H02N

ELECTRIC MACHINES NOT OTHERWISE PROVIDED FOR

Definition statement

This subclass/group covers:

Electrostatic generators, motors, clutches, or holding devices;

Other non-dynamo-electric generators or motors;

Holding or levitation devices using magnetic attraction or repulsion;

Arrangements for starting, regulating, braking, or otherwise controlling such machines unless in conjoint operation with a second machine.

References relevant to classification in this subclass

This subclass/group does not cover:

Dynamo-electric machines	H02K
Pumps	F04D
Loudspeakers and microphones	H04R

H02N 1/00

Electrostatic generators or motors using a solid moving electrostatic charge carrier

H02N 1/002

[N: Electrostatic motors]

References relevant to classification in this group

This subclass/group does not cover:

Switches making use of micromechanics	H01H 1/0036
Electrostatic relays; Electro-adhesion relays	H01H 59/00
Making use of micromechanics	H01H 59/0009

Informative references

Attention is drawn to the following places, which may be of interest for search:

Reflecting element being a micromechanical device and being moved or deformed by electrostatic means	G02B 26/0841

Special rules of classification within this group

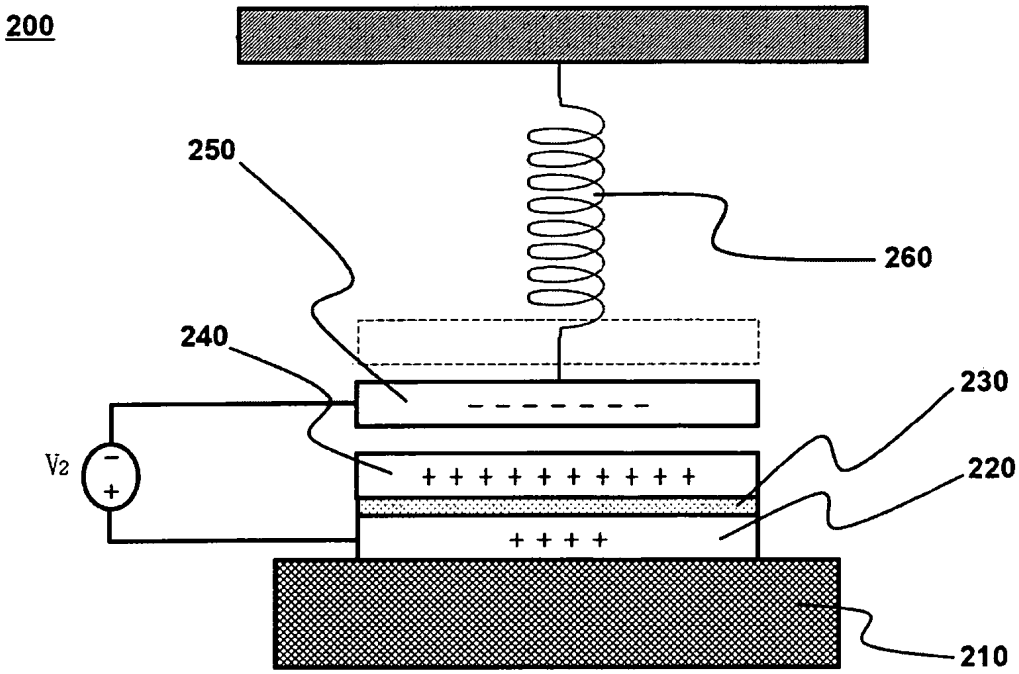
Electroactive polymers: see rules of classification in H02N 1/006

H02N 1/006

[N: of the gap-closing type (H02N1/004 takes precedence)]

Definition statement

This subclass/group covers:
electrostatic actuators:



References relevant to classification in this group

This subclass/group does not cover:

Electrostatic motors, in which a body is moved along a path due to interaction with an electric field travelling along the path	H02N 1/004

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electro-chemical actuators; Actuators having a material for absorbing or desorbing gas, e.g. a metalhydride; Actuators using the difference in osmotic pressure between fluids; Actuators with elements stretchable when contacted with liquid rich in ions, with UV light, with a salt solution	F03G 7/005

Special rules of classification within this group

The electroactive polymers (EAPs) are of three types:

1) The EAPs based on some electrochemical effect inside the polymer (e.g. or i.e. ionic EAPs). Electric machines with the same are classified in F03G 7/00.

2/3) The EAPs based on electrostrictive, or electrostatic (or a combination of electrostrictive and electrostatic) effects. Electric machines based on electrostrictive / electrostatic EAPs are classified in H02N 2/00.

H02N 1/008

[N: Laterally driven motors, e.g. of the comb-drive type]

Definition statement

This subclass/group covers:

Comb shaped motors the direction of movement is parallel to the extension direction of the comb teeth, among others

References relevant to classification in this group

This subclass/group does not cover:

Details of micro-electro-mechanical resonators	H03H 9/02244

Constructional features of micro-electro-mechanical resonators of material which is not piezo-electric, electrostrictive, or magnetostrictive	H03H 9/2405

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of micro-electro-mechanical resonators	H03H 9/02244

Special rules of classification in this group

Comb shaped motors with oscillating movement are classified in H02N 1/006

H02N 1/08

with conductive charge carrier, i.e. capacitor machines

Definition statement

This subclass/group covers:

Including conveyor belt carrying conductive charge carriers charged by induction, i.e. like capacitors.

References relevant to classification in this group

This subclass/group does not cover:

Machines of the corona charging type in which an (usually) insulating belt is charged by charges generated by corona effect	H02N 1/12

Special rules of classification within this group

Influence type generators built as a conveyor belt can be of two types (according to the way the belt is charged): induction charging type and corona charging type.

The corona charging type usually comprises an insulating belt charged by charges generated by corona effect. This type of machine is classified in

H02N 1/12 (even if the belt comprises some conductive element)

The induction charging type are a conveyor belt version (i.e. a linear version) of capacitor machines in which conductive charge carriers are charged by induction (i.e. like capacitors). This type of machine is classified in H02N 1/08.

H02N 1/12

in the form of a conveyer belt, e.g. van de Graaff machine

Definition statement

This subclass/group covers:

Machines of the corona charging type in which an (usually) insulating belt is charged by charges generated by corona effect. (if the belt contains some conductive element see Special Rules of Classification).

References relevant to classification in this group

This subclass/group does not cover:

Machines of the induction charging type i.e. in which the belt carries conductive charge carriers charged by induction	H02N 1/08

Special rules of classification within this group

Influence type generators built as a conveyor belt can be of two types (according to the way the belt is charged): induction charging type and corona charging type.

The corona charging type usually comprises an insulating belt charged by charges generated by corona effect. This type of machine is classified in H02N 1/12 (even if the belt comprise some conductive element)

The induction charging type are a conveyor belt version (i.e. a linear version) of capacitor machines in which conductive charge carriers are charged by induction (i.e. like capacitors). This type of machine is classified in H02N 1/08.

H02N 2/00

Electric machines in general using piezo-electric effect, electrostriction or magnetostriction

Definition statement

This subclass/group covers:

Electric motors or generators using piezo-electric (PE) or magnetostriction (MS) devices described under H01L 41/00 as primary motion producing or electricity generating parts. In particular:

Linear or rotary motors, including positioners or actuators, based on at least one PE or MS device in cooperation with at least one driven element as mechanical output, e.g. a rotor or translating shaft. The motors can operate based on standing or travelling waves or quasi-static deformation generated by said PE or MS devices;

Generators based on at least one PE or MS device in cooperation with at least one driving element as mechanical input;

Aspects such as the operating principle, mechanical construction built around said PE or MS devices, driving or control circuits or methods, and methods relating to manufacturing of the engines.

Further information:

In this group the PE or MS devices are seen as black boxes which could in principle be replaced by any device of equal electromechanical conversion functionality.

If no relevant details of the PE or MS devices themselves are given classification is done only in this group. If particular details of the PE or MS devices are concerned, e.g. these devices appear to be relevant to other technical fields as well, classification in H01L 41/00 is required. If no details other than the PE or MS devices themselves are described, e.g. PE stacks or benders are just called actuators or generators, classification is done only in H01L 41/00.

References relevant to classification in this group

This subclass/group does not cover:

Examples of places where the subject matter of this group is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Mechanical vibration generators	B06B 1/06
Adjustable work or tool supports in machining tools, e.g. motorised platforms	B23Q 1/34
Hair clippers; Shavers	B26B 19/28
Typewriters	B41J 2/295

PE generators - in tyre sensors- in spark lighters - in firing or trigger mechanisms of weapons - for measurement devices- in photographic flash ignition	B60C 23/0411, F23Q 2/287, F23Q 3/002, F41A 19/62, G01, G03B 15/0463,
Fuel injection in combustion engines - Control circuits or methods for injectors - Injectors- Injection valves	F02D 41/2096, F02M 51/0603, F02M 59/468, F02M 63/0026,
Pumps - Diaphragm type micropumps - Tube type- Oscillatory type, e.g. fans	F04B 17/003, F04B 43/046, F04B 43/095, F04D 33/00,
Brakes	F16D 65/14D6F F16D 65/14P14H
Adjustable optical elements, e.g. motorised lenses or objectives	G02B 7/02 - G02B 7/10

Informative references

Attention is drawn to the following places, which may be of interest for search:

Liquid wave driven, e.g. ocean powered, generators	F03B 13/14
Oscillatory wind driven generators	F03D 5/06
PE or MS devices in general, e.g. PE stacks or benders; Structural details and fabrication thereof	H01L 41/00
Oscillatory dynamo-electric generators	H02K 35/00
Electrostatic motors or generators	H02N 1/00
Motors using thermal drive effects	H02N 10/00
Motors or generators not provided for elsewhere; Alleged electric or magnetic perpetua mobilia	H02N 11/00

Special rules of classification within this group

In this group, in the absence of an indication to the contrary, an invention is classified in the last appropriate place.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Motor	Apparatus producing mechanical motion from electrical energy, the motion may be continuous or in separate strokes ;The term includes thus actuators or positioners, wherein the driven element is movable along a certain linear or angular stroke (limited stroke motors)
Ultrasonic motor	PE or MS motor operating in ultrasonic frequency range
perpetua mobilia	latin expression for devices having perpetual motion

Synonyms and Keywords

BAW	Bulk acoustic wave
EAP	Electroactive polymer
MEMS	Microelectromechanical system
MS	Magnetostrictive
PE	Piezoelectric or electrostrictive
PEG	Piezoelectric generator
SAW	Surface acoustic wave
USM	Ultrasonic motor
Travelling wave motorVibration wave motor	PE or MS motor

H02N 2/0005

producing non-specific motion; Details common to machines covered by H02N2/02 to H02N2/16

Definition statement

This subclass/group covers:

Motors wherein the type of motion is irrelevant, e.g. driving devices which may be used to advance a driven body in arbitrary directions, and details thereof.

Details of linear or rotary motors covered by H02N 2/02 to H02N 2/16 wherein the type of motion is irrelevant, e.g. of mechanical, electrical or thermal nature, such as friction interfaces between driving and driven parts.

References relevant to classification in this group

This subclass/group does not cover:

Details of linear or rotary motors wherein the type of motion is relevant	H02N 2/02 - H02N 2/16

Informative references

Attention is drawn to the following places, which may be of interest for search:

Casings for dynamo-electric machines	H02K 5/00
Springs in general	F16F 1/00
Friction linings	F16D 69/00

H02N 2/023

Inchworm motors

Definition statement

This subclass/group covers:

Linear motors comprising at least two clamping devices and one intermediate driving device which are excited in sequence to grip and move a driven body.

H02N 2/025

Inertial sliding motors

Definition statement

This subclass/group covers:

Linear motors comprising a driving device which is excited asymmetrically during multiple phases such that in one phase the static friction between a driven body and its support is overcome, thereby effecting a sliding motion between them.

H02N 2/026

by pressing one or more vibrators against the driven body

Definition statement

This subclass/group covers:

Linear motors wherein a driven body, e.g. a translating rail, is moved by vibrations of one or more vibrators pressed against the driven body.

References relevant to classification in this group

This subclass/group does not cover:

Details of the vibrator	H02N 2/0005

H02N 2/08

using travelling waves

Definition statement

This subclass/group covers:

Linear motors wherein a driven body is moved by Rayleigh type surface acoustic waves only.

H02N 2/103

by pressing one or more vibrators against the rotor

Definition statement

This subclass/group covers:

Rotary motors wherein a rotor is moved by vibrations of one or more vibrators

pressed against the rotor.

References relevant to classification in this group

This subclass/group does not cover:

Details of the vibrator	H02N 2/0005

H02N 2/105

Cycloid or wobble motors; Harmonic traction motors

Definition statement

This subclass/group covers:

Rotary motors wherein a cycloid type motion of a rotor is caused by radial or tangential driving devices excited in different phases.

H02N 2/106

Langevin motors

Definition statement

This subclass/group covers:

Rotary motors wherein a substantially rod-shaped vibrator excited to axial vibrations, e.g. a longitudinal mode, combined with lateral vibrations, e.g. a bending or torsion mode, creates a hula-hoop like progressive wave on its surface, thereby driving a rotor.

H02N 2/16

using travelling waves

Definition statement

This subclass/group covers:

Rotary motors wherein a rotor is moved by Rayleigh type surface acoustic waves only.

H02N 3/00

Generators in which thermal or kinetic energy is converted into electrical energy by ionisation of a fluid and removal of the charge therefrom (discharge tubes functioning as

thermionic generators H01J45/00)

Definition statement

This subclass/group covers:

Generators based on the collection of free electrical charges in the flow. e.g. inonized gas in a thermal engine exhaust.

References relevant to classification in this group

This subclass/group does not cover:

Discharge tubes functioning as thermionic generators	H01J 45/00
Use of naturally-occurring electricity, e.g. lightning or static electricity	H05F 7/00

H02N 6/00

Generators in which light radiation is directly converted into electrical energy (solar cells or assemblies thereof H01L25/00, H01L31/00)

References relevant to classification in this group

This subclass/group does not cover:

Solar cells or assemblies thereof	H01L 25/00, H01L 31/00
Generation of electric power by conversion of infra-red radiation, visible light or ultraviolet light, e.g. using photovoltaic [PV] modules	H02S

H02N 10/00

Electric motors using thermal effects [N: (motors using expansion or contraction of bodies due to heating or cooling F03G7/06)]

Definition statement

This subclass/group covers:

This group covers :

Devices working around the Curie point.

References relevant to classification in this group

This subclass/group does not cover:

Thermomagnetic generators, e.g. ;using Nernst-Ettinghausen effect (plurality of solid state components formed in or on a common substrate)	H01L 37/00
Using thermal change of magnetic permeability, e.g. working above and below the Curie point	H01L 37/04
Radiation pyrometers	G01J 5/34
Thermometers using thermo-electric or thermomagnetic elements	G01K 7/00
Selection of materials for magnetography, e.g. for Curie-point writing	G03G 5/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Mechanical-power-producing mechanisms using a shape memory alloy	F03G 7/065

H02N 11/00

Generators or motors not provided for elsewhere; Alleged perpetua mobilia obtained by electric or magnetic means (by hydrostatic pressure F03B17/04; [N: by mechanical means F03G7/10;] by dynamo-electric means, [N: including arrangements of permanent magnets interacting with other permanent magnets,] H02K53/00)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Alleged perpetua mobilia obtained by hydrostatic pressure	F03B 17/04
Alleged perpetua mobilia obtained by mechanical means	F03G 7/10
Alleged perpetua mobilia obtained by dynamo-electric means, including arrangements of permanent magnets interacting with other permanent magnets	H02K 53/00

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

perpetua mobilia	latin expression for devices having perpetual motion

H02N 11/002

[N: Generators]

References relevant to classification in this group

This subclass/group does not cover:

This group does not cover

Thermomagnetic generators, e.g. using Nernst-Ettinghausen effect (plurality of solid state components formed in or on a common substrate)	H01L 37/00
Using thermal change of magnetic permeability, e.g. working above and below the Curie point	H01L 37/04
Radiation pyrometers	G01J 5/34
Thermometers using thermo-electric or thermomagnetic elements	G01K 7/00
Selection of materials for	G03G 5/00

magnetography, e.g. for Curie-point writing	
Electrochemical current or voltage generators	H02M 6/00 - H01M 14/00
Thermoelectric generators comprising a junction of dissimilar materials, i.e. exhibiting Seebeeck or Peltier effect with or without other thermo-electric effects or thermomagnetic effects	H01L 35/00

H02N 11/006

[N: Motors]

References relevant to classification in this group

This subclass/group does not cover:

Electro-chemical actuators; Actuators having a material for absorbing or desorbing gas, e.g. a metalhydride; Actuators using the difference in osmotic pressure between fluids; Actuators with elements stretchable when contacted with liquid rich in ions, with UV light, with a salt solution	F03G 7/005

Special rules of classification within this group

Electroactive polymers: see rules of classification in H02N 1/006

H02N 11/008

[N: Alleged electric or magnetic perpetua mobilia]

References relevant to classification in this group

This subclass/group does not cover:

Perpetua mobilia obtained by the reciprocal attraction / repulsion of a system of magnets arranged as the coils and or the magnets of the normal electrodynamic machines,	H02K 53/00

including systems comprising only permanent magnets	

H02N 13/00

Clutches or holding devices using electrostatic attraction, e.g. using Johnson-Rahbek effect

Informative references

Attention is drawn to the following places, which may be of interest for search:

Supporting structures for apparatus specially adapted for handling semiconductors using electrostatic chucks	H01L 21/368C

H02N 15/00

Holding or levitation devices using magnetic attraction or repulsion, not otherwise provided for (electric or magnetic devices for holding work on machine tools B23Q3/15; [N: monorail vehicle propulsion or suspension B60L13/00]; sliding or levitation devices for railway systems B61B13/08; material handling devices associated with conveyers incorporating devices with electrostatic or magnetic grippers B65G47/92; separating thin or filamentary articles from piles using magnetic force B65H3/16; delivering thin or filamentary articles from magnetic holders by air blast or suction B65H29/24; bearings using magnetic or electric supporting means F16C32/04; relieving bearing loads using magnetic means F16C39/06; magnets H01F7/00; dynamo-electric clutches or brakes H02K49/00; [N: electric furnaces with simultaneous levitation and heating H05B6/32])

Informative references

Attention is drawn to the following places, which may be of interest for search:

Electric or magnetic devices for holding work on machine tools	B23Q 3/15
Monorail vehicle propulsion or suspension	B60L 13/00

Sliding or levitation devices for railway systems	B61B 13/08
Material handling devices associated with conveyers incorporating devices with electrostatic or magnetic grippers	B65G 47/92
Separating thin or filamentary articles from piles using magnetic force	B65H 3/16
Delivering thin or filamentary articles from magnetic holders by air blast or suction	B65H 29/24
Bearings using magnetic or electric supporting means	F16C 32/04
Relieving bearing loads using magnetic means	F16C 39/06
Magnets	H01F 7/00
Apparatus specially adapted for handling semiconductor using electrostatic chucks	H01L 21/6831
Details of electrostatic chucks	H01L 21/6833
Dynamo-electric clutches or brakes	H02K 49/00
Electric furnaces with simultaneous levitation and heating	H05B 6/32

H02N 15/04

Repulsion by the Meissner effect (superconductors or hyperconductors in general H01L39/00)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Superconductors or hyperconductors in general	H01L 39/00

H02N 99/00

Subject matter not provided for in other groups of this subclass