F16F

SPRINGS; SHOCK-ABSORBERS; MEANS FOR DAMPING VIBRATION

Definition statement

This place covers:

Springs, shock-absorbers or vibration-dampers;

Their arrangement in, or adaptation for, particular apparatus if not provided for in the subclasses covering said apparatus.

References

Application-oriented references

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

Spring mattresses	A47C 23/00 - A47C 27/00
Springs or shock-absorbers for protheses	A61F 2/00
Vibration dampers in skis	A63C 5/075
Vehicle suspensions	B60G
Mounting of bumpers on vehicles	B60R 19/24
Rail vehicle suspensions	B61F
Buffers for railway or tramway vehicles	B61G 11/00
Vehicle chassis frames having impact absorbing means	B62D 21/15
Resiliently mounted saddles on cycles	B62J 1/02
Steering dampers	B62K 21/08
Anti-vibration mounting of marine propulsion plant in ships	B63H 21/30
Arrangement of shock-absorbers or springs in aeroplane alighting gear	B64C 25/58
Containers, packing elements or packages with shock-absorbing means	B65D 81/02
Resilient mountings in washing machines	D06F 37/20
Resilient mountings in domestic spin-dryers	D06F 49/06
Protection of buildings against vibrations or shocks	E04B 1/98
Braking devices with springs structurally combined with hinges	E05D 7/086
Spring motors	F03G 1/00
Pipe or cable supports	F16L 3/20
Resilient mounting of lighting devices	F21V 15/04
Gun cradles to permit recoil	F41A 25/00
Vibration dampers for archery bows	F41B 5/1426
Weighing apparatus, e.g. arrangement of shock-absorbers in weighing apparatus	G01G 21/10
Springs for clocks or watches	G04B
Damping of movements in instruments	G12B 3/08
Disposition of shock-absorbing devices for displaceable control elements in nuclear reactors	G21C 7/20

Arrangements or devices for damping mechanical oscillations of power lines	H02G 7/14

Informative references

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

Indicating or recording in connection with measuring	G01D 11/10

Special rules of classification

For the whole F16F range, consider the indexing range F16F 2222/00 - F16F 2238/045

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Steel or metal	Mention of “steel” or “metal” in groups F16F, unless specific mention is made otherwise, should be seen in the light of the title of group F16F 1/00, i.e. material having low internal friction. This normally includes composite materials such as fibre-reinforced plastics.
Rubber or plastics	Mention of “rubber” or “plastics” in group F16F, unless specific mention is made otherwise, should be seen in the light of the title of group F16F 1/36, i.e. material having high internal friction. This normally does NOT include composite materials such as fibre-reinforced plastics except in the case of groups F16F 1/366 - F16F 1/3686 and F16F 15/305.

F16F 1/00

Springs (working with fluid F16F 5/00, F16F 9/00)

Definition statement

This place covers:

Springs and spring elements made of elastic material

References

Limiting references

This place does not cover:

Springs working with fluid	F16F 5/00, F16F 9/00

F16F 3/00

Spring units consisting of several springs, e.g. for obtaining a desired spring characteristic ({F16F 1/32, F16F 1/34, F16F 7/14 take precedence } ; if including fluid springs F16F 5/00, F16F 13/00)

Definition statement

This place covers:

Spring units comprising several springs made of elastic material, e.g. springs which are superposed upon each other or springs arranged in parallel

References

Limiting references

This place does not cover:

Springs working with fluid or including fluid spring	F16F 5/00, F16F 9/00, F16F 13/00

F16F 5/00

Liquid springs in which the liquid works as a spring by compression, e.g. combined with throttling action; Combinations of devices including liquid springs {(dampers with solid or semi-solid material F16F 9/30)}

Definition statement

This place covers:

Spring devices in which the compressibility of the liquid (specifically not a gas) is a key feature

References

Limiting references

This place does not cover:

Dampers with solid or semi solid material	F16F 9/30

F16F 6/00

Magnetic springs{(magnetic spring arrangements for the suppression of vibration in systems F16F 15/03)}; Fluid magnetic springs{, i.e. magnetic spring combined with a fluid}

Definition statement

This place covers:

Spring device in which the spring effect is given by magnetic attraction or repulsion; the device may work with permanent magnets or electromagnets

References

Limiting references

This place does not cover:

Magnetic spring arrangements for the suppression of vibration in systems	F16F 15/03

F16F 7/00

Vibration-dampers; Shock-absorbers (using fluid F16F 5/00, F16F 9/00; specific for rotary systems F16F 15/10{; belt tensioners F16H 7/12})

Definition statement

This place covers:

- One shot absorbers
- Vibration dampers using friction between particles
- Vibration dampers using friction between surfaces
- Vibration dampers using inertia effect
- Vibration dampers or shock absorbers using plastic deformation
- Vibration dampers of cable support type

References

Limiting references

This place does not cover:

Vibration dampers using fluid	F16F 5/00, F16F 9/00
Vibration dampers specific for rotary systems	F16F 15/10

F16F 9/00

Springs, vibration-dampers, shock-absorbers, or similarly-constructed movement-dampers using a fluid or the equivalent as damping medium (F16F 5/00 takes precedence; connection of valves to inflatable elastic bodies B60C 29/00; {braking devices, stops or buffers for wing-operating appliances E05F 3/00, E05F 5/00})

Definition statement

This place covers:

Movement-dampers using a fluid (i.e.: compressible or incompressible) as damping medium

Some examples:

- gas springs,
- hydraulic shock absorbers using liquid only, the damping effect being achieved by throttling or viscous shear
- hydraulic shock absorbers using liquid and gas in combination

References

Limiting references

This place does not cover:

Using liquid springs	F16F 5/00
Connection of valves to inflatable elastic bodies	B60C 29/00
Braking devices, stops or buffers for wing-operating appliances	E05F 3/00, E05F 5/00

F16F 13/00

Units comprising springs of the non-fluid type as well as vibration-dampers, shock-absorbers, or fluid springs (F16F 5/00, {F16F 6/00, F16F 9/003} take precedence)

Definition statement

This place covers:

Devices comprising a combination of a plastic springs (e.g. elastomeric springs) and dampers using friction or fluid

References

Limiting references

This place does not cover:

Using liquid springs	F16F 5/00
Unit comprising a magnetic spring	F16F 6/00
Device comprising a sponge rubber as pressure absorbing means	F16F 9/003

F16F 15/00

Suppression of vibrations in systems ({damping of non-rotary systems using inertia effect F16F 7/10; prevention or isolation of vibrations in machine tools B23Q 11/0032; suppression of driveline vibrations in hybrid vehicle transmissions B60W 30/20} ; vehicle seat suspension devices B60N 2/50; {methods or devices for protecting against, or damping of, acoustic waves, e.g. sound G10K 11/16}); Means or arrangements for avoiding or reducing out-of-balance forces, e.g. due to motion ({vibration absorbing or balancing means for aircraft propellers B64C 11/008, for rotorcraft rotors B64C 27/001} ; testing static and dynamic balance of machines or structures G01M 1/00)

Definition statement

This place covers:

Suppression of vibrations in rotating as well non rotating systems; and means or arrangements for avoiding or reducing out-of-balance forces; some examples:

- Systems characterised by the control method or their control circuitry
- Systems using electro- or magnetostrictive actuation means
- Suppression of vibrations of non-rotating, e.g. reciprocating systems

- Suppression of vibrations of rotating systems by use of members not moving with the rotating systems
- Suppression of vibrations in rotating systems by making use of members moving with the system
- Suppression of vibrations of rotating systems by favourable grouping or relative arrangements of the moving members of the system or systems
- Compensation of inertia forces
- Additional weights counterbalancing inertia forces induced by the reciprocating movement of masses in the system
- Flywheels

References

Limiting references

This place does not cover:

Damping of non-rotary systems using inertia effect	F16F 7/10
Prevention or isolation of vibrations in machine tools	B23Q 11/0032
Vehicle seat suspension devices	B60N 2/50
Absorbing or balancing means for aircraft propellers	B64C 11/008
Absorbing or balancing means for rotorcraft rotors	B64C 27/001
Methods or devices for protecting against, or damping of, acoustic waves, e.g. sound	G10K 11/16

Informative references

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

Testing static and dynamic balance of machines or structures	G01M 1/00