CPC COOPERATIVE PATENT CLASSIFICATION

F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING
(NOTE omitted)

ENGINEERING IN GENERAL

F16 ENGINEERING ELEMENTS AND UNITS; GENERAL MEASURES FOR PRODUCING AND MAINTAINING EFFECTIVE FUNCTIONING OF MACHINES OR INSTALLATIONS; THERMAL INSULATION IN GENERAL

F16J PISTONS {{specially adapted for dampers F16F 9/32}}; CYLINDERS; SEALINGS

NOTE

Attention is drawn to the following places:

A47J 27/08 Pressure cookers
E04B 1/08 Sealing building joints
E05C 9/00 Multi-point fastening of wings in general
F01B Machines or engines in general or of reciprocating type, e.g. cylinders peculiar to steam engines
F01B 31/28 Cylinders for combustion engines
F02F 1/00 Pistons for combustion engines
F04D 29/08 Sealings of non-positive displacement pumps
F17B 1/04 Sealing devices for sliding parts of gas holders of variable capacity
F28F 9/04 Arrangements for sealing elements into header boxes or end plates of heat-exchangers.

WARNINGS

1. The following IPC groups are not in the CPC scheme. The subject matter for these IPC groups is classified in the following CPC groups:
   - F16J 15/53 covered by F16J 15/43

2. 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 Pistons; Trunk pistons; Plungers {{bellows pistons F16J 3/06; piston-rings or seats therefor F16J 9/00; [manufacture of pistons B23P 15/10]; rotary pistons, e.g. for "Wankel" type engines F01C; specific for combustion engines, i.e. constructed to withstand high temperature or modified for guiding, igniting, vaporising or otherwise treating the charge F02E; [pistons for hydraulic engines F03C]; pumps F04B; floats F16K 33/00}}

1/01 . {One-piece pistons}
1/02 . Bearing surfaces
1/03 . {with integral sealing lips}
1/04 . {obtained by assembling several pieces}
1/05 . {of different materials}
1/06 . {with sealing lips}
1/07 . characterised by the use of particular materials (F16J 1/02 takes precedence)
1/08 . Constructional features providing for lubrication
1/09 . {resilient guiding parts, e.g. skirts, particularly for trunk pistons}
1/10 . {with separate expansion members; Expansion members}
1/11 . {constructed for guiding fluids (F16J 1/08 takes precedence)}
1/12 . {with piston-rods, e.g. rigid connections}
1/11 . {constructed for guiding fluids (F16J 1/08 takes precedence)}
1/14 . {with connecting-rod, i.e. pivotal connections}
1/16 . {with gudgeon-pin; Gudgeon-pins}
1/18 . . . Securing of gudgeon-pins
1/20 . . . with rolling contact, other than in ball or roller bearings
1/22 . . . with universal joint, e.g. ball-joint
1/24 . . . designed to give the piston some rotary movement about its axis

3/00 Diaphragms; Bellows; Bellows pistons {connection of valves to inflatable elastic bodies B66C 29/00; bellows or the like used in instruments G12B 1/04; diaphragms for electromechanical transducers H04R 7/00}

3/02 . Diaphragms
3/04 . Bellows
3/041 . {Non-metallic bellows}
3/042 . {Fastening details}
3/043 . {with particular means for limiting wear}
3/045 . {Split bellows}
3/046 . {Lubrication or venting arrangements}
3/047 . {Metallic bellows}
3/048 . {with guiding or supporting means}
3/06 . Bellows pistons
7/00 Piston-rods
Piston-rings, e.g. non-metallic piston-rings, seats therefor; Ring sealings of similar construction (other sealings between pistons and cylinders F16J 3/06, F16J 15/16; manufacture of piston-rings B23P 15/06, B23P 15/08); tools for mounting or removing piston-rings or the like B25B; piston sealing arrangements on brake master cylinders B60T 11/236 (sealing provided on pump pistons F04B 53/143))

L-section rings
Helical rings
using separate springs or elastic elements expanding the rings; Springs therefor [Expansion by wedging]
using metallic coiled or blade springs (F16J 9/145 takes precedence)
Coiled spring along the entire circumference
Strip or wire along the entire circumference
Rings with a flat annular side rail
Spring expander with massive cross-section
Spring expander from sheet metal
corrugated in the radial direction
corrugated in the axial direction
with a "C"-shaped cross section along the entire circumference
with expansion obtained by pressure of the medium
Special members for adjusting the rings
Details
Joint-closures
of spring expanders
obtained by stacking of rings
with separate bridge-elements
Rings with special cross-section (L-section rings F16J 9/02); Oil-scraping rings (F16J 9/06 takes precedence)

Oil-scraping rings

WARNING
The group F16J 9/203 is no longer used for the classification of new documents from August 1st, 2002. The backlog of this group is being continuously reclassified to F16J 9/206, and to F16J 9/06 and subgroups

One-piece oil-scraping rings
Rings for preventing wear of grooves or like sealings
Members preventing rotation of rings in grooves
characterised by the use of particular materials
of non-metals

Engine or like cylinders (pressure vessels in general F16J 12/00; cylinders for engines or other apparatus of particular kinds, see the appropriate subclasses, e.g. for combustion engines F02D; Features of hollow, e.g. cylindrical, bodies in general
Cylinders designed to receive moving pistons or plungers
Running faces; Liners

Pressure vessels in general (covers therefor F16J 13/00; for particular applications, see the relevant subclasses, e.g. B01J, F17C, G21C)

13/00 Covers or similar closure members for pressure vessels in general (for engines or like cylinders F16J 10/00; sealings F16J 15/02; covers for box-like containers B65D 43/00; devices for securing or retaining closure members B65D 45/00; closures for containers not otherwise provided for B65D 51/00; manholes, covers for large containers B65D 90/10; gates or closures for large containers B65D 90/54; for vessels for containing or storing compressed, liquefied or solidified gases F17C 13/06; steam boilers F23B)
Detachable closure members; Means for tightening closures (F16J 13/16, F16J 13/22 take precedence)
attached with a bridge member
attached only by clamps along the circumference
the clamp comprising a ring encircling the flange
attached by one or more members actuated to project behind a part or parts of the frame (similar constructions for doors or windows B05C 9/00)
attached by means of a divided ring
attached by wedging action by means of screw-thread, interrupted screw-thread, bayonet closure, or the like
attached exclusively by spring action or elastic action
Pivoted closures (F16J 13/22 takes precedence)
pivoted directly on the frame
mounted by mobile fastening on swinging arms
with movement parallel to the plane of the opening
with safety devices, e.g. to prevent opening prior to pressure release

Sealings

comprising at least two sealings in succession (F16J 15/162, F16J 15/40 take precedence)
(forming of recuperation chamber for the leaking fluid (F16J 15/44 takes precedence)
(with division of the pressure (F16J 15/44 takes precedence)
(with provision to put out of action at least one sealing; One sealing sealing only on standstill; Emergency or servicing sealings (F16J 15/164 takes precedence)

between relatively-stationary surfaces (F16J 15/46, F16J 15/48 take precedence)
with elastic packing (F16J 15/08 takes precedence)
characterised by structure or material
characterised by the geometry of the seat
(with positioning means (F16J 15/0831 takes precedence)
(characterised by the geometry of the seat
(characterised by the sealing function with other functions)
construction F16J 9/00

F16J 3/06

F16J 15/52

; piston-rings or ring sealings of similar

{ which permits material to be continuously

packing }

{ with means to prevent the extrusion of the

pressure difference, temperature or presence of

the sealing action depending on movements; F16J 15/3404

or cooling of the sealing itself ( F16J 15/324,

}, F16J 15/40 { Special parts or details relating to lubrication

by means of granular or plastic material, or fluid

with additional static sealing between the

surfaces }

with metal coverings e.g. O-rings

with stuffing-boxes for rigid sealing rings

with sealing rings made of metal

with sealing rings made of carbon

with elastic sealings, e.g. O-rings

with at least one lip

provided with tension elements, e.g. elastic

rings

with metal springs

supported in a direction parallel to the

surfaces

supported in a direction perpendicular to the

surfaces

capable of accommodating changes in
distances or misalignment between the

surfaces, e.g. able to compensate for defaults

of eccentricity or angular deviations

formed by deforming a flat ring

having two or more lips

with at least one lip for each surface, e.g.

U-cup packings

Arrangements for lubrication or cooling of the

sealing itself

with hydrodynamic pumping action

provided with casings or supports

with rigid casings or supports

comprising two casing or support

elements, one attached to each surface, e.g.

cartridge or cassette seals

with means for detecting or measuring

relative rotation of the two elements

the elements being separable from each

other

Mounting of sealing rings

the rings having a break or opening, e.g. to

enable mounting on a shaft otherwise than

from a shaft end

with additional static sealing between the

sealing, or its casing or support, and the

surface on which it is mounted

Self-aligning stuffing-boxes

[Split assemblies]

[Means for facilitating the removal of the

packing]

Packaging materials therefor

shaped as strands, ropes, threads, ribbons, or

the like

with radially or tangentially compressed

packing

with stuffing-boxes for rigid sealing rings

with sealing rings made of metal

with sealing rings made of carbon

with elastic sealings, e.g. O-rings

with at least one lip

provided with tension elements, e.g. elastic

rings

with metal springs

supported in a direction parallel to the

surfaces

supported in a direction perpendicular to the

surfaces

capable of accommodating changes in
distances or misalignment between the

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the rings having a break or opening, e.g. to

enable mounting on a shaft otherwise than

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with additional static sealing between the

sealing, or its casing or support, and the

surface on which it is mounted

Manufacturing methods specially adapted for

elastic sealings ( moulding B29C)

characterised by their structure; Selection of
elastic sealings ( moulding B29C)

Manufacturing methods specially adapted for

elastic sealings ( moulding B29C)

characterised by their structure; Selection of

materials

Filamentary structures, e.g. brush seals

Lamellar structures

[using a lantern ring]

[Tightening mechanisms]

[with continuous adjustment of the

compression of the packing]

[using springs]

{ Self-aligning stuffing-boxes}

{ Split assemblies}

{ Means for facilitating the removal of the

packing}

Packaging materials therefor

shaped as strands, ropes, threads, ribbons, or

the like

with radially or tangentially compressed

packing

with stuffing-boxes for rigid sealing rings

with sealing rings made of metal

with sealing rings made of carbon

with elastic sealings, e.g. O-rings

with at least one lip

provided with tension elements, e.g. elastic

rings

with metal springs

supported in a direction parallel to the

surfaces

supported in a direction perpendicular to the

surfaces

capable of accommodating changes in
distances or misalignment between the

surfaces, e.g. able to compensate for defaults

of eccentricity or angular deviations

formed by deforming a flat ring

having two or more lips

with at least one lip for each surface, e.g.

U-cup packings

Arrangements for lubrication or cooling of the

sealing itself

with hydrodynamic pumping action

provided with casings or supports

with rigid casings or supports

comprising two casing or support

elements, one attached to each surface, e.g.

cartridge or cassette seals

with means for detecting or measuring

relative rotation of the two elements

the elements being separable from each

other

Mounting of sealing rings

the rings having a break or opening, e.g. to

enable mounting on a shaft otherwise than

from a shaft end

with additional static sealing between the

sealing, or its casing or support, and the

surface on which it is mounted

Manufacturing methods specially adapted for

elastic sealings ( moulding B29C)

characterised by their structure; Selection of

materials

Filamentary structures, e.g. brush seals

Lamellar structures

[fire resistant]

[Split packings]

[the packing swelling under working

conditions]

with exclusively metal packing

[characterised by material or surface

treatment]

[with a braided or knitted body]

[Flat gaskets]

[laminated]

{ with mounting aids

[with an edge portion folded over a second

plate or shim]

[with an edge portion folded over the plate

itself]

(without fold over]

[with a non-metallic coating or strip]

[with a bore ring]

{ Aspects not related to the edges of the

gasket}

[comprising welds]

[the sealing effect being obtained by plastic

deforation of the packing]

[the sealing effect being obtained by elastic
deforation of the packing]

[the packing having a hollow profile]

[with non-metallic packing]

[characterised by material]

[characterised by structure]

[homogeneous]

[Special methods for making a non-metallic

packing]

[with metal reinforcement]

[generally parallel to the surfaces]

[Details relating to the edges of the

packing]

[generally perpendicular to the

surfaces]

[consisting of additions, e.g. metallic

fibres, metallic powders, randomly

dispersed in the packing]

[the reinforcement being a compression

stopper]

[with metal covering]

by means of granular or plastic material, or fluid

between relatively-moving surfaces (F16J 15/50,

F16J 15/52 take precedence; bellows pistons

F16J 3/06; piston-rings or ring sealings of similar

construction F16J 9/00)

{ Special parts or details relating to lubrication

or cooling of the sealing itself (F16J 15/324,

F16J 15/3404, F16J 15/40 take precedence)

{ the sealing action depending on movements;

pressure difference, temperature or presence of

leaking fluid}

{ with means to prevent the extrusion of the

packing}

{ which permits material to be continuously

conveyed}

with stuffing-boxes for elastic or plastic packings

{ for plastic packings}

{ with lubricating, cooling or draining means}
Arrangements for monitoring the condition or operation of elastic sealings (F16J 15/326 takes precedence); Arrangements for control of elastic sealings, e.g. of their geometry or stiffness

15/34 . . . with slip-ring pressed against a more or less radial face on one member

15/3404 . . . [and characterised by parts or details relating to lubrication, cooling or venting of the seal]

15/3408 . . . [at least one ring having an uneven slipping surface]

15/3412 . . . {with cavities (F16J 15/3424 takes precedence)}

15/3416 . . . {with at least one continuous groove}

15/342 . . . . . {with means for feeding fluid directly to the face}

15/3424 . . . . {with microcavities}

15/3432 . . . . . [the geometry of the surface being able to vary during operation]

15/3436 . . . {Pressing means}

15/344 . . . . . [the pressing force being applied by means of an elastic ring supporting the slip-ring]

15/3444 . . . . . [by magnetic attraction]

15/3448 . . . . . [the pressing force resulting from fluid pressure]

15/3452 . . . . . [the pressing force resulting from the action of a spring]

15/3456 . . . . . [without external means for pressing the ring against the face, e.g. slip-ring with a resilient lip]

15/346 . . . . . [the pressing force varying during operation]

15/3464 . . . . . [Mounting of the seal]

15/3468 . . . . . [Means for controlling the deformations of the contacting faces]

15/3472 . . . . . [Means for centering or aligning the contacting faces]

15/3476 . . . . . [Means for minimising vibrations of the slip-ring]

15/348 . . . . . . [Pre-assembled seals, e.g. cartridge seals]

15/3484 . . . . . . [Tandem seals]

15/3488 . . . . . . [Split-rings]

15/3492 . . . . . . [with monitoring or measuring means associated with the seal]

15/3496 . . . . . . [use of special materials]

15/36 . . . connected by a diaphragm [or bellow] to the other member

15/363 . . . . . . [the diaphragm or bellow being made of metal]

15/366 . . . . . . [and comprising vibration-damping means]

15/38 . . . sealed by a packing

15/40 . . . by means of fluid

15/403 . . . [by changing the state of matter]

15/406 . . . . . [by at least one pump]

15/42 . . . kept in sealing position by centrifugal force

15/43 . . . kept in sealing position by magnetic force

15/44 . . . . . Free-space packings

15/441 . . . . . {with floating ring}

15/442 . . . . . {segmented}

15/443 . . . . . {provided with discharge channels}

15/444 . . . . . {with facing materials having honeycomb-like structure}