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 1/68 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
1/04 . Resilient guiding parts, e.g. skirts, particularly for trunk pistons
1/06 . with separate expansion members; Expansion members
1/08 . Constructional features providing for lubrication
1/09 . with means for guiding fluids \{F16J 1/08 takes precedence\}
1/10 . Connection to driving members
1/12 . with piston-rods, e.g. rigid connections

1/14 . . with connecting-rods, 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 B60C 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

(9/00)

(others sealings between pistons and cylinders F16J 3/06, 16J 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))

9/02 . L-section rings
9/04 . Helical rings
9/06 . using separate springs or elastic elements expanding the rings; Springs therefor ; Expansion by wedging
9/061 . (using metallic coiled or blade springs (F16J 9/145 takes precedence))
9/062 . Coiled spring along the entire circumference
9/063 . Strip or wire along the entire circumference
9/064 . Rings with a flat annular side rail
9/065 . Spring expander with massive cross-section
9/066 . Spring expander from sheet metal
9/067 . corrugated in the radial direction
9/068 . corrugated in the axial direction
9/069 . with a C-shaped cross section along the entire circumference
9/08 . with expansion obtained by pressure of the medium
9/10 . Special members for adjusting the rings
9/12 . Details
9/14 . Joint-closures
9/145 . Of spring expanders
9/16 . obtained by stacking of rings
9/18 . with separate bridge-elements
9/20 . Rings with special cross-section (L-section rings F16J 9/02); Oil-scraping rings (F16J 9/06 takes precedence)
9/203 . 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 sub-groups

9/206 . One-piece oil-scraping rings
9/22 . Rings for preventing wear of grooves or like sealings
9/24 . Members preventing rotation of rings in grooves
9/26 . characterised by the use of particular materials
9/28 . of non-metals

10/00 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
10/02 . Cylinders designed to receive moving pistons or plungers
10/04 . Running faces; Liners

12/00 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 45/00; 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 F22B)

13/02 . Detachable closure members; Means for tightening closures (F16J 13/16, F16J 13/22 take precedence)
13/04 . attached with a bridge member
13/06 . attached only by clamps along the circumference
13/065 . (the clamp comprising a ring encircling the flange)
13/08 . attached by one or more members actuated to project behind a part or parts of the frame (similar constructions for doors or windows F05C 9/00)
13/10 . attached by means of a divided ring
13/12 . attached by wedging action by means of screw-thread, interrupted screw-thread, bayonet closure, or the like
13/14 . attached exclusively by spring action or elastic action
13/16 . Pivot closures (F16J 13/22 takes precedence)
13/18 . pivoted directly on the frame
13/20 . mounted by mobile fastening on swinging arms
13/22 . with movement parallel to the plane of the opening
13/24 . with safety devices, e.g. to prevent opening prior to pressure release

15/00 Sealings
15/002 . comprising at least two sealings in succession (F16J 15/162, F16J 15/40 take precedence)
15/004 . (forming of recuperation chamber for the leaking fluid)
15/006 . with division of the pressure (F16J 15/44 takes precedence)
15/008 . with provision to put out of action at least one sealing; One sealing only on standstill; Emergency or servicing sealings (F16J 15/164 takes precedence)
15/02 . between relatively-stationary surfaces (F16J 15/46, F16J 15/48 take precedence)
15/021 . with elastic packing (F16J 15/08 takes precedence)
15/022 . [characterised by structure or material]
15/024 . [with provision to put out of action at least one sealing; One sealing only on standstill; Emergency or servicing sealings (F16J 15/164 takes precedence)]
15/025 . [and with at least one flexible lip]
15/027 . [and with a hollow profile]
15/028 . [the packing being mechanically expanded against the sealing surface]
15/04 . without packing between the surfaces, e.g. with ground surfaces, with cutting edge
15/06 . with solid packing compressed between sealing surfaces
15/061 . [with positioning means (F16J 15/0831 takes precedence)]
15/062 . [characterised by the geometry of the seat]
15/064 . [the packing combining the sealing function with other functions]
with exclusively metal packing 15/08  
(characterised by material or surface treatment) 15/0806  
(with a braided or knitted body) 15/0812  
(Flat gaskets) 15/0818  
(laminated) 15/0825  
(with mounting aids) 15/0831  
(with an edge portion folded over a second plate or shim) 2015/0837  
(with an edge portion folded over the plate itself) 2015/0843  
(without fold over) 2015/085  
(with a non-metallic coating or strip) 2015/0856  
(with a bore ring) 2015/0862  
(Aspects not related to the edges of the gasket) 2015/0868  
(comprising welds) 2015/0875  
(the sealing effect being obtained by plastic deformation of the packing) 2015/0881  
(the sealing effect being obtained by elastic deformation of the packing) 2015/0887  
(the packing having a hollow profile) 2015/0893  
(without metal reinforcement) 15/09  
(with non-metallic packing) 15/10  
(characterised by material) 15/102  
(characterised by structure) 15/104  
(homogeneous) 15/106  
(Special methods for making a non-metallic packing) 15/108  
(with metal reinforcement or covering) 15/12  
(with metal reinforcement) 15/121  
(generally parallel to the surfaces) 15/122  
(Details relating to the edges of the packing) 15/123  
(generally perpendicular to the surfaces) 15/125  
(consisting of additions, e.g. metallic fibres, metallic powders, randomly dispersed in the packing) 15/126  
(the reinforcement being a compression stopper) 15/127  
(with metal covering) 15/128  
(by means of granular or plastic material, or fluid) 15/14  
(between relatively-moving surfaces) 15/16  
(3/06) (Lamellar structures; Bellows) 15/160  
[Fire resistant] 15/165  
[Split packings] 15/167  
[the packing swelling under working conditions] 15/168  
[using a lantern ring] 15/183  
[Tightening mechanisms] 15/184  
[with continuous adjustment of the compression of the packing] 15/185  
[using springs] 15/186  
[Self-aligning stuffing-boxes] 15/187  
[Split assemblies] 15/188  
[Means for facilitating the removal of the packing] 15/189  
(Packing materials therefor) 15/20  
(shaped as strands, ropes, threads, ribbons, or the like) 15/22  
(with radial or tangentially compressed packing) 15/24  
(stuffing-boxes for rigid sealing rings) 15/26  
(sealing rings made of metal) 15/28  
(sealing rings made of carbon) 15/30  
(elastic sealings, e.g. O-rings) 15/32  
(at least one lip) 15/3204  
(provided with tension elements, e.g. elastic rings) 15/3208  
(with metal springs) 15/3212  
supported in a direction parallel to the surfaces 15/3216  
supported in a direction perpendicular to the surfaces 15/322  
(capable of accommodating changes in distances or misalignment between the surfaces, e.g. able to compensate for defaults of eccentricity or angular deviations) 15/3224  
formed by deforming a flat ring) 15/3228  
(having two or more lips) 15/3232  
(with at least one lip for each surface, e.g. U-cup packings) 15/3236  
(Arrangements for lubrication or cooling of the sealing itself) 15/324  
(with hydrodynamic pumping action) 15/3244  
(provided with casings or supports) 15/3248  
(with rigid casings or supports) 15/3252  
(comprising two casing or support elements, one attached to each surface, e.g. cartridge or cassette seals) 15/3256  
(means for detecting or measuring relative rotation of the two elements) 15/326  
(the elements being separable from each other) 15/3264  
(Mounting of sealing rings) 15/3268  
(the rings having a break or opening, e.g. to enable mounting on a shaft otherwise than from a shaft end) 15/3272  
(with additional static sealing between the sealing, or its casing or support, and the surface on which it is mounted) 15/3276  
(Manufacturing methods specially adapted for elastic sealings) 15/328  
(characterised by their structure; Selection of materials) 15/3284  
(Filamentary structures, e.g. brush seals) 15/3288  
(Lamellar structures) 15/3292
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

with slip-ring pressed against a more or less radial face on one member

{ and characterised by parts or details relating to lubrication, cooling or venting of the seal }

(at least one ring having an uneven slipping surface)

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

{ with at least one continuous groove }

{ with means for feeding fluid directly to the face }

{ with microcavities }

{ with a wavy surface }

{ the geometry of the surface being able to vary during operation }

{ Pressing means }

{ the pressing force being applied by means of an elastic ring supporting the slip-ring }

{ by magnetic attraction }

{ the pressing force resulting from fluid pressure }

{ the pressing force resulting from the action of a spring }

{ without external means for pressing the ring against the face, e.g. slip-ring with a resilient lip }

{ the pressing force varying during operation }

{ Mounting of the seal }

{ Means for controlling the deformations of the contacting faces }

{Means for centering or aligning the contacting faces }

{ Means for minimising vibrations of the slip-ring }

{ Pre-assembled seals, e.g. cartridge seals }

{ Tandem seals }

{ Split-rings }

{ with monitoring or measuring means associated with the seal }

{ use of special materials }

connected by a diaphragm { or bellow } to the other member

{ the diaphragm or bellow being made of metal }

{ and comprising vibration-damping means }

sealed by a packing

by means of fluid

{ by changing the state of matter }

{ by at least one pump }

kept in sealing position by centrifugal force

kept in sealing position by magnetic force

Free-space packings

{ with floating ring }

{ segmented }

{ provided with discharge channels }

{ with facing materials having honeycomb-like structure }

Labyrinth packings

{ [Pre-assembled packings] }

{ with radial path }

{ [Pre-assembled packings] }

characterised by the use of particular materials (F16J 15/444 takes precedence) }

with packing ring expanded or pressed into place by fluid pressure, e.g. inflatable packings (connection of valves to inflatable elastic bodies B60C 29/00; for sealing arrangements in vehicles B60J 10/244; for sealing arrangements of openings in buildings E06B 7/2318; for tube connections F16L)

between relatively-movable members, by means of a sealing without relatively-moving surfaces, e.g. fluid-tight sealings for transmitting motion through a wall

by means of sealing bellows or diaphragms (connection of valves to inflatable elastic bodies B60C 29/00)

{ fixed to a part of a transmission performing a wobbling or a circular translatory movement }

Other sealings for rotating shafts

{ submitted to unbalanced pressure in circumference; seals for oscillating actuator }

Other sealings for reciprocating rods

sealed by a packing

by means of fluid

{ by changing the state of matter }

{ by at least one pump }

kept in sealing position by centrifugal force

kept in sealing position by magnetic force

Free-space packings

{ with floating ring }

{ segmented }

{ provided with discharge channels }

{ with facing materials having honeycomb-like structure }