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	
F02F 1/00	Cylinders for combustion engines
F02F 3/00	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 F02F; {pistons for hydraulic engines F03C}; pumps F04B; floats F16K 33/00)

1/001 . {One-piece pistons}
1/003 . . {with integral sealing lips}
1/005 . {obtained by assembling several pieces}
1/006 . . {of different materials}
1/008 . . . {with sealing lips}
1/01 . characterised by the use of particular materials (F16J 1/02 takes precedence)
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**

9/00 **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})

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 seatings

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 F02F)**; 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 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 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 E05C 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 . Pivoted 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 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 . . . . {the packing being locally weakened in order to increase elasticity}

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}

15/065 . . . . {fire resistant}
15/067 . . . {Split packings}
15/068 . . . {the packing swelling under working conditions}
15/08 . . . with exclusively metal packing
15/0806 . . . . {characterised by material or surface treatment}
15/0812 . . . . . {with a braided or knitted body}
15/0818 . . . . {Flat gaskets}
15/0825 . . . . . {laminated}
15/0831 . . . . . {with mounting aids}
2015/0837 . . . . . {with an edge portion folded over a second plate or shim}
2015/0843 . . . . . {with an edge portion folded over the plate itself}
2015/085 . . . . . {without fold over}
2015/0856 . . . . . {with a non-metallic coating or strip}
2015/0862 . . . . . {with a bore ring}
2015/0868 . . . . . {Aspects not related to the edges of the gasket}
2015/0875 . . . . . {comprising welds}
15/0881 . . . . {the sealing effect being obtained by plastic deformation of the packing}
15/0887 . . . . {the sealing effect being obtained by elastic deformation of the packing}
15/0893 . . . . . {the packing having a hollow profile}
15/10 . . . with non-metallic packing
15/102 . . . . {characterised by material}
15/104 . . . . {characterised by structure}
15/106 . . . . . {homogeneous}
15/108 . . . . {Special methods for making a non-metallic packing}
15/12 . . . . with metal reinforcement or covering
15/121 . . . . . {with metal reinforcement}
15/122 . . . . . {generally parallel to the surfaces}
15/123 . . . . . {Details relating to the edges of the packing}
15/125 . . . . . {generally perpendicular to the surfaces}
15/126 . . . . . {consisting of additions, e.g. metallic fibres, metallic powders, randomly dispersed in the packing}
15/127 . . . . . {the reinforcement being a compression stopper}
15/128 . . . . . {with metal covering}
15/14 . . by means of granular or plastic material, or fluid
15/16 . 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)
15/162 . . {Special parts or details relating to lubrication or cooling of the sealing itself (F16J 15/324, F16J 15/3404, F16J 15/40 take precedence)}
15/164 . . {the sealing action depending on movements; pressure difference, temperature or presence of leaking fluid}
15/166 . . {with means to prevent the extrusion of the packing}
15/168 . . {which permits material to be continuously conveyed}
15/18 . . with stuffing-boxes for elastic or plastic packings
15/181 . . . {for plastic packings}
15/182 . . . {with lubricating, cooling or draining means}
15/183 . . . . {using a lantern ring}
15/184 . . . {Tightening mechanisms}
15/185 . . . . {with continuous adjustment of the compression of the packing}
15/186 . . . . . {using springs}
15/187 . . . {Self-aligning stuffing-boxes}
15/188 . . . {Split assemblies}
15/189 . . . {Means for facilitating the removal of the packing}
15/20 . . . Packing materials therefor
15/22 . . . . shaped as strands, ropes, threads, ribbons, or the like
15/24 . . . with radially or tangentially compressed packing
15/26 . . with stuffing-boxes for rigid sealing rings
15/28 . . . with sealing rings made of metal
15/30 . . . with sealing rings made of carbon
15/32 . . with elastic sealings, e.g. O-rings
15/3204 . . . with at least one lip
15/3208 . . . . provided with tension elements, e.g. elastic rings
15/3212 . . . . . with metal springs
15/3216 . . . . supported in a direction parallel to the surfaces
15/322 . . . . supported in a direction perpendicular to the surfaces
15/3224 . . . . capable of accommodating changes in distances or misalignment between the surfaces, e.g. able to compensate for defaults of eccentricity or angular deviations
15/3228 . . . . formed by deforming a flat ring
15/3232 . . . . having two or more lips
15/3236 . . . . . with at least one lip for each surface, e.g. U-cup packings
15/324 . . . Arrangements for lubrication or cooling of the sealing itself
15/3244 . . . with hydrodynamic pumping action
15/3248 . . . provided with casings or supports
15/3252 . . . . with rigid casings or supports
15/3256 . . . . . comprising two casing or support elements, one attached to each surface, e.g. cartridge or cassette seals
15/326 . . . . . with means for detecting or measuring relative rotation of the two elements
15/3264 . . . . . the elements being separable from each other
15/3268 . . . Mounting of sealing rings
15/3272 . . . . the rings having a break or opening, e.g. to enable mounting on a shaft otherwise than from a shaft end
15/3276 . . . . with additional static sealing between the sealing, or its casing or support, and the surface on which it is mounted
15/328 . . . Manufacturing methods specially adapted for elastic sealings (moulding B29C)
15/3284 . . . characterised by their structure; Selection of materials
15/3288 . . . . Filamentary structures, e.g. brush seals
15/3292 . . . . Lamellar structures

15/3296 . . . 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}
15/3428 . . . . . {with a wavy surface}
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}
15/445 . . {with means for adjusting the clearance}
15/447 . . Labyrinth packings
15/4472 . . . {with axial path}
15/4474 . . . . {Pre-assembled packings}
15/4476 . . . {with radial path}
15/4478 . . . . {Pre-assembled packings}
15/453 . . . characterised by the use of particular materials {(F16J 15/444 takes precedence)}
15/46 . 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)
15/48 . . influenced by the pressure within the member to be sealed
15/50 . between relatively-movable members, by means of a sealing without relatively-moving surfaces, e.g. fluid-tight sealings for transmitting motion through a wall
15/52 . . by means of sealing bellows or diaphragms (connection of valves to inflatable elastic bodies B60C 29/00)
15/525 . . . {fixed to a part of a transmission performing a wobbling or a circular translatory movement}
15/54 . Other sealings for rotating shafts
15/545 . . {submitted to unbalanced pressure in circumference; seals for oscillating actuator}
15/56 . Other sealings for reciprocating rods