

# CPC COOPERATIVE PATENT CLASSIFICATION

## 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.

### WARNING

The following IPC groups are not used in the CPC scheme. Subject matter covered by these groups is classified in the following CPC groups:

[F16J 15/53](#)

covered by

[F16J 15/43](#)

**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}	13/12	. . attached by wedging action by means of screw-thread, interrupted screw-thread, bayonet closure, or the like
9/069	. . . . {with a "C"-shaped cross section along the entire circumference}	13/14	. . attached exclusively by spring action or elastic action
9/08	. with expansion obtained by pressure of the medium	13/16	. Pivoted closures ( <a href="#">F16J 13/22</a> takes precedence)
9/10	. Special members for adjusting the rings	13/18	. . pivoted directly on the frame
9/12	. Details	13/20	. . mounted by mobile fastening on swinging arms
9/14	. . Joint-closures	13/22	. with movement parallel to the plane of the opening
9/145	. . . {of spring expanders}	13/24	. with safety devices, e.g. to prevent opening prior to pressure release
9/16	. . . obtained by stacking of rings		
9/18	. . . with separate bridge-elements		
9/20	. Rings with special cross-section ( <a href="#">L-section rings F16J 9/02</a> ); Oil-scraping rings {( <a href="#">F16J 9/06</a> takes precedence)}	<b>15/00</b>	<b>Sealings</b>
9/203	. . . {Oil-scraping rings}	15/002	. {comprising at least two sealings in succession ( <a href="#">F16J 15/162</a> , <a href="#">F16J 15/40</a> take precedence)}
	<b>WARNING</b>	15/004	. . {forming or recuperation chamber for the leaking fluid}
	The group <a href="#">F16J 9/203</a> is no longer used for the classification of new documents from August 1st, 2002. The backlog of this group is being continuously reclassified to <a href="#">F16J 9/206</a> , and to <a href="#">F16J 9/06</a> and sub-groups	15/006	. . {with division of the pressure ( <a href="#">F16J 15/44</a> takes precedence)}
9/206	. . . {One-piece oil-scraping rings}	15/008	. . {with provision to put out of action at least one sealing; One sealing sealing only on standstill; Emergency or servicing sealings ( <a href="#">F16J 15/164</a> takes precedence)}
9/22	. . Rings for preventing wear of grooves or like seatings	15/02	. between relatively-stationary surfaces ( <a href="#">F16J 15/46</a> , <a href="#">F16J 15/48</a> take precedence)
9/24	. . Members preventing rotation of rings in grooves	15/021	. . {with elastic packing ( <a href="#">F16J 15/08</a> takes precedence)}
9/26	. characterised by the use of particular materials	15/022	. . . {characterised by structure or material}
9/28	. of non-metals	15/024	. . . . {the packing being locally weakened in order to increase elasticity}
<b>10/00</b>	<b>Engine or like cylinders (pressure vessels in general <a href="#">F16J 12/00</a>; cylinders for engines or other apparatus of particular kinds, see the appropriate subclasses, e.g. for combustion engines <a href="#">F02F</a>); Features of hollow, e.g. cylindrical, bodies in general</b>	15/025	. . . . . {and with at least one flexible lip}
10/02	. Cylinders designed to receive moving pistons or plungers	15/027	. . . . . {and with a hollow profile}
10/04	. . Running faces; Liners	15/028	. . . {the packing being mechanically expanded against the sealing surface}
<b>12/00</b>	<b>Pressure vessels in general (covers therefor <a href="#">F16J 13/00</a>; for particular applications, see the relevant subclasses, e.g. <a href="#">B01J</a>, <a href="#">F17C</a>, <a href="#">G21C</a>)</b>	15/04	. . without packing between the surfaces, e.g. with ground surfaces, with cutting edge
<b>13/00</b>	<b>Covers or similar closure members for pressure vessels in general (for engines or like cylinders <a href="#">F16J 10/00</a>; sealings <a href="#">F16J 15/02</a>; covers for box-like containers <a href="#">B65D 43/00</a>; devices for securing or retaining closure members <a href="#">B65D 45/00</a>; closures for containers not otherwise provided for <a href="#">B65D 51/00</a>; manholes, covers for large containers <a href="#">B65D 90/10</a>; gates or closures for large containers <a href="#">B65D 90/54</a>; for vessels for containing or storing compressed, liquefied or solidified gases <a href="#">F17C 13/06</a>; steam boilers <a href="#">F22B</a>)</b>	15/06	. . with solid packing compressed between sealing surfaces
13/02	. Detachable closure members; Means for tightening closures ( <a href="#">F16J 13/16</a> , <a href="#">F16J 13/22</a> take precedence)	15/061	. . . {with positioning means ( <a href="#">F16J 15/0831</a> takes precedence)}
13/04	. . attached with a bridge member	15/062	. . . {characterised by the geometry of the seat}
13/06	. . attached only by clamps along the circumference	15/064	. . . {the packing combining the sealing function with other functions}
13/065	. . . {the clamp comprising a ring encircling the flange}	15/065	. . . . {fire resistant}
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 <a href="#">E05C 9/00</a> )	15/067	. . . {Split packings}
13/10	. . attached by means of a divided ring	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 micro-cavities}
- 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