

SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

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

F16J PISTONS; CYLINDERS; PRESSURE VESSELS IN GENERAL; SEALINGS

Note(s)

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.

Subclass index

PISTONS, TRUNK PISTONS, OR PLUNGERS; PISTON-RODS.....	1/00, 7/00
DIAPHRAGMS, BELLOWS, BELLOWS PISTONS; PISTON-RINGS.....	3/00, 9/00
CYLINDERS, HOLLOW BODIES.....	10/00
PRESSURE VESSELS; COVERS.....	12/00, 13/00
SEALINGS.....	15/00

1/00	Pistons; Trunk pistons; Plungers (bellows pistons F16J 3/06; piston-rings or seats therefor F16J 9/00; 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 specially adapted for reciprocating-piston liquid engines F03C 1/28; for pumps F04B; floats F16K 33/00) [1, 2006.01]	1/20	• • • with rolling contact, other than in ball or roller bearings [1, 2006.01]
1/01	• characterised by the use of particular materials (F16J 1/02 takes precedence) [3, 2006.01]	1/22	• • • with universal joint, e.g. ball-joint [1, 2006.01]
1/02	• Bearing surfaces [1, 2006.01]	1/24	• • designed to give the piston some rotary movement about its axis [1, 2006.01]
1/04	• Resilient guiding parts, e.g. skirts, particularly for trunk pistons [1, 2006.01]	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) [1, 2006.01]
1/06	• • with separate expansion members; Expansion members [1, 2006.01]	3/02	• Diaphragms [2, 2006.01]
1/08	• Constructional features providing for lubrication [1, 2006.01]	3/04	• Bellows [2, 2006.01]
1/09	• with means for guiding fluids (F16J 1/08 takes precedence) [3, 2006.01]	3/06	• Bellows pistons [2, 2006.01]
1/10	• Connection to driving members [1, 2006.01]	7/00	Piston-rods, i.e. rods rigidly connected to the piston (connecting-rods or like links pivoted at both ends F16C 7/00) [1, 2006.01]
1/12	• • with piston-rods, i.e. rigid connections [1, 2006.01]	9/00	Piston-rings, seats therefor; Ring sealings of similar construction in general (other sealings between pistons and cylinders F16J 3/06, F16J 15/16; tools for mounting or removing piston-rings or the like B25B; piston sealing arrangements on brake master cylinders B60T 11/236) [1, 2, 5, 2006.01]
1/14	• • with connecting-rods, i.e. pivotal connections [1, 2006.01]	9/02	• L-section rings [1, 2006.01]
1/16	• • • with gudgeon-pin; Gudgeon-pins [1, 2006.01]	9/04	• Helical rings [1, 2006.01]
1/18	• • • • Securing of gudgeon-pins [1, 2006.01]		

- 9/06 • using separate springs expanding the rings; Springs therefor **[1, 2006.01]**
- 9/08 • with expansion obtained by pressure of the medium **[1, 2006.01]**
- 9/10 • Special members for adjusting the rings **[1, 2006.01]**
- 9/12 • Details **[1, 2006.01]**
- 9/14 • • Joint-closures **[1, 2006.01]**
- 9/16 • • • obtained by stacking of rings **[1, 2006.01]**
- 9/18 • • • with separate bridge-elements **[1, 2006.01]**
- 9/20 • • Rings with special cross-section (L-section rings F16J 9/02); Oil-scraping rings **[1, 2006.01]**
- 9/22 • • Rings for preventing wear of grooves or like seatings **[1, 2006.01]**
- 9/24 • • Members preventing rotation of rings in grooves **[1, 2006.01]**
- 9/26 • characterised by the use of particular materials **[3, 2006.01]**
- 9/28 • • of non-metals **[3, 2006.01]**
- 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** **[3, 2006.01]**
- 10/02 • Cylinders designed to receive moving pistons or plungers **[3, 2006.01]**
- 10/04 • • Running faces; Liners **[3, 2006.01]**
- 12/00 Pressure vessels in general** (covers therefor F16J 13/00; for particular applications, see the relevant subclasses, e.g. B01J, F17C, G21C) **[3, 2006.01]**
- 13/00 Covers or similar closure members for pressure vessels in general** (for engine 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) **[1, 2006.01]**
- 13/02 • Detachable closure members; Means for tightening closures (F16J 13/16, F16J 13/22 take precedence) **[1, 3, 2006.01]**
- 13/04 • • attached with a bridge member **[1, 2006.01]**
- 13/06 • • attached only by clamps along the circumference **[1, 2006.01]**
- 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) **[1, 2006.01]**
- 13/10 • • attached by means of a divided ring **[1, 2006.01]**
- 13/12 • • attached by wedging action by means of screw-thread, interrupted screw-thread, bayonet closure, or the like **[1, 2006.01]**
- 13/14 • • attached exclusively by spring action or elastic action **[1, 2006.01]**
- 13/16 • Pivoted closures (F16J 13/22 takes precedence) **[1, 3, 2006.01]**
- 13/18 • • pivoted directly on the frame **[1, 2006.01]**
- 13/20 • • mounted by mobile fastening on swinging arms **[1, 2006.01]**
- 13/22 • with movement parallel to the plane of the opening **[3, 2006.01]**
- 13/24 • with safety devices, e.g. to prevent opening prior to pressure release **[3, 2006.01]**
- 15/00 Sealings** **[1, 5, 2006.01]**
- 15/02 • between relatively-stationary surfaces (F16J 15/46, F16J 15/48 take precedence) **[1, 2006.01]**
- 15/04 • • without packing between the surfaces, e.g. with ground surfaces, with cutting edge **[1, 2006.01]**
- 15/06 • • with solid packing compressed between sealing surfaces **[1, 2006.01]**
- 15/08 • • • with exclusively metal packing **[1, 2006.01]**
- 15/10 • • • with non-metallic packing **[1, 2006.01]**
- 15/12 • • • with metal reinforcement or covering **[1, 2006.01]**
- 15/14 • • by means of granular or plastic material, or fluid **[1, 2006.01]**
- 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) **[1, 2, 2006.01]**
- 15/18 • • with stuffing-boxes for elastic or plastic packings **[1, 2006.01]**
- 15/20 • • • Packing materials therefor **[1, 2006.01]**
- 15/22 • • • shaped as strands, ropes, threads, ribbons, or the like **[1, 2006.01]**
- 15/24 • • • with radially or tangentially compressed packing **[1, 2006.01]**
- 15/26 • • with stuffing-boxes for rigid sealing rings **[1, 2006.01]**
- 15/28 • • • with sealing rings made of metal **[1, 2006.01]**
- 15/30 • • • with sealing rings made of carbon **[1, 2006.01]**
- 15/32 • • with elastic sealings, e.g. O-rings **[1, 2006.01, 2016.01]**
- 15/3204 • • • with at least one lip **[2016.01]**
- 15/3208 • • • provided with tension elements, e.g. elastic rings **[2016.01]**
- 15/3212 • • • • with metal springs **[2016.01]**
- 15/3216 • • • supported in a direction parallel to the surfaces **[2016.01]**
- 15/322 • • • supported in a direction perpendicular to the surfaces **[2016.01]**
- 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 **[2016.01]**
- 15/3228 • • • formed by deforming a flat ring **[2016.01]**
- 15/3232 • • • having two or more lips **[2016.01]**
- 15/3236 • • • with at least one lip for each surface, e.g. U-cup packings **[2016.01]**
- 15/324 • • Arrangements for lubrication or cooling of the sealing itself **[2016.01]**
- 15/3244 • • with hydrodynamic pumping action **[2016.01]**
- 15/3248 • • provided with casings or supports **[2016.01]**
- 15/3252 • • • with rigid casings or supports **[2016.01]**
- 15/3256 • • • comprising two casing or support elements, one attached to each surface, e.g. cartridge or cassette seals **[2016.01]**
- 15/326 • • • • with means for detecting or measuring relative rotation of the two elements **[2016.01]**
- 15/3264 • • • • the elements being separable from each other **[2016.01]**
- 15/3268 • • Mounting of sealing rings **[2016.01]**
- 15/3272 • • • the rings having a break or opening, e.g. to enable mounting on a shaft otherwise than from a shaft end **[2016.01]**

- 15/3276 • • • • with additional static sealing between the sealing, or its casing or support, and the surface on which it is mounted **[2016.01]**
- 15/328 • • • • Manufacturing methods specially adapted for elastic sealings (moulding B29C) **[2016.01]**
- 15/3284 • • • • characterised by their structure; Selection of materials **[2016.01]**
- 15/3288 • • • • Filamentary structures, e.g. brush seals **[2016.01]**
- 15/3292 • • • • Lamellar structures **[2016.01]**
- 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 **[2016.01]**
- 15/34 • • • with slip-ring pressed against a more or less radial face on one member **[1, 2006.01]**
- 15/36 • • • • connected by a diaphragm to the other member **[1, 2006.01]**
- 15/38 • • • • sealed by a packing **[1, 2, 2006.01]**
- 15/40 • • • by means of fluid **[1, 2006.01]**
- 15/42 • • • • kept in sealing position by centrifugal force **[1, 2006.01]**
- 15/43 • • • • kept in sealing position by magnetic force **[6, 2006.01]**
- 15/44 • • • Free-space packings **[1, 2006.01]**
- 15/447 • • • • Labyrinth packings **[3, 2006.01]**
- 15/453 • • • • characterised by the use of particular materials **[3, 2006.01]**
- 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; specially adapted for tube connections F16L) **[1, 2006.01]**
- 15/48 • • • influenced by the pressure within the member to be sealed **[1, 2006.01]**
- 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 **[1, 2006.01]**
- 15/52 • • • by means of sealing bellows or diaphragms (connection of valves to inflatable elastic bodies B60C 29/00) **[1, 2006.01]**
- 15/53 • • • using magnetic means **[6, 2006.01]**
- 15/54 • • • Other sealings for rotating shafts **[1, 2006.01]**
- 15/56 • • • Other sealings for reciprocating rods **[1, 2006.01]**