

CPC COOPERATIVE PATENT CLASSIFICATION

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

ENGINES OR PUMPS

F02 COMBUSTION ENGINES; HOT-GAS OR COMBUSTION-PRODUCT ENGINE PLANTS

F02F CYLINDERS, PISTONS OR CASINGS, FOR COMBUSTION ENGINES; ARRANGEMENTS OF SEALINGS IN COMBUSTION ENGINES

NOTES

1. Attention is drawn to the notes preceding class [F01](#).
2. In considering the relationship between class [F16](#) and subclass [F02F](#), class [F16](#) will take precedence unless the subject matter is specific to combustion engines.
3. {In this subclass, it is desirable to add the indexing codes of subclass [F05C](#) for specific details or properties of materials.}

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| 1/00 | Cylinders; Cylinder heads | 1/24 | . Cylinder heads |
| 1/002 | . {Integrally formed cylinders and cylinder heads} | 2001/241 | . . {specially adapted to pent roof shape of the combustion chamber} |
| 1/004 | . {Cylinder liners (F02F 1/08 , F02F 1/16 take precedence)} | 1/242 | . . {Arrangement of spark plugs or injectors} |
| 2001/006 | . {having a ring at the inside of a liner or cylinder for preventing the deposit of carbon oil particles, e.g. oil scrapers} | 1/243 | . . {Cylinder heads and inlet or exhaust manifolds integrally cast together} |
| 2001/008 | . {Stress problems, especially related to thermal stress} | 2001/244 | . . {Arrangement of valve stems in cylinder heads} |
| 1/02 | . having cooling means (cylinder heads F02F 1/26) | 2001/245 | . . . {the valve stems being orientated at an angle with the cylinder axis} |
| 1/04 | . . for air cooling | 2001/246 | {and orientated radially from the combustion chamber surface} |
| 1/045 | . . . {Attachment of cylinders to crankcase} | 2001/247 | . . . {the valve stems being orientated in parallel with the cylinder axis} |
| 1/06 | . . . Shape or arrangement of cooling fins; Finned cylinders | 2001/248 | . . {Methods for avoiding thermal stress-induced cracks in the zone between valve seat openings} |
| 1/065 | {with means for directing or distributing cooling medium} | 2001/249 | . . {with flame plate, e.g. insert in the cylinder head used as a thermal insulation between cylinder head and combustion chamber} |
| 1/08 | running-liner and cooling-part of cylinder being different parts or of different material | 1/26 | . . having cooling means |
| 1/10 | . . for liquid cooling | 1/28 | . . . for air cooling |
| 1/102 | . . . {Attachment of cylinders to crankcase} | 1/30 | Finned cylinder heads |
| 2001/104 | . . . {using an open deck, i.e. the water jacket is open at the block top face} | 1/305 | {the cylinder heads being of side valve type} |
| 2001/106 | . . . {using a closed deck, i.e. the water jacket is not open at the block top face} | 1/32 | the cylinder heads being of overhead valve type |
| 1/108 | . . . {Siamese-type cylinders, i.e. cylinders cast together} | 1/34 | with means for directing or distributing cooling medium |
| 1/12 | . . . Preventing corrosion of liquid-swept surfaces | 1/36 | . . . for liquid cooling |
| 1/14 | . . . Cylinders with means for directing, guiding or distributing liquid stream | 1/365 | {the cylinder heads being of side valve type} |
| 1/16 | . . . Cylinder liners of wet type | 1/38 | the cylinder heads being of overhead valve type |
| 1/163 | {the liner being midsupported} | 1/40 | cylinder heads with means for directing, guiding, or distributing liquid stream |
| 1/166 | {Spacer decks} | 1/42 | . . Shape or arrangement of intake or exhaust channels in cylinder heads |
| 1/18 | . Other cylinders | 2001/4207 | . . . {Arrangements with one conduit connected with two valves; Arrangements connecting one valve with two conduits} |
| 1/183 | . . {Oval or square cylinders} | 1/4214 | . . . {specially adapted for four or more valves per cylinder} |
| 1/186 | . . {for use in engines with two or more pistons reciprocating within same cylinder} | 1/4221 | {particularly for three or more inlet valves} |
| 1/20 | . . characterised by constructional features providing for lubrication | | |
| 1/22 | . . characterised by having ports in cylinder wall for scavenging or charging | | |

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| 1/4228 | . . . {Helically-shaped channels (imparting a rotation to the charge in the cylinder F02B 31/00)} | 3/24 | . having means for guiding gases in cylinders, e.g. for guiding scavenging charge in two-stroke engines |
| 1/4235 | . . . {of intake channels} | 3/26 | . having combustion chamber in piston head (the surface thereof being covered F02F 3/14) |
| 1/4242 | . . . {with a partition wall inside the channel} | 3/28 | . Other pistons with specially-shaped head |
| 1/425 | . . . {with a separate deviation element inside the channel} | 3/285 | . . {the head being provided with an insert located in or on the combustion-gas-swept surface} |
| 1/4257 | . . . {with an intake liner} | | |
| 1/4264 | . . . {of exhaust channels} | 5/00 | Piston rings, e.g. associated with piston crown |
| 1/4271 | . . . {with an exhaust liner} | NOTE | |
| 2001/4278 | . . . {Exhaust collectors} | | {Details of piston rings or related details of the pistons, piston crowns or cylinders are classified in group F16J 9/00 .} |
| 1/4285 | . . . {of both intake and exhaust channel} | | |
| 1/4292 | . . . {with liners (F02F 1/4257 , F02F 1/4271 take precedence)} | 7/00 | Casings, e.g. crankcases |
| 3/00 | Pistons | 7/0002 | . {Cylinder arrangements} |
| 2003/0007 | . {Monolithic pistons; One piece constructions; Casting of pistons} | 7/0004 | . . {Crankcases of one-cylinder engines} |
| 3/0015 | . {Multi-part pistons} | 7/0007 | . . {Crankcases of engines with cylinders in line} |
| 3/0023 | . . {the parts being bolted or screwed together} | 7/0009 | . . {Crankcases of opposed piston engines} |
| 3/003 | . . {the parts being connected by casting, brazing, welding or clamping} | 7/0012 | . . {Crankcases of V-engines} |
| 2003/0038 | . . . {by brazing} | 7/0014 | . . {Crankcases of W-, deldic, or quadratic engines, or the like} |
| 2003/0046 | . . . {by crimping} | 7/0017 | . . {Crankcases of radial engines} |
| 2003/0053 | . . . {by soldering} | 7/0019 | . . {Cylinders and crankshaft not in one plane (deaxation)} |
| 2003/0061 | . . . {by welding} | 7/0021 | . {Construction} |
| 3/0069 | . . {the crown and skirt being interconnected by the gudgeon pin} | 7/0024 | . . {Casings for larger engines} |
| 3/0076 | . {the inside of the pistons being provided with ribs or fins} | 7/0026 | . . . {Casings for horizontal engines} |
| 3/0084 | . {the pistons being constructed from specific materials} | 7/0029 | . . {Space-frames} |
| 3/0092 | . . {the material being steel-plate} | 7/0031 | . . {Construction kit principle (modular engines)} |
| 3/02 | . having means for accommodating or controlling heat expansion | 7/0034 | . . {Built from sheet material and welded casings} |
| 3/022 | . . {the pistons having an oval circumference or non-cylindrical shaped skirts, e.g. oval (F02F 3/025 , F02F 3/027 take precedence)} | 7/0036 | . . {Casings for two-stroke engines with scavenging conduits} |
| 3/025 | . . {having circumferentially slotted piston skirts, e.g. T-slots} | 7/0039 | . . {Casings for small engines, especially with crankcase pumps} |
| 3/027 | . . {the skirt wall having cavities} | 2007/0041 | . . {Fixing Bolts} |
| 3/04 | . . having expansion-controlling inserts | 7/0043 | . {Arrangements of mechanical drive elements} |
| 3/042 | . . . {the inserts consisting of reinforcements in the skirt interconnecting separate wall parts, e.g. rods or strips} | 7/0046 | . . {Shape of casings adapted to facilitate fitting or dismantling of engine parts} |
| 3/045 | . . . {the inserts being located in the crown} | 7/0048 | . . {Tunnel-type frames} |
| 3/047 | . . . {the inserts being located around the gudgeon pin bearings} | 7/0051 | . . {Crankcase pump engines} |
| 3/06 | . . . the inserts having bimetallic effect | 7/0053 | . . {Crankshaft bearings fitted in the crankcase} |
| 3/08 | . . . the inserts being ring-shaped | 2007/0056 | . . . {using bearing beams, i.e. bearings interconnected by a beam or multiple beams} |
| 3/10 | . having surface coverings (F02F 3/02 takes precedence) | 7/0058 | . . {Longitudinally or transversely separable crankcases} |
| 3/105 | . . {the coverings forming a double skirt} | 7/006 | . {Camshaft or pushrod housings} |
| 3/12 | . . on piston heads | 2007/0063 | . . {Head bolts; Arrangements of cylinder head bolts} |
| 3/14 | . . . within combustion chambers | 7/0065 | . {Shape of casings for other machine parts and purposes, e.g. utilisation purposes, safety} |
| 3/16 | . having cooling means | 7/0068 | . . {Adaptations for other accessories} |
| 3/18 | . . the means being a liquid or solid coolant, e.g. sodium, in a closed chamber in piston | 7/007 | . . {Adaptations for cooling} |
| 3/20 | . . the means being a fluid flowing through or along piston | 7/0073 | . . {Adaptations for fitting the engine, e.g. front-plates or bell-housings} |
| 3/22 | . . . the fluid being liquid | 2007/0075 | . . . {Front covers} |
| 3/225 | . . . {the liquid being directed into blind holes} | 2007/0078 | . . . {Covers for belt transmissions} |
| | | 7/008 | . . {Sound insulation} |
| | | 7/0082 | . {Mounting of engine casings} |
| | | 7/0085 | . {Materials for constructing engines or their parts} |
| | | 7/0087 | . . {Ceramic materials} |
| | | 2007/009 | . . {Hypereutectic aluminum, e.g. aluminum alloys with high SI content} |

F02F

- 2007/0092 . . {Transparent materials}
- 7/0095 . {Constructing engine casings ([welded casings F02F 7/0034](#))}
- 2007/0097 . {for large diesel engines}
- 11/00 Arrangements of sealings in combustion engines**
{(piston rings or ring sealings of similar construction [F16J 9/00](#))}
- 11/002 . {involving cylinder heads}
- 11/005 . {involving cylinder liners}
- 11/007 . {involving rotary applications}

Indexing scheme relating to manufacturing

- 2200/00 Manufacturing**
- 2200/02 . Riveting
- 2200/04 . Forging of engine parts
- 2200/06 . Casting
- 2200/08 . . using a lost model, e.g. foam casting
- 2200/11 . using wrought materials, e.g. wrought steels