CPC COOPERATIVE PATENT CLASSIFICATION

F MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING

(NOTE omitted)

ENGINES OR PUMPS

F04 POSITIVE DISPLACEMENT MACHINES FOR LIQUIDS; PUMPS FOR LIQUIDS OR ELASTIC FLUIDS (portable fire-extinguishers with manually-operated pumps A62C 11/00, with power-driven pumps A62C 25/00; charging or scavenging combustion engines by pumps F02B; engines fuel-injection pumps F02M; ion pumps H01J 41/00; electro-dynamic pumps H02K 44/02)

(NOTE omitted)

F04B POSITIVE DISPLACEMENT MACHINES FOR LIQUIDS; PUMPS (machines for liquids, or pumps, of rotary piston or oscillating piston type F04C; non-positive displacement pumps F04D; pumping of fluid by direct contact of another fluid or by using inertia of fluid to be pumped F04F; crankshafts, crossheads, connecting-rods F16C; flywheels F16F; gearings for interconverting rotary motion and reciprocating motion in general F16H; pistons, piston-rods, cylinders, in general F16J)

NOTES

1. In this subclass, the following term is used with the meaning indicated:
   - "piston" also covers a plunger.
2. Attention is drawn to the notes preceding class F01, especially as regards the definitions of "machines", "pumps", and "positive-displacement".

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:
   F04B 35/02 covered by F04B 9/08
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.

Pumps for liquids or for liquid and elastic fluids; Positive-displacement machines for liquids (pumps for raising fluids from great depths F04B 47/00; having flexible working members F04B 43/00)

1/00 Multi-cylinder machines or pumps characterised by number or arrangements of cylinders (F04B 3/00 takes precedence; fluid-driven pumps F04B 9/08; control of reciprocating machines or pumps in general F04B 49/00)

1/005 . {Pumps with cylinder axis arranged substantially tangentially to a circle centred on main shaft axis}
1/02 . having two cylinders (in V-arrangement F04B 1/04)
1/04 . having cylinders in star- or fan-arrangement
1/0404 . . {Details, component parts specially adapted for such pumps}
1/0408 . . . {Pistons}
1/0413 . . . {Cams}
1/0417 . . . . {consisting of several cylindrical elements, e.g. rollers}
1/0421 . . . {Cylinders}
1/0426 . . . {Arrangements for pressing or connecting the pistons against the actuated cam}
1/043 . . . . {hydraulically}
1/0435 . . . {Disconnecting the pistons from the actuated cam (in general F01B 31/24)}
1/0439 . . . {Supporting and guiding means for the pistons}
1/0443 . . . {Draining of the engine housing; arrangements dealing with leakage fluid}
1/0448 . . . {Sealing, e.g. seals for shafts or housings (F04B 1/0408, F04B 53/164 take precedence)}
1/0452 . . . {Particularities relating to the distribution members (F04B 1/0472, F04B 1/0531 and F04B 1/0535 take precedence)}
1/0456 . . . . {to cylindrical distribution members}
1/0461 . . . . {to conical distribution members}
1/0465 . . . . {to plate-like distribution members}
1/047 . . with an actuating or actuated element at the outer ends of the cylinders
1/0472 . . . {with cam-actuated distribution members}
1/0474 . . . {with two or more series radial piston-cylinder units}
1/0476 . . . . {directly located side-by-side}
1/0478 . . . . {Coupling of several cylinder-barrels}
1/053 . . with an actuating or actuated element at the inner ends of the cylinders
1/0531 . . . {with cam-actuated distribution members}

1/0533 . . . . {each machine piston being provided with channels which are coacting with the cylinder and are used as a distribution member for another piston-cylinder unit}
1/0535 . . . {the piston-driving cam being provided with an inlet and an outlet}
1/0536 . . . {with two or more series radial piston-cylinder units}
1/0538 . . . . {directly located side-by-side}
1/06 . . Control {(F04B 49/12, F04B 49/18 take precedence)}
1/063 . . . {by using a valve in a system with several pumping chambers wherein the flow-path through the chambers can be changed, e.g. series-parallel}
1/066 . . . {by changing the phase relationship between the actuating cam and the distributing means}
1/07 . . . by varying the relative eccentricity between two members, e.g. a cam and a drive shaft
1/08 . . . regulated by delivery pressure
1/10 . . the cylinders being movable, e.g. rotary {(F04B 1/20 and F04B 3/006 take precedence)}
1/107 . . . with an actuating or actuated element at the outer ends of the cylinders
1/1071 . . . . {with rotary cylinder block}
1/1072 . . . . . {with cylinder block and actuating cam rotating together (F04B 1/1075 and F04B 1/1078 take precedence)}
1/1074 . . . . . {with two or more series radial piston-cylinder units}
1/1075 . . . . . {with cylinder block and actuating cam both rotating (F04B 1/1078 takes precedence)}
1/1077 . . . . . {directly located side-by-side}
1/1078 . . . . . {with cylinder block and actuating cam both rotating}
1/113 . . . with an actuating or actuated element at the inner ends of the cylinders
1/1133 . . . . {with rotary cylinder block}
1/1136 . . . . . {the rotary cylinder being provided with only one piston, reciprocating within the cylinder}
1/12 . having cylinder axes coaxial with, or parallel or inclined to main shaft axis
1/122 . . {Component parts, details, e.g. valves, sealing, lubrication (F04B 1/2014 takes precedence)}
1/124 . . . {Pistons}
1/126 . . . . {Piston shoe retaining means}
1/128 . . {Driving means}
1/14 . . having stationary cylinders
1/141 . . . {Component parts}
1/143 . . . . {Cylinders}
1/145 . . . . {Housings}
1/146 . . . . {Swash plates or actuating elements}
1/148 . . . . . {Swash plate or actuating element bearing means or driving axis bearing means}
1/16 . . . having two or more sets of cylinders or pistons
1/18 . . . having self-acting distribution members, i.e. actuated by working fluid
1/182 . . . . {Check valves}
1/184 . . . . {Cylindrical distribution members}
1/186 . . . . {Conical distribution members}
1/188 . . . . {Plate-like distribution members}
1/20 . . having rotary cylinder block
1/2007 . . . {Arrangements for pressing the cylinder barrel against the valve plate, e.g. by fluid pressure}
1/2014 . . . {Component parts}
1/2021 . . . . {Particularities in the contacting area between cylinder barrel or valve plate}
1/2028 . . . . . {Bearing means}
1/2035 . . . . {Cylinder barrel}
1/2042 . . . . {Valve means}
1/205 . . . . . {Cylindrical valve means}
1/2057 . . . . . {Conical valve means}
1/2064 . . . . {Pumphousing}
1/2071 . . . . . {Cylinder barrel bearing means}
1/2078 . . . . {Swash plate}
1/2085 . . . . . {Swash plate bearing means or driving axis bearing means}
1/2092 . . . {Connection between rotating cylinder barrel and rotating inclined swash plate}
1/22 . . . having two or more sets of cylinders or pistons
1/24 . . . . inclined to main shaft axis
1/26 . . Control
1/28 . . . for machines or pumps with stationary cylinders
1/29 . . . . by varying the relative positions of a swash plate and a cylinder block
1/295 . . . . . {by changing the inclination of the swash plate}
1/30 . . . for machines or pumps with rotary cylinder block
1/303 . . . . {by turning the valve plate}
1/306 . . . . {by turning the swash plate (with fixed inclination)}
1/32 . . . . by varying the relative positions of a swash plate and a cylinder block
1/322 . . . . . {by moving the swash plate in a direction perpendicular to the axis of rotation of the cylinder barrel}
1/324 . . . . . {by changing the inclination of the swash plate}
1/326 . . . . . {using wedges}
1/328 . . . . . {by changing the inclination of the axis of the cylinder barrel relative to the swash plate (F04B 1/30 takes precedence)}
1/34 . Control not provided for in a single group of groups F04B 1/02 - F04B 1/32

3/00 Machines or pumps with pistons coacting within one cylinder, e.g. multi-stage

3/003 . {with two or more pistons reciprocating one within another, e.g. one piston forning cylinder of the other}
3/006 . . {with rotating cylinder block}

5/00 Machines or pumps with differential surface pistons

5/02 . with double-acting pistons

7/00 Piston machines or pumps characterised by having positively-driven valving (with cylinders in star- or fan-arrangement F04B 1/04; with cylinder axes coaxial with, or parallel or inclined to, main shaft axis F04B 1/12)

7/0003 . {the distribution member forming both the inlet and discharge distributor for one single pumping chamber (F04B 7/0208 takes precedence)}

7/0007 . . {and having a rotating movement}
7/0011 . . {and having an oscillating movement}
7/0015 . . {and having a slidable movement}
7/0019 . {a common distribution member forming a single discharge distributor for a plurality of pumping chambers (F04B 7/0233 takes precedence)}
7/0023 . . {and having a rotating movement}
7/0026 . . {and having an oscillating movement}
7/003 . . {and having a slidable movement}
7/0034 . . {and having an orbital movement, e.g. elbow-pipe type members}
7/0038 . {the distribution member forming a single inlet for a plurality of pumping chambers or a multiple discharge for one single pumping chamber}
7/0042 . {with specific kinematics of the distribution member (F04B 7/0003, F04B 7/0019 take precedence)}
7/0046 . . {for rotating distribution members}
7/0049 . . {for oscillating distribution members}
7/0053 . . {for reciprocating distribution members}
7/0057 . {Mechanical driving means therefor, e.g. cams}
7/0061 . . {for a rotating member}
7/0065 . . . {being mounted on the main shaft}
7/0069 . . {for a sliding member}
7/0073 . {the member being of the lost-motion type, e.g. friction-actuated members, or having means for pushing it against or pulling it from its seat}
7/0076 . {the members being actuated by electro-magnetic means}
7/008 . {the distribution being realised by moving the cylinder itself, e.g. by sliding or swinging (F04B 7/0291 takes precedence)}
7/0084 . {Component parts or details specially adapted therefor}
7/0088 . . {Sealing arrangements between the distribution members and the housing}
7/0092 . . . {for oscillating distribution members}
7/0096 . . . {for pipe-type distribution members}
7/02 . the valving being fluid-actuated
7/0208 . . {the distribution member forming both the inlet and discharge distributor for one single pumping chamber}
7/0216 . . . {and having an oscillating movement}
7/0225 . . . {and having a slidable movement}
7/0233 . . {a common distribution member forming a single discharge distributor for a plurality of pumping chambers}
7/0241 . . . {and having an oscillating movement}
7/025 . . . {and having a slidable movement}
7/0258 . . . {and having an orbital movement, e.g. elbow-pipe type members}
7/0266 . . {the inlet and discharge means being separate members}
7/0275 . . . {and being deformable, e.g. membranes}
7/0283 . . . {and having a rotating movement}
7/0291 . . {the distribution being realised by moving the cylinder itself, e.g. by sliding or swinging}
7/04 . in which the valving is performed by pistons and cylinders coacting to open and close intake or outlet ports
7/045 . . {Two pistons coacting within one cylinder}
7/06 . . the pistons and cylinders being relatively reciprocated and rotated

9/00 Piston machines or pumps characterised by the driving or driven means to or from their working members

9/02 . the means being mechanical
9/025 . . {Driving of pistons coacting within one cylinder}
9/04 . . the means being cams, eccentrics, or pin-and-slot mechanisms (with cylinder axes coaxial with, or parallel or inclined to, main shaft axis F04B 1/12)
9/042 . . . {the means being cams}
9/045 . . . {the means being eccentrics}
9/047 . . . {the means being pin-and-slot mechanisms}
9/06 . . the means including spring- or weight-loaded lost-motion devices
9/08 . the means being fluid
9/10 . . the fluid being liquid
9/103 . . . having only one pumping chamber
9/1035 . . . . {the movement of the pump piston in the two directions being obtained by two single-acting liquid motors each acting in one direction}
9/105 . . . . reciprocating movement of the pumping member being obtained by a double-acting liquid motor
9/1053 . . . . . {one side of the double-acting liquid motor being always under the influence of the liquid under pressure}
9/1056 . . . . . {with fluid-actuated inlet or outlet valve (mechanically controlled F04B 7/00)}
9/107 . . . . rectilinear movement of the pumping member in the working direction being obtained by a single-acting liquid motor, e.g. actuated in the other direction by gravity or a spring
9/1073 . . . . . {with actuation in the other direction by gravity}
9/1076 . . . . . {with fluid-actuated inlet or outlet valve (mechanically controlled F04B 7/00)}
9/109 . . . having plural pumping chambers
9/1095 . . . . {having two or more pumping chambers in series}
9/111 . . . . with two mechanically connected pumping members
9/1115 . . . . . {the movement of the pumping pistons in only one direction being obtained by a single-acting piston liquid motor, e.g. actuation in the other direction by spring means}
9/113 . . . . . reciprocating movement of the pumping members being obtained by a double-acting liquid motor
9/115 . . . . . reciprocating movement of the pumping members being obtained by two single-acting liquid motors, each acting in one direction
9/117 . . . . the pumping members not being mechanically connected to each other
9/1172 . . . . . {the movement of each pump piston in the two directions being obtained by a double-acting piston liquid motor}
9/1174 . . . . . {with fluid-actuated inlet or outlet valve (mechanically controlled F04B 7/00)}
9/1176 . . . . . {the movement of each piston in one direction being obtained by a single-acting piston liquid motor}

9/1178 . . . . . {the movement in the other direction being obtained by a hydraulic connection between the liquid motor cylinders}
9/12 . . the fluid being elastic, e.g. steam or air
9/1207 . . . {using a source of partial vacuum or sub-atmospheric pressure}
9/1215 . . . . {the return stroke being obtained by a spring}
9/1222 . . . . {the return stroke being obtained by an elastic fluid under pressure}
9/123 . . . having only one pumping chamber
9/1235 . . . . {the movement of the pump piston in the two directions being obtained by two single-acting piston fluid motors, each acting in one direction}
9/125 . . . . reciprocating movement of the pumping member being obtained by a double-acting elastic-fluid motor
9/1253 . . . . . {one side of the double-acting piston fluid motor being always under the influence of the fluid under pressure}
9/1256 . . . . . {with fluid-actuated inlet or outlet valve (mechanically controlled F04B 7/00)}
9/127 . . . . rectilinear movement of the pumping member in the working direction being obtained by a single-acting elastic-fluid motor, e.g. actuated in the other direction by gravity or a spring
9/1273 . . . . . {with actuation in the other direction by gravity}
9/1276 . . . . . {with fluid-actuated inlet or outlet valve (mechanically controlled F04B 7/00)}
9/129 . . . having plural pumping chambers
9/1295 . . . . {having two or more pumping chambers in series}
9/131 . . . . with two mechanically connected pumping members
9/1315 . . . . . {the movement of the pumping pistons in only one direction being obtained by a single-acting piston fluid motor, e.g. actuation in the other direction by spring means}
9/133 . . . . . reciprocating movement of the pumping members being obtained by a double-acting elastic-fluid motor
9/135 . . . . . reciprocating movement of the pumping members being obtained by two single-acting elastic-fluid motors, each acting in one direction
9/137 . . . . the pumping members not being mechanically connected to each other
9/1372 . . . . . {the movement of each pump piston in the two directions is obtained by a double-acting piston fluid motor}
9/1374 . . . . . {with fluid-actuated inlet or outlet valve (mechanically controlled F04B 7/00)}
9/1376 . . . . . {the movement of each piston in one direction being obtained by a single-acting piston fluid motor}
9/1378 . . . . . {the movement in the other direction being obtained by an hydraulic connection between the fluid motor cylinders}
9/14 . Pumps characterised by muscle-power operation {(hand-held spraying or dispensing apparatus using pumps or bulbs B05B 11/00)}

11/00 Equalisation of pulses, e.g. by use of air vessels; Counteracting cavitation

11/0008 . {using accumulators}
11/0016 . . {with a fluid spring}
11/0025 . . . {the spring fluid being in direct contact with the pumped fluid}
11/0033 . . {with a mechanical spring}
11/0041 . {by piston speed control (F04B 11/0058 takes precedence)}
11/005 . {using two or more pumping pistons}
11/0058 . . {with piston speed control}
11/0066 . . . {with special shape of the actuating element}
11/0075 . . {connected in series}
11/0083 . . . {the pistons having different cross-sections}
11/0091 . {using a special shape of fluid pass, e.g. throttles, ducts}

13/00 Pumps specially modified to deliver fixed or variable measured quantities (for transferring liquid from bulk storage containers or reservoirs into vehicles or into portable containers B67D 7/58)

13/02 . of two or more fluids at the same time

15/00 Pumps adapted to handle specific fluids, e.g. by selection of specific materials for pumps or pump parts

15/02 . the fluids being viscous or non-homogeneous
15/023 . . {supply of fluid to the pump by gravity through a hopper, e.g. without intake valve}
2015/026 . . {with a priming plunger or piston ahead of the pumping piston and connected on the same piston rod}
15/04 . the fluids being hot or corrosive (F04B 15/06 takes precedence)
15/06 . for liquids near their boiling point, e.g. under subnormal pressure
15/08 . . the liquids having low boiling points
2015/081 . . . {Liquefied gases}
2015/0812 . . . . {Air}
2015/0814 . . . . {Argon}
2015/0816 . . . . {Carbon monoxide}
2015/0818 . . . . {Carbon dioxide}
2015/082 . . . . {Helium}
2015/0822 . . . . {Hydrogen}
2015/0824 . . . . {Nitrogen}
2015/0826 . . . . {Oxygen}

17/00 Pumps characterised by combination with, or adaptation to, specific driving engines or motors

17/003 . {driven by piezo-electric means (F04B 43/046 and F04B 43/095 take precedence)}
17/006 . {Solar operated}
17/02 . driven by wind motors
17/03 . driven by electric motors
17/04 . . using solenoids
17/042 . . . {the solenoid motor being separated from the fluid flow}
17/044 . . . . {using solenoids directly actuating the piston}
17/046 . . . {the fluid flowing through the moving part of the motor}

17/048 . . . {the fluid flowing around the moving part of the motor}
17/05 . driven by internal-combustion engines
17/06 . Mobile combinations

19/00 Machines or pumps having pertinent characteristics not provided for in, or of interest apart from, groups F04B 1/00 - F04B 17/00
19/003 . {free-piston type pumps}
19/006 . {Micropumps (F04B 43/043 and F04B 43/095 take precedence)}
19/02 . having movable cylinders
19/022 . . {reciprocating cylinders}
19/025 . . {cylinders rotating around their own axis}
19/027 . . {cylinders oscillating around an axis perpendicular to their own axis}
19/04 . Pumps for special use (for transferring liquids from bulk storage containers or reservoirs into vehicles or into portable containers B67D 7/58)
19/06 . . Pumps for delivery of both liquid and elastic fluids at the same time (wet gas pumps F04B 37/20)
19/08 . Scoop devices
19/10 . . of wheel type
19/12 . . of helical or screw-type
19/14 . . of endless-chain type, e.g. with the chains carrying pistons co-operating with open-ended cylinders
19/16 . Adhesion-type liquid-lifting devices
19/18 . . Adhesion members therefor
19/20 . Other positive-displacement pumps
19/22 . . of reciprocating-piston type
19/24 . . Pumping by heat expansion of pumped fluid

23/00 Pumping installations or systems (F04B 17/00 takes precedence)
23/02 . having reservoirs
23/021 . . {the pump being immersed in the reservoir}
23/023 . . . {only the pump-part being immersed, the driving-part being outside the reservoir}
23/025 . . {the pump being located directly adjacent the reservoir}
23/026 . . . {a pump-side forming a wall of the reservoir}
23/028 . . . {the pump being mounted on top of the reservoir}
23/04 . Combinations of two or more pumps
23/06 . . the pumps being all of reciprocating positive-displacement type
23/08 . . the pumps being of different types
23/10 . . . at least one pump being of the reciprocating positive-displacement type
23/103 . . . . {being a radial piston pump}
23/106 . . . . {being an axial piston pump}
23/12 . . . at least one pump being of the rotary-piston positive-displacement type (F04B 23/10 takes precedence)
23/14 . . . at least one pump being of the non-positive-displacement type (F04B 23/10, F04B 23/12 take precedence)

Pumps specially adapted for elastic fluids (having a flexible working member F04B 45/00; for raising fluid from great depths F04B 47/00)

25/00 Multi-stage pumps
25/005 . {with two cylinders}
25/02 . of stepped piston type
25/04 . having cylinders coaxial with, or parallel or inclined to, main shaft axis

27/00 Multi-cylinder pumps characterised by number or arrangement of cylinders (F04B 25/00 takes precedence; control of reciprocating machines or pumps in general F04B 49/00)
27/005 . {with two cylinders}
27/02 . having cylinders arranged oppositely relative to main shaft
27/04 . having cylinders in star- or fan-arrangement
27/0404 . . {Details, component parts specially adapted for such pumps}
27/0409 . . . {Pistons}
27/0414 . . . {Cams}
27/0418 . . . . {consisting of several cylindrical elements, e.g. rollers}
27/0423 . . . {Cylinders}
27/0428 . . . {Arrangements for pressing or connecting the pistons against the actuated cam}
27/0432 . . . . {hydraulically}
27/0437 . . . {Disconnecting the pistons from the actuated cam (in general F01B 31/24)}
27/0442 . . . {Supporting and guiding means for the pistons}
27/0446 . . . {Draining of the engine housing; Arrangements dealing with leakage fluid}
27/0451 . . . {Particularities relating to the distribution members (F04B 27/0472, F04B 27/0531 and F04B 27/0535 take precedence)}
27/0456 . . . . {to cylindrical distribution members}
27/046 . . . . {to conical distribution members}
27/0465 . . . . {to plate like distribution members}
27/047 . . with an actuating element at the outer ends of the cylinders
27/0472 . . . {with cam-actuated distribution members}
27/0474 . . . {with two or more series radial piston-cylinder units}
27/0476 . . . . {directly located side-by-side}
27/0478 . . . . {Coupling of several cylinder-barrels}
27/053 . . with an actuating element at the inner ends of the cylinders
27/0531 . . . {with cam-actuated distribution members}
27/0533 . . . . {each machine piston being provided with channels, which are coacting with the cylinder and are used as a distribution member for another piston-cylinder unit}
27/0535 . . . {the piston-driving cam being provided with an inlet or an outlet}
27/0536 . . . {with two or more series radial piston-cylinder units}
27/0538 . . . . {directly located side-by-side}
27/06 . . the cylinders being movable, e.g. rotary {(F04B 27/08 takes precedence)}
27/0606 . . . {having cylinders in star- or fan-arrangement, the connection of the pistons with an actuating element being at the outer ends of the cylinders}
27/0612 . . . . {rotary cylinder block}
27/0619 . . . . . {cylinder block and actuating cam rotating together (F04B 27/0631 and F04B 27/0644 take precedence)}

27/0625 . . . . . {with two or more series radial piston cylinder units}
27/0631 . . . . . {cylinder block and actuating cam both rotating (F04B 27/0644 takes precedence)}
27/0638 . . . . . {directly located side by side}
27/0644 . . . . . {cylinder block and actuating cam both rotating}
27/065 . . . {having cylinders in star- or fan-arrangement, the connection of the pistons with an actuating element being at the inner ends of the cylinders}
27/0657 . . . . {rotary cylinder block}
27/0663 . . . . . {the rotary cylinder being provided with only one piston, reciprocating within this cylinder}
27/067 . . Control
27/0673 . . . {by using a valve in a system with several pumping chambers, wherein the flow-path through the chambers can be changed, e.g. series-parallel}
27/0676 . . . {by changing the phase relationship between the actuating cam and the distribution means}
27/073 . . . by varying the relative eccentricity between two members, e.g. a cam and a drive shaft
27/08 . having cylinders coaxial with, or parallel or inclined to, main shaft axis
27/0804 . . {having rotary cylinder block (see F01B 3/0032, F03C 1/0636, F03C 1/20)}
27/0808 . . . {having two or more sets of cylinders or pistons}
27/0813 . . . . {inclined to main shaft axis}
27/0817 . . . {arrangements for pressing the cylinder barrel against the valve plate, e.g. by fluid pressure}
27/0821 . . . {component parts, details, e.g. valves, sealings, lubrication}
27/0826 . . . . {particularities in the contacting area between cylinder barrel and valve plate}
27/083 . . . . . {bearing means}
27/0834 . . . . {cylinder barrel}
27/0839 . . . . {valve means, e.g. valve plate}
27/0843 . . . . . {cylindrical valve means}
27/0847 . . . . . {conical valve means}
27/0852 . . . . {machine housing}
27/0856 . . . . . {cylinder barrel bearing means}
27/086 . . . . {swash plate}
27/0865 . . . . . {swash plate bearing means or driving axis bearing means}
27/0869 . . . {connection between rotating cylinder barrel and rotating inclined swash plate}
27/0873 . . {Component parts, e.g. sealings; Manufacturing or assembly thereof}
27/0878 . . . {Pistons}
27/0882 . . . . {piston shoe retaining means}
27/0886 . . . . {Piston shoes}
27/0891 . . . {casings, housings}
27/0895 . . . {driving means}
27/10 . . having stationary cylinders
27/1009 . . . {Distribution members}
27/1018 . . . . {Cylindrical distribution members}
27/1027 . . . . {Conical distribution members}
27/1036 . . . {Component parts, details, e.g. sealings, lubrication}
27/1045 . . . . {Cylinders}
27/1054 . . . . {Actuating elements}
27/1063 . . . . . {Actuating-element bearing means or driving-axis bearing means}
27/1072 . . . . . {Pivot mechanisms}
27/1081 . . . . {Casings, housings}
27/109 . . . . {Lubrication}
27/12 . . . having plural sets of cylinders or pistons
27/14 . . Control
27/16 . . . of pumps with stationary cylinders
27/18 . . . . by varying the relative positions of a swash plate and a cylinder block
27/1804 . . . . . {Controlled by crankcase pressure}
2027/1809 . . . . . {Controlled pressure}
2027/1813 . . . . . {Crankcase pressure}
2027/1818 . . . . . {Suction pressure}
2027/1822 . . . . . {Valve-controlled fluid connection}
2027/1827 . . . . . {between crankcase and discharge chamber}
2027/1831 . . . . . {between crankcase and suction chamber}
2027/1836 . . . . . {between crankcase and working chamber}
2027/184 . . . . . {Valve controlling parameter}
2027/1845 . . . . . {Crankcase pressure}
2027/185 . . . . . {Discharge pressure}
2027/1854 . . . . . {External parameters}
2027/1859 . . . . . {Suction pressure}
2027/1863 . . . . . {with an auxiliary valve, controlled by}
2027/1868 . . . . . {Crankcase pressure}
2027/1872 . . . . . {Discharge pressure}
2027/1877 . . . . . {External parameters}
2027/1881 . . . . . {Suction pressure}
2027/1886 . . . . . {Open (not controlling) fluid passage}
2027/189 . . . . . {between crankcase and discharge chamber}
2027/1895 . . . . . {between crankcase and suction chamber}
27/20 . . . of pumps with rotary cylinder block
27/22 . . . . by varying the relative positions of a swash plate and a cylinder block
27/24 . Control not provided for in a single group of groups F04B 27/02 - F04B 27/22

29/00 {Other pumps with movable, e.g. rotatable cylinders}

31/00 Free-piston pumps; Systems incorporating such pumps (muscle-driven pumps in which the stroke is not defined by gearing F04B 33/00; free-piston combustion engines, free-piston gas generators F02B 71/00; systems predominated by prime mover aspects, see the relevant classes for the prime mover)

33/00 Pumps actuated by muscle power, e.g. for inflating
33/005 . {specially adapted for inflating tyres of non-motorised vehicles, e.g. cycles, tricycles}
33/02 . with intermediate gearing

35/00 Piston pumps characterised by the driving means to their working members, or by combination with, or adaptation to, specific driving engines or motors, not otherwise provided for (predominant aspects of the engines or motors, see the relevant classes)

35/002 . {driven by internal combustion engines}
35/004 . {driven by floating elements}
35/006 . {driven by steam engines}
35/008 . {the means being a fluid transmission link}
35/01 . the means being mechanical
35/04 . the means being electric
35/045 . . {using solenoids}
35/06 . Mobile combinations

37/00 Pumps having pertinent characteristics not provided for in, or of interest apart from, groups F04B 25/00 - F04B 35/00

37/02 . for evacuating by absorption or adsorption (absorption or adsorption in general B01J {; for gas-filled discharge tubes see H01J 17/24})
37/04 . . Selection of specific absorption or adsorption materials
37/06 . for evacuating by thermal means
37/08 . . by condensing or freezing, e.g. cryogenic pumps (cold traps B01D 8/00)
37/085 . . . {Regeneration of cryo-pumps}
37/10 . for special use (F04B 37/02, F04B 37/06 take precedence)
37/12 . . to obtain high pressure
37/14 . . to obtain high vacuum
37/16 . . . Means for nullifying unswept space
37/18 . . for specific elastic fluids
37/20 . . . for wet gases, e.g. wet air

39/00 Component parts, details, or accessories, of pumps or pumping systems, not otherwise provided for in, or of interest apart from, groups F04B 25/00 - F04B 37/00 (for controlling F04B 49/00)

39/0005 . {adaptations of pistons}
39/0011 . . {liquid pistons}
39/0016 . . {with valve arranged in the piston}
39/0022 . . {piston rods}
39/0027 . {Pulsation and noise damping means}
39/0033 . . {with encapsulations}
39/0038 . . . {of inlet or outlet channels}
39/0044 . . {with vibration damping supports}
39/005 . . {with direct action on the fluid flow using absorptive materials}
39/0055 . . {with a special shape of fluid passage, e.g. bends, throttles, diameter changes, pipes}
39/0061 . . . {using muffler volumes}
39/0066 . . . {using sidebranch resonators, e.g. Helmholtz resonators}
39/0072 . . . {characterised by assembly or mounting}
39/0077 . . {by generating oil foam}
39/0083 . . {using blow off silencers}
39/0088 . . {using mechanical tuned resonators}
39/0094 . {crankshaft}
39/02 . Lubrication (of machines or engines in general F01M)
39/0207 . . {with lubrication control systems}
39/0215 . . {characterised by the use of a special lubricant}
39/0223 . . {characterised by the compressor type (swash-plate compressors F04B 27/109)}
39/023 . . . {Hermetic compressors}
39/0238 . . . . {with oil distribution channels}
39/0246 . . . . . {in the rotating shaft}
39/0253 . . . . . {using centrifugal force for transporting the oil}
39/0261 . . . . {with an auxiliary oil pump}
39/0269 . . . . {with device for spraying lubricant or with mist lubrication}
39/0276 . . . {the pump being of the reciprocating piston type, e.g. oscillating, free-piston compressors}
39/0284 . . {Constructional details, e.g. reservoirs in the casing (swash-plate compressors F04B 27/0878, F04B 27/109)}
39/0292 . . . {Lubrication of pistons or cylinders}
39/04 . Measures to avoid lubricant contaminating the pumped fluid
39/041 . . {sealing for a reciprocating rod (sealing in general F16J)}
39/042 . . . {sealing being provided on the piston}
39/044 . . . {sealing with a rolling diaphragm between piston and cylinder}
39/045 . . . {Labyrinth-sealing between piston and cylinder}
39/047 . . . {Sealing between piston and carter being provided by a bellow}
39/048 . . . {Sealing between piston and carter being provided by a diaphragm}
39/06 . Cooling (of machines or engines in general F01P); Heating; Prevention of freezing
39/062 . . {Cooling by injecting a liquid in the gas to be compressed}
39/064 . . {Cooling by a cooling jacket in the pump casing}
39/066 . . {Cooling by ventilation}
39/068 . . {prevention of freezing}
39/08 . Actuation of distribution members
39/10 . Adaptations or arrangements of distribution members
39/1006 . . {the members being ball valves}
39/1013 . . {the members being of the poppet valve type}
39/102 . . {the members being disc valves}
39/1026 . . . {without spring (F04B 39/1033 takes precedence)}
39/1033 . . . {annular disc valves}
39/104 . . {the members being parallel flexible strips}
39/1046 . . {Combination of in- and outlet valve}
39/1053 . . {the members being Hoerbigen valves}
39/106 . . {the members being parallel non-flexible strips}
39/1066 . . {Valve plates}
39/1073 . . {the members being reed valves}
39/108 . . . {circular reed valves}
39/1086 . . . {flat annular reed valves}
39/1093 . . {the members being low-resistance valves allowing free streaming}
39/12 . Casings (casings for machines or engines in general F16M); Cylinders; Cylinders heads; Fluid connections
39/121 . . {Casings}
39/122 . . {Cylinder block}
39/123 . . {Fluid connections}
39/125 . . {Cylinder heads}
39/126 . . {Cylinder liners}
39/127 . . {Mounting of a cylinder block in a casing}
39/128 . . {Crankcases}
39/14 . Provisions for readily assembling or disassembling
39/16 . Filtration; Moisture separation

41/00 **Pumping installations or systems** (F04B 31/00, F04B 35/00 take precedence)
41/02 . having reservoirs
41/04 . Conversion of internal-combustion engine cylinder units to pumps
41/06 . Combinations of two or more pumps

Machines or pumps having flexible working members

43/00 **Machines, pumps, or pumping installations having flexible working members** (pumps or pumping installations specially adapted for elastic fluids F04B 45/00)
43/0009 . {Special features}
43/0018 . . {the periphery of the flexible member being not fixed to the pump-casing, but acting as a valve}
43/0027 . . {without valves}
43/0036 . . {the flexible member being formed as an O-ring}
43/0045 . . {with a number of independent working chambers which are actuated successively by one mechanism}
43/0054 . . {particularities of the flexible members}
43/0063 . . . {bell-shaped flexible members}
43/0072 . . . {of tubular flexible members}
43/0081 . . {systems, control, safety measures}
43/009 . . . {leakage control; pump systems with two flexible members; between the actuating element and the pumped fluid}
43/02 . having plate-like flexible members, e.g. diaphragms
43/021 . . {the plate-like flexible member is pressed against a wall by a number of elements, each having an alternating movement in a direction perpendicular to the plane of the plate-like flexible member and each having its own driving mechanism}
43/023 . . {double acting plate-like flexible member}
43/025 . . {two or more plate-like pumping members in parallel}
43/026 . . . {each plate-like pumping flexible member working in its own pumping chamber}
43/028 . . {with in- or outlet valve arranged in the plate-like flexible member (valve arranged in the piston F04B 53/12)}
43/04 . . Pumps having electric drive
43/043 . . . {Micropumps}
43/046 . . . . {with piezo-electric drive}
43/06 . . Pumps having fluid drive
43/067 . . . the fluid being actuated directly by a piston
43/073 . . . the actuating fluid being controlled by at least one valve
43/0733 . . . . {with fluid-actuated pump inlet or outlet valves; with two or more pumping chambers in series}
43/0736 . . . . {with two or more pumping chambers in parallel}
43/08 . having tubular flexible members (F04B 43/12 takes precedence)
43/082 . . {the tubular flexible member being pressed against a wall by a number of elements, each having an alternating movement in a direction perpendicular to the axes of the tubular member and each having its own driving mechanism}
43/084 . . {the tubular member being deformed by stretching or distortion}
43/086 . . {with two or more tubular flexible members in parallel (F04B 43/1136 takes precedence)}
43/088 . . {with two or more tubular flexible members in series (F04B 43/1133 takes precedence)}
43/09 . . Pumps having electric drive
43/095 . . . {Piezo-electric drive}
43/10 . . Pumps having fluid drive
43/107 . . . the fluid being actuated directly by a piston
43/113 . . . the actuating fluid being controlled by at least one valve
43/1133 . . . . {with fluid-actuated pump inlet or outlet valves; with two or more pumping chambers in series}
43/1136 . . . . {with two or more pumping chambers in parallel}
43/12 . having peristaltic action
43/1207 . . {the actuating element being a swash plate}
43/1215 . . {having no backing plate (deforming of the tube only by rollers)}
43/1223 . . {the actuating elements, e.g. rollers, moving in a straight line during squeezing}
43/123 . . {using an excenter as the squeezing element}
43/1238 . . {using only one roller as the squeezing element, the roller moving on an arc of a circle during squeezing}
43/1246 . . . {the roller being placed at the outside of the tubular flexible member}
43/1253 . . {by using two or more rollers as squeezing elements, the rollers moving on an arc of a circle during squeezing}
43/1261 . . . {the rollers being placed at the outside of the tubular flexible member}
43/1269 . . . {the rotary axes of the rollers lying in a plane perpendicular to the rotary axis of the driving motor}
43/1276 . . . {Means for pushing the rollers against the tubular flexible member}
43/1284 . . . {Means for pushing the backing-plate against the tubular flexible member}
43/1292 . . . {Pumps specially adapted for several tubular flexible members}
43/14 . . having plate-like flexible members

45/00 **Pumps or pumping installations having flexible working members and specially adapted for elastic fluids**
45/02 . having bellows
45/022 . . {with two or more bellows in parallel}
45/024 . . {with two or more bellows in series}
45/027 . . having electric drive
45/033 . . having fluid drive
45/0333 . . . {the fluid being actuated directly by a piston}
45/0336 . . . {the actuating fluid being controlled by one or more valves}
45/04 . having plate-like flexible members, e.g. diaphragms
45/041 . . {double acting plate-like flexible pumping member}
45/043 . . {two or more plate-like pumping flexible members in parallel}
45/045 . . {with in- or outlet valve arranged in the plate-like pumping flexible members}
45/047 . . Pumps having electric drive
45/053 . . Pumps having fluid drive
45/0533 . . . {the fluid being actuated directly by a piston}

45/0536 . . . {the actuating fluid being controlled by one or more valves}
45/06 . having tubular flexible members (F04B 45/02 takes precedence)
45/061 . . {with fluid drive}
45/062 . . . {the fluid being actuated directly by a piston}
45/064 . . . {the actuating fluid being controlled by one or more valves}
45/065 . . {with electric drive}
45/067 . . Pumps having electric drive
45/073 . . Pumps having fluid drive
45/0733 . . . {the fluid being actuated directly by a piston}
45/0736 . . . {the actuating fluid being controlled by one or more valves}
45/08 . . having peristaltic action
45/085 . . . {the actuating element being a swash plate}
45/10 . . having plate-like flexible members

47/00 Pumps or pumping installations specially adapted for raising fluids from great depths, e.g. well pumps (by using positive or negative pressurised fluid medium acting directly on the liquid to be pumped F04F 1/00)

47/005 . {Sand trap arrangements}
47/02 . the driving mechanisms being situated at ground level (F04B 47/12 takes precedence)
47/022 . . {driving of the walking beam}
47/024 . . {actuated by muscle power}
47/026 . . {Pull rods, full rod component parts}
47/028 . . {details of the walking beam}
47/04 . . the driving means incorporating fluid means
47/06 . having motor-pump units situated at great depth
47/08 . . the motors being actuated by fluid
47/10 . . . the units or parts thereof being liftable to ground level by fluid pressure
47/12 . having free plunger lifting the fluid to the surface
47/14 . Counterbalancing
47/145 . . {with fluid means}

49/00 Control {, e.g. of pump delivery, or pump pressure} of, or safety measures for, machines, pumps, or pumping installations, not otherwise provided for, or of interest apart from, groups F04B 1/00 - F04B 47/00

NOTE

The classification symbols in group F04B 49/00 and subgroups can be followed by additional symbols preceded by the sign "+". The symbols are applied in subgroups F04B 49/06, F04B 49/08, F04B 49/16 and F04B 49/225. The symbols have the meanings as listed below:

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+C  specially adapted for pumps
for elastic fluids,
e.g. compressors
+P  specially adapted for pumps
for liquids
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49/002 . {Hydraulic systems to change the pump delivery}
49/005 . {changing the phase relationship of two working pistons in one working chamber or the phase-relationship of a piston and a driven distribution member}
49/007 . {Installations or systems with two or more pumps or pump cylinders, wherein the flow-path through the stages can be changed, e.g. from series to parallel (centrifugal pumps F04D 15/0072)}
49/02 . Stopping, starting, unloading or idling control (controlled electrically F04B 49/06)
49/022 . . {by means of pressure}
49/025 . . by means of floats
49/03 . . by means of valves
49/035 . . . Bypassing
49/04 . Regulating by means of floats (F04B 49/025 takes precedence)
49/06 . Control using electricity (regulating by means of floats actuating electric switches F04B 49/04)
49/065 . . {and making use of computers}
49/08 . Regulating by delivery pressure
49/10 . Other safety measures
49/103 . . {Responsive to speed}
49/106 . . {Responsive to pumped volume}
49/12 . by varying the length of stroke of the working members
49/121 . . {Lost-motion device in the driving mechanism}
49/123 . . {by changing the eccentricity of one element relative to another element}
49/125 . . . {by changing the eccentricity of the actuation means, e.g. cams or cranks, relative to the driving means, e.g. driving shafts (F04B 49/128 takes precedence)}
49/126 . . . . {with a double eccenter mechanism}
49/128 . . . {by changing the eccentricity of the cylinders, e.g. by moving a cylinder block}
49/14 . . Adjusting abutments located in the path of reciprocation
49/16 . by adjusting the capacity of dead spaces of working chambers
49/18 . by changing the effective cross-section of the working surface of the piston
49/20 . by changing the driving speed (controlled electrically F04B 49/06)
49/22 . by means of valves (F04B 49/03 takes precedence)
49/225 . . {with throttling valves or valves varying the pump inlet opening or the outlet opening}
49/24 . . Bypassing
49/243 . . . {by keeping open the inlet valve}
49/246 . . . {by keeping open the outlet valve}

51/00 Testing machines, pumps, or pumping installations

53/00 Component parts, details or accessories not provided for in, or of interest apart from, groups F04B 1/00 - F04B 23/00 or F04B 39/00 - F04B 47/00

53/001 . {Noise damping}
53/002 . . {by encapsulation}
53/003 . . {by damping supports}
53/004 . . {by mechanical resonators}
53/005 . {Adaptations or arrangements of valves used as foot valves, of suction strainers, or of mud-boxes}
53/006 . {Crankshafts}
53/007 . {Cylinder heads}
53/008 . {Spacing or clearance between cylinder and piston}
53/02 . Packing the free space between cylinders and pistons
53/04 . Draining
53/06 . Venting

53/08 . Cooling (of machines or engines in general F01P); Heating; Preventing freezing
53/10 . Valves; Arrangement of valves
53/1002 . . {Ball valves}
53/1005 . . . {being formed by two closure members working in series}
53/1007 . . . {having means for guiding the closure member}
53/101 . . . {having means for limiting the opening height}
53/1012 . . . . {and means for controlling the opening height}
53/1015 . . . {Combinations of ball valves working in parallel}
53/1017 . . . {Semi-spherical ball valves}
53/102 . . {Disc valves}
53/1022 . . . {having means for guiding the closure member axially}
53/1025 . . . . {the guiding means being provided within the valve opening}
53/1027 . . . . {the guiding means being provided at both sides of the disc}
53/103 . . . {Flat-annular type disc valves}
53/1032 . . . {Spring-actuated disc valves (F04B 53/1022, F04B 53/103 take precedence)}
53/1035 . . . {with means for limiting the opening height}
53/1037 . . {Flap valves}
53/104 . . . {the closure member being a rigid element oscillating around a fixed point}
53/1042 . . . . {by means of a flexible connection}
53/1045 . . . . {the valve being formed by two elements}
53/1047 . . . {the valve being formed by one or more flexible elements}
53/105 . . . . {one flexible element oscillating around a fixed point}
53/1052 . . . . {two flexible elements oscillating around a fixed point}
53/1055 . . . . {more than two flexible elements oscillating around a fixed point}
53/1057 . . . . {the valve being a tube, e.g. normally closed at one end}
53/106 . . . . {the valve being a membrane}
53/1062 . . . . . {fixed at two or more points at its periphery}
53/1065 . . . . . {fixed at its centre}
53/1067 . . . . . {fixed at its whole periphery and with an opening at its centre}
53/107 . . . . . {the opening normally being closed by a fixed element}
53/1072 . . {the valve being an elastic body, the length thereof changing in the opening direction}
53/1075 . . {the valve being a flexible annular ring}
53/1077 . . {Flow resistance valves, e.g. without moving parts}
53/108 . . {Valves characterised by the material}
53/1082 . . . {magnetic}
53/1085 . . {having means for limiting the opening height (F04B 53/101 and F04B 53/1035 take precedence)}
53/1087 . . {Valve seats}
53/109 . . {inlet and outlet valve forming one unit}
53/1092 . . . {and one single element forming both the inlet and outlet closure member}
53/1095 . . {Valves linked to another valve of another pumping chamber}
53/1097 . . {with means for lifting the closure member for pump cleaning purposes}
53/12 . . arranged in or on pistons
53/121 . . . {the valve being an annular ring surrounding the piston, e.g. an O-ring}
53/122 . . . {the piston being free-floating, e.g. the valve being formed between the actuating rod and the piston}
53/123 . . . {Flexible valves}
53/124 . . . {Oscillating valves}
53/125 . . . {Reciprocating valves}
53/126 . . . . {Ball valves}
53/127 . . . . {Disc valves}
53/128 . . . . . {Annular disc valves}
53/129 . . . . {Poppet valves}
53/14 . Pistons, piston-rods or piston-rod connections
53/141 . . {Intermediate liquid piston between the driving piston and the pumped liquid (F04B 43/06 and F04B 43/10 take precedence)}
53/142 . . {Intermediate liquid-piston between a driving piston and a driven piston (F04B 9/10, F04B 43/06, F04B 43/10 and F04B 53/141 take precedence)}
53/143 . . {Sealing provided on the piston}
53/144 . . {Adaptation of piston-rods}
53/145 . . . {Rod shock absorber}
53/146 . . . {Piston-rod guiding arrangements}
53/147 . . . {Mounting or detaching of piston rod}
53/148 . . {the piston being provided with channels which are coacting with the cylinder and are used as a distribution member for another piston-cylinder unit}
53/16 . Casings; Cylinders; Cylinder liners or heads; Fluid connections
53/162 . . {Adaptations of cylinders}
53/164 . . . {Stoffing boxes}
53/166 . . . {Cylinder liners}
53/168 . . . . {Mounting of cylinder liners in cylinders}
53/18 . Lubricating (of machines or engines in general F01M)
53/20 . Filtering
53/22 . Arrangements for enabling ready assembly or disassembly

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2201/00 Pump parameters
2201/02 . Piston parameters
2201/0201 . . Position of the piston
2201/02011 . . . Angular position of a piston rotating around its own axis
2201/0202 . . Linear speed of the piston
2201/0203 . . Acceleration of the piston
2201/0204 . . Power on the piston
2201/0205 . . Piston ring wear
2201/0206 . . Length of piston stroke
2201/0207 . . Number of pumping strokes in unit time
2201/02071 . . . Total number of pumping strokes
2201/0208 . . Leakage across the piston
2201/0209 . . Duration of piston stroke

2201/021 . . Rotational speed of a piston rotating around its own axis (F04B 7/06)
2201/04 . Carter parameters
2201/0401 . . Carter pressure
2201/0402 . . Lubricating oil temperature
2201/0403 . . Carter housing temperature
2201/0404 . . Lubricating oil condition
2201/0405 . . Leakage
2201/0406 . . Pressure change across an oil filter
2201/06 . Valve parameters
2201/0601 . . Opening times
2201/06011 . . . of the inlet valve only
2201/06012 . . . of the outlet valve only
2201/0602 . . Valve acceleration
2201/0603 . . Valve wear
2201/0604 . . Valve noise
2201/0605 . . Leakage over a valve
2201/0606 . . Opening width or height
2201/06061 . . . of the inlet valve
2201/06062 . . . of the outlet valve
2201/08 . Cylinder or housing parameters
2201/0801 . . Temperature
2201/0802 . . Vibration
2201/0803 . . Leakage
2201/0804 . . Noise
2201/0805 . . Rotational speed of a rotating cylinder block
2201/0806 . . Resonant frequency
2201/0807 . . Number of working cylinders
2201/0808 . . Size of the dead volume
2201/12 . Parameters of driving or driven means
2201/1201 . . Rotational speed of the axis
2201/1202 . . Torque on the axis
2201/1203 . . Power on the axis
2201/1204 . . Position of a rotating inclined plate
2201/12041 . . . Angular position
2201/1205 . . Position of a non-rotating inclined plate
2201/12051 . . . Angular position
2201/1206 . . Rotational speed of a rotating inclined plate
2201/1207 . . Wear of the bearings
2201/1208 . . Angular position of the shaft
2201/1209 . . Radial force on the bearings
2201/121 . . Load on the sucker rod
2201/1211 . . Position of the walking beam
2201/1212 . . Oil pressure in the bearings
2201/1213 . . Eccentricity of an outer annular cam
2201/124 . . Coupling parameters
2201/1241 . . . Engagement
2201/127 . . Braking parameters

2203/00 Motor parameters
2203/02 . of rotating electric motors
2203/0201 . . Current
2203/0202 . . Voltage
2203/0203 . . Magnetic flux
2203/0204 . . Frequency of the electric current
2203/0205 . . Temperature
2203/0206 . . Vibration
2203/0207 . . Torque
2203/0208 . . Power
2203/0209 . . Rotational speed
2203/021 . . Lubricating-oil temperature
2203/0211 . . Noise
2203/0212 . . Amplitude of the electric current
2203/0213 . . Pulses per unit of time (pulse motor)
2203/0214 . . Number of working motor-pump units
2203/04 . of linear electric motors
2203/0401 . . Current
2203/0402 . . Voltage
2203/0403 . . Magnetic flux
2203/0404 . . Frequency of the electric current
2203/0405 . . Temperature
2203/0406 . . Vibration
2203/0407 . . Force
2203/0408 . . Power
2203/0409 . . Linear speed
2203/041 . . Lubricating-oil temperature
2203/0411 . . Noise
2203/06 . of internal combustion engines
2203/0601 . . Temperature
2203/0602 . . Vibration
2203/0603 . . Torque
2203/0604 . . Power
2203/0605 . . Rotational speed
2203/0606 . . Lubricating-oil temperature
2203/0607 . . Fuel consumption
2203/06071 . . . position of the carburettor valve
2203/09 . of linear hydraulic motors
2203/0901 . . Opening time of the valves
2203/0902 . . Liquid pressure in a working chamber
2203/0903 . . Position of the driving piston
2203/091 . . . Opening time of the valves
2203/10 . of linear elastic fluid motors
2203/1001 . . Opening time of the valves
2203/11 . of a gas turbine
2203/1101 . . Rotational speed of the turbine
2203/1102 . . Flow rate of the driving fluid
2203/1103 . . Rotation sense of the turbine
2203/12 . of rotating hydraulic motors
2203/1201 . . Rotational speed
2203/1202 . . Pressure at the motor inlet

2205/00 Fluid parameters
2205/01 . Pressure before the pump inlet
2205/02 . Pressure in the inlet chamber
2205/03 . Pressure in the compression chamber
2205/04 . Pressure in the outlet chamber
2205/05 . Pressure after the pump outlet
2205/06 . Pressure in a (hydraulic) circuit
2205/061 . . after a throttle
2205/062 . . before a throttle
2205/063 . . in a reservoir linked to the pump outlet
2205/064 . . in a reservoir linked to the pump inlet
2205/065 . . between two stages in a multi-stage pump
2205/07 . Pressure difference over the pump
2205/08 . Pressure difference over a throttle
2205/0801 . . the throttle being a filter
2205/09 . Flow through the pump
2205/10 . Inlet temperature
2205/11 . Outlet temperature
2205/111 . . after a throttle
2205/112 . . between two stages in a multi-stage pump
2205/12 . Pressure pulsations before the pump
2205/13 . Pressure pulsations after the pump
2205/14 . Viscosity

2205/15 . By-passing over the pump
2205/151 . . Opening width of a bypass valve
2205/16 . Opening or closing of a valve in a circuit
2205/17 . Opening width of a throttling device
2205/171 . . before the pump inlet
2205/172 . . after the pump outlet
2205/173 . . in a circuit
2205/18 . Pressure in a control cylinder/piston unit
2205/50 . Presence of foreign matter in the fluid
2205/501 . . of solid particles
2205/503 . . of gas in a liquid flow, e.g. gas bubbles

2207/00 External parameters
2207/01 . Load in general
2207/02 . External pressure
2207/03 . External temperature
2207/04 . Settings
2207/041 . . of flow
2207/0411 . . . maximum
2207/0412 . . . minimum
2207/0413 . . . medium
2207/042 . . of pressure
2207/0421 . . . maximum
2207/0422 . . . minimum
2207/0423 . . . medium
2207/043 . . of time
2207/044 . . of the rotational speed of the driving motor
2207/0441 . . . maximum
2207/0442 . . . minimum
2207/045 . . of the resonant frequency of the unit motor-pump
2207/046 . . of length of piston stroke
2207/047 . . of the nominal power of the driving motor
2207/048 . . of a reference voltage of the driving motor
2207/70 . Warnings
2207/701 . . Sound
2207/702 . . Light
2207/703 . . Stopping
2207/704 . . Idling