CPC  COOPERATIVE PATENT CLASSIFICATION

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

ENGINEERING IN GENERAL

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

F16K  VALVES; TAPS; COCKS; ACTUATING-FLOATS; DEVICES FOR VENTING OR AERATING {(devices for emptying and evacuating the excess liquid in valves or conduits F16L 55/07)}

NOTE

Attention is drawn to the following places:

A47J 27/09  Safety devices for pressure cookers
A47J 31/46  Dispensing spouts, drain valves or like beverage-making apparatus
A61B 5/0235  Valves specially adapted for measuring pressure in heart or blood vessels
A61F 2/24  Heart valves
A61M 16/20  Valves specially adapted for medical respiratory devices
A61M 39/00  Tube connectors, tube couplings, valves or branch units specially adapted for medical use in general
A62B 9/02  Valves for respiratory apparatus
A62B 18/10  Valves for breathing masks or helmets
A62C  Fire extinguishers
{B01D 35/04}  {Plug, tap, or cock filters}
B05B  Nozzles, spray heads or other discharge apparatus for spraying or atomising
B60C 29/00  Arrangements of tyre-inflating valves relative to tyres or wheel rims; Connection of valves to wheel rims, tyres or other inflatable elastic bodies
B60G 17/048  Valves specially adapted for adjusting vehicle fluid-spring characteristics
B60T  Valves specially adapted for vehicle brake control systems
B62D 5/08  Vehicle power-assisted steering characterised by the type of valve used
B63B 7/00  B63C 9/00  Arrangement of inflating valves for floatable life-saving equipment
B65D 47/04  Container closures with discharging valves
B65D 90/32  Safety valves for large containers
B65D 90/54  Gates or closures on large containers
B67C 3/28  Flow control devices for bottling liquids
B67D  Dispensing, delivering or transferring liquids
{C21B 9/12}  {Hot-blast valves for blast furnaces}
E02B 8/00  Details, e.g. valves, of barrages or weirs
E02B 13/02  Closures for irrigation conduits
{E03C 1/04}  {Water-basin installations specially adapted for wash-basins or baths}
{E03C 1/05}  {Arrangements on wash-basins for the remote control of taps}
E03D  Flushing valves for water-closets or urinals
{E03F 7/04}  {Valves for preventing return flow in sewer systems}
E05F 3/12  Valve arrangements in door closers
E21B 21/10  Valve arrangements in drilling-fluid circulation systems
E21B 34/00  Valve arrangements for boreholes or wells
{E21D 15/51}  {Arrangement of relief valves in hydraulic mine props}
F01B 25/10  Working-fluid valves for controlling machines or engines in general or of positive-displacement type
F01D 17/10  Final actuators for controlling non-positive displacement machines or engines
F01L  Cyclically operated valves for machines or engines
F02D 9/08  Throttle valves for controlling combustion engines
F02K 9/58  Propellant feed valves for rocket-engines
F02M  Carburettors, fuel injection
F02M 59/46  Valves for fuel injection pumps
F04  Pumps
F16F 9/34  Valves for shock absorbers
F16L 29/00,  F16L 37/28  Pipe joints or quick-acting couplings with fluid cut-off means
F16L 55/00  Arrangement of valves in pipes

CPC - 2020.02  1
35x183] . . . . . F16K 7/00
35x195] . . . . . F16K 3/267
35x207] . . . . . F16K 3/246
35x219] . . . . . F16K 3/12, F24C 5/16
35x231] F25B 41/04
35x243] F24F
35x255] F24C 3/12
35x267] F24C 5/16
35x279] F24E
35x291] F22D 5/34
35x303] F22B 37/44
35x315] F17C 13/04
35x327] F16N 23/00
35x339] F16L 55/055
35x351] F16L 55/055
35x363] F16L 55/055
35x375] F16L 55/055
35x387] F16L 55/055
35x399] F16L 55/055
35x411] F16L 55/055
35x423] F16L 55/055
35x435] F16L 55/055
35x447] F16L 55/055
35x459] F16L 55/055
35x471] F16L 55/055
35x483] F16L 55/055
35x495] F16L 55/055
35x507] F16L 55/055
35x519] F16L 55/055
35x531] F16L 55/055
35x543] F16L 55/055
35x555] F16L 55/055
35x567] F16L 55/055
35x579] F16L 55/055
35x591] F16L 55/055
35x603] F16L 55/055
35x615] F16L 55/055
35x627] F16L 55/055
35x639] F16L 55/055
35x651] F16L 55/055
35x663] F16L 55/055
35x675] F16L 55/055
35x687] F16L 55/055
35x699] F16L 55/055
35x711] F16L 55/055
35x723] F16L 55/055
35x735] F16L 55/055
35x747] F16L 55/055
35x759] F16L 55/055
35x771] F16L 55/055
35x783] F16L 55/055
35x795] F16L 55/055
35x807] F16L 55/055
35x819] F16L 55/055
35x831] F16L 55/055
35x843] F16L 55/055
35x855] F16L 55/055
35x867] F16L 55/055
35x879] F16L 55/055
35x891] F16L 55/055
35x903] F16L 55/055
35x915] F16L 55/055
35x927] F16L 55/055
35x939] F16L 55/055
35x951] F16L 55/055
35x963] F16L 55/055
35x975] F16L 55/055
35x987] F16L 55/055
35x999] F16L 55/055

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:

<table>
<thead>
<tr>
<th>IPC Group</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>F16K 31/11</td>
<td>covered by F16K 31/06, F16K 31/08, F16K 31/10</td>
</tr>
<tr>
<td>F16K 31/64</td>
<td>covered by F16K 31/002, G05D 23/00</td>
</tr>
<tr>
<td>F16K 31/66</td>
<td>covered by F16K 31/006, G05D 23/00</td>
</tr>
<tr>
<td>F16K 31/68</td>
<td>covered by F16K 31/001, G05D 23/00</td>
</tr>
<tr>
<td>F16K 31/70</td>
<td>covered by F16K 31/002, G05D 23/08</td>
</tr>
<tr>
<td>F16K 31/72</td>
<td>covered by F16K 31/00</td>
</tr>
</tbody>
</table>

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.

Construational types (check valves F16K 15/00)

NOTE

In groups F16K 1/00 - F16K 13/00, an initial seal breaking or final sealing movement which is different from the opening or closing movement of the valve is not considered in determining the movement to be classified.

I/00 Lift valves (or globe valves), i.e. cut-off apparatus with closure members having at least a component of their opening and closing motion perpendicular to the closing faces (in combination with sliding valves F16K 3/246, F16K 3/267 ; diaphragm valves F16K 7/00)

I/02 . . . with screw-spindle (F16K 1/12, F16K 1/28 take precedence; actuating mechanisms with screw-spindles F16K 31/50)

I/04 . . . with a cut-off member rigid with the spindle, e.g. main valves

I/06 . . Special arrangements for improving the flow, e.g. special shape of passages or casings

I/08 . . . in which the spindle is perpendicular to the general direction of flow

I/10 . . . in which the spindle is inclined to the general direction of flow

I/12 . . . with streamlined valve member around which the fluid flows when the valve is opened

I/123 . . . (with stationary valve member and moving sleeve)

I/126 . . . (actuated by fluid)

I/14 . . . with ball-shaped valve member (check valves F16K 15/04)

I/16 . . . with pivoted closure-members

I/165 . . . (with a plurality of closure members)

1/18 . . . with pivoted discs or flaps

1/20 . . . with axis of rotation arranged externally of valve member

1/2007 . . . (specially adapted operating means therefor (operating means per se F16K 31/00))

1/2014 . . . (Shaping of the valve member)

1/2021 . . . (with a plurality of valve members)

1/2028 . . . (Details of bearings for the axis of rotation)

1/2035 . . . (the axis of rotation having only one bearing)

1/2042 . . . (Special features or arrangements of the sealing)

1/205 . . . . (the sealing being arranged on the valve member)

1/2057 . . . . (the sealing being arranged on the valve seat)

1/2064 . . . . . (with a channel- or U-shaped seal covering a central body portion)

1/2071 . . . . . (and being forced into sealing contact with the valve member by a spring or a spring-like member)

1/2078 . . . . . (Sealing means for the axis of rotation)

1/2085 . . . . . (Movable sealing bodies)

1/2092 . . . . . (the movement being caused by the flowing medium)

1/22 . . . . with axis of rotation crossing the valve member, e.g. butterfly valves

1/221 . . . . (specially adapted operating means therefor (operating means per se F16K 31/00))

1/222 . . . . (Shaping of the valve member)

1/223 . . . . (with a plurality of valve members)

1/224 . . . . (Details of bearings for the axis of rotation)
Constructional types

1/225 . . . . . [the axis of rotation having only one bearing]
1/226 . . . . . Shaping or arrangements of the sealing
1/2261 . . . . . [the sealing being arranged on the valve member]
1/2263 . . . . . [the sealing being arranged on the valve seat]
1/2265 . . . . . [with a channel- or U-shaped seal covering a central body portion]
1/2266 . . . . . [and being forced into sealing contact with the valve member by a spring or a spring-like member]
1/2268 . . . . . (Sealing means for the axis of rotation)
1/228 . . . . . Movable sealing bodies
1/2285 . . . . . [the movement being caused by the flowing medium]
1/24 . . . with valve members that, on opening of the valve, are initially lifted from the seat and next are turned around an axis parallel to the seat
1/26 . . . Shape or arrangement of the sealing [Not used]
1/28 . . . Movable sealing bodies [Not used]
1/30 . . . specially adapted for pressure containers
1/301 . . . [only shut-off valves, i.e. valves without additional means]
1/302 . . . . . [with valve member and actuator on the same side of the seat]
1/303 . . . . . [with a valve member, e.g. stem or shaft, passing through the seat]
1/304 . . . . . [Shut-off valves with additional means]
1/305 . . . . . [with valve member and actuator on the same side of the seat]
1/306 . . . . . [with a valve member, e.g. stem or shaft, passing through the seat]
1/307 . . . . . [Additional means used in combination with the main valve]
1/308 . . . . . [Connecting means]
1/32 . . . Details (details of more general applicability
F16K 25/00 - F16K 51/00)
1/34 . . . Cutting-off parts, e.g. valve members, seats
(F16K 1/06, F16K 1/12, F16K 1/14, F16K 1/26 take precedence)
1/36 . . . . . . . Valve members (for double-seat valves F16K 1/44 ; for butterfly valves F16K 1/222, F16K 1/223)
1/38 . . . . . . . of conical shape
1/385 . . . . . . . [contacting in the closed position, over a substantial axial length, a seat surface having the same inclination]
1/40 . . . . . . . of helical shape
1/42 . . . . . . . Valve seats (for double-seat valves F16K 1/44)
1/422 . . . . . [attachable by a threaded connection to the housing]
1/425 . . . . . [Attachment of the seat to the housing by plasctical deformation, e.g. valve seat or housing being plastically deformed during mounting]
1/427 . . . . . [Attachment of the seat to the housing by one or more additional fixing elements]
1/44 . . . . . . . Details of seats or valve members of double-seat valves
1/443 . . . . . . . [the seats being in series]
1/446 . . . . . . . [with additional cleaning or venting means between the two seats]
1/46 . . . . . . . Attachment of sealing rings
1/465 . . . . . . . [to the valve seats]
1/48 . . . Attaching valve members to screw-spindles
1/482 . . . . . . . [with a collar on the spindle or a groove in the spindle, by which a fixing element is supported, the spindle reaching into the valve member]
1/485 . . . . . . . [with a groove in the spindle]
1/487 . . . . . . . [by a fixing element extending in the axial direction of the spindle, e.g. a screw]
1/50 . . . Preventing rotation of valve members
1/52 . . . Means for additional adjustment of the rate of flow
1/523 . . . . . . . [for limiting the maximum flow rate, using a stop]
1/526 . . . . . . . [for limiting the maximum flow rate, using a second valve]
1/54 . . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve

3/00 Gate valves or sliding valves, i.e. cut-off apparatus with closing members having a sliding movement along the seat for opening and closing (F16K 5/00 takes precedence; in barrages or weirs F02B 8/04)
3/02 . . . with flat sealing faces; Packings therefor
3/0209 . . . . . [the valve having a particular passage, e.g. provided with a filter, throttle or safety device]
3/0218 . . . . . [with only one sealing face]
3/0227 . . . . . [Packings]
3/0236 . . . . . [the packing being of a non-resilient material, e.g. ceramic, metal]
3/0245 . . . . . [Curtain gate valves]
3/0254 . . . . . [being operated by particular means]
3/0263 . . . . . [using particular material or covering means]
3/0272 . . . . . [permitting easy assembly or disassembly]
3/0281 . . . . . [Guillotine or blade-type valves, e.g. no passage through the valve member]
3/029 . . . . . . . [with two or more gates]
3/03 . . . with a closure member in the form of an iris-diaphragm
3/04 . . . . . . . with pivoted closure members
3/06 . . . . . . . in the form of closure plates arranged between supply and discharge passages (F16K 3/10 takes precedence)
3/08 . . . . . . . with circular plates rotatable around their centres
3/085 . . . . . . . [the axis of supply passage and the axis of discharge passage being coaxial and parallel to the axis of rotation of the plates]
3/10 . . . . . . . with special arrangements for separating the sealing faces or for pressing them together
3/12 . . . . . . . with wedge-shaped arrangements of sealing faces
3/14 . . . . . . . with special arrangements for separating the sealing faces or for pressing them together
3/16 . . . . . . . with special arrangements for separating the sealing faces or for pressing them together
(F16K 3/10, F16K 3/14 take precedence)
3/18 . . . . . . . by movement of the closure members
3/182 . . . . . . . [by means of toggle links]
3/184 . . . . . . . [by means of cams]
3/186 . . . . . . . [by means of cams of wedge from]
3/188 . . . . . . . [by means of hydraulic forces]
3/20 . . . . . . . by movement of the seats
3/202 . . . . . . . [by movement of toggle links]
Construcational types

5/00 (Plug valves:) Taps or cocks comprising only cut-off apparatus having at least one of the sealing faces shaped as a more or less complete surface of a solid of revolution, the opening and closing movement being predominantly rotary (taps of the lift-valve type F16K 1/00)
Constructional types

F16K

5/184 . . . . (with the plugs or parts of the plugs mechanically pressing the seals against the housing)

5/185 . . . . (by means of conical surfaces)

5/187 . . . . (with rolling action)

5/188 . . . . [Sealing effected by the flowing medium]

5/20 . . . . for plugs with spherical surfaces

5/201 . . . . [with the housing or parts of the housing mechanically pressing the seal against the plug]

5/202 . . . . (with conical surfaces)

5/204 . . . . [with the plugs or parts of the plugs mechanically pressing the seal against the plug]

5/205 . . . . [Sealing effected by the flowing medium]

5/207 . . . . (using bellows)

5/208 . . . . (with tongue-shaped means)

5/22 . . . . Features relating to lubrication

5/222 . . . . (for plugs with conical surfaces)

5/225 . . . . (for plugs with cylindrical surfaces)

5/227 . . . . (for plugs with spherical surfaces)

7/00 Diaphragm {valves or} cut-off apparatus, e.g. with a member deformed, but not moved bodily, to close the passage (container gates or closures operating by deformation of flexible walls B65D 90/56, means for plugging pipes or hoses F16L 55/10) [: Pinch valves]

7/02 . . . with tubular diaphragm

7/04 . . . constrictable by external radial force

7/045 . . . (by electric or magnetic means)

7/06 . . . by means of a screw-spindle, cam, or other mechanical means ([: F16K 7/045 takes precedence])

7/061 . . . (Screw clamps)

7/063 . . . (Lever clamps)

7/065 . . . (Cam clamps)

7/066 . . . (Wedge clamps)

7/068 . . . (by bending the hose)

7/07 . . . by means of fluid pressure

7/075 . . . (a rigid body being located within the tubular diaphragm)

7/08 . . . constrictable by twisting

7/10 . . . with inflatable member

7/12 . . . with flat, dished, or bowl-shaped diaphragm

7/123 . . . (the seat being formed on the bottom of the fluid line)

7/126 . . . (the seat being formed on a rib perpendicular to the fluid line)

7/14 . . . arranged to be deformed against a flat seat

7/16 . . . the diaphragm being mechanically actuated, e.g. by screw-spindle or cam

7/17 . . . the diaphragm being actuated by fluid pressure

7/18 . . . with diaphragm secured at one side only, e.g. to be laid on the seat by rolling action

7/20 . . . with a compressible solid closure member

11/00 Multiple-way valves, e.g. mixing valves; Pipe fittings incorporating such valves

11/02 . . . with all movable sealing faces moving as one unit

11/022 . . . (comprising a deformable member)

11/025 . . . (with an O-ring)

11/027 . . . (the fluid flowing through a constrictable tubular diaphragm)

11/04 . . . comprising only lift valves

11/044 . . . with movable valve members positioned between valve seats

11/0445 . . . (Bath/shower selectors)

11/048 . . . with valve seats positioned between movable valve members

11/052 . . . with pivoted closure members, e.g. butterfly valves

11/0525 . . . (the closure members being pivoted around an essentially central axis)

11/056 . . . with ball-shaped valve members

11/0565 . . . (moving in a combined straight line and rotating movement)

11/06 . . . comprising only sliding valves [, i.e. sliding closure elements]

11/065 . . . with linearly sliding closure members

11/0655 . . . (with flat slides)

11/07 . . . with cylindrical slides

11/0704 . . . (comprising locking elements)

11/0708 . . . (comprising means to avoid jamming of the slide or means to modify the flow)

11/0712 . . . (comprising particular spool-valve sealing means)

11/0716 . . . (with fluid passages through the valve member [: F16K 11/0704, F16K 11/0708, F16K 11/0712 take precedence])

11/072 . . . with pivoted closure members

11/074 . . . with flat sealing faces

11/0743 . . . (with both the supply and the discharge passages being on one side of the closure plates)

11/0746 . . . (with two or more closure plates comprising a single lever control)

11/076 . . . with sealing faces shaped as surfaces of solids of revolution

11/078 . . . with pivoted and linearly movable closure members

11/0782 . . . (Single-lever operated mixing valves with closure members having flat sealing faces)

11/0785 . . . (the movable closure member being pivotally supported at one point and being linked to the operating lever at only one other point)

11/0787 . . . (with both the supply and the discharge passages being on the same side of the closure members [: F16K 11/0785 takes precedence])

11/08 . . . comprising only taps or cocks

11/083 . . . with tapered plug

11/0833 . . . (having all the connecting conduits situated in a single plane perpendicular to the axis of the plug)

11/0836 . . . (having all the connecting conduits situated in more than one plane parallel to the axis of the plug)

11/085 . . . with cylindrical plug

11/0853 . . . (having all the connecting conduits situated in a single plane perpendicular to the axis of the plug)

11/0856 . . . (having all the connecting conduits situated in more than one plane parallel to the axis of the plug)

11/087 . . . with spherical plug
Construcional types

13/00 Other constructional types of cut-off apparatus (means for plugging pipes or hoses F16L 55/10); Arrangements for cutting-off

13/02 . . . with both sealing faces shaped as small segments of a cylinder and the moving member pivotally mounted

13/04 . . . with a breakable closure member

13/06 . . . constructed to be ruptured by an explosion

13/08 . . . Arrangements for cutting-off { not used }

13/10 . . . by means of liquid or granular medium

Functional types

NOTE

Attention is drawn to Note (2) following the title of subclass G05D and also the subdivisions of that subclass, according to which pressure regulators and flow regulators, e.g. flow regulating valves with pressure compensator, even with the whole regulating system contained in a valve, operating with or without auxiliary power, are covered by groups G05D 16/00 or G05D 7/00, respectively. However, details of the valve parts, per se, are classified in the appropriate groups of this subclass.

15/00 Check valves (valves specially adapted for inflatable balls A63B 41/00)

15/02 . . . with guided rigid valve members

15/021 . . . [the valve member being a movable body around which the medium flows when the valve is open (F16K 15/025 - F16K 15/12 take precedence)]

15/023 . . . [the valve member consisting only of a predominantly disc-shaped flat element]
Functional types

17/003 . [reacting to pressure and temperature]
17/006 . [specially adapted for shelters]
17/02 . opening on surplus pressure on one side; closing on insufficient pressure on one side (check valves F16K 15/00)
17/025 . [and remaining open after return of the normal pressure]
17/04 . spring-loaded
17/0406 . [in the form of balls]
17/0413 . [in the form of closure plates]
17/042 . [with locking or disconnecting arrangements]
17/0426 . [with seat protecting means]
17/0433 . [with vibration preventing means]
17/044 . [with more than one spring]
17/0446 . [with an obturating member having at least a component of their opening and closing motion not perpendicular to the closing faces]
17/0453 . [the member being a diaphragm]
17/046 . [the valve being of the gate valve type or the sliding valve type]
17/0466 . [with a special seating surface]
17/0473 . [Multiple-way safety valves]
17/048 . [combined with other safety valves, or with pressure control devices]
17/0486 . [with mechanical actuating means]
17/0493 . [with a spring other than a helicoidal spring]
17/06 . [with special arrangements for adjusting the opening pressure]
17/065 . [with differential piston]
17/08 . with special arrangements for providing a large discharge passage
17/082 . [with piston]
17/085 . [with diaphragm]
17/087 . [with bellows]
17/10 . [with auxiliary valve for fluid operation of the main valve]
17/105 . [using choking or throttling means to control the fluid operation of the main valve]
17/12 . weight-loaded
17/14 . [with fracturing member]
17/16 . [with fracturing diaphragm] (rupture discs)
17/1606 . [of the reverse-buckling-type (F16K 17/1633 takes precedence)]
17/1613 . [with additional cutting means]
17/162 . [of the non reverse-buckling-type (F16K 17/1633 takes precedence)]
17/1626 . [with additional cutting means]
17/1633 . [made of graphite]
17/164 . and remaining closed after return of the normal pressure
17/168 . combined with manually-controlled valves, e.g. a valve combined with a safety valve
17/18 . opening on surplus pressure on either side
17/19 . Equalising valves predominantly for tanks ([when combined with safety valve by change of position F16K 17/36])
17/192 . with closure member in the form of a movable liquid column
17/194 . weight-loaded
17/196 . spring-loaded
17/20 . Excess-flow valves (actuated in consequence of shock or similar extraneous influence F16K 17/36)
17/205 . [specially adapted for flexible gas lines]
17/22 . actuated by the difference of pressure between two places in the flow line
17/24 . [acting directly on the cutting-off member]
17/26 . operating in either direction
17/28 . operating in one direction only
17/285 . [the cutting-off member being a ball (F16K 17/30 takes precedence)]
17/30 . spring-loaded
17/32 . acting on a servo-mechanism or on a catch-releasing mechanism
17/34 . in which the flow-energy of the flowing medium actuates the closing mechanism
17/36 . actuated in consequence of extraneous circumstances, e.g. shock, change of position
17/363 . [the closure members being rotatable or pivoting (F16K 17/386 takes precedence)]
17/366 . [the closure member being a rotatable or pivoting (F16K 17/38 takes precedence)]
17/38 . of excessive temperature
17/383 . [the valve comprising fusible, softening or meltable elements, e.g. used as link, blocking element, seal, closure plug (F16K 17/386 takes precedence)]
17/386 . [the closure members being rotatable or pivoting]
17/40 . with a fracturing member, e.g. fracturing diaphragm, glass, fusible joint (valves opening on surplus pressure F16K 17/14)
17/403 . [with a fracturing valve member]
17/406 . [the fracturing member being a generally elongated member, e.g. rod or wire, which is directly connected to a movable valve member, the breaking or buckling of the elongated member allowing the valve member to move to a closed or open position]
17/42 . Valves preventing penetration of air in the outlet of containers for liquids
19/00 [Arrangements of valves and flow lines specially adapted for mixing fluids (multiple-way valves F16K 11/00)]
19/003 . [Specially adapted for boilers]
19/006 . [Specially adapted for faucets]
21/00 Fluid-delivery valves, [e.g. self-closing valves] (for liquid handling B65D; for flushing devices for water-closets or the like B03D)
21/02 . providing a continuous small flow
21/04 . Self-closing valves, i.e. closing automatically after operation [(pneumatic tools B25B 9/00)]
21/06 . in which the closing movement, either retarded or not, starts immediately after opening
21/08 . with ball-shaped closing members
21/10 . with hydraulic brake cylinder acting on the closure member
21/12 . with hydraulically-operated opening means; with arrangements for pressure relief before opening
21/14 . with special means for preventing the self-closing
21/16 . closing after a predetermined quantity of fluid has been delivered (F16K 21/10 takes precedence)
21/165 . [with means sensing the weight of said fluid quantity]
Functional types

21/18 . . . closed when a rising liquid reaches a predetermined level (float-actuated valves F16K 31/18)
21/185 . . . [with electrical or magnetic means, e.g. with magnetic floats, for sensing the liquid level]
21/20 . . . by means making use of air-suction through an opening closed by the rising liquid

23/00 Valves for preventing drip from nozzles

24/00 Devices, e.g. valves, for venting or aerating enclosures (equalising valves F16K 17/00; arrangement or mounting in pipes or pipe systems F16L 55/07; venting or aerating as an additional function of steam traps or like apparatus F16T; ventilation of rooms, vehicles, see the appropriate subclass, e.g. F24F)
24/02 . . . the enclosure being itself a valve, tap, or cock
24/04 . . . for venting only (F16K 24/02 takes precedence)
24/042 . . . [actuated by a float]
24/044 . . . [the float being rigidly connected to the valve element, the assembly of float and valve element following a substantially translational movement when actuated, e.g. also for actuating a pilot valve]
24/046 . . . . . . (the assembly of float and valve element being a single spherical element)
24/048 . . . . . . [a transmission element, e.g. arm, being interposed between the float and the valve element, the transmission element following a non-translational, e.g. pivoting or rocking, movement when actuated]
24/06 . . . for aerating only (F16K 24/02 takes precedence)

Details

NOTE

Details not provided for in the following groups are classified in the preceding groups.

25/00 Details relating to contact between valve members and seat (sealing constructions, see the appropriate groups according to the type of valve; movement of valve members other than for opening and closing F16K 2900)
25/005 . . . [Particular materials for seats or closure elements]
25/02 . . . Arrangements using fluid issuing from valve members or seats
25/04 . . . Arrangements for preventing erosion, not otherwise provided for

27/00 Construction of housing (methods for welding housings B23K); Use of materials therefor
27/003 . . . [Housing formed from a plurality of the same valve elements]
27/006 . . . [of hydrants]
27/02 . . . of lift valves (for reducing the flow resistance of screw-spindle lift-valves F16K 1/06)
27/0209 . . . [Check valves or pivoted valves]
27/0218 . . . [Butterfly valves]
27/0227 . . . [with the valve members swinging around an axis located at the edge of or outside the valve member]
27/0236 . . . [Diaphragm cut-off apparatus]
27/0245 . . . [with ball-shaped valve members]
27/0254 . . . [with conical shaped valve members]
27/0263 . . . [multiple way valves]
27/0272 . . . [valves provided with a lining]
27/0281 . . . [Housings in two parts which can be orientated in different positions]
27/029 . . . [Electromagnetically actuated valves]
27/04 . . . of sliding valves
27/041 . . . [cylindrical slide valves]
27/042 . . . [Hydraulic fluid leak traps]
27/044 . . . [slide valves with flat obturating members]
27/045 . . . . . . [with pivotal obturating members]
27/047 . . . . . . . [with wedge-shaped obturating members]
27/048 . . . . . . . . . . . [Electromagnetically actuated valves]
27/06 . . . of taps or cocks
27/062 . . . . . . [with conical plugs]
27/065 . . . . . . . [with cylindrical plugs]
27/067 . . . . . . . [with spherical plugs]
27/07 . . . . . . . [of cutting-off parts of tanks, e.g. tank-cars]
27/08 . . . Guiding yokes for spindles; Means for closing housings; Dust caps, e.g. for tyre valves
27/10 . . . Welded housings
27/102 . . . . . . [for lift-valves]
27/105 . . . . . . [for gate valves]
27/107 . . . . . . [for taps or cocks]
27/12 . . . Covers for housings

29/00 Arrangements for movement of valve members other than for opening and closing the valve, e.g. for grinding-in, for preventing sticking

29/02 . . . providing for continuous motion

31/00 {Actuating devices;} Operating means; Releasing devices {{regulating means G05D}}
31/001 . . . [actuated by volume variations caused by an element soluble in a fluid or swelling in contact with a fluid (life-boats B63C 9/24)]
31/002 . . . [actuated by temperature variation (thermo-electric F16K 31/025)]
31/003 . . . [operated without a stable intermediate position, e.g. with snap action (F16K 31/56 takes precedence)]
31/004 . . . [actuated by piezo-electric means]
31/005 . . . [Piezo-electric benders]
31/006 . . . . . . [having a free end]
31/007 . . . . . . [Piezo-electric stacks]
31/008 . . . . . . . [for sliding valves]
31/02 . . . . . . . . . . . [Electric (F16K 31/004 takes precedence)]; magnetic
31/025 . . . . . . . [actuated by thermo-electric means]
31/04 . . . . . . . using a motor
31/041 . . . . . . . . . . . [for rotating valves (F16K 31/055 takes precedence)]
31/042 . . . . . . . . . . . [with electric means, e.g. for controlling the motor or a clutch between the valve and the motor]
31/043 . . . . . . . . . . . [characterised by mechanical means between the motor and the valve, e.g. lost motion means reducing backlash, clutches, brakes or return means]
31/045 . . . . . . . . . . . [with torque limiters]
31/046 . . . . . . . . . . . [with electric means, e.g. electric switches, to control the motor or to control a clutch between the valve and the motor (F16K 31/041 takes precedence)]
31/047 . . . [characterised by mechanical means between the motor and the valve, e.g. lost motion means reducing backlash, clutches, brakes or return means (F16K 31/043 takes precedence)]

31/048 . . . [with torque limiters (F16K 31/041 takes precedence)]

31/05 . . . specially adapted for operating hand-operated valves or for combined motor and hand operation

31/055 . . . [for rotating valves]

31/06 . . . using a magnet, e.g. diaphragm valves, cutting off by means of a liquid]

31/0603 . . . [Multiple-way valves]

31/0606 . . . [Fluid passing through the solenoid coil]

31/061 . . . [Sliding valves]

31/0613 . . . [with cylindrical slides]

31/0617 . . . [with flat slides]

31/062 . . . [the valve element being at least partially ball-shaped]

31/0624 . . . [Lift valves]

31/0627 . . . [with movable valve member positioned between seats]

31/0631 . . . [with ball shaped valve members]

31/0634 . . . [with fixed seats positioned between movable valve members]

31/0637 . . . [with ball shaped valve members]

31/0641 . . . [the valve member being a diaphragm]

31/0644 . . . [One-way valve]

31/0648 . . . [the armature and the valve member forming one element (F16K 31/0651 takes precedence)]

31/0651 . . . [the fluid passing through the solenoid coil]

31/0655 . . . [Lift valves]

31/0658 . . . [Armature and valve member being one single element]

31/0662 . . . [with a ball-shaped valve member]

31/0665 . . . [with valve member being at least partially ball-shaped (F16K 31/0662 takes precedence)]

31/0668 . . . [Sliding valves]

31/0672 . . . [the valve member being a diaphragm]

31/0675 . . . [Electromagnet aspects, e.g. electric supply therefor]

31/0679 . . . [with more than one energising coil]

31/0682 . . . [with an articulated or pivot armature]

31/0686 . . . [Braking, pressure equilibration, shock absorbing]

31/0689 . . . [Braking of the valve element]

31/0693 . . . [Pressure equilibration of the armature]

31/0696 . . . [Shock absorbing, e.g. using a dash-pot]

31/08 . . . using a permanent magnet

31/082 . . . [using a electromagnetic and a permanent magnet]

31/084 . . . [the magnet being used only as a holding element to maintain the valve in a specific position, e.g. check valves (F16K 31/082, F16K 31/086 takes precedence)]

31/086 . . . [the magnet being movable and actuating a second magnet connected to the closing element]

31/088 . . . [the movement of the first magnet being a rotating or pivoting movement]

31/10 . . . [with additional mechanism between armature and closure member]

31/105 . . . [for rotating valves]

31/12 . . . actuated by fluid ([fluid-actuated lift valves F16K 1/126]: fluid-actuated check valves F16K 15/00; fluid-actuated safety valves F16K 17/00)

31/122 . . . the fluid acting on a piston (F16K 31/143, F16K 31/163, F16K 31/363, F16K 31/383 take precedence)

31/1221 . . . [one side of the piston being spring-loaded]

31/1223 . . . [one side of the piston being acted upon by the circulating fluid]

31/1225 . . . [with a plurality of pistons]

31/1226 . . . [the fluid circulating through the piston]

31/1228 . . . [with a stationary piston]

31/124 . . . servo actuated

31/1245 . . . [with more than one valve]

31/126 . . . the fluid acting on a diaphragm, bellows, or the like (F16K 31/145, F16K 31/165, F16K 31/365, F16K 31/385 take precedence)

31/1262 . . . [one side of the diaphragm being spring loaded]

31/1264 . . . [with means to allow the side on which the springs are positioned to be altered]

31/1266 . . . [one side of the diaphragm being acted upon by the circulating fluid]

31/1268 . . . [with a plurality of the diaphragms]

31/128 . . . servo actuated

31/14 . . . for mounting on, or in combination with, hand-actuated valves

31/143 . . . the fluid acting on a piston

31/145 . . . the fluid acting on a diaphragm

31/16 . . . with a mechanism, other than pulling-or pushing-rod, between fluid motor and closure member (with float F16K 31/18)

31/163 . . . the fluid acting on a piston

31/1655 . . . [for rotating valves]

31/18 . . . actuated by a float (floats F16K 33/00; float-actuated valves in steam-traps F16T 1/20) in boilers F22D 5/08)

31/20 . . . actuating a lift valve

31/22 . . . with the float rigidly connected to the valve

31/24 . . . with a transmission with parts linked together from a single float to a single valve

31/26 . . . with the valve guided for rectilinear movement and the float attached to a pivoted arm

31/265 . . . [with a second lever or toggle between the pivoted arm and the valve]

31/28 . . . with two more floats actuating one valve

31/30 . . . actuating a gate valve or sliding valve

31/32 . . . actuating a tap or cock

31/34 . . . acting on pilot valve controlling the cut-off apparatus

31/36 . . . in which fluid from the circuit is constantly supplied to the fluid motor

31/363 . . . the fluid acting on a piston (F16K 31/38 takes precedence)

31/365 . . . the fluid acting on a diaphragm
in which the fluid works directly on both sides of the fluid motor, one side being connected by means of a restricted passage and the motor being actuated by operating a discharge from that side (F16K 31/40 takes precedence)

the fluid acting on a piston

{the discharge being effected through the piston and being blockable by a mechanically-actuated member making contact with the piston}

the fluid acting on a diaphragm

{the discharge being effected through the diaphragm and being blockable by a mechanically-actuated member making contact with the diaphragm}

with electrically-actuated member in the discharge of the motor

{acting on a diaphragm}

{acting on a piston}

{acting on a piston}

by means of electrically-actuated members in the supply or discharge conduits of the fluid motor (F16K 31/40 takes precedence)

{the actuated members consisting of multiple way valves}

{the actuated valves being cylindrical sliding valves}

Mechanical actuating means

{with exterior sleeve}

for remote operation

{by flexible transmission means, e.g. cable, chain, bowden wire}

acted by mechanical timing-device, e.g. with dash-pot (self-closing valves F16K 21/16)

{and specially adapted for gas valves}

with screw-spindle (or internally threaded actuating means)

{actuating pivotable valve members}

{the actuating means being rotatable, rising, and having internal threads which co-operate with threads on the outside of the valve body}

{with plural sets of thread, e.g. with different pitch}

{the actuating element being rotatable, non-rising, and driving a non-rotatable axially-sliding element}

with crank, eccentric, or cam

{comprising a pivoted disc or flap}

{comprising a tap or cock}

{comprising a sliding valve}

with a cam

{comprising a lift valve}

{comprising a multiple-way lift valve}

{with a ball-shaped valve member}

{with a streamlined or helically shaped valve member, e.g. for reducing flow losses or guiding the fluid flow}

{with a pivoted disc or flap}

{with a valve member of conical shape}

{comprising a tap or cock}

{comprising a multiple-way tap or cock}

{comprising a sliding valve}

{comprising a multiple-way sliding valve}

{comprising a diaphragm cut-off apparatus}

with pin and slot

{comprising a pivoted disc or flap}

{comprising a tap or cock}

{comprising a sliding valve}

{comprising a diaphragm cut-off apparatus}

{with toothed gearing}

{for rotating valves (F16K 31/54 takes precedence)}

with pinion and rack

{without stable intermediate position, e.g. with snap action}

{for rotating or pivoting valves}

{using a bistable spring device arranged symmetrically around the actuating stem}

comprising a movable discharge-nozzle

Handles (form, features or function of taps or faucet-handles for domestic plumbing installations E03C 1/04)

{Pivoting levers, e.g. single-sided (F16K 31/605 takes precedence)}

{for single handle mixing valves}

{characterised by particular material, by special measures to obtain aesthetical effects, or by auxiliary functions, e.g. storage}

Pedals or like operating members, e.g. actuated by knee or hip

Flows for actuation of valves or other apparatus (float actuated valves F16K 31/18)

Means to prevent accidental or unauthorised actuation

{to be locked or disconnected by means of a pushing or pulling action}

{the locking mechanism being actuated by a separate actuating element}

{said actuating element being operated manually (e.g. a push-button located in the valve actuator)}

{the locking mechanism being actuated by pushing or pulling the valve actuator, the valve actuator being rotated subsequently to bring the valve closure element in the desired position}

yieldingly resisting the actuation

using a removable actuating or locking member, e.g. a key (F16K 35/10, F16K 35/12 takes precedence)

requiring setting according to a code, e.g. permutation locks

with locking caps or locking bars

with sealing wire

interlocking two or more valves

with locking member actuated by magnet

Special means in or on valves or other cut-off apparatus for indicating or recording operation thereof, or for enabling an alarm to be given

{Mechanical means (F16K 37/0075 takes precedence)
Details

37/0016 . . . [having a graduated scale]
37/0025 . . . [Electrical or magnetic means (F16K 37/0075 takes precedence)]
37/0033 . . . [using a permanent magnet, e.g. in combination with a reed relays]
37/0041 . . . [for measuring valve parameters (F16K 37/0033 takes precedence)]
37/005 . . . [for measuring fluid parameters (F16K 37/0033 takes precedence)]
37/0058 . . . [Optical means, e.g. light transmission, observation ports (F16K 37/0075 takes precedence)]
37/0066 . . . [Hydraulic or pneumatic means (F16K 37/0075 takes precedence)]
37/0075 . . . [For recording or indicating the functioning of a valve in combination with test equipment]
37/0083 . . . [by measuring valve parameters]
37/0091 . . . [by measuring fluid parameters]

39/00 Devices for relieving the pressure on the sealing faces
39/02 . . . [for lift valves]
39/022 . . . [using balancing surfaces]
39/024 . . . [using an auxiliary valve on the main valve]
39/026 . . . [using an external auxiliary valve]
39/028 . . . [with pivoted closure members, e.g. butterfly valves]
39/04 . . . [for sliding valves]
39/045 . . . [of rotating or pivoting type]
39/06 . . . [for taps or cocks]

41/00 Spindle sealings
41/003 . . . [by fluid]
41/006 . . . [by establishing an under-pressure]
41/02 . . . [with staffing box; : sealing rings]
41/023 . . . [for spindles which only rotate, i.e. non-rising spindles (F16K 41/043, F16K 41/063 and F16K 41/083 take precedence)]
41/026 . . . [for rotating valves]
41/04 . . . [with at least one ring of rubber or like material between spindle and housing]
41/043 . . . [for spindles which only rotate, i.e. non-rising spindles]
41/046 . . . . . . . [for rotating valves]
41/06 . . . [with at least one ring attached to both spindle and housing]
41/063 . . . . . . . [for spindles which only rotate, i.e. non-rising spindles]
41/066 . . . . . . . [for rotating valves]
41/08 . . . [with at least one ring provided with axially-protruding peripheral closing-lip]
41/083 . . . . . . . [for spindles which only rotate, i.e. non-rising spindles]
41/086 . . . . . . . [for rotating valves]
41/10 . . . [with diaphragm, e.g. shaped as bellows or tube]
41/103 . . . [the diaphragm and the closure member being integrated in one member]
41/106 . . . . . . . [for use with rotating spindles or valves (F16K 41/125 takes precedence)]
41/12 . . . . . . . [with approximately flat diaphragm]
41/125 . . . . . . . [the part of the spindle traversing the diaphragm being rotatable or pivotable]
41/14 . . . . . . . [with conical flange on the spindle which co-operates with a conical surface in the housing]
41/16 . . . . . . . [with a flange on the spindle which rests on a sealing ring]
41/18 . . . . . . . [sealing only when the closure member is in the opened position]

43/00 Auxiliary closure means in valves, which in case of repair, e.g. rewashering, of the valve, can take over the function of the normal closure means; Devices for temporary replacement of parts of valves for the same purpose
43/001 . . . [an auxiliary valve being actuated independently of the main valve]
43/003 . . . . . . . [the auxiliary valve being a rotary valve]
43/005 . . . . . . . [an auxiliary valve closing automatically when the main valve is being disassembled]
43/006 . . . . . . . [the auxiliary valve being held open by the main valve]
43/008 . . . . . . . [the main valve having a back-seat position, e.g. to service the spindle sealing]

47/00 Means in valves for absorbing fluid energy {, e.g. cushioning of opening or closure movement, eliminating of vibrations of the valve member} (for pipes F16L 55/00)
47/02 . . . . . . . . . . . [for preventing water-hammer or noise {, e.g. for sanitary applications, toilet flush reservoirs (F16K 47/04 and F16K 47/08 take precedence)]
47/023 . . . . . . . . . . . [for preventing water-hammer, e.g. damping of the valve movement]
47/026 . . . . . . . . . . . [preventing noise in a single handle mixing valve]
47/04 . . . . . . . . . . . [for decreasing pressure {or noise level}, the throttle being incorporated in the closure member]
47/045 . . . . . . . . . . . [and the closure member being rotatable]
47/06 . . . . . . . . . . . [with a throttle in the form of a helical channel]
47/08 . . . . . . . . . . . [for decreasing pressure {or noise level} and having a throttling member separate from the closure member {, e.g. screens, slots, labyrinth}]
47/10 . . . . . . . . . . . [in which the medium in one direction must flow through the throttling channel, and in the other direction may flow through a much wider channel parallel to the throttling channel]
47/12 . . . . . . . . . . . [the throttling channel being of helical form]
47/14 . . . . . . . . . . . [the throttling member being a perforated membrane]
47/16 . . . . . . . . . . . [the throttling member being a cone]

49/00 Means in or on valves for heating or cooling (heating or cooling of pipes or pipe systems F16L 53/00; thermal insulation in connection with pipes or pipe systems F16L 59/16)
49/002 . . . [Electric heating means]
49/005 . . . [Circulation means for a separate heat transfer fluid]
49/007 . . . [located within the obturating element]

51/00 Other details not peculiar to particular types of valves or cut-off apparatus
51/02 . . . . . . . . . . . [specially adapted for high-vacuum installations]

99/00 Subject matter not provided for in other groups of this subclass
99/0001 . . . [Microvalves (microdevices B81B 1/00; manufacture or treatment of devices or systems in or on a substrate B81C 1/00; microfluidic structures B01L 3/5027; micropumps F04B 19/006)
Details
99/0003 . . {Constructional types of microvalves; Details of the cutting-off member}
99/0005 . . {Lift valves}
99/0007 . . . . {of cantilever type}
99/0009 . . . . {the valve element held by multiple arms}
99/0011 . . {Gate valves or sliding valves}
99/0013 . . {Rotary valves}
99/0015 . . {Diaphragm or membrane valves}
99/0017 . . {Capillary or surface tension valves, e.g. using electro-wetting or electro-capillarity effects}
99/0019 . . {Valves using a microdroplet or microbubble as the valve member}
99/0021 . . {No-moving-parts valves}
99/0023 . . {with ball-shaped valve members}
99/0025 . . {Valves using microporous membranes}
99/0026 . . {Valves using channel deformation}
99/0028 . . {Valves having multiple inlets or outlets}
99/003 . . {Valves for single use only}
99/0032 . . {using phase transition or influencing viscosity}
99/0034 . . {Operating means specially adapted for microvalves}
99/0036 . . {operated by temperature variations}
99/0038 . . {using shape memory alloys}
99/004 . . {using radiation}
99/0042 . . {Electric operating means therefor}
99/0044 . . {using thermo-electric means}
99/0046 . . {using magnets}
99/0048 . . {using piezoelectric means}
99/0049 . . {using an electroactive polymer [EAP]}
99/0051 . . {using electrostatic means}
99/0053 . . {using magnetostrictive means}
99/0055 . . {actuated by fluids}
99/0057 . . {the fluid being the circulating fluid itself, e.g. check valves}
99/0059 . . {actuated by a pilot fluid}
99/0061 . . {actuated by an expanding gas or liquid volume}
99/0063 . . {using centrifugal forces}
99/0065 . . {using chemical activation}
99/0067 . . . . {actuated by a pyrotechnical charge}
2099/0069 . . {Bistable microvalves}
2099/0071 . . {with latching means}
2099/0073 . . {Fabrication methods specifically adapted for microvalves}
2099/0074 . . {using photolithography, e.g. etching}
2099/0076 . . {using electrical discharge machining [EDM], milling or drilling}
2099/0078 . . {using moulding or stamping}
2099/008 . . {Multi-layer fabrications}
2099/0082 . . {Microvalves adapted for a particular use}
2099/0084 . . {Chemistry or biology, e.g. "lab-on-a-chip" technology}
2099/0086 . . {Medical applications}
2099/0088 . . {Implanted devices}
2099/009 . . {Fluid power devices}
2099/0092 . . {Inkjet printers}
2099/0094 . . {Micropumps}
2099/0096 . . {Fuel injection devices}
2099/0098 . . {Refrigeration circuits, e.g. for cooling integrated circuits}