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
Construcational types

F16K
(continued)

F16L 55/055 Valves specially adapted to prevent or minimise the effect of water hammer
F16L 55/46 Launching devices for pigs or moles
F16N 23/00 Check valves for lubrication systems
[F16T] [Draining-off liquids from steam traps]
F17C 13/04 Arrangement of valves in pressure vessels
F22B 37/44 Arrangement of safety valves on steam boilers
F22D 5/34 Application of valves to automatic water-feed in boiler
F23L 13/00 Valves for air supply control to burners
[F23Q 2/16] [Valves for lighters with gaseous fuel and adjustable flame]
F24C 3/12, F24C 5/16 Arrangement of valves on stoves or ranges
F24F Air conditioning; Ventilation
F25B 41/04 Disposition of fluid circulation valves in refrigeration machines
G05D Controlling non-electric variables
G10B 3/06 Valves for organs
G10D 9/04 Valves for other wind-actuated musical instruments
[G21C 9/06] [Safety valves structurally associated with nuclear reactors]
[H01M 2/12] [Vent plugs in batteries or cells]

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:

F16K 31/11 covered by F16K 31/06, F16K 31/08, F16K 31/10
F16K 31/64 covered by F16K 31/002, G05D 23/00
F16K 31/66 covered by F16K 31/06, G05D 23/00
F16K 31/68 covered by F16K 31/001, G05D 23/00
F16K 31/70 covered by F16K 31/002, G05D 23/08
F16K 31/72 covered by F16K 31/00

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.

Construcational 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.

1/00 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

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

1/04 . . with a cut-off member rigid with the spindle, e.g. main valves

1/06 . . Special arrangements for improving the flow, e.g. special shape of passages or casings

1/08 . . . in which the spindle is perpendicular to the general direction of flow

1/10 . . . in which the spindle is inclined to the general direction of flow

1/12 . . with streamlined valve member around which the fluid flows when the valve is opened

1/123 . . [with stationary valve member and moving sleeve]

1/126 . . [actuated by fluid]

1/14 . . with ball-shaped valve member (check valves F16K 15/04)

1/16 . . with pivoted valve member

1/165 . . [with a plurality of closure members]
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 seating 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 seating 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 plastiical deformation, e.g. valve seat or housing being plastiically 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 E02B 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]
Constructional 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 3/00)**

5/02 . . with plugs having conical surfaces; Packings therefor

5/0207 . . [with special plug arrangement, e.g. special shape or built in means]

5/0214 . . [Plug channel at 90 degrees to the inlet]

5/0221 . . [Fixed plug and turning sleeve]

5/0228 . . [with a conical segment mounted around a supply pipe]

5/0235 . . [with the angle the spindle makes housing being other than 90 degrees]

5/0242 . . [Spindles and actuating means]

5/025 . . [Particular coverings or materials]

5/0257 . . [Packings]

5/0264 . . [in the housing]

5/0271 . . [between housing and plug]

5/0278 . . [on the plug]

5/0285 . . [spindle sealing]

5/0292 . . [Easy mounting or dismounting means]

5/04 . . with plugs having cylindrical surfaces; Packings therefor

5/0407 . . [with particular plug arrangements, e.g. particular shape or built-in means]

5/0414 . . [Plug channel at 90 degrees to the inlet]

5/0421 . . [Fixed plug and turning sleeve]

5/0428 . . [with a cylindrical segment mounted around a supply pipe]

5/0435 . . [the angle the spindle makes with the housing being other than 90 degrees]

5/0442 . . [Spindles and actuating means]

5/045 . . [Particular coverings and materials]

5/0457 . . [Packings]

5/0464 . . [in the housing]

5/0471 . . [between housing and plug]

5/0478 . . [on the plug]

5/0485 . . [Spindle sealing]

5/0492 . . [Easy mounting or dismounting means]

5/06 . . with plugs having spherical surfaces; Packings therefor

5/0605 . . [with particular plug arrangements, e.g. particular shape or built-in means]

5/061 . . [(knee-joint)]

5/0615 . . [the angle the spindle makes with the housing being other than 90 degrees]

5/0621 . . [with a spherical segment mounted around a supply pipe]

5/0626 . . [Easy mounting or dismounting means]

5/0631 . . [between two flanges]

5/0636 . . [the spherical plug being insertable from the top of the housing]

5/0642 . . [the spherical plug being insertable from one and only one side of the housing]

5/0647 . . [Spindles or actuating means]

5/0652 . . [for remote operation]

5/0657 . . [Particular coverings or materials]

5/0663 . . [Packings]

5/0668 . . [Single packings]

5/0673 . . [Composite packings]

5/0678 . . in which only one of the components of the composite packing is contacting the plug]

5/0684 . . [on the plug]

5/0689 . . [between housing and plug]

5/0694 . . [Spindle sealings]

5/08 . . Details

5/10 . . Means for additional adjustment of the rate of flow

5/103 . . [specially adapted for gas valves]

5/106 . . [with pilot flame]

5/12 . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve

5/14 . . Special arrangements for separating the sealing faces or for pressing them together

5/16 . . for plugs with conical surfaces

5/161 . . [with the housing or parts of the housing mechanically pressing the seal against the plug]

5/162 . . [with the plugs or parts of the plugs mechanically pressing the seal against the housing]

5/163 . . [adjustable in height]

5/165 . . [Means pressing on the small diameter]

5/166 . . [Means pressing on the large diameter]

5/167 . . [Means pressing radially]

5/168 . . [Sealing effected by the flowing medium]

5/18 . . for plugs with cylindrical surfaces

5/181 . . [with the housing or parts of the housing mechanically pressing the seals against the plugs]

5/182 . . [by means of conical surfaces]
Construcational types

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 . . . constrictible 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 . . . constrictible 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 perpendicular 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 perpendicular to the axis of the plug]
11/087 . . . with spherical plug
Constructional types

11/0873 . . . [the plug being only rotatable around one spindle]
11/0876 . . . [one connecting conduit having the same axis as the spindle]
11/10 . . . with two or more closure members not moving as a unit
11/105 . . . [Three-way check or safety valves with two or more closure members]
11/12 . . . with one plug turning in another
11/14 . . . operated by one actuating member, e.g. a handle (with one plug turning in another F16K 11/12)
11/16 . . . which only slides, or only turns, or only swings in one plane
11/161 . . . [only slides]
11/163 . . . [only turns]
11/165 . . . [with the rotating spindles parallel to the closure members]
11/166 . . . [with the rotating spindles at right angles to the closure members]
11/168 . . . [only swings]
11/18 . . . with separate operating movements for separate closure members
11/185 . . . [with swinging shafts]
11/20 . . . operated by separate actuating members (with one plug turning in another F16K 11/12)
11/202 . . . [with concentric handles]
11/205 . . . [with two handles at right angles to each other]
11/207 . . . [with two handles or actuating mechanisms at opposite sides of the housing]
11/22 . . . with an actuating member for each valve, e.g. interconnected to form multiple-way valves
11/24 . . . with an electromagnetically-operated valve, e.g. for washing machines

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 especially 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]
15/025 . . . [the valve being loaded by a helicoidal spring (F16K 15/03 - F16K 15/12 take precedence)]
15/026 . . . [the valve member being a movable body around which the medium flows when the valve is open]
15/028 . . . [the valve member consisting only of a predominantly disc-shaped flat element]
15/03 . . . with a hinged closure member
15/031 . . . [the hinge being flexible (F16K 15/035 takes precedence)]
15/033 . . . [spring-loaded (F16K 15/035 takes precedence)]
15/035 . . . [with a plurality of valve members]
15/036 . . . [Dual valve members with hinges crossing the flow line substantially diametrical]
15/038 . . . [having a common hinge]
15/04 . . . shaped as balls
15/042 . . . [with a plurality of balls]
15/044 . . . [spring-loaded (F16K 15/042 takes precedence)]
15/046 . . . [by a spring other than a helicoidal spring]
15/048 . . . [Ball features]
15/06 . . . with guided stems
15/063 . . . [the valve being loaded by a helicoidal spring]
15/066 . . . [with a plurality of valve members]
15/08 . . . shaped as rings
15/10 . . . integral with, or rigidly fixed to, a common valve plate
15/12 . . . Springs for ring valves
15/14 . . . with flexible valve members
15/141 . . . [the closure elements not being fixed to the valve body]
15/142 . . . [the closure elements being shaped as solids of revolution, e.g. toroidal or cylindrical rings]
15/144 . . . [the closure elements being fixed along all or a part of their periphery]
15/145 . . . [the closure elements being shaped as a solids of revolution, e.g. cylindrical or conical]
15/147 . . . [the closure elements having specially formed slits or being of an elongated easily collapsible form]
15/148 . . . [the closure elements being fixed in their centre]
15/16 . . . with tongue-shaped laminae
15/18 . . . with actuating mechanism; Combined check valves and actuated valves
15/181 . . . [for check valves with a hinged closure member (F16K 15/188 takes precedence)]
15/183 . . . [for ball check valves (F16K 15/186, F16K 15/188 take precedence)]
15/185 . . . [for check valves with flexible valve members (F16K 15/188 takes precedence)]
15/186 . . . [Check valves which can be actuated by a pilot valve]
15/188 . . . [Check valves combined with valves having a rotating tap or cock]
15/20 . . . specially designed for inflatable bodies, e.g. tyres (connecting valves to inflatable bodies B60C 29/00)
15/202 . . . [and with flexible valve member]
15/205 . . . [and with closure plug]
15/207 . . . [and combined with other valves, e.g. safety valves]
17/00 Safety valves; Equalising valves, [e.g. pressure relief valves]
Excess-flow valves (actuated in consequence of insufficient pressure on one side; check valves opening on surplus pressure on one side; closing)

{ specially adapted for shelters }

{ reacting to pressure and temperature }

{ actuated by the difference of pressure between two places in the flow line }

17/27 . . . 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 movable ball (F16K 17/38 takes precedence))

17/38 . . . of excessive temperature

17/383 . . . . . . [the valve comprising fusible, softening or meltexible 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

17/003 . . . [reacting to pressure and temperature]

17/006 . . . [specially adapted for shelters]

17/152 . . . 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

17/046 . . . . . . [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]
Valves for preventing drip from nozzles

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)

- the enclosure being itself a valve, tap, or cock
- for venting only (F16K 24/02 takes precedence)
- [actuated by a float]
- [the floating 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]
- [the assembly of float and valve element being a single spherical element]
- [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]

- for aerating only (F16K 24/02 takes precedence)

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

- providing for continuous motion

Actuating devices; Operating means; Releasing devices (regulating means G05D)

- [actuated by volume variations caused by an element soluble in a fluid or swelling in contact with a fluid (life-boats B63C 9/24)]
- [actuated by temperature variation (thermo-electric F16K 31/025)]
- [operated without a stable intermediate position, e.g. with snap action (F16K 31/56 takes precedence)]
- [actuated by piezo-electric means]
- [Piezo-electric benders]
- [having a free end]
- [Piezo-electric stacks]
- [for sliding valves]
- [electric (F16K 31/004 takes precedence)]; magnetic
- [actuated by thermo-electric means]
- using a motor
- [for rotating valves (F16K 31/055 takes precedence)]
- [with electric means, e.g. for controlling the motor or a clutch between the valve and the motor]
- [characterised by mechanical means between the motor and the valve, e.g. lost motion means reducing backlash, clutches, brakes or return means]
- [with torque limiters]
- [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)]
Details

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 an electromagnet 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 (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 31/383 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
31/165 . . . . . . the fluid acting on a diaphragm
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 ore 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
31/38 . . . 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)

31/383 . . . the fluid acting on a piston
31/385 . . . the fluid acting on a diaphragm
31/3855 . . . (the discharge being effectuated through the diaphragm and being blockable by a mechanically-actuated member making contact with the diaphragm)

31/40 . . . with electrically-actuated member in the discharge of the motor
31/402 . . . (acting on a diaphragm)
31/404 . . . (the discharge being effectuated through the diaphragm and being blockable by an electrically-actuated member making contact with the diaphragm)
31/406 . . . (acting on a piston)
31/408 . . . (the discharge being effectuated through the piston and being blockable by an electrically-actuated member making contact with the piston)

31/42 . . by means of electrically-actuated members in the supply or discharge conduits of the fluid motor (F16K 31/40 takes precedence)
31/423 . . . [the actuated members consisting of multiple way valves]
31/426 . . . [the actuated valves being cylindrical sliding valves]
31/44 . . . Mechanical actuating means
31/445 . . . [with exterior sleeve]
31/46 . . . for remote operation
31/465 . . . [by flexible transmission means, e.g. cable, chain, bowden wire]
31/48 . . . actuated by mechanical timing-device, e.g. with dash-pot (self-closing valves F16K 21/16)
31/485 . . . [and specially adapted for gas valves]
31/50 . . . with screw-spindle [or internally threaded actuating means]
31/502 . . . [actuating pivotable valve members]
31/504 . . . [the actuating means being rotatable, rising, and having internal threads which co-operate with threads on the outside of the valve body]
31/506 . . . [with plural sets of thread, e.g. with different pitch]
31/508 . . . [the actuating element being rotatable, non-rising, and driving a non-rotatable axially-sliding element]
31/52 . . . with crank, eccentric, or cam
31/521 . . . [comprising a pivoted disc or flap]
31/522 . . . [comprising a tap or cock]
31/523 . . . [comprising a sliding valve]
31/524 . . . with a cam
31/52408 . . . [comprising a lift valve]
31/52416 . . . [comprising a multiple-way lift valve]
31/52425 . . . [with a ball-shaped valve member]
31/52433 . . . [with a streamlined or helically shaped valve member, e.g. for reducing flow losses or guiding the fluid flow]

31/52441 . . . . . . . [with a pivoted disc or flap]
31/5245 . . . . . . . [with a valve member of conical shape]
31/52458 . . . . . . . [comprising a tap or cock]
31/52466 . . . . . . . [comprising a multiple-way tap or cock]
31/52475 . . . . . . . [comprising a sliding valve]
31/52483 . . . . . . . [comprising a multiple-way sliding valve]
31/52491 . . . . . . . [comprising a diaphragm cut-off apparatus]
31/528 . . . . . . . with pin and slot
31/5282 . . . . . . . [comprising a pivoted disc or flap]
31/5284 . . . . . . . [comprising a tap or cock]
31/5286 . . . . . . . [comprising a sliding valve]
31/5288 . . . . . . . [comprising a diaphragm cut-off apparatus]
31/53 . . . . . . . with toothed gearing
31/535 . . . . . . . [for rotating valves (F16K 31/54 takes precedence)]
31/54 . . . . . . . with pinion and rack
31/56 . . . . . . . without stable intermediate position, e.g. with snap action
31/563 . . . . . . . [for rotating or pivoting valves]
31/566 . . . . . . . [using a bistable spring device arranged symmetrically around the actuating stem]
31/58 . . . . . . . comprising a movable discharge-nozzle
31/60 . . . . . . . Handles [(form, features or function of taps or faucet handles for domestic plumbing installations E03C 1/04)]
31/602 . . . . . . . [Pivoting levers, e.g. single-sided (F16K 31/605 takes precedence)]
31/605 . . . . . . . [for single handle mixing valves]
31/607 . . . . . . . [characterised by particular material, by special measures to obtain aesthetical effects, or by auxiliary functions, e.g. storage]
31/62 . . . . . . . Pedals or like operating members, e.g. actuated by knee or hip

33/00 Floats for actuation of valves or other apparatus [(float actuated valves F16K 31/18)]

35/00 Means to prevent accidental or unauthorised actuation

35/02 . . to be locked or disconnected by means of a pushing or pulling action
35/022 . . . [the locking mechanism being actuated by a separate actuating element]
35/025 . . . [said actuating element being operated manually (e.g. a push-button located in the valve actuator)]
35/027 . . . [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]
35/04 . . . yieldingly resisting the actuation
35/06 . . . using a removable actuating or locking member, e.g. a key (F16K 35/10, F16K 35/12 take precedence)
35/08 . . . requiring setting according to a code, e.g. permutation locks
35/10 . . . with locking caps or locking bars
35/12 . . . with sealing wire
35/14 . . . interlocking two or more valves
35/16 . . . with locking member actuated by magnet

37/00 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
37/0008 . . . [Mechanical means (F16K 37/0075 takes precedence)]
Devices for relieving the pressure on the sealing faces

Spindle sealings

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)

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)

Other details not peculiar to particular types of valves or cut-off apparatus

Subject matter not provided for in other groups of this subclass

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 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]
47/05 . . . . [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, labyrinths}]
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)]
Constructional types of microvalves; Details of the cutting-off member

Lift valves

of cantilever type

the valve element held by multiple arms

Gate valves or sliding valves

Rotary valves

Diaphragm or membrane valves

Capillary or surface tension valves, e.g. using electro-wetting or electro-capillarity effects

Valves using a microdroplet or microbubble as the valve member

No-moving-parts valves

with ball-shaped valve members

Valves using microporous membranes

Valves using channel deformation

Valves having multiple inlets or outlets

Valves for single use only

Valves using a microdroplet or microbubble as the valve member

Operating means specially adapted for microvalves

operated by temperature variations

using shape memory alloys

using radiation

Electric operating means therefor

using thermo-electric means

using magnets

using piezoelectric means

using an electroactive polymer [EAP]

using electrostatic means

using magnetostrictive means

actuated by fluids

actuated by a pilot fluid

actuated by an expanding gas or liquid volume

using centrifugal forces

using chemical activation

actuated by a pyrotechnical charge

Bistable microvalves

with latching means

Fabrication methods specifically adapted for microvalves

using photolithography, e.g. etching

using electrical discharge machining [EDM], milling or drilling

using moulding or stamping

Multi-layer fabrications

Microvalves adapted for a particular use

Chemistry or biology, e.g. "lab-on-a-chip" technology

Medical applications

Implanted devices

Fluid power devices

Inkjet printers

Micropumps

Fuel injection devices

Refrigeration circuits, e.g. for cooling integrated circuits

Implanted devices

Fluid power devices

Inkjet printers

Micropumps

Fuel injection devices

Refrigeration circuits, e.g. for cooling integrated circuits