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 1 Fire extinguishers
- [B01D 35/04] {Plug, tap, or cock filters}
- B05B Nozzles, spray heads or other discharge apparatus for spraying or atomising
- B06C 9/00 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
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 41/20  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 50/30}  (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.

Construcional 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 closure-members  
1/165 . . . {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 5/00 - F16K 5/00)
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 1/22, F16K 1/23})
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 plasitical 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

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

3/205 . . . . [by means of cams]
3/207 . . . . [by means of hydraulic forces]
3/22 . . . . with sealing faces shaped as surfaces of solids of revolution (F16K 13/02 takes precedence; with resilient valve members F16K 3/28)
3/24 . . . . with cylindrical valve members
3/243 . . . . [Packings (F16K 3/246 takes precedence)]
3/246 . . . . [Combination of a sliding valve and a lift valve]
3/26 . . . . with fluid passages in the valve member
3/262 . . . . [with a transverse bore in the valve member]
3/265 . . . . [with a sleeve sliding in the direction of the flow line]
3/267 . . . . [Combination of a sliding valve and a lift valve (F16K 3/262, F16K 3/265 take precedence)]
3/28 . . . . with resilient valve members
3/30 . . . . Details
3/312 . . . . Line blinds
3/314 . . . . Forms or constructions of slides; Attachment of the slide to the spindle
3/316 . . . . Guiding of the slide
3/3165 . . . . [with rollers or balls]
3/32 . . . . Arrangements for additional adjustment of the rate of flow
3/34 . . . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve
3/36 . . . . Features relating to lubrication

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)
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]
Constructional types

5/184 . . . . (with the plugs or parts of the plugs mechanically pressing the seals against the housing)
5/185 . . . . (by means of conical seats)
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 housing)
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 . . . . (with plugs with conical stems)
5/225 . . . . (with plugs with cylindrical surfaces)
5/227 . . . . (with plugs with spherical bodies)

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) [F16K 7/045]; 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 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

11/073 [the plug being only rotatable around one spindle]
11/076 [one connecting conduit having the same axis as the spindle]
11/082 . with two or more closure members not moving as a unit
11/083 [Three-way check or safety valves with two or more closure members]
11/085 . with one plug turning in another
11/087 . operated by one actuating member, e.g. a handle
   (with one plug turning in another F16K 11/12)
11/091 . which only slides, or only turns, or only swings in one plane
11/093 [only slides]
11/095 [only turns]
11/098 [with the rotating spindles parallel to the closure members]
11/100 [with the rotating spindles at right angles to the closure members]
11/102 [only swings]
11/104 . with separate operating movements for separate closure members
11/106 . [with swinging shafts]
11/108 . operated by separate actuating members (with one plug turning in another F16K 11/12)
11/110 . [with concentric handles]
11/112 . [with two handles at right angles to each other]
11/114 . [with two handles or actuating mechanisms at opposite sides of the housing]
11/116 . with an actuating member for each valve, e.g. interconnected to form multiple-way valves
11/118 . with an electromagnetically-operated valve, e.g. for washing machines
11/120 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)

WARNING

Groups F16K 15/00, F16K 15/20, F16K 15/202 and F16K 15/205 are incomplete pending reclassification of documents from group F16K 15/03.

All groups listed in this Warning should be considered in order to perform a complete search.

15/02 . with guided rigid valve members

WARNING

Groups F16K 15/02, F16K 15/21, F16K 15/23, F16K 15/04 and F16K 15/048 are incomplete pending reclassification of documents from group F16K 15/03.

All groups listed in this Warning should be considered in order to perform a complete search.

15/021 . [the valve member being a movable body around which the medium flows when the valve is open (F16K 15/25 - 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 spring (F16K 15/03 - F16K 15/12 take precedence)]

WARNING

Group F16K 15/25 is incomplete pending reclassification of documents from group F16K 15/03.

All groups listed in this Warning should be considered in order to perform a complete search.

15/026 . [the valve member being a movable body around which the medium flows when the valve is open]

WARNING

Groups F16K 15/26 and F16K 15/28 are incomplete pending reclassification of documents from group F16K 15/03.

All groups listed in this Warning should be considered in order to perform a complete search.

15/028 . [the valve member consisting only of a predominantly disc-shaped flat element]
15/03 . with a hinged closure member [or with a pivoted closure member]

WARNING

Group F16K 15/03 is impacted by reclassification into groups F16K 15/031 - F16K 15/207 and F16K 17/00 - F16K 17/42.

All groups listed in this Warning should be considered in order to perform a complete search.
15/031 ... [the hinge being flexible]

**WARNING**

Group F16K 15/031 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/035, F16K 15/036 and F16K 15/038.
Group F16K 15/031 is also impacted by reclassification into group F16K 15/034.
All groups listed in this Warning should be considered in order to perform a complete search.

15/033 ... [spring-loaded]

**WARNING**

Group F16K 15/033 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/035, F16K 15/036 and F16K 15/038.
Group F16K 15/033 is also impacted by reclassification into group F16K 15/034.
All groups listed in this Warning should be considered in order to perform a complete search.

15/035 ... [weight-loaded]

**WARNING**

Group F16K 15/035 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/031, F16K 15/033, F16K 15/033, F16K 15/035, F16K 15/036 and F16K 15/038.
Group F16K 15/035 is also impacted by reclassification into groups F16K 15/031, F16K 15/033 and F16K 15/034.
All groups listed in this Warning should be considered in order to perform a complete search.

15/06 ... with guided stems

**WARNING**

Group F16K 15/06 is incomplete pending reclassification of documents from group F16K 15/03.
Group F16K 15/06 is also impacted by reclassification into groups F16K 15/063, F16K 15/064, F16K 15/065, F16K 15/066 and F16K 15/067.
All groups listed in this Warning should be considered in order to perform a complete search.
15/063 . . . {the valve being loaded by a spring}

**WARNING**

Group F16K 15/063 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/06 and F16K 15/066.

Group F16K 15/063 is also impacted by reclassification into groups F16K 15/064, F16K 15/065, F16K 15/066 and F16K 15/067.

All groups listed in this Warning should be considered in order to perform a complete search.

15/064 . . . {with a spring other than a helicoidal spring}

**WARNING**

Group F16K 15/064 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/06, F16K 15/063 and F16K 15/066.

All groups listed in this Warning should be considered in order to perform a complete search.

15/065 . . . {spring pulling the closure member against the seat}

**WARNING**

Group F16K 15/065 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/06, F16K 15/063 and F16K 15/066.

All groups listed in this Warning should be considered in order to perform a complete search.

15/066 . . . {with a plurality of valve members}

**WARNING**

Group F16K 15/066 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/06 and F16K 15/063.

Group F16K 15/066 is also impacted by reclassification into groups F16K 15/063, F16K 15/064, F16K 15/065 and F16K 15/067.

All groups listed in this Warning should be considered in order to perform a complete search.

15/067 . . . {stem guided at two or more points}

**WARNING**

Group F16K 15/067 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/06, F16K 15/063 and F16K 15/066.

All groups listed in this Warning should be considered in order to perform a complete search.

15/08 . . . shaped as rings

**WARNING**

Groups F16K 15/08, F16K 15/10, and F16K 15/12 are incomplete pending reclassification of documents from group F16K 15/03.

All groups listed in this Warning should be considered in order to perform a complete search.

15/10 . . . integral with, or rigidly fixed to, a common valve plate

15/12 . . . Springs for ring valves

15/14 . . . with flexible valve members

**WARNING**

Group F16K 15/14 is incomplete pending reclassification of documents from group F16K 15/03.

Group F16K 15/14 is also impacted by reclassification into groups F16K 15/1401 and F16K 15/1402.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1401 . . . {having a plurality of independent valve members}

**WARNING**

Group F16K 15/1401 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/14, F16K 15/144, F16K 15/147, F16K 15/148 and F16K 15/16.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1402 . . . {having an integral flexible member cooperating with a plurality of seating surfaces}

**WARNING**

Group F16K 15/1402 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/14, F16K 15/144, F16K 15/147, F16K 15/148 and F16K 15/16.

All groups listed in this Warning should be considered in order to perform a complete search.

15/141 . . . {the closure elements not being fixed to the valve body}

**WARNING**

Groups F16K 15/141 and F16K 15/142 are incomplete pending reclassification of documents from group F16K 15/03.

All groups listed in this Warning should be considered in order to perform a complete search.

15/142 . . . {the closure elements being shaped as solids of revolution, e.g. toroidal or cylindrical rings}
**Functional types**

15/144  . .  (the closure elements being fixed along all or a part of their periphery)

**WARNING**

Group **F16K 15/144** is incomplete pending reclassification of documents from group **F16K 15/03**.

Group **F16K 15/144** is also impacted by reclassification into groups **F16K 15/1401**, **F16K 15/1402** and **F16K 15/1411**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1441  . .  {with biasing means in addition to material resiliency, e.g. spring}

**WARNING**

Group **F16K 15/1441** is incomplete pending reclassification of documents from groups **F16K 15/03**, **F16K 15/144** and **F16K 15/147**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/145  . .  {the closure elements being shaped as a solids of revolution, e.g. cylindrical or conical}

**WARNING**

Group **F16K 15/145** is incomplete pending reclassification of documents from group **F16K 15/03**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/147  . .  {the closure elements having specially formed slits or being of an elongated easily collapsible form}

**WARNING**

Group **F16K 15/147** is incomplete pending reclassification of documents from group **F16K 15/03**.

Group **F16K 15/147** is also impacted by reclassification into groups **F16K 15/1401**, **F16K 15/1402**, **F16K 15/1411**, **F16K 15/1471** and **F16K 15/1472**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1471  . .  {slits arranged along multiple axes}

**WARNING**

Group **F16K 15/1471** is incomplete pending reclassification of documents from groups **F16K 15/03** and **F16K 15/147**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1472  . .  {the closure elements being fixed onto an internally extending mount}

**WARNING**

Group **F16K 15/1472** is incomplete pending reclassification of documents from groups **F16K 15/03** and **F16K 15/147**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/148  . .  (the closure elements being fixed in their centre)

**WARNING**

Group **F16K 15/148** is incomplete pending reclassification of documents from group **F16K 15/03**.

Group **F16K 15/148** is also impacted by reclassification into groups **F16K 15/1401**, **F16K 15/1402** and **F16K 15/1481**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1481  . .  {with biasing means in addition to material resiliency, e.g. spring}

**WARNING**

Group **F16K 15/1481** is incomplete pending reclassification of documents from groups **F16K 15/03** and **F16K 15/148**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/16  . .  with tongue-shaped laminae

**WARNING**

Group **F16K 15/16** is incomplete pending reclassification of documents from group **F16K 15/03**.

Group **F16K 15/16** is also impacted by reclassification into groups **F16K 15/1401**, **F16K 15/1402**, **F16K 15/161** and **F16K 15/162**.

All groups listed in this Warning should be considered in order to perform a complete search.

15/161  . .  {with biasing means in addition to material resiliency, e.g. spring}

**WARNING**

Group **F16K 15/161** is incomplete pending reclassification of documents from groups **F16K 15/03** and **F16K 15/16**.

All groups listed in this Warning should be considered in order to perform a complete search.
15/162 . . . [with limit stop]

**WARNING**

Group F16K 15/162 is incomplete pending reclassification of documents from groups F16K 15/03 and F16K 15/16.

All groups listed in this Warning should be considered in order to perform a complete search.

15/18 . . . [with actuating mechanism; Combined check valves and actuated valves]

**WARNING**

Group F16K 15/18 is incomplete pending reclassification of documents from group F16K 15/03.

Group F16K 15/18 is also impacted by reclassification into groups F16K 15/182, F16K 15/184, F16K 15/1841, F16K 15/1843 and F16K 15/1845.

All groups listed in this Warning should be considered in order to perform a complete search.

15/182 . . . [with actuating mechanism]

**WARNING**

Group F16K 15/182 is incomplete pending reclassification of documents from groups F16K 15/03 and F16K 15/18.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1821 . . . [for check valves with a hinged or pivoted closure member]

**WARNING**

Group F16K 15/1821 is incomplete pending reclassification of documents from group F16K 15/03.

Group F16K 15/1821 is also impacted by reclassification into group F16K 15/1841.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1823 . . . [for ball check valves]

**WARNING**

Group F16K 15/1823 is incomplete pending reclassification of documents from group F16K 15/03.

Group F16K 15/1823 is also impacted by reclassification into group F16K 15/1843.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1825 . . . [for check valves with flexible valve members]

**WARNING**

Group F16K 15/1825 is incomplete pending reclassification of documents from group F16K 15/03.

Group F16K 15/1825 is also impacted by reclassification into group F16K 15/1845.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1826 . . . [Check valves which can be actuated by a pilot valve]

**WARNING**

Group F16K 15/1826 is incomplete pending reclassification of documents from group F16K 15/03.

All groups listed in this Warning should be considered in order to perform a complete search.

15/184 . . . [Combined check valves and actuated valves]

**WARNING**

Group F16K 15/184 is incomplete pending reclassification of documents from groups F16K 15/03 and F16K 15/18.

Group F16K 15/184 is also impacted by reclassification into group F16K 15/1842.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1841 . . . [for check valves with a hinged closure member]

**WARNING**

Group F16K 15/1841 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/18 and F16K 15/1821.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1843 . . . [for ball check valves]

**WARNING**

Group F16K 15/1843 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/18 and F16K 15/1823.

All groups listed in this Warning should be considered in order to perform a complete search.

15/1845 . . . [for check valves with flexible valve members]

**WARNING**

Group F16K 15/1845 is incomplete pending reclassification of documents from groups F16K 15/03, F16K 15/18 and F16K 15/1825.

All groups listed in this Warning should be considered in order to perform a complete search.
15/1848 . . . [Check valves combined with valves having a rotating tap or cock]

**WARNING**

Group **F16K 15/1848** is incomplete pending reclassification of documents from group **F16K 15/03**.

All groups listed in this Warning should be considered in order to perform a complete search.

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)

**WARNING**

Group **F16K 15/207** is incomplete pending reclassification of documents from group **F16K 15/03**.

All groups listed in this Warning should be considered in order to perform a complete search.

17/00 Safety valves; Equalising valves, (e.g. pressure relief valves)

**WARNING**

Groups **F16K 17/00** - **F16K 17/42** are incomplete pending reclassification of documents from group **F16K 15/03**.

All groups listed in this Warning should be considered in order to perform a complete search.

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 15/030)
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 (F16K 17/36)]
17/1606 . . . [of the reverse-buckling-type (F16K 17/1633 takes precedence)]
17/1613 . . . . . . (F16K 17/1633 takes precedence]
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 movable ball (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]
Functional types

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 1/00)]

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 B67D; 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)

21/18 . . . closed when a rising liquid reaches a predetermined level {float-actuated valves F16K 21/18}

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. F12F)

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 seal (sealing constructions, see the appropriate groups according to the type of valve; movement of valve members other than for opening and closing F16K 29/00)

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)

27/002 . . . 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)

WARNING

Group F16K 27/0227 is impacted by reclassification into group F16K 27/0232.

Groups F16K 27/0227 and F16K 27/0232 should be considered in order to perform a complete search.

27/0232 . . . (the valve member retained by a removable closure)

WARNING

Group F16K 27/0232 is incomplete pending reclassification of documents from Group F16K 27/0227.

Groups F16K 27/0227 and F16K 27/0232 should be considered in order to perform a complete search.

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
Details

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 . (acted by volume variations caused by an element soluble in a fluid or swelling in contact with a fluid (life-boats B63C 9/024))

31/002 . (acted 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 . (acted 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 . . . (acted 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 31/065 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 31/062 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 take 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 . . . . acted 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]
the fluid acting on a diaphragm, bellows, or the like (F16K 31/145, F16K 31/165, F16K 31/365, F16K 31/385 take precedence)

one side of the diaphragm being spring loaded

with means to allow the side on which the springs are positioned to be altered

one side of the diaphragm being acted upon by the circulating fluid

with a plurality of the diaphragms

servo actuated

for mounting on, or in combination with, hand-actuated valves

the fluid acting on a piston

the fluid acting on a diaphragm

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

the fluid acting on a piston

for rotating valves

the fluid acting on a diaphragm

for rotating valves

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

actuating a lift valve

with the float rigidly connected to the valve

with a transmission with parts linked together from a single float to a single valve

with the valve guided for rectilinear movement and the float attached to a pivoted arm

[with a second lever or toggle between the pivoted arm and the valve]

with two or more floats actuating one valve

actuating a gate valve or sliding valve

actuating a tap or cock

acting on pilot valve controlling the cut-off apparatus

in which fluid from the circuit is constantly supplied to the fluid motor

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

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 fluid acting on a diaphragm

the discharge being effected through the diaphragm 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

the discharge being effected through the diaphragm and being blockable by an electrically-actuated member making contact with the diaphragm

acting on a piston

the discharge being effected through the piston and being blockable by an electrically-actuated member making contact with the 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

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

[specially adapted for gas valves]

with screw-spindle [or internally threaded actuating means]

[actuating pivotal 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 sliding 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
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)]
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
39/002 . . for lift valves
39/0022 . . . [using balancing surfaces]
39/0024 . . . [using an auxiliary valve on the main valve]
39/0026 . . . [using an external auxiliary valve]
39/0028 . . . [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 stuffing-box (; Sealing rings)]
41/023 . . . . . [for rotating valves]
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]
41/105 . . . . . . . . . . . . . [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]
47/00  Means in valves for absorbing fluid energy (for pipes F16L 55/00)

**WARNING**

Group F16K 47/00 is impacted by reclassification into groups F16K 47/01, F16K 47/011, F16K 47/0111, F16K 47/0112 and F16K 47/012.

All groups listed in this Warning should be considered in order to perform a complete search.

47/01  . . . (Damping of valve members)

**WARNING**

Groups F16K 47/01 and F16K 47/012 are incomplete pending reclassification of documents from groups F16K 47/00, F16K 47/011, F16K 47/0111, F16K 47/0112 and F16K 47/023.

All groups listed in this Warning should be considered in order to perform a complete search.

47/011  . . . (by means of a dashpot)

**WARNING**

Groups F16K 47/011, F16K 47/0111, F16K 47/0112 are incomplete pending reclassification of documents from groups F16K 47/00, F16K 47/011, F16K 47/0111, F16K 47/0112 and F16K 47/023.

All groups listed in this Warning should be considered in order to perform a complete search.

47/0111  . . . [the valve members comprising a plunger sliding within a fixed dashpot]

47/0112  . . . [the valve members comprising a dashpot sliding over a fixed plunger]

47/012  . . . (by means of a resilient damping element)

47/02  . . . for preventing water-hammer or noise

**WARNING**

Group F16K 47/02 is impacted by reclassification into groups F16K 47/01, F16K 47/011, F16K 47/0111, F16K 47/0112 and F16K 47/012.

All groups listed in this Warning should be considered in order to perform a complete search.

47/023  . . . [for preventing water-hammer, e.g. damping of the valve movement]

**WARNING**

Group F16K 47/023 is impacted by reclassification into groups F16K 47/01, F16K 47/011, F16K 47/0111, F16K 47/0112 and F16K 47/012.

All groups listed in this Warning should be considered in order to perform a complete search.

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, 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)]

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 microparticle 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]
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</tbody>
</table>

### Details of valves

- Means for compensation of misalignment between seat and closure member
- Closure member self-aligning to seat
- Seat self-aligning to closure member
- Common housing having a single inlet, a single outlet and multiple valve members
- Of diverse type, size or shape
- One valve arranged inside of the valve member of a second valve, e.g. nested valve members
- In parallel
- In series
- Spring arrangements
- Common spring for multiple closure members
- Plurality of biasing means, e.g. springs, for opening or closing single valve member
- Means for protecting the spring in the fluid flow path
- Adjustable spring pre-loading
- Constructional features of springs
- Generally flat springs
- Cantilever springs
- Helicoidal springs of variable pitch, diameter or spring rate
- Bleeding means in closed position of the valve, e.g. bleeding passages
- Arranged on the closure member
- Arranged on the valve housing or seat
- Self-contained valve assemblies
- Cartridge valves