

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

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

- 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

- 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.

Constructional 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)	1/18	. . . with pivoted discs or flaps
1/02	. with screw-spindle (F16K 1/12 - F16K 1/28 take precedence; actuating mechanisms with screw-spindles F16K 31/50)	1/20	. . . with axis of rotation arranged externally of valve member
1/04	. . with a cut-off member rigid with the spindle, e.g. main valves	1/2007	. . . . {specially adapted operating means therefor (operating means per se F16K 31/00)}
1/06	. . Special arrangements for improving the flow, e.g. special shape of passages or casings	1/2014	. . . . {Shaping of the valve member}
1/08	. . . in which the spindle is perpendicular to the general direction of flow	1/2021	. . . . {with a plurality of valve members}
1/10	. . . in which the spindle is inclined to the general direction of flow	1/2028	. . . . {Details of bearings for the axis of rotation}
1/12	. with streamlined valve member around which the fluid flows when the valve is opened	1/2035	. . . . . {the axis of rotation having only one bearing}
1/123	. . {with stationary valve member and moving sleeve}	1/2042	. . . . . {Special features or arrangements of the sealing}
1/126	. . {actuated by fluid}	1/205	. . . . . {the sealing being arranged on the valve member}
1/14	. with ball-shaped valve member (check valves F16K 15/04)	1/2057	. . . . . {the sealing being arranged on the valve seat}
1/16	. with pivoted closure-members	1/2064	. . . . . {with a channel- or U-shaped seal covering a central body portion}
1/165	. . {with a plurality of closure members}	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}

1/225	. . . . . {the axis of rotation having only one bearing}	1/465	. . . . . {to the valve seats}
1/226	. . . . . Shaping or arrangements of the sealing	1/48	. . . Attaching valve members to screw-spindles
1/2261	. . . . . {the sealing being arranged on the valve member}	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}
1/2263	. . . . . {the sealing being arranged on the valve seat}	1/485	. . . . . {with a groove in the spindle}
1/2265	. . . . . {with a channel- or U-shaped seal covering a central body portion}	1/487	. . . {by a fixing element extending in the axial direction of the spindle, e.g. a screw}
1/2266	. . . . . {and being forced into sealing contact with the valve member by a spring or a spring-like member}	1/50	. . . Preventing rotation of valve members
1/2268	. . . . . {Sealing means for the axis of rotation}	1/52	. . . Means for additional adjustment of the rate of flow
1/228	. . . . . Movable sealing bodies	1/523	. . . {for limiting the maximum flow rate, using a stop}
1/2285	. . . . . {the movement being caused by the flowing medium}	1/526	. . . {for limiting the maximum flow rate, using a second valve}
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	1/54	. . . Arrangements for modifying the way in which the rate of flow varies during the actuation of the valve
1/26	. . . Shape or arrangement of the sealing {Not used}	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)
1/28	. . . Movable sealing bodies {Not used}	3/02	. . . with flat sealing faces; Packings therefor
1/30	. . . specially adapted for pressure containers	3/0209	. . . {the valve having a particular passage, e.g. provided with a filter, throttle or safety device}
1/301	. . . {only shut-off valves, i.e. valves without additional means}	3/0218	. . . {with only one sealing face}
1/302	. . . {with valve member and actuator on the same side of the seat}	3/0227	. . . {Packings}
1/303	. . . {with a valve member, e.g. stem or shaft, passing through the seat}	3/0236	. . . {the packing being of a non-resilient material, e.g. ceramic, metal}
1/304	. . . {Shut-off valves with additional means}	3/0245	. . . {Curtain gate valves}
1/305	. . . {with valve member and actuator on the same side of the seat}	3/0254	. . . {being operated by particular means}
1/306	. . . {with a valve member, e.g. stem or shaft, passing through the seat}	3/0263	. . . {using particular material or covering means}
1/307	. . . {Additional means used in combination with the main valve}	3/0272	. . . {permitting easy assembly or disassembly}
1/308	. . . {Connecting means}	3/0281	. . . {Guillotine or blade-type valves, e.g. no passage through the valve member}
1/32	. . . Details (details of more general applicability F16K 25/00 - F16K 51/00)	3/029	. . . {with two or more gates}
1/34	. . . Cutting-off parts, e.g. valve members, seats (F16K 1/06 , F16K 1/12 , F16K 1/14 , F16K 1/26 take precedence)	3/03	. . . with a closure member in the form of an iris-diaphragm
1/36	. . . Valve members (for double-seat valves F16K 1/44 ; for butterfly valves F16K 1/222 , F16K 1/223)	3/04	. . . with pivoted closure members
1/38	. . . . . of conical shape	3/06	. . . in the form of closure plates arranged between supply and discharge passages (F16K 3/10 takes precedence)
1/385	. . . . . {contacting in the closed position, over a substantial axial length, a seat surface having the same inclination}	3/08	. . . . . with circular plates rotatable around their centres
1/40	. . . . . of helical shape	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}
1/42	. . . Valve seats (for double-seat valves F16K 1/44)	3/10	. . . with special arrangements for separating the sealing faces or for pressing them together
1/422	. . . . . {attachable by a threaded connection to the housing}	3/12	. . . with wedge-shaped arrangements of sealing faces
1/425	. . . . . {Attachment of the seat to the housing by plastical deformation, e.g. valve seat or housing being plastically deformed during mounting}	3/14	. . . with special arrangements for separating the sealing faces or for pressing them together
1/427	. . . . . {Attachment of the seat to the housing by one or more additional fixing elements}	3/16	. . . with special arrangements for separating the sealing faces or for pressing them together (F16K 3/10 , F16K 3/14 take precedence)
1/44	. . . Details of seats or valve members of double-seat valves	3/18	. . . by movement of the closure members
1/443	. . . . . {the seats being in series}	3/182	. . . . . {by means of toggle links}
1/446	. . . . . {with additional cleaning or venting means between the two seats}	3/184	. . . . . {by means of cams}
1/46	. . . Attachment of sealing rings	3/186	. . . . . {by means of cams of wedge form}
		3/188	. . . . . {by means of hydraulic forces}
		3/20	. . . by movement of the seats
		3/202	. . . . . {by movement of toggle links}

- 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 . . Means 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}
- 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}

5/184	. . . . {with the plugs or parts of the plugs mechanically pressing the seals against the housing}	11/04	. . comprising only lift valves
5/185	. . . . . {by means of conical surfaces}	11/044	. . . with movable valve members positioned between valve seats
5/187	. . . . . {with rolling action}	11/0445	. . . . {Bath/shower selectors}
5/188	. . . . . {Sealing effected by the flowing medium}	11/048	. . . with valve seats positioned between movable valve members
5/20	. . . for plugs with spherical surfaces	11/052	. . . with pivoted closure members, e.g. butterfly valves
5/201	. . . . {with the housing or parts of the housing mechanically pressing the seal against the plug}	11/0525	. . . . {the closure members being pivoted around an essentially central axis}
5/202	. . . . . {with conical surfaces}	11/056	. . . with ball-shaped valve members
5/204	. . . . {with the plugs or parts of the plugs mechanically pressing the seals against the housing}	11/0565	. . . . {moving in a combined straight line and rotating movement}
5/205	. . . . . {Sealing effected by the flowing medium}	11/06	. . comprising only sliding valves {, i.e. sliding closure elements}
5/207	. . . . . {using bellows}	11/065	. . . with linearly sliding closure members
5/208	. . . . . {with tongue-shaped means}	11/0655	. . . . {with flat slides}
5/22	. . Features relating to lubrication	11/07	. . . . with cylindrical slides
5/222	. . . {for plugs with conical surfaces}	11/0704	. . . . . {comprising locking elements}
5/225	. . . {for plugs with cylindrical surfaces}	11/0708	. . . . . {comprising means to avoid jamming of the slide or means to modify the flow}
5/227	. . . {for plugs with spherical surfaces}	11/0712	. . . . . {comprising particular spool-valve sealing means}
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}	11/0716	. . . . . {with fluid passages through the valve member (F16K 11/0704 , F16K 11/0708 , F16K 11/0712 take precedence)}
7/02	. with tubular diaphragm	11/072	. . . with pivoted closure members
7/04	. . constrictable by external radial force	11/074	. . . . with flat sealing faces
7/045	. . . {by electric or magnetic means}	11/0743	. . . . . {with both the supply and the discharge passages being on one side of the closure plates}
7/06	. . . by means of a screw-spindle, cam, or other mechanical means {(F16K 7/045 takes precedence)}	11/0746	. . . . . {with two or more closure plates comprising a single lever control}
7/061	. . . . . {Screw clamps}	11/076	. . . . with sealing faces shaped as surfaces of solids of revolution
7/063	. . . . . {Lever clamps}	11/078	. . . with pivoted and linearly movable closure members
7/065	. . . . . {Cam clamps}	11/0782	. . . . {Single-lever operated mixing valves with closure members having flat sealing faces}
7/066	. . . . . {Wedge clamps}	11/0785	. . . . . {the movable closure member being pivotally supported at one point and being linked to the operating lever at only one other point}
7/068	. . . . {by bending the hose}	11/0787	. . . . . {with both the supply and the discharge passages being on the same side of the closure members (F16K 11/0785 takes precedence)}
7/07	. . . by means of fluid pressure	11/08	. . comprising only taps or cocks
7/075	. . . . {a rigid body being located within the tubular diaphragm}	11/083	. . . with tapered plug
7/08	. . constrictable by twisting	11/0833	. . . . {having all the connecting conduits situated in a single plane perpendicular to the axis of the plug}
7/10	. with inflatable member	11/0836	. . . . {having all the connecting conduits situated in more than one plane perpendicular to the axis of the plug}
7/12	. with flat, dished, or bowl-shaped diaphragm	11/085	. . . with cylindrical plug
7/123	. . {the seat being formed on the bottom of the fluid line}	11/0853	. . . . {having all the connecting conduits situated in a single plane perpendicular to the axis of the plug}
7/126	. . {the seat being formed on a rib perpendicular to the fluid line}	11/0856	. . . . {having all the connecting conduits situated in more than one plane perpendicular to the axis of the plug}
7/14	. . arranged to be deformed against a flat seat	11/087	. . . with spherical plug
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}		

- 11/0873 {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
- 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}**

Functional types

NOTE

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

- 15/00 Check valves (valves specially adapted for inflatable balls [A63B 41/00](#))**
- 15/02 . with guided rigid valve members
- 15/021 . . {the valve member being a movable body around which the medium flows when the valve is open ([F16K 15/025](#) - [F16K 15/12](#) take precedence)}
- 15/023 . . . {the valve member consisting only of a predominantly disc-shaped flat element}

- 17/003 . {reacting to pressure and temperature}
- 17/006 . {specially adapted for shelters}
- 17/02 . opening on surplus pressure on one side; closing on insufficient pressure on one side ([check valves F16K 15/00](#))
- 17/025 . . {and remaining open after return of the normal pressure}
- 17/04 . . spring-loaded
- 17/0406 . . . {in the form of balls}
- 17/0413 . . . {in the form of closure plates}
- 17/042 . . . {with locking or disconnecting arrangements}
- 17/0426 . . . {with seat protecting means}
- 17/0433 . . . {with vibration preventing means}
- 17/044 . . . {with more than one spring}
- 17/0446 . . . {with an obturating member having at least a component of their opening and closing motion not perpendicular to the closing faces}
- 17/0453 {the member being a diaphragm}
- 17/046 {the valve being of the gate valve type or the sliding valve type}
- 17/0466 . . . {with a special seating surface}
- 17/0473 . . . {Multiple-way safety valves}
- 17/048 . . . {combined with other safety valves, or with pressure control devices}
- 17/0486 . . . {with mechanical actuating means}
- 17/0493 . . . {with a spring other than a helicoidal spring}
- 17/06 . . . with special arrangements for adjusting the opening pressure
- 17/065 {with differential piston}
- 17/08 . . . with special arrangements for providing a large discharge passage
- 17/082 {with piston}
- 17/085 {with diaphragm}
- 17/087 {with bellows}
- 17/10 . . . with auxiliary valve for fluid operation of the main valve
- 17/105 {using choking or throttling means to control the fluid operation of the main valve}
- 17/12 . . weight-loaded
- 17/14 . . with fracturing member
- 17/16 . . . with fracturing diaphragm {; Rupture discs}
- 17/1606 {of the reverse-buckling-type ([F16K 17/1633 takes precedence](#))}
- 17/1613 {with additional cutting means}
- 17/162 {of the non reverse-buckling-type ([F16K 17/1633 takes precedence](#))}
- 17/1626 {with additional cutting means}
- 17/1633 {made of graphite}
- 17/164 . . and remaining closed after return of the normal pressure
- 17/168 . . combined with manually-controlled valves, e.g. a valve combined with a safety valve
- 17/18 . opening on surplus pressure on either side
- 17/19 . . Equalising valves predominantly for tanks {([when combined with safety valve by change of position F16K 17/36](#))}
- 17/192 . . . with closure member in the form of a movable liquid column
- 17/194 . . . weight-loaded
- 17/196 . . . spring-loaded
- 17/20 . Excess-flow valves ([actuated in consequence of shock or similar extraneous influence F16K 17/36](#))
- 17/205 . . {specially adapted for flexible gas lines}
- 17/22 . . . actuated by the difference of pressure between two places in the flow line
- 17/24 acting directly on the cutting-off member
- 17/26 operating in either direction
- 17/28 operating in one direction only
- 17/285 {the cutting-off member being a ball ([F16K 17/30 takes precedence](#))}
- 17/30 spring-loaded
- 17/32 acting on a servo-mechanism or on a catch-releasing mechanism
- 17/34 . . in which the flow-energy of the flowing medium actuates the closing mechanism
- 17/36 . . actuated in consequence of extraneous circumstances, e.g. shock, change of position
- 17/363 . . {the closure members being rotatable or pivoting ([F16K 17/386 takes precedence](#))}
- 17/366 . . {the closure member being a 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}
- 17/406 . . {the fracturing member being a generally elongated member, e.g. rod or wire, which is directly connected to a movable valve member, the breaking or buckling of the elongated member allowing the valve member to move to a closed or open position}
- 17/42 . Valves preventing penetration of air in the outlet of containers for liquids
- 19/00 {Arrangements of valves and flow lines specially adapted for mixing fluids (multiple-way valves [F16K 11/00](#))}**
- 19/003 . {Specially adapted for boilers}
- 19/006 . {Specially adapted for faucets}
- 21/00 Fluid-delivery valves, {e.g. self-closing valves}(for liquid handling [B67D](#); for flushing devices for water-closets or the like [E03D](#))**
- 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 31/18](#))
- 21/185 . . . {with electrical or magnetical means, e.g. with magnetic floats, for sensing the liquid level}
- 21/20 . . . by means making use of air-suction through an opening closed by the rising liquid
- 23/00 Valves for preventing drip from nozzles**
- 24/00 Devices, e.g. valves, for venting or aerating enclosures** ([equalising valves F16K 17/00](#); [arrangement or mounting in pipes or pipe systems F16L 55/07](#); [venting or aerating as an additional function of steam traps or like apparatus F16T](#); [ventilation of rooms, vehicles, see the appropriate subclass, e.g. F24F](#))
- 24/02 . the enclosure being itself a valve, tap, or cock
- 24/04 . for venting only ([F16K 24/02 takes precedence](#))
- 24/042 . . {actuated by a float}
- 24/044 . . . {the float being rigidly connected to the valve element, the assembly of float and valve element following a substantially translational movement when actuated, e.g. also for actuating a pilot valve}
- 24/046 {the assembly of float and valve element being a single spherical element}
- 24/048 . . . {a transmission element, e.g. arm, being interposed between the float and the valve element, the transmission element following a non-translational, e.g. pivoting or rocking, movement when actuated}
- 24/06 . for aerating only ([F16K 24/02 takes precedence](#))
- Details**
- NOTE**
- Details not provided for in the following groups are classified in the preceding groups.
- 25/00 Details relating to contact between valve members and seat** ([sealing constructions, see the appropriate groups according to the type of valve; movement of valve members other than for opening and closing F16K 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}
- 27/02 . of lift valves ([for reducing the flow resistance of screw-spindle lift-valves F16K 1/06](#))
- 27/0209 . . {Check valves or pivoted valves}
- 27/0218 . . . {Butterfly valves}
- 27/0227 . . . {with the valve members swinging around an axis located at the edge of or outside the valve member}
- 27/0236 . . {Diaphragm cut-off apparatus}
- 27/0245 . . {with ball-shaped valve members}
- 27/0254 . . {with conical shaped valve members}
- 27/0263 . . {multiple way valves}
- 27/0272 . . {valves provided with a lining}
- 27/0281 . . {Housings in two parts which can be orientated in different positions}
- 27/029 . . {Electromagnetically actuated valves}
- 27/04 . of sliding valves
- 27/041 . . {cylindrical slide valves}
- 27/042 . . . {Hydraulic fluid leak traps}
- 27/044 . . {slide valves with flat obturating members}
- 27/045 . . . {with pivotal obturating members}
- 27/047 . . . {with wedge-shaped obturating members}
- 27/048 . . {Electromagnetically actuated valves}
- 27/06 . of taps or cocks
- 27/062 . . {with conical plugs}
- 27/065 . . {with cylindrical plugs}
- 27/067 . . {with spherical plugs}
- 27/07 . of cutting-off parts of tanks, e.g. tank-cars
- 27/08 . Guiding yokes for spindles; Means for closing housings; Dust caps, e.g. for tyre valves
- 27/10 . Welded housings
- 27/102 . . {for lift-valves}
- 27/105 . . {for gate valves}
- 27/107 . . {for taps or cocks}
- 27/12 . Covers for housings
- 29/00 Arrangements for movement of valve members other than for opening and closing the valve, e.g. for grinding-in, for preventing sticking**
- 29/02 . providing for continuous motion
- 31/00 {Actuating devices;} Operating means; Releasing devices** ([regulating means G05D](#))
- 31/001 . {actuated by volume variations caused by an element soluble in a fluid or swelling in contact with a fluid ([life-boats B63C 9/24](#))}
- 31/002 . {actuated by temperature variation ([thermo-electric F16K 31/025](#))}
- 31/003 . {operated without a stable intermediate position, e.g. with snap action ([F16K 31/56 takes precedence](#))}
- 31/004 . {actuated by piezo-electric means}
- 31/005 . . {Piezo-electric benders}
- 31/006 . . . {having a free end}
- 31/007 . . {Piezo-electric stacks}
- 31/008 . . . {for sliding valves}
- 31/02 . electric {([F16K 31/004 takes precedence](#))}; magnetic
- 31/025 . . {actuated by thermo-electric means}
- 31/04 . . using a motor
- 31/041 . . . {for rotating valves ([F16K 31/055 takes precedence](#))}
- 31/042 {with electric means, e.g. for controlling the motor or a clutch between the valve and the motor}
- 31/043 {characterised by mechanical means between the motor and the valve, e.g. lost motion means reducing backlash, clutches, brakes or return means}
- 31/045 {with torque limiters}
- 31/046 . . . {with electric means, e.g. electric switches, to control the motor or to control a clutch between the valve and the motor ([F16K 31/041 takes precedence](#))}

- 31/047 . . . {characterised by mechanical means between the motor and the valve, e.g. lost motion means reducing backlash, clutches, brakes or return means ([F16K 31/043 takes precedence](#))}
- 31/048 {with torque limiters ([F16K 31/041 takes precedence](#))}
- 31/05 . . . specially adapted for operating hand-operated valves or for combined motor and hand operation
- 31/055 {for rotating valves}
- 31/06 . . using a magnet {, e.g. diaphragm valves, cutting off by means of a liquid}
- 31/0603 . . . {Multiple-way valves}
- 31/0606 {fluid passing through the solenoid coil}
- 31/061 {Sliding valves}
- 31/0613 {with cylindrical slides}
- 31/0617 {with flat slides}
- 31/062 {the valve element being at least partially ball-shaped}
- 31/0624 {Lift valves}
- 31/0627 {with movable valve member positioned between seats}
- 31/0631 {with ball shaped valve members}
- 31/0634 {with fixed seats positioned between movable valve members}
- 31/0637 {with ball shaped valve members}
- 31/0641 {the valve member being a diaphragm}
- 31/0644 . . . {One-way valve}
- 31/0648 {the armature and the valve member forming one element ([F16K 31/0651 takes precedence](#))}
- 31/0651 {the fluid passing through the solenoid coil}
- 31/0655 {Lift valves}
- 31/0658 {Armature and valve member being one single element}
- 31/0662 {with a ball-shaped valve member}
- 31/0665 {with valve member being at least partially ball-shaped ([F16K 31/0662 takes precedence](#))}
- 31/0668 {Sliding valves}
- 31/0672 {the valve member being a diaphragm}
- 31/0675 . . . {Electromagnet aspects, e.g. electric supply therefor}
- 31/0679 {with more than one energising coil}
- 31/0682 . . . {with an articulated or pivot armature}
- 31/0686 . . . {Braking, pressure equilibration, shock absorbing}
- 31/0689 {Braking of the valve element}
- 31/0693 {Pressure equilibration of the armature}
- 31/0696 {Shock absorbing, e.g. using a dash-pot}
- 31/08 . . . using a permanent magnet
- 31/082 {using 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 . . . actuated by fluid ({[fluid-actuated lift valves F16K 1/126](#)}; [fluid-actuated check valves F16K 15/00](#); [fluid-actuated safety valves F16K 17/00](#))
- 31/122 . . the fluid acting on a piston ([F16K 31/143, F16K 31/163, F16K 31/363, F16K 31/383 take precedence](#))
- 31/1221 {one side of the piston being spring-loaded}
- 31/1223 {one side of the piston being acted upon by the circulating fluid}
- 31/1225 {with a plurality of pistons}
- 31/1226 {the fluid circulating through the piston}
- 31/1228 {with a stationary piston}
- 31/124 . . . servo actuated
- 31/1245 {with more than one valve}
- 31/126 . . the fluid acting on a diaphragm, bellows, or the like ([F16K 31/145, F16K 31/165, F16K 31/365, F16K 31/385 take precedence](#))
- 31/1262 {one side of the diaphragm being spring loaded}
- 31/1264 {with means to allow the side on which the springs are positioned to be altered}
- 31/1266 {one side of the diaphragm being acted upon by the circulating fluid}
- 31/1268 {with a plurality of the diaphragms}
- 31/128 . . . servo actuated
- 31/14 . . . for mounting on, or in combination with, hand-actuated valves
- 31/143 . . . the fluid acting on a piston
- 31/145 . . . the fluid acting on a diaphragm
- 31/16 . . . with a mechanism, other than pulling-or pushing-rod, between fluid motor and closure member ([with float F16K 31/18](#))
- 31/163 . . . the fluid acting on a piston
- 31/1635 {for rotating valves}
- 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 or 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
- 31/3835 {the discharge being effected through the piston and being blockable by a mechanically-actuated member making contact with the piston}
- 31/385 the fluid acting on a diaphragm
- 31/3855 {the discharge being effected 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 effected 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 effected 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](#))}

37/0016	. . {having a graduated scale}	41/16	. with a flange on the spindle which rests on a sealing ring
37/0025	. {Electrical or magnetic means (F16K 37/0075 takes precedence)}	41/18	. . sealing only when the closure member is in the opened position
37/0033	. . {using a permanent magnet, e.g. in combination with a reed relays}	43/00	Auxiliary closure means in valves, which in case of repair, e.g. rewashing, 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
37/0041	. . {for measuring valve parameters (F16K 37/0033 takes precedence)}	43/001	. {an auxiliary valve being actuated independently of the main valve}
37/005	. . {for measuring fluid parameters (F16K 37/0033 takes precedence)}	43/003	. . {the auxiliary valve being a rotary valve}
37/0058	. {Optical means, e.g. light transmission, observation ports (F16K 37/0075 takes precedence)}	43/005	. {an auxiliary valve closing automatically when the main valve is being disassembled}
37/0066	. {Hydraulic or pneumatic means (F16K 37/0075 takes precedence)}	43/006	. . {the auxiliary valve being held open by the main valve}
37/0075	. {For recording or indicating the functioning of a valve in combination with test equipment}	43/008	. {the main valve having a back-seat position, e.g. to service the spindle sealing}
37/0083	. . {by measuring valve parameters}	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)
37/0091	. . {by measuring fluid parameters}	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)}
39/00	Devices for relieving the pressure on the sealing faces	47/023	. . {for preventing water-hammer, e.g. damping of the valve movement}
39/02	. for lift valves	47/026	. . {preventing noise in a single handle mixing valve}
39/022	. . {using balancing surfaces}	47/04	. for decreasing pressure {or noise level}, the throttle being incorporated in the closure member
39/024	. . {using an auxiliary valve on the main valve}	47/045	. . {and the closure member being rotatable}
39/026	. . {using an external auxiliary valve}	47/06	. . with a throttle in the form of a helical channel
39/028	. . {with pivoted closure members, e.g. butterfly valves}	47/08	. for decreasing pressure {or noise level} and having a throttling member separate from the closure member {, e.g. screens, slots, labyrinths}
39/04	. for sliding valves	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
39/045	. . {of rotating or pivoting type}	47/12	. . the throttling channel being of helical form
39/06	. for taps or cocks	47/14	. . the throttling member being a perforated membrane
41/00	Spindle sealings	47/16	. . the throttling member being a cone
41/003	. {by fluid}	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)
41/006	. {by establishing an under-pressure}	49/002	. {Electric heating means}
41/02	. with stuffing-box {; Sealing rings}	49/005	. {Circulation means for a separate heat transfer fluid}
41/023	. . {for spindles which only rotate, i.e. non-rising spindles (F16K 41/043 , F16K 41/063 and F16K 41/083 take precedence)}	49/007	. . {located within the obturating element}
41/026	. . . {for rotating valves}	51/00	Other details not peculiar to particular types of valves or cut-off apparatus
41/04	. . with at least one ring of rubber or like material between spindle and housing	51/02	. specially adapted for high-vacuum installations
41/043	. . . {for spindles which only rotate, i.e. non-rising spindles}	99/00	Subject matter not provided for in other groups of this subclass
41/046	. . . . {for rotating valves}	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)}
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		

99/0003	. . {Constructional types of microvalves; Details of the cutting-off member}
99/0005	. . . {Lift valves}
99/0007	. . . . {of cantilever type}
99/0009	. . . . {the valve element held by multiple arms}
99/0011	. . . {Gate valves or sliding valves}
99/0013	. . . {Rotary valves}
99/0015	. . . {Diaphragm or membrane valves}
99/0017	. . . {Capillary or surface tension valves, e.g. using electro-wetting or electro-capillarity effects}
99/0019	. . . {Valves using a microdroplet or microbubble as the valve member}
99/0021	. . . {No-moving-parts valves}
99/0023	. . . {with ball-shaped valve members}
99/0025	. . . {Valves using microporous membranes}
99/0026	. . . {Valves using channel deformation}
99/0028	. . . {Valves having multiple inlets or outlets}
99/003	. . . {Valves for single use only}
99/0032	. . . {using phase transition or influencing viscosity}
99/0034	. . {Operating means specially adapted for microvalves}
99/0036	. . . {operated by temperature variations}
99/0038	. . . . {using shape memory alloys}
99/004	. . . . {using radiation}
99/0042	. . . {Electric operating means therefor}
99/0044	. . . . {using thermo-electric means}
99/0046	. . . . {using magnets}
99/0048	. . . . {using piezoelectric means}
99/0049	. . . . {using an electroactive polymer [EAP]}
99/0051	. . . . {using electrostatic means}
99/0053	. . . . {using magnetostrictive means}
99/0055	. . . {actuated by fluids}
99/0057	. . . . {the fluid being the circulating fluid itself, e.g. check valves}
99/0059	. . . . {actuated by a pilot fluid}
99/0061	. . . . {actuated by an expanding gas or liquid volume}
99/0063	. . . {using centrifugal forces}
99/0065	. . . {using chemical activation}
99/0067	. . . . {actuated by a pyrotechnical charge}
2099/0069	. . {Bistable microvalves}
2099/0071	. . {with latching means}
2099/0073	. {Fabrication methods specifically adapted for microvalves}
2099/0074	. . {using photolithography, e.g. etching}
2099/0076	. . {using electrical discharge machining [EDM], milling or drilling}
2099/0078	. . {using moulding or stamping}
2099/008	. . {Multi-layer fabrications}
2099/0082	. {Microvalves adapted for a particular use}
2099/0084	. . {Chemistry or biology, e.g. "lab-on-a-chip" technology}
2099/0086	. . {Medical applications}
2099/0088	. . . {Implanted devices}
2099/009	. . {Fluid power devices}
2099/0092	. . {Inkjet printers}
2099/0094	. . {Micropumps}
2099/0096	. . {Fuel injection devices}
2099/0098	. . {Refrigeration circuits, e.g. for cooling integrated circuits}