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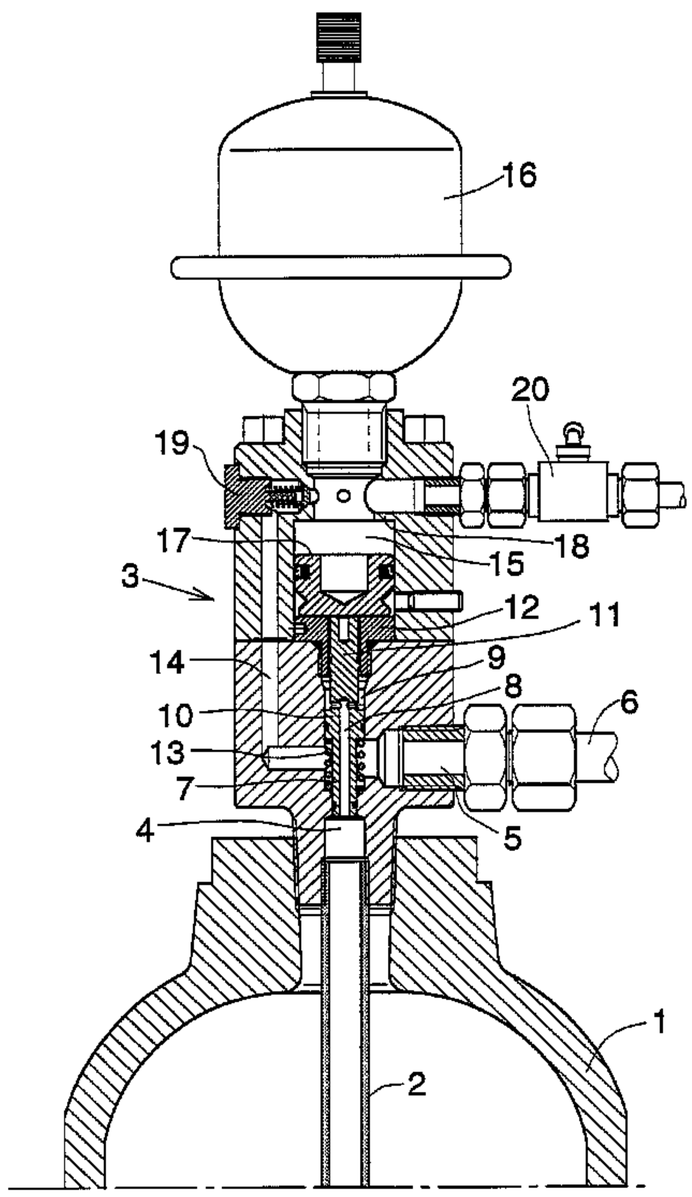
(54) Titre : VANNE ACTIONNEE PAR PRESSION, POUR INSTALLATION DE LUTTE CONTRE L'INCENDIE
(54) Title: PRESSURE ACTIVATED VALVE FOR FIRE FIGHTING INSTALLATION



(57) Abrégé/Abstract:
A fire fighting installation is taught having a high operating pressure provided with a valve which is reliable without access to electric current and is of a simple structure. The valve has a spindle which is movable between a stand-by position and an activated position. A secondary liquid source with a low pressure acts on the spindle in the direction towards the stand-by position and a spring acts on the spindle in the opposite direction. When the pressure in the secondary liquid source, due to liquid delivery to a released spray head in the installation, has fallen to a predeterminable value the spring drives the spindle to the activated position and opens a direct connection from the inlet of the valve to its outlet.

Abstract

A fire fighting installation is taught having a high operating pressure provided with a valve which is reliable without access to electric current and is of a simple structure. The valve has a spindle which is movable between a stand-by position and an activated position. A secondary liquid source with a low pressure acts on the spindle in the direction towards the stand-by position and a spring acts on the spindle in the opposite direction. When the pressure in the secondary liquid source, due to liquid delivery to a released spray head in the installation, has fallen to a predeterminable value the spring drives the spindle to the activated position and opens a direct connection from the inlet of the valve to its outlet.

Pressure activated valve for fire fighting installation

The present invention relates to a valve for a fire fighting installation, in particular for such a fire fighting installation that is capable of operating with a high drive pressure for the extinguishing liquid. By a high pressure is in this context meant a pressure within the range about 30 bar to about 300 bar, while conventional low pressure installations have an operating pressure of about 5 - 10 bar. As source for the extinguishing liquid can preferably be utilized at least one hydraulic accumulator to the out-going line of which a number of automatically releasable spray heads are connected.

Known high pressure valves are expensive and in most cases electrically operated which is a drawback in fire situations.

The object of the invention is to provide a new valve which is reliable without access to electric current and is of a simple structure and thus cheap.

The valve according to the invention is mainly characterized in that it comprises an inlet connectable to the high pressure liquid source and an outlet connectable to an out-going line, and a spindle which is movable between a stand-by position in which the spindle closes connection from the inlet to the outlet, and an activated position in which the spindle opens connection from the inlet to the outlet,

that the housing of the valve comprises a channel which connects the outlet of the valve to a liquid space which is under the influence of a secondary liquid source with a lower pressure than said high pressure source,

that the valve spindle is arranged to be under the influence of a spring acting in the opposite

direction in relation to the pressure action of said liquid space on the spindle, and

that the pressure of the secondary liquid source and the force of said spring are mutually adapted in such a way that when the secondary liquid source acts with full pressure on the spindle via said liquid space the spindle is held in stand-by position and when the pressureof the secondary liquid source due to liquid delivery to a released spray head has decreased to a predeterminable value the spring drives the spindle to activated position.

In the channel of the valve housing is preferably positioned a nonreturn valve which in the activated state of the valve prevents the pressure of the high pressure source from entering said liquid space.

The invention shall in the following be described with reference to an exemplifying preferred embodiment shown in the attached drawing.

Figure 1 shows a valve in stand-by state.

Figure 2 shows the valve in activated state.

A hydraulic accumulator with a high charge pressure (e.g. 200 bar) is indicated by the reference numeral 1. The accumulator 1, which in the following is called primary accumulator, comprises an outlet tube 2 which preferably is provided with a number of apertures in its wall in order to, according to what is described in the patent application 924752, deliver liquid and a mixture of liquid and the drive gas of the accumulator, respectively. An outlet valve connected to the tube 2 is generally indicated by 3, the inlet of the valve by 4 and its outlet by 5.

The outlet 5 is via an out-going line 6 in connection with a number of automatically releasable spray heads which are not shown in the drawing.

In the stand-by position of the valve 3, according to figure 1, the connection between the inlet 4 of the valve and the outlet 5 closed by a valve spindle 7.

The valve spindle 7 has an axial channel 8 starting from the inlet 4 and leading to an annular space 9 between the spindle and the surrounding valve housing. The cross section area of the annular space 9 is equal to that area of the spindle 7 which is under the influence of the pressure of the hydraulic accumulator 1. The pressure action of the accumulator on the spindle 7 is thus reversed (compensated, balanced) by the pressure action in the annular space 9 in the opposite direction against the end face of a piston-like part 10 formed on the spindle, because the opposite end portion 11 of the spindle is arranged axially movable through a support element 12 fixed in the valve housing, in sealed gliding contact. The pressure prevailing in the primary accumulator cannot thus bring the spindle 7 to move.

A helical spring 13 is laid around the spindle 7 and is supported on one hand in the valve inlet 4 and on the other hand against the piston part 10; the spring 13 thus tries to move the spindle 7 upwards in figure 1 from the stand-by position in which the spindle keeps the connection from the inlet 4 to the outlet 5 closed.

The housing of the valve 3 comprises a channel 14 which connects the outlet 5 to a liquid space 15 which in turn is in connection to a small (e.g. about 0,3 liter) hydraulic accumulator 16 with a low charge pressure (e.g. 6-10 bar), in the following also called secondary accumulator.

The end portion 11 of the valve spindle 7 has, or at least lies against, a head 17 which like a piston is movable in the liquid space 15 between the position

of figure 1, in which the head 17 presses against the the support element 12 fixed in the housing of the valve 3, through which element the spindle end 11 is axially movable in sealed contact, and the connection from the inlet 4 to the outlet 5 is closed, and the position of figure 2, in which the head 17 presses against an opposite stop 18 and the connection from the inlet 4 to the outlet 5 is open.

In figure 1 the spindle 7 is kept in place by the the liquid space 15 pressure, which acts on the spindle head 17. The spring 13 acts in the opposite direction, while the high pressure in the primary accumulator 1, as earlier mentioned, thanks to the compensation or balance by means of the annular space 9, does not drive the spindle 7.

When a spray head being in connection to the outlet 5 is released, the secondary accumulator 16 starts delivering liquid to the spray head in question. Hereby the pressure in the liquid space 15 falls quickly whereat the push action of the spring 13 on the spindle 7 wins and the spindle starts moving upwards in figure 1 to the end position of figure 2, against the stop 18.

A nonreturn valve 19 positioned in the channel 14 of the valve housing prevents the pressure of the primary accumulator in the position of figure 2 from entering the liquid space 15. A manually operable reserve release means, which in figure 1 is closed and in figure 2 is opened, is indicated by 20.

For larger installations the invention can of course be applied on an arbitrary number of hydraulic accumulators and/or high pressure pumps. With respect to spray heads, nozzles, group release and other arrangements, in each case can at will be applied what has been described e.g. in the International Patent ApplicationsPCT/FI92/00060, .../00122, .../00155,

.../00156, .../00193 .../00213, .../00316, .../00317, and .../00330.

Claims:

1. Valve for a fire fighting installation, comprising:

a housing with an inlet connectable to a high pressure source, an outlet connectable to an out-going line, and a spindle which is movable between a stand-by position in which the spindle closes connection from the inlet to the outlet, and an activated position in which the spindle opens connection from the inlet to the outlet,

wherein the housing of the valve comprises a channel that connects the outlet of the valve to a liquid space, which is under the influence of a secondary liquid source having a lower pressure than said high pressure source,

and wherein the spindle is arranged to be under the influence of a spring acting in an opposite direction to the pressure action of said liquid space on the spindle, and

and wherein the pressure of the secondary liquid source and a force of said spring are mutually adapted in such a way that when the secondary liquid source acts with full pressure on the spindle via said liquid space the spindle is held in the stand-by position and when the pressure of the secondary liquid source due to liquid delivery to a released spray head of the fire fighting installation has decreased to a predeterminable value the spring drives the spindle to the activated position.

2. Valve according to claim 1, characterized in that in the channel of the valve housing is positioned a nonreturn valve to prevent the pressure of the high pressure source from entering said liquid space, when the spindle is in the activated position.

3. Valve according to claim 1, characterized in that when the spindle is in the stand-by position one end of the spindle closes the inlet of the valve, with the one end under the influence of the pressure prevailing in the inlet, and

wherein the spindle has an axial channel starting from said one end of the spindle and leading to an annular space, formed between the spindle and the surrounding valve housing, a piston-like part of the spindle projecting transversely to the axis of the spindle between the one end and an opposite end of the spindle, and area of the piston-like part of the spindle being equal to a cross-sectional area of the one end of the spindle, in order to compensate pressure action in the inlet with oppositely directed pressure from the inlet in the annular space against the piston-like part of the spindle.

4. Valve according to claim 3, characterized in that the spring is a helical spring laid around the spindle with one end of the helical spring supported against the housing of the inlet and an opposite end of the helical spring supported against the piston-like part of the spindle.

5. Valve according to claim 4, characterized in that a portion of the spindle, in relation to the inlet of the valve, is glideably brought through a support element fixed in the valve housing, to abutment against a head which is movably arranged like a piston in said liquid space.

6. Valve according to claim 1, characterized in that the secondary liquid source is a hydraulic accumulator.

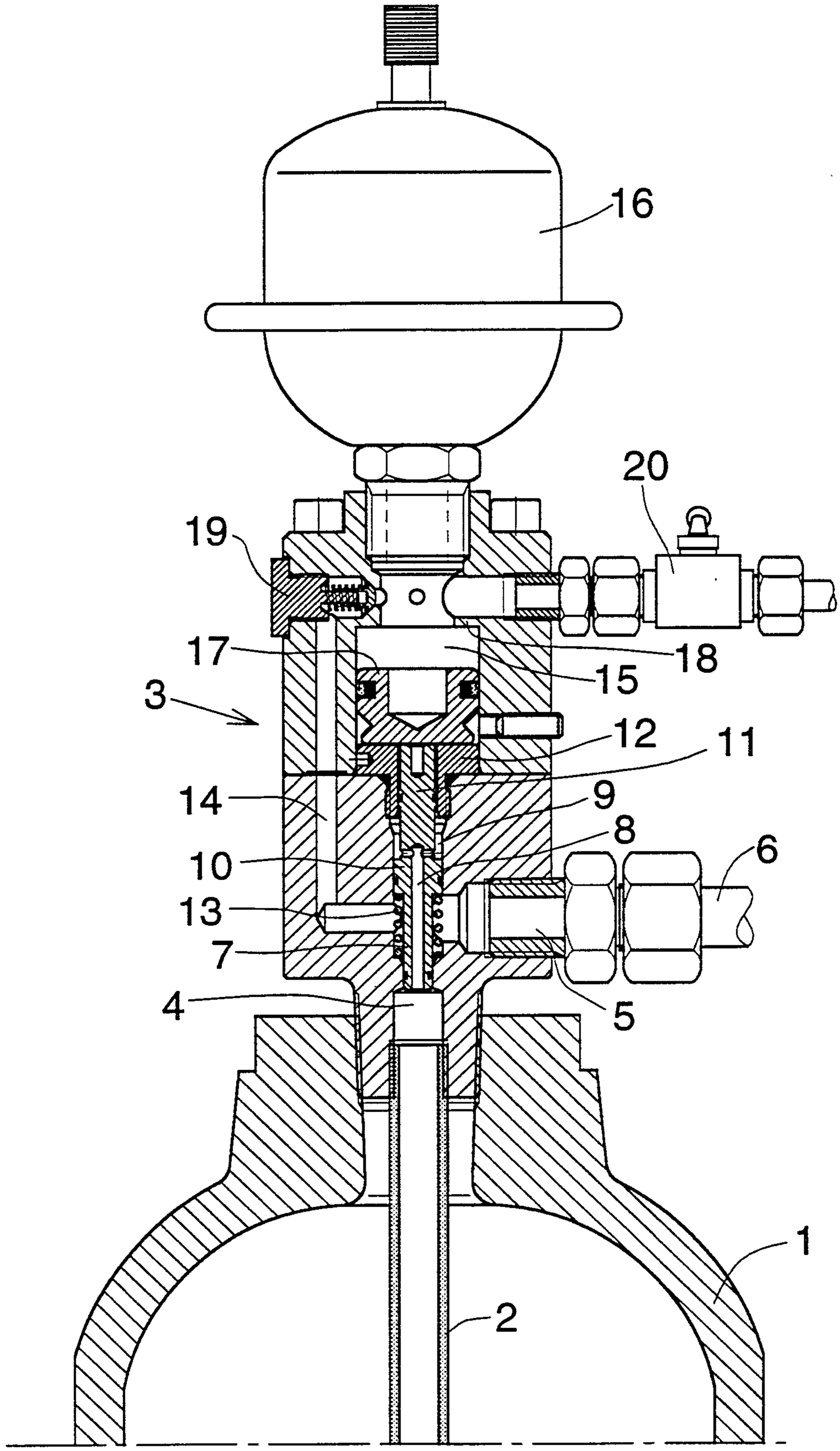


Fig.1

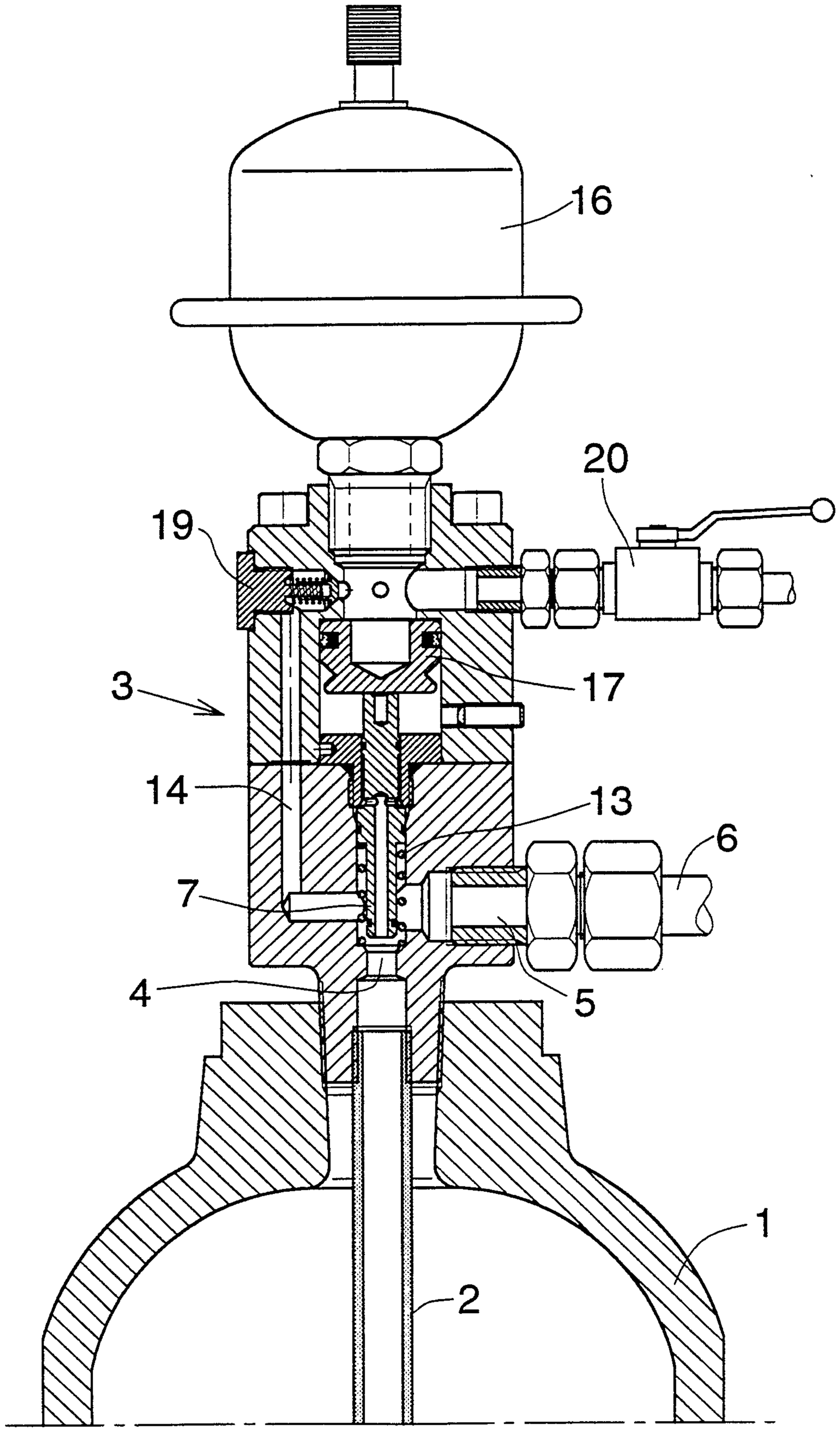
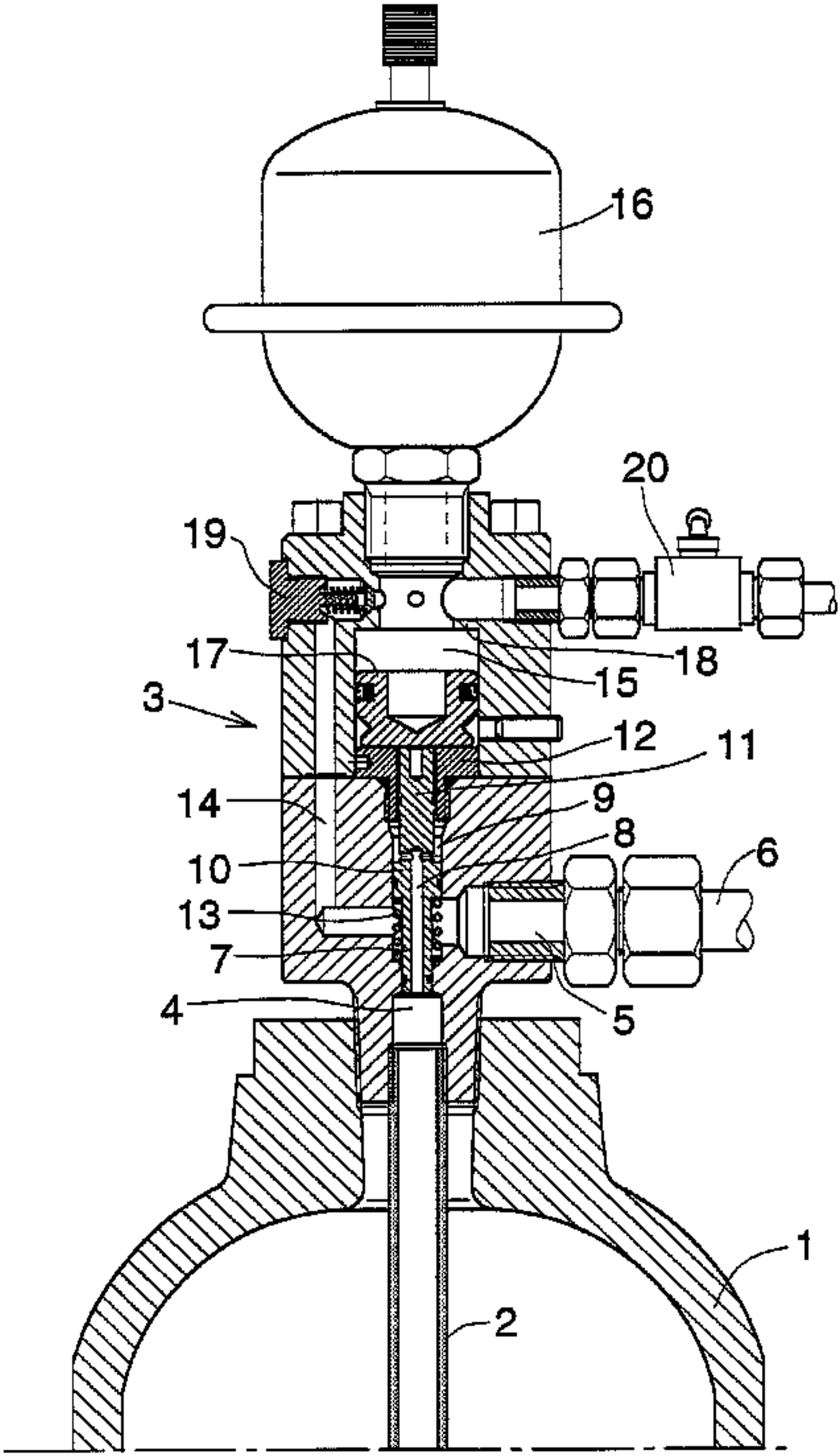


Fig.2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