Nov. 6, 1934. A. C. ROWLEY 1,980,096

CONTROL VALVE

Original Filed Feb. 24, 1933

Fig. 1.

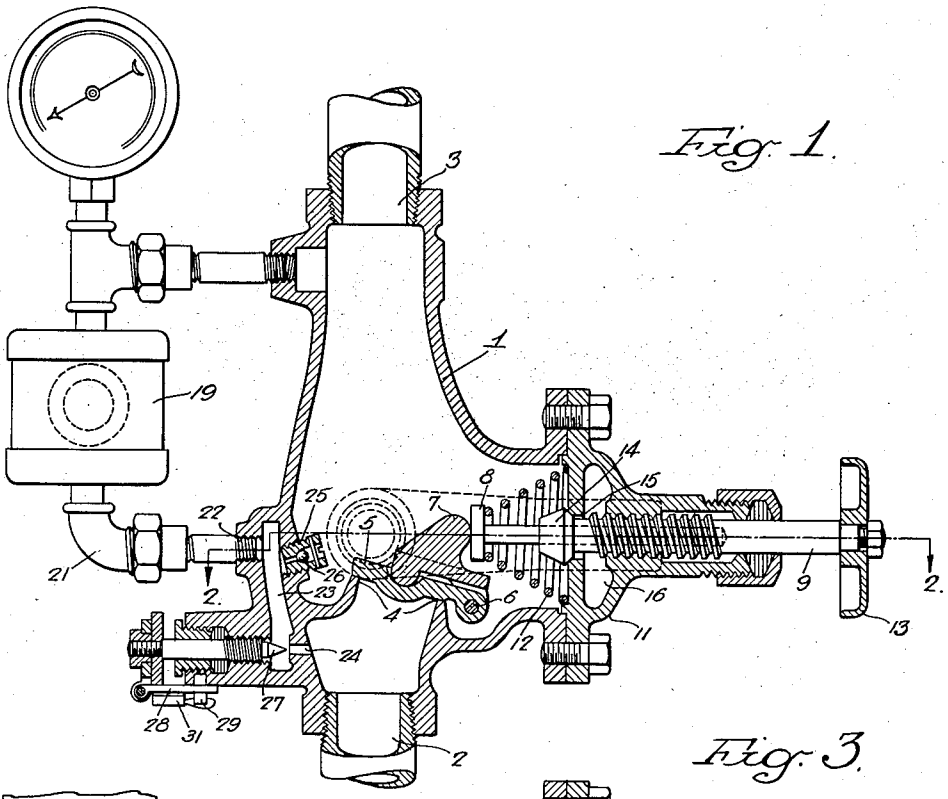


Fig. 3.

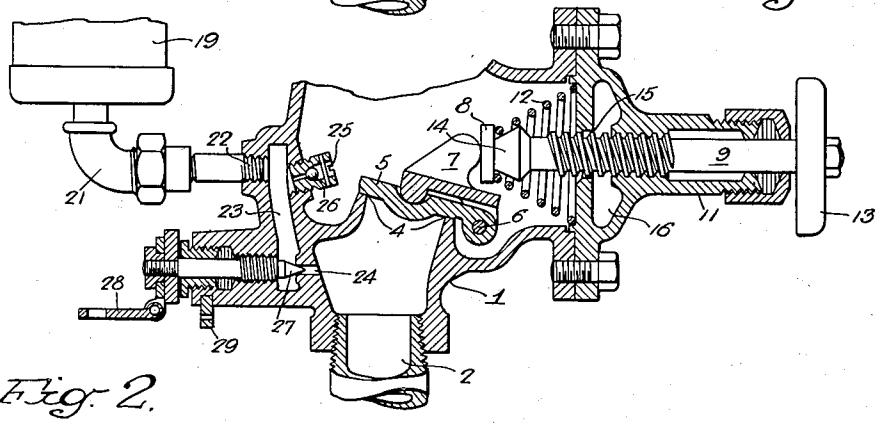
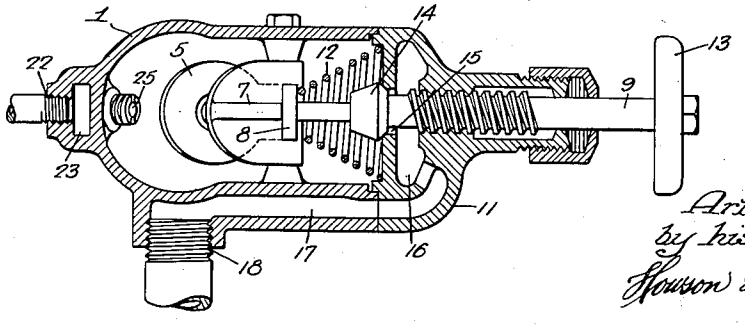


Fig. 2.



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1,980,096

CONTROL VALVE

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1 Claim. (Cl. 277—9)

This invention relates to improvements in control valves for automatic sprinkler systems, (being a division of my application for patent filed February 24, 1933, Serial Number 658,410), and a principal object of the invention is to provide a simple and efficient valve combining the functions of independent control, drain and alarm valves.

Another and more specific object of the invention is to provide a valve of the general character set forth comprising novel means for locking on its seat the valve element which controls the passage of water or other fluid from the supply main to the sprinkler system, and for simultaneously rendering a drain means for the system operative to free the system of accumulated fluid.

Another object of the invention is to provide a novel alarm device actuated by sudden substantial differences in fluid pressure at opposite sides of the valve.

Still another object of the invention is to provide novel means for preventing accidental actuation of the alarm due to surges or resurges in the supply and sprinkler systems.

The invention further resides in certain novel and improved structural and mechanical features hereinafter described and illustrated in the attached drawing, in which:

Figure 1 is a sectional view of a valve made in accordance with my invention showing the parts in the relative positions to which they are adjusted when the device is set for operation;

Fig. 2 is a sectional view taken through the casing on the line 2—2, Fig. 1; and

Fig. 3 is a sectional view corresponding to Fig. 1 but showing the parts adjusted to their inoperative positions.

With reference to Fig. 1 of the drawing, the valve in a preferred embodiment comprises a casing 1 having an inlet port 2 adapted for connection to a fluid supply main and an outlet port 3 adapted for connection with the sprinkler system. In the interior of the valve and between these ports is formed a seat 4 for a valve clapper 5 pivotally mounted in the casing at 6 and having associated therewith a retaining lever 7 with bifurcations also pivotally mounted on the pivot 6. One arm of the lever 7 engages in a recess in the upper face of the clapper 5, while the other end is engaged by the head of a plunger 8, this plunger being slidably mounted in a longitudinal recess in a valve stem 9 threaded into a cap 11 constituting a part of the casing 1. Between the inner face of the cap 11 and the head of the plunger 8 is a spring 12 which normally exerts a pressure upon the plunger forcing it resiliently against the valve-retaining lever 7. The stem 9 has at its outer end a hand wheel 13, and the inner end of the stem carries a valve 14 which normally and as shown in Fig. 1 seats in the inner face of the cap 11 to seal the port 15 in said cap through which the stem extends into the interior of the valve casing. The port 15 at its outer end communicates with a chamber 16 in the cap 11, and this chamber, see Fig. 2, communicates through a passage 17 in the cap and in the wall of the casing proper with a port 18 which is connected to a suitable drain. It will be apparent that when the hand wheel 13 is turned to advance the stem inwardly in the threaded cap, the valve 14 will be moved from its seat, thereby opening the port 15 and connecting the drain chamber 16 with the interior chamber of the valve casing. Also the stem 9 is capable of being turned inwardly sufficiently to bring the valve 14 into engagement with the head 8 of the plunger when the latter is in the normal position shown in Fig. 1. The purpose of this adjustment will be described hereinafter.

The valve casing 1 on the sprinkler system side of the clapper 5 is provided with a port 17 which is connected through suitable pipe connections 18 with one end of a casing 19. The other end of the casing 19 is connected through a suitable fitting 21 with a port 22 in the valve casing, which port communicates with a passage 23 formed in the wall of the casing. The passage 23 communicates through a port 24 with the interior of the casing at the intake side of the clapper 5; and the passage 23 is also connected through a port 25 with the interior of the casing at the opposite or sprinkler system side of the clapper. The port 25 is controlled by a ball check 26, the arrangement of this check valve being such that the ball normally closes the port 25 as shown. The port 24 is controlled by a needle valve 27 threaded into the casing and adjustable from the exterior of the latter, and means is provided in the form of a lever 28 pivotally secured to the outer exposed end of the valve 27 for locking this valve in the open position shown in Fig. 1. The lever 28 is apertured for reception of an apertured lug 29 projecting from the casing, and the aperture in the said lever 28 will register with the lug 29 only when the needle valve 27 is in a predetermined open position. The aperture in the lug 29 is adapted for reception of a suitable wire seal 31 of well known type, rupture of which to release the lever 28 will indicate that the device has been tampered with. When this seal

is intact, therefore, it may be assumed that the needle valve 27 is in the normal open position.

It will be understood that the casing 19 houses the elements of a pressure-actuated switch mechanism constituting an element of an alarm device forming no part of the present invention. It is sufficient to state that the switch mechanism is actuated when the fluid pressure applied to the casing 19 through the port 17 falls appreciably below the fluid pressure applied to the casing through the port 22.

In describing the operation of the device, it will be considered that the parts are adjusted to the positions illustrated in Fig. 1, wherein the valve is shown in its operating setting. Assuming that the port 2 is connected to a water main, water pressure will be applied to the adjacent side of the valve clapper 5, and since the sprinkler system is also connected with the water main through the ports 24 and 25, the entire system will be flooded and the pressures at opposite sides of the valve clapper will be the same. Under these conditions, the pressure of the spring 12 is sufficient to hold the clapper to its seat. Also the fluid pressure at the ports 17 and 22 will be the same and the switch mechanism in the casing 19 will be open. It will be noted further that under these conditions the valve 14 is seated and the needle valve 27 backed away to open the port 24. Assuming that under these conditions pressure on the sprinkler system side of the clapper 5 is reduced by the opening for example of one of the sprinkler heads, the resulting reduction of pressure in that chamber of the casing 1 communicating with the sprinkler system results in a corresponding reduction of fluid pressure at the port 17, and the relatively high fluid pressure, which by reason of the restricted character of the port 25 is still exerted at the port 22, causes an actuation of the switch mechanism closing the alarm circuit. Also the reduced pressure at the system side of the clapper 5 permits the pressure of the water main to force this valve from its seat, thereby permitting flow of water from the main to the sprinkler system.

If it is desired to interrupt the flow of water from the sprinkler system, the valve stem 9 is turned inwardly through the medium of the hand wheel 13 until, as shown in Fig. 3, the valve 14 engages the inner face of the head of the plunger 8, and further until the plunger is advanced against the lever 7 of the valve clapper 5 sufficiently to return this clapper to its seat. The needle valve 27 is also turned inwardly to close the port 24 so that flow of water from the main to the system is entirely prevented. Inward movement of the valve 14 uncovers the port 15 and connects the sprinkler system through the drain chamber 16 and passage 17 with the drain port 18 whereby the water remaining in the sprinkler system is permitted to escape. When the system is entirely cleared of water and the sprinkler reset, the entire system may be again placed in operative condition by returning the valve 14 to its original seated position and by backing away the needle valve 27 to again uncover the port 24. Water will then again enter and fill the sprinkler system, and the valve 5 and the elements of the alarm device 19 will, when the pressure in the sprinkler system equals the pressure in the supply main, again assume their normal positions as shown in Fig. 1. Surges of water in the supply line are permitted to vent through the port 25 into the sprinkler system without actuating the alarm, and the check 26 prevents actuation by resurge from the sprinkler system.

It will be apparent that the device is suited for use in a dry pipe system as well as in the wet system described above. Under these circumstances, sufficient air must be applied to the sprinkler system to balance the effect upon the ball check 26 and the clapper 5 of the water pressure in the main. When sufficient air pressure is applied, the valves 14 and 27 may be adjusted to their seated and unseated positions respectively, the air pressure thereafter maintaining under normal conditions the ball check and the clapper 5 on their seats against the water pressure.

I claim:

In a valve of the stated type, the combination with a casing having intake and discharge ports, of a valve element seating in said casing and normally separating said ports, a drain port in said casing, a valve normally closing said port and having a stem threaded into said casing, a plunger slidable in a longitudinal recess in said stem and projecting beyond the inner end thereof, and a spring resiliently advancing the projecting end of said plunger into engagement with the valve element first named and tending resiliently to retain the element on its seat, said threaded stem being rotatable from the exterior of the casing to unseat its valve from the drain port and to bring said valve into locking engagement with said plunger to retain the plunger in position preventing movement of the said valve element from its seat.

ARTHUR C. ROWLEY.