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PRESSURE ACTUATED SPRINKLER VALVE

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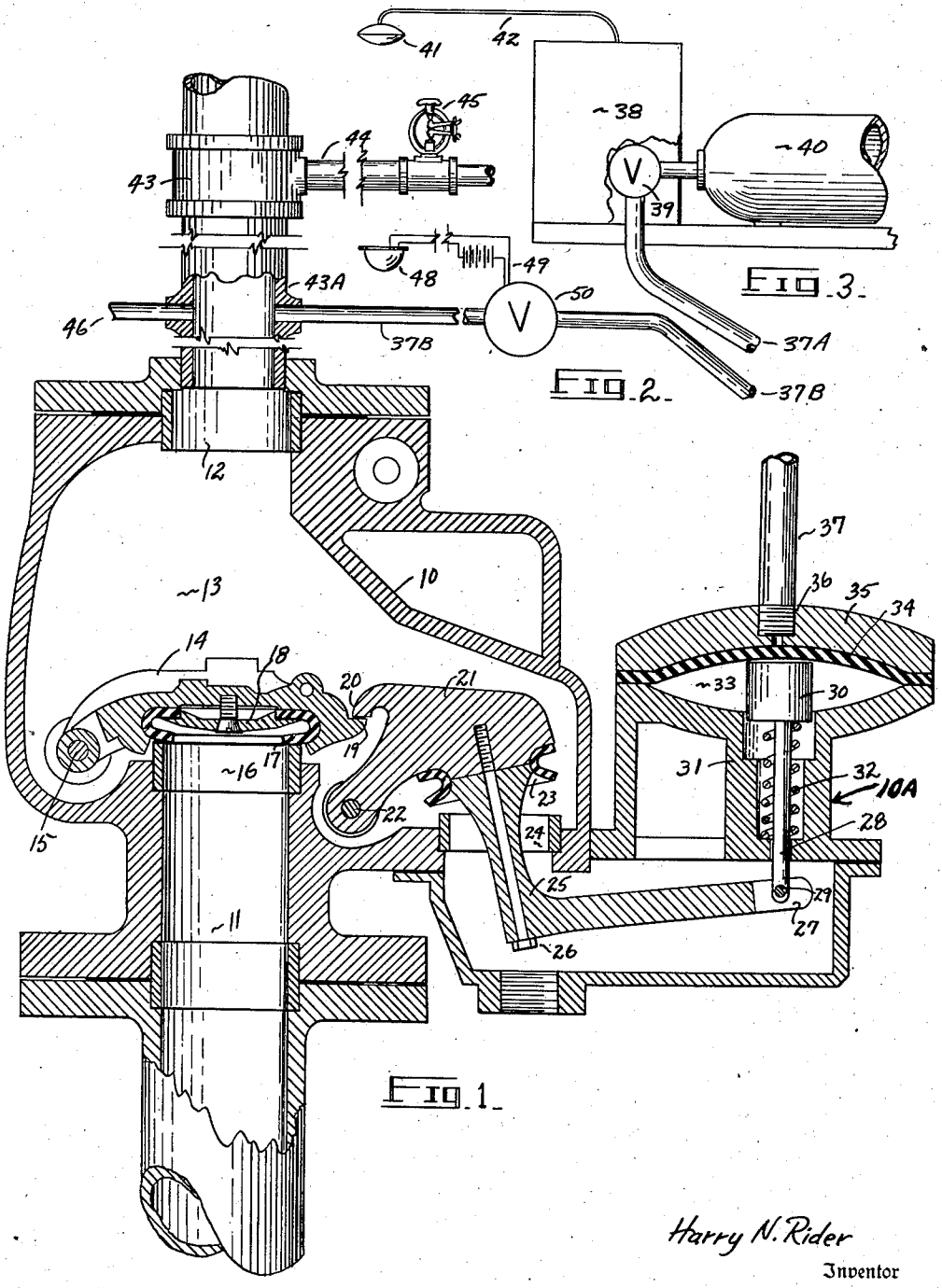


Fig. 3.

Fig. 2.

Fig. 1.

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PRESSURE ACTUATED SPRINKLER VALVE

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1 Claim. (Cl. 169—19)

This invention relates to a pressure actuated sprinkler valve.

The principal object of the invention is the provision of a pressure actuated sprinkler valve capable of use in controlling the entrance of fire extinguishing fluid to a sprinkler system.

A further object of the invention is the provision of a pressure actuated sprinkler valve capable of remote control.

A still further object of the invention is the provision of a valve of the latched clapper type having fluid pressure actuated means for unlatching the clapper thereof.

The pressure actuated sprinkler valve shown and described herein has been designed to provide an efficient and simple valve construction which may be used in any fluid line for the control of the fluid flow therethrough as it may be actuated by the utilization of the fluid pressure it controls or it may be actuated by the application to the valve of fluid pressure from another source. The valve element of the pressure actuated sprinkler valve comprises a clapper which is held in normally closed position by means of a movable latch which in turn is adapted for actuation by a fluid pressure operated means which in turn is subject to actuation by the application thereto of suitable fluid pressure, as, for example, from a compressed gas source incorporating a remotely actuated control means, or the application of fluid pressure to the pressure operated means from the piping of the dry pipe sprinkler system in connection therewith, such application of fluid pressure being subject to remote control. The control means controlling the application of fluid pressure to the valve of the invention may obviously comprise heat actuated devices which may be positioned, for example, in a fire zone.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawing, wherein:

Figure 1 is a cross sectional side elevation of the fluid pressure actuated valve.

Figure 2 is a schematic illustration of means for applying actuating pressure from a dry pipe sprinkler system to the valve illustrated in Figure 1.

Figure 3 is a schematic illustration of means for applying actuating pressure from a separate source to the valve illustrated in Figure 1.

This application is a continuation in part of my co-pending application for patent on Pressure tank sprinkler system with secondary supply No. 450,659, filed July 13, 1942 which has matured into Patent No. 2,353,116.

By referring to the drawing and Figure 1 in particular, it will be seen that a pressure actuated sprinkler valve has been disclosed which consists of a body member 10 having an inlet 11 and an outlet 12 and defining a chamber 13 in which a clapper 14 is pivotally mounted by means of a pivot 15, the clapper 14 seating upon a seat ring 16 positioned in the body member 10. The clapper 14 includes in its construction an annular gasket 17, which is U-shaped in cross section, and is affixed to the clapper 14 by means of a gasket retaining disk 18. The gasket 17 is adapted to register with the upper edge of the seat ring 16 in a manner so that fluid from the inlet 11 of the valve may exert pressure downwardly against the interior of the gasket 17 so as to cause an efficient seal. The clapper 14 is provided with a ledge 19 which is adapted to receive a latch 20 which forms a portion of a latch mechanism 21 and which latch mechanism 21 is pivoted in the valve body by means of pivot 22. A housing 10a is secured to the valve body member 10 in such a way that a secondary seat ring 24 forms a passage between the said housing and the said valve body member. A secondary annular gasket 23 which is U-shaped in cross section is affixed to the latch mechanism 21 and is adapted to register with, so as to close, the said secondary seat ring 24. An L-shaped lever 25, which forms a part of the latch mechanism 21, projects through this passage into the said housing. A bolt 26 holds the assembly comprising the latch mechanism 21 and the L-shaped lever 25 in one unit so that the outermost end 27 of the L-shaped lever 25 may receive, in a workable manner, motion imparted by a connecting rod 28, through a pivot 29, the connecting rod 28 being vertically positioned and adapted to be moved by a piston block 30 which in turn forms a part of an actuating mechanism 31 of the valve. The piston block 30 is normally urged upwardly as is the connecting rod 28 and the outermost end 27 of the L-shaped lever 25 by a coil spring 32 positioned about the connecting rod 28 between the piston block 30 and the lower wall of the actuating mechanism 31. Positioned immediately above the piston block 30 and across a chamber 33 in the actuating mechanism 31 there is a diaphragm 34 formed of rubber or similar resilient material which is normally positioned in the manner illustrated in Figure 1, immediately beneath a cap portion 35 of the actuating mechanism 31. A centrally positioned opening 36 in the cap 35 is adapted to receive and retain a tube 37 which serves to

convey fluid pressure from any suitable source and control means to the actuating mechanism 31 so as to actuate the same and thereby cause the movement of the latch mechanism 21 and the freeing of the clapper 14, which action permits fire extinguishing fluid in the inlet 11 of the valve 10 to raise the clapper 14 and flow through the pressure actuated sprinkler valve.

It will thus be seen that the clapper 14 of the pressure actuated sprinkler valve is normally closed as shown in Figure 1 and that it is retained in normally closed position by the latch mechanism 21 which in turn extends outwardly from the valve body chamber 13 by way of the secondary seat ring 24 and is subject to actuation by application of fluid pressure to the diaphragm 34 of the actuating mechanism 31. It will be observed that at such times as the actuating mechanism 31 is caused to move as by the application of fluid pressure through the pipe 37 from any suitable source, the outermost end 27 of the L-shaped bracket 25 of the latch mechanism 21 is moved downwardly causing the entire latch mechanism 21 to pivot on the pivot 22 so that the latch portion 20 moves away from the ledge 19 of the clapper 14. When this occurs the secondary U-shaped gasket 23 registers with the uppermost edge of the secondary seat ring 24 and forms a fluid tight closure with respect to the opening in the valve body 10 defined by the secondary seat ring 24. Thus, fire extinguishing fluid admitted to the chamber 13 in the pressure actuated sprinkler valve 10 is not diverted and must flow upwardly through the outlet 12 into any existing distributing piping of a sprinkler system. It is obvious that several methods of applying fluid pressure to the diaphragm 34 of the actuating mechanism 31 are possible and two such methods are illustrated in Figures 2 and 3 of the drawing, respectively. In Figure 3 of the drawing, a schematic illustration of a compressed gas release mechanism such as constitutes the subject matter of my U. S. Patent No. 2,340,143, of January 25, 1944, is indicated by the numeral 38, which mechanism includes a valve 39. The compressed gas release mechanism 38 controls a compressed gas source such as a compressed gas cylinder 40 and is capable upon actuation, as by a heat actuated device 41, of releasing the compressed gases from the cylinder 40 into a tube 37A which in actual practice would connect with the tube 37 heretofore described so that the compressed gases would be brought into engagement with the diaphragm 34 of the valve actuating mechanism heretofore described and cause the release of the clapper latch 20. The heat actuated device 41 is adapted to confine air and when subjected to heat to direct the expanded air through a tube 42 to the compressed gas release mechanism 38, where the same serves as the actuating medium. It will thus be observed that the actuation of the pressure actuated sprinkler valve illustrated in Figure 1 when utilized in connection with the compressed gas release mechanism illustrated in Figure 3 is dependent for operation upon one or more of the heat actuated devices 41 which may obviously be located in the fire zone.

It will thus be observed that when the pressure actuated sprinkler valve illustrated in Figure 1 is connected with distributing piping, including a riser 43 and branch mains 44 having one or more sprinklers 45, as illustrated in Figure 1, and the system subject to the control of heat actuated devices such as those indicated at 41 in Figure 3, the apparatus constitutes an efficient and dependable sprinkler system of the preaction type whereby the out-break of fire in the fire zone actuates the compressed gas release mechanism 38 by means of the heat actuated devices 41 and causes the release of compressed gases from the cylinder 40 which in turn actuate the sprinkler valve so as to admit fluid to the sprinkler piping. In such a preaction system fire extinguishing fluid is not distributed from the sprinklers 45 until the same fuse from the fire. There is, however, no delay when this occurs as the sprinkler piping has already been filled with fire extinguishing fluid by the preaction operation of the system.

The pressure actuated sprinkler valve illustrated in Figure 1 is also capable of actuation by the application of fluid pressure from the distributing piping thereof to the actuating mechanism 31 thereof and such an arrangement is illustrated in Figure 2 wherein a broken away section of a riser 43A reveals the connection therewith of an air supply pipe 46 which communicates with an air supply source (not shown). In a sprinkler system so formed, operation in the event of fire is dependent upon the actuation by a heat actuated device 48 in a suitable electric circuit 49 which is in connection with a valve 50. The valve 50 controls the communication line 37B which, in actual practice, communicates with the tube 37 heretofore described in connection with the actuating mechanism 31 of the valve 10. When this occurs, supervisory air pressure normally maintained in the sprinkler system piping by the air source 46 is directed through the communication line 37B through the valve 50 and to the diaphragm 34 of the actuating mechanism 31 where it actuates the valve illustrated in Figure 1 and permits entrance of fire extinguishing fluid to the piping. When so formed, the sprinkler system resulting is also of the preaction type, fire extinguishing fluid being delivered to the sprinklers in advance of their actual opening from fire.

It is obvious that the valve illustrated in Figure 1 in actual practice would be actuated by one or the other of the mechanisms illustrated in Figures 2 and 3 and not by both and that in either event a dependable and efficient fire extinguishing system has been disclosed. The valve is also capable of being actuated by other means known in the art.

Having thus described my invention, what I claim is:

In a sprinkler valve including a valve body having inlet and outlet openings, a clapper pivoted in the said valve body and adapted to normally close the said inlet opening, a latch pivoted in the said valve body and normally engaging the said clapper to maintain it in closed position, an opening formed in said valve body, a lever affixed to said latch and extending outwardly through said opening and means in association with said lever for causing movement thereof so as to move the said latch and release the said clapper, said means including a pressure actuated mechanism, and a gasket positioned on the said latch and adapted to register with the said opening at such time as the latch is operated so as to close the said opening.

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