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SPRINKLER SYSTEM

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Fig. 1.

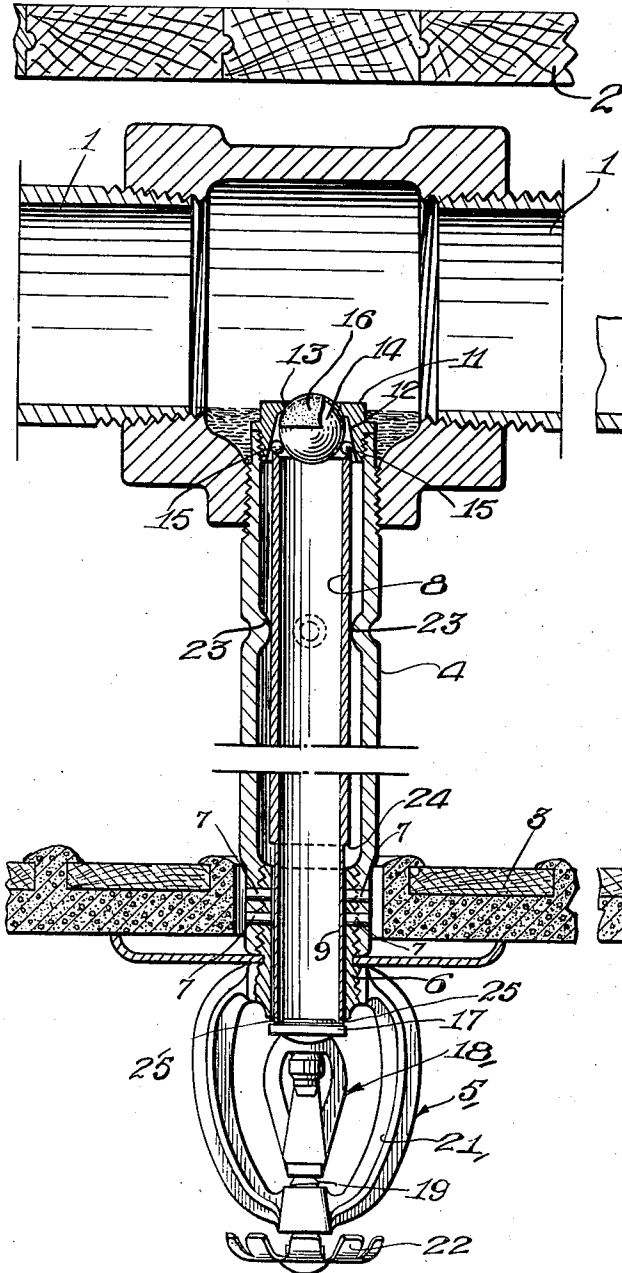
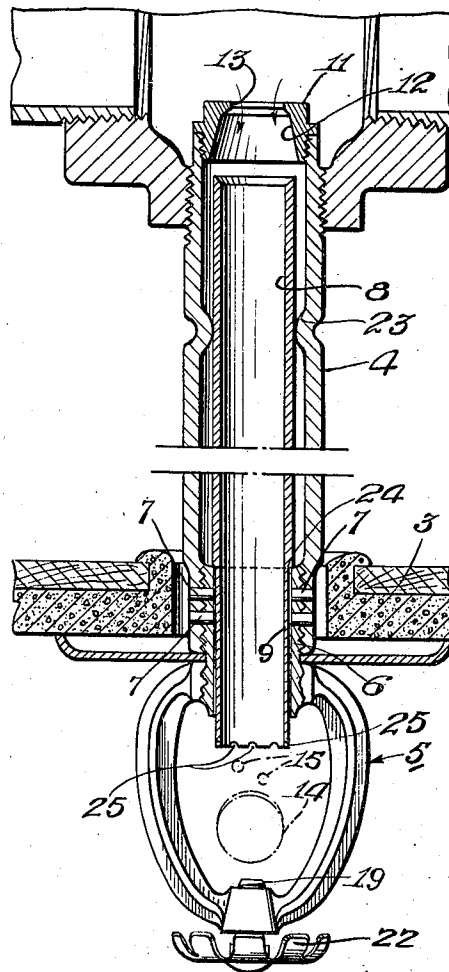


Fig. 2



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SPRINKLER SYSTEM

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Application August 9, 1938, Serial No. 223,970

7 Claims. (Cl. 169—41)

This invention relates to improvements in sprinkler systems of the so-called pendent type, wherein the individual sprinkler heads are connected by means of depending pipes or ducts with system pipes concealed within the ceiling structure.

A principal object of the invention is to provide a novel valve device for normally closing the connection between the said pendent pipes or ducts and the system pipes to which these ducts are connected, said valve device being such that when the valve is opened to admit water to the pendent duct, a free and unobstructed passage is afforded through the latter to the sprinkler head.

More specifically stated, a principal object of the invention is to provide a novel valve device of the character described wherein the valve elements when released may pass freely through the pendent ducts to be discharged from the latter whereby the said elements are prevented from interfering or obstructing the free flow of water from the system through the pendent duct.

Another object of the invention is to provide a system of the character set forth wherein the connection between the system pipes and the pendent ducts is such as to preclude damage or displacement of the said valve elements by the freezing of residual water left in the pipes after drainage.

The invention further resides in certain novel structural details and arrangements hereinafter described and illustrated in the attached drawing, in which:

Figure 1 is a fragmentary vertical sectional view of a sprinkler system illustrating my novel valve device, and

Fig. 2 is a similar view illustrating the mode of operation of the device.

With reference to the drawing, 1 is a system water pipe which in the present instance is shown as extending in the space between the floor 2 and a subjacent ceiling 3. 4 is a pipe connected to and pendent from the system pipe 1, said pipe extending downwardly through an aperture in the ceiling 3 and having a sprinkler head 5 attached at its lower end. The sprinkler head 5 in the present instance has at its upper end a sleeve 6 which is threaded into the lower end of the pendent pipe 4, and is secured against removal from the pipe by means of pins 7. Mounted within the pipe 4 is an inner tube 8, the lower end 9 of this tube being of reduced external diameter and extending freely through the sleeve 6 and normally projecting, as illustrated, slightly below the lower end of the latter.

Threaded into the upper end of the pipe 4 is a sleeve 11, the inner wall surface 12 of which tapers inwardly from the lower end of the sleeve and terminates in a valve seat 13. Cooperative with this valve seat to normally close the connection between the upper end of the pendent pipe 4 and the system pipe 1 is a ball valve 14, this valve being normally held to its seat by a plurality of small spheres or balls 15 which seat against the spherical surface of the ball 14 and against the tapered wall 12 of the sleeve 11, and which in turn are supported by the upper end of the tube 8. A suitable gasket 16 may be inserted between the ball valve 14 and the seat 13.

The lower extremity of the tube 8 is engaged by a disk 17, and this disk is normally supported against the lower end of the duct 8 by means of the heat-responsive linkage 18 of the sprinkler head. The lower end of this linkage is in turn engaged and supported by a screw 19 threaded into the lower end of the yoke 21 of the sprinkler head, which screw has at its lower end a conventional spreader 22. Pressure is applied to the tube 8 through the screw 19, linkage 18 and disk 17 to support this tube in elevated position within the pendent pipe 4 in which it functions through the balls 15 to maintain the valve 14 in pressure engagement with the seat 13. The sprinkler head, per se, forms no part of the present invention, and may vary widely as to form, the one illustrated being of the type disclosed in my prior Patent No. 1,849,316.

The tube 8 is adapted to slide longitudinally within the pendent duct 4, and is guided for this longitudinal movement by the lower restricted end 9, which as described passes through the sleeve 6 of the sprinkler head, and toward its upper end by bosses 23 which in the present instance are pressed in from the metal of the pendent pipe 4. It will be noted that the downward movement of the tube 8 in the pipe 4 is limited by the shoulder 24 formed by the lower tube section 9 of reduced diameter, this shoulder being adapted to engage the inner extremity of the sleeve 6, as shown in Fig. 2.

Since the ball valve 14 is of lesser diameter than the diameter of the tube 8, and since the said valve 14 depends for its support upon the tube acting through the series of small balls 15, it will be apparent that if the tube 8 is permitted to drop, as by release of the linkage 18 of the sprinkler head, the small retaining balls 15 will be permitted to spread between the diverging walls of the sleeve 11 to an extent permitting the ball valve 14 to pass downwardly through the tube 8,

to be eventually discharged from the lower end of the latter. Similarly the small balls 15 may pass freely through the tube 8, to be discharged from the lower end in like manner, see Fig. 2.

By this means, the valve elements are cleared from the path of the water discharging through the tube 8, and the water will thereby have free and unobstructed access through said tube to the spreader 22 of the sprinkler head.

It will be noted that the pipe 4 is established within the system pipe 1 so that the upper end of the sleeve 11 will project above the inside bottom of the system pipe, and so that if the latter is drained of water, the upper end of the sleeve 11 in which the ball valve is secured will be elevated above any residual water that might remain in the system. Under these circumstances, any freezing of the residual water can have no effect upon the valve 14. It will be noted further that the lower end of the tube 8 is formed in the present instance with a plurality of small recesses 25 forming vents which preclude an absolute sealing of the lower end of the tube by the disk 17 and through which any water accidentally passing from the system pipe into the pendent pipe 4 or tube 8 may slowly seep. Under normal conditions, water can pass into the pendent pipe from the system pipe only in the event of a defective seating of the ball valve 14, so that any seepage of water through the recesses 25 will indicate that the valve 14 is not functioning effectively to exclude water from the pendent pipe, and the valve may be tightened through the medium of the screw 19 or readjusted, as may be required. Obviously, the recesses 25 may be eliminated if desired so that the disk 17 with or without a suitable gasket may seal the lower end of the pendent duct.

I claim:

1. In a sprinkler system, a system pipe, a discharge duct of substantial length depending from said pipe, and means for sealing the upper end of said duct, said means comprising an upwardly seating valve element, an inner tubular member slidable in said duct, separable means interposed between the upper end of said inner tube and the valve element and adapted when the tube is in an elevated position to support the valve element in duct-sealing position, and releasable means at the bottom of said duct for normally supporting the tube in the said elevated position, said valve element and the separable supporting means being of a size to pass freely through said inner tube, and being adapted when released by downward movement of the tube in the duct to pass downwardly through the tube and from the duct to thereby leave the said tube unobstructed for discharge of fluid from the said pipe.

2. In a sprinkler system, a system pipe, a discharge duct of substantial length depending from said pipe, and means for sealing the upper end of said duct, said means comprising an upwardly seating valve element, an inner tubular member slidable in said duct, and separable means interposed between the upper end of said tube and said valve element and adapted when said tube is in an elevated position to support the valve element in the duct-sealing position, a spreader element supported below and in spaced relation to the lower end of said duct, and releasable means for normally supporting said inner tube in the said elevated position, said valve element and said separable supporting means being of a size to pass freely through said inner tube whereby when the latter is released from said sup-

porting means the said valve element and separable means may pass downwardly through the inner tube and from the duct to thereby leave the inner tube unobstructed, and means for limiting the downward movement of the inner tube in the duct.

3. In a sprinkler system, a system pipe, a discharge duct of substantial length depending from said pipe, and means for sealing the upper end of said duct, said means comprising a terminal element at the upper end of said duct formed with a valve seat and with a diverging conical inner surface extending downwardly below said seat, an upwardly seating spherical valve element fitted to said valve seat, a tubular valve-supporting member slidable longitudinally in said duct, and a plurality of relatively small spherical elements supported by said inner tube in wedged engagement between the said valve element and said spherical surface to thereby hold the valve to its seat, releasable means at the bottom of said duct for normally supporting the inner tube in the valve-retaining position, said tube being of greater diameter than the said spherical valve element whereby when said tube is released from said supporting means the said valve element and the relatively small spherical retaining elements may pass downwardly through the tube and from the lower end of the duct to thereby leave the tube substantially unobstructed for discharge of fluid from said pipe.

4. A pendent discharge head for sprinkler systems adapted to be attached in depending position from a system pipe, said head comprising a duct of substantial length, a valve seat in the upper end of said duct, an upwardly seating valve element engaging the seat, a plurality of valve-retaining elements in wedging engagement with and between said valve element and a subjacent wall of the duct, an inner tubular member supporting said retaining elements and movable longitudinally in the duct, means for limiting the downward movement of the tube in the duct, releasable means at the lower end of said duct for normally retaining the tube in an elevated operative position, and means to permit said valve-retaining elements to move outwardly away from the valve element when said tube moves downwardly in the duct to thereby release the valve element, said element being formed and dimensioned to pass freely through the tube and being thereby adapted for discharge from the duct when released by said retaining elements.

5. A pendent discharge head for sprinkler systems adapted to be attached in depending position from a system pipe, said head comprising a duct of substantial length, a valve seat in the upper end of said duct, an upwardly seating valve element engaging the seat, a plurality of valve-retaining elements in wedging engagement with and between said valve element and a subjacent wall of the duct, an inner tubular member supporting said retaining elements and movable longitudinally in the duct, means for limiting the downward movement of the tube in the duct, releasable means at the lower end of said duct for normally retaining the tube in an elevated operative position, said retaining means including a detachable closure for the lower end of the tube, means providing for seepage of water at slow rate from the lower end of the duct, and means to permit said valve-retaining elements to move outwardly away from the valve element when said tube moves downwardly in the duct to thereby release the valve element, said element

being formed and dimensioned to pass freely through the tube and being thereby adapted for discharge from the duct when released by said retaining elements.

- 5 6. In a sprinkler system, a system pipe, and a pendent discharge fixture including a duct of substantial length depending from said pipe and a distributor element in axial alignment with and spaced from the lower end of the duct, and
10 means for sealing the upper end of said duct comprising an upwardly seating valve element of a size to pass freely through the duct and between the lower end of the duct and said distributor, and retaining means for said valve including
15 a thermally-responsive release element, said retaining means being constructed and arranged to afford, when released, a free passage for discharge of said valve from the fixture.

7. In a sprinkler system, a system pipe, a discharge duct of substantial length depending from said pipe, and means for sealing the upper end of said duct, said means comprising an upwardly seating valve element, retaining means for said valve including a sleeve fitted to the interior of said duct and having limited free movement longitudinally of the latter, and releasable means at the lower end of the duct for normally supporting said sleeve in valve-retaining position, said sleeve, when released from said supporting means, being adapted to free said valve element for passage downwardly through the sleeve and from the duct to thereby leave a substantially unobstructed passage for fluid through the duct. 15

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