P. D. KINGBERRY & W. J. McCARTHY.

DRY PIPE VALVE.

APPLICATION FILED MAY 25, 1914.

1,144,849. Patented June 29, 1915.

FIG. 1.

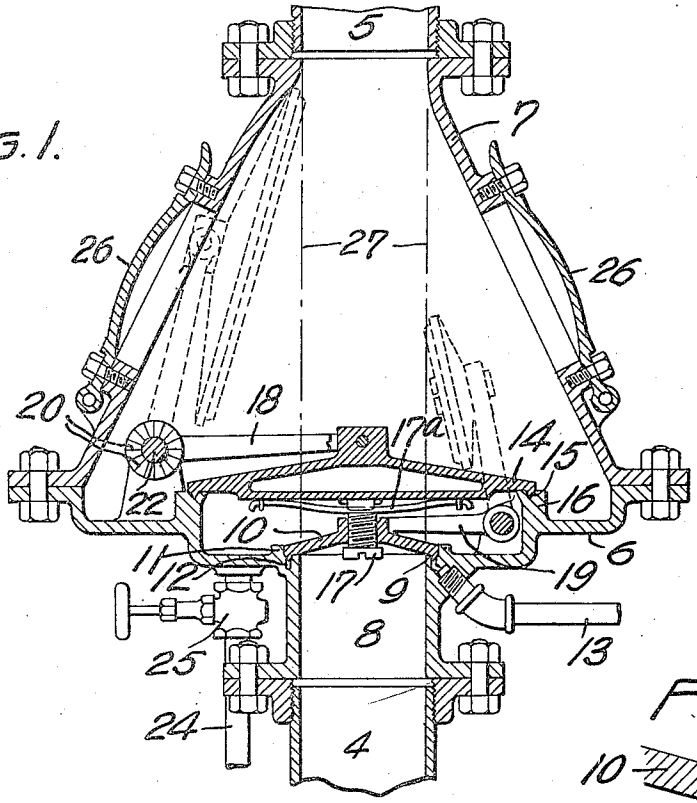


FIG. 3.

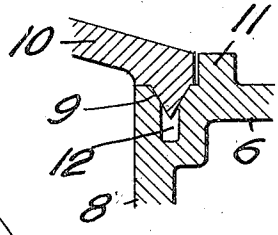
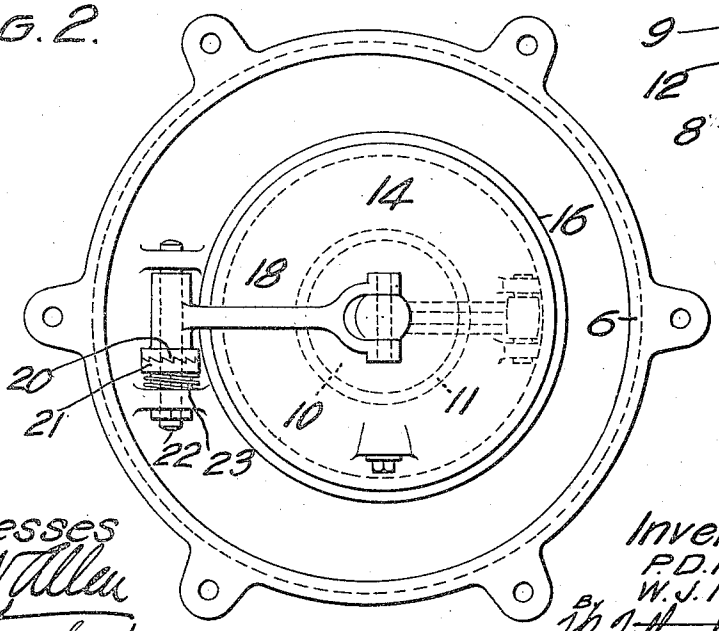


FIG. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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DRY-PIPE VALVE.

1,144,849. Specification of Letters Patent. Patented June 29, 1915.

Application filed May 25, 1914. Serial No. 840,850.

To all whom it may concern:

Be it known that we, PAUL D. KINGBERRY and WARREN J. McCARTHY, a citizen of the United States and a subject of the King of Great Britain, respectively, and both residents of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented new and useful Improvements in Dry-Pipe Valves, of which the following is a full, clear, and exact description.

This invention relates to improvements in dry pipe valves for use in connection with fire protection sprinkler systems, and the object is to provide a simple and reliable valve of great durability, which when open permits an absolutely unobstructed and straight flow therethrough.

A further object is to provide a valve which will remain open after the sprinkler system has been in operation until properly closed and re-set.

Dry pipe sprinkler systems are used in locations where the system is exposed to cold, so that water in the pipes would freeze, not only bursting the pipes but rendering the system inoperative. These systems consist merely in placing a valve between the system and the water supply, and charging the system with compressed air. The air operates to hold the valve closed and keep the water out of the system until some sprinkler head blows off, relieving the pressure and allowing the water to enter.

In the present invention, the valve for excluding the water is so constructed that comparatively small air pressure will hold back quite a heavy water pressure. This result is obtained by the use of a small water valve and a large air valve, which presses on the water valve and holds it closed.

In the drawings, the air and water valves are shown having an area ratio of approximately 5:1, so that an air pressure of 12 to 15 lbs. in the sprinkler system will hold out water under a pressure of 60 to 75 lbs., which is as high as supplied in most city water work systems. The object of this arrangement is obvious, as it is well known that a low air pressure can be maintained much more easily than a high.

In the drawings which illustrate the invention: Figure 1 is a vertical sectional view of the device. Fig. 2 is a plan view with the upper part of the casing removed. Fig. 3 is a fragmentary sectional view of the water valve seat on an enlarged scale.

Referring more particularly to the drawings, 4 designates a water supply pipe, and 5 the main of the sprinkler system, which are connected together by the valve forming the subject of this invention. The casing of the valve consists of a substantially flat seat member 6 and a conical or pyramidal cap member 7. The seat member 6 is provided with a neck 8 for attachment to the water pipe 4, at the upper end of which is a seat 9 for the water valve 10. This seat is in the form of a circular groove of approximately triangular or other suitable cross section, as clearly shown in Fig. 3, and is surrounded by a circular flange 11 within which the valve 10 seats. At the bottom of the seat 9, a small annular groove 12 is formed which is connected at one point with an outlet pipe 13 extending to any suitable alarm device. If the valve should become loose on its seat and permit any slight leakage, the water will obviously enter the groove 12 and escape downwardly through the pipe 13 instead of flowing upwardly over the flange 11. Such leakage of water would operate an alarm device indicating that water was flowing past the valve. If the valve opens in the event of fire, the same thing occurs. Above the water valve 10, a large air valve 14 is provided seated in a groove 15, formed in the upper edge of a circular flange 16. The formation of the bottom casing member and the flange 16 raise the air valve considerably above the water valve, so that a pocket is formed therebetween.

An adjustable bolt 17 is centrally mounted in the water valve 10, and is pressed upon by a resilient bronze spider 17^a loosely secured to the lower side of the air valve 14, as clearly shown in Fig. 1, so that air pressure in the sprinkler system pressing down on the air valve holds the water valve closed. The spider acts as a resilient connection between the two valves, so that both valves close tightly. The air and water valves are independently mounted at the ends of pivot arms 18 and 19 respectively, the pivotal points being placed diametrically across the casing from one another, as clearly seen in Fig. 1. The water valve arm is of simple construction and requires no further description, but the air valve arm 18 is provided at its pivot end with ratchet teeth

20 engaging with the toothed disk 21 slidably mounted on the pivot pin 22, but held against revolution. This toothed disk is held in mesh with the teeth 20 by a spring 23. It will therefore be seen that when the valve opens, its teeth engaging the teeth of the disk will hold the valve in open position until it is properly closed. There are various reasons for this feature, one of which is sufficient for the purpose of this specification. It might occur that a certain amount of water would enter the system during a momentary opening of the valve, and if the large air valve could close, the weight of this water would be sufficient to hold the smaller water valve closed and render the system inoperative. In order to drain the water out of the valve or system, a drip pipe 24 is provided leading from the lowest point of the valve casing and provided with a valve 25. Suitable hand hole plates 26 are provided in the upper part of the casing for cleaning, inspection and re-seating of the valve.

The operation of air pressure in the system to hold the water out has been already explained, as also the opening of the valves themselves. When the valves are open, the flow of water forces them to substantially vertical position, entirely out of the direct line of flow, as clearly indicated by the dotted flow lines 27. To re-seat the valve, the water supply is first turned off and the water in the system drained away through the pipe 24. When the system has been drained, a hand hole plate 26 is removed and the air valve lowered on to its seat to hold the water valve down. The hand hole plate is then closed and compressed air forced into the system.

From the foregoing description, it will be seen that this valve serves a double purpose, namely, that of a dry pipe valve and a water flow alarm valve. This feature is of considerable value, as at the present time the dry pipe valves in use require to have a special alarm device arranged in series therewith. Another advantage of this device is that it may be used as an ordinary wet system valve in summer by merely raising the air valve, which then stays up. In a wet system, the water valve operates similarly to the clapper of a check valve and holds the water in the system. In the event of the water supply being cut off, it also operates on a wet system as an alarm valve. When the valve is closed, there is no flow of water from the pipe 13 communicating with the valve seat, but as soon as the slightest amount of flow through the system commences, the valve will lift. It will be noted in the drawings that the air and water valves are pivoted on opposite sides of a casing. This enables the valve to be used in horizontal position. When used thus, the valve is arranged with the pivot of the air valve at the lower side, so that the water valve will close as soon as water flow stops, while the air valve will remain open by the force of gravity irrespective of the ratchet holding device.

Having thus described our invention, what we claim is:—

1. In a dry pipe valve, a water valve, a separate and larger air valve, and an adjustable abutment on the water valve engageable by the air valve.

2. In a dry pipe valve, a pivotally mounted water valve, a larger air valve pivotally mounted at a different center from the water valve, and an adjustable abutment for the air valve carried by the water valve.

3. In a dry pipe valve, a water valve, a seat therefor in the form of a groove substantially triangular in cross section, a narrower groove below said seat communicating therewith, an outlet from said lower groove, and an upstanding flange surrounding said valve seat arranged to force the water of leakage from said groove outlet.

4. In a dry pipe valve, a water valve, a separate air valve, and a resilient member carried by the air valve arranged to hold the water valve firmly seated.

5. In a dry pipe valve, a water valve, a separate air valve, an adjustable abutment on the water valve, and a resilient member carried by the air valve engageable with said abutment during closed valve position.

6. In a dry pipe valve, separate air and water valves arranged concentrically and in different planes, arms carrying said valves pivoted at opposite sides of the valve centers, and a resilient member carried by the air valve arranged to hold the water valve closed.

7. In a dry pipe valve, air and water valves, a resilient member carried by the air valve adapted to hold the water valve closed during closed position of the air valve, and means for holding the air valve in open position.

8. In a dry pipe valve, separate air and water valves pivotally mounted at different centers, main and auxiliary outlets from said valve closed by the water valve, said water valve being arranged to operate independently of the air valve to indicate water flow through the device by opening of the auxiliary outlet.

In witness whereof, we have hereunto set our hands in the presence of two witnesses.

PAUL D. KINGBERRY.
WARREN J. McCARTHY.

Witnesses:
S. R. W. ALLEN,
G. N. MORELAND.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."