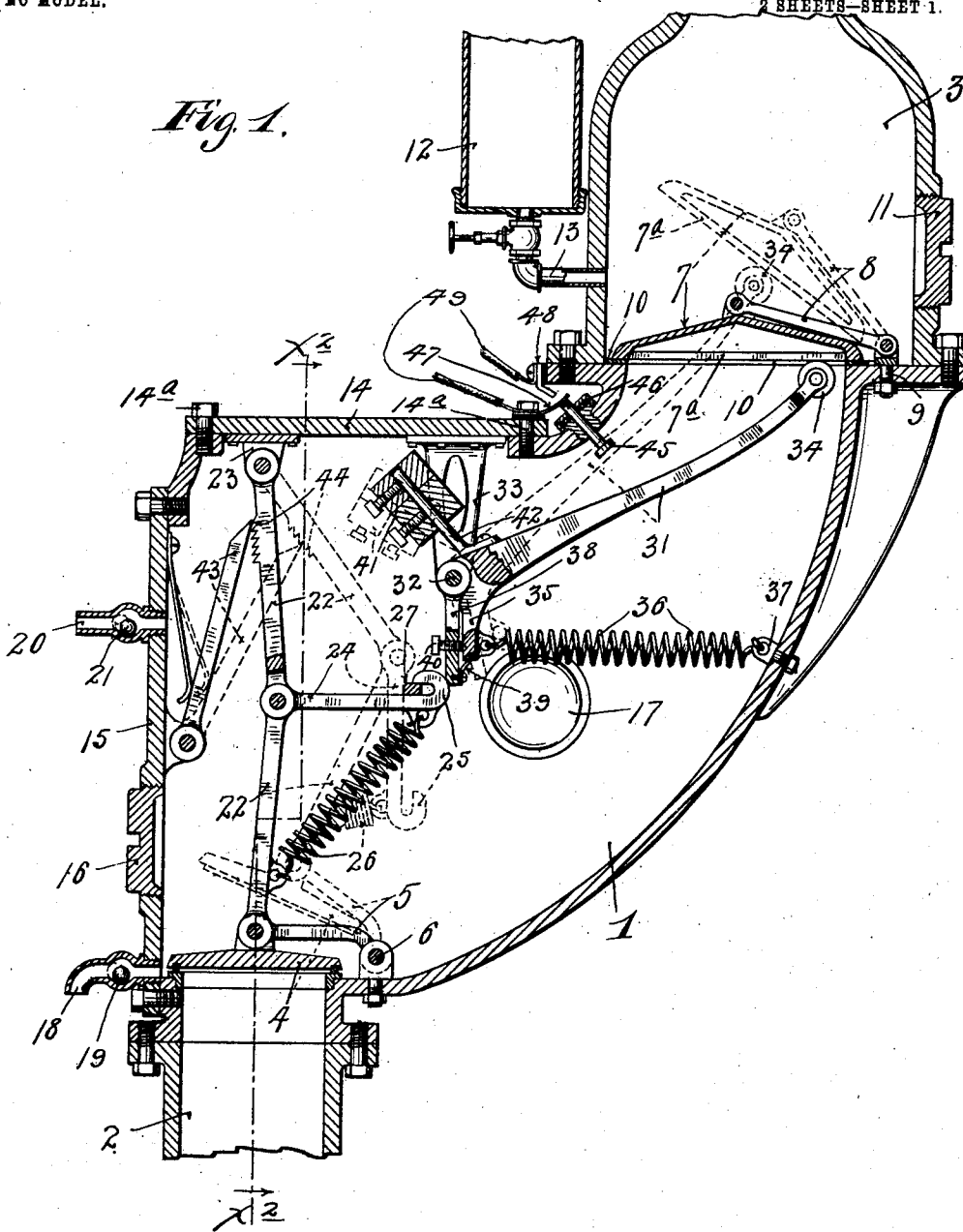


C. B. GARRETT.
DRY PIPE VALVE.

APPLICATION FILED MAR. 20, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses,
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By his Attorneys,
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2 SHEETS—SHEET 2.

Fig. 2.

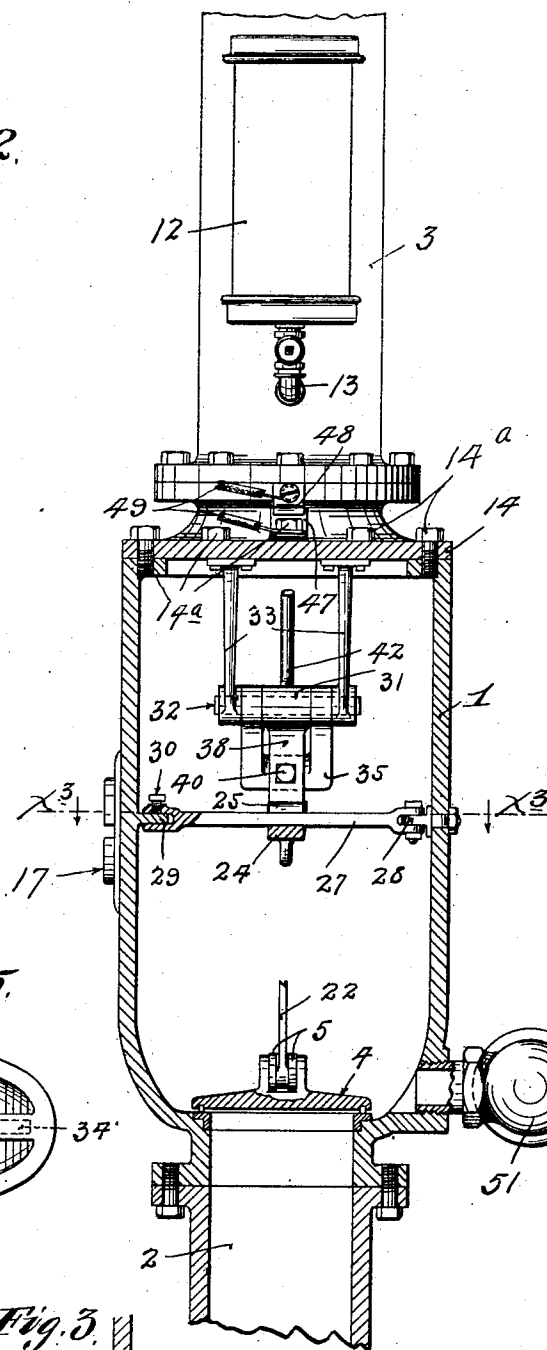


Fig. 4.

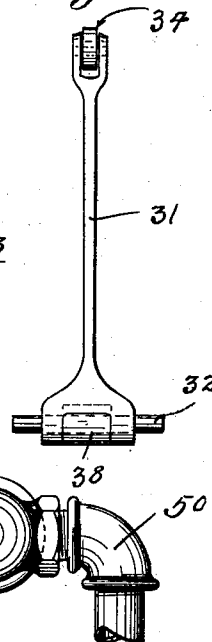


Fig. 5.

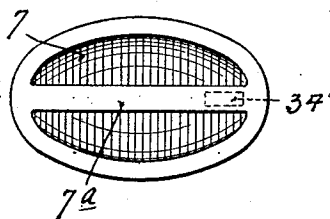
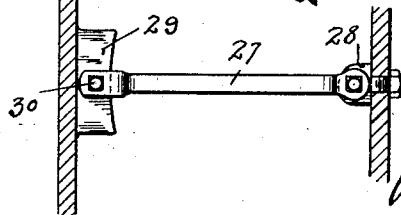


Fig. 3.



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UNITED STATES PATENT OFFICE.

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DRY-PIPE VALVE.

SPECIFICATION forming part of Letters Patent No. 723,264, dated March 24, 1903.

Application filed March 20, 1902. Serial No. 99,060. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. GARRETT, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Dry-Pipe Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to automatic fire-extinguishing systems of the dry-pipe type, and has for its object to provide an improved dry-pipe valve.

To the above ends the invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

The invention is illustrated in the accompanying drawings, wherein like characters indicate like parts throughout the several views.

Figure 1 is a view in vertical section taken centrally through a dry-pipe valve embodying the several features of my invention. Fig. 2 is a vertical section taken approximately on the line $x^2 x^2$ of Fig. 1, some parts being broken away. Fig. 3 is a horizontal section on the line $x^3 x^3$ of Fig. 2, some parts being broken away and others being removed. Fig. 4 is a plan view in detail of the so-called "tripping-lever," and Fig. 5 is a bottom plan view of the so-called "secondary valve."

The body of the valve-case is afforded by a segmental section or elbow 1, into the lower portion of which a branch 2 from the street-main opens, as clearly shown in Figs. 1 and 2. From the upper portion of the elbow 1 a main riser 3 leads upward, as best shown in Fig. 1. The passage from the pipe 2 is normally closed by a primary valve 4, which, as shown, is pivoted to the free end of an arm 5, which in turn is pivoted to lugs 6 on the inner side of the elbow 1. In a similar manner the outlet-passage from the elbow into the main riser 3 is normally closed by a secondary valve 7, pivoted to an arm 8, which in turn is pivoted to lugs 9, shown as located

within the base of the main riser 3 and secured to the upper flange of the elbow 1. Between the peripheral portion of the said valve 7 and its seat afforded by the upper end of the elbow 1 is placed a gasket or packing-ring 10, of leather or rawhide. The valve 7 as preferably formed is bulged slightly upward at the center, is made elliptical, and is provided at its under surface with a straight track 7^a, afforded by a bar or web extending on the major axis thereof. Furthermore, said valve 7 is preferably formed of aluminum, so as to make the same as light as possible in view of the strength required. The upwardly-bulged form of the valve increases its ability to withstand the air-pressure from within the main riser 3.

The numeral 11 indicates a plug, which when removed opens up a hand-hole which affords access to the valve 7.

The numeral 12 indicates a tank, shown as connected by a valved pipe 13 to the lower portion of the main riser 3. This tank or cup 12 is adapted to contain glycerin to be conveyed by the pipe 13 into the base of the main riser and onto the gasket or packing 10.

In the construction illustrated the numeral 14 indicates a detachable cap secured to the top of the elbow 1, and the numeral 15 indicates a detachable side plate secured to one side or end of the elbow 1. Also, as shown, the numeral 16 indicates a hand-hole plug in the plate 15, and the numeral 17 indicates another hand-hole plug in one face of the elbow 1.

The numeral 18 indicates an air-cock which opens through the lower portion of the plate 15 and is provided with a ball-valve 19, located in an enlarged seat therein. The numeral 20 indicates a similar air-cock which opens through the upper portion of the plate 15 and is provided with a ball-valve 21.

The primary valve 4 is normally held closed directly by a toggle 22, one end of which is pivoted to the said valve and to the free end of the arm 5 and the other end of which is, as shown, pivoted to lugs 23, depending from the cap 14. To the intermediate joint of the toggle 22 is pivoted a strut 24, afforded by an arm having a hooked free end 25, which is connected by a spring 26 to the lower arm of the

toggle, as shown in Fig. 1. Normally the hooked end 25 of the strut 24 engages with a transverse supporting bar or rod 27. One end of this bar 27 is pivoted to a lug 28 on one side of the elbow 1, while the free end thereof is detachably securable to a flange 29 on the other side of the said elbow, as shown in Figs. 2 and 3. The free end of said bar 27 is pronged, so as to embrace the flange 29, and is provided with a set-screw 30, by means of which the said prongs may be tightly clamped to the said flange.

A long tripping-lever 31 is pivoted on a small shaft or pin 32, held by brackets 33, which, as shown, depend from the cap 14. The free end of this arm 31 is equipped with a roller 34, which engages and is adapted to run over the track 7^a of the secondary valve 7. Said arm 31 is provided with a depending lug or short arm 35, which is connected by a spring 36 to a lug 37 or other suitable anchoring device projecting from the inner surface of the elbow 1.

The numeral 38 indicates a short arm pivoted on the shaft 32 and yieldingly connected to the lug or arm 35 by a spring 39. This arm 38 affords a supplemental section to the lug or arm 35 and is adapted to be adjusted with respect thereto by means of a set-screw 40, working through the former and impinging on the latter.

When the parts are set as shown in the drawings, the air-pressure within the main riser 3 will hold the secondary valve 7 seated, said secondary valve will hold the tripping-arm 31 in the normal position indicated against the tension of the spring 36, the free end of the supplemental arm 38 will hold the hooked end 25 of the strut 24 in engagement with the bar 27, and the said strut will in turn hold the toggle 22 in position to hold the primary valve 4 closed.

The numeral 41 indicates a counterweight adjustably secured on a rod or projection 42 of the arm 31. By means of these counterweights the tripping-arm 31 may be so counterbalanced that the spring 36, acting through the same, will have only the weight of the light valve 7 and its link 8 to raise when the main riser 3 is relieved from air-pressure.

To lock the primary valve in an open position when it has once been opened, I provide a lock, the best form of which is illustrated in the drawings, wherein the numeral 43 indicates a spring-pressed lock-pawl pivoted to the plate 15 and engageable at its free end with ratchet-teeth 44, shown as cut on the upper arm of the toggle 22. With this device, as is evident, when the toggle is buckled and the primary valve 4 is opened, as indicated by dotted lines in Fig. 1, the said pawl 43 will be thrown inward, as indicated by dotted lines, and by its engagement with the ratchet-teeth 44 will positively hold the toggle buckled and the said valve opened.

The numeral 45 indicates a small plunger

which works through a small stuffing-box 46 in the elbow 1, with its inner end in position to be struck by the tripping-arm 31 when the latter is moved into its dotted-line position indicated in Fig. 1. This plunger 45 is normally pressed inward by a spring 47, shown as secured by one of the screws 14^a, which hold the cap 14 in working position.

The numeral 48 indicates a fixed contact-piece insulated from the elbow 1, but secured thereto in position to be engaged by the spring or contact-piece 47 when the latter is moved outward by the outward movement of the plunger 45.

The numeral 49 indicates the leads of an annunciator-circuit, which leads connect one to the contact or spring 47 and the other to the fixed contact 48.

A summary of the action of the device is as follows: As long as sufficient air-pressure is maintained in the main riser 3 the parts will be held in the positions indicated by full lines in Fig. 1. When, however, the main riser is relieved from air-pressure (an action which will of course take place when any one or more of the automatic sprinklers connecting with the main riser are thrown into action) the secondary valve 7 will no longer be held seated by such air-pressure. When this takes place, the spring 36 becomes active and throws the tripping-arm 31 into its dotted-line position, and thereby raises said secondary valve into its opened position, as indicated by dotted lines. When the said tripping-lever is thus moved, the strut 24 is released and the pressure of the water in the primary valve 4 then becomes effective to buckle the toggle and move the primary valve into its open position, in which position it will be held by the pawl 43, as already described. Under the buckling movement of the toggle 22 the hooked end 25 of the strut 24 is carried from engagement with the bar 27 and is then quickly thrown downward and out of the way, as indicated by dotted lines in Fig. 1. The tension of the spring 26 when the parts are in the normal positions indicated by full lines in Fig. 1 does not tend to buckle the toggle, but simply draws the hooked end 25 of the strut 24 downward into tight engagement with the bar 27. The movement of the tripping-lever 31 from its normal to its dotted-line position also serves to force outward the plunger 46, thereby throwing the contact-pieces 47 and 48 into engagement, so as to close the annunciator-circuit and cause the distant annunciator (not herein shown) to be actuated, and thereby give warning or notice that one or more of the automatic sprinklers have been thrown into action, or, in other words, that the pressure in the main riser has been relieved and that the secondary valve has been opened. Here it is important to note that the annunciator-circuit is closed whenever the secondary valve is opened and regardless of whether or not the primary valve has been opened.

This I consider a novel feature. As is evident, if the water in the supply-pipe 2 from the street-main or from the elevated tank, as the case may be, should happen to be shut off at the time the secondary valve is opened, as above described, it is evident that the primary valve would not be opened, even though the toggle and strut were released. Stated in another way, I believe I am the first to provide an annunciator-circuit which will be closed when the air-seated secondary valve is released or opened while the supply of water to the valve is cut off. It should also be noted that when the arm 31 and valve 7 are thrown into their dotted-line positions the former will stand approximately at a right angle to or on a dead-center with the face of said valve, so that downward pressure on the said valve will not cause the same to be closed. This is important, as it prevents the valve from being closed should the column of water in the main riser for any reason be allowed to back up or recede temporarily.

The lower air-vent 18 serves as a drip-cock to permit the slow escape of water which may possibly collect within the case 1 due to slight leakage. However, any considerable current flow or pressure of water within the case or elbow 1 will cause the valves 19 and 21, respectively, to close the vents 18 and 20. The said vents 18 and 20 normally open the elbow 1 to the atmosphere and afford a supply of air within the same, and thereby prevent the secondary valve 7 from being held closed by suction or back pressure within the elbow, as might be the case were these air vents or cocks, or at least one of them, not provided. The upper air vent or cock is provided for additional safety.

To reset the parts of the device, it is only necessary to remove the plugs 16 and 17, so as to obtain access to the inner mechanism. The set-screw 40 will usually first be turned, so as to bring the supplemental arm 38 a little closer to the lug or arm 35. The bar 27 is also loosened and swung inward. Then the tripping-arm is drawn downward to allow the secondary valve to close and is held downward until sufficient air-pressure is applied within the riser 3 to hold the said valve closed against the tension of the spring 36. Then the toggle 22 is straightened out, so as to close the primary valve 4. The strut 24 is thrown upward into normal position, and, finally, the pivoted bar 27 is turned back into its normal position into engagement with the hooked end 25 of said detent and is then locked. The set-screw 40 should also then be turned to further separate the arms 35 and 38 and force the free end of the latter into engagement with the free hooked end of the strut 24. This being done and the pawl 43 of course having previously been moved back to its normal position, the valve as an entirety is again set ready for automatic action.

The numeral 50 indicates a draining-pipe

which leads from the lower portion of the elbow 1 and is provided with a valve 51, by means of which it may be opened and closed. This pipe 50 serves to drain the whole system, which is supplied with water from the supply-pipe 2 and main riser 3.

It will of course be understood that the device above described is capable of many modifications within the scope of my invention as herein set forth and claimed.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a valve casing or shell having inlet and outlet passages, of an inwardly-opening primary valve normally closing said inlet-passage, an outwardly-opening secondary valve normally closing said outlet-passage and adapted to be held closed by air-pressure applied to the outer face thereof, a toggle normally holding said primary valve closed, and a yieldingly-pressed tripping-lever independent of said toggle normally preventing the buckling movement of said toggle and tending to open said secondary valve, but adapted to be overcome by the air-pressure applied to said secondary valve, substantially as described.

2. The combination with a fluid-passage, of a valve normally closing said passage, a toggle normally holding said valve closed, a strut pivotally connected to the intermediate portion of said toggle, a bar or rest normally supporting the free end of said strut but permitting endwise movement thereof, and a tripping device normally acting on said strut to prevent endwise movements thereof and through said strut and toggle serving to hold the said valve closed, substantially as described.

3. The combination with a valve-casing having an inlet-pipe and an outlet-pipe, of an inwardly-opening primary valve normally closing the said inlet-pipe, an outwardly-opening secondary valve normally closing the passage into said outlet-pipe and adapted to be held closed by air-pressure from within said outlet-pipe, a pivoted spring-pressed tripping-lever normally tending to open said secondary valve but adapted to be restrained by the air-pressure on said valve, a toggle normally holding said primary valve closed, a transverse supporting-bar within said case, and a strut pivoted to said toggle, supported by said bar and normally held against endwise movement by said tripping-lever, substantially as described.

4. The combination with the casing 1, inlet-pipe 2 and riser 3, of the valves 4 and 7 normally closing said pipe 2 and riser 3, respectively, a tripping-lever 31 subject to the spring 36 and operating at its free end on said valve 7, as described, the adjustable supplemental arm 38 carried by said tripping-lever, and the toggle 22 normally holding said valve 4 closed, the supporting-bar 27 pivoted at one end and detachably supported at its other end, and the strut 24 connected to the intermediate

joint of said toggle and provided at its free end with the hook 25 normally engaging said bar 27 and held against movement by the supplemental arm 38 of said tripping-lever, substantially as described.

5 5. In a dry-pipe valve, the combination with a primary valve normally holding back the water-supply, of a secondary air-seated valve, an oscillating tripping-arm for opening said secondary valve when said valve is
10 relieved from air-pressure, a device for holding said primary valve closed, itself normally held in working position by said tripping-arm, and an annunciator-circuit arranged to
15 be closed, under that movement of said trip which opens said secondary valve, and regardless of whether or not said primary valve is opened, substantially as described.

20 6. The combination with a case or shell having an inlet and outlet passage, of an inwardly-opening primary valve normally clos-

ing said inlet-passage, an outwardly-opening secondary valve normally closing said outlet-passage and adapted to be seated under air-pressure, a toggle normally holding said primary valve closed and provided with a projecting strut, and a tripping device normally under spring-pressure tending to open said secondary valve, said tripping device involving the arm 31 with projection 35, and the
25 supplemental arm 38 pivoted to said arm 31, yieldingly connected to said projection 35 by spring 39 and provided with the set-screw 40 for adjusting the same, substantially as described.
30 35

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES B. GARRETT.

Witnesses:

E. H. KELEHER,
F. D. MERCHANT.