(No Model.) 2 Sheets—Sheet 1.

R. DOWSON & J. TAYLOR.

ALARM VALVE FOR AUTOMATIC FIRE EXTINGUISHERS.

No. 384,514. Patented June 12, 1888.

Fig. 1.

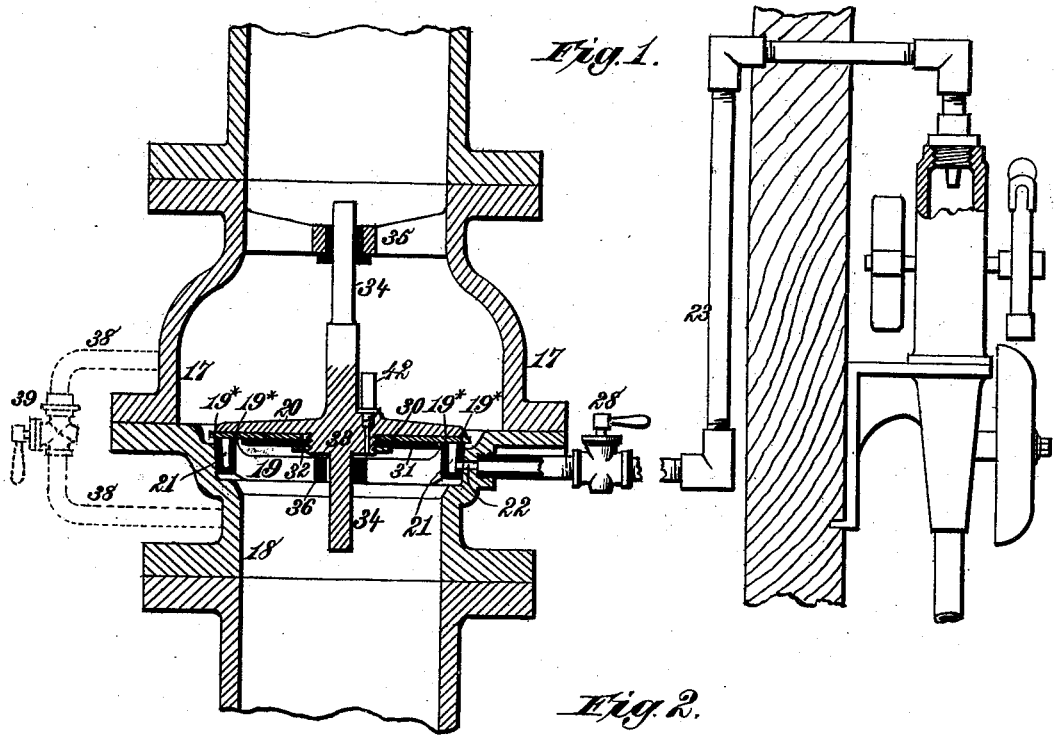


Fig. 2.

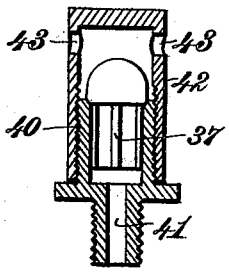
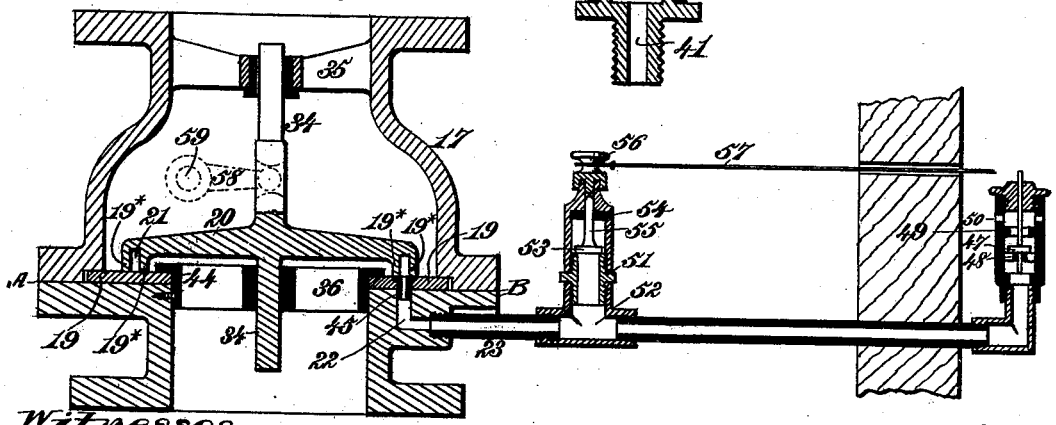


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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ALARM VALVE FOR AUTOMATIC FIRE EXTINGUISHERS.

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Fig. 4.

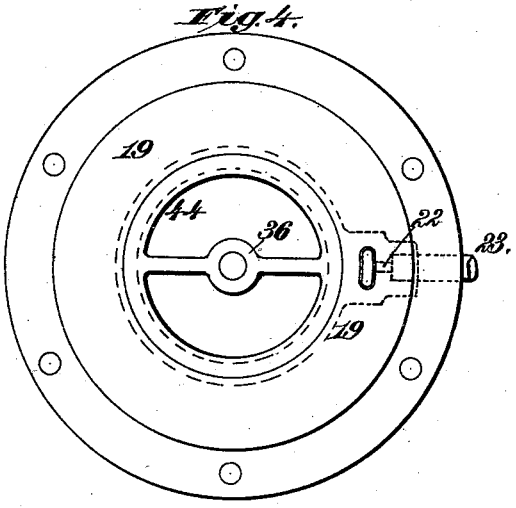


Fig. 5.

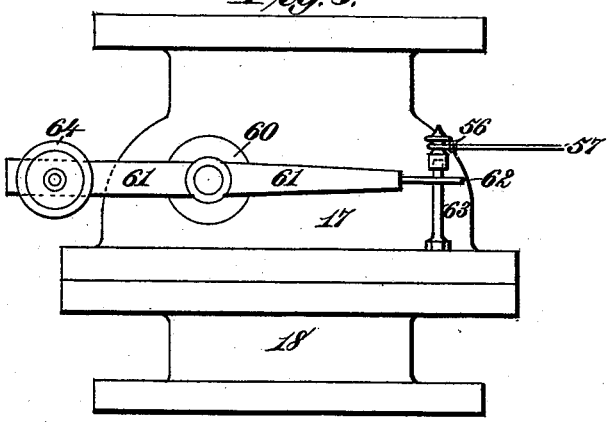
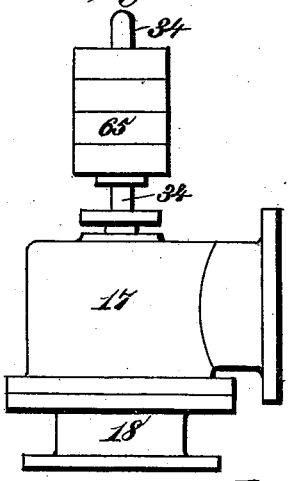


Fig. 6.



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UNITED STATES PATENT OFFICE.

RALPH DOWSON AND JOHN TAYLOR, OF BOLTON, COUNTY OF LANCASTER, ENGLAND.

ALARM-VALVE FOR AUTOMATIC FIRE-EXTINGUISHERS.

SPECIFICATION forming part of Letters Patent No. 384,514, dated June 12, 1888.

Application filed December 29, 1887. Serial No. 259,316. (No model.) Patented in England October 2, 1886, No. 12,528.

To all whom it may concern:

Be it known that we, RALPH DOWSON and JOHN TAYLOR, of Knowsley Street, Bolton, in the county of Lancaster, England, have invented new and useful Improvements in an Alarm-Valve for Automatic Fire-Extinguishing Sprinkler Installations, (for which we have obtained a patent in Great Britain, dated October 2, 1886, No. 12,528,) of which the following is a specification.

This invention relates to improvements in an alarm-valve employed in connection with automatic fire-extinguishing sprinklers, and is designed to be so sensitive as to operate when a leakage takes place equal to a fractional part of a sprinkler, and its construction makes it impossible for a false alarm to be given unless motion is given to the water by the aforesaid leakage.

Figure 1 is a sectional elevation of our improved alarm-valve. Fig. 2 is an enlarged sectional elevation of compensating-valve 37 in Fig. 1. Fig. 3 is a sectional elevation of another modification of our alarm-valve. Fig. 4 is a plan of valve-seat through line A B in Fig. 3, with valve and top portion of valve-box removed. Fig. 5 is an outside elevation of another modification of our alarm-valve, and Fig. 6 is an outside elevation of our improved valve when converted into a dead-weight throttle or reducing valve.

The alarm-valve box is composed of the upper and lower portions, 17 and 18, respectively, the latter being fitted with the double valve-seat 19 in the form of a **U**, on which is mounted the valve 20. The annular chamber or cavity 21 between the facings $19^{\times}$ of the valve-seat 19 is open to the action of atmospheric pressure by the hole or passage 22 and pipe 23 in the valve box or casing 18, and through which water flows immediately the main valve 20 opens, and can be used to operate a bell or other suitable alarm. This annular chamber or cavity is for the purpose of providing two separate seatings of different areas, the annular chamber or cavity being only subject to the pressure of the atmosphere when the main valve is closed. The pipe 23 is fitted with the tap 28, for the purpose of stopping the waste of water after the fire has been detected, and also, if necessary, for seating and reseating the alarm-valve. The top and bottom areas of the valve 20 and the width of the chamber or cavity 21 are constructed according to the various requirements or pressures, the larger area being on the top side, by which the valve is kept tight on its seat. The face of the main valve 20 is covered with the ring 30 of leather or other suitable substance, secured thereto by the metallic washer 31 and nut 32, the latter being screwed on the stem 33 on the under side of the valve 20. The valve 20 is provided with the spindle or stem 34, and is mounted in the cross-bar 35 in the upper portion, 17, of the valve-box and the guide or cross-bar 36 in the valve-seat 19. In case the volume of water above the top side of the valve 20 evaporates or becomes reduced in pressure, the valve 20 is fitted with the small compensating-valve 37, of which Fig. 2 is an enlarged sectional elevation, to automatically allow small quantities of water of an increased pressure to pass from the lower side of the valve to the upper side, which may be substituted by the pipes 38 and back-pressure valve 39. (Shown in dotted lines in Fig. 1.) The compensating-valve or by-pass 37 is mounted on the valve seat 40, the lower end of which is screwed into the upper side of the main valve 20, the latter being provided with the hole or passage 41 to admit water to the valve 37, the size of which regulates the sensitiveness of the action of the main valve. The valve 37 is inclosed in the casing 42, provided with the outlets 43.

Immediately a sprinkler is placed in action, from whatever cause, or a leakage takes place, so as to reduce the total pressure on the top side of the main valve 20 below that of the total pressure below the same, the valve 20 opens and allows the water to flow through the same to the sprinkler, and at the same time flows through the pipe 23 from the annular chamber or cavity 21 to a water motor or turbine or other suitable connection or alarm.

In the modification shown in Fig. 3 the annular chamber or cavity 21 and the double facings $19^{\times}$ are disposed on the main valve 20,

the valve-seat 19 being formed of leather or other suitable substance secured to the casing 18 by the metallic ring 44 and the upper portion, 17, of the valve box or casing. The ring 44 is provided with the cross-bar 36, in which is mounted the spindle or stem 34, the opposite or upper end being mounted in the cross-bar 35 in the upper portion, 17, of the valve-box. The valve-seat 19 and the valve box or casing 18 are provided with the slot 45, connecting with the hole or passage 22, by which the annular chamber or cavity 21 is open to the pressure of the atmosphere. The hole or passage 22 is fitted with the pipe 23, on the outlet of which is disposed the valve-box 46 and flat valve or lid 47. When the main valve 20 is closed, the valve 47 rests on the cross-bar 48, permitting the normal atmospheric pressure in the annular space 21, as shown in Fig. 3. Immediately the valve 20 opens said valve 47 is blown or driven by the force of water in the pipe 23 against the seat 49, thereby stopping the outlet entirely. In case the main valve 20 leaks the water passes the valve 47 and out through the holes 50. The pipe 23 is fitted with the valve-box 51, mounted on the T-piece 52, in which is disposed the valve 53. Immediately the valve 47 is blown or forced against its seat 49 by the opening of the main valve 20 the pressure forces the valve 53 against the india-rubber or other seat 54, the valve 53 in rising, by means of the stem 55 lifts the button 56 off the upper end of the valve-box 51, and sets the electric or other alarm, to which it is connected by the wire or cord 57, in operation.

In another arrangement the valve-spindle 34 is provided with a socket or slot and is operated by the lever 58, as shown in dotted lines in Fig. 3. This lever is attached to the spindle 59, which extends through the stuffing-box 60 to the outside of the valve-box, as in Fig. 5, on which is fitted the double-ended lever 61. The end 62 of the lever 61 is forked to slide on the pin 63, attached to the valve-box 17, which carries the button 56, attached to an electric or other alarm by the wire or cord 57. Immediately the main valve 20 opens the fork lifts the button 56 off the pin 63 and sets the alarm in motion. The opposite end of the lever 61 is fitted with the weight 64 or its equivalent—such as a spring—to force open the main valve 20 immediately the total pressures on each side are equal, or thereabout. If considerable variation in the pressures between the two sides of the valve 20 is required, the weight 64 can be placed on the opposite or fork side of the lever 61.

If desired, the main valve can be arranged to fulfill the function of a reduction-valve by which varying pressures can be obtained on each side—for example, say, one hundred and twenty pounds per square inch in the mains and eighty pounds per square inch in the sprinkler, the difference being compensated for by the areas of the upper and lower or under faces of the valve. In the case of employing a valve of this description the pipes above and below the main valve 20 are charged with water to the pressure intended to be utilized in the sprinkler. Then the stop-valve leading from the street or other main is closed to stop the flow of water, so as to allow the valve 20 to become seated, after which the stop-valve or street-main can be opened and the increased pressure placed under the valve 20. Any evaporation or decrease of pressure in the sprinkler is renewed by opening the tap or by-pass 39, which is again closed when the requisite pressure is attained.

In another modification the main valve 20 is weighted by the adjustable weights 65, as shown in Fig. 6, to vary the pressure on both sides when in operation or otherwise, in such case acting as a throttle or reducing valve when water is passing through. In this modification the valve-stem 34 is carried through a stuffing-box in the top of the casing in order to enable it to receive the weights 65.

The mode of operating the alarm can be varied in any convenient manner. For instance, that shown in connection with Fig. 1 can be applied to the valve shown in Fig. 3, and vice versa.

The purpose of valve 47 is to provide free access of air to the seating-surface of the main valve 20 and its valve-seat at all times.

Having fully described our invention, what we desire to claim and secure by Letters Patent is—

1. In an automatic fire-extinguisher, the combination, with a valve-casing through which the water passes to the sprinkler, said casing having a passage leading to a pipe communicating with an alarm and being provided with a valve-seat having an opening communicating with said passage, of a valve closing the water-passage through said casing and covering and uncovering said opening in the valve-seat as the valve closes and opens, substantially as described.

2. In combination with the valve 20, provided with the double facing $19^{\times}$, the annular chamber or cavity 21 between the same, the seating 19, and the slot or opening 45 through same to allow of the annular chamber or cavity 21 being open to the pressure of the atmosphere when the valve 20 is closed, and through which water flows to operate an alarm when the valve 20 opens, substantially as and for the purpose herein set forth.

3. The combination, with the casing, of a main valve, 20, and by-pass consisting of a valve-seat, 40, and valve 37, inclosed by a casing, 42, having discharge-openings, said by-pass being mounted on the main valve, which is provided with a passage communicating with the passage closed by the valve 37, substantially as described.

4. The combination, with the casing 17 18, of the main valve 20, having an annular space or channel, 21, the valve-seat 19, having a slot, 45, communicating with annular chamber 21

and with a pipe, 23, the valve-box 51, valve 53, having stem 55, and the detachable button 56, having a cord or wire connected to the alarm, substantially as described.

5. The combination, with the valve-casing 17 18, having the passage 22, of the main valve 20, having an annular space, 21, valve-seat 19, having a slot, 45, communicating with annular space 21 and passage 22, the pipe 23, valve-casing 46, having openings 50, valve 47, normally resting on the cross-bar 48, the valve-box 51, valve 53, having stem 55, and button 56, having cord or wire 57, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

RALPH DOWSON.
JOHN TAYLOR.

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