No. 871,021. PATENTED NOV. 12, 1907.

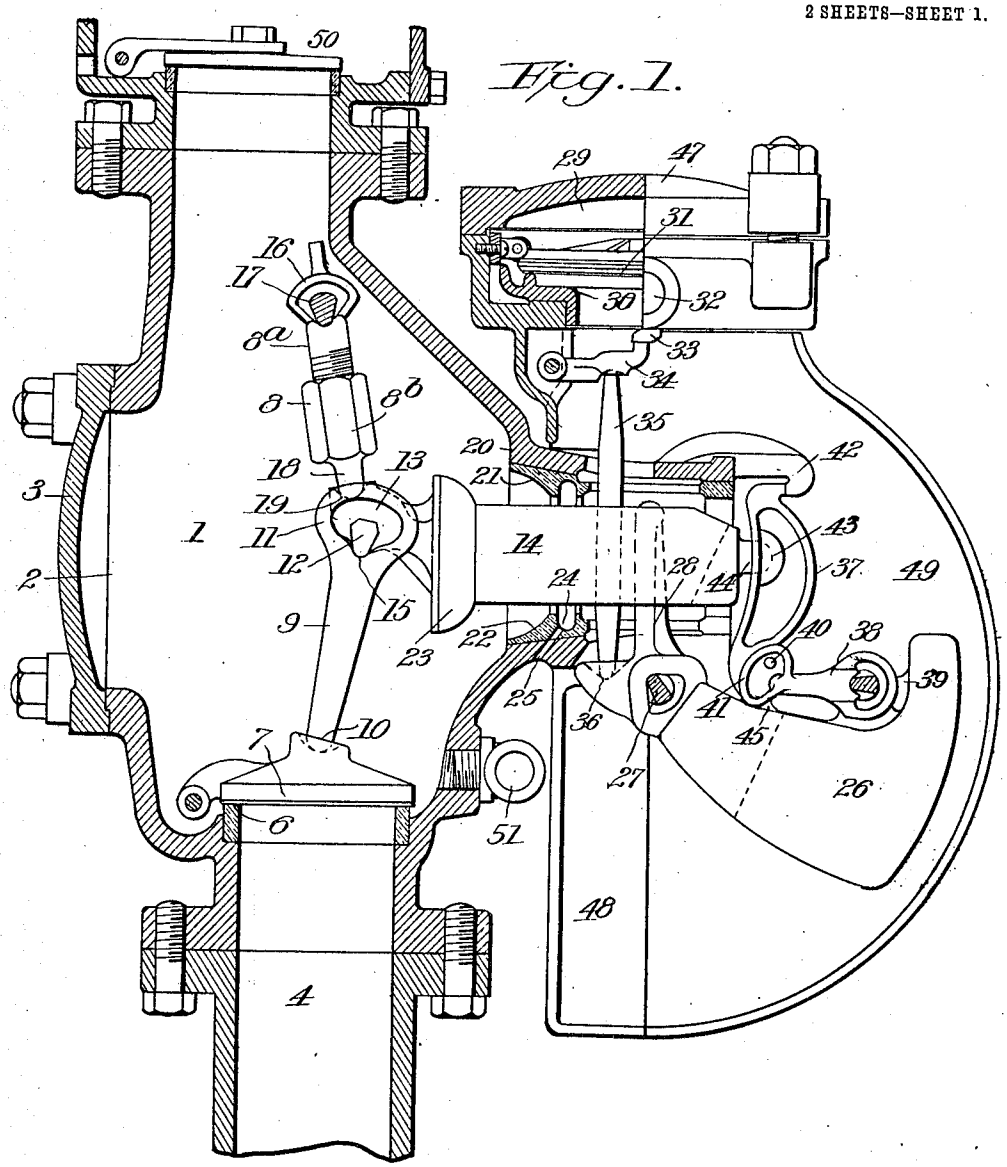
W. G. ALLEN & F. G. FEELEY.

FIRE EXTINGUISHER SYSTEM.

APPLICATION FILED MAY 11, 1906.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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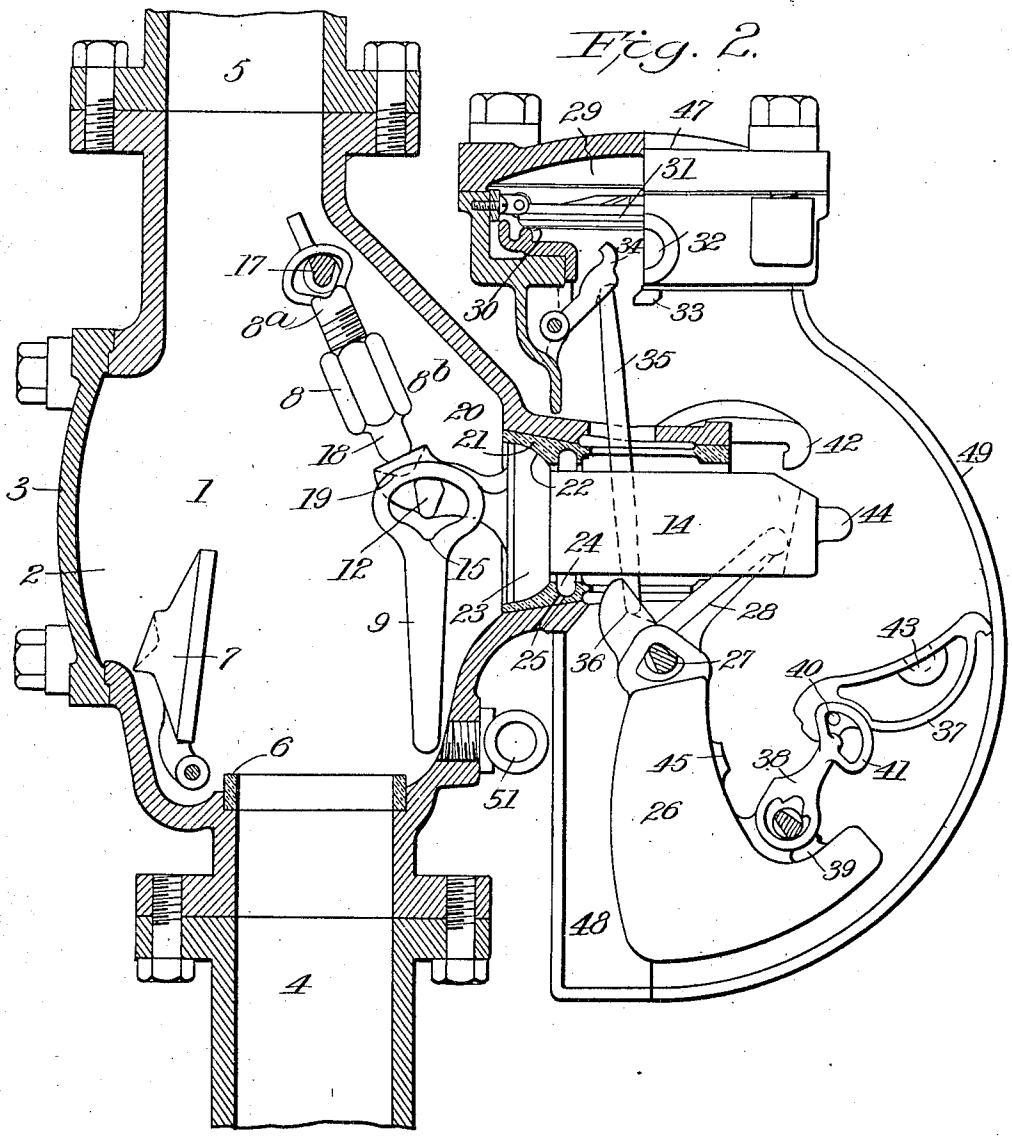
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FIRE EXTINGUISHER SYSTEM.

APPLICATION FILED MAY 11, 1906.

2 SHEETS—SHEET 2.

Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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FIRE-EXTINGUISHER SYSTEM.

No. 871,021. Specification of Letters Patent. Patented Nov. 12, 1907.

Application filed May 11, 1906. Serial No. 316,406.

To all whom it may concern:

Be it known that we, WILLIAM G. ALLEN and FRANK G. FEELEY, citizens of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented certain new and useful Improvements in Fire-Extinguisher Systems, of which the following is a specification.

This invention relates to improvements in automatic fire-extinguisher systems, and the object is to provide a valve of simple construction for automatically connecting the sprinkler system with the water supply upon the automatic opening of one or more of the sprinklers caused by the excessive heat generated by the fire, the valve being positive and reliable in its action.

With the above object in view, the invention consists in the novel features of construction hereinafter fully described, particularly pointed out in the claims, and clearly illustrated by the accompanying drawings, in which,—

Figure 1 is a sectional view showing the valve-mechanism in normal position, closing communication between the system and water-supply, and Fig. 2, a similar view showing the position of the parts when the mechanism has operated to establish such communication.

Referring now more particularly to the drawings, 1 designates the valve-casing proper to which access may be had through an opening 2 provided with a cover 3. 4 indicates the water-inlet which is connected with the water-supply and 5 the outlet therefor which is in communication with the sprinkler system, through check-valve 50. The inlet 4 is provided with a seat 6 for an inwardly-opening valve-disk 7 which is pivotally mounted in the casing. Said disk is normally held to its seat by a toggle consisting of two members 8 and 9. Member 9 rests at its free end in a depression 10 formed in the inner face of the valve disk and at its opposite end is formed with a loop 11 to receive a lug 12 carried by an arm 13 projecting from the end of a sliding plunger 14. The lug 12, when the toggle is in position holding the valve to its seat, bears against a seat 15 formed in member 9. Member 8 is formed of two parts, 8^a and 8^b, the part 8^a having a loop 16 on one end to receive a pin or stud 17 carried by the casing and having its opposite end screw-threaded for adjustable connection with the other part 8^b which is in the form of a nut having a projecting portion 18 seating in a depression 19 formed in the arm 13 of the sliding plunger. When the parts are in position holding the valve closed, the member 9 of the toggle bears against the valve-disk and the lug 12, while the member 8 bears against the arm 13 of the plunger and stud 17. The valve-disk is thus held positively to its seat against the pressure of the water-supply until the plunger is moved forwardly to break the toggle.

The valve-casing is formed with a contracted portion 20 in which a bushing 21 is fitted having a seat 22 at its inner end, and in said bushing, the plunger 14 slides, said plunger having a valve portion 23 at its inner end which when it is in forward position engages seat 22 and prevents escape of the water from the casing at this point. Any slight leakage at this seat is collected in annular groove 24 in the bushing and conveyed outside by the drain passage 25.

The plunger is operated by a weight 26 which is pivotally supported on a pin or stud 27. Said weight is provided on one side of its pivot with an operating arm 28 which works in a slot in the plunger and effects the movement of the latter.

29 designates the air-pot or chamber having a seat 30 for a pivoted valve-disk 31 which is normally held thereon by air-pressure in the chamber. The air-space in the chamber is in communication with the sprinkler system through the port 32, the connection with the system being made in the top of the riser. A check-valve on top of casing 1 excludes the air-pressure, from the body of valve-casing. On the face opposite to that acted on by the air-pressure, this valve-disk 31 is provided with a stud 33, against which, when the disk is seated, the free end of a pivoted lever 34 bears. When said disk is seated by air-pressure the weight is held raised by a rod or stem 35 which bears at one end against the lever 34 and at its opposite end against a projection 36 on the opposite side of the weight to its major portion. The plunger is held from movement by a member consisting of a retaining device comprising two parts 37 and 38. The part or strut 38 is pivotally attached to a toe 39 on the weight 26 and at its opposite end is loosely connected with the part or lever 37, the latter carrying a pin or stud 40 working in a loop 41 formed in the end of said strut 38. Lever 37, when the mechanism is in its normal position shutting off the supply of water, engages at its free end a member 42 projecting from the contracted portion 20 of the valve-casing at the forward end of the plunger. Said lever 37 is provided with a seat 43 receiving a stem 44 projecting from the forward end of the plunger. The position of lever 37 is fixed by a lug 45 on the weight 26, said lug being most clearly illustrated in Fig. 2.

The operation of my improved valve is as follows: Assuming the parts to be in the position shown in Fig. 1, a sprinkler or several sprinklers open and reduce pressure in the system and consequently in the air-chamber or pot above the valve-disk 31. This causes the weight 26 to overcome the pressure on said disk, raising the latter. As lever 34 and the disk 31 revolve about their pivots, the surfaces in contact slide on each

other until the end of said lever disengages the stud 33, permitting the disk to resume its former position and prevents the water when it has filled the system from flowing through at this point. The weight when falling carries with it the outer end of member or strut 38, and as said weight continues to fall this strut 38 and the part or lever 37 assume a straight line and are jerked free from the member or hook 42 and from the plunger. The plunger being free to move forward, its movement is effected by the arm 28 of the weight. The forward movement of the plunger breaks the toggle and releases the valve disk 7 which is opened by the force of the water supply which then flows into the system. Should the parts be stuck by corrosion or from any other cause, they are freed by the blow delivered to the plunger by an inwardly-projecting horn or lug 46 formed on said weight.

It is impossible to reset the valve without draining the system and air-line connecting with the air pot as the lever 34 cannot be reset in its proper position without raising the valve disk 31 which cannot be done with a load of water in the air-pipe. Any strain on the parts due to stress on said valve increases the buckle of the toggle which is on the side of safety instead of tending to clog the operation of the valve.

The tripping-point is entirely independent of the water-pressure or screw-stress, as both of these stresses are transmitted to the body itself, partly through the lever 37 to the member 42 and partly through said lever 37, strut 38 and weight 26 to the pivotal pin of said weight which is secured in a bracket formed integral with the body. The latter is true, since the two bearings of the strut or part 38 and the bearing of the pivotal end of the weight on the pivotal pin are in a straight line. As before stated, it is impossible to set these points otherwise, as the position of the lever or part 37 is fixed by the lug 45 on said weight.

The cover 47 of the air-pot and the cover 3 of the valve casing proper are interchangeable and the lower part of the air pot is so formed that it, with the lower shield 48 and door 49 entirely inclose all moving parts. A check valve is bolted to the top of the body of the valve casing and the sprinkler system riser flanged on top of it. A mechanical alarm may be arranged in the back shield 48 so that when the weight falls, it will close the circuit and sound an alarm.

At the bottom of the valve casing proper an automatic drip is attached, which takes care of any accidental leakage past seat 6 but closes as soon as the valve casing fills with water by the opening of the valve, thereby preventing further waste. If desired, a water motor-alarm can be attached at this point.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is;—

1. A valve for automatic fire-extinguisher systems, comprising a casing having an inlet connected with a water supply and an outlet in communication with the system, a valve disk for normally closing said inlet, a sliding member, a toggle-device comprising two members, one of which is pivotally mounted at one end in the casing and arranged to have longitudinal play on its pivot and engaging at its opposite end said sliding member and the other member pivotally mounted on said sliding member and arranged to have longitudinal movement on its pivot and engaging at its opposite end said valve-disk, a pivoted weight-lever adapted by its movement in one direction to effect the movement of said sliding-member, and means controlled by air pressure in the systems for holding said weight normally suspended.

2. A valve for automatic fire-extinguisher systems comprising a casing having an inlet connected to a water-supply and an outlet in communication with the system, a valve-disk for normally closing said inlet, a toggle-device for holding said valve-disk to its seat, a sliding-member operatively connected with said toggle device, a pivoted weight lever adapted by its movement in one direction to effect the movement of said sliding device, means controlled by air pressure in the system for holding said weight normally suspended and means for holding the sliding member from movement operative to release the same by the movement of the weight.

3. A valve for automatic fire-extinguisher systems comprising a casing having an inlet connected to a water supply and an outlet in communication with the system, a valve-disk for normally closing said inlet, a toggle device for holding said valve to its seat, a sliding member having an operative connection with said toggle device, a pivoted weight lever constructed and arranged to effect the movement of the sliding device, an air chamber in communication with the system, a movable member in said chamber controlled by said air pressure, means interposed between said movable member and the weight lever for holding the latter suspended, and means for holding the sliding member from movement operated by the weight-lever.

4. A valve for automatic fire-extinguisher systems, comprising a casing having an inlet connected to a water-supply and an outlet in communication with the system, a valve-disk normally closing said inlet, a toggle-device for holding said valve-disk to its seat, a sliding-member having an operative connection with said toggle-device, an air-chamber in communication with the system, a disk in said air-chamber normally held to its seat by air-pressure, a pivoted lever engaging said disk, a pivoted weight lever for actuating said sliding-member, a stem interposed between said weight lever and the first-mentioned lever whereby the former is held suspended while said air-disk is seated, and means for holding the sliding-member from movement operated to release the same by the movement of the weight-lever.

5. A valve for automatic fire-extinguisher systems, comprising a casing having an inlet connected to a water supply and an outlet having communication with the system, a valve-disk normally closing said inlet, a toggle device for holding said valve on its seat, a sliding member having an operative connection with said toggle device, a pivoted weight-lever arranged to effect the movement of the sliding member, means controlled by air-pressure in the system for holding said weight suspended, and means normally preventing movement of the sliding-member comprising two members loosely connected, one of said members being pivotally attached to the weight lever and the other adapted when the device is set to engage a fixed portion of the valve casing and disposed in such a position as to prevent movement of the sliding-member.

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

WILLIAM G. ALLEN
FRANK G. FEELEY.

Witnesses:
J. H. ADAMS,
F. M. ROOSE.