E. A. CAHILL.

AUTOMATIC ALARM VALVE.

APPLICATION FILED MAY 9, 1917.

1,356,598. Patented Oct. 26, 1920.

Fig. I.

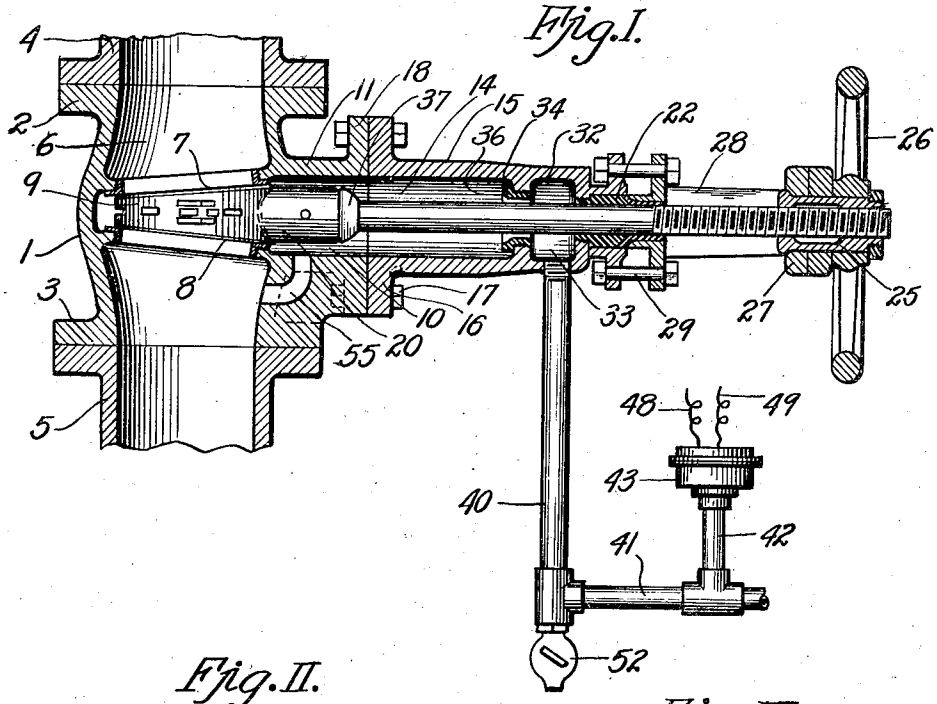


Fig. II.

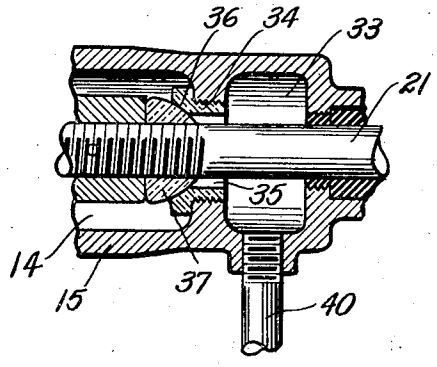
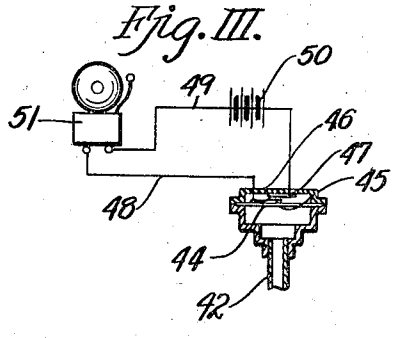


Fig. III.



INVENTOR.
Edmund A. Cahill.
BY Arthur C. Brown
ATTORNEY

UNITED STATES PATENT OFFICE.

EDMUND A. CAHILL, OF KANSAS CITY, MISSOURI.

AUTOMATIC ALARM-VALVE.

1,356,598. Specification of Letters Patent. Patented Oct. 26, 1920.

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To all whom it may concern:

Be it known that I, EDMUND A. CAHILL, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Automatic Alarm-Valves; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to automatic alarm valves, and has for its principal object to provide a valve of this character, particularly adapted for use in pipe lines between a water supply head and distributing mains and comprising means whereby should the valve gate be moved from a normal open position, connection would be made to close a circuit through an electrically operated alarm to sound a warning that such a valve movement had been made.

Valves of this character are of particular value in the supply main of certain fire prevention and control systems used extensively in large store buildings and warehouses. A system commonly employed consists in suspending water distributing pipes from the building ceilings, these pipes being supplied by mains which, in turn, are connected by risers with a common source of water supply; the distributing pipes being provided at spaced intervals along their lengths with sprinkler or spray heads, whereby should a fire occur, water admitted into the pipes from the main may be sprayed over the contents of the rooms.

In systems of this character, while such valves are necessary in order that the supply may be cut off from the mains should it be desired to make connections with or repair the latter, it is very essential, and is a requirement of most insurance writing companies, that they be retained normally entirely open so that, should a fire occur, water will be instantly available when control valves of the distributing pipes are opened.

It is, therefore, the object of the invention to provide a valve of this character that, when in open position, will maintain an open circuit through an electrically operated alarm device but should one unauthorized close, or even partially close, the valve gate a circuit will be closed through the alarm system to sound a warning which will continue to sound until the valve has again been moved to open position.

In accomplishing the object of the present invention, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings: wherein:—

Figure I is a sectional view of a valve embodying the present invention, showing the valve gate in closed position and the alarm control valve open.

Fig. II is an enlarged view of a portion of the valve housing showing the alarm control valve in closed position.

Fig. III is a diagrammatic view illustrating the electrical connection of the alarm device and the circuit contact points.

Referring more in detail to the drawings:—

1 designates a valve housing which is adapted for inter-position in a supply pipe leading from a source of water supply to distributing conduits and which is provided at its opposite ends with flanges 2—3 whereby connection may be made to the respective supply pipe sections 4 and 5.

Interposed in the channel 6 through the housing, are spaced inwardly facing valve seats 7—8, which are disposed obliquely to each other to coöperatively receive a wedge shaped valve gate 9 when the latter is in closed position, to shut off flow through the valve.

The gate 9 is disposed in a plane perpendicular to axial center of the housing 1 and is adapted to move from the housing to open the channel 6 through an outwardly opening channel 10 of a neck 11 formed integrally with the housing and into the inner chamber 14 of a housing 15; the latter being closed at its outer end and provided at its inner end with a peripheral flange 16 for receiving bolts 17, whereby it may be attached to a similar flange 18 at the open end of the neck 11.

Fixed in a boss 20 on the valve gate 8 is a valve stem 21, which slidably extends to the exterior of the housing 15 through a suitable packing bushing 22 in the closed end thereof, and at its outer end is threaded

through a sleeve 25, which may be revolved on the stem by a hand wheel 26; the sleeve being revolubly anchored in the cross head 27 of a U-bracket 28, the legs of which are fixed by bolts 29 to the outer end of the housing 15, so that by revolving the hand wheel and sleeve fixed thereto the stem 21 will be moved longitudinally to and from the housing to move the gate 9 from and toward closed position.

Adjacent its closed outer end the housing 15 is divided by a partition 32, forming an end chamber 33, and threaded into the partition is a collar 34 through which the stem 21 is adapted to move and which forms an annular channel 35 thereabout, whereby communication between the inner and outer chambers 14 and 33 is provided.

At its inner end the collar 34 is provided with a valve seat 36 which is adapted to receive a tapered valve 37 on the stem 21 at such a position that when the valve gate is moved to entirely open position the valve 37 will coöperate with the seat to close the channel 35 and prevent communication between the chambers 14 and 33, but when the gate is not in such open position communication is provided therebetween.

In the present device, the alarm mechanism is actuated by the admission of water from the supply conduit and chamber 14 into the chamber 33, which it is apparent is only acomplished by withdrawing the valve 37 from the valve seat 36 to open the channel 35; the alarm actuating means comprising a conduit 40 which opens at one end into the chamber 33 and communicates through branch conduits 41 and 42 with a closed diaphragm housing 43; the said housing being of such a character that water under pressure admitted thereto through the conduits 40—41—42 by the opening of the channel 35 will move a flexible diaphragm 44 therein to close a circuit between contact points 45 and 46 located respectively on the diaphragm and the housing cover 47 and to which circuit wires 48—49 are attached, that lead through a battery 50 and electrically operated alarm 51 so that when the circuit is closed an audible warning is given which will continue to sound until the channel 35 is again closed by moving the valve 9 to its open position and the water drawn from the conduits leading to the diaphragm housing; the latter being effected by opening a drain cock 52 at the lower end of the conduit 40, which is normally closed to effect operation of the diaphragm.

In order that the water may not be cut off from the chamber 14, even though the valve gate 9 be moved to entirely closed position, I provide a channel 55 which opens at one end into the main passage of the valve housing and at its opposite end into the chamber 14 so that at no time except when the gate is entirely open will communication between the diaphragm housing and housing 1 be cut off.

Assuming that the valve is so constructed it is apparent that with the same properly located in a supply main and with the gate then entirely open, the channel 35 will be closed and, although the water from the mains fill the chamber 14, it cannot be admitted to the diaphragm housing to cause a contact of the points 45—46 to close a circuit through the alarm, but should the valve gate be moved even slightly toward closed position the channel will be opened so that water may fill the chamber 33 and housing to cause a contact of the circuit closing parts and the alarm sounded.

To set the alarm parts, after the valve has been closed and the diaphragm housing filled with water, the valve stem 21 is moved by actuation of the hand wheel 26 to seat the valve 37 thereon within the valve seat 36 to close the channel 35. The drain cock 52 is then opened to drain the conduits and permit a disconnection of the contact points 45—46 and the opening of the circuit.

It is apparent that by providing a valve of this character, the supply main may be closed if desired as by the usual valve mechanism by actuation of the valve wheel 26 and that the alarm may be prevented from sounding continuously by a disconnection of one of the circuit wires from the battery or bell.

With an alarm of this character so constructed with the valve, it is apparent that should any one tamper with or attempt to close the valve, the alarm will sound a warning so that it may be opened in readiness for any emergency.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters-Patent, is:—

The combination with a water main, of a gate valve for closing said main and provided with a valve stem, a casing surrounding the stem of said valve and having a valve seat, a passageway leading from the main on one side of the valve seat to the valve casing, a water actuated alarm having a pipe in communication with the valve stem casing beyond the valve seat therein, and a valve on the stem adapted to be seated on said seat, the passageway being at all times in communication with the valve stem casing and admitting water to the pipe when the gate valve is closed, the valve on the valve stem being effective in cutting off communication between the main and the pipe when the gate valve is unseated.

In testimony whereof I affix my signature.

EDMUND A. CAHILL.