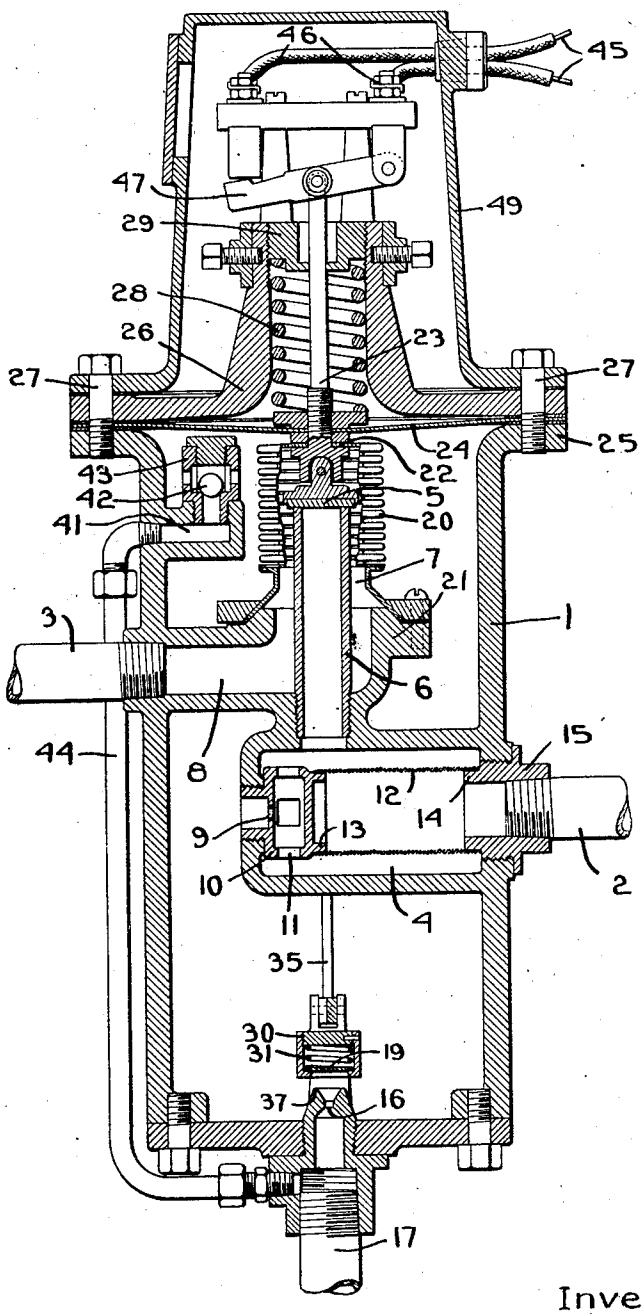
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J. E. EVANS ET AL

RETARDING CHAMBER FOR AUTOMATIC SPRINKLER SYSTEMS

Filed Aug. 30, 1922 2 Sheets-Sheet 1

Fig. 1



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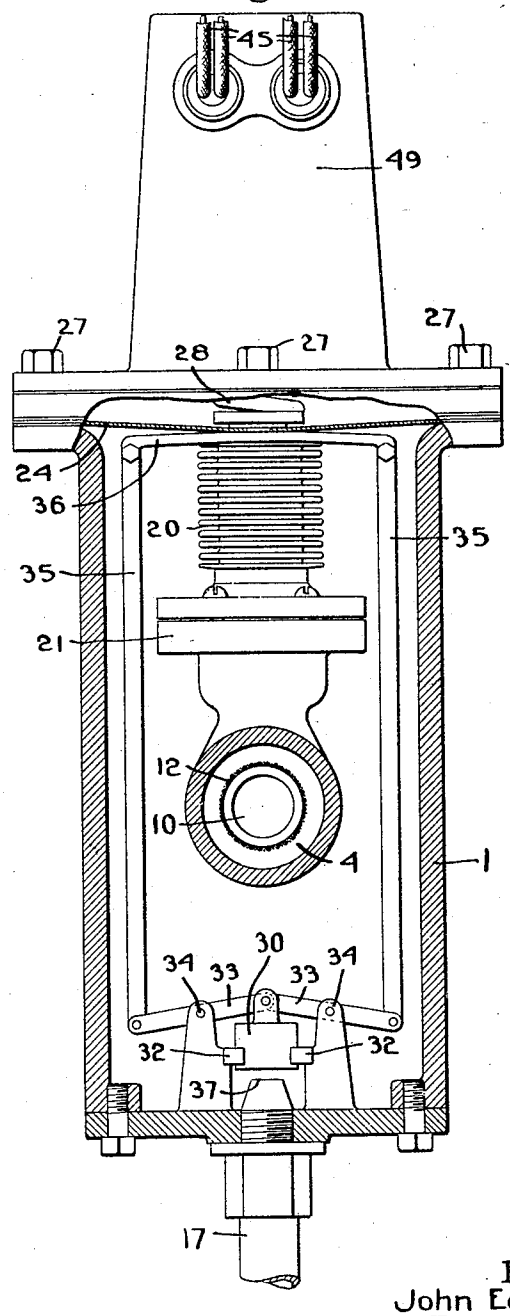
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RETARDING CHAMBER FOR AUTOMATIC SPRINKLER SYSTEMS

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Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN EDWARD EVANS, OF NEW YORK, AND FRANCIS HERBERT GRIFFITHS, OF YONKERS, NEW YORK, ASSIGNORS TO THE RELIABLE AUTOMATIC SPRINKLER CO. INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

RETARDING CHAMBER FOR AUTOMATIC SPRINKLER SYSTEMS.

Application filed August 30, 1922. Serial No. 585,244.

This invention relates to that portion of an automatic sprinkler system which is commonly referred to as the retarding chamber. These retarding chambers are used in connection with the alarm mechanism and its controlling valve and they have for their purpose to retard the action of the alarm mechanism so that it will not operate upon a momentary or temporary unseating of the main check valve but only when the same check valve is open to permit continuous flow therethrough.

Among the features of the present invention are the provision of a normally-closed passage leading directly from the alarm valve to the alarm mechanism, but having a restricted communication with the retarding chamber and means operated by fluid under pressure in the retarding chamber to open said passage to allow free flow of fluid to the alarm mechanism. One advantage of this construction is that when the passage is open the water for actuating the alarm flows directly thereto from the alarm valve without passing through the retarding chamber and, therefore, a more direct and positive operation of the alarm mechanism is provided for.

Another feature of our invention relates to the provision of a supply chamber within the retarding chamber which is connected to the alarm mechanism and also has a communication independent of the retarding chamber with the alarm mechanism, said supply chamber having a continuously-open restricted communication with the retarding chamber, together with a valve for closing the passage which is controlled by the fluid under pressure in the retarding chamber.

Still another feature of our invention relates to the manner of closing an electric circuit by fluid under pressure in said retarding chamber for the purpose of operating an electrical alarm or other similar device.

Still another feature of the invention relates to a novel construction for assisting in draining the retarding chamber. Other features of the invention will be more fully hereinafter set forth and then pointed out in the appended claims.

In order to give an understanding of our invention we have illustrated in the drawings a selected embodiment thereof which will now be described after which the novel features will be pointed out in the appended claims.

Fig. 1 is a vertical sectional view through a retarding chamber embodying our invention;

Fig. 2 is a partial sectional view taken at right angles to Fig. 1.

In the drawings 1 indicates the retarding chamber, 2 indicates a pipe connection which leads to the alarm valve which may be associated with a main check valve in the sprinkler system (said alarm valve and main valve not being shown herein as they form no part of the present invention and may be of any approved construction), and 3 indicates a pipe connection leading to the alarm mechanism (the latter also being omitted from the drawings because it may be of any usual construction).

Our present invention involves a construction in which there is a direct passage between the inlet pipe 2 and delivery pipe 3 which is separate from the retarding chamber, but which has a restricted communication therewith.

The inlet pipe 2 is herein shown as leading into a supply chamber 4, which in the present embodiment of the invention is located within the retarding chamber, and this supply chamber 4 communicates with the discharge pipe 3 through a passage that is normally closed by a valve 5. In the present embodiment of the invention this passage comprises a pipe section 6 communicating with and leading from the supply chamber 4 and the upper end of which constitutes a valve seat for the valve 5, said valve being held against its seat by the spring 28, and it also includes a chamber 7 surrounding the discharge end of the pipe section 6 and communicating with the pipe section 3 through a duct 8. The walls of the chamber 7 are shown as made of an expansible bellows-like structure 20, the lower end of which is connected to the member 21 through which the duct 8 is formed and the upper end of which is connected to a disk 22 that in turn is secured to the stem 23 of the valve 5.

The supply chamber 4 is in communication with the retarding chamber 1, through a restricted orifice 9, the latter being con-

stantly open. This restricted orifice is shown as formed in a fitting 10 that is located at the inner end of the supply chamber 4, said fitting having a box-like structure having ports 11 in its side communicating with the chamber 4 and having the restricted orifice 9 in one end.

12 indicates a cylindrical strainer or sieve which is supported at one end on a boss 13 of the fitting 10 and at the other end on a boss 14 of the bushing 15 into which the inlet pipe 2 is secured. This cylindrical strainer 12 is for the purpose of straining the water which passes either to the retarding chamber 1 or to the alarm mechanism.

It will thus be seen that our construction is one wherein the inlet pipe 2 has constant communication with the retarding chamber 1 through the restricted orifice 9 and in which there is a direct passage from the inlet pipe 2 to the discharge pipe 3 which is separate from the retarding chamber 1 and is normally closed by the valve 5.

The retarding chamber is also provided with a drain outlet 16 which is slightly smaller than the restricted orifice 9 and which leads to a drain pipe 17 and this drain outlet is adapted to be closed by a valve 19. The valve 19, however, is normally open and is only closed when the valve 5 is opened.

It will be understood by those skilled in the art that so long as the alarm valve or the main check valve, if used in combination with the alarm valve, remains closed, the alarm valve will be closed and consequently there will be no water delivered to the inlet pipe 2. If, however, the main check valve is unseated then the alarm valve will also be unseated and water will flow through the check valve and from the alarm valve through the pipe 2 and into the supply chamber 4, and from the supply chamber through the restricted orifice 9 into the retarding chamber, it being remembered that the valve 5 is closed so that no water can flow through the passage leading to the pipe 3. If the unseating of the main valve is temporary or momentary, such as would result from water hammer, then the alarm valve will only be opened momentarily and a relatively small amount of water will be delivered through the pipe 2. This water will flow through the restricted orifice 9 into the retarding chamber and from thence will drain out through the drain port 16.

On the other hand if the main valve remains unseated so that there is a continuous flow of water therethrough then the alarm valve will also remain unseated and water will flow continuously through the pipe connection 2 into the supply chamber 4 and from the latter through the restricted orifice 9 into the chamber 1. Since the restricted orifice 9 is larger than the drain port 16, such continuous flow will result in an accumulation of water in the retarding chamber 1.

Means are provided whereby the pressure developed by the accumulation of water in the retarding chamber 1 will open the valve 5 thus allowing a free flow of water from the pipe connection 2 direct to the pipe connection 3 for the purpose of operating the alarm.

The means we have herein provided for this purpose comprise a flexible diaphragm 24 forming the upper end of the retarding chamber 1 and connected to the valve stem 23. This diaphragm is retained at its edges between the flange 25 at the upper end of the retarding chamber and a head 26 which is clamped to the flange by bolts 27. The spring 28 which holds the valve 5 to its seat is located within the head 26 and is backed by a cap 29.

As a pressure is developed in the chamber 1 by the accumulation of water therein, such pressure acting against the diaphragm 24 will raise the valve 5 from its seat thus opening the passage between the pipes 2 and 3. During this opening movement of the valve 5 the bellows-like structure 20 will merely expand but will at all times form a separating wall between the interior of the chamber 1 and the chamber 7.

Means are also provided whereby the drip valve 19 is closed simultaneously with the opening of the valve 5. This drip valve 19 comprises a valve member 19 yieldingly sustained in a valve housing 30, said valve member being backed by the spring 31. The housing 30 is vertically movable between guides 32 secured to the bottom of the chamber 1 and it is connected to two levers 33 that are in turn pivotally connected to the guides 32 as shown at 34. The outer ends of these levers are connected by links 35 to a cross bar 36 which is secured to the valve stem 23. When the valve stem 23 is raised by pressure against the diaphragm 24 the upward movemest of the yoke or cross bar 36 operates through the links 35 and levers 33 to close the valve 19 onto the valve seat 37 of the drip outlet 16. The valve element 19 is so arranged that it will seat against the valve seat 37 before the diaphragm 24 reaches the upper limit of its movement, but because of the yielding mounting of the valve member due to the spring 31 the full movement of the diaphragm is permitted.

The closing of the valve member 19 onto its seat retains the pressure in the chamber 1 so as to hold the valve 5 open so long as the alarm valve is open.

After the device has functioned to sound the alarm and the main valve and alarm valve have again been set it will be necessary to drain the chamber 1 so as to put it in condition for operation again. As soon

as the alarm valve is closed and the pressure in the chamber 1 is reduced then the spring 28 will operate automatically to close the valve 5 and at the same time to open the drain port 16 thus allowing the water to drain out from the chamber 1.

In order to assist this draining operation we have provided means for venting the chamber to allow air to enter it. At the upper part of the chamber 1 is a vent opening 41 which is normally closed by a ball valve 42 that is confined within a cage 43. This vent opening 41 communicates by a pipe 44 with the drain pipe 17. The ball valve 42 normally closes the vent and prevents the escape of water therefrom but when the chamber 1 is being drained then air is allowed to enter through the drain pipe 17 and through the pipe 44 and vent 41 into the chamber 1 thus preventing the formation of vacuum therein and hastening the draining operation.

We have shown herein means operated by the diaphragm 24 for closing an electric circuit by which an alarm may be given.

45 indicate the wires of a circuit for operating an alarm, said wires leading to the terminals 46 of a switch that is closed by a switch blade 47. This switch blade is secured to the valve stem, the latter extending through the cap 29 for this purpose, and is so constructed that when the valve 5 is closed the switch will be open but when the valve is raised from its seat the switch will be closed. This switch is confined within a housing 49 that is secured to the chamber 1 and encloses the head 26.

While we have illustrated herein a selected embodiment of our invention we desire it to be understood that the invention is not confined to the construction or details shown but may be varied in various ways within the scope of the appended claims.

We claim—

1. In a retarding device for fire alarm systems, the combination with a retarding chamber, of a normally closed passage leading from a source of supply to an alarm mechanism, said passage being separate from the retarding chamber and having a continuously-open but restricted communication with said chamber, and means operated by fluid under pressure in said chamber to open said passage.

2. In a retarding device for sprinkler systems, the combination with a retarding chamber having a drain outlet, of a normally-closed passage leading to an alarm mechanism and having a continuously open but restricted communication with said chamber, and means operated by fluid under pressure in the chamber to open said passage and simultaneously close the drain outlet.

3. In a device of the class described, the combination with a retarding chamber, of a supply chamber having a restricted communication with the retarding chamber, a normally-closed passage separate from the retarding chamber and leading from the supply chamber to an alarm mechanism, and means operated by fluid under pressure in the retarding chamber to open said passage thereby permitting a free flow from the supply chamber directly to the alarm mechanism.

4. In a device of the class described, the combination with a retarding chamber having a drain outlet, of a supply chamber having a restricted communication with the retarding chamber and also having communication with an alarm valve, a normally-closed passage leading from the supply chamber directly to an alarm mechanism, and means operated by fluid under pressure in the retarding chamber to open said passage and to close the drain outlet.

5. In a device of the class described, the combination with a retarding chamber, of a supply chamber situated within the retarding chamber and having a restricted communication therewith, a normally-closed passage from the supply chamber to an alarm mechanism, said passage being separate from the retarding chamber, and means operated by fluid under pressure in said chamber to open said passage.

6. In a device of the class described, the combination with a retarding chamber having a drain outlet, of a supply chamber within the retarding chamber and having a restricted communication therewith, a passage leading from said supply chamber directly to an alarm mechanism, a valve normally closing said passage, and means operated by fluid under pressure in said retarding chamber to open the valve and simultaneously close the drain outlet.

7. In a retarding device for sprinkler systems, the combination with a retarding chamber having a drain outlet, of a normally-closed passage leading to an alarm mechanism and having a continuously-open but restricted communication with said chamber, means operated by fluid under pressure in the chamber to open said passage and simultaneously close the drain outlet, a vent passage leading from the drain outlet to the top of the retarding chamber, and a check valve in said passage.

8. In a device of the class described, the combination with a retarding chamber, of a passage leading from an alarm valve to an alarm mechanism, a portion thereof having bellows-like walls, a valve within said portion normally closing the passage, said passage having a continuously-open but restricted communication with the retarding chamber, and means operated by fluid under pressure in said chamber to open said valve

thus allowing free flow of fluid from the alarm valve to the alarm mechanism.

9. In a device of the class described, the combination with a retarding chamber having a head at one end, a diaphragm at said end of the chamber which is subjected to the action of fluid under pressure in said chamber, a spring acting against said diaphragm in opposition to such pressure, a passage leading from the alarm valve of a sprinkler system to an alarm mechanism and having a restricted communication with said chamber, an alarm circuit and a switch connected to said diaphragm for closing said circuit.

10. In a device of the class described, the combination with a retarding chamber, of a normally-closed passage separate from said chamber and leading to an alarm mechanism whereby fluid flowing through said passage to the alarm mechanism does not pass into said chamber, said passage having a continuously-open but restricted communication with said retarding chamber, and means operated by fluid under pressure in said chamber to open said passage.

11. In a device of the class described, the combination with a retarding chamber, of a passage separate from said chamber leading from a source of supply other than the chamber to an alarm mechanism, a valve normally closing said passage, the latter having a continuously-open but restricted communication with said retarding chamber, and means operated by water accumulating in the retarding chamber through said restricted communication to open said valve.

12. In a device of the class described, the combination with a retarding chamber, of a passage separate from said chamber leading to an alarm mechanism, said passage having a continuously-open but restricted communication with the retarding chamber, a valve normally closing said passage on the delivery side of said restricted communication, and means operated by water accumulating in the retarding chamber through said restricted communication to open the valve.

In testimony whereof, we have signed our names to this specification.

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FRANCIS HERBERT GRIFFITHS.