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F. GRINNELL.

APPARATUS FOR OPERATING ALARMS OR OTHER DEVICES.

(Application filed Mar. 28, 1900.)

(No Model.)

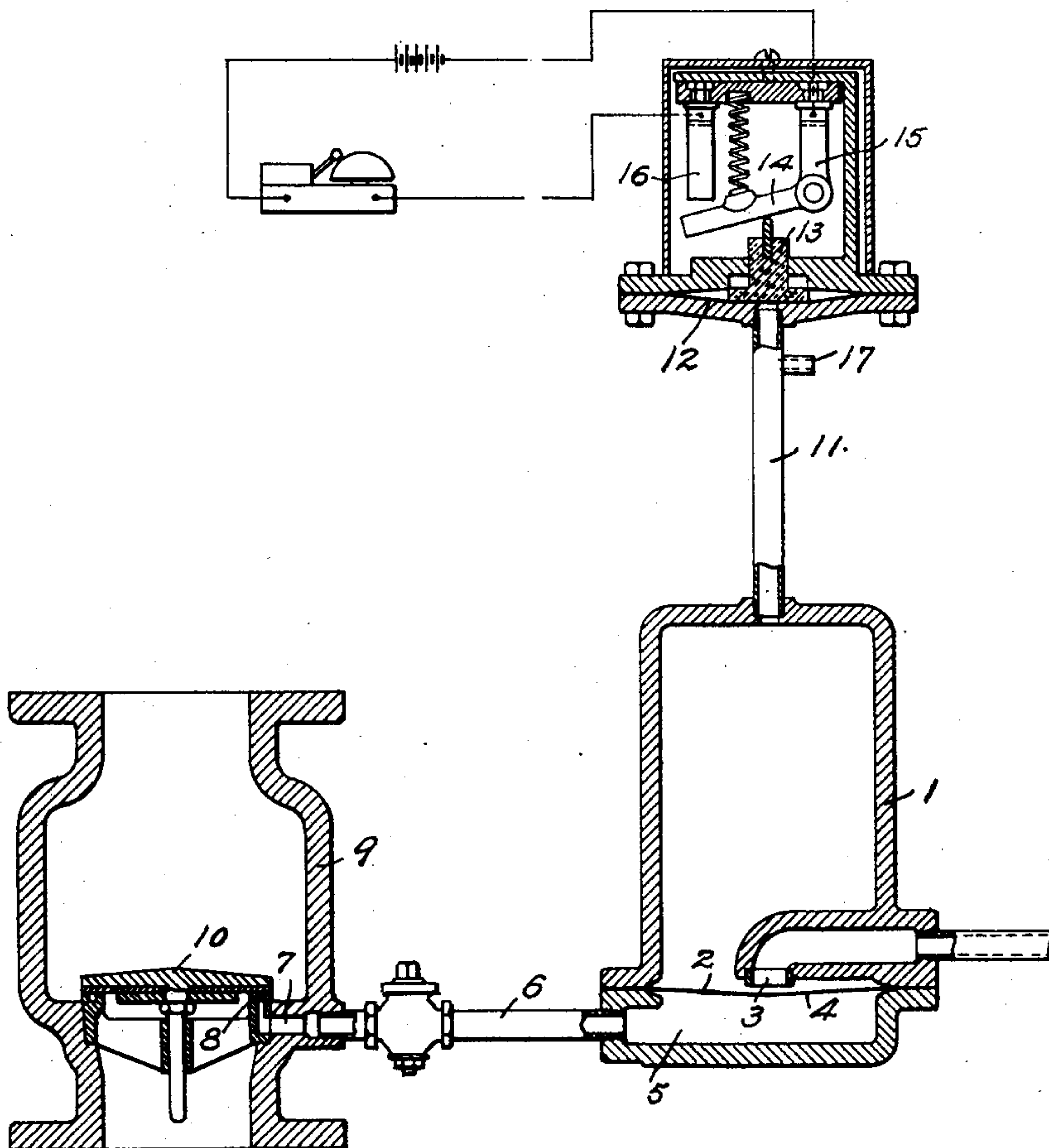


FIG. 1.



FIG. 2.

WITNESSES,

Ira L. Fisher

John Henshaw

INVENTOR,

Frederick Grinnell

BY *Kilmarth C. Thurston*

ATT'Y.

UNITED STATES PATENT OFFICE.

FREDERICK GRINNELL, OF NEW BEDFORD, MASSACHUSETTS, ASSIGNOR TO
THE GENERAL FIRE EXTINGUISHER COMPANY, OF NEW YORK, N. Y., A
CORPORATION OF NEW YORK.

APPARATUS FOR OPERATING ALARMS OR OTHER DEVICES.

SPECIFICATION forming part of Letters Patent No. 688,305, dated December 10, 1901.

Application filed March 28, 1900. Serial No. 10,502. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK GRINNELL, of New Bedford, county of Bristol, and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Operating Alarms or other Devices; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

The invention relates to an apparatus for causing the operation of a device—such as an alarm, for instance—whenever there is an escape of liquid from the system of pipes to which the apparatus is connected, and more especially relates to an apparatus in which the device is operated or controlled by the liquid in the system acting through a normally closed communication which is opened upon the escape of liquid from the system. This form of apparatus is especially useful in connection with automatic fire-extinguisher systems for operating an alarm, and this application of the invention will be referred to in more fully explaining the invention.

Alarm devices of the general character above referred to have heretofore been used in connection with fire-sprinkler systems, and when so used the communication with the system has usually been controlled by a check-valve located at the entrance of the system of sprinkling-pipes. When the sprinkler system is supplied from water-pipes which also supply water for other purposes, the check-valve is liable to be opened for an instant at more or less frequent intervals by water-hammer produced in the supply-pipes. These openings may occur at such short intervals that a considerable flow of water to the alarm device is produced, and with the previous construction of such devices this flow may be sufficient to operate them, thus giving a false alarm. This danger of giving false alarms is the chief objection to the previous constructions, which objection the present invention overcomes by providing an alarm device of the general character referred to which will surely operate upon the opening of a sprinkler, but which will not be operated by fre-

quent opening and closing of the communication with the system. This is accomplished by the use in connection with an alarm device of a receiving-chamber connected with the liquid-supply system through a normally closed passage and having an outlet for discharging liquid from said chamber when the passage is closed, which outlet is reduced upon the opening of said passage, causing the liquid to rise in and fill the chamber and operate or cause the operation of the alarm. In practice it is desirable to so proportion the outlet that when open it will quickly discharge any liquid which may have collected in the chamber, and it is also desirable to close the outlet when the passage to the system is opened, as in such case the full pressure in the system is rendered operative in effecting the operation of the alarm. The reduction of the outlet upon the opening of the passage to the system may be less than a complete closing of said outlet, if found desirable for any reason, and in any case the size of the supply to the chamber may be so proportioned that under a given head or pressure in the system it will require the desired time to fill the receiving-chamber. If the communication with the system does not remain open for this length of time, the alarm will not be operated, for upon the closing of the communication the outlet will be opened to its full extent and the liquid which has collected in the receiving-chamber will be quickly discharged.

In the accompanying drawings, in which is shown an apparatus embodying the invention in its preferred form, arranged to cause the operation of an alarm, Figure 1 is a sectional elevation, and Fig. 2 is a detail showing the supply-opening through the diaphragm to be described.

In the construction shown the receiving-chamber 1 is provided with a supply-opening 2, through which water from a water-supply system may flow into said chamber when the communication between the chamber and system is open. The chamber is also provided with a discharge-outlet 3, through which any water which may have accumulated in said chamber when the communication with the

system is open may quickly escape when said communication is closed. This discharge-opening is normally open and the passage to the system normally closed; but when the
 5 passage to the system is opened the discharge is closed, so that the water may accumulate in the chamber 1, and when this accumulation has reached a certain amount the alarm or other device is operated. Should the pas-
 10 sage to the system close, however, before the accumulation reaches this amount, then the discharge is opened and the water rapidly escapes until the chamber is emptied or the passage to the system is again opened. The
 15 supply is preferably so proportioned that the accumulation of water in the chamber is comparatively slow, so that the passage to the system must remain open some time before there is a sufficient accumulation of water in
 20 the chamber to operate the alarm, and the discharge is preferably so proportioned that the accumulated water is rapidly discharged when the passage to the system is closed. Any
 25 suitable means may be employed for closing the discharge when the supply-passage is opened. It is preferred, however, to use a movable member for this purpose, which is sub-
 30 jected to the pressure of the system when the supply-passage is opened and the movement of which causes the closing of the discharge. In the construction shown the movable mem-
 35 ber consists of a diaphragm 4, which normally stands below the outlet 3. There is a chamber 5 beneath the diaphragm, which commu-
 40 nicates with the system through a pipe 6. This pipe also forms the passage or a part of the passage from the system to the chamber 1. The pipe 6 communicates with the system
 45 through a passage 7 and an annular channel or chamber formed in a valve-seat 8. The passage 7 is formed in, and the valve-seat 8 is supported by, a casting 9, which may be in-
 50 cluded in the supply system. A check-valve 10 is arranged to seat upon the valve-seat 8, and thus close the passage to the receiving-chamber. This valve and its mode of oper-
 55 ation are well understood in the sprinkler art and need not be herein described. When the passage between the system and the chamber 1 is opened by the opening of the valve 10 for
 60 any reason, the diaphragm 4 is subjected to the pressure of the water in the system and is moved upward to close the discharge, and as soon as the valve 10 returns to its seat the
 65 pressure on the diaphragm is removed, allowing said diaphragm to spring away from the discharge-opening. The supply-passage may be located and arranged as desired and is preferably formed, as shown, by an opening
 70 in the diaphragm 4. Whenever a sprinkler opens in the system, the flow of water past the valve 10 and through the pipe 6 is practically continuous and the accumulation of water in the chamber 1 will continue and may be em-
 75 ployed to operate an alarm or other device. Successive and frequent openings and clos-
 80 ings of the valve caused by water-hammer

or otherwise will not cause an operative ac-
 70 cumulation of water in the chamber 1, how-
 75 ever, for the reasons before stated, and false
 80 alarms or improper operation of other devices
 85 will not occur. Moreover, with this construc-
 90 tion comparatively large passages for the wa-
 95 ter may be employed, so that there is no dan-
 100 ger that they will become clogged or stopped
 105 and cause an improper operation of the alarm
 110 or other device or a failure to operate at the
 115 proper time. In the form shown when the
 120 valve 10 remains open the water accumulates
 125 in the chamber 1 until said chamber is filled,
 130 when it rises in the pipe 11 and acts against
 135 a diaphragm 12, the movement of which com-
 140 pletes an electric circuit and sounds an alarm.
 145 The diaphragm 12 carries a block 13, which
 150 acts against a blade 14, one end of which is
 155 pivoted to a binding-post 15, included in the
 160 alarm-circuit, and the other end of which is
 165 arranged to engage a second post 16, also in-
 170 cluded in the circuit. The chamber 1 should
 175 be provided with a vent for the escape of air
 180 as the water rises therein, and such a vent is
 185 shown in the pipe 11 at 17.

While the apparatus described is especially
 190 designed and intended for use in connection
 195 with alarm devices for automatic sprinkler
 200 systems and its advantages have been set
 205 forth in connection with such apparatus and
 210 systems, yet it will be understood that the in-
 215 vention is not limited to use in such connec-
 220 tions and that devices other than alarms
 225 might be operated by the increased flow or
 230 pressure produced in the receiving-chamber
 235 and that the invention might be used in con-
 240 nection with supply systems other than sprin-
 245 kler systems.

What I claim as my invention, and desire
 to secure by Letters Patent, is—

1. The combination with a receiving-cham-
 250 ber, of a supply-passage between said receiv-
 255 ing-chamber and a water-supply system, means
 260 for normally closing said supply-pas-
 265 sage, an outlet for discharging the water from
 270 said chamber, and independent means oper-
 275 ated upon the opening of the supply-passage
 280 to reduce said outlet and upon the closing of
 285 said passage to restore said outlet.

2. The combination with a receiving-cham-
 290 ber, of a supply-passage between said receiv-
 295 ing-chamber and a water-supply system, means
 300 for normally closing said supply-pas-
 305 sage, an outlet for discharging the water from
 310 said chamber, and independent means oper-
 315 ated upon the opening of the supply-passage
 320 for closing said outlet, and upon the closing
 325 of said passage to open said outlet.

3. The combination with a receiving-cham-
 330 ber, of a normally closed supply-passage be-
 335 tween said receiving-chamber and a water-
 340 supply system, an outlet for discharging the
 345 water from said chamber, and means oper-
 350 ated directly by the pressure in the system
 355 for closing said outlet upon the opening of
 360 said passage.

4. The combination with a receiving-cham-

ber, of a normally closed supply-passage between said receiving-chamber and a water-supply system, an outlet for discharging the water from said chamber, and a diaphragm 5 subjected to the pressure of the system upon the opening of said passage, said diaphragm by its movement causing the closing of the outlet.

5. The combination with a receiving-chamber, a yielding diaphragm therein, a chamber 10 below said diaphragm, a communication between said chambers and a water-supply system, and a discharge-outlet for said receiving-chamber opened and closed by the movement of said diaphragm. 15

6. The combination with a receiving-chamber 1, a diaphragm 4 therein, a chamber 5 below said diaphragm, a discharge-outlet 3 arranged to be closed by movement of said diaphragm, an inlet to said chamber 5, and a 20 passage from chamber 5 to chamber 1.

7. The combination, with a water-supply system, of a check-valve located therein, a receiving-chamber, a supply-passage leading to 25 said receiving-chamber, said supply-passage being normally closed by said check-valve, an

outlet from said chamber, and means operated upon the opening of the supply-passage to reduce said outlet and upon the closing of said passage to restore said outlet. 30

8. The combination, with a water-supply system, of a check-valve located therein, a receiving-chamber, a supply-passage leading to said receiving-chamber, said supply-passage being normally closed by said check-valve, an 35 outlet from said chamber, and means operated upon the opening of the supply-passage to close said outlet, and upon the closing of said passage to open said outlet.

9. The combination, with a water-supply 40 system, of a check-valve located therein, a receiving-chamber, a supply-passage leading to said receiving-chamber, said supply-passage being normally closed by said check-valve, an outlet from said chamber, and means oper- 45 ated by the pressure in the system for closing said outlet upon the opening of said supply-passage.

FREDERICK GRINNELL.

Witnesses:

IRA L. FISH,
R. A. BATES.