(No Model.)

C. C. WORTHINGTON.

ALARM APPARATUS FOR AUTOMATIC FIRE EXTINGUISHERS.

No. 306,201. Patented Oct. 7, 1884.

Fig. 1.

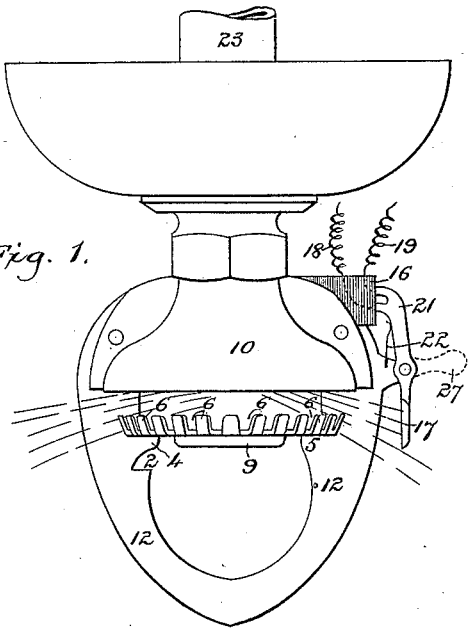
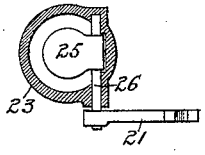


Fig. 3.



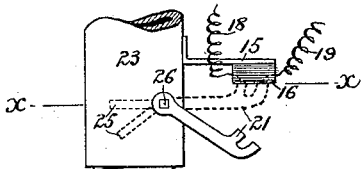
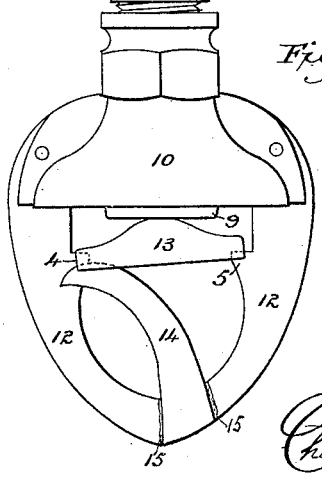


Fig. 2.



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ALARM APPARATUS FOR AUTOMATIC FIRE-EXTINGUISHERS.

SPECIFICATION forming part of Letters Patent No. 306,201, dated October 7, 1884.

Application filed March 25, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES C. WORTHINGTON, a citizen of the United States, residing in the city of Irvington, county of Westchester, and State of New York, have invented certain new and useful Improvements in Alarm Apparatus for Automatic Fire-Extinguishers, fully described and represented in the following specification and accompanying drawings, forming a part of the same.

The invention relates to an alarm mechanism which is designed for use in connection with what are known as "automatic fire-extinguishers or sprinklers"—that is to say, that class of devices which are so constructed and arranged that the heat occasioned by the breaking out of a fire in their vicinity will operate to release a valve or other similar device controlling a water-supply, and permit the water to be ejected in the form of a shower over a considerable area surrounding the sprinkler, and thus extinguish any fire which may be within the range of such shower. These devices, although differing greatly in form and construction, have all or nearly all consisted, essentially, of a nozzle which is connected to a water-supply pipe, and closed by a valve or other similar device which is held in place either directly or through suitable connections by an alloy which is fusible at a comparatively low temperature, so that whenever a fire was lighted in the vicinity of one of these sprinklers, so as to raise the temperature of the surrounding air above the melting-point of the alloy the valve would be released, so as to permit the water to flow, as just stated. These devices have proved very successful in practice for the purpose intended, and have gone into extensive use in those places where little or no damage would result from the discharge of water; but a very serious objection exists to their use in dry-goods stores and other like places, where great damage is sure to result from any unnecessary use of water in this manner: first, because, owing to the necessarily frail nature of the means by which the valve or other device which confines the water in the sprinkler is held in place, it is liable to become dislocated, so as to cause the water to flow when no fire exists; second, because when the sprinkler is once set in operation it will continue to operate until the water is shut off from the supply-pipe, which, if no alarm is given, may, and in most instances will, be long after the fire is extinguished, and this continued flow of water in such places would be sure to cause very great damage.

It is the object of the present invention to obviate this difficulty, and to provide devices of this class with an automatic alarm mechanism by which notice of any escape of water from the sprinkler, occasioned either by the melting of the alloy, as in case of a fire, or by reason of the accidental displacement of the valve, will be instantly communicated to the watchman or other person having charge of the building in which the sprinkler is located, or to the fire department, or to any other point where it may be desired, so that measures may be at once taken to shut off the water from the supply-pipe, and thus prevent damage to the contents of the room or building, or to the building itself in which the sprinkler is located.

To this end the invention consists, broadly, in providing fire-extinguishers or sprinklers of this class with electrical circuit-connections having circuit-closing mechanism which is so constructed and arranged that the moving force of the water set in motion by the release of the valve or other device which confines the water in the sprinkler will operate said circuit-closing mechanism, so as to make operative the electrical circuit, and, through a suitable alarm mechanism, give notice of the fact at any desired point.

The invention also embraces various details of construction and combinations of parts in an apparatus of this character, all of which will now be fully explained, and particularly pointed out in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of a sprinkler provided with means of the character just stated for operating an alarm mechanism, the parts being shown in the position which they will occupy when the sprinkler is in operation. Fig. 2 is a similar view showing means of a different form for operating the alarm mechanism, the parts being shown in their normal position. Fig. 3 is a horizontal section taken upon the line *x x* of Fig. 2.

As before stated, these sprinklers differ

greatly both in form and construction; but the present invention, as will hereinafter appear, is equally applicable to any of these forms, one of the most common of which has been selected for illustrating the principle and application of the invention. This sprinkler consists, essentially, of a nozzle, 10, which is attached in any convenient manner to a water-supply pipe, 23, and is provided with a downwardly-extending yoke, 12, within which is placed a plate, 9, which is provided upon its opposite sides with recesses in which lie the arms of the yoke, the recesses being of such size that the plate can move freely up and down between the arms of the yoke. The center of the plate 9 is provided with a suitable packing forming a valve, which, when the plate is in its raised position, as shown in Fig. 2, is pressed against the nozzle 10, so as to close it tightly and prevent the escape of the water. The valve-plate 9 is also provided upon its edges with an upwardly-extending flange in which are formed a series of vertical slots, 6, which act, when the valve is unseated, as shown in Fig. 1, to divide the water issuing from the nozzle into a large number of small streams, and cause it to fall in the form of a shower around the sprinkler. The valve-plate 9 is held in position to close the nozzle by means of a cross-bar, 13, one end of which rests upon a lug or projection, 5, formed upon one side or arm of the yoke 12, while its opposite end is slotted, so as to embrace a similar lug, 4, formed upon the opposite arm of the yoke, the free end of the bar 13 being supported by a curved lever, 14, the upper end of which rests in a notch, 2, formed in the yoke, while its opposite end is secured to the bottom of the yoke by means of fusible alloy 15.

For a more complete and detailed description and illustration of the construction of this sprinkler, reference is made to my companion application executed of even date herewith. The wires 18 19, which form an electrical circuit which is provided with suitable battery-power, and in which is located, at any point where it is desired to give notice of the fact that water is flowing from the sprinkler. any suitable form of alarm mechanism, are connected to the sprinklers by means of a plug, 16, of insulating material, which holds the wires insulated from each other and from the sprinkler.

In order to provide a suitable circuit-closing mechanism by which the circuit thus formed can be closed, so as to give notice of the escape of water from the sprinklers, there is provided a lever, 21, which is pivoted in any convenient manner at one side of the sprinkler, and the upper arm of which forms a contact-plate, which, when the lever is rocked to the position shown in Fig. 1, will connect the wires 18 19 and thus close the circuit through the alarm mechanism. This lever is provided with a suitable balancing-weight, 27, as indicated by dotted lines, or with a light spring, 22, by which the lever is normally held in such position that the circuit through the wires 18 19 is broken. The lower end of this lever is provided with a broad surface, 17, which is located in such position that the water issuing from the sprinkler when the valve becomes unseated will impinge against said surface and rock the lever to the position shown in Fig. 1, so as to make operative the circuit through the alarm mechanism.

The operation of the apparatus when thus constructed is as follows: So long as the valve of the sprinkler remains in its normal position the spring 22 or the weight 27 will continue to hold the lever 21 away from the wires 18 19, so as to keep the circuit through the alarm mechanism open, and, consequently, no alarm will be given. As soon, however, as the valve becomes displaced, either by the melting of the alloy which holds the lever 14, as in case of fire, or by the breaking of said alloy, either by an accidental blow or by undue pressure of the water in the supply-pipe, the water issuing from the nozzle will impinge against the broad surface 17 of the lever, and thus rock it to the position shown in Fig. 1, so as to close the circuit through the wires 18 19 and give the alarm, thereby allowing the person in charge of the building to shut off such water as would occasion unnecessary damage.

In the construction shown in Fig. 2 the circuit-closing apparatus, instead of being operated by the moving force of the water issuing from the sprinkler, is arranged to be operated by the moving force of the water in the supply-pipe, which water will be set in motion whenever the valve confining it therein is released. To effect this the pipe 23 is provided at some convenient point with a gate, 25, which partially or wholly closes the pipe, as shown in Fig. 3, and is secured to a rock-shaft, 26, the end of which projects outward through the pipe, and is provided with a rock arm or lever, 21, the end of which forms a contact-plate, which, when the gate 25 is rocked by the movement of the water in the pipe, will be carried into position to connect the wires 18 19 and close the circuit through the alarm mechanism, as shown by dotted lines in Fig. 2. The insulating material by which the wires 18 19 are connected with the sprinkler is in this case supported upon a bracket, 15, secured to the side of the pipe 23.

The operation of the apparatus when thus constructed is exactly the same in effect as that already described in connection with Fig. 1, so long as the valve remains closed so as to prevent the escape of the water from the sprinkler. The gate 25 will be held in a horizontal position by the weight of the lever 21. As soon, however, as water commences to issue from the sprinkler in any considerable quantity, the movement of the water in the pipe 23 will carry the gate 25 downward, thereby rocking the lever upward, so as to close the circuit through the wires 18 19 and give the alarm.

When this construction is used and it is desired to connect a number of sprinklers to the same alarm mechanism, it is not necessary that each sprinkler should be provided with a circuit-closing apparatus, as a single circuit-closing apparatus located in the supply-pipe leading to a series of sprinklers will operate to give the alarm when any one or some of the sprinklers are set in operation. It is also to be observed that with either form of circuit-closing mechanism, instead of using two wires, as 18 19, to form the electric circuit, the water-connections may, if preferred, be used in place of one of the wires; or, where two wires are used, as shown in the present case, one of the wires may be connected to the sprinkler or to the pipe 23, so that the circuit through said wires will be formed through the sprinkler or the pipe, instead of directly through the two wires, as illustrated.

The operation of the apparatus may also be reversed, so the alarm will be given by breaking instead of closing the electric circuit.

In conclusion, it is also to be remarked that the circuit-closing apparatus shown in Figs. 2 and 3, although especially designed for use in connection with devices of the class specified, may be used for many other purposes when it is desired to have notice given of the flow of water or other fluid through a supply-pipe.

What is claimed is—

1. The combination, with an automatic fire-extinguisher or sprinkler, of an electrical circuit which is connected with an alarm mechanism and provided with a circuit-closing apparatus, and a movable part, as 17 or 25, connected to said circuit-closing apparatus and arranged to be acted upon and moved by the water set in motion by the opening of the valve of the sprinkler, all substantially as described.

2. The combination, with an automatic fire-extinguisher or sprinkler, of an electrical circuit connected with an alarm mechanism and provided with a circuit closing or opening mechanism mounted upon a lever, as 21, and means by which the moving force of the water set in motion by the displacement of the valve of the sprinkler will actuate said lever so as to make operative said circuit and give an alarm, substantially as described.

3. The combination, with the water-supply pipe 23, of an electric circuit for operating an alarm mechanism, a gate, as 25, located in said pipe, and a lever, as 21, connected to said gate and so arranged that the flow of water through said pipe will actuate said lever to make operative said circuit and give an alarm, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHAS. C. WORTHINGTON.

Witnesses:
JOSIAH HEDDEN,
STILLMAN H. STORY.