June 29, 1937. C. L. METZGAR 2,085,379

FIRE ALARM APPARATUS

Filed Aug. 8, 1935

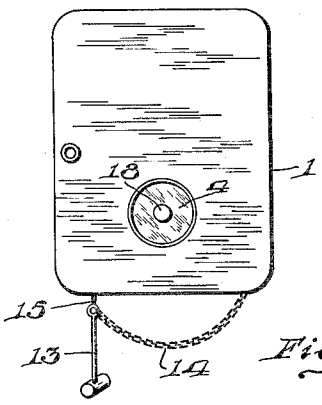

Fig. 1.

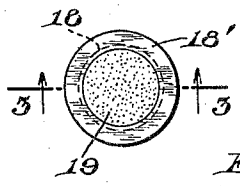

Fig. 2.

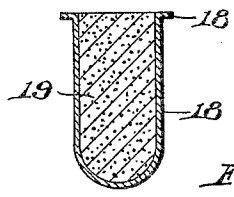

Fig. 3.

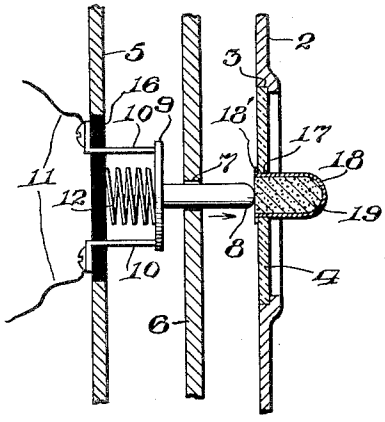

Fig. 4.

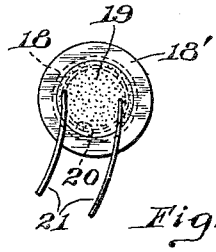

Fig. 5.

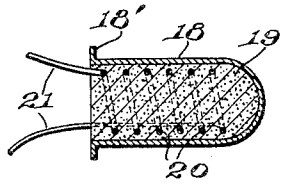

Fig. 6.

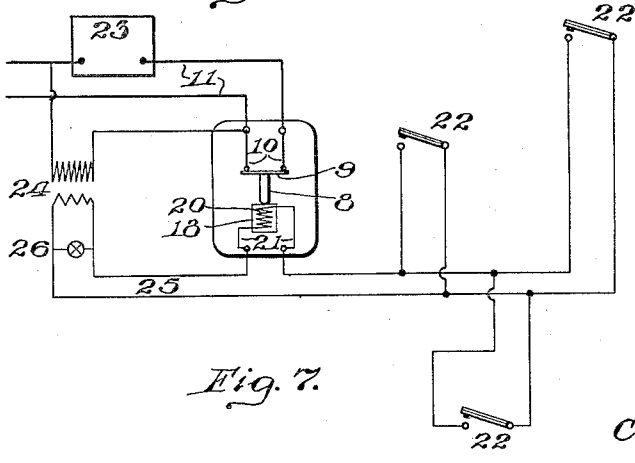

Fig. 7.

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FIRE ALARM APPARATUS

Clarence L. Metzgar, Media, Pa.

Application August 8, 1935, Serial No. 35,308

7 Claims. (Cl. 200—142)

The object of the invention is to provide improvements in fire alarm apparatus broadly, but more especially in an improved means for automatically permitting either automatic or manual alarm devices of various types to function, upon the temperature in a given locality rising above a predetermined degree.

Primarily, the improved device comprising a fusible element is adapted for association with almost an infinite number of alarm devices, and for location and operation at any one of many positions within or connected with each such device. With this fact in mind, it will be hereinafter referred to as being associated with coded, non-coded and water flow alarm systems, but will be illustrated as specifically applied to a non-coded box, it being realized at all times that the device is designed as an adjunct to, and not a substitute for, standard equipment of the several classes specified.

Another object therefore is to provide a device of this character, which can be operatively associated with existing types of switch boxes, whether coded or non-coded, and will thereafter permit the switches to function fully automatically, but will not prevent their being operated or released manually at any time, without adjustment or alteration in any way. Thus, a switch box at any location upon a particular floor of a building, can be made to respond to a fire at any one or more of a multitude of locations upon such floor, thru the medium of a thermostat at each of such locations, or a single such box near the entrance to a building can be actuated by any one of numerous thermostats located throughout the building, and the box in each case being manually actuated by anyone seeing a fire and desiring to report the same.

With the objects of the invention thus broadly stated, the invention comprises further details of construction and operation, which are hereinafter fully brought out in the following description, when read in conjunction with the accompanying drawing, in which

Fig. 1 is a front elevational view of a fire-alarm or switch-box comprising one embodiment of the invention;

Fig. 2 is an enlarged detail elevation of the fusible element shown in Fig. 1;

Fig. 3 is a section on the line 3—3 of Fig. 2;

Fig. 4 is an enlarged fragmentary section of a portion of the same;

Fig. 5 is an enlarged detail elevation of a modified form of fusible element;

Fig. 6 is a diametrical longitudinal section thru the same;

Fig. 7 is a wiring diagram of a system in which the said modified form of fusible element is embodied in conjunction with three representative thermostats.

Referring to Figs. 1, 2, 3 and 4 of the drawing, any representative type of fire alarm or switch box 1 is illustrated, as comprising a casing having a forward closure 2, provided with an aperture 3, normally spanned by a preferably circular glass or other fragile disc 4, said box also comprising a rear wall 5, and if found necessary or advisable an intervening partition wall 6, having an aperture 7 thru which freely extends a plunger 8, provided at its rear end with a radially enlarged flange, or other form of contact portion 9, adapted to normally span and connect the spaced terminals 10, which are suitably insulated from and preferably extend thru the rear wall 5 of said box, said terminals being connected by wires 11 in any well known form of fire alarm circuit.

A compression spring 11, positioned between the rear box wall 5 and the contact portion 9 of said plunger, tends to force said plunger forwardly and thus break the electrical connection across the terminals 10, it being understood that such switch is adapted for use in a normally closed circuit system, whereas the invention is equally applicable to a normally open circuit system, by merely providing that the terminals 10 or their equivalent shall be connected, instead of disconnected, by and upon the forward movement of said plunger. In the apparatus here illustrated the sides of the aperture 7 in the partition 6 serve as a support and guide for the movement of said plunger at all times.

In the present well known types of switch boxes of this character, the fragile disc 4 of glass or other suitable material is designed to be struck and shattered by any available object, such for instance as the small mallet 13, loosely atached to a suitable portion of the switch box by means of a chain 14, and also loosely supported when not in use by a hook or other form of projection 15 also carried by said box, and it is to be understood that when incorporating the present invention in a box of this character, said fragile disc 4 can still be manually shattered in the same or similar manner, in order to permit the spring to force the plunger forwardly, and thus break the electrical connection between the terminals 10, said terminals obviously being of any number, size, construction, or arrangement, and their

representation in the drawing being purely diagrammatic in character.

The present invention involves the provision of a central aperture 17 in the fragile disc 4, in which aperture is inserted from the rear side a cup-shaped member or the like 18, having a position-limiting flange 18' and preferably formed of a heat-conductive material, such as copper, brass, aluminum, or other suitable metal, either fully or substantially filled with a fusible alloy 19, which as a result of its peculiar nature or characteristic melts at a predetermined temperature, thus softening and becoming fluid at such temperature, and permitting the plunger 8 to enter the then hollow cup-shaped member with which it is in axial alignment. These alloy-filled members form units, which are of such low expense relatively that a fresh one can be readily inserted in the disc aperture 17, after the initial unit is destroyed as a means for effectively maintaining the plunger in its normal rearmost position.

Referring to Figs. 5, 6, and 7, there is here shown a fusible unit exactly similar to the one hereinbefore described, but containing any suitable form of electric resistance material embedded within the fusible filler, such for instance as is represented by the coil of resistance wire 20 having terminals 21, which as shown in Fig. 7 may be connected to a suitable binding post in any circuit, which also includes and may at all times be short circuited by any one or more of the thermostats 22, diagrammatically represented in the drawing, said circuit also including a suitable source of current.

In the construction and application of this invention, it is to be understood that the illustrations and foregoing description are intended to describe merely two embodiments of the invention in its broadest conception, it being also understood that such a fusible unit may be suitably positioned in order to release any mechanical part, portion, or element, of an alarm system, whether or not actual fire is involved or whether the alarm is merely for the purpose of notifying the proper party or parties of a rise in temperature, above a certain predetermined degree at any definite locality.

It is to be further understood that, while the first embodiment of the invention herein illustrated and described, permits such excess rise in temperature to attack the cup-shaped element 18 and melt the alloy 19, thereby releasing the switch plunger as described, or releasing said switch plunger for a rise in temperature at a given locality, thru the medium of suitably located thermostats, water flow devices, or otherwise, the alarm apparatus is nevertheless at all times capable of being actuated or released manually by shattering or at least mutilating the fragile disc 4 or its equivalent.

Finally, referring in particular to Fig. 7, one of the several suitable ways for energizing the coil 20 and thermostats 22 is shown. In the first place it should be noted that, as a normally closed switch is illustrated, the current supply wires 11 must lead from the usual control panel 23 containing the necessary relays for such a circuit, and as a rule the current supplied to the said switch is the customary 110 volts or 220 volts of the standard alternating current lines most usually met with. Having this in mind, the primary of a small transformer 24, such as is widely employed in bell-ringing systems, is preferably connected to that side of the control panel opposite to the switch, and also connected to the opposite side or contact 10 of said switch, or in other words so that said switch is interposed between the primary terminals, and upon being opened automatically breaks the circuit thru the said primary. The secondary of said transformer is then connected to the wires 25 leading to the coil 20 and thermostats 22, and if it is desired that the operativeness of the transformer shall be evident at all times, a pilot light 26 may be shunted across its secondary as shown.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not descriptive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

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

1. In a device of the class described, a spring-pressed switch member, a fragile disc adapted to be shattered to permit movement of said member and provided with an aperture, and a capsule positioned in said aperture and normally containing fusible material against which said member is normally pressed, and adapted upon softening to permit movement of said member independently of said disc.

2. In a device of the class described, a spring-pressed switch member, a capsule normally containing fusible material against which said member is normally pressed, and a relatively fixed fragile support for said element, said member being released either by the softening of said material or the breaking of said support.

3. In a device of the class described, a spring-pressed switch member, a fusible element against which said member is normally pressed, and a relatively rigid support for said element, said member being released either by the softening of said element or the breaking of said support.

4. In a device of the class described, a spring-pressed switch member, a capsule normally containing fusible material against which said member is normally pressed, a relatively fixed fragile support for said element, and an electric heater element operative upon a rise in temperature to soften said fusible material, and permit movement of said member, said member being automatically movable upon the breaking of said support, or by the softening of said material by extraneous heat or the heating of said element.

5. In a device of the class described, a spring-pressed switch member, a fusible element against which said member is normally pressed, a relatively fixed fragile support for said element, and an electric heater element operative upon a rise in temperature to soften said fusible element, and permit movement of said member, said member being automatically movable upon the breaking of said support, or by the softening of said first element by extraneous heat or the heating of said heater element.

6. In a device of the class described, a spring-pressed switch member, a casing containing said member and having a normally fixedly positioned wall having an aperture, a fragile closure for said aperture in turn provided with an aperture, a fusible element positioned in said last-named aperture and against which said member normally presses, and an electric heater element operative

upon a rise in temperature to soften said fusible element, and permit movement of said member.

7. In a device of the class described, a spring-pressed switch member, a casing containing said member and having a normally fixedly positioned wall having an aperture, a fragile closure for said aperture in turn provided with an aperture, a hollow metal container supported by said closure within its said aperture, fusible material normally within said container and against which said member normally presses, and an electric heater element embedded in said fusible material within said metal container, and operative upon a rise in temperature to soften said fusible material, and permit movement of said member.

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