June 10, 1941. W. B. GRIFFITH 2,245,144

ACTUATOR FOR AUTOMATIC SPRINKLERS

Filed Jan. 27, 1940

FIG. 1.

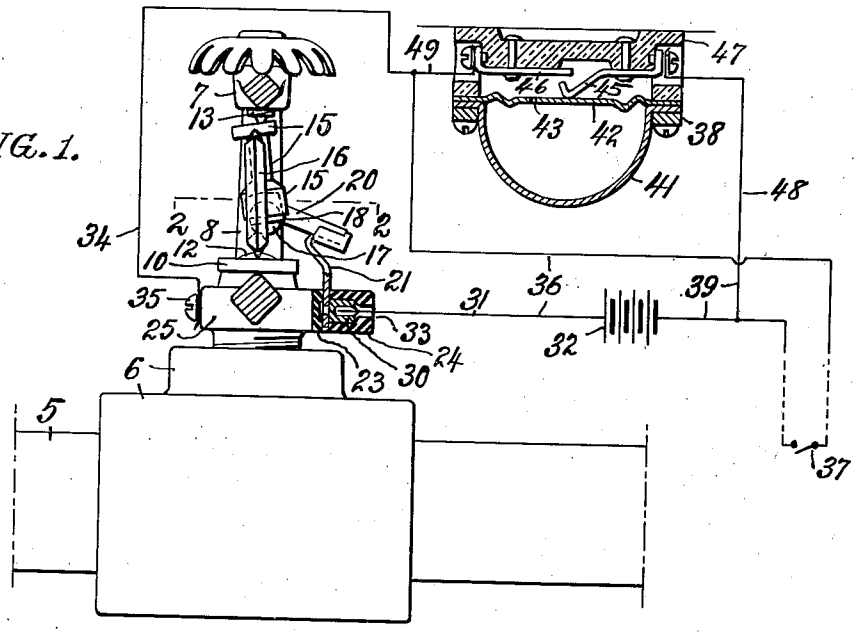


FIG. 2.

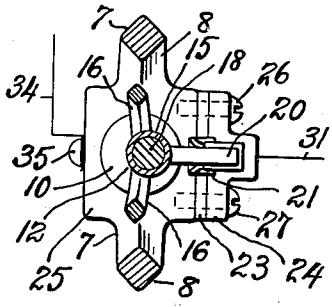
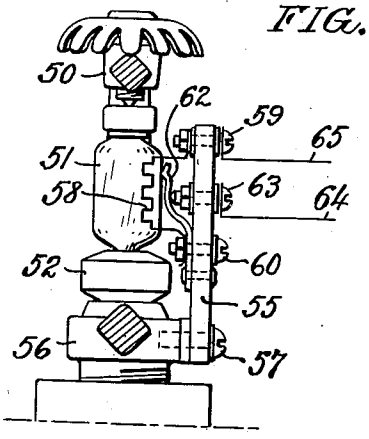


FIG. 3.



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ACTUATOR FOR AUTOMATIC SPRINKLERS

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3 Claims. (Cl. 169—37)

My invention relates to improvements in sprinkler systems for fire protection, of the dry-pipe type and also the deluge type, and particularly relates to an actuator for automatic sprinklers which are normally held closed by struts adapted to be released by the fusing of solder at a predetermined temperature and also to sprinklers normally held closed by a strut in the form of a glass bulb containing an expansive medium adapted to break the bulb at a predetermined temperature for opening the sprinklers.

The object of my invention is to provide an actuator for reducing the time required for sprinkler systems to be placed in operation when a fire occurs.

A further object is to provide an electric heating element arranged upon each sprinkler for transferring heat to the solder, or to the bulb, for actuating the sprinkler before the atmosphere surrounding the sprinkler has reached the required temperature for opening the sprinkler in the usual manner.

A further object is to provide an electric circuit including the heating element and provide a sudden rate in rise of temperature switch, and also a manually operated switch, in said circuit for controlling the opening of the sprinkler.

A further object is to provide novel means for mounting the heating element upon the sprinkler and for automatically opening the circuit upon the opening of the sprinkler.

These together with various other novel features of construction and arrangement of the parts which will be more fully hereinafter described and claimed constitute my invention.

Referring to the accompanying drawing:

Fig. 1 is a vertical sectional view of a sprinkler mounted upon a distributing pipe and embodying my invention.

Fig. 2 is a horizontal section on line 2—2 of Fig. 1.

Fig. 3 is a vertical sectional view showing a different form of sprinkler and embodying my invention.

In the drawing in which like reference characters refer to like parts, 5 represents a water distributing pipe of a sprinkler system, said pipe has a fitting 6 upon which is mounted a sprinkler 7, which may be of any standard type.

The sprinkler 7 shown in Fig. 1, comprises an open frame 8 carrying a valve 10, forming an abutment 12, and an adjustable abutment in the form of a screw 13. Between said abutments are struts 15 and 16, normally held in valve closing position by a key 17, which is retained by solder 18, adapted to fuse at a predetermined temperature for releasing the struts and opening the valve 10, so that water may be supplied through the pipe 5 and discharged at the sprinkler 7, in the usual manner.

My invention provides means for opening the sprinkler before the atmosphere surrounding the sprinkler has reached a predetermined temperature in the event of a fire. An electric heating element 20, as shown in Figs. 1 and 2, is mounted upon a resilient plate 21, which in turn is secured between blocks 23 and 24, formed of insulation material, and secured upon the body 25 of the sprinkler 7 by screws 26 and 27. The plate 21 has secured thereon a sleeve 30 in which is soldered a conductor 31 forming part of an electric circuit including a source of potential 32. The block 24 is recessed to receive the sleeve 30 and is provided with an aperture 33 through which the wire 31 passes.

The heating element 20 is formed of carbon or other suitable material forming an electrical resistor. Said element 20 is mounted with one end thereof in contact with the strut 15 and with the solder 17, by means of said resilient plate 21. A conductor 34 which is included in the electric circuit, is connected with the body 25 of the sprinkler by a binding screw 35, or it may be connected with one of the screws 26 or 27, so that upon the circuit 36 being closed through the body 25, the current will heat the resistor, or element 20, and fuse the solder 18, thereby releasing the struts 15 and 16 and allowing the valve 10 to open.

The circuit 36 is adapted to be closed manually by means of a push button 37, which may be located at a distance from the sprinkler 7.

A rapid rate in rise of temperature device 38 is provided for automatically closing a circuit 39, including the heating element 20, upon a rapid increase in temperature in the event of a fire.

The device 38 may be of any well known type. The form shown in Fig. 1 comprises an air receptacle 41, which is closed by a flexible diaphragm 42, having a restricted aperture 43, through which aperture the air within the receptacle may equalize with the pressure of the surrounding atmosphere during slow changes in temperature without moving the diaphragm. Switch plates 45 and 46 are mounted upon the base 47, on which the receptacle 41 is mounted. Said plates 45 and 46 are connected in the circuit 39 by conductors 31, 34, 48 and 49. In the event of a fire a sudden rate in rise of temperature will

cause the air confined within the receptacle 41 to expand and move the diaphragm and engage the plates 45 and 46 and complete the circuit.

The closing of the circuit by the device 38 will quickly heat the resistor 20 sufficiently to fuse the solder 18 and allow the valve 10 to open. When the struts 15 and 16 are expelled from the sprinkler upon the fusing of the solder 18, the heating element 20 will be held by the plate 21 out of contact with the sprinkler parts, whereby the circuit will be opened between the element 20 and the body of the sprinkler.

Fig. 3 illustrates my invention installed upon a sprinkler 50, having a glass bulb 51 which forms a strut normally holding the valve 52 closed. Said bulb contains a heat responsive substance adapted to expand and break the bulb at a predetermined temperature, thus allowing the valve to open.

The form of my invention shown in Fig. 3 comprises a bracket 55 formed of insulation material, and secured to the body 56 of the sprinkler by screws 57. An element, or resistor 58, is mounted adjacent to the bulb 51 and is connected between the binding screws 59 and 60 upon the bracket 55. A resilient plate 62 is attached to the screw 60 and is adapted to be held in contact with a contact screw 63 by the bulb 51, when the latter is in valve closing position upon the sprinkler. Conductors 64 and 65 are connected with the screws 59 and 63. Said conductors 64 and 65 correspond to the conductors 31 and 34 forming part of the electric circuit shown in Fig. 1.

When a circuit including the resistor 58 is closed by means of either of the devices 37 or 38, shown in Fig. 1, the resistor 58 will be quickly heated to a temperature which will expand the contents of the bulb 51 and cause the bulb to break, thus allowing the valve 52 to open and place the sprinkler in operation in a much shorter period of time than heretofore when the bulbs would not burst until the surrounding atmosphere had reached a predetermined temperature in the event of a fire.

The operation of my invention is as follows: The preacting devices comprising the heating elements 20 or 58 may be attached to any standard sprinklers without interfering with their normal operation at a predetermined temperature.

My invention includes a heating element upon each sprinkler and provides means for opening the sprinkler before a fire has reached such proportions that the temperature of the atmosphere surrounding a particular sprinkler will reach the predetermined point required for opening the sprinkler, as heretofore.

The actuator is adapted to be operated by an electric circuit which may be controlled manually by means of push buttons 37 located at distant points relatively to the sprinkler to be controlled. Said circuit is also adapted to be automatically controlled by a sudden rate in rise of temperature switch 38, which latter may be made much more sensitive in operation than devices actuated at a predetermined temperature.

The actuators when used in connection with dry-pipe systems will reduce the time required for the systems to be placed in operation, and consequently reduce the number of sprinklers required to be opened for extinguishing a fire. The independently controlled sprinklers used with dry-pipe systems will extinguish a fire as rapidly as a deluge system and with far less damage from water.

My novel actuators may be used upon deluge systems, giving them all the advantages of dry-pipe systems employing normally closed sprinklers which discharge water locally or directly over the fire without waste of water.

Sprinklers equipped with independently operated sprinkler actuators according to my invention will extinguish a fire in less time than heretofore, and when applied to deluge systems permit the use of normally closed sprinklers for reducing the waste of water and loss from water damage.

I claim:

1. In an automatic sprinkler having a valve controlling a discharge outlet, a strut normally holding the valve closed, thermally responsive means included in said strut and operable under the action of heat to collapse the strut and release the valve, an electric circuit, a bracket secured upon the sprinkler, a heating element included in said circuit, means mounting said element upon the bracket adjacent to said strut for transferring heat to the latter, a resilient plate mounted upon the bracket and positioned by said strut in circuit closing position and arranged for opening the circuit upon the collapsing of said strut, and a rate in rise of temperature switch included in said circuit.

2. An automatic sprinkler comprising a body having a discharge outlet, a valve, a strut normally holding the valve upon the body in outlet closing position, thermally responsive means included in the strut and operable under the action of heat to collapse the strut and release the valve, a bracket secured upon the body, an electric circuit, a heating element included in said circuit, and means mounting said element upon the bracket in heat transferring position with the strut and in separable relation with the latter whereby said element will be retained intact upon the bracket upon the collapsing of the strut.

3. An automatic sprinkler comprising a body having a discharge outlet, a valve, a strut normally holding the valve upon the body in outlet closing position, thermally responsive means included in the strut and operable under the action of heat to collapse the strut and release the valve, a bracket secured upon the body, an electric circuit, a heating element included in said circuit, a resilient plate having one end thereof secured upon the bracket and its opposite end secured upon said element and arranged for yieldingly supporting the latter in heat transferring engagement with the strut for collapsing the latter upon the circuit being energized, and said plate arranged for retaining said element relatively to the bracket upon the collapsing of the strut.

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