June 30, 1942. W. B. GRIFFITH 2,287,989

RELEASE DEVICE FOR FIRE PROTECTION APPARATUS

Filed Feb. 27, 1941

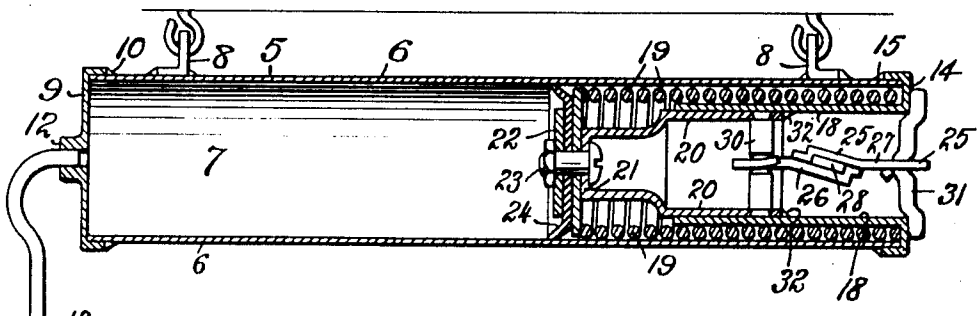


FIG. 1

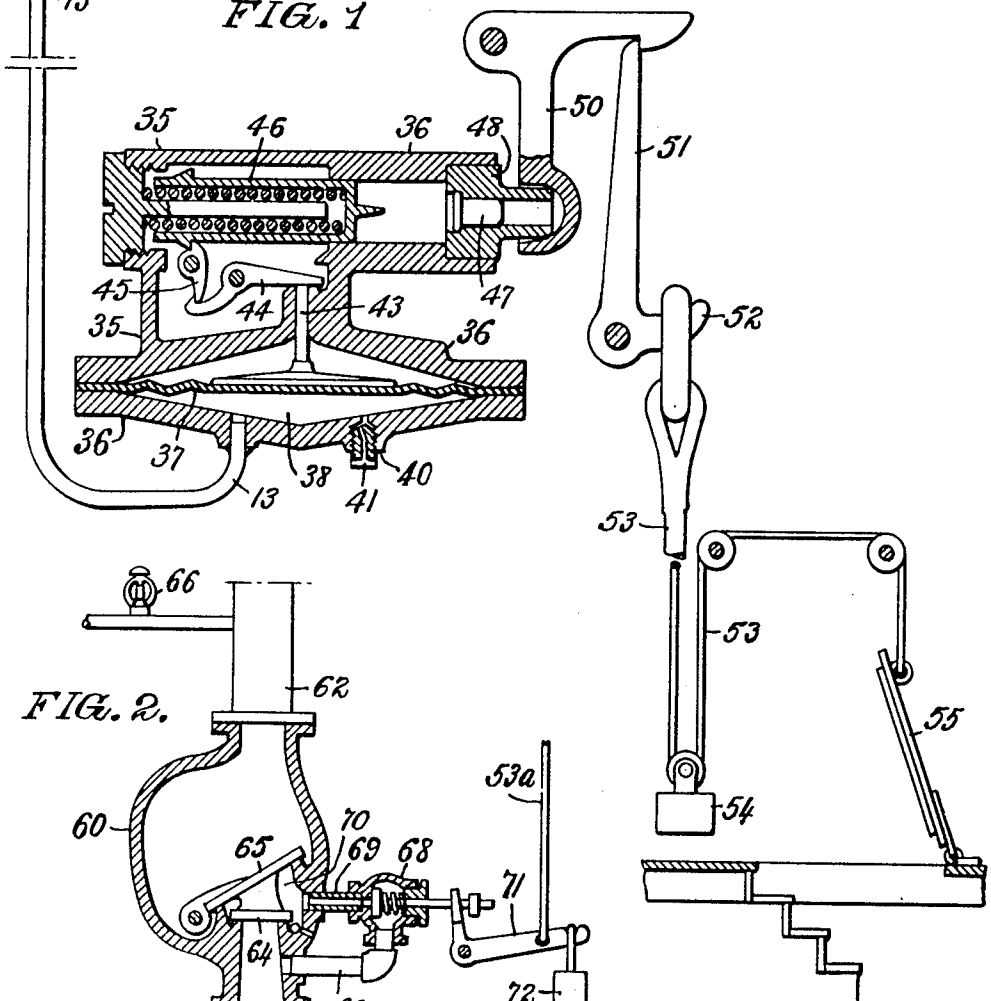


FIG. 2.

Inventor:
William B. Griffith
By F. Dellett Goodwin
Attorney

Patented June 30, 1942

2,287,989

UNITED STATES PATENT OFFICE

2,287,989

RELEASE DEVICE FOR FIRE PROTECTION APPARATUS

William B. Griffith, Audubon, N. J.

Application February 27, 1941, Serial No. 380,840

4 Claims. (Cl. 169—2)

My invention relates to improvements in release and alarm systems for fire protection apparatus and particularly relates to systems employing air receptacles, or containers, known as heat actuating devices, which operate upon a rapid rate in rise of temperature, due to fire in the zone in which the heat actuating devices are located. Said receptacles are connected with and arranged for actuating pressure responsive devices adapted for releasing fire protection apparatus and for giving an alarm.

Rate in rise of temperature systems depend entirely upon the rapid expansion of air contained in a receptacle, or tubing, and in operation are only responsive to an increase in temperature which is sufficiently rapid that the pressure will not exhaust through the slow leak vent valves, through which slow changes in pressure, due to natural changes in temperature, may equalize with the atmosphere without actuating the pressure responsive devices.

Such systems fail to operate when the rate in rise of temperature is slow and gradual, covering a period of time sufficient for the air in the receptacle to equalize through the vent valve with the atmosphere.

The object of my invention is to provide means for insuring the operation of the systems in the event of a slow fire causing a slowly rising temperature.

A further object is to combine a fixed temperature impulse creating device with the air receptacle of the rapid rate in rise of temperature system.

A further object is to provide a spring actuated plunger for creating an air pressure impulse within the receptacle, and a fusible link normally holding the plunger out of action and adapted for releasing the plunger at a predetermined temperature.

A further object is to provide an air receptacle in the form of a sealed cylinder containing a spring actuated plunger controlled by a fusible link, which latter is exposed to the atmosphere outside of the cylinder and adapted to fuse and release the plunger in the event of a smoldering fire causing a slowly rising temperature. By this arrangement, if the increase of pressure within the air chamber of the receptacle is too slow to operate the pressure responsive device, the plunger will be released, at a predetermined temperature, and create a pressure impulse in the receptacle which will actuate the pressure responsive device, thereby sounding an alarm and releasing the fire apparatus.

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 my novel air receptacle and plunger, shown connected with a pressure responsive device arranged for releasing a fire door.

Fig. 2 is a vertical sectional view of a sprinkler system adapted to be released by the mechanism shown in Fig. 1.

In the drawing in which like reference characters refer to like parts, 5 represents an air receptacle in the form of a cylinder 6, formed of thin metal for readily conducting temperature changes to the air within a chamber 7.

The cylinder 6 is provided with lugs 8 for mounting the receptacle in a zone subjected to fire hazard. The cylinder 6 has an end head 9 which is secured by brazing or by hard solder 10 to the cylinder. The head 9 is provided with an air outlet connection 12 for the attachment of an air pipe 13.

The opposite end of the cylinder 6 is sealed by a collar 14, which is secured to the cylinder by hard solder 15. A sleeve 18 is supported upon the collar 14 and extends axially into one end portion of the cylinder. Said sleeve is smaller in diameter than the cylinder 6 and forms a guide for the free movements of a spring 19, which occupies the space between the sleeve and the cylinder. The inner surface of the sleeve 18 forms a rigid support and guide for a hollow cup-shaped piston 20, having a closed end 21, to which is secured a head, or plunger 22, by means of a fastening device 23. The plunger 22 is provided with a cup washer 24 which engages the inner surface of the cylinder 6 and forms a pump.

The spring 19 is normally compressed between the plunger 22 and the end collar 14, by means of a fusible link 25, of any well known construction. The link 25 shown, comprises separable members 26 and 27 secured by a key formed of soft solder 28 adapted to fuse at a predetermined temperature. One end of the link 25 is attached to a cross bar 30, which is secured to the open end of the piston 20, and the opposite end of the link 25 is secured to a yoke-shaped bar 31 having its end portions detachably mounted upon the collar 14.

The joint between the sleeve 18 and the piston 20 is sealed by soft solder 32, which is fusible at about the same temperature as the key 28. This construction prevents the loss of air pressure

from the chamber 7 of the cylinder in case there is a slight leakage around the washer 24. The air pressure in the chamber 7 will not be reduced by leakage of air between the sleeve 18 and the piston 20 when the cylinder is functioning as a rate in rise of temperature device before the plunger 22 is released by the fusing of the key 28 and the solder 32 sealing the piston.

The cylinder 6 is adapted to be connected through the pipe 13 with a pressure responsive device 35, which may be of any well known type.

The pressure responsive device 35 disclosed herein contains novel subject matter described and claimed in an application filed by me on even date herewith.

The pressure responsive device 35 comprises a housing 36 having a flexible diaphragm 37, forming an air chamber 38, which is in communication through the pipe 13 with the chamber 7 of the receptacle 6. The housing 36 forming the chamber 38 is provided with a slow leak vent valve 40, provided with a regulating screw 41, through which valve the air pressure confined in the chambers 7 and 38 and the pipe 13 can equalize with the atmosphere during slow changes in temperature.

The diaphragm 37 is provided with a rod 43 adapted for engaging a lever or trigger 44 for releasing a detent lever 45 and a spring actuated plunger 46, which latter in turn explodes a blank cartridge 47 adapted for giving an alarm, and also for moving the sleeve or barrel 48 relatively to the housing 36 and into engagement with the detent, or latch lever 50, adapted for releasing a lever 51 having a hook 52. A cable 53 is detachably secured upon the hook 52 and is arranged for releasing fire protection apparatus. In Fig. 1 the cable 53 is shown associated with a weight 54 suspending a fire door 55. When the cable 53 is released from the hook 52 the weight will be released thereby allowing the door 55 to close.

Fig. 2 illustrates a sprinkler system having a main valve 60, connected between a water supply pipe 61 and a distributing pipe 62.

The water clapper 64, of the valve 60, is held closed by air under pressure within the distributing pipe 62 acting upon a larger air clapper 65. When an automatic sprinkler 66 is opened at a predetermined temperature by fire occurring adjacent to the sprinkler, the air exhausts and the clappers open in the usual manner. A control valve 68 is connected with a by-pass pipe 69, connecting the supply pipe 61 with the neutral chamber 70 formed between the clappers. A lever 71 is suspended by a cable 53*a*, similar to the cable 53, which is released by the pressure responsive device 35. When the cable is released the weight 72 moves the lever 71 to the open position of the control valve 68 for admitting water pressure to the neutral chamber 70, thereby opening the clappers and filling the distributing pipe 62 with water before the sprinkler 66 is opened.

The operation is as follows: The receptacle 5 forms a heat actuating chamber in which air pressure is created upon a rapid rate in rise of temperature when a fire occurs adjacent to the receptacle 5. The pressure is communicated from the chamber 7, through the pipe 13, to the device 35 and moves the diaphragm, which latter actuates the levers 44 and 45 for releasing the plunger 46. The movement of the plunger sounds an alarm and also releases the detent levers 50 and 51 which in turn release fire protection apparatus, as above described.

Heat actuated devices have heretofore failed to operate when the rise in temperature is gradual, as upon the occurrence of a slow smoldering fire. My invention provides means for creating an additional impulse of air pressure in the receptacle 5 when a predetermined temperature is reached by a slow fire.

When the temperature continues to rise due to a slow fire in the zone where the receptacle 5 is located, the fusible link 25 will be released at a predetermined temperature. When the link 25 is fused, the air seal solder 32 will also fuse and release the piston 20, whereby the spring 19 will force the plunger 22 into the chamber 7, of the cylinder 6, and the plunger will create an impulse of pressure sufficient to move the diaphragm 37, of the pressure responsive device 35, which latter releases the spring actuated plunger 46, which in turn releases the fire door 55, or the control valve 68 of the sprinkler system.

The reliability of rate in rise of temperature systems is greatly improved by the addition of my novel pressure impulse creating device, which operates at a predetermined temperature and insures the release of the fire protection apparatus.

Various changes in the construction and operation of the parts may be made without departing from my invention.

I claim:

1. A release device for fire protection apparatus comprising, a cylinder having a relatively thin heat conducting wall forming an air chamber subject to a rapid rate in rise of temperature, a head closing one end of the cylinder, a collar upon the end of the cylinder opposite to the head, a sleeve supported upon the collar and extending axially into the cylinder, a plunger mounted for movement within the cylinder between the inner end of said sleeve and said head, a spring surrounding the sleeve and positioned between the collar and the plunger tending to move the plunger for compressing the air in said chamber, means fusible at a predetermined temperature normally holding the plunger against the action of the spring and for releasing the plunger at a predetermined temperature, and said cylinder having an air outlet connection from said chamber.

2. A release device for fire protection apparatus comprising, a cylinder having a relatively thin heat conducting wall forming an air chamber subject to a rapid rate in rise of temperature, a head closing one end of the cylinder, a collar upon the end of the cylinder opposite to the head, a sleeve supported upon the collar and extending axially into the cylinder, a plunger mounted for movement within the cylinder between the inner end of the sleeve and said head, a spring surrounding the sleeve and positioned between the collar and the plunger tending to move the plunger for compressing the air in said chamber, a hollow piston slidably mounted within said sleeve, means securing the plunger to the inner end of the piston, means fusible at a predetermined temperature located in the open end of the piston opposite to the plunger arranged for holding the piston against the action of the spring, and said cylinder having an air outlet connection from said chamber.

3. A release device for fire protection apparatus comprising, a cylinder having a relatively thin heat conducting wall forming an air chamber subject to a rapid rate in rise of temperature, a head closing one end of the cylinder, a collar upon the end of the cylinder opposite to the head, a sleeve supported upon the collar

Search Room

42

and extending axially into the cylinder, a plunger mounted for movement within the cylinder between the inner end of the sleeve and the head, a spring tending to move the plunger toward the head for compressing the air in said chamber, a hollow piston slidably mounted within the sleeve, means securing the plunger to the inner end of the piston, means fusible at a predetermined temperature forming an air seal between the piston and said sleeve, a link fusible at a predetermined temperature arranged for holding the piston against the action of the spring, and said cylinder having an air outlet connection from said chamber.

4. A release device for fire protection apparatus comprising, a cylinder forming an air chamber subject to a rapid rate in rise of temperature, a head closing one end of the cylinder, a collar upon the end of the cylinder opposite to the head, a sleeve supported upon the collar and extending axially into the cylinder, a plunger mounted for movement within the cylinder between the inner end of the sleeve and said head, a spring tending to move the plunger for compressing the air in said chamber, a cup-shaped piston slidably mounted in said sleeve with its open end adjacent to the collar, means securing the closed end of the piston to the plunger, a link including separable members and a fusible element adapted for releasing said members at a predetermined temperature, means securing one member of the link to the piston at the open end of the latter, a cross-bar detachably mounted upon the collar, means securing the opposite member of the link to the cross-bar for normally holding the piston against the action of the spring, and said cylinder having an air outlet connection.

WILLIAM B. GRIFFITH.