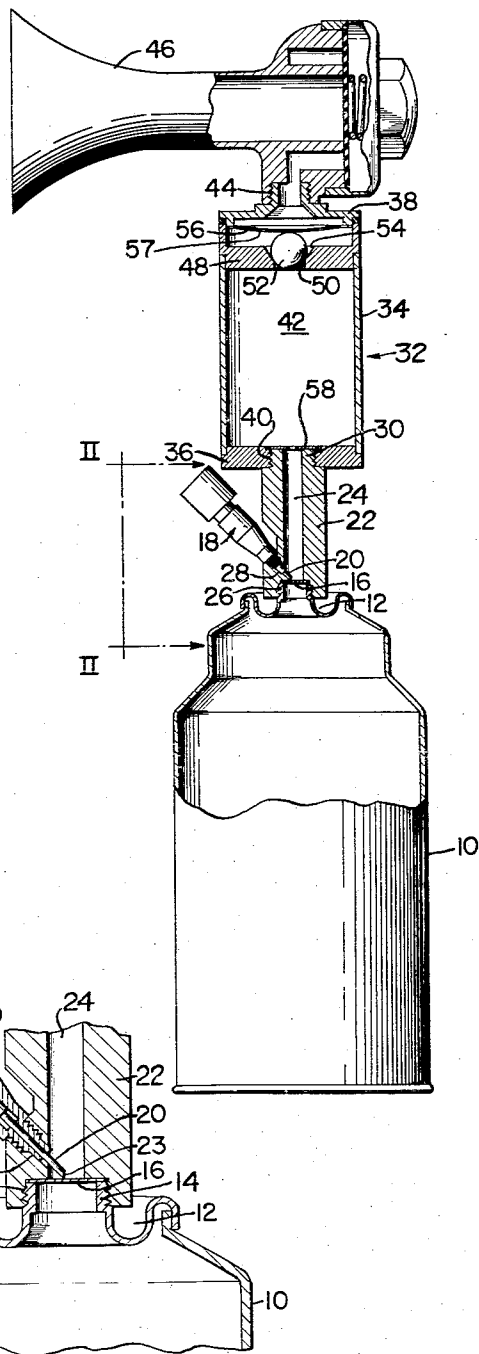


ALARM DEVICE

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This invention relates to alarm devices and more particularly to portable self contained temperature responsive fire alarms.

Heretofore, portable fire alarms which produced an audible signal in response to an increase in temperature beyond a predetermined limit have been of the continuous discharge type. Upon an increase in the temperature of the surrounding atmosphere due to the presence of fire, a fusible element usually placed in the discharge outlet of the alarm melted, allowing fluid under pressure to escape through a whistle or the like and a continuous signal was sounded by the escaping contents of the container until the pressure within the supply container equalled that of the surrounding atmosphere.

An inherent disadvantage in using fluid under pressure for a power source results from the fact that as the pressurized fluid is discharged it changes state due to the drop in pressure and takes on heat from the supply container, thus resulting in a cooling effect on the container and resultant pressure drop in the fluid therein. Accordingly, it is the primary object of this invention to discharge fluid under pressure from a supply container intermittently, so as to permit the container to recover some of the heat it loses.

Another important object of the invention is to sound an audible signal device intermittently to indicate the presence of fire conditions.

Another object of the invention is to eliminate the need for batteries or electrical power sources for energy to operate an alarm system.

Another object of the invention is to intermittently sound an alarm over a period of time longer than heretofore possible on a given quantity of pressurized fluid.

Another object of the invention is to render a fire alarm capable of actuation without periodic maintenance or adjustment.

These and other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings wherein:

FIG. 1 is a partial cutaway and sectional view of an alarm embodying the invention; and

FIG. 2 is an enlarged sectional view taken along the line II—II of FIG. 1 of a detail shown in FIG. 1.

Referring more particularly to the drawings, a container 10 is supplied with a quantity of fluid under pressure. By way of example, but by no means exclusive thereto, commercially manufactured gas under the tradename "Freon" is particularly well suited for it is stable, non-corrosive and non-flammable and is, therefore, conducive to reliable operation and has no ill effects on the container when stored for long periods of time.

A closure cap 12 having a threaded outlet nozzle 14 is fitted to the container 10 and provided with a sealing element 16 for the nozzle 14. A temperature responsive power element 18 mounted adjacent the sealing element 16 is provided with the usual piston 19 and heat responsive fill 21 whereupon, with an increase in atmospheric temperature, the heat responsive fill will expand driving the piston downwardly, actuating a pin 20 provided with a sharpened cutting end 23 which, upon application of suitable pressure, will rupture the aforementioned sealing element 16 and allow the contents of the container to escape.

A conduit 22 is provided with a central bore portion 24 and an internally threaded end portion 26 for the recep-

2

tion of the nozzle 14. An angular opening 28 is provided in the body of the conduit 22 to receive and support the aforementioned power element 18 adjacent the container seal 16. The opposite end of the conduit 22 terminates in a portion of reduced diameter which is externally threaded as shown at 30.

A fluid capacitor, generally shown at 32, comprises a cylindrical body portion 34 terminating in opposite end walls 36, 38. An internally threaded opening 40 adapted to cooperate with externally threaded end 30 of the conduit 22, forms an inlet for the admission of fluid under pressure from the container 10 to the capacitor pressure chamber 42. An externally threaded nipple 44 forms an outlet for the capacitor 32 and also serves to support the audible signal device 46, shown in the form of a diaphragm horn, extending perpendicular to the capacitor 32 and container 10. The structure of the signal device 46 forms no part of this invention and any fluid operated type will serve the purpose.

A partition 48 is positioned intermediate the end walls 36 and 38 and is provided with an opening 50 defining a flow path for the fluid under pressure from the inlet 30 to the outlet 44. Valve means in the form of a ball 52 is adapted to cooperate with an enlarged seat portion 54 formed on the wall of the opening 50 in the partition 48 thereby controlling fluid flow through the opening 50. A resilient snap disc 56 is secured by the end wall 38 overlying the ball 52 and is operative to urge the ball 52 into engagement with the seat 54 in the opening 50. A plurality of openings 57 are provided in the snap discs 56 to allow fluid to flow therethrough to the outlet 44 for actuating the horn 46.

A flow restrictor 58 in the form of an apertured disc is positioned in the flow path between the supply container 10 and the fluid capacitor 32 for the purpose of controlling the volumetric rate of fluid flow into the chamber 42 of the fluid capacitor 32. The relative size of the inlet to the chamber 42 to the outlet 44 and opening 50 is critical in that it is essential that the time period required to fill the chamber 42 with pressurized fluid from the container 10 be greater than the time required to discharge the contents of the chamber 42 through the opening 50 controlled by the ball 52 and the outlet 44. Therefore, it will be obvious that the opening 50 and the outlet 44 must be sufficiently large to provide greater fluid flow capacity than that of the flow restrictor 58 in the inlet 40.

In operation, the entire self contained unit is placed in the location desired to be protected. Upon an increase in the temperature of the surrounding atmosphere above a given point, i.e., 135° F., the fill in the power element 18 will expand driving the piston 19 downwardly against the actuating pin 20. The pin 20, upon application of sufficient pressure, will rupture the seal 16 allowing the contents of the pressurized container 10 to escape through the conduit 22 and the flow restrictor 58 into the chamber 42 of the fluid capacitor 32. The ball 52 will be urged into engagement with its seat 54 by resilient snap disc 56 thereby preventing the flow of fluid to the outlet 44. Upon passage of sufficient time the pressure within the chamber 42 will rise to the point where it will overcome the force of the snap disc 56 and thus the ball 52 will be dislodged from its seat and a quantity of the pressurized fluid within the chamber 42 will be discharged to the horn 46 for actuating the same.

When the pressure within the chamber 42 has fallen as a result of the discharge of the fluid, the resilient snap disc 56 will again urge the ball 52 into engagement with its seat 54 and fluid flow to the horn will be stopped. It is important to note that due to the flow restrictor 58 in the inlet 40, fluid under pressure from the supply 10 cannot overcome the loss of pressure in the chamber 42, due to discharge, at a fast enough rate to hold the valve 52

away from its seat 54 and produce a signal of a continuous nature. On the contrary, a rapid oscillation of the ball 52 toward and away from its seat 54 is effected and the fluid under pressure is discharged to the horn at periodic intervals resulting in an intermittent sounding of the alarm device. It will be clear that the intermittent sounding of the alarm results in a conservation of the supply of pressurized fluid, and, therefore, an alarm lasting over a longer time period is achieved.

Although a preferred embodiment has been shown and described herein, it is to be understood that the invention is not limited to the details of construction and arrangement of parts disclosed, except within the scope of the appended claims.

We claim:

1. In a self contained temperature responsive fire alarm device the combination comprising a container, a supply of pressurized fluid within said container, outlet means on said container for discharging said pressurized fluid, rupturable sealing means on said container outlet for preventing discharge of said fluid, temperature responsive power means for rupturing said outlet sealing means, fluid pressure actuated valve means on said container operable between open and closed positions in response to changes in a pressure condition to cause intermittent discharge of said fluid under pressure from said container, and audible signal means mounted on said valve means whereby intermittent discharges of fluid under pressure will actuate said audible signal means to cause intermittent sounding of said audible signal means.

2. In a temperature responsive alarm device the combination comprising a container having a supply of fluid under pressure therein, outlet means in said container for discharging said fluid, rupturable sealing means on said outlet for preventing discharge of said fluid, externally mounted temperature responsive power means movable between controlling positions in accordance with variations in a temperature condition adapted to rupture said sealing means in response to increases of a predetermined magnitude in a temperature condition, conduit means mounted on said container outlet for conducting discharged fluid away from said container, restrictor means mounted in said conduit for limiting the flow of said fluid from said container, fluid pressure actuated pneumatic capacitor means mounted on said conduit responsive to changes in fluid pressure for discharging said fluid intermittently, and audible signalling means mounted on said

pneumatic capacitor and responsive to discharge of fluid pressure therefrom.

3. An intermittent fluid discharge device for controlling the release of fluid under pressure from a container in response to variations in a temperature condition including an externally mounted temperature responsive power element positioned to sense and respond to variations in surrounding temperature of a predetermined magnitude and to open said container allowing said fluid under pressure to escape in accordance with an increase in said temperature above said predetermined level, a fluid capacitor having a chamber portion, means defining an inlet for the flow of fluid into said chamber and a flow resistor in said inlet for limiting the flow of fluid into said chamber, a partition in said chamber, pressure responsive snap acting valve means movable between controlling positions in said partition for controlling the flow of fluid, resilient snap disc means cooperating with said valve means for urging said valve means to the fully closed position during periods of reduced pressure and allowing said valve to open fully during periods when said pressure in said chamber is increased to a predetermined level, and outlet means in said fluid capacitor having a flow capacity greater than said inlet whereby said fluid under pressure will be exhausted from said capacitor at a rate higher than said fluid may be introduced.

4. A pneumatic capacitor comprising a chamber portion, means defining an inlet for the flow of fluid under pressure into said chamber portion, pressure responsive snap acting valve means in said chamber movable between fully open and fully closed positions for intermittently discharging a portion of said fluid under pressure, said valve means including a resilient snap disc for urging said valve means to said fully closed position, said valve means having a flow capacity when open greater than said inlet, and outlet means for discharging said fluid under pressure from said chamber when said valve means is in the open position.

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