Oct. 28, 1969 W. E. MILLEN 3,474,769

FIRE EXTINGUISHERS

Filed Dec. 21, 1967

FIG. 1

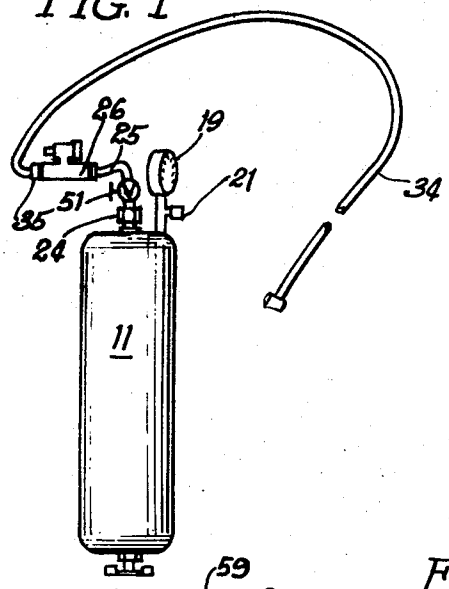


FIG. 2

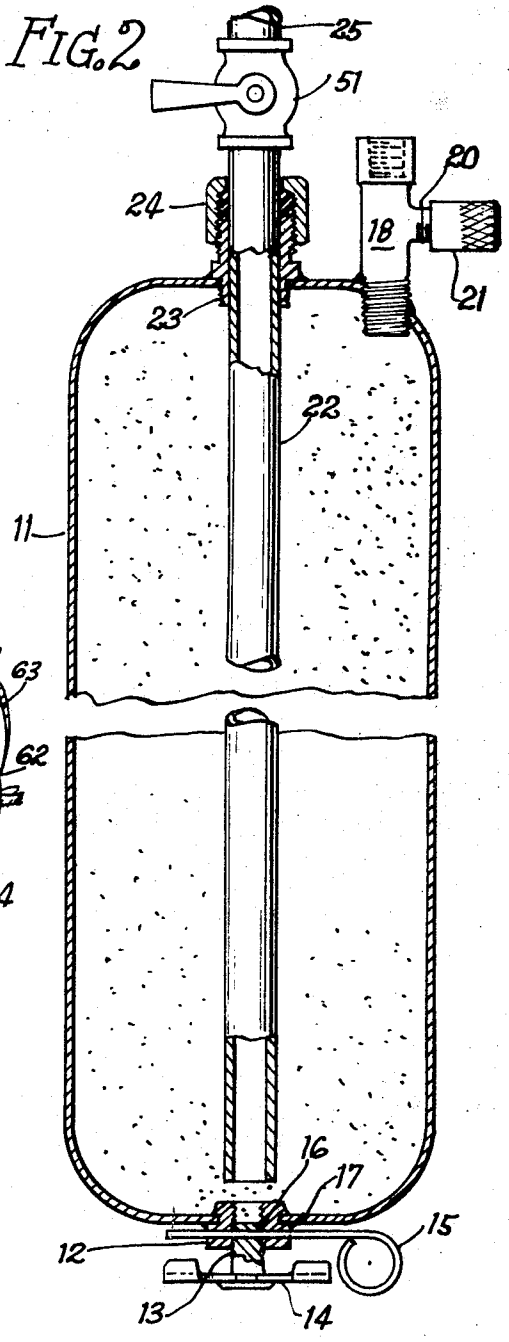


FIG. 5

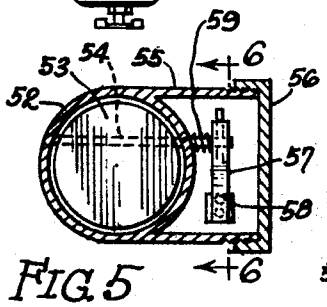


FIG. 6

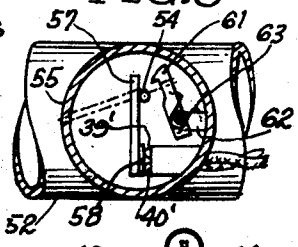


FIG. 3

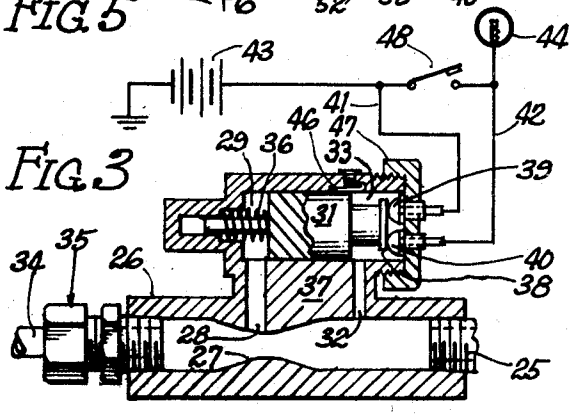
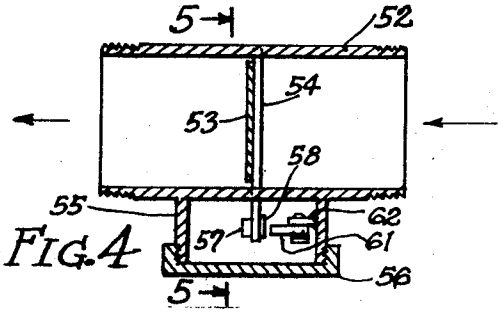


FIG. 4



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FIRE EXTINGUISHERS

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ABSTRACT OF THE DISCLOSURE

This invention comprises, for association with an internal combustion motor, a tank and a fusible tube extending therefrom containing a fire retardant material maintained under pressure in the tank and the tube. A pressure activated switch is associated with the tank and tube in such manner that should a fire occur and melt the tube the resultant discharging of the fire retardant will activate the switch to cause the motor to stop.

This invention relates broadly to a fire extinguisher especially adapted for installation adjacent an internal combustion motor such as may be used in automobiles, motor trucks, agricultural implements, boats and other equipment.

One of the objects of the invention is to provide a fire extinguisher which will be activated by the heat emanating from a fire to melt a discharge tube and release a fire retardant powder, liquid or foam directly upon the fire.

Another object of the invention is to cause the activation of the extinguisher to operate an electric switch circuit connected with the motor, with which the extinguisher will normally be associated, to cause the motor to stop.

Other particular objects of the invention will be mentioned hereinafter.

In the drawing, FIGURE 1 is an elevational view of the extinguisher, omitting the wiring. FIGURE 2 is a vertical sectional view of the storage tank for the fire retardant material. FIGURE 3 is a vertical sectional view of a switch mechanism forming part of the invention.

FIGURE 4 is a horizontal sectional view of an alternative switch mechanism. FIGURE 5 is a vertical sectional view on line 5—5 of FIGURE 4. FIGURE 6 is a vertical sectional view on line 6—6 of FIGURE 5.

The drawing shows a storage tank **11** having a filling opening at its bottom for the fire retardant material, normally closed by the plug **12** and a screw plug **13**, the latter plug having a wing nut head **14**. Wire **15**, inserted through suitable holes **16** in the plugs **12** and **17** in plug **13**, serves to secure the plug **13** against accidental loosening or opening.

A nipple **18** is threaded into the top of the tank to receive a pressure indicating gauge **19**, while an offset nipple **20**, normally equipped with a tire valve and valve cap **21**, provides for the introduction of an inert gas, such as nitrogen, under pressure after the retardant is in the tank. The gas pressure may be rather high, such as 75 to 100 pounds, if desired, for expelling the retardant. This pressure is readily maintained as the apparatus is leak proof.

A metal pipe **22** may be extended into the tank as shown, and its exit from the top of the tank is sealed by the double threaded nipple **23** and packing gland **24**.

The horizontally bent portion of the pipe **25** is threaded into the body **26** of a pressure differential activated switch mechanism having a flow passage restricted at **27**, in which area the outward flow of gas and retardant attains temporarily a higher velocity and a lower pressure. A passage **28** leading from this area imposes such

reduced pressure, whenever it occurs, in one end portion **20** of the chamber is in which piston **31** is positioned for reciprocation. A passage **32** imposes the higher pressure, when it occurs, on the other end portion **33** of the chamber.

When the entire apparatus is charged ready for use and not discharging, the pressure in passages **28** and **32** will be equal, and the same as the pressure in the tank and in the hose **34**. The hose may be secured to the switch body **26** by means of the packing gland **35**, and may be a heat fusible plastic and may have its free extremity sealed by a heated clamp.

The piston **31** is normally subject to pressure of spring **36** to press its reduced portion **37** toward the right, as viewed in FIG. 3. On the face of the portion **37**, but insulated therefrom by insulating fiber, not shown, is a brass plate **38** which closes a circuit through the contact buttons **39** and **40**, also mounted on insulating fiber. These buttons are connected to the insulated wires **41** and **42** which lead, as shown, to the vehicle battery **43** and to a conventional ignition switch **44**, through which current may be supplied to the ignition system of the motor.

The fusible hose **34** may be detachably secured in position on an automobile block, for example, adjacent the motor carburetor under the air filter, as that is where many fires start. However, the hose should be placed wherever it may be needed.

Should a fire melt any portion of the hose **34** the retardant will begin discharging immediately, creating the differential pressure heretofore mentioned, and this will have the effect of cutting off ignition to the motor. When the motor stops the coolant fan breeze stops, and the gasoline pump also stops. The vehicle, if travelling, will slow down and stop, even if the driver fails to react properly.

A spring loaded dog **46** is recessed and pivoted in the piston chamber wall and is normally held retracted by the piston. But the dog will be projected when the differential pressure propels the piston to the left, and thereby the piston is prevented from being returned to circuit closing position by its switch **36** after the pressure differential is terminated. To release the dog **46**, the threaded sealing cap **47** may be removed and the dog restored manually.

A normally open manually operable switch **48** is provided for restoring the ignition circuit independently of the switch **26**.

If desired, the tank and its hose may be held in normal position by spring clips, so that the extinguisher may be quickly removed and used as a hand extinguisher, in which case the valve at the bottom of the tank may be opened manually, or the hose may be cut in an emergency, or the free end of the hose may be placed in a fire directly. In such latter event the valve **51** may be used to terminate the discharge retardant.

An alternative pressure activated switch mechanism is shown in FIGURES 4, 5 and 6, which may be inserted between pipe **25** and hose **34** in substitution for the switch mechanism **26**.

A tube **52**, to be connected to pipe **25** and hose **34** in any conventional manner, has a loosely fitting disc **53** pivotally placed transversely of tube **52** by mounting it on a rod **54** pivoted at one end in the tube wall and extending through the tube wall into a small chamber **55** which is sealed from the atmosphere by a threaded cap **56**.

A bar **57**, fixed on rod **54** and depending therefrom, carries a metal plate **58**, insulated from the bar, which plate **58** normally is held by spring **59** in contact with a pair of electrical contact buttons **39'** and **40'**, which are insulated from the chamber **55** and are connected to the wires such as **41** and **42** in the ignition control circuit of FIGURE 3, when this alternative switch mechanism is being employed.

The mechanism of FIGURES 4, 5 and 6 functions as follows. Ignition for the motor is normally maintained through contacts 39′ and 40′, under control of the conventional ignition switch 44. As long as no fire occurs, the gas column in the tube 52 will be stationary. But should a fire occur and hose 34 melt, the ensuing violent rush of gas and retardant through the tube 52 will thrust the disc 53 and the bar 57 upwardly to the angle of the dotted line position for bar 57, shown in FIG. 6, thus opening the circuit through contacts 39′ and 40′, to cut off the motor ignition. Simultaneously, the bar 57, and hence the disc 53, will become latched in the inclined open position by the dog 61 which is pivoted on bracket 62. A conventional spring 63 will cause the head of the dog to engage and retain the top of the bar 57, and thus prevent ignition from being restored when the flow of gas terminates. The dog may be released later by first removing the sealing cap 56.

One of the fire retardants found to be especially useful in this apparatus is a conventional non-flammable dry powder already extensively used in portable hand extinguishers, the powder serving to blanket and snuff out various types of fires.

While the switch mechanisms and circuits for the maintenance of the motor ignition circuit under normal contions and for its interruption in the event of fire, may be constructed in more than one arrangement, that shown herein is workable and durable, and has the advantage of being interposed in the low voltage portion of an ignition system. And it may readily be switched over to a simple manually controlled system whenever the fire apparatus is out of service temporarily.

It is contemplated that this apparatus may remain installed adjacent a motor for many years, hence it is very desirable that it be leakproof and not require frequent inspection. It is important that it always be in instant readiness to perform its fire retardant or extinguishing mission. Also, though the ambient temperature at the location of this apparatus may well vary from many degrees below zero to many degrees well above 100 degrees Fahrenheit, all of which will have an effect on the gas pressure, yet this apparatus will be able to perform its functions unimpeded by said variations.

Having shown and described my invention, I claim:

1. For combination with an internal combustion motor and its ignition circuit, storage means for containing a fire retardant maintained therein commingled with and under pressure of an inert gas, a heat fusible hose connected in constant communication with the gas within said storage means and having a normally sealed terminal portion for positioning adjacent the motor, and means actuated by a rapid flow of gas and retardant through the hose when the hose has been melted adapted to open the ignition circuit of the motor.

2. For combination with an internal combustion motor and its ignition circuit, storage means for containing a fire retardant material maintained therein commingled with a gas under high pressure, a heat fusible hose connected to the tank in open communication constantly with the tank contents, a portion of the hose having a sealed terminous and being provided for positioning near the motor in a fire hazardous location, and means displaceable by a rapid flow of gas and retardant through the hose adapted to actuate an electrical circuit effective to cut off the motor ignition.

3 Apparatus in accordance with claim 1, including a switch mechanism normally maintaining a circuit for supplying ignition to the motor, and means in said mechanism exposed to the normal static gas pressure condition in the storage means and in the hose rendered operable by a rapid flow of gas and retardant to effect cutting off the ignition to said motor.

4. Apparatus in accordance with claim 1 including a switch mechanism having a movable member interposed in the stream of gas and retardant flowing from the hose whenever melted, said member being normally stationary but movable by the flowing stream of gas and retardant whenever the hose melts to actuate a circuit for cutting off the motor ignition.

5. Apparatus in accordance with claim 1 including a switch mechanism having a pivoted member interposed in the stream of gas and retardant flowing whenever the hose is melted, and means holding said member normally stationary but yieldable to the flow of the stream to actuate a circuit effective for cutting off the motor ignition.

6. Apparatus in accordance with claim 2 which includes a switch mechanism having a restricted throat through which the discharging gas flows and creates spaced apart zones of substantially different pressures, and means operated by such pressure differential to open the motor ignition circuit.

7. Apparatus in accordance with claim 5, in which means are provided to automatically retain said member in the position to which it is moved at the time of cut off of the motor ignition, to prevent restoring ignition.

8. Apparatus in accordance with claim 4, in which the switch mechanism and movable member are contained in an assembly sealed apart from the atmosphere.

9. Apparatus in accordance with claim 2, in which is provided a switch mechanism having a flow chamber and a narrowed passage therein through which the discharging gas flows and creates spaced apart zones of substantially different pressures, a second chamber in said mechanism and a piston slidable therein, a circuit normally closed by the piston when not subject to said different pressures, and means for impressing said different pressures on opposite faces of said piston to cause it to move and open the last said circuit.

10. Apparatus in accordance with claim 9, including means preventing the return of the piston to circuit closing position after it has moved away therefrom.

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U.S. Cl. X.R.

123—146.5; 169—2