

[54] HEAT OPERATED FIRE EXTINGUISHER

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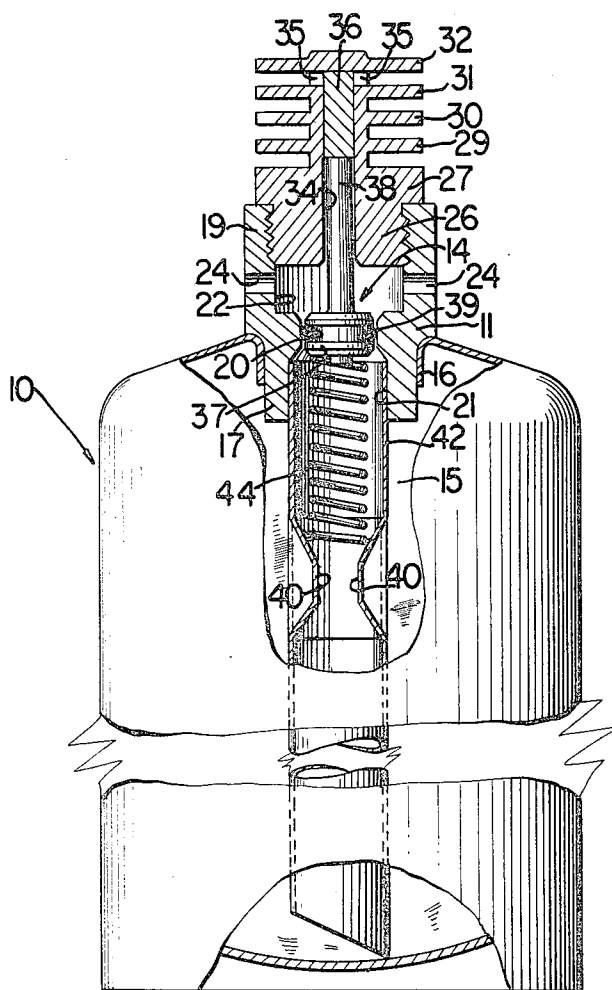
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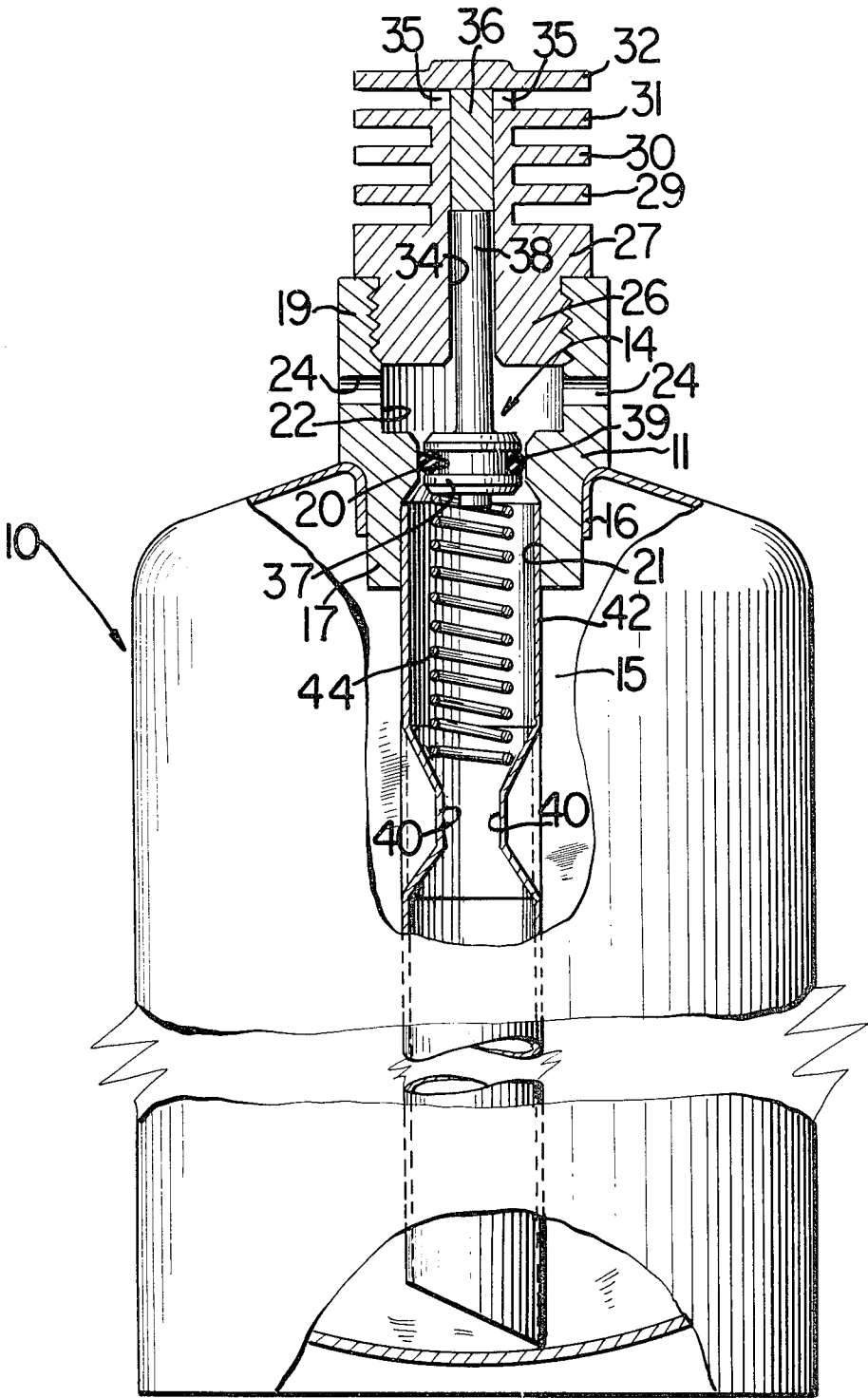
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[57]. **ABSTRACT**

A heat operated fire extinguisher wherein a piston closing the mouth of the extinguishing agent pressure vessel is held in the sealing position by a plug of heat fusible material. This plug melts releasing the piston and discharging the pressure vessel when the ambient temperature indicates the presence of a fire.

4 Claims, 1 Drawing Figure





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HEAT OPERATED FIRE EXTINGUISHER

BACKGROUND OF THE INVENTION

The present invention relates to fire extinguishers, and, more particularly to extinguishers which are automatically operated by the presence of high ambient temperatures.

There has long been a need for a practical fire extinguishing arrangement which would automatically respond to and extinguish a fire occurring in the engine compartment of small water craft.

Prior art arrangements suggested for this type of application are generally either relatively complex and expensive or slow acting and of limited effectiveness.

SUMMARY

It is an object of the present invention to provide an effective and inexpensive fire extinguisher which rapidly responds to and automatically extinguishes a fire.

Another object is to provide such an extinguisher consisting of a unitary assembly which can be easily mounted within an engine compartment.

The foregoing objects are accomplished by providing fire extinguishing apparatus comprising a pressure vessel for fire extinguishing agent under pressure having a mouth, a heat sensing head having a bore aligned with the mouth, a piston normally positioned to seal the mouth and movable under the pressure within the pressurized vessel to a second position to unseal the mouth and having a stem slideably mounted in the bore, a body of heat fusible material in the bore to hold the piston in the normal position, and means for allowing the fusible material to be displaced from the bore by the stem when the fusible material is melted.

BRIEF DESCRIPTION OF THE DRAWING

A preferred embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawing, forming a part of the specification, wherein:

The single FIGURE of the drawing is a longitudinal view, partly in section, of apparatus according to the present invention.

Referring to the drawing the present invention includes a pressure vessel comprising a container 10 and a neck 11, a heat-sensing head 12 mounted on the neck, a piston member 14 positioned within the neck, and a syphon tube 15 extending downwardly from the neck.

The container 10 is provided with an opening defined by a downwardly extending flange 16 for receiving the neck 11. The neck has a small diameter lower section 17 extending into the container and an upper section 19 of larger diameter extending upwardly from the top surface of the container. The neck 11 is provided with a centrally located small inner diameter bore 20 providing a mouth for the pressure vessel, a larger diameter bore 21 extending from the bore 20 downwardly within the neck section 17, and a still larger diameter bore 22 extending from the bore 20 upwardly within the neck section 19. A plurality of outlet ports 24 extend radially through the neck section 19. The neck is secured to the container by brazing the neck section 17 to the flange 16.

The heat-sensing head 12 has a lower section 26 threaded into the bore 22 of the neck section 19, an upper section 27 of larger diameter which is annularly grooved to provide a plurality of vertically spaced horizontal fins 29 to 32. A bore 34 extends vertically from the lower end of the section 26 upwardly to the lower edge of the top most fin 32. A plurality of openings 35 extends radially outwardly from the bore 34 between the fins 31 and 32. A plug 36 of heat fusible material such as an alloy of bismuth, lead and tin is positioned in the upper end of the bore 34.

The piston member 14 includes a piston head 37 normally

positioned within the bore 20 and a stem 38 extending upwardly into the bore 34. The piston head 37 carries an O-ring 39 to provide a seal between the head and the bore 20. The stem 38 engages the plug 36 to hold the piston member in the position shown.

The syphon tube 15 is provided with two inwardly extending indentations 40 a short distance below the upper end of the tube. A coil spring 44 is seated on the indentations 40 and engages the piston head 37 to prevent the piston member 14 from dropping into the bore 21 upon assembly, before the container is pressurized.

In operation, after assembly, fire extinguishing agent is introduced under pressure through the ports 24. This may be accomplished by a cup-shaped fitting which slips over the head 12 and the neck 11 and seals against the upper surface of the container 10 or against the neck below the ports 24. The flow of pressurized agent through the holes 24 moves the piston member 14 downwardly against the spring 44 until the head 37 is within the bore 21. The agent then flows through the syphon tube 15 filling the container. When the container is filled, the valve member returns to the position shown to seal the mouth of the pressure vessel.

The unit is installed in the upright position within the engine compartment of other hazard zone to be protected. When the temperature in the zone reaches the melting point of the plug 36, indicating the presence of a fire, the plug melts. The pressure acting on the lower surface of the piston head 37 forces the piston member 14 upwardly extruding the melted fusible material out through the openings 35. The piston head 37 thus moves out of the bore 20 into the bore 22 and the extinguisher discharges, spraying the fire extinguishing agent through the ports 24 into the protected zone.

It will be seen that the present invention provides an effective and inexpensive fire extinguisher which rapidly responds to and automatically extinguishes a fire, and which consists of a unitary assembly that can be easily mounted within an engine compartment.

We claim:

1. Automatic fire extinguishing apparatus provided with a container for storing fluid under pressure and having a discharge passage, a closure for controlling the discharge of fluid including a valve seat and a movable valve member to cooperate with the seat to close the passage, said apparatus comprising: a pressure surface on the valve member communicating with pressurized fluid in the container to produce a force tending to open the valve; a heat-sensing control head connected at one end to the closure and having a bore communicating with the discharge passage, said head including means for conducting ambient heat to interior wall surfaces of said bore and having a plurality of openings adjacent the other end and extending radially through the sidewall thereof to said bore; a piston member forming part of the valve member and adapted to fit within said bore; and an elongated body of heat fusible material positioned within said bore and being engaged by and substantially surrounded by said interior wall surfaces, said body engaging said piston member to hold the valve closed against said opening force, and being adapted to convert from a solid state to a flowable state in the presence of a predetermined ambient temperature, whereby said body in the flowable state is moved by said piston to flow through said openings as the valve member moves in response to said opening force.

2. Apparatus as in claim 1 wherein said body of heat fusible material is engaged around its diameter along the length thereof and on top by said interior wall surfaces.

3. Apparatus as in claim 2 wherein said body of heat fusible material is approximately four times as long as it is wide.

4. Apparatus as in claim 3 wherein the diameter of said body of heat fusible material is substantially narrower than the diameter of said control head.

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