

[54] **OPERATING HEADS FOR FIRE EXTINGUISHERS**

[75] Inventors: **Leslie James Harris**, Yatley; **Eric Trevor Thorpe**, Farnborough; **John Peter Wellborne**, Oxted; **Edward Charles D'Aprix**, Camberley, all of England

[73] Assignee: **Intercontinental Equipment Corporation**, Nashville, Tenn.

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Primary Examiner—Lloyd L. King
Assistant Examiner—Michael Mar
Attorney, Agent, or Firm—Bacon & Thomas

[57] **ABSTRACT**

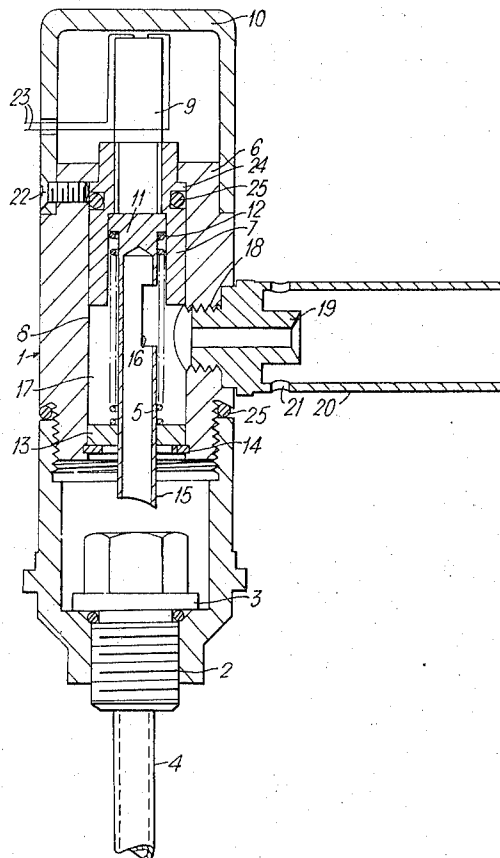
An operating head for a fire extinguisher containing pressurised fire extinguishing medium comprises a housing in which is slidably mounted a carriage mounting an electrically operable detonator arranged to explosively drive a hollow pin to break the seal of the extinguisher and allow discharge of the contents through a chamber and outlet passage.

[56] **References Cited**

UNITED STATES PATENTS

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6 Claims, 2 Drawing Figures



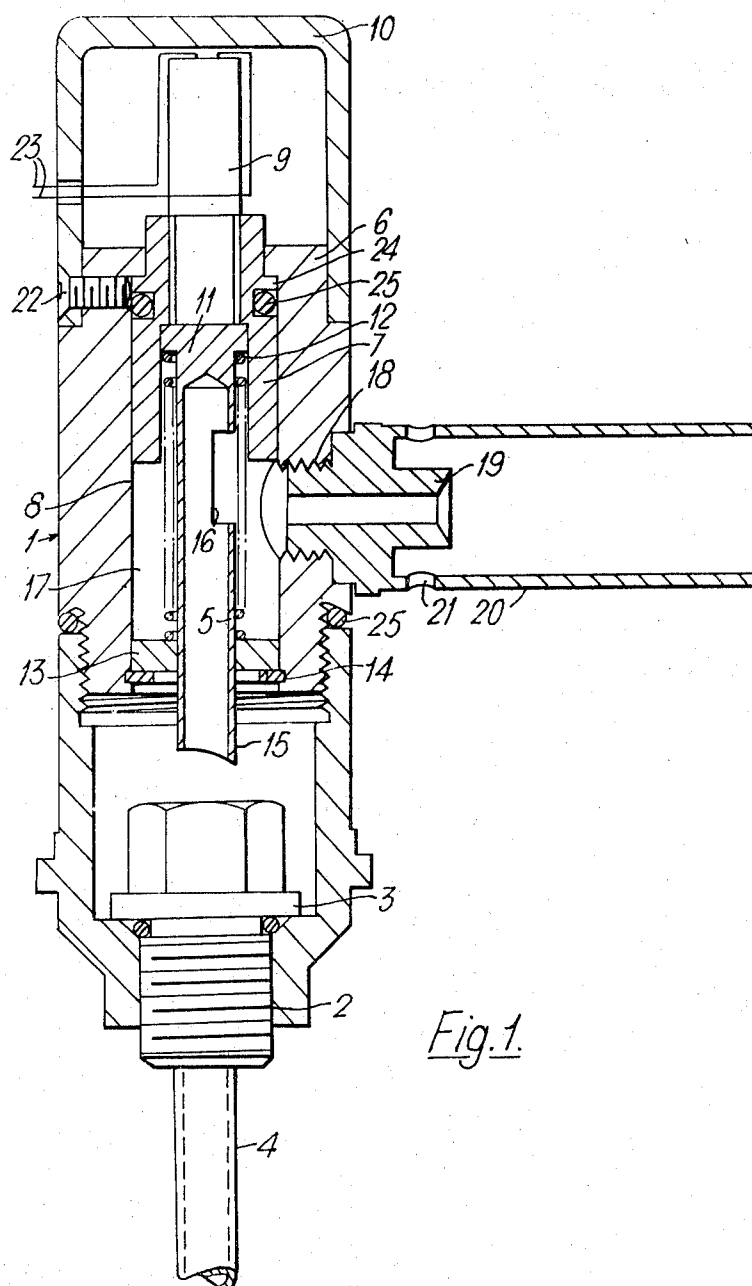
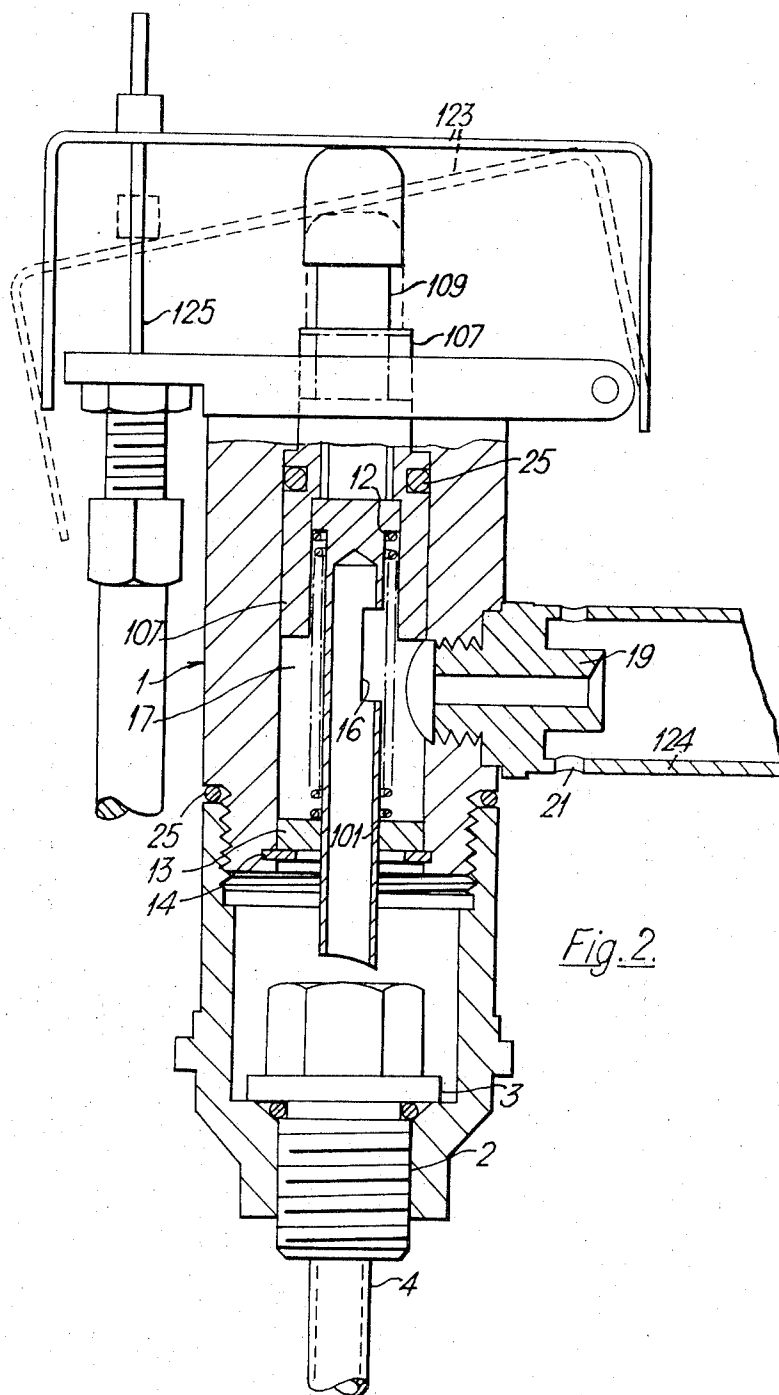


Fig. 1.



OPERATING HEADS FOR FIRE EXTINGUISHERS

The invention relates to an operating head for actuating a fire extinguisher of the kind containing an extinguishing medium under pressure and also relates to a fire extinguisher of this kind provided with such an operating head.

It is known to provide fire extinguishers of the kind mentioned with a pin which is arranged to pierce a seal in order to discharge the contents, the pin being actuated by a manually operable lever or by a remotely operable means, e.g., a cable. It has also been proposed where automatic operation is required to use a solenoid connectable via a heat sensitive thermostat to a power pack to drive the pin in its piercing direction when a predetermined temperature is reached. This latter extinguisher, while effective, has the disadvantages that the solenoid, being necessarily large, tends to make the operating head rather bulky, and being expensive, makes the extinguisher costly.

While fire extinguishers of this kind may be used in any environment likely to catch fire they are particularly useful for combating fire in the engine compartments of motor cars, racing cars, hovercraft, aircraft and power boats. In these instances and especially in racing cars it is important that the extinguisher with its operating head fitted shall be as compact and small as possible consistent with the required contents of extinguishing medium.

It is an object of this invention to provide an improved operating head for a fire extinguisher of the kind mentioned.

According to the present invention we provide in or for a fire extinguisher of the kind containing an extinguishing medium under pressure an operating head comprising an electrically operable detonator disposed to actuate said fire extinguisher upon detonation.

In a preferred arrangement, the operating head comprises a housing, the electrically operable detonator being mounted on said housing, and a hollow pin arranged on detonation of said detonator to provide or complete a flow path for a fluid extinguishing medium.

Preferably the detonator is arranged directly to drive the pin in a piercing direction. However, the detonator may alternatively be arranged to release a detent holding a strong spring in compression, expansion of said spring driving said pin in a piercing direction.

The detonator is preferably associated with a thermostat which, upon a predetermined temperature being reached, completes an electrical circuit, for example with a power pack, and detonates the detonator. The thermostat and/or the power pack may be mounted remote from or on the operating head, or on the body of the complete fire extinguisher.

In the event that the thermostat fails to operate, the extinguisher will be actuated when the material in the detonator reaches its ignition temperature so as to detonate, or a seal retaining the extinguishing medium bursts owing to the increased pressure due to higher temperature.

The operating head may if desired include facilities for manually driving the pin in its piercing direction. Such facilities can include, for example a pair of hand grips squeezable together to drive the pin in a piercing direction, a plunger adapted to be struck manually and so drive the pin, or a rod, cable or the like adapted or

being pulled to actuate an operating lever which drives the pin.

In a presently preferred embodiment of the invention, the detonator is mounted in or on carriage which is slidably mounted in the housing.

When the detonator is detonated the carriage remains substantially stationary and the pressure wave generated by the detonator (or a plunger contained in the detonator) drives the pin into its piercing position. Alternatively, the carriage may be driven forward, for example by hand, so as to engage the pin and drive it in its piercing direction.

The housing preferably contains a chamber leading to an outlet and the pin is preferably so shaped that, in use, extinguishing medium leaving the fire extinguisher passes into the chamber and out of the outlet. Thus the pin may advantageously be hollow and arranged to provide or complete a fluid flow path between the interior of the extinguisher and the exterior.

For a better understanding of the invention, reference will now be made, by way of example, to the accompanying drawings in which:

FIG. 1 is a view, mainly in cross-section of one embodiment of an operating head in accordance with the invention mounted on part of a fire extinguisher, and

FIG. 2 is a view similar to FIG. 1 of another embodiment of an operating head in accordance with the invention.

Referring to FIG. 1 of the drawings, there is shown an operating head, which is generally identified by reference numeral 1, mounted on an adaptor 2 fixed to a fire extinguisher body (not shown) containing gaseous extinguishing medium under high pressure. A pierceable seal (not visible) is located in the neck of a fitting 3 and prevents release of the extinguishing medium from the body until a pin 5 is caused to pierce the said seal whereupon the medium flows through tube 4 and pin 5 to nozzle 19 and outlet tube 20.

The operating head 1 comprises a housing 6, pin 5 and a carriage 7 which is slidably movable in bore 8 between an inoperative position as shown and an operative position in which the tip of pin 5 pierces the seal in fitting 3. A detonator 9 known per se is screwed into the end of carriage 7 and is covered by a cap 10 which abuts the side of the housing 6. Two wires 23 lead to the detonator 9 and are connected to a thermostat and a source of power such as a battery power pack (not shown). Pin 5 has an enlarged head portion 11 which abuts the end of a recess formed in carriage 7. The pin 5 is biased into the position shown by a coil spring 12 which acts at one end against the head portion 11 of pin 5 and at the other end against a spacer 13 held in position in bore 8 by a circlip 14. The tip 15 of pin 5 is sharpened to pierce the seal in fitting 3, and is hollow, having an opening 16 leading to a chamber 17. Chamber 17 has an outlet 18 on which is mounted a nozzle 19 and an outlet tube 20. A multiplicity of air vents 21 are bored in the base of the outlet tube 20 adjacent the housing 6.

O-ring seals 25 are provided between the carriage 7 and housing 6, and between the housing 6 and adaptor 2 as shown.

A fire extinguisher comprising the body and operating head 1 is located at a desired position in, say, an automotive vehicle. Although a nozzle 19 and outlet tube 20 are shown it should be understood that a hose could

also be fitted over outlet 18. When an electric current flows through wires 23, for example when a thermostat is actuated by a fire to complete an electrical circuit between a power pack (e.g. a 1½ volt battery) and the detonator 9, the detonator fires. Detonator 9 contains a plunger (not shown) which strikes the enlarged head portion 11 of pin 5 and drives the tip 15 of pin 5 through the seal in fitting 3. A shoulder 24 on carriage 7 prevents the carriage being blown out of bore 8. On piercing the seal, extinguishing medium in the body of the cylinder passes through tube 4, through the hollow pin 5 (which remains in the fitting 3 after detonation) and through opening 16 into chamber 17. The extinguishing medium then passes out through nozzle 19 and outlet tube 20.

If it is desired to actuate the fire extinguisher manually, cap 10, which is held in place by a screw 22 for the purposes of transport only, is removed. A blow delivered by hand on the free end of detonator 9 drives carriage 7 into the housing 6 and thus drives pin 5 into the metal seal to actuate the fire extinguisher.

Should the thermostatic operation fail and the fire extinguisher be inaccessible, the seal will burst due to increase of pressure of the medium, due to the heat of the fire.

Referring now to FIG. 2, there is shown an operating head generally similar to that shown in FIG. 1 except that cap 10 is replaced by an operating lever 123 which is arranged to drive a pin 105 into its piercing direction via carriage 107 when the operating cable or rod 125 is pulled. This particular fire extinguisher is particularly useful for use in motor racing vehicles. It has an overall length of 13½ inches and is adapted to fit on the seat under the crook of the driver's legs. A tube 124 is connected to the outlet of the extinguisher and, in use, leads to the engine compartment of the vehicle.

The detonator 109 is connected to a 1½ volt battery and thermostat mounted in a box (not shown) strapped to the tubular framework in the engine compartment. If a fire breaks out, for example in the fuel injection system, this can quickly be extinguished by the driver by manually pulling the cable or rod 123. If however the driver is unaware of the fire, or is unconscious after an accident the fire extinguisher will be automatically actuated.

Although the principal intended use of the above described fire extinguishers is for motor racing vehicles and power boats, it will be appreciated that it is equally useful in domestic vehicles, aircraft, hovercraft, homes, factories and offices. The same operating head can be used on extinguisher bodies irrespective of their extinguishing medium capacities.

The operating heads can be rearmed after detonation by merely replacing the detonator 9. Moreover in view of the high driving force available from a detonator of small size as compared with, say, a solenoid use in the prior art, the size and weight of the operating head can be greatly reduced with no loss, and possibly an increase, in efficiency.

What we claim is:

1. In a fire extinguisher of the kind containing an extinguishing medium under pressure, an operating head comprising a housing, a carriage slidably mounted in said housing, a hollow pin movably mounted on said carriage, an electrically operated detonator mounted on said carriage and disposed on detonation to drive said hollow pin through a seal to provide a flow path for discharge of the extinguishing medium, and manually operable means for selectively sliding said carriage to drive the pin manually through said seal to provide said flow path.

2. An operating head according to claim 1, in which said pin is resiliently mounted in said carriage.

3. An operating head according to claim 1, in which said manually operable means comprises a pair of hand grips squeezable together.

4. An operating head according to claim 1, in which said manually operable means comprises an operating lever adapted to be actuated by means extending to a remote position.

5. An operating head according to claim 1, in which said housing defines a chamber and an outlet therefrom, which provide a flow path for discharge of the extinguishing medium.

6. An operating head according to claim 1, in which the detonator is associated with a thermostat which is arranged upon a predetermined temperature being reached to complete an electric circuit to fire the detonator.

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