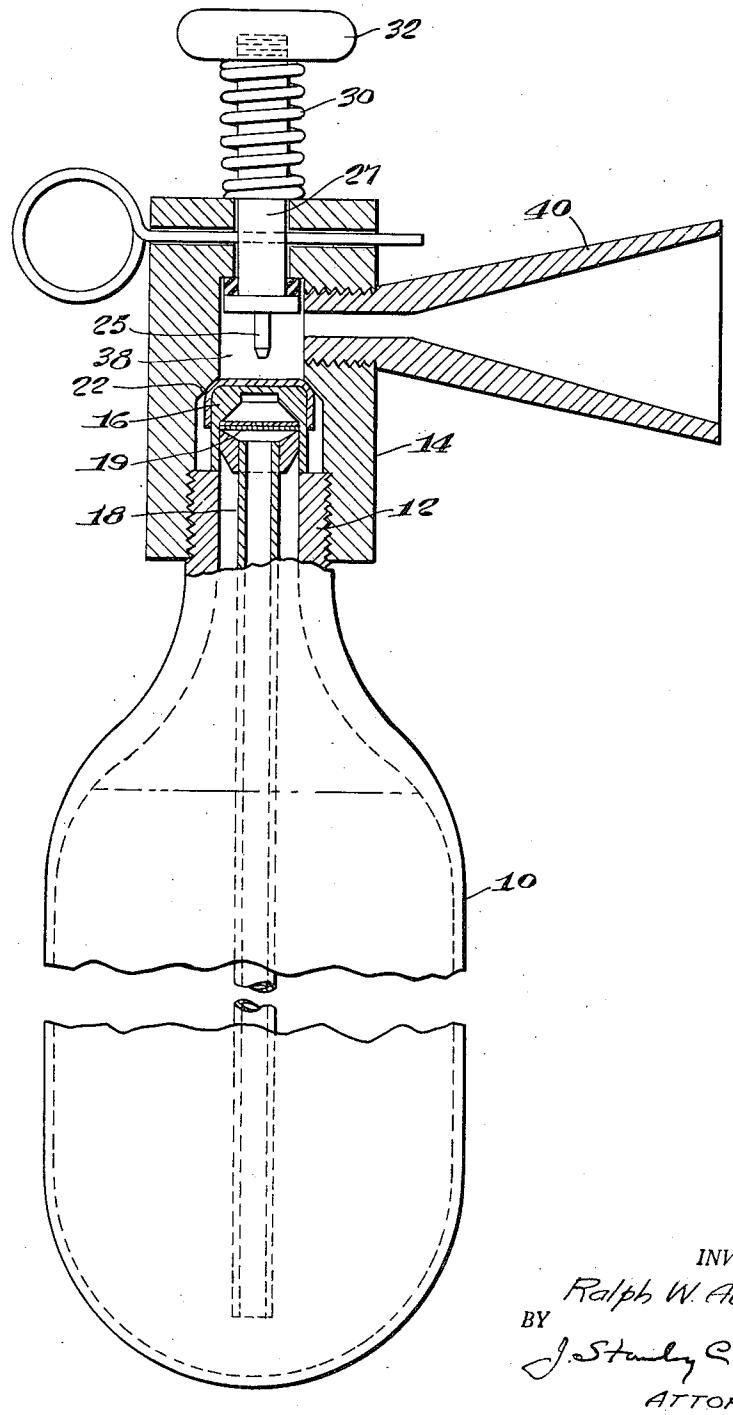
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FIRE-EXTINGUISHING APPARATUS

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FIRE-EXTINGUISHING APPARATUS

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1 Claim. (Cl. 169—31)

This invention relates to fire-extinguishing apparatus.

One object of the invention is to provide a novel fire extinguisher wherein an extinguishing medium is stored within a gas-pressurized sealed extinguisher casing to form a sealed unit and wherein the sealed extinguisher casing is detachably supported in operative relation to gas-releasing mechanism, and preferably in operative relation to seal-puncturing mechanism, to thereby permit the sealed extinguisher casing and the gas-releasing mechanism to be readily detached from one another for replacement and recharging purposes.

Another object of the invention is to provide a novel fire extinguisher which is highly efficient in operation, light in weight, may be easily and conveniently assembled, and in which one or more component parts and/or the entire extinguisher are expandable, as will be described.

A further object of the invention is to provide a novel fire extinguisher in which the extinguishing medium is maintained under pressure within the extinguisher casing, and principally in liquid form, and comprises a plurality of components which are metered to the vapor phase when the pressure is released and the extinguisher is operated.

With these general objects in view and such others as may hereinafter appear, the invention consists in the fire-extinguishing apparatus hereinafter described and particularly defined in the claim at the end of this specification.

In the drawing I have illustrated in the single Figure in elevation, with portions in section, the preferred form of fire-extinguishing apparatus embodying the invention.

In general, the present invention contemplates a novel fire-extinguishing apparatus in which an extinguishing medium is stored within a gas-pressurized extinguisher casing to form a sealed unit. The extinguishing medium itself may comprise any usual or preferred form of extinguishing medium, such as known dry chemicals, known liquids which may be discharged as a gas or as a liquid, and also certain known extinguishing gases themselves. The gas-pressurized sealed extinguisher casing unit is detachably supported in operative relation to gas-releasing mechanism and preferably to seal-puncturing mechanism to thereby permit the sealed casing unit and the gas-releasing mechanism to be detached from one another for replacement, recharging and other purposes.

In its preferred form the extinguishing medium may comprise a halogenated aliphatic compound characterized by the fact that at low temperatures and under substantial pressure it remains liquid with minimum vapor pressure, and upon release of the gas pressure the liquid is metered to the vapor phase to form an extinguishing gas. A suitable halogenated aliphatic compound may be selected from the compounds disclosed in the publication of October 1951, in the National Fire Protective Association's quarterly publication, and particularly in the article by J. Malcolm, of the Engineer Research and Development Laboratories, Ft. Belvoir, Virginia. Such a compound may and preferably will comprise bromotrifluoromethane,

although the invention contemplates other extinguishing media, such as sulphur hexachloride, carbon dioxide or carbon tetrachloride.

For convenience of description, the halogenated aliphatic compound used in the present fire extinguisher as the fire-extinguishing medium will be hereinafter referred to as "halon," the trade name given to bromotrifluoromethane and similar compounds.

As herein shown, the extinguisher is provided with an extinguishing casing **10** of steel or other metal having the strength to withstand the required pressures. The casing **10** is provided with a threaded neck **12** adapted to be screwed into a head indicated generally at **14**. The "halon" is refrigerated to liqud form, and a predetermined weight or volume thereof is introduced into the casing **10**. Preferably, the casing is of a size such that the quantity of "halon" employed fills the major portion of the casing. Immediately thereafter a metal sealing cap **16** is welded on the upper open end of the neck of the casing, a suitable siphon tube **18** and screen **19** having been previously assembled in operative relation to the cap **16** and welded thereto. When the cap is in sealing position upon the upper end of the neck of the casing the siphon tube assumes its proper position within the casing as shown. Prior to the welding of the cap upon the casing, as described, the extinguishing casing is pressurized by a gaseous medium, preferably nitrogen, and in practice, the nitrogen is delivered into the casing at approximately 220 lbs. per square inch gauge, and because of the fact that the refrigerated liquid in the cylinder exerts little vapor pressure, it is possible by properly welding the cap assembly to seal the mouth of the extinguisher casing to pressurize the system at from 200 to 210 lbs. per square inch so that when the refrigerated liquid is permitted to come up to room temperature about 400 lbs. per square inch pressure will be developed within the extinguisher casing.

Referring to the drawing, it will be observed that the pressurized cylinder or casing **10** with the cap sealed in place to hermetically seal the same is screwed into the threaded opening in the bottom of the head **14**. The upper end of the cap **16** bears against a lead or equivalent cap seal providing a compressible member between the shoulder portion **22** of the interior surface of the head **14** and the top of the cap. From the description thus far it will be observed that the pressurized extinguisher casing **10** is removably secured in the lower portion of the head and may be readily replaced when it is required to recharge the extinguisher.

The head **14** is arranged to operatively support mechanism for puncturing the cap **16** when the extinguisher is to be operated. In general, the cap-puncturing mechanism comprises a pointed puncturing member **25** shaped when moved through a predetermined stroke to form a predetermined-sized hole in the cap **16**, and such opening comprises a metering opening in the operation of the extinguisher, as will be described. Resilient means are provided for normally maintaining the puncturing pin raised in its inoperative or non-puncturing position. As illustrated herein, the puncturing pin **25** is mounted on the lower end of a plunger **27** slidably mounted in a hole in the upper wall of the head **14**. The plunger is provided with a flanged portion at its lower end, and a gasket is interposed between the flange and the undersurface of the upper wall of head **14**, as shown. The plunger projects upwardly beyond the top of the head, and a coil spring **30** of substantial strength embraces the projecting portion of the plunger and is interposed between a handle **32** on the upper end of the plunger and the top of the head so that when it is desired to operate the extinguisher the handle is depressed compressing the coil spring until

the puncturing pin punctures the cap and forms therein a hole of a predetermined size. When downward pressure is removed from the handle, the spring returns the parts to the position shown.

After the cap has been punctured, the gas pressure within the cylinder forces the extinguishing liquid upwardly through the siphon tube and through the metering hole which has been formed in the cap, and the liquid emerges from the metering hole as a gas under substantial pressure. This gas is discharged from the chamber **38** through a discharge orifice in a horn member **40** screwed into a threaded hole in the side of the head **14**. The stream of gas may be directed by the horn upon the fire to be extinguished.

From the description thus far it will be observed that the present construction of extinguisher is simple, positive in operation, and the extinguisher may be constructed to be light in weight. The head and/or the casing and/or the entire extinguisher may be expendable. The screwed-in mounting of the casing into the head facilitates the replacement of a casing of a discharged extinguisher with a new filled and sealed casing. In those instances where it is desired to renew the head, this may be also readily accomplished by reason of the screwed-in mounting. The structure of the extinguisher lends itself to use by military service personnel, and the casings may be stored in depots or mobile carriers until required. All parts of the extinguisher are readily replaceable in the field, and the parts for completion may be readily shipped in knocked-down form and easily assembled in the field.

While it is preferred to utilize bromotrifluoromethane and nitrogen as the two components of the present extinguisher, nevertheless, if desired, other extinguishing liquids having equivalent characteristics may be used, and in addition, one more other gas, such as carbon dioxide, may be used instead of or with the nitrogen.

Having thus described the invention, what is claimed is:

A fire extinguisher comprising a casing having a threaded neck portion, said casing being gas pressurized and containing an extinguishing medium, a puncturable cup-shaped metal cap welded upon the neck and sealing the extinguishing casing, a siphon tube leading downwardly from the cap into the casing and being itself welded to the internal wall of the cap, said casing being partially filled with a liquid halogenated aliphatic extinguishing compound and the remainder of the casing being pressurized with an inert gas to a predetermined pressure, a one-piece head portion having manually operated cap-piercing mechanism carried thereby, said head portion being removably secured to the threaded neck portion of the casing to form a unit therewith, the interior of said head portion having a conical shoulder, and a gasket extended across the top of said cap and interposed between the top of the cap and said conical shoulder, said gasket being directly engaged with the top of the cap and with said conical shoulder.

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