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SELF-CONTAINED, INSTANTANEOUSLY RESPONSIVE FIRE EXTINGUISHER

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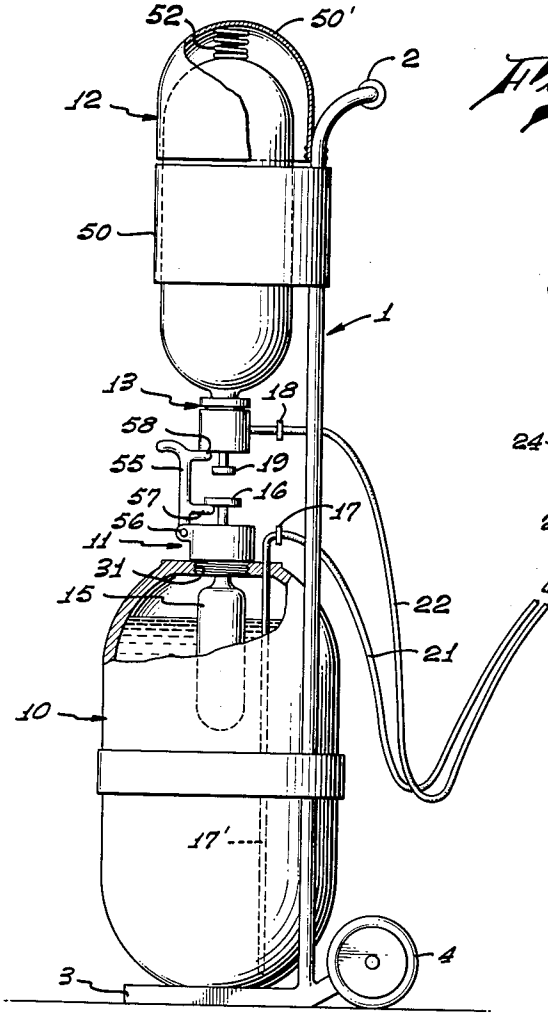


Fig. 1.

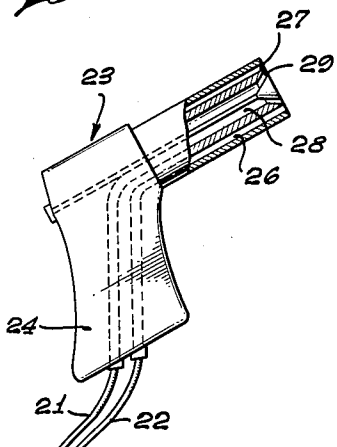
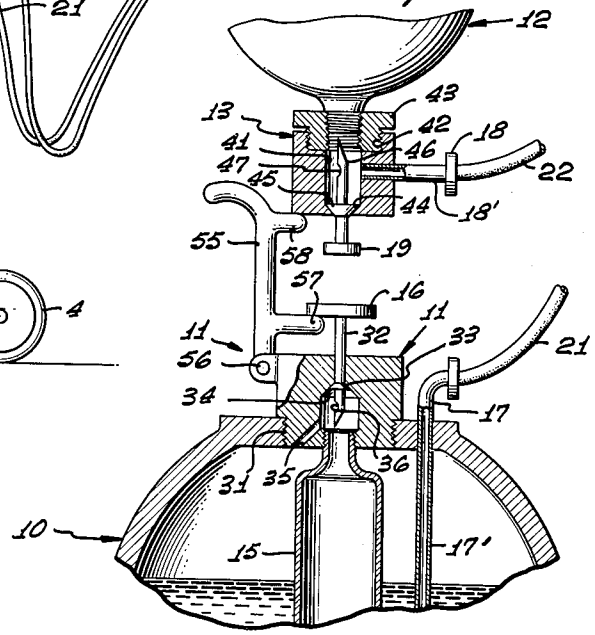


Fig. 2.



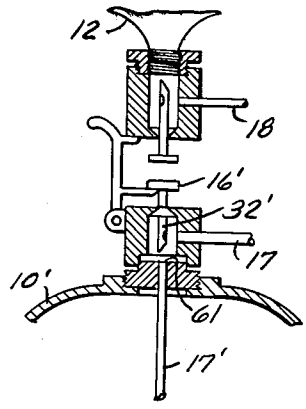


Fig. 3

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SELF-CONTAINED, INSTANTANEOUSLY RESPONSIVE FIRE EXTINGUISHER

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8 Claims. (Cl. 169—31)

The present invention relates to a compact, self-contained fire extinguishing apparatus capable of producing a finely divided mist or fog of any desired noninflammable liquid, the apparatus being free from pumps and similar devices and effectively utilizing a compressed noninflammable gas both as a source of pressure and as an ingredient of the fire fighting fog generated. By reason of the many modifications and changes in substances employed in the fire extinguishing unit, the device may be employed in fighting class A (wood, paper, rubber etc.); class B (chemical and solvent); and class C fires (involving electrical systems). The unit may be portable, mounted upon a vehicle, or permanently installed.

Although liquefied or compressed gases, such as carbon dioxide, had been used heretofore both in fire fighting and as a source of readily available pressure, no completely self-contained instantaneously responsive unit capable of generating a water fog is known to me. The present invention not only utilizes liquefied or compressed noninflammable gases as a component of the fog, but also employs such gas as a pressure producing medium whereby a suitable liquid is supplied to a fog nozzle and there disseminated into an effective fire fighting fog. The present invention contemplates the use of two or more containers in alignment, both of said containers being simultaneously punctured and rendered operative for the purpose of supplying suitable materials to a fog nozzle, by the actuation of a single selectively operable means. In obtaining such simultaneous activation of separate containers of liquefied gas and a noninflammable liquid, gravity may be employed thereby preventing the necessity of using complicated machinery.

It is an object of the present invention, therefore, to disclose and provide a compact, self-contained and instantaneously responsive fire extinguishing unit adapted to produce a fire fighting fog from any desired noninflammable liquid and noninflammable gas.

A further object of the invention is to disclose and provide a portable, self-contained fire fighting device which is free from pumps and other complicated machinery and preferably utilizes the weight of one of the containers in actuating and energizing the unit.

These and other objects of the invention will become apparent to those skilled in the art from the following detailed description of an exemplary form of the device. In order to facilitate understanding, reference will be had to the appended drawings in which:

Fig. 1 is a side elevation of one form of unit.

Fig. 2 is an enlarged sectional view illustrating a typical head construction and selectively operable means for energizing the unit.

Fig 3 is a fragmentary sectional view illustrating a modified form of construction.

The form of device selected for illustrating the present invention is a portable one and comprises a suitable dolly or two-wheeled truck having frame members 1, an upper handle portion 2, and a lower foot 3, and is provided with

wheels 4. Preferably the foot is so made as to permit the entire device to assume a vertical position as illustrated in Fig. 1, it being understood that when the device is moved from one place to another, the weight rests directly upon the wheels 4 and the frame 1 assumes an angle to both the vertical and horizontal.

The primary elements of the device comprise a pressure-resistant storage container 10 for a noninflammable liquid such as water, carbon tetrachloride or the like provided with a head structure 11, this storage container being preferably firmly seated upon the foot 3 of the dolly or truck in a relatively immovable position and a container 12 for compressed noninflammable gas of which liquid carbon dioxide is an example. The container 12 is preferably mounted in alignment with the liquid container 10. The gas container 12 is also provided with a head generally indicated at 13.

The liquid container 10 also includes a capsule of compressed gas indicated at 15, the closure of head 11 including a movable plunger 16 adapted to pierce the capsule and subject the liquid within the container 10 to superatmospheric pressure. The container 10 is also provided with a liquid outlet port 17 through which the liquid may be discharged.

The head 13 of the gas container 12 is also provided with a plunger 19 adapted to pierce the seal of the gas container 12 so as to discharge such gas through the gas outlet port 18.

Liquid and gas outlet ports 17 and 18 are connected by flexible conduits 21 and 22 to a fog nozzle generally indicated at 23, it being understood that the length of the conduits 21 and 22 is suitable to permit ready manipulation of the fog nozzle 23 at some distance from the unit itself. The fog nozzle 23 is preferably provided with a pistol grip 24 so as to permit ready manipulation and control of the fog nozzle in order to direct the fog ejected from the outlets upon the conflagration. It may be noted that at this time the fog nozzle 23 comprises an external passageway indicated at 26 for the compressed gas, this external passageway terminating at an annular, narrow port 27 whereas the liquid from container 10 is fed to a central chamber 28 and is discharged in an outwardly inclined fine conical stream through outlet 29, the liquid being broken off, atomized and fogged by impingement of the stream of gas through outlet 27. By making outlet 27 the smallest aperture in the gas stream, freezing of the nozzle is prevented.

By referring to Fig. 2 it will be noted that the liquid storage container 10 is provided with a head closure 11 having a downwardly directed internally threaded opening into which the end of the pressure gas capsule 15 is threaded. It will be understood that the head 11 may be removably attached to the container 10 as by means of the threads 31 so as to facilitate refilling and recharging. It is also to be understood that the end or neck or the pressure gas capsule 15 is provided with a breakable or perforatable metallic seal.

Slidably mounted within the head 11 is the shaft 32 of the plunger 16. This shaft 32 is preferably provided with an enlargement 33 adapted to seat upon the inclined surfaces 34 of a recess within the head 11, said recess communicating with the interior of the container 10 by means of a passageway 35. The end of shaft 32, adjacent the seal of capsule 15, is preferably pointed, tubular and provided with a side port 36 so that in the event the plunger 16 and shaft 32 is forcibly moved axially, the pointed end of the shaft will pierce the seal and permit the pressure gas contained in the capsule to be discharged through passageway 35 into the upper portion of the liquid stortage container 10. The liquid outlet port 17 is preferably provided with a downwardly extending siphon tube 17' provided with an open end adjacent the bottom of container 10 so that the

liquid in the container is forcibly ejected therefrom through tube 17' and port 17 into the flexible conduit 21.

The head closure 13 of the gas container 12 may be provided with a bore 41 and a counter bore 42 internally threaded so as to receive an attachment gland 43, said attachment gland being connectable with the neck of gas container 12. The neck of this gas container is also provided with a perforatable seal.

The bore 41 may be provided with a seat 44 upon which a boss 45 carried by shaft 46 of plunger 19 may rest. The end of shaft 46 opposite the plunger 19 is also preferably tubular, pointed and provided with a side port 47 so that when the seal of gas container 12 is perforated or pierced the gas will be discharged into bore 41 and be discharged therefrom by conduit 18' leading to the gas outlet port 18.

As previously indicated, the two containers 10 and 12 are held in axial alignment upon the cart frame or dolly with their respective plungers 16 and 19 in opposed, but spaced relation. The lower and generally larger container for liquid 10 is firmly attached to the frame; the upper gas container 12 is preferably slidably mounted within a sleeve 50 carried by the frame 1 and such sleeve may be provided with a cap 50', a biasing spring 52 bearing against the gas container 12 and said cap and urging said gas container 12 toward the liquid container 10.

Selectively operable means are provided for normally maintaining the two containers and their plungers in spaced relation when in one position of such means and for permitting relative motion between such containers 10 and 12 so as to cause the two plungers 16 and 19 to come into forcible engagement and simultaneously perforate the seals of the capsule 15 and gas container 12 so as to activate and energize the unit. Such means may comprise a latching lever 55 pivotally connected to the closure head 11 as at 56, such latching lever being provided with one lip 57 capable of extending under and supporting the plunger 16 and a second lip 58 capable of engaging and supporting the gas container 12 as, for example, by engaging the end of closure head 13. When in the position illustrated in Fig. 1, it will be evident that the device is inoperative but instantaneously available. By simply moving the latching lever 55 outwardly about its pivotal connection 56, the upper gas container 12 will fall by gravity, spring 52 facilitating such movement in the event such spring is used, and the two plungers 16 and 19 will forcibly contact, the weight of the filled gas container 12 being effectively utilized in driving both piercing shafts through the respective seals of the gas capsule 15 and the gas container 12. Liquid under pressure as well as gas will, therefore, be simultaneously discharged through outlet ports 17 and 18 and supplied by flexible conduits 21 and 22 to the fog nozzle 23.

It is to be understood that although the two containers 10 and 12 are preferably placed in a vertical position when ready for use, they may also be placed in horizontal or any other position. By increasing the strength of spring 52 (or by employing hydraulic or other means for imparting movement to container 12), the device may be placed in a horizontal position and caused to operate by selective movement of the latch or releasing means 55.

It is also to be understood that the two storage containers may be firmly mounted in axially aligned relation upon a frame, truck or dolly, with their respective plungers in opposing, spaced relation, and a single means (movable manually, hydraulically or pneumatically), as for example a cam or wedge, may be caused to simultaneously move the plungers into seal-piercing position.

Moreover, it is to be understood that the present invention is not limited to the specific types of closure heads illustrated herein since various other arrangements of plungers adapted to perform the functions herein disclosed may be used.

A safety latch or key 60, pivotally connected to frame 1, may normally hold releasing means 55 inoperative until such time as a portable unit is brought to the vicinity of a fire to be extinguished. Liquid container 10 may be precharged so as to be at superatmospheric pressure prior to use and in such event plunger 16 can open and make such liquid available by puncturing a seal in line 17'. In such case the liquid container may be provided with a head of the type indicated at 13 in Figs. 1 and 2 and more clearly shown in Fig. 3 wherein plunger 16' is carried by slidable stem 32' and the pointed hollow end of such stem may perforate seal 61 to thereby open the port and place pipe 17' leading to the bottom of container 10' in communication with line 17 connected to the nozzle.

All changes and modifications coming within the scope of the appended claims are embraced thereby.

I claim:

1. A compact, self-contained and instantaneously responsive fire extinguisher adapted to produce fire fighting fog comprising: a pressure-resistant storage container for a noninflammable liquid, said storage container being provided with an outlet port for liquid and a head closure carrying a pressure capsule and having a plunger movable into capsule-piercing position; a container for compressed noninflammable gas, said gas container being provided with a head closure including a seal for said gas, a separate gas outlet port and a plunger selectively movable to pierce said seal and establish communication between said gas and gas outlet port; means for holding said liquid storage container and gas container in aligned relation with respective plungers in opposition, and with one of said containers axially movable toward the other; selectively operable means holding said containers in spaced relation when in one position and in another position permitting said containers to move toward each other to forcibly contact their respective plungers to simultaneously supply liquid and gas to their respective outlet ports; a fog nozzle and flexible conduit means connecting said liquid and gas ports with said fog nozzle.

2. A compact, self-contained and instantaneously responsive fire extinguisher adapted to produce fire fighting fog comprising: a pressure-resistant storage container for a noninflammable liquid, said storage container being provided with an outlet port for liquid and a head closure carrying a pressure capsule and having a plunger movable into capsule-piercing position; a container for compressed noninflammable gas, said gas container being provided with a head closure including a seal for said gas, a separate gas outlet port and a plunger selectively movable to pierce said seal and establish communication between said gas and gas outlet port; frame means holding said liquid and gas containers in aligned relation with their respective plungers in opposition, said frame means being adapted to permit movement of one of said containers toward the other; and selectively operable means holding said containers in spaced relation when in one position and in another position permitting said containers to forcibly contact their respective plungers to simultaneously supply liquid and gas to their respective outlet ports.

3. A fire extinguisher of the character stated in claim 2, wherein the frame means includes spring biasing means urging said containers into forcible contact.

4. A fire extinguisher of the character stated in claim 2, wherein said liquid and gas containers are vertically disposed.

5. A fire extinguisher of the character stated in claim 2, wherein the frame means are wheeled and include a sleeve guidingly positioning one of said containers with respect to the other.

6. A compact, self-contained and instantaneously responsive fire extinguisher adapted to produce fire fighting fog comprising: a pressure-resistant storage container for a noninflammable liquid, said storage container being provided with an outlet port for liquid and a head closure carrying a pressure capsule and having a plunger movable into capsule-piercing position; a container for compressed noninflammable gas, said gas container being provided

with a head closure including a seal for said gas, a gas outlet port and a plunger selectively movable to pierce said seal and establish communication between said gas and gas outlet port; frame means holding said liquid and gas containers in aligned relation with their respective plungers in opposition, and a single means selectively movable to simultaneously move both said plungers into seal-piercing position, whereby liquid and gas from their respective containers are simultaneously supplied to said liquid and gas outlet ports for fire-fighting purposes.

7. A compact, self-contained and instantaneously responsive fire extinguisher adapted to produce fire fighting fog comprising: a pressure-resistant storage container for noninflammable liquid under superatmospheric pressure, said storage container being provided with a head closure having an outlet port for liquid and a plunger movable into outlet port opening position; a container for compressed noninflammable gas, said gas container being provided with a head closure including a seal for said gas, a gas outlet port and a plunger selectively movable to pierce said seal and establish communication between said gas and gas outlet port; frame means holding said liquid and gas containers in aligned relation with their respective plungers in opposition, and a single means selectively movable to simultaneously move both said plungers into seal-piercing and liquid outlet port opening positions, whereby liquid and gas from their respective containers are simultaneously supplied to said liquid and gas outlet ports for fire-fighting purposes.

8. A portable, self-contained fire extinguisher adapted to produce a fire fighting fog consisting of water and carbon dioxide, comprising: a pressure-resistant storage container for water and a separate container for compressed carbon dioxide; means for holding said containers in vertically aligned relation with one of said containers axially movable toward the other; selectively operable means holding said containers in spaced relation when in one position and in another position permitting one of said containers to move toward the other container and under the force of gravity; a normally closed outlet port from said water container and a separate normally closed outlet port from said separate carbon dioxide container; a fog nozzle and flexible conduit means connecting said separate outlet port with said fog nozzle; and means, actuated by the movement of one of said containers toward the other under the force of gravity upon movement of said selectively operable means, to open said separate outlet ports and concurrently supply water and carbon dioxide to said fog nozzle.

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