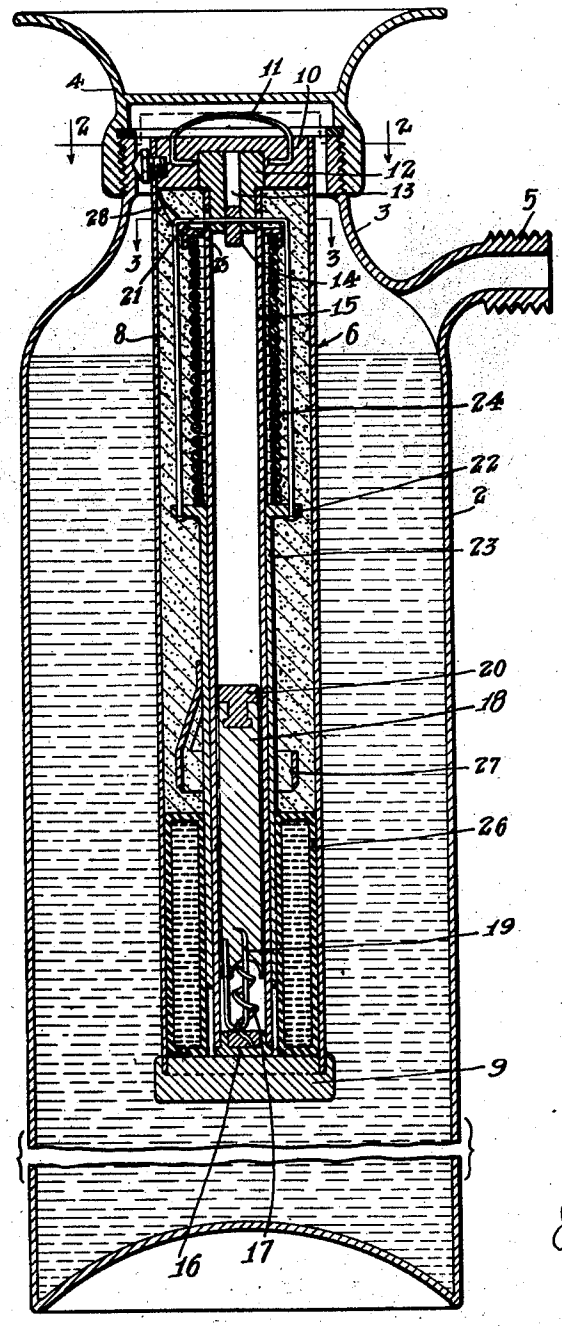
Aug. 7, 1945. J. L. HULL ET AL 2,381,749

FIRE EXTINGUISHING UNIT

Filed March 1, 1943

Fig. 1



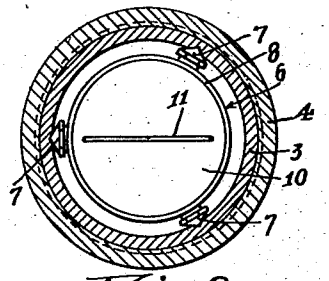


Fig. 2

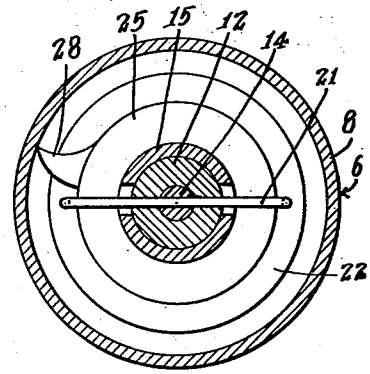


Fig. 3

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FIRE EXTINGUISHING UNIT

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Application March 1, 1943, Serial No. 477,602

7 Claims. (Cl. 169—32)

This invention relates to fire extinguishers of the class in which the contents of the extinguisher are expelled by gas pressure generated within the extinguisher by chemical reaction of gas-generating materials.

It is a general object of the present invention to provide a unit for a fire extinguisher, which unit contains means for holding the gas-generating chemicals in a moisture-proof condition, well-protected against accidental discharge, which unit includes means for rapidly breaking the seals of such chemicals and for forcing the chemicals into the water supply of an extinguisher.

A further object of the present invention is to provide a unit for a fire extinguisher, in which there is included a means for automatically breaking the seals surrounding the chemicals of the extinguisher upon inversion of the extinguisher.

A further object of the present invention is to provide a unit for a fire extinguisher, which unit contains, in combination with means for holding gas-generated ingredients in moisture-proof condition, a source of stored mechanical energy adapted to be automatically released for effecting a rupture of the seals for the ingredients and also effective for ejecting the ingredients to operate in contact with the water of the extinguisher.

A further object of the present invention is to provide a unit for a fire extinguisher, which unit is so designed as to be capable of substitution for less effective units now contained in fire extinguishers heretofore manufactured and sold, so that the fire extinguishers now in use may be converted to the improved type merely by the substitution of the improved unit of the present invention.

The extinguisher of the present invention, together with various additional advantages of the invention, will be fully understood from the following description of a preferred form or example of a fire extinguishing unit embodying the invention. For this purpose, we have hereinafter described a preferred example of the invention in connection with the accompanying drawing, in which

Figure 1 is an elevation in vertical section.

Figure 2 is a section on the line 2—2 of Figure 1.

Figure 3 is a section on the line 3—3 of Figure 1.

Referring to the drawing, we have indicated a fire extinguisher as including an outer casing 2 which may be of any usual or preferred type, the particular one indicated being of general cylindrical form reduced to a neck 3 which is threaded to a cap 4. The casing 2 is provided with a suitable outlet 5, which may be threaded for attachment to a discharge hose. The unit 6 of the present invention is indicated as mounted within the casing 2 by means of three pointed set screws 7, which may be forced into the neck 3 of the casing 2 for suspending the unit within the casing.

The unit comprises an outer shell 8, which may be made of any suitable material, but we prefer to make the shell 8 of plastic material or paper impregnated with plastic material. The lower end of the shell 8 is closed by end plate 9, which also, if desired, may be made of plastic material, in which case the end of the shell 8 may be molded within the cap 9, as indicated. The upper end of the casing 8 is closed by a plate 10, which also may be made of plastic material which is preferably inserted within the end of the shell 8 so as to be easily ruptured therefrom. In molding the top plate 10 a wire bale 11 is molded thereto to serve as a handle for the unit. The set screws 7 are indicated as threaded into the top plate 10.

In the top plate 10 there is a socket for receiving an anvil 12 having a central bore 13, which slidably fits a plunger 14. Within the shell 8 there is provided an inner tube 15, the diameter of which is considerably smaller than the diameter of shell 8, and the intervening space is mainly filled with a suitable gas-generating chemical, such as sodium bicarbonate. The upper end of the tube 15 fits over the anvil 12 and the lower end of the tube fits a plug 16, which plug is provided with a helical retarding wire 17, the axis of which coincides with the axis of the tube 15. A cylindrical shaped weight 18 is provided, preferably composed mainly of lead, and is positioned within the tube 15 and has a loose fit therein. The weight 18 is provided with a bale 19 at its lower end, one side of the bale coinciding with the axis of the weight and the other side of the bale joining the body of the weight near the periphery of the weight 18. The helical retarding wire 17 is coiled loosely around the side of the bale 19, which is coaxial with the weight, and the bale 19 is of sufficient length to hold the body of the weight 18 from contact with the end of the helical retarding wire 17.

By this attachment of the weight 18 to the helical retarding wire 17 it is essential that the weight 18 make a number of revolutions with respect to the retarding wire before becoming detached therefrom. If the weight 18 tightly fits

the tube 15, friction may prevent any release of the weight even when the unit is inverted from the position shown in Figure 1. With a slight play or looseness between the weight 18 and tube 15 it is found that the weight will become released only when the container is inverted to a position within about 8 to 10° of the vertical. With the device of the present invention, there is no danger of releasing the unit for operation merely by accidentally tipping the unit, or even by turning the unit nearly completely over as the weight will be released only when the unit is brought substantially to the upright position after being inverted. Furthermore, the release of this position is positive, and there is no danger of the weight catching or failing to fall when it is intended to operate the unit.

At the top of the weight, as viewed in Figure 1 (i. e., the bottom of the weight in the striking position), we provide an insert 20 of steel in order to form a better striking surface on the weight. In the inverted position, the weight is intended to strike the plunger 14 and thereby shear the wire 21. The wire 21 passes through openings in the plunger 14 and anvil 12, and is secured to a flange 22 mounted on a movable tube 23. A coil spring 24 surrounds the tube 15 with its lower end engaging the flange 22 and with its upper end engaging a loose collar 25 slidably mounted at the upper end of the tube 15 and held from movement upward by the wire 21. In the assembled position the spring 24 is compressed and held in the compressed position by the wire 21. The cutting of the wire by dropping the weight 18 so as to strike the plunger 14 releases the energy of the coiled spring 24.

The movable tube 23 extends down to a short distance from the lower end of the tube 15 (as viewed in Figure 1), and at the lower end of the unit (as viewed in Figure 1) there is provided an acid container 26, which acid container is made of a rupturable material, for example wax, and contains therein a supply of acid which is preferably formic acid. Mounted on the movable tube 23 is provided a circular knife 27 capable of rupturing the acid bottle 26 upon release of the spring 24, and extending from the loose collar 25 is a knife blade 28 directed to engage the point of intersection of the plate 10 and casing 8 of the unit when the loose collar is forced upwardly by the spring upon breaking of the wire 21.

It will be seen from the foregoing description that when the unit is inverted the weight 18, upon release from the retarding wire 17, will fall striking the plunger 14 and breaking the wire 21. The force of the coiled spring will jam the knife blade 28 into position to break the seal between the casing 8 and top plate 10 to allow the contents of the casing to be expelled into the water surrounding the unit. At the same time, the circular knife 27 is forced into position to shatter the wax acid bottle, ejecting the acid into the sodium bicarbonate so that the chemicals are rapidly mixed and ejected into the water supply. By this mechanism the formation of gas is immediate upon inversion of the unit into the vertical position and it is found that a large pressure immediately builds up in the unit resulting in the discharge of the contents thereof through the outlet 5.

The particular chemicals employed in the unit may be varied with the desire of the operator, but the particular chemicals described, namely, sodium bicarbonate and formic acid, have been discovered by us to effect unusual efficiency in operation, and the feature of employing such chemicals in the unit is made the subject-matter of a copending application.

While the particular form of the invention herein described is well adapted to carry out the objects of the present invention, it is to be understood that various modifications and changes may be made, and this invention includes all such changes and modifications as come within the appended claims.

We claim:

1. A fire extinguishing unit, comprising a frangible acid container, means for fracturing the acid container, including a striking member and a coil spring operative for actuating the same, means for retaining the coiled spring in a compressed position, a cutter for releasing said means, means guiding a drop weight for movement towards said cutter, and a helical retarding wire normally restraining the movement of said drop weight.

2. A fire extinguishing unit comprising a spring-actuated means for fracturing an acid container, means for normally restraining the operation of said spring-actuated means, releasing means for said last-mentioned means adapted to be actuated by a moving weight, said weight, and a helical retarding wire engaging said weight.

3. In a fire extinguishing unit, a tube, a drop weight slidable through said tube, a helical retarding wire engaging said weight and adapted to release said weight in a substantially inverted position, cutter means actuated by the striking of said weight, spring-actuated mechanism for fracturing the acid container, means normally restraining the operation of said spring-actuated means and adapted to be released by operation of said cutter.

4. A fire extinguishing unit, comprising a casing member housing a frangible acid container and providing space for housing an alkali, a spring-actuated means for fracturing the acid container and substantially simultaneously opening said casing, means normally restraining the movement of said spring-actuated means, cutting means for releasing said spring-actuated means, and a drop weight for actuating said cutter upon inversion of said unit.

5. A fire extinguishing unit, comprising a casing member housing a frangible acid container and providing space for housing an alkali, a spring-actuated means for fracturing the acid container and substantially simultaneously opening said casing, means normally restraining the movement of said spring-actuated means, cutting means for releasing said spring-actuated means, a tube positioned within said casing member, and a drop weight for actuating said cutter upon inversion of said unit, said drop weight loosely fitting within said tube and having a loose attachment to a helical wire extending into said tube from the lower end of said unit.

6. A fire extinguishing unit, comprising a tube, a weight normally positioned in the lower end of said tube and having a loose fit therewith, a helical retarding wire loosely attached to said weight for releasing the weight upon substantial inversion of the unit, a cutter in the opposite end of said tube, a wire positioned to be cut by said cutter, a spring-actuated mechanism normally restrained from operation by said wire, an acid container, a casing housing the afore-

mentioned elements, said spring-actuated mechanism having striking members for fracturing said acid container and said casing.

7. A fire extinguishing unit, comprising a tube, a helical retarding wire extending into said tube from the lower end thereof, a drop weight having a releasable connection with said wire, a frangible acid container, a spring-actuated mechanism for fracturing the same, means for restraining the movement of said spring-actuated mechanism, and means actuated by the said drop weight for releasing the said restraining means.

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