Oct. 9, 1934. C. H. WHEELER 1,976,467

FIRE EXTINGUISHER

Filed Aug. 11, 1933

FIG. 1

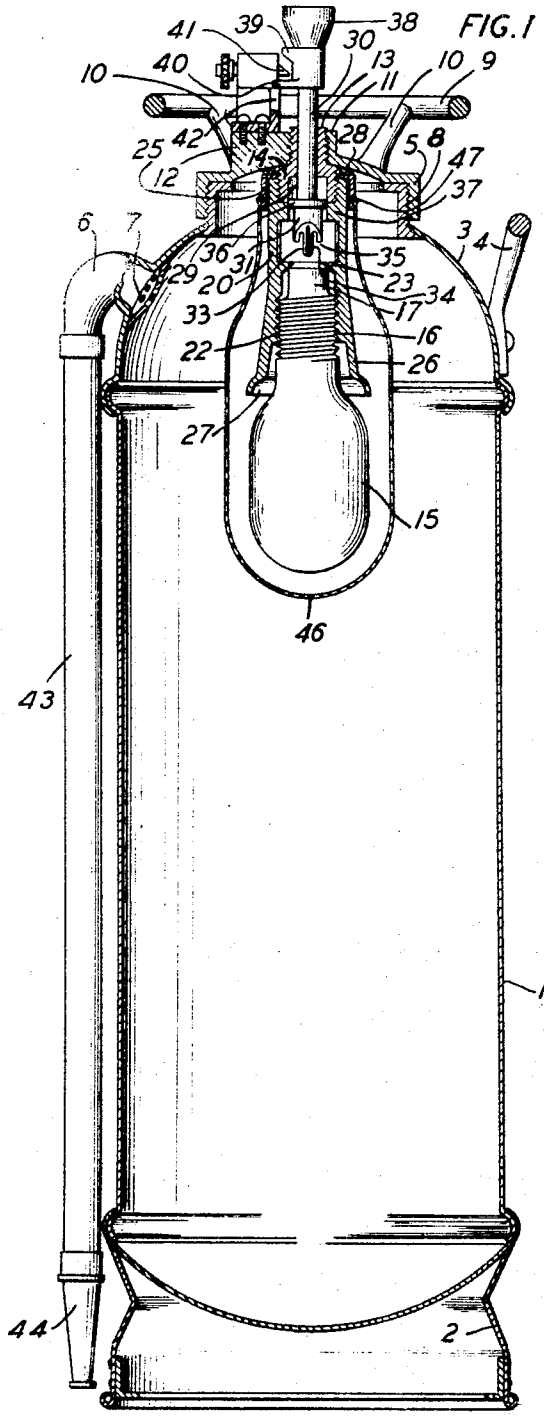


FIG. 2

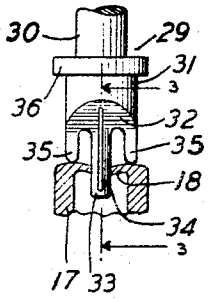


FIG. 3

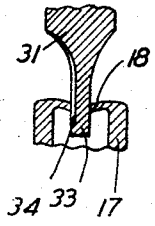


FIG. 4

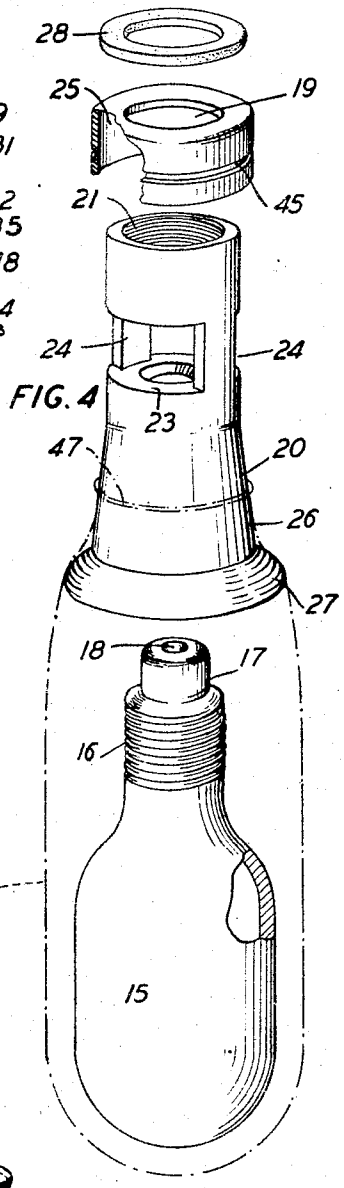
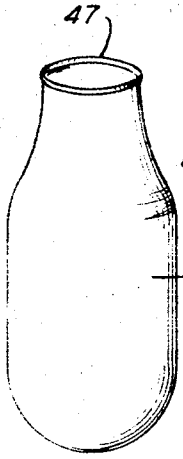


FIG. 5



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Patented Oct. 9, 1934 1,976,467

UNITED STATES PATENT OFFICE

1,976,467

FIRE EXTINGUISHER

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Application August 11, 1933, Serial No. 684,616

4 Claims. (Cl. 169—31)

This invention relates to fire extinguishers and more particularly to fire extinguishers of the type in which a fire extinguishing medium is expelled from a tank by pressure released from a cartridge within the tank.

The object of this invention is to protect the cartridge from corrosion or the effects of electrolytic action or other injurious agencies which might cause perforation of the cartridge when the extinguisher is not being used.

A feature of this invention resides in a protecting casing for the cartridge which is normally maintained as an enclosing member for the cartridge and which is automatically removed from an outlet end of the cartridge when the charge in the cartridge is released.

Another feature resides in a holder for the protecting casing which normally holds the casing in protecting position but which permits automatic release of the protecting casing when the extinguisher is operated.

In the drawing, Fig. 1 is a side elevational view partly in section of a fire extinguisher embodying this invention;

Fig. 2 shows a fragment of the upper portion of a cartridge case in section and a fragment of a stem puncturing the cartridge case,

Fig. 3 is a view in section taken on the line 3—3 in Fig. 2 and shows a fragment of the upper portion of the cartridge case and a fragment of the stem puncturing the cartridge case;

Fig. 4 is an exploded view partly in section of a cartridge, a sleeve coupling for holding the cartridge suspended within the main tank of the extinguisher from a screw cap, a protecting casing for the cartridge and a ferrule to support the protecting casing; and

Fig. 5 is a side elevational view of the protecting casing.

Fire extinguishers of the type shown in Fig. 1 are usually filled with a chemical in liquid form which serves as a fire extinguishing medium. To expel the fire extinguishing chemical from the tank with sufficient force to reach a fire, gas held under pressure within a cartridge case supported within the tank is released from the cartridge case and allowed to escape into the tank.

There are some instances, however, when in putting out a fire, the use of fire extinguishing chemical is found undesirable. This is particularly true in the extinguishment of fires occurring among delicately adjusted mechanical and electrical elements or among comparatively close networks of wires, such, for instance, as are found in telephone equipment in central stations. When a fire extinguishing chemical is used in extinguishing a fire occurring among telephone relays, switches or wire networks, considerable damage is done to the apparatus by reason of the corrosive effects of the chemical on the comparatively closely spaced contacts in the apparatus and the inherent adhesive properties of the chemical in sticking to the apparatus parts upon which it happens to fall. In addition to the damage caused by the fire and the corrosive effect of the chemical fire extinguishing medium there is also a considerable loss due to the time required in removing the chemical from the apparatus and reconditioning the apparatus for service again. It has therefore been found advisable in extinguishing fires in some instances to use water as the fire extinguishing medium in place of a chemical. When water is used as the fire extinguishing medium, the parts to which it is applied and which are not damaged by fire may be quickly dried out and restored to operable condition.

A cartridge of carbon dioxide under pressure has been found a satisfactory medium for creating sufficient pressure within a tank of water to expel the water from the tank. The cartridge used for this purpose usually consists of a steel cartridge case filled with a charge of carbon dioxide, the carbon dioxide having been forced into the interior of the cartridge case under comparatively high pressure. The cartridge case is provided with a reduced wall portion or with a frangible disc which may be readily punctured by a plunger when the extinguisher is to be operated. The tank in which the water is contained and in which the cartridge is suspended is usually made of sheet copper and is lined on the inside with tin.

I have found that there is always present above the water level in the tank some moisture due to condensation or displacement of the water and that the cartridge case becomes corroded. I have also found that some electrolytic action occurs, both above and below the water level between the walls of the tank and the cartridge case or between the cartridge case and other metal parts of the extinguisher and that either this corrosion or electrolytic action in time results in perforation of the cartridge case. If the cartridge case becomes perforated by either corrosion or electrolytic action or by any other injurious agency or if the cartridge case becomes pitted by these injurious agencies to such an extent that it will no longer hold the charge of carbon dioxide, the carbon dioxide escapes into the extinguisher tank and out of the tank through an outlet connection. This loss of the charge of carbon dioxide renders the extinguisher inoperative.

To prevent perforation of the cartridge case by corrosion or electrolytic action or by any other like injurious agency, I have provided a protecting sack. The protecting sack is suspended about the cartridge case and the sleeve coupling for the cartridge case and provides a chamber for these parts from which all moisture and other

elements in which corrosion or electrolytic action might develop are excluded.

For a complete description of this invention reference will now be had to the various figures in the drawing in which like parts bear the same numerals and in which 1 is a comparatively large tin-lined copper tank having an annular base 2, a top portion 3, a handle 4, a screw cap 5, and an outlet connection 6 across the inner end of which is a perforated plate 7. The screw cap 5 is screw-threadedly attached to a comparatively large annular filler connection 8 located in the top portion 3 of the tank 1 and is provided with a comparatively large diameter ring-shaped hand grid 9 which is connected to the screw cap by spokes 10. The top of the screw cap 5 has an upwardly extending annular centrally located boss 11 and a fin 12 extending radially from the boss 11. The boss 11 is internally threaded to receive the smaller externally threaded end of a reducing coupling 13 which is screwed into the threaded boss 11 from the underside of the screw cap 5, the larger externally threaded end 14 of the reducing coupling 13 extending downward from the underside of the screw cap 5 through the filler connection 8 and toward the interior of the tank 1.

Supported within the tank 1 is the cartridge case 15 containing a charge of carbon dioxide under pressure. This cartridge case 15 is a bottle-shaped casing of steel having an enlarged lower end portion, an externally threaded neck portion 16, and an upper reduced end portion 17. The walls of the cartridge case 15 as shown in section in Fig. 4 are comparatively thick. The wall, however, at the extreme upper end of the reduced end portion 17 is considerably reduced in thickness as shown at 18 in Figs. 2, 3 and 4 to provide a comparatively thin wall section which may be punctured when it is desired to allow escapement of the carbon dioxide from the cartridge case 15 to the tank 1.

The cartridge case 15 is suspended within the tank 1 from the reducing coupling 13 by means of a sleeve coupling 20. The sleeve coupling 20 is internally threaded at 21 to engage the externally threaded larger end 14 of the reducing coupling 13 and is internally threaded at 22 to receive the externally threaded neck portion 16 of the cartridge case 15. An annular inwardly extending beveled shoulder 23 is provided about midway of the ends of the sleeve coupling 20 to form a receptacle for the reduced end portion 17 of the cartridge case 15. Between the shoulder 23 and the interiorly threaded end 21 are two comparatively large side outlet ports 24—24. The lower portion of the sleeve coupling 20 is flared out in the form of a bell at 26 and is provided with an outwardly extending annular offset 27 to accommodate the lower end of the neck portion of the cartridge case 15.

Clamped between the upper end of the sleeve coupling 20 and the under surface of the screw cap 5 is a ferrule 25 and an annular washer 28, the washer 28 being placed between the ferrule 25 and the under surface of the screw cap 5. The ferrule 25 is cup-shaped and is apertured at 19 to receive the larger threaded end 14 of the reducing coupling 13 and is clamped between the sleeve coupling 20 and the screw cap 5 in an inverted position as shown in Fig. 1. An annular groove 45 is provided in the outer surface of the lower end of the ferrule 25 as shown in Fig. 4.

Supported by means of the ferrule 25 and enclosing the cartridge 15 is a protecting sack 46. The protecting sack 46 may be made of rubber in the form of a toy balloon or may be made of some material other than rubber providing it is moisture proof and that the neck portion 47 of the sack 46 is readily expandible. In assembling the parts the sack 46 is pulled over the cartridge 15 and over the sleeve coupling 20. The neck portion 47 of the sack 46 is then stretched over the lower end of the ferrule 25, and the neck portion 47 of the sack 46 is permitted to contract into the annular groove 45 of the ferrule 25. In this position, as shown in Fig. 1, the protecting sack 46 in combination with the ferrule 25, the washer 28, and the reducing coupling 13, forms an enclosure for the cartridge 15 and the sleeve coupling 20. It is to be noted that the protecting sack 46 extends upward around the sleeve coupling 20 and covers that portion of the sleeve coupling 20 in which the side outlet ports 24—24 are provided and that it not only protects the lower portion of the cartridge 15 from corrosion and the effects of electrolytic action, but that it also protects the most vulnerable part of the cartridge 15 which is the reduced wall portion 18 from the above mentioned injurious agencies. It is also to be noted that the projecting sack 46 is only slip connected to the ferrule 25.

To puncture the cartridge case 15 at the reduced wall portion 18, a stem 29 is provided. The stem 29 which is adapted to move longitudinally within the reducing coupling 13 comprises a shank portion 30 which extends upward through the reducing coupling 13 to the outside of the extinguished and an enlarged lower cylindrical end 31, which extends downward within the tank. The lower portion of the enlarged lower cylindrical end 31 of the stem 29 is chamfered on opposite sides and cut down to form a spade end 32 having three spaced prongs in parallel, the central prong being about twice the length of the other two and forming a cylindrical puncturing pin 33 for puncturing the cartridge case 15 at the point 18 where the wall of the cartridge case 15 has been reduced in thickness. A groove 34 is provided in one side of the puncturing pin 33 to allow escapement of the carbon dioxide from the cartridge case 15 when the puncturing pin 33 is thrust through the reduced wall portion 18. The groove 34 does not extend the full length of the puncturing pin 33 but starts at a point slightly above the lower extremity of the pin and extends upward into the curved portion of the chamfer as shown in Figs. 1, 2 and 3. When the puncturing pin 33 is driven through the reduced wall portion 18 of the cartridge case 15, as shown in Figs. 2 and 3, it makes a round hole in the reduced wall portion 18 and is thrust far enough through so that the full round solid end of the puncturing pin extends below the inner surface of the reduced wall portion 18 and the lower end of the groove 34 is within the cartridge case 15. The two outside prongs 35—35 on the spade portion 32 of the stem 29 rest on the top of the cartridge case 15 and limit the extent of the thrust of the puncturing pin 33 through the reduced wall portion 18 of the cartridge case 15, and in cooperation with the puncturing pin 33 form two arch-like channels on opposite sides of the puncturing pin 33 for circulation of the water or other fire extinguishing medium across the top of the cartridge case 15. Between the enlarged lower cylindrical end 31 and the shank portion 30 of the stem 29 is an outwardly projecting annular shoulder 36 which bears against

the inner wall surface of the larger end 14 of the reducing coupling 13 and the inner wall surface of an inwardly projecting annular shoulder 37 provided in the upper portion of the sleeve coupling 20 as shown in Fig. 1.

On the outer end of the stem 29 is an impact knob 38 to receive a blow administered to the stem 29 when the puncturing pin 33 is to be thrust through the reduced wall portion 18 of the cartridge case 15. The impact knob 38 has an inverted cone-shaped upper portion terminating in a cylindrical lower portion which is longitudinally bored to accommodate the outer end of the shank 30 of the stem 29. Laterally projecting from the lower cylindrical portion of the impact knob 38 is a lug 39 and directly below the lug 39 and extending in the same direction are a pair of spaced fingers 40, only one of which is shown in Fig. 1. The lug 39 is beveled on its under surface and cooperates with a spring pressed bolt 41 supported by a bracket 42 on the fin 12 to hold the stem 29 in its projected position and driven through the reduced wall portion 18 of the cartridge case 15. The spaced fingers 40 project on opposite sides of the bracket 42 and prevent rotation of the stem 29.

In operating the fire extinguisher a blow is delivered to the impact knob 38 sufficient to drive the stem 29 inward of the tank 1. This may be conveniently done by turning the extinguisher upside down and driving the impact knob 38 against a floor surface. The stem 29 thereby is driven inward of the tank 1 and the puncturing pin 33 of the stem 29 is thrust through the reduced wall portion 18 of the cartridge case 15. The lug 39 on the impact knob 38 is driven against the spring pressed bolt 41 and causes sufficient displacement of the bolt 41 to allow the lug 39 to pass. When the lug 39 passes the bolt 41 the spring pressed bolt 41 again resumes its normal position and prevents withdrawal of the puncturing pin 33 from the cartridge case 15.

When the puncturing pin 33 is driven through the reduced wall portion 18 of the cartridge case 15, carbon dioxide within the cartridge case 15 begins to escape from the cartridge case 15 into the protecting sack 46 by way of the groove 34 in the pin 33 and the side outlet ports 24—24 of the sleeve coupling 20. The carbon dioxide escaping into the protecting sack 46 from the cartridge case 15 develops sufficient pressure within the protecting sack 46 to expand the neck portion 47 and release the neck portion 47 from the annular groove 45 of the ferrule 25. When the neck portion 47 is expanded sufficient to release it from the annular groove 45, the protecting sack 46 is blown by the expanding gas along the sleeve coupling 20 in the direction of the bell end 26. When the neck portion 47 of the protecting sack 46 is driven past the side outlet ports 24—24 of the sleeve coupling 20, the neck portion 47 contracts about the bell end 26 of the sleeve coupling 20 sufficient to prevent the protecting sack 46 from being blown entirely off the sleeve coupling 20. The side outlet ports 24—24 being free of the protecting sack 46, the carbon dioxide escaping from the cartridge case 15 and passing through the side outlet ports 24—24 escapes into the tank 1 and expands therein sufficient to drive the water from the tank 1 out through the outlet connection 6. The water then flows through the hose 43 and nozzle 44 with sufficient force to be directed on a fire.

In the event that the charge of carbon dioxide released from the cartridge case 15 is of considerable magnitude and that the contraction of the neck portion 47 of the protecting sack 46 about the bell end 26 of the sleeve coupling 20 is not sufficiently rapid or effective to immediately stop the passage of the protecting sack 46 along the sleeve coupling 20, after it leaves the portion of the sleeve coupling 20 in which the side outlet ports 24—24 are located, the annular offset 27 on the lower end of the sleeve coupling 20 will positively prevent the protecting sack 46 from being blown entirely off the sleeve coupling 20.

A ferrule 25 having an annular groove 45 has been shown and described as a supporting means for the protecting sack 46. It is understood, however, that the ferrule 25 may be made integral with the sleeve coupling 20 or that other means may be provided for supporting the protecting sack without departing from the spirit of this invention.

What is claimed is:

1. In a fire extinguisher comprising a tank, a cover member, a cartridge of compressed fluid and a holder to suspend said cartridge from said cover member, a sack enclosing said cartridge and said holder, an expandible neck portion on said sack, and a grooved ferrule supported by said holder, the expandible neck portion of said sack being stretched over said ferrule and said sack being automatically removable from said ferrule by fluid released from said cartridge.

2. In a fire extinguisher comprising a tank and a cartridge of compressed fluid, a holder for said cartridge, an outlet portion in said holder, an enclosure member for said cartridge and said holder, supporting means for said enclosure member and stop means for said enclosure member on said holder, said enclosure member being automatically removed from said outlet portion of said holder by fluid issuing from said cartridge and said stop means preventing complete removal of said enclosure member from said holder when the extinguisher is operated.

3. In a fire extinguisher comprising a tank and a cartridge of compressed fluid, a coupling to support said cartridge within the tank, an apertured portion in said coupling, a sack enclosing said cartridge and said coupling, said sack having an expandible neck portion, means engaged by the expandible neck portion of the sack to support said sack and an enlarged end portion on said coupling to prevent complete removal of said sack from said coupling, said sack being automatically removed from the apertured portion of said coupling by fluid issuing from said cartridge when the extinguisher is operated.

4. In a fire extinguisher comprising a tank and a cartridge of compressed fluid, a coupling to support said cartridge within the tank, an enlarged bell end portion on said coupling, an outlet portion on said coupling, a sack enclosing said cartridge and said coupling and having an expandible neck portion, and supporting means engaged by the expandible neck portion of said sack to support said sack, said sack being blown along said coupling by fluid issuing from the cartridge when the extinguisher is operated and said expandible neck portion contracting about the enlarged bell end of the coupling when the sack has been removed from the outlet portion of said coupling.

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