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DISCHARGER FOR PRESSURIZED METAL BULBS

Filed July 5, 1949

2 SHEETS—SHEET 1

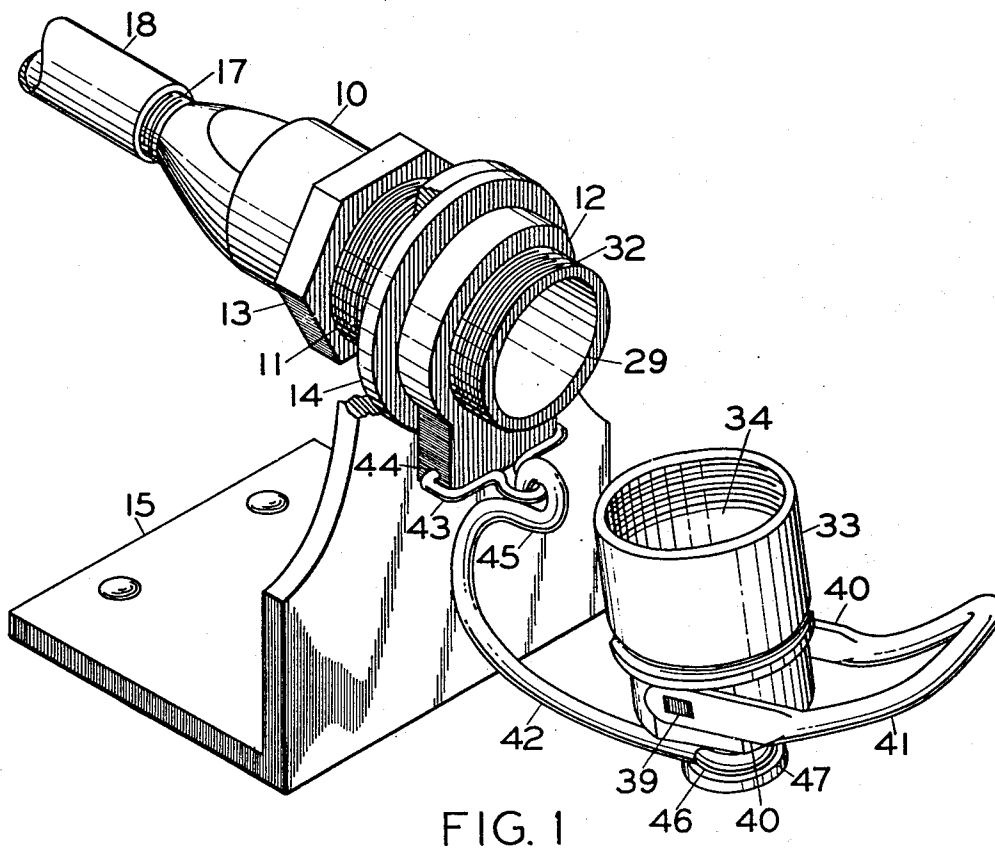


FIG. 1

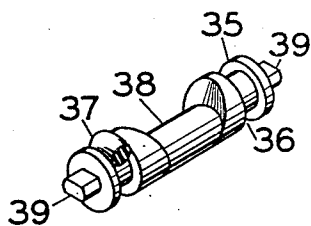


FIG. 2

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2 SHEETS—SHEET 2

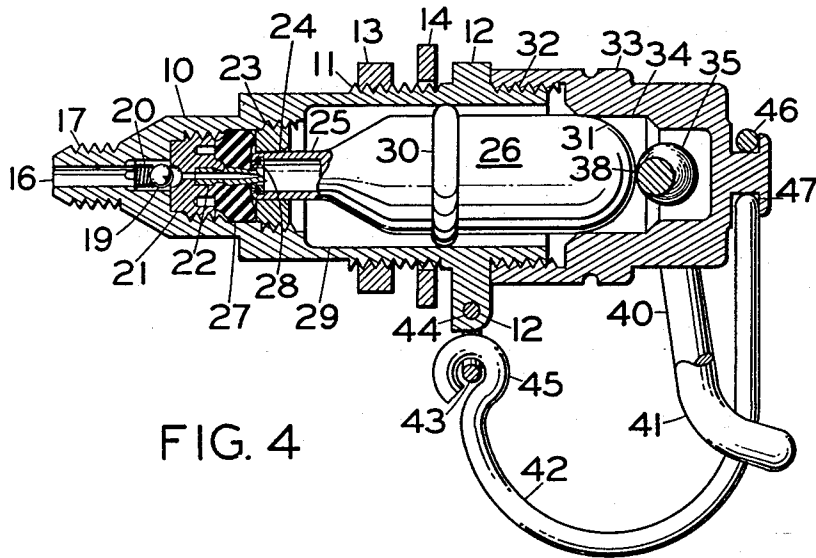


FIG. 4

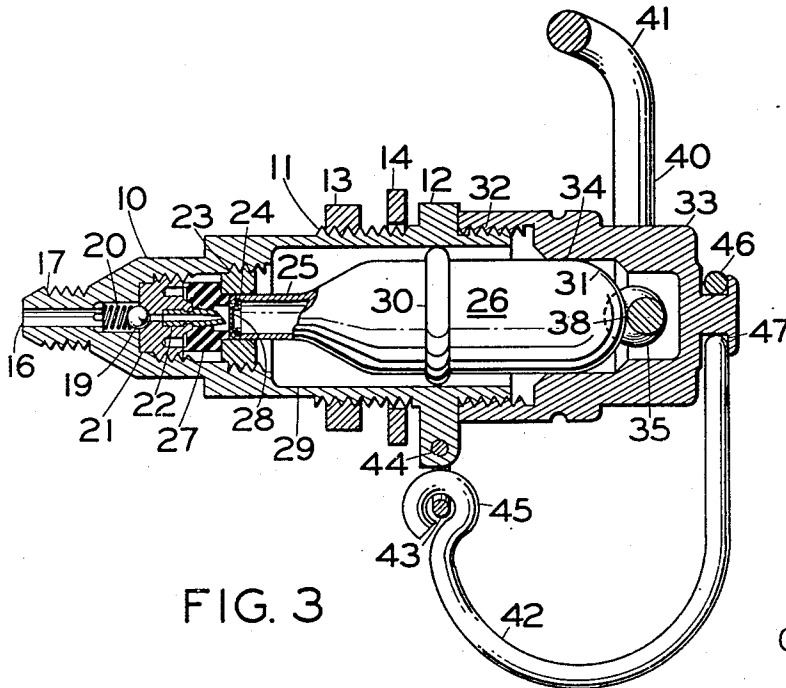


FIG. 3

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DISCHARGER FOR PRESSURIZED
METAL BULBS

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13 Claims. (Cl. 222-5)

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This invention relates to a discharger for a pressurized metal bulb for retaining a charge of liquid until it is to be released into the atmosphere or into a conduit system such as the intake manifold of an internal combustion engine, and particularly refers to an arrangement of a body for receiving the bulb and a closure therefor having a connector which is interlocked with the bulb-discharging means for preventing undesired actuation of the latter when the closure is applied to said body to retain said bulb therein.

One type of bulb for which this invention is adapted consists of a drawn metal shell, generally cylindrical in shape, with a hemispherical base at one end and a contracted neck at the opposite end which is closed by a perforable metal seal or diaphragm. Various types of holders or dischargers have been employed for these bulbs so that they may be retained indefinitely in a charged condition and discharged at will by piercing the diaphragm with a hollow sharpened pin which is suitably connected to the space into which the contents of the bulb are to be forced by the gas pressure therein. After discharge, the empty bulb is removed and discarded and a filled and pressurized, or charged, unit is inserted in the holder.

Two systems of discharging the bulb are generally in use, one in which the bulb is inserted into a side-opening receiver, with an abutment for the base of the bulb, and means for moving the piercing pin relative to the receiver and the bulb, as by a threaded connection to the receiver, and the other in which the hollow pin is fixed within the receiver recess and the bulb diaphragm is pressed against the sharpened end of the pin by an axial plunger, an externally actuated cam, or a threaded cap which engages the base of the bulb. In that arrangement which utilizes an externally actuated cam for urging the bulb against the hollow pin, it is essential that the cam be in its retracted position when the closure cap is secured to the receiver body, otherwise the bulb will be discharged inadvertently when the cap is seated or applied to the body.

In certain environments, as in tractors, aircraft, and the like, where dischargers of this nature are installed to introduce priming liquids into the engine to facilitate starting in cold weather, and, particularly in military equipment, some form of retainer to connect the bulb-retaining cap to the discharger body is almost universally required to prevent loss of the cap when it is removed.

It is an object of this invention to provide an

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improved arrangement of a discharger of the last-named type with an inter-locking arrangement between the cam-actuating mechanism in the removable cap for the receiver, and the retainer means which connects the cap to the receiver body in such a manner that the cap may be removed for replacing bulbs and may be replaced on the body to retain a charged bulb therein only when the cam-actuating or bulb-discharging mechanism is in retracted or inoperative position.

Another object is to provide a hinged connector for the cap and the body of a unit of this kind which will be of simple construction and which will at least partially align the receiver and cap to facilitate replacement of the latter in stormy or freezing weather which requires the wearing of heavy gloves or mittens by the operator of the device.

A further object is to provide an improved safety construction of a unit of this kind which is adapted to receive a pressurized bulb of reduced overall length having a circumferential bead or enlargement intermediate the length of its cylindrical portion, thereby preventing inadvertent utilization of a bulb of ordinary configuration and length but filled with a fluid of improper characteristics for the service required. For example, a plain bulb filled with carbon dioxide intended for inflating a life preserver could not be substituted for an externally beaded, shortened, ethyl ether-filled bulb intended for starting a diesel engine, and vice versa.

These and other objects and advantages of the invention will be further apparent from the following description, and the accompanying drawings, which form a part of this specification and illustrate a preferred embodiment as applied to a discharger for pressurized metal bulbs.

In the drawings, Figure 1 is a perspective view of a discharger with the cap removed but retained against loss by a connector, and with the cam-actuating means in retracted position. Figure 2 is a perspective view of one form of cam which has been found suitable for use in the discharger cap. Figure 3 is a longitudinal sectional view of the discharger of Figure 1 with the cap attached and a bulb in place and ready for discharging. Figure 4 is a longitudinal sectional view of the discharger with the cam-actuating means in extended or discharging position, illustrating the interlocking relation between the cam-actuating means and the cap-retaining means.

Referring to the drawings and particularly to

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Figures 1 and 2 thereof, reference number 10 designates generally the body of the discharger which may be of any suitable material, for example, aluminum-zinc alloy, having a threaded portion 11 and a shoulder 12 intermediate its ends, with a nut 13 and washer 14 for securing the body 10 to any suitable support such as bracket 15. The end of body 10 surrounding outlet bore 16 is threaded at 17 so that the contents of the bulb to be discharged may be carried through conduit 18 to the space where they are to be utilized, for example, the intake manifold of an internal combustion engine (not shown). Bore 16 may be provided with a check valve 19 and spring 20 to prevent undesired back flow of fluid from conduit 18 into discharger body 10. A hollow threaded plug 21 provides a seat for ball check 19 and rigidly supports a hardened steel piercing element or hollow pin 22 in body 10. A second threaded plug 23 in the base of body 10 has a bore 24 to receive the contracted neck 25 of the bulb 26 to align it and the diaphragm closure or seal for the bulb with the sharpened end of piercing pin 22. Between plugs 21 and 23 is a sealing gasket 27, which may be of synthetic rubber or other resilient material that is not affected by the fluids to be handled. Gasket 27, in this example, serves a two-fold purpose, that of supporting the tip or neck 25 of the bulb 26, thereby normally holding bulb closure or diaphragm 28 out of contact with the piercing pin 22, and also acting as a fluid seal for these parts when the diaphragm 28 is pierced (Figure 4), as will be discussed below.

Body 10 is provided throughout a part of its length with a cylindrical recess 29 which is of suitable diameter to receive the bulb body 26 or any enlargement thereof, for example, bead 30. Desirably the recess 29 is of such a length that the base 31 of bulb 26 will extend therefrom when the cap is detached to enable a person to grasp the bulb and remove it for disposal. To insure against undesired interchange of bulbs having different fluid contents, the safety provision of circumferential bead 30, which prevents utilization of such a bulb in a receiver having a recess for the normal smaller diameter of bulb, usually shortens the overall bulb length of the beaded unit to an extent that the normal bulb is too long for the space within the receiver and cap cavity that is designed for the beaded bulb. Thus, the diameter of the beaded bulb is too large for the normal receiver, for example, in a life jacket inflater, and the normal bulb, while its smaller diameter will admit of its entering a receiver for the beaded bulb, will be too long to be operative in the latter.

The outer end of body 10, adjacent shoulder 12, is threaded as at 32 to receive a correspondingly threaded cap 33 which is provided with a cavity 34 of adequate diameter to receive the base portion 31 of the bulb 26. In this example, the diameter of body recess 29 is larger than that of cap cavity 34 to receive the "safety" or non-interchangeable bulb configuration as discussed above. In cap 33 and extending across cavity 34 is a cam member generally designated 35, journaled at each end in the cap body and provided with circumferential grooves 36 to receive annular resilient sealing rings 37 (Figure 2). The offset or eccentric portion of cam 35 is designated by reference number 38 and is positioned centrally of the cap 33 at the inner end of cavity 34. The outer ends of cam 35 are desirably flattened at 39 and, in this example, are

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riveted or otherwise secured into corresponding openings in the ends of the arms 40 of the bifurcated handle 41 which is adapted to rotate the cam 35 to move its offset portion 38 from its withdrawn or retracted position (Figure 3) in cavity 34 to its extended or bulb-discharging position (Figure 4) in that cavity. Desirably, but not necessarily, the medial portion of handle 41 is displaced angularly from the plane of the arms 40 (Figure 3) for a purpose which will be explained in detail below.

An arcuate cap-retaining or securing member 42, in this example a length of spring wire, is used in this example to connect cap 33 with body 10 by a hinged loop 43 having ends extending into transverse bore 44 in shoulder 12, which loop is in turn engaged by a loop 45 at the inner end of member 42. The outer end of member 42 is pivotally connected by a loop 46 and a circumferential groove 47 to the top of cap 33 in a position such that the axis of cam 35 is located substantially between the ends of the arcuate member 42 when the cap 33 is assembled in the body 10. If desired, member 42 may be made of smaller diameter or more flexible material and received directly into transverse bore 44, thus making a swiveled or pivoted connection to the body 10.

The purpose of the arrangement of cap-retaining member 43 and cam-actuating handle 41 will be apparent from Figures 3 and 4. With the handle 41 in its bulb-discharging position (Figure 4) the angularly displaced medial portion of the handle 41 will partially surround the member 42, which latter member will thereby form an obstruction preventing the handle 41, and likewise the cap 33 to which it is attached, from being rotated in such a manner as to unscrew or otherwise rotate or remove the cap 33 from body 10. This requires the operator, after discharging a bulb 26, to move the handle 41 to the cam-retracted position of Figure 3, whereupon the cam handle 41 may be rotated about the longitudinal axis of body 10 and cap 33 and through the partial loop formed by the arcuate cap-retaining member 42 to unscrew the cap 33. Thereafter the operator may remove the empty bulb and replace it with a charged bulb. The angularly displaced medial portion of handle 41 facilitates this operation and gives added clearance in certain locations and arrangements. If when the cap 33 is disassembled from the body 10 the cam handle 41 should be moved, either accidentally or otherwise, to the bulb-discharging position of Figure 4, it will be impossible to apply the cap 33 to body 10, either with or without a charged bulb in recess 29, due to the engagement of handle 41 with member 42. In this way, the operator is effectively prevented from either intentionally or inadvertently inserting a charged bulb 26 (whose discharge may not be desired until some time has elapsed) into recess 29 of body 10 and closing the cap 33 thereon with the cam 35 in its extended or bulb-discharging position, which would fire or discharge the bulb prematurely.

The invention is considered to involve broadly, in this environment, of arrangements for providing interaction of the cam-actuating handle, which, in this example, is bifurcated for convenience and symmetry, but need not necessarily be so constructed, with a hinged or pivoted connecting member for the cap of a discharger of this nature and the body thereof, to prevent application of the cap as by any substantial rotation of the latter when the cam is in its bulb-discharging

position. Although the arrangement here shown uses a continuously threaded connection between the cap and body, it is obvious that an interrupted thread or even a pin and slot bayonet joint could be employed, using a lesser degree of rotation, to function in the same manner and accomplish the same result. Accordingly, although a single embodiment has been illustrated and described in detail, it is obvious that numerous other changes could be made without departing from the invention, and all such that fall within the scope of the appended claims are intended to be embraced thereby.

I claim:

1. In a discharger for a pressurized bulb having a perforable closure, the body of said discharger having a cylindrical recess for receiving said bulb with perforating means for said closure within said recess, the combination comprising a rotatable cap for said discharger body having a cavity for the base of said bulb, a rotatable cam in said cap cavity, a handle for said cam for selectively rotating it to an extended bulb-discharging position and a withdrawn cam-retracted position, and a pivoted member connecting said cap and said discharger body, said member being disposed between said cap and said discharger body in a position to engage said handle when the latter is in bulb-discharging position to prevent application of said cap to said body.
2. In a discharger according to claim 1, screw threads on said body and said cap for securing the latter thereon when said handle is in its cam-retracted position.
3. In a discharger according to claim 1, the handle for said cam being bifurcated, said pivoted member adapted to be received between the arms of said handle when the latter is turned to its bulb-discharging position to prevent application of said cap to said body.
4. In a discharger according to claim 1, the handle for said cam being bifurcated and secured to each end thereof and with an angularly displaced medial portion, the latter portion being adapted to engage said pivoted member when said handle is turned to its bulb-discharging position to prevent application of said cap to said body.
5. In a discharger according to claim 1, said member being rotatably secured to said cap in a position such that the axis rotation of said cam lies substantially between the ends of said member.
6. In a discharger for a generally cylindrical pressurized metal bulb having a perforable closure and a circumferential enlargement intermediate its cylindrical portion, the body of said discharger having a cylindrical recess to receive the enlarged portion of said bulb, with closure-perforating means at the bottom of said recess, the combination comprising a rotatable cap for said discharger body having a cavity for the base of said bulb, a cam in said cavity, a handle for said cam rotatable to a first position for urging said cam against the base of said bulb to force said bulb closure against said perforating means thereby to discharge the contents of said bulb, said handle being rotatable to a second position to retract said cam to a non-discharging position, and a swiveled connector for said cap and said discharger body, said connector being disposed between said cap and said discharger body in a position to engage said cam handle when the latter is in bulb-discharging position to prevent application of said cap to said body to an

extent which would result in premature discharge of said bulb.

7. In a discharger according to claim 6, said connector comprising an outwardly bent portion extending transversely to said body and said cap, said cam handle rotatable with said cap inside of said bent portion to attach said cap to said body only when said handle is in cam-retracted position.

8. In a discharger for a generally cylindrical pressurized metal bulb having a perforable closure, the body of said discharger having a cylindrical recess to receive said bulb, with closure-perforating means at the end of said recess and a removable cap for said body, the combination comprising actuating means for moving said bulb axially in said recess to perforate said closure, and pivoted securing means connecting said body and said cap said securing means being disposed between said body and said cap in a position to interlock with said actuating means when the latter is in position to perforate said bulb closure to prevent application of said cap to said body to an extent which would result in premature discharge of said bulb.

9. In a discharger according to claim 8, in which the said actuating means extends transversely from the side of said cap and said securing means is attached to the cap in a position to engage said actuating means when the bulb has been moved to the closure perforating position.

10. A device for piercing a hermetically sealed container comprising a housing to receive said container, a piercing element in said housing, a rotatable cover for said housing, a retainer for said cover, means supported by said cover for forcing said container against said piercing element, and means coacting with said cover, said forcing means and said retainer to prevent said cover from being rotated when said forcing means is in position to force said container against said piercing element.

11. A device for piercing a closed container comprising a housing to receive said container, a detachable cover for said housing, a piercing element for piercing a wall of said container, an actuating mechanism having a first position in which it is operative to cause said piercing element to pierce said container and a second position in which it is inoperative to cause said piercing element to pierce said container, and means coacting with said actuating mechanism and said cover to prevent said cover from being attached to said housing when the actuating mechanism is in the said first position.

12. A device for piercing a closed container comprising a housing to receive said container, a detachable cover for said housing, a piercing element for piercing a wall of said container, an actuating mechanism having a first position in which it is operative to cause said piercing element to pierce said container and a second position in which it is inoperative to cause said piercing element to pierce said container, and means co-acting with said actuating mechanism and said cover to prevent said cover from being attached to said housing when the actuating mechanism is in the said first position, and permitting said cover to be attached to said housing when the actuating mechanism is in the said second position.

13. In a discharger for a pressurized container having a perforable closure, the body of said discharger having a recess to receive said container, with closure-perforating means at one end

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of said recess and a rotatable cap for the other end of said recess, the combination comprising actuating means rotatable about an axis transverse to the axis of said body for moving said container axially in said recess to engage said perforating means and means connected to said body and engageable with said actuating means when the latter is rotated to container-discharging position to prevent rotation of said cap, said means which is connected to said body being free from said actuating means when the latter is rotated to its retracted position whereby the said cap may then be rotated with respect to said body.

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