

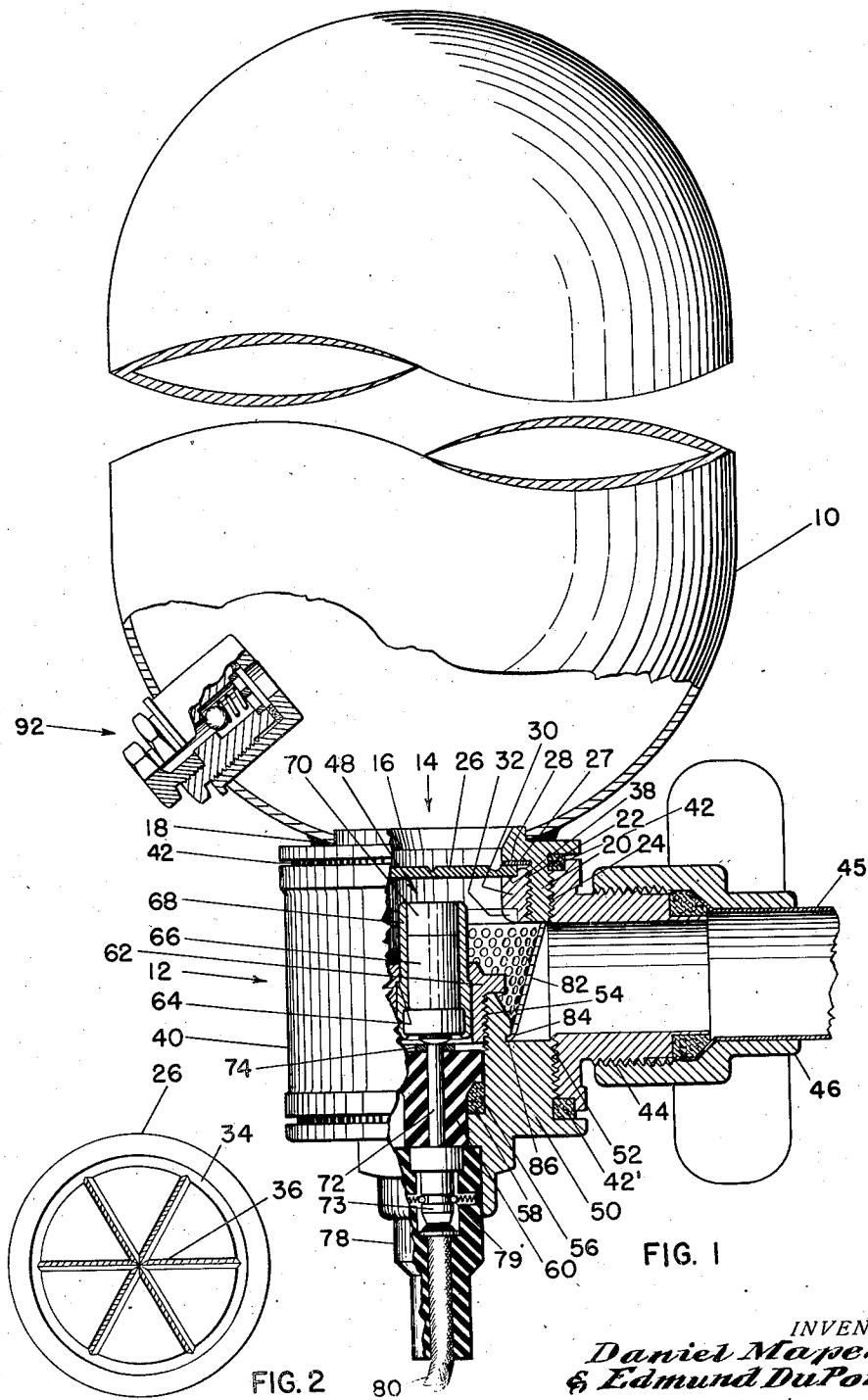
March 11, 1947.

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2,417,082

APPARATUS FOR DISCHARGING FLUIDS UNDER PRESSURE

Filed March 13, 1944



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## UNITED STATES PATENT OFFICE

2,417,082

APPARATUS FOR DISCHARGING FLUIDS  
UNDER PRESSURE

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Application March 13, 1944, Serial No. 526,216

9 Claims. (Cl. 169—28)

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This invention relates to improvements in apparatus for discharging fluids under pressure, and more particularly to the discharge of fluid pressure medium from storage containers adapted to be used for fire extinguishing purposes.

The invention contemplates the discharge of methylbromide, carbon dioxide, carbontetrachloride or any other fluid medium stored under pressure in a sealed container such as is generally used in fire extinguishing or other dispensing apparatus.

One of the objects of the invention is the provision of a novel discharge head for such containers wherein the container seal is instantaneously broken upon the operation of actuating means whereby a high rate of discharge of the fluid from the container is provided.

Another object, in connection with discharge means having an outlet or conduit for a source of fluid under pressure, is to provide an outlet closure member or disc embodying a peripheral portion and a central portion, or portion bounded by the peripheral portion, for separation therefrom which is adapted for shattering into fragments or defined portions independently of such separation.

Another object is to have the above mentioned central portion, in addition to being adapted for breakage into fragments or defined portions, to be adapted for separation from the peripheral portion as a defined area for such breakage.

Another object of the invention is the provision of novel sealing means for the container.

Other and further objects of the present invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawing forming a part of the specification wherein:

Figure 1 is an elevational view, partly in section, of the improved discharge head of the present invention attached to a container; and

Figure 2 is a top plan view of the sealing disc of the discharge head.

Referring to the drawing in detail, there is shown a container 10 for a fluid pressure medium having an opening 14 to which a discharge head 12 is secured. A bushing 16 fits within the opening 14 and is secured to the container in any

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suitable manner, as for example, by welding the same thereto at 18. The bushing 16 has a collar 20 extending outwardly of the container, which is provided with internal and external screw threads 22 and 24, respectively.

The opening 14 of the container is closed by means of a shatterable disc 26, which is placed on a gasket 27 seated on a shoulder 28 of the bushing 16, and held in place by any suitable means such as a retaining ring 30, which is screw threaded for threaded engagement with the internal threads 22 of the bushing 16. The ring 30 is provided with slots 32 for the reception of a suitable operating tool whereby the same may be screwed into and out of position.

The shatterable disc 26 is made of such material as to be capable of being broken into fragments, as distinguished from a disc capable of being cut or severed. This disc, as will be seen from Figure 2, has an annular scored or weakened zone 34 and transverse intersecting diametrical scored or weakened zones 36, at which zones the disc may be shattered into a predetermined number of pieces. As will be seen from Figure 1, the retaining ring 30 is provided with a recess 38 for the reception of the disc 26. The internal diameter of the ring 30 is substantially equal to the internal diameter of the bushing 16, and the annular scored or weakened zone 34 of the disc 26 is substantially in alignment with these internal diameters.

A substantially T-shaped fitting or coupling 40, which constitutes the outer shell or casing of the discharge head 12, is screw threaded internally at its upper end for threaded engagement with the external threads 24 of the collar 20 of the bushing 16, whereby the coupling may be removably secured to the bushing and hence to the container. A gasket 42 is provided between a flange on the bushing 16 and a shoulder in a recess of the coupling to insure a leak-proof connection. The coupling 40 has an outlet portion 44 provided with a port leading to a discharge conduit which is threaded externally to receive a coupling 46 for attachment of a conduit or hose 45 or other distributing means.

The coupling 40 provides a discharge chamber 48 closed at the upper end by the shatterable disc 26 and at the lower end by a plug 50 which is screw threaded at 52 whereby it may be removably secured to the coupling 40. A gasket 42' is provided between a flange on the plug 50 and a shoulder in a recess of the coupling to insure a leak-proof connection. This plug is apertured or recessed at 54 for the reception of means

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for shattering the disc 26, which will be described presently.

A compressible ring or gasket 56 is seated in the recess 54 on a shoulder 58. A block 60 of insulating material is held in the recess 54 in contact with said gasket 56 by means of a gland 62. The gland 62 is screw threaded into the end of the recess 54 whereby the gland may be screwed into position in the plug 50. The gland 62 is provided with a shoulder 64 for retaining an explosive cartridge 66 therein. This cartridge is adapted to be fired electrically and comprises a shell 68 and a projectile or slug 70 for shattering the disc 26.

The block 60 of insulating material, mounted in the recess 54 of the plug 50, is provided with a central bore for receiving an electric conductor 72 which terminates at its inner or upper end in a contact head 74 adapted to contact the lower end of cartridge 66. The other end of the electric conductor 72 is provided with a terminal 73 adapted to be inserted in a conventional socket 78 of insulating material having resilient means such as the spring pressed balls 79 for removably holding the said terminal 73 of the conductor 72 in the said socket 78. The socket 78 carries the usual flexible electric conductor 80 leading to a source of electric current (not shown). The electric conductor 80 leads to the terminal 73 of the conductor 72 and another conductor is grounded in the discharge head to complete the electric circuit to the cartridge. In conventional installations of devices of this character, the device is mounted in a metal bracket secured to the wall of a vehicle, airplane or the like; the wall, and consequently the bracket, being electrically connected to one terminal of the vehicle battery, while the conductor 80 is in the other leg of the circuit leading from the other terminal of the battery. When it is desired to operate the device to discharge the contents a switch (not shown, but generally on the instrument panel of the vehicle, and in the battery circuit) is closed to complete the circuit to the cartridge. In some installations the circuit is closed automatically by means of a fire detecting device, while in still other installations the plug 78 may be omitted and the device operated manually by striking the terminal 73 or its equivalent.

A shield, 82, in this instance shown as a cup or cup-like receptacle having a perforated wall, is provided in the discharge chamber for the purpose to be described presently. This shield is frusto-conical shaped, and is open at both ends. The narrower end of the shield is provided with a bead 84 adapted to be received in an annular groove 86 of the plug 50 while the other end of the shield engages the collar 20 of the bushing 16 when the shield is positioned in the chamber 48.

In the operation of the device to release the fluid pressure medium, a circuit (not shown) is closed to supply electric current to the conductor 80, in the manner previously described which current is conducted to the cartridge 66 by way of conductor 72 to fire the cartridge. Upon explosion of the cartridge the projectile or slug 70 will be forcibly propelled against the shatterable disc 26 whereby the disc will be shattered along the annular and diametrical weakened zones into a number of pieces predetermined by the number of such zones in the disc. Shattering of the disc releases the fire extinguishing medium which passes through the discharge chamber 48 and out

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through the discharge outlet to the hose 45 or other distributing means.

The size of the shattered pieces or sectors of the disc 26, as will be appreciated, is determined by the number of diametrical zones 36 in the disc. These pieces or sectors as will be seen from Figure 2 are considerably smaller than the opening 14 in the neck of the container 10 so as definitely not to clog or obstruct said opening.

By reason of the internal diameters of the bushing 16, and the collar 20 being in alignment with the annular weakened zone 34 of the disc the rupturing of the disc along the zone 34 will provide a uniform uninterrupted passage for the fluid.

Since the container 10, preferably but not necessarily, is mounted with its discharge head lowermost, it will be appreciated that after shattering of the disc 26, the projectile or slug 70 and the pieces of the disc will fall by gravity into the discharge chamber 48 and will be trapped by the shield 82 and thereby will be prevented from entering the discharge outlet portion 44. The shield, by reason of its perforated or articulated wall, will readily permit free passage of the fluid medium from the discharge chamber while retaining the fragments of the disc and the slug or projectile.

After the discharge of the contents of the container, the discharge head may be removed by unscrewing the coupling 40 from the collar 20 to permit the removal of the fragments of the disc and the slug and the insertion of a new cartridge and shatterable disc in place, after which the head may be restored to its position on the container.

After replacing the discharge head on the container, the container may be readily refilled or recharged through a check valve 92 in the wall of the container. By employing a refill check valve remote from the discharge head, the container can be refilled or recharged without disturbing the discharge head or any of its parts.

It will be seen from Figure 1 that the block 60 of insulating material and the cartridge retaining gland 62 are inserted in the plug 50 from the inside. This arrangement provides, in addition to the threaded connections, assurance against these members being blown out upon the discharge of the cartridge.

While an electrically fired explosive cartridge as the shattering means for breaking the sealing disc has been illustrated and described, it is to be understood that a manual, mechanical or pneumatically operated plunger or rod, or any other desired shattering means may be employed without departing from the spirit and scope of the invention.

From the foregoing, it will be appreciated that the present invention provides an improved apparatus of the character indicated having manifold advantages over prior structures.

As various changes may be made in the form, construction and arrangement of the parts herein, without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in any limiting sense.

It is also to be understood that the following claims are intended to cover all the generic and specific features of the invention herein described, and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween:

What is claimed is:

1. A fluid pressure medium releasing apparatus comprising a container for the fluid medium, a closure disc for said container having predetermined weakened portions, a discharge head providing a discharge chamber and a discharge outlet, shattering means in said discharge head in alignment with said disc, explosive means for forcibly propelling said shattering means against said disc to shatter the same into fragments whereby to release the fluid pressure medium from the container, and means interposed between said disc and said outlet for preventing the entry of fragments into said outlet.

2. In a fire extinguishing apparatus, the combination of a container for fire extinguishing medium under pressure, a disc for closing said container, said disc being provided with weakened portions, a discharge head secured to said container providing a discharge chamber and a discharge outlet, shattering means in said discharge head in alignment with said disc, explosive means for forcibly propelling said shattering means against said disc whereby to shatter the same at said weakened portions into fragments to release the medium to said chamber and outlet, and means in said chamber preventing the shattered fragments of the disc from entering the said outlet while permitting passage of the medium from the container through said chamber to and out of said outlet.

3. In a fire extinguishing apparatus, the combination of a container for fire extinguishing medium under pressure, a shatterable closure member for said container, a discharge head secured to said container providing a discharge chamber and a discharge outlet, a cartridge having a projectile in said discharge head in alignment with said closure member, electrical means for igniting said cartridge whereby to project said projectile against said closure to shatter the same and release the pressure medium to said chamber and outlet, and a perforated shield in said chamber preventing the projectile and shattered fragments of the closure member from entering the said outlet.

4. In a fire extinguishing apparatus, the combination of a container for fluid medium under pressure, a closure for said container having means to permit shattering thereof, a discharge head for the container adjacent said closure and having passage means for the fluid medium leading therefrom, an explosive cartridge having a projectile in alignment with said closure, means for firing said cartridge to forcibly propel said projectile against said closure to break the same into fragments whereby to release fluid medium from the container, means intermediate said closure and passage means for preventing the entry of said fragments into said passage means, and means independent of said discharge head for permitting refilling or recharging the container.

5. In a fire extinguishing apparatus, the combination of a container for fluid pressure medium, a discharge head secured to the container, a removable plug in said discharge head having an internal recess, a shatterable closure for the container, and actuating means within said recess for shattering said closure to release the pressure medium from the container.

6. In a fire extinguishing apparatus, the combination of a container for fluid under pressure, a discharge head removably secured to the container, a plug in said discharge head having an internal recess, a closure disc having means to facilitate shattering thereof, and explosive means within said recess for shattering said disc to release the fluid from the container, said plug being removable to permit of renewing the explosive means after the shattering of the disc and the release of the fluid.

7. A fluid pressure medium releasing apparatus comprising a container for the medium having an outlet, a closure member for said outlet, a discharge head secured to said container over said outlet and providing a discharge chamber and a discharge outlet, means in said discharge chamber for rupturing said closure member, and means in said discharge head interposed between said closure member and said discharge outlet for preventing the entry of ruptured portions of said closure member into said discharge outlet.

8. A fluid pressure medium releasing apparatus comprising a container for the medium having an outlet, a closure for said outlet having weakened portions for facilitating fragmentation thereof to provide a clear passage of predetermined size and shape at said outlet whereby the medium is adapted to be discharged from said container at a predetermined rate, a discharge head secured to said container over said closure and having a discharge outlet for the discharged medium from said head, means in said discharge head for breaking said closure into fragments, and means in said discharge head between said outlets for preventing the entry of fragments of said closure into said discharge outlet.

9. In combination, a container for fluid pressure medium having an outlet formed therein, a closure disc for said outlet formed of shatterable material capable of being broken into fragments and having an annular weakened zone adjacent its periphery and a transverse weakened zone located within the said annular zone to facilitate shattering of the disc into a predetermined number of defined fragments to release the fluid medium through said outlet, said annular weakened zone defining a peripheral rim, and means for retaining said closure disc in said outlet before shattering and for retaining the said peripheral rim after shattering.

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