

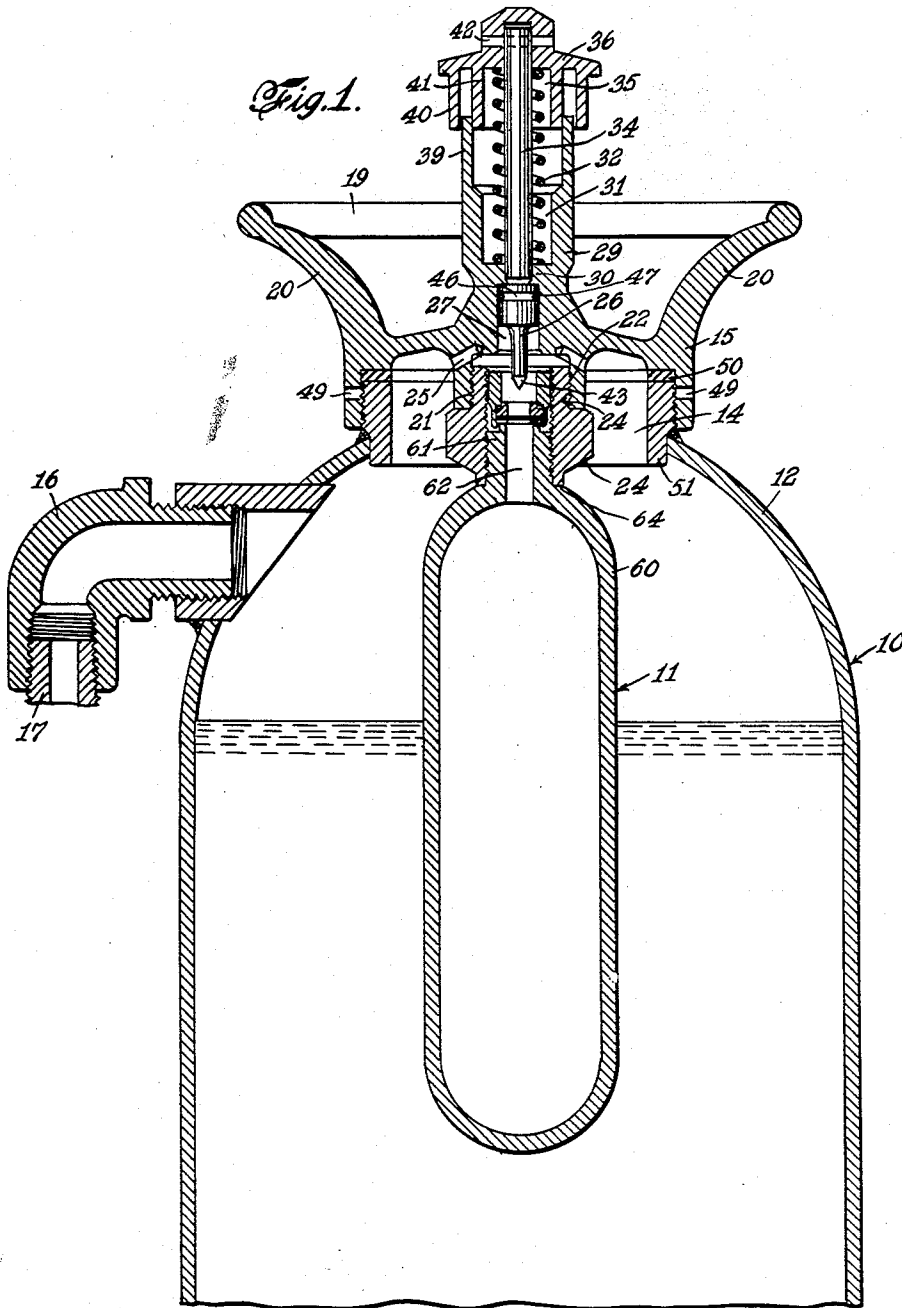
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R. H. HILL
CARTRIDGE

2,682,967

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2 Sheets-Sheet 1



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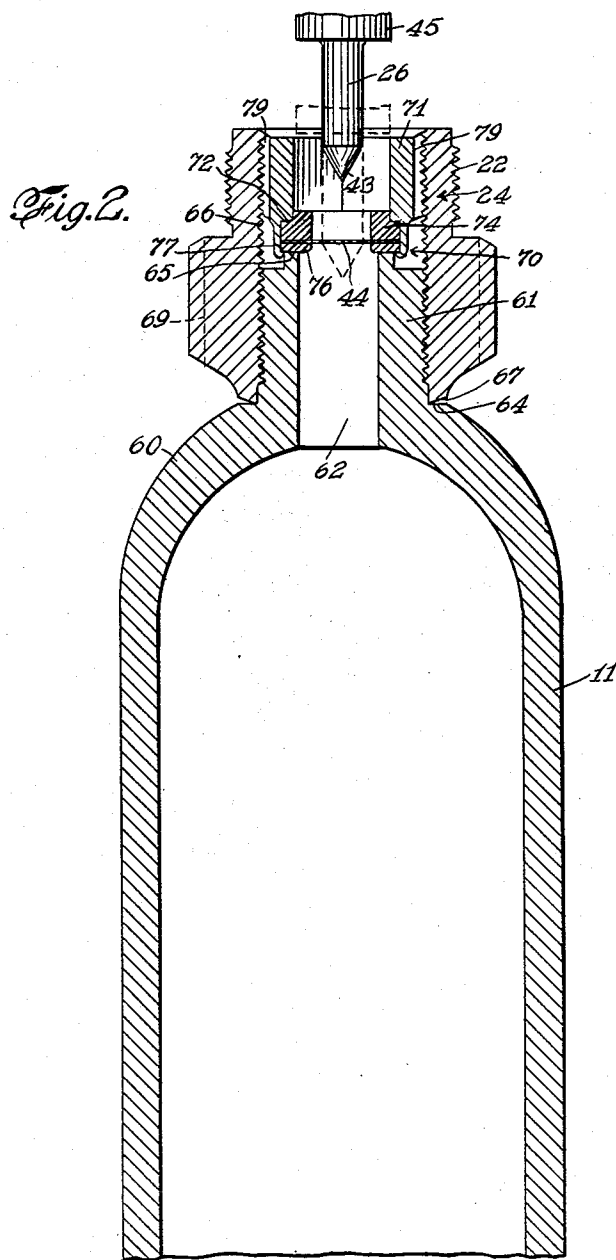
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2 Claims. (Cl. 220-27)

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The present invention relates to stored fluid pressure medium containers and closures therefor such as may be used for pressurizing fire extinguishers or other devices containing an agent to be expelled by pressure of released stored pressure medium.

The containers are charged with a compressible fluid such as carbon dioxide at a high pressure and are provided with a bushing or collar carrying a rupturable sealing disc adapted to be punctured to release the pressure medium. When the containers are made of comparatively small capacity such as for the storage of about 4 ounces of carbon dioxide, they are termed "cartridges" in the trade. The device with which the cartridge is to be used, such as a fire extinguisher, is constructed with a puncturing member operable to pierce the rupturable sealing disc of the cartridge.

Heretofore cartridges have been provided in which the closure member has been secured in threaded engagement with the inner surface of the cartridge neck. In such cartridges, a seating surface for the disc assembly has been provided on a shoulder about the passage through the closure member. In such cartridges, in order to provide adequate strength in the neck thereof so that the closure member will be held securely against the pressure, it is necessary to form the cartridge with thickened material in the region about its neck. The additional material not only adds to the cost of the cartridge but requires heavier equipment to fabricate the material.

The present invention aims to provide an improved cartridge wherein closure means for the cartridge overlies the container neck, thus permitting a construction wherein the cartridge neck may be made with a minimum of material.

Another object of the invention is to provide a cartridge which is simple and economical in manufacture, efficient in operation and durable in use.

In accordance with the invention, the foregoing objects are accomplished by providing a cartridge in which an external bushing is adapted to overlie the outlet neck which has its outer end formed to provide a seat for a sealing disc. The construction in accordance with the invention is advantageous in that one point of leakage of prior devices is eliminated along the threads between the closure member and the wall of the neck of the cartridge.

Another advantage of the construction in accordance with the invention is that a sealing seat is provided of comparatively tough material less liable to become damaged by small particles of

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abrasive material which may become entrapped between the sealing disc assembly and the seat. Any roughness which might result from the presence of such particles probably would cause damage, if any, to the gasket material which is replaced each time the cartridge is recharged.

Other objects and advantages of the invention will be apparent from the following description and drawings which show, by way of example, an embodiment of the invention.

In the drawings:

Figure 1 illustrates a fragmentary vertical sectional view of a fire extinguisher incorporating a cartridge made in accordance with the invention.

Figure 2 is an enlarged view of the upper end of the cartridge and its closure means illustrated in Figure 1. The puncturing member of the extinguisher is shown in full lines as representing its normal position and in dotted lines showing its position to rupture the sealing disc of the cartridge.

Referring to the drawings, there is shown in Figure 1 a liquid fire extinguisher 10 pressurized by a stored fluid pressure medium container 11 made in accordance with the invention. The extinguisher may be charged with any suitable fluid, such as water, carbon tetrachloride, dry powder, etc.

The fire extinguisher 10 does not form part of the invention but is illustrated to show a use for the stored pressure fluid medium container or cartridge 11 made in accordance with the invention. It is understood that the cartridge 11 may be used to pressurize any other suitable device, such as small motors or the like, requiring a stored fluid pressure medium.

The fire extinguisher includes a standard shell 12 adapted to be almost completely filled with the liquid fire extinguishing agent through a filling opening 14 closed by a conventional filling cap 15. In order to expel the extinguishing agent, the stored fluid pressure medium is released from the cartridge 11, the fire extinguishing agent then being expelled through an outlet elbow 16 and a discharge hose 17 having attached thereto a suitable nozzle, not shown.

In order to facilitate its attachment and removal, the filling cap 15 has a hand ring 19 spaced from the body of the cap by legs 20. The hand ring 19 is used as a carrying handle as well as to facilitate engaging the cap with the cartridge. To provide a mounting for the cartridge 11, the underside of the filling cap 15 has a downwardly extending tubular portion 21 with a

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threaded inner surface to engage upper threaded end 22 of a collar or external bushing 24. Apertures 25 are made in the wall of the tubular portion 21 for the passage of released fluid from the cartridge 11.

In order to release the stored pressure fluid medium from its cartridge 11, puncturing means are provided in the cap member operable from the exterior of the extinguisher. A puncturing member 26 is carried for sliding movement in a guideway 27 of an upwardly turned hollow extension 29 of the cap member 15. The extension 29 is formed with its opening therethrough having various diameters along its length. The lower portion of the opening is somewhat enlarged to form the guideway 27 for the puncturing member 26. Immediately above the guideway 27, the opening is restricted to form a shoulder 30, and then enlarged to form a spring recess 31 for a spring 32 positioned about upper end 34 of the puncturing member 26. The spring 32 has its upper end received in a recess 35 of a cap member 36 and its lower end abutting against the shoulder 30. The upper end of the extension 29 is made with a reduced wall section 39 to provide a guideway to be received between side wall 43 of the cap member 36 and an inner annular guiding extension 41 positioned concentric therewith. A pin 42 is frictionally engaged in aligned holes extending through the cap member 36 and the upper end 34 of the puncturing member 26 to hold the assembly in position.

The puncturing member 26 has a pointed lower end 43 to facilitate rupturing a sealing disc 44 of the cartridge 11. An intermediate portion 45 of the puncturing member 26 is made with a somewhat larger diameter to be received in the guideway 27, and is grooved to provide a recess 46 for an O-ring 47 to prevent leakage.

The flange of the cap member 15 is made with safety venting apertures 49 to insure the release of any pressure in the shell 12 before the cap member 15 is completely unscrewed from the shell. A sealing gasket 50 is positioned against a shoulder formed on the under surface of the cap member and is compressed against the upper edge of flange 51 of the shell 12 to provide a leakproof seal.

The stored fluid pressure medium cartridge 11 in accordance with the invention includes a body or container portion 60, which may be made of any suitable material such as steel, to store a fluid medium under high pressure.

The upper end of the body 60 is made with a threaded neck 61 having an outlet passage 62 extending therethrough. The body of the container is flattened at the base of the neck to provide a shoulder 64. The outer end of the neck 61 is made with a seating surface 65 of reduced outer diameter, preferably with a flat surface, although any suitable surface may be used. The closure collar or external bushing 24 is tubular in shape with a threaded inner surface 66. The lower end of the bushing 24 is formed with a slightly pitched surface 67 adapted to abut against shoulder 64, preferably the surface 67 is inclined at an angle of about 10° from the plane of the shoulder 64. In order to attach and remove the cartridge in position, the bushing 24 is formed with a plurality of ears 69.

A unitary sealing disc assembly 70 includes a ring nut or internal bushing 71 having a threaded outer surface adapted to engage with the threaded inner surface 66 of the external bushing 24. At the lower end of the ring nut 71, a

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portion of enlarged internal diameter is made to provide a shoulder 72 to receive a gasket 74. The sealing disc 44 is positioned between the gasket 74 and an annular deformable gasket 76 and held in position by an inwardly spun end 77 of the ring nut 71. The end 77 is made with a somewhat reduced external diameter than the threaded portion to provide a thin wall which may be readily spun in to hold the parts in a unitary assembly. The sealing disc assembly 70 is adapted to be engaged in the threaded surface 66 of the bushing 24 to abut against the seat 65 to close the cartridge. A plurality of longitudinally extending grooves 79 are cut through the threads of the ring nut 71 to provide a passage between its wall and the wall of the bushing 24 for filling the cartridge.

In charging or recharging the cartridge 11, the ring nut 71 is loosened and the bushing 24 secured to a suitable filling machine, and pressurizing fluid passed through the filling grooves 79 across the seat 65 into the outlet passage of the cartridge. After the charging operation is completed, the ring nut 71 is turned to seat the gasket 76 against the seating surface 65 to retain the stored fluid pressure medium.

In using an extinguisher fitted with a cartridge 11, made in accordance with the invention, the extinguisher is inverted and its discharge cap 36 is struck against a surface to move the pointed end 43 of the puncturing member 26 inwardly through the sealing disc 44 to allow the stored pressure medium to escape through the apertures 25 to pressurize the extinguishing agent.

It is thus apparent that the present invention provides a cartridge which is simple and economical in manufacture and which provides a seating surface at the outer end of the neck of the container able to withstand injury by particles of foreign matter which may be entrapped between the seating surface and the gasket material. Further, it is obvious that a construction is provided eliminating one of the leakage points of prior devices in that there is no change of leakage along the threaded connection between the bushing 24 and the neck 61 of the container as the pressure seal is made between the seating surface 65, the gasket 76 and the sealing disc 44.

While the invention is described and illustrated with reference to a specific embodiment thereof, it will be understood that other embodiments may be resorted to without departing from the invention. For example, while a gasket member has been described and illustrated as being positioned between the sealing disc 44 and the seating surface 65, it is obvious that if a sealing disc were to be used of material having a deformable edge, the gasket 76 might be eliminated, in which event there would be only one possible source of leakage in the closure of the cartridge. Therefore, the form of the invention set out above should be considered as illustrative and not as limiting the scope of the following claims.

I claim:

1. A stored fluid pressure medium cartridge for use with a discharge device having a puncturing member to release the stored fluid comprising, a high pressure fluid container having an outlet neck threaded on its exterior surface, the body of the container having a flattened portion at the intersection with the neck providing a shoulder, a seating surface at the outer end of the outlet neck of smaller diameter than the outer diameter of the outlet neck, a sealing disc assembly including a ring nut, a sealing disc received

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in the lower end of the ring nut and secured in position therein, the ring nut threaded on its exterior surface, and a bushing member holding the sealing disc assembly in direct contact with the sealing surface of the container, the bushing having a threaded interior surface receiving at its lower end in threaded engagement therewith the container neck and receiving at its upper end in threaded engagement therewith the sealing disc assembly, the exterior surface of the bushing at its upper end threaded for engagement with supporting means, the exterior surface of the bushing at its lower end shaped for engagement by a tool, and the lower edge of the bushing member abutting against the shoulder of the container.

2. A stored fluid pressure medium cartridge for use with a discharge device having a puncturing member to release the stored fluid comprising, a high pressure fluid container having an outlet neck threaded on its exterior surface, a seating surface at the outer end of the outlet neck of smaller diameter than the outer diameter of the outlet neck, a sealing disc assembly including a ring nut, a sealing disc received in the lower end of the ring nut and secured in position therein, the ring nut threaded on its exterior surface, and a bushing member holding the

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sealing disc assembly in direct contact with the seating surface of the container, the bushing having a threaded interior surface of uniform bore throughout its length and receiving at its lower end in threaded engagement therewith the container neck and receiving at its upper end in threaded engagement therewith the sealing disc assembly while the bushing is in position on the container neck, the exterior surface of the bushing at its upper end threaded for engagement with supporting means, and the exterior surface of the bushing at its lower end shaped for engagement by a tool.

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