

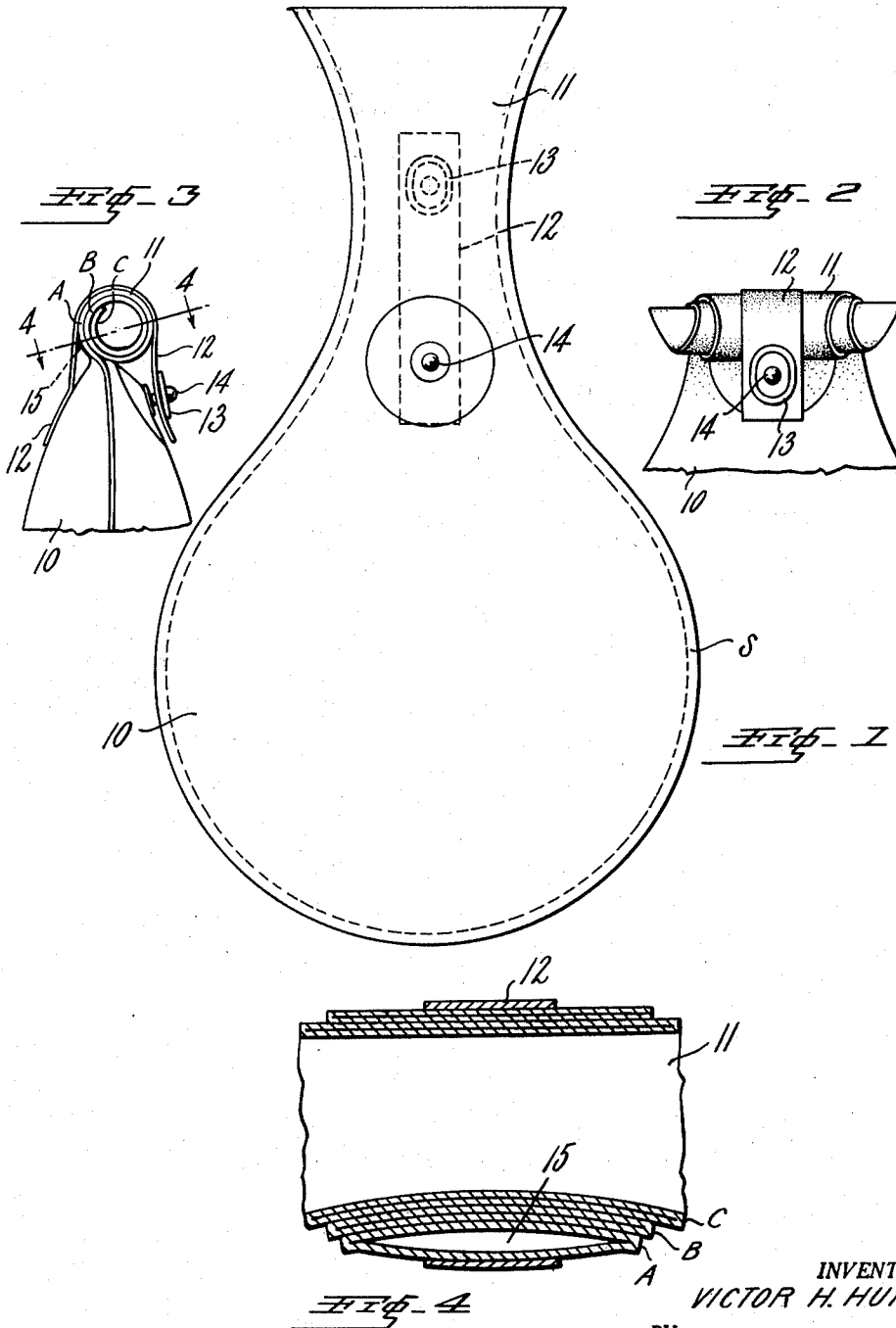
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FLUID TIGHT RECEPTACLE

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FLUIDTIGHT RECEPTACLE

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1 Claim. (Cl. 150—2.1)

This invention relates to a fluidtight bag or receptacle, and more particularly it relates to a bag or receptacle such as a water bottle having a simple watertight closure.

Heretofore it has been the practice to provide fluid receptacles such as water bottles and the like with a plug or similar closure to close the filling passage in the neck of the bottle. Bottles having such closures are costly to manufacture. It has also been proposed heretofore to make so-called stopperless water bottles in which various means other than plugs were provided to close the neck of the bottle. These so-called stopperless bottles have not been entirely satisfactory because either the closure means for the filling neck did not entirely shut off the passage through the neck with the result that the bottle would leak in service, or because the closure means was so complicated as to be difficult to manipulate.

The present invention contemplates a novel fluidtight receptacle that is provided with an extremely simple and easily manipulable fluidtight closure for the filling opening. A bottle having a closure in accordance with this invention can be made absolutely fluidtight, yet the receptacle and closure are easy to manipulate, and the bottle can be manufactured inexpensively. The principles of this invention may be applied to fluidtight receptacles generally, and they will be especially useful when applied to simple inexpensive fluidtight receptacles such as water bottles and the like.

In accordance with this invention a water bottle is provided with a flexible filling neck which communicates with the interior of the receptacle and therefore provides a passage through which the receptacle may be filled or emptied. This neck is constructed with an outwardly flaring taper so that the neck is larger adjacent the mouth of the filling passageway through the neck than adjacent the receptacle. The neck is foldable upon itself; in one specific embodiment the neck may be rolled down upon itself toward the body of the receptacle so that the roll lies outside the receptacle; and means are provided for maintaining this neck folded upon itself outside the receptacle. The neck, because of its taper, is constructed such that when thus folded upon itself, the walls at the wider portion thereof overlie the walls at the narrower portion thereof and are held against the narrow walls.

When the neck of the receptacle in accordance with this invention is thus folded upon itself and the holding means is rendered operative to hold the neck thus folded, the receptacle is absolutely fluidtight. If pressure is exerted on this rolled neck, as will occur when fluid in the receptacle is impelled from the receptacle through the filling passage toward the mouth of the filling passage, this pressure tends to unfold the neck. Since the neck is held to prevent such unfolding by the holding means, the internal pressure distorts the walls of the neck forming the filling passage. The walls of the narrow portion of the neck, which is adjacent the body of the receptacle, are distorted by the internal pressure. The expansion of the walls of the filling passage in this area adjacent the body of the receptacle exerts a force on succeeding folds of the neck

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because of the neck's outward taper, to press the walls of the filling passage in other parts of the neck together to seal them.

In addition to the above described sealing action, a further result occurs as fluid is impelled from the receptacle through the filling neck toward the mouth thereof. As the walls defining the filling passage expand at their center in the narrow area of the neck, the edges of the neck along this expanded portion are drawn inwardly toward the center of the filling passage. The walls along the edge of the filling passage are therefore placed under tension to cause the edges of the outer fold to tighten against the folded filling neck. Because of this action in the closure in accordance with this invention which flows from the outwardly flaring construction of the filling neck, the edges of the filling passage are effectively sealed off against passage of fluid therealong, to render the receptacle absolutely fluidtight. This closing off of the edges of the filling passage is most important because leakage through a filling neck normally occurs along such edges, and this leakage is most difficult to prevent.

For a better understanding of the nature of this invention, reference should be had to the following description when read in conjunction with the accompanying drawing, wherein:

Fig. 1 is a plan view of a fluid receptacle embodying this invention;

Fig. 2 is a view of the receptacle closure shown in Fig. 1, in which the receptacle is filled and the closure is disposed to seal the receptacle in fluid tight relation;

Fig. 3 is a side elevational view of the closure shown in Fig. 2; and

Fig. 4 is a cross-sectional view along the line 4—4 of Fig. 3.

Referring now to the drawing, there is shown a preferred embodiment of this invention in a simple flat bag or receptacle. The receptacle shown in the drawing may be constructed by forming two flat sheets preferably of raw rubber to the configuration shown in Fig. 1. Although rubber is preferred, other fluid impervious materials may be used. Each of these sheets is formed having an enlarged bulb-like portion 10 which is to form the body of the receptacle. The sheets also have a narrow, outwardly flaring, neck-like portion 11 adjacent the body 10, and this neck portion is relatively narrow adjacent the bulb-like body 10 and the neck gets progressively wider outwardly from the body toward the filling mouth at the open end of the neck 11. In forming the receptacle, two sheets having this configuration may be disposed in overlying relation, the sheets may be pressed together along a seam S at the edges of the sheets about their peripheries excepting for the mouth at the end of the neck 11 to join the sheets along this seam, and the rubber may be vulcanized.

To close such a container after it has been filled with fluid, the neck 11 is rolled upon itself from the mouth of the neck toward the bulb-like body 10 as best illustrated in Figs. 2-4. Means are provided for holding the rolled neck in its folded position against the outside of the receptacle. In the embodiment illustrated in the drawings, this means comprises a keeper which consists of an elongated strap 12 of flexible material which may conveniently be rubber. The strap 12 has one end fixed to the wall of the container and is long enough to extend about the rolled neck 11 when the receptacle is closed. The free end of the strap 12 is provided with a snap fastener 13 that is adapted to snap on the button 14 fixed to the wall of the container opposite the fixed end of the strap 12.

When the container is filled with fluid the neck 11 is rolled down upon itself toward the body 10 of the container until the keeper 12 can be extended about this roll and the snap 13 fixed to the button 14 to hold the neck 11 in a rolled condition. If pressure is subsequently exerted

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on the container, as by pressing the bulb-like body 10, the fluid will tend to escape through the passage in the filling neck 11. The pressure of this fluid in turn will tend to unroll the neck 11, but since this neck is held by the keeper 12 against being thus straightened, those portions of the walls of the neck which define the narrower portion of the neck and which are nearer the body 10 will be distorted. This distortion will take the form of an expansion of the neck by the separation of the walls defining the narrow portion of the neck at their centers between the seams S as shown at 15 in Fig. 4. This narrower portion which has been indicated as the layer A in Fig. 4, since it is the outermost layer of the roll will tend to expand against the keeper 12. The keeper 12 holds the layer A against expansion and the layer A will also press against succeeding layers B, C in the roll to close these succeeding layers at their centers.

More important however, as the layer A expands at its center as shown at 15, the edges of the neck adjacent the seam S in this layer A will be drawn inwardly toward the expanded center of the neck. This in turn places the edges under tension because it tends to increase the length of the path of these edges in their convolutions through the roll. This tensioning of the seams in the roll is an important feature which flows from the peculiar tapered construction of the closure in accordance with this invention. As the seams in the layer A are tensioned, they will therefore be drawn more tightly against the layers, B, C, etc., of the roll, and the seams in these succeeding layers will in turn be drawn more tightly against the roll to seal the edges of the filling passage through the neck 11. Consequently fluid within the receptacle 10 may not seep along the seam S to pass through the roll and ultimately out of the container through the mouth of the neck 11. Since both the central portion of the filling passage and the edges thereof are thus sealed, the receptacle is absolutely fluidtight.

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To achieve the fluidtight receptacle of this invention, it is essential that the neck 11 be provided with the outwardly flaring portion adjacent that part of the neck which is to be folded or rolled upon itself. When such a construction is provided, the wider portion adjacent the mouth of the neck may be rolled down on the narrower portion of the neck which is adjacent the body of the receptacle.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

A fluidtight water bottle, comprising a fluid impervious bottle having a neck providing a filling passageway communicating with the interior of said bottle, said neck flaring first inwardly and then outwardly between said bottle and the extremity of said neck to provide a passageway that has a constricting portion intermediate its ends, said neck being rollable upon itself so that the walls thereof forming the larger portion of the passageway near the mouth of the neck lie adjacent the walls thereof forming the constricting portion, a strap fixed to said bottle adapted to be folded over said neck when the neck is rolled, and means for holding said strap against said neck when it is rolled to maintain the neck rolled and seal the neck of the bottle with a fluidtight seal.

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