April 10, 1962 L. A. POPE 3,028,985

BOTTLE STOPPER

Filed Jan. 24, 1961

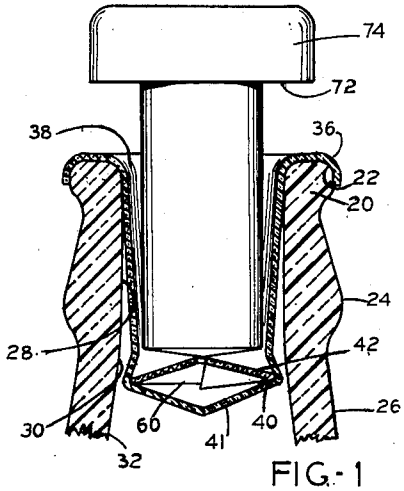


FIG.-1

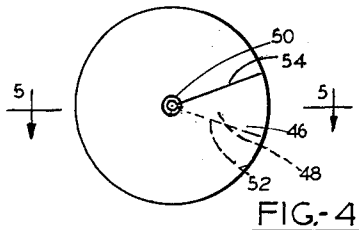


FIG.-4

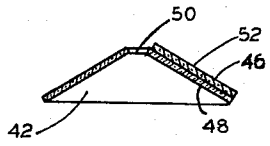


FIG.-5

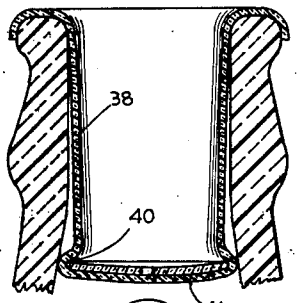


FIG.-2

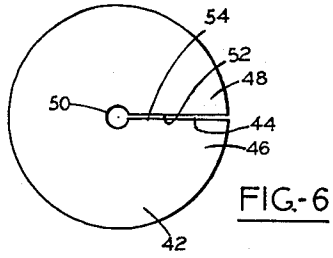


FIG.-6

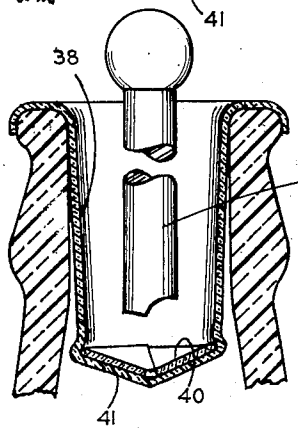


FIG.-3

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BOTTLE STOPPER

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This invention relates to bottle stoppers, and more particularly to a reusable stopper adapted to be employed to hold the remaining contents of a carbonated beverage bottle without loss of carbonation and pressure for deferred consumption.

Bottles employed for the dispensing of carbonated beverages, soda, beer and the like are provided with an outwardly extending annular bead around the mouth thereof to receive the usual crown type of cap. Such cap when once removed, is usually deformed in the removal process, and cannot be replaced in most instances and in any event without special bottle capping apparatus, and when so replaced is generally incapable of holding pressure. The unused contents of the bottle is thus allowed to lose its carbonation, and the contents becomes dead and unpalatable, and is usually thrown away, and thus represents considerable wastage.

The present invention is directed to a stopper capable of insertion into the neck of the bottle to a point below where the internal diameter of the neck flares outwardly, the stopper at its lower end being distendable in diameter in the flared portion of the neck whereby to provide a pressure seal. More particularly the stopper comprises an elongated tubular member of rubber or other suitable elastic material closed at its lower end, and provided with an interior shoulder flange at its upper end to embrace the external annular bead of the bottle mouth. The lower end of the stopper is provided with an annular enlargement or groove immediately adjacent the lower end, whose relaxed external diameter is capable of free insertion into the bottle mouth. An expanding disk of semi-rigid, slightly resilient material has its marginal edge seated in said groove, and the disk is slit radially to the center, whereby to permit the disk to assume a conical shape of less exterior diameter, to permit the stopper to be inserted into and removed from the bottle neck, and adapted to assume a relatively flat planar form, in which the disk causes the annular groove portion of the stopper to enlarge and engage the enlarged diameter of the internal flare of the bottle neck. The invention is further directed to tools manually operable for causing the disk to shift from its conical form to its flat enlarged diameter form, and vice versa whereby to render the stopper capable of insertion into, or removal from, the bottle neck, as well as to enlarge the lower end to provide the seal.

The above and other novel features of the invention will appear more fully hereinafter from the following detailed description when taken in conjunction with the accompanying drawings. It is expressly understood that the drawings are employed for purposes of illustration only and are not designed as a definition of the limits of the invention, reference being had for this purpose to the appended claims.

In the drawings, wherein like reference characters indicate like parts:

FIGURE 1 is a longitudinal sectional view through the mouth of a bottle with the stopper inserted in position for sealing expansion.

FIGURE 2 is a longitudinal sectional view through the mouth of the bottle showing the stopper expanded to form a seal.

FIGURE 3 is a longitudinal sectional view through the mouth of the bottle showing the stopper after breaking the seal by allowing the stopper to contract.

FIGURE 4 is an enlarged plan view of the disk in its conical formation.

FIGURE 5 is a sectional view taken on the line 5—5 of FIGURE 4; and

FIGURE 6 is a plan view of the disk when in the flat formation with its diameter enlarged.

Referring to the drawings there is shown the neck of a standard beverage bottle of the type adapted to hold its contents under carbonation and pressure. The bottle has a mouth 20, having an exterior bead 22, adapted to receive a crown type cap, as will be well understood in the art. The bottle exterior has an enlarged diameter portion as at 24 below which the bottle neck commences to flare as at 26. The interior of the neck has a generally cylindrical portion 28, which commences to flare as at 30, the portion therebelow as at 32 gradually increasing in diameter.

The bottle stopper is of generally thimble shape and may be molded or otherwise formed of resilient rubber or the equivalent. The stopper has an annular upper outwardly extending integral flange 36 adapted to embrace the beaded mouth of the bottle, an elongated substantially cylindrical body portion 38, which terminates in an annular outwardly extending grooved portion 40, adjacent the closed end portion 41, which may be referred to as the end diaphragm.

Seated within the annular groove 40 is a disk 42 of relatively rigid material such as red fiber board. Such disk, as shown in FIGURES 4–6 is capable of flexing sufficiently to make a conical shape as shown in FIGURES 4 and 5, or a flat shape as shown in FIGURE 6, the disk having a single radial slit 44, to permit the peripheral portion 46 to ride over or under the adjacent peripheral portion 48 when in the conical configuration. The slit 44 may terminate in a small central circular cut-out portion 50 to facilitate the transformation from the flat state to the conical state as indicated. The edges 52 and 54 formed by the slit will be transversely cut to provide thin surfaces lying generally in an axial plane or planes, so that when abutting one another, as when the disk is in its substantially flat aspect, resistance to deforming the disk into its conical configuration is afforded, except under circumstances when the edges are disaligned, that is disk adjacent one edge being displaced axially from the plane of the disk adjacent the other edge, so that one edge may override the other.

Referring to FIGURE 1, it will be seen that there is seated in the annular groove 40 of the stopper a disk 42, in the conical form with the portions adjacent the slit overlapping as at 48. The resiliency of the rubber forming the annular groove is such as to hold the disk sprung in the conical form shown, and when so sprung the exterior diameter of the annular groove portion is such as to readily slide into and out of the neck portion of the bottle, and just clear the cylindrical wall portion 28 thereof.

With the stopper located in the bottle as shown in FIGURE 1, the disk in its conical form is reached by the substantially flat end 70 of the manual tool 72, and by pressing said tool into the bottle to the limit as determined by the shoulder 72 of the handle portion 74, the disk is forced to a flat planar configuration, the center being moved beyond dead center by the slight conical shape of the end 70. Such action tends to stretch the substantially cylindrical wall portion of the stopper thimble, flattens the disk causing the overriding portion 46 of the disk to move circumferentially with respect to the underriding portion 48 whereby when the disk is in the substantially flat configuration, the slit edges fall into a common plane, and abut one another to thereby maintain the disk in the substantially flat configuration. The peripheral edge of the disk is thus caused to expand against the resiliency of the annular groove portion of the stopper, forcing the exterior of the groove into the flared portion of the bottle

neck, to thereby form a pressure seal, as shown in FIGURE 2.

To remove the stopper, a manual tool **90** having a shoulder **92** on its lower end is projected into the stopper and pressed against the disk adjacent the slit to force the portion of the disk adjacent one side of the slit below the plane of the portion adjacent the other side of the slit, thereby permitting the portions adjacent the slit to override to destroy the rigidity which disk had, when in its substantially planar configuration. Once the edges of the slit are so positioned as to permit overriding, the resiliency of the annular groove portion of the stopper which was expanded in diameter, placing the groove portion of the stopper under peripheral tension, is allowed to relax and return to its original diameter, as for example shown in both FIGURES 1 and 3. The stopper is then removable from the bottle, the seal having thus been broken.

Once the stopper is removed from the bottle, the disk may be manipulated to return it to the position shown in FIGURE 1, whereupon the stopper is ready for reuse.

While reference has been made to a bottle as an application for the use of the stopper, it should be apparent that the stopper will seal any opening of similar contour to that of a bottle, the stopper expanding to a larger diameter than the throat of the opening to form a seal.

Although a single embodiment of the invention has been illustrated and described, it is to be understood that the invention is not limited thereto. As various changes in the construction and arrangement may be made without departing from the spirit of the invention, as will be apparent to those skilled in the art, reference will be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In combination, a bottle having a neck terminating at its mouth with an exterior annular bead, and having a neck opening that flares and enlarges in diameter to form the bottle proper, a stopper in the form of a thimble having an annular outwardly extending flange at its open upper end adapted to embrace the annular bead around the mouth of the bottle, said thimble being of a length and diameter to extend into the neck of the bottle and into the flare of the neck, said stopper being closed at its lower end and having, adjacent its lower end an outwardly extending internal annular groove and an exterior annular sealing bead, said thimble being formed of resilient rubber like material, and having an unstressed normal exterior diameter including the sealing bead not greater than the internal diameter of the neck, and a circular disk of relatively thin stiff resilient material having a radial slit extending to the center thereof disposed with its marginal edge in said groove, whereby said disk may assume a conical shape with the portions thereof adjacent said slit overlapping with a peripheral diameter that of the diameter of said groove when unstressed, and a substantially planar shape with the edge portions of said slit abutting, and the overall diameter thereof greater than the unstressed diameter of said groove, whereby the exterior bead around said groove may be enlarged to provide sealing engagement with the internal flared portion of the neck of the bottle.

2. A bottle stopper for use in a bottle having a neck terminating at its mouth with an exterior annular bead, and having a neck opening that flares and enlarges in diameter to form the bottle proper, said bottle stopper being in the form of a thimble having an annular outwardly extending flange at its open upper end adapted to embrace the annular bead around the mouth of the bottle, said thimble being of a length and diameter to extend into the neck of the bottle and into the flare of the neck, said stopper being closed at its lower end and having, adjacent its lower end an outwardly extending internal annular groove and an exterior annular sealing bead, said thimble being formed of resilient rubber like material, and having an unstressed normal exterior diameter including the sealing bead not greater than the internal diameter of the bottle neck, and a circular disk of relatively thin stiff resilient material having a radial slit extending to the center thereof disposed with its marginal edge in said groove, whereby said disk may assume a conical shape with the portions thereof adjacent said slit overlapping, with a peripheral diameter that of the diameter of said groove when unstressed, and a substantially planar shape with the edge portions of said slit abutting, and the overall diameter thereof greater than the unstressed diameter of said groove, whereby the exterior bead around said groove may be enlarged to provide sealing engagement with the internal flared portion of the neck of the bottle.

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