United States Patent

[11] 3,581,927

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[54] **CONTAINER CLOSURE**
2 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **215/43,** 215/49, 220/23
[51] **Int. Cl.** **B65d 41/04,** B65d 39/08
[50] **Field of Search** 215/43, 49, 44, 50, 47; 220/23

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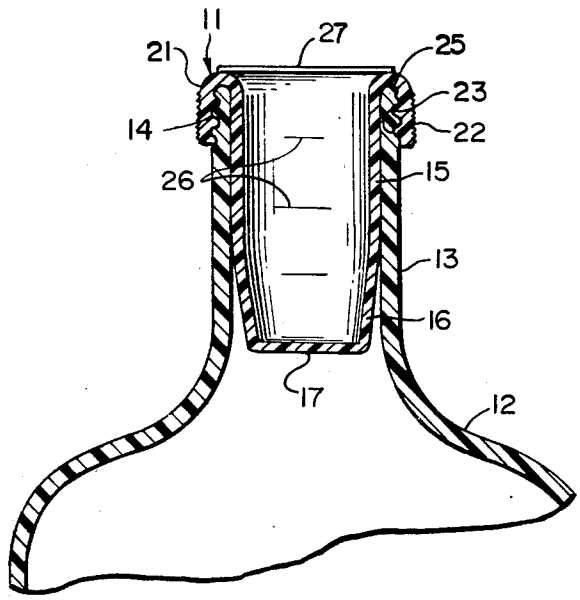
ABSTRACT: A container closure having the convenience of a screw cap and the sealing properties of a cork while being capable of measuring the material in the container. The closure is cup-shaped having a lip with screw threads to mate with the threads on the bottle neck. The cup extends into the neck of the bottle in an upright orientation.



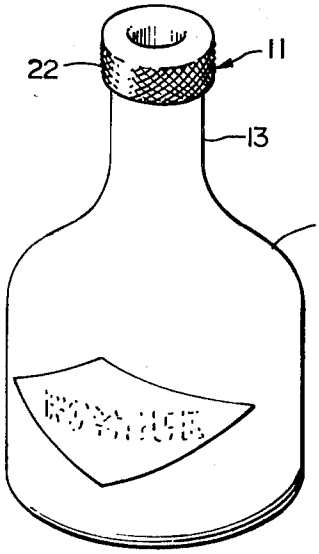


FIG. 1

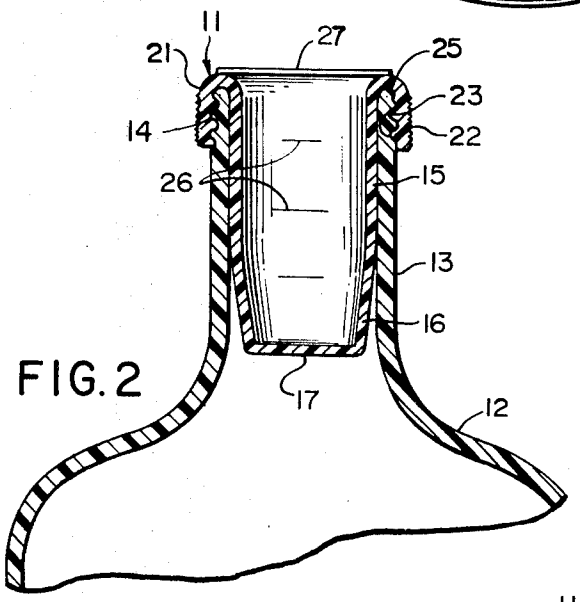


FIG. 2

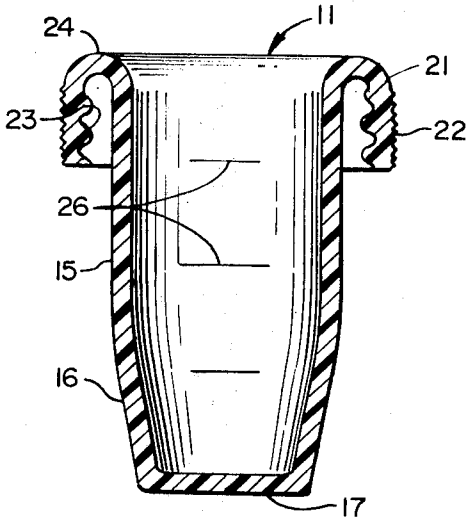


FIG. 3

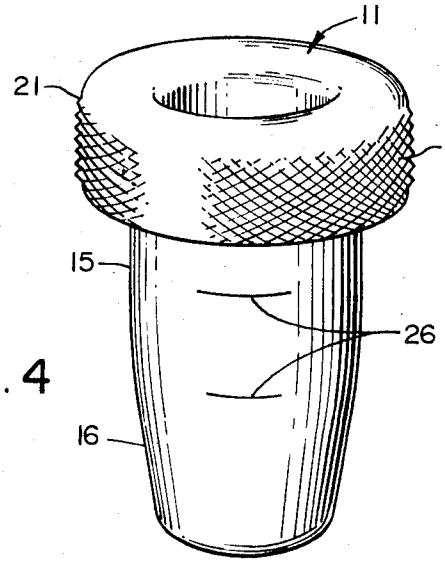


FIG. 4

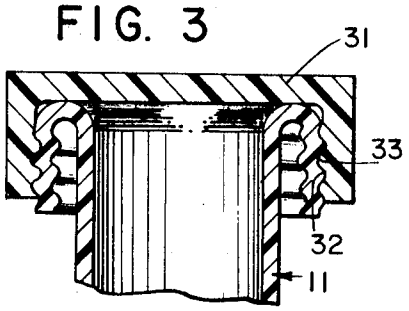


FIG. 5

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CONTAINER CLOSURE

FIELD OF THE INVENTION

This invention relates in general to closures for containers such as glass or semirigid plastic bottles, and more particularly concerns a novel closure which provides a double watertight seal against the inner surface of the container neck and at its rim while also being useful as a measure for the fluent contents in the bottle.

DISCUSSION OF THE PRIOR ART

Bottles for the transportation and storage of fluent materials are a part of man's day-to-day existence. These bottles come in a seemingly infinite variety of shapes and sizes and a myriad of different closures have been designed to maintain the enclosed materials within the bottles with varying degrees of effectiveness. Screw cap closures provide certain well known advantages such as security of attachment to the container and ease of manipulation in the hands of the user. They also commonly have several shortcomings. When made of rigid plastic or metal, a liner of relatively more resilient material has normally been necessary to improve the seal at the rim of the bottle neck. This results in added manufacturing costs without always providing a satisfactory seal. Furthermore, these liners often separate from the cap and have to be replaced with each use. Attempts to mold such caps from a somewhat pliable plastic material, such as polyethylene, for purpose of avoiding the necessity of a liner for effective sealing have not been wholly successful due to variations in the finish of the rim of the bottle to which the plastic cannot completely conform. It has been found that even with flexible plastic caps, a certain number of "leakers" are inevitable, especially with semirigid plastic bottles.

Additional problems arise when it is necessary to provide a measure with each container. It is a natural step to attempt to configure a bottle cap to provide the required measuring container. The usual practice is to increase the depth of the cap so that it takes on the appearance of an inverted cup over the top of the bottle. This results in a completely exposed cap which is subject to damage during transit and handling. These inverted, relatively deep bottle caps are often designed in such a way that the overall height of bottle and cap is substantially increased, thereby increasing the height necessary for storage purposes as well as increasing the possibility of damage to the cap. When caps of this type are used for measuring the fluid within the bottle, the liquid comes into contact with the threads on the inside of the cap. As is the case with detergents and other viscous liquids, the result is a rather sticky film over the threads in the cap which is transferred to the threads on the bottle when the cap is replaced. In some instances when this film dries the cap becomes set in place and is very difficult to remove. The film tends to build up over a period of time after a number of uses of the cap for measuring purposes and the cap and the neck of the bottle become excessively contaminated. Where the fluid in the bottle is not viscuous the result is likely to be slight spillage and leakage as the cap is inverted and placed over the top of the bottle after each use. This can be prevented only if the cap is cleaned out before it is replaced. If the cap is used on a bottle containing a colored fluid such as ink, the bottle and the surrounding storage area will likely become stained and streaked after a short period of time.

Many closures such as corks and more complicated multielement caps have provided satisfactory seals. However, a satisfactory sealing cap which is easily removed and replaced and which also acts as a measure is not presently available. The object of this invention is to provide an effective closure which is also simple and economical to manufacture and which prevents the threads in the cap and on the bottle from becoming contaminated with the enclosed materials. Although useful for many types of containers, the term "bottle" is sufficiently generic and will be generally used herein to signify the containers with which this closure operates.

SUMMARY OF THE INVENTION

The invention herein resides in a bottle closure having a cup-shaped body portion which fits snugly within the bottle neck to thereby provide an extended surface seal against the inside of the neck itself, similar to the seal provided by a cork. The top of the cup portion of the bottle closure is flared outwardly to form a rounded annular lip and a cylindrical rim which extends partially down the side of the cup. The surface of the rim facing inward is provided with threads which mate with the threads on the outside of the bottle neck. The annular lip of the closure joining the cup and the rim makes firm contact with the top rim of the bottle neck, the contact pressure being increased as the closure is screwed more tightly onto the bottle. A paper covering may be adhered across the top of the bottle enclosure to keep out dust or to retain such material as may be enclosed in the bottle cap during shipping. Alternatively, a more substantial covering may be provided so that the cap may contain a substance such as coloring, catalyst or other additives for mixing with the contents of the bottle.

This cap provides a double seal which effectively removes the possibility of leakage and, because the measuring cup portion is located within the bottle neck, virtually eliminates the possibility of damage to the cap during handling. With the threads located outside of the cup portion of the cap, no fluid comes in contact with them when the closure is used as a measuring device. Thus the threads of both the cap and the bottle do not become contaminated and the cap need never be inverted over the top of the bottle, thereby preventing the spillage of any residue material.

The purpose of combining a measuring device with a bottle closure is generally related to convenience. However, with some substances which may be toxic, it may be necessary for purposes of safety to have the measuring device always attached to the bottle containing the substance which it is intended to measure. In this way, auxiliary measuring devices are not necessary so that the chances of contaminating external areas with the consequent danger to people, and especially to small children, is substantially reduced.

BRIEF DESCRIPTION OF THE DRAWING

The feature and advantages of this invention will become readily apparent from the following detailed description when read in conjunction with the drawing, in which:

FIG. 1 is a perspective view of a bottle sealed with a closure constructed in accordance with the principles of this invention;

FIG. 2 is a cross-sectional view of the closure and the neck of the container shown in FIG. 1;

FIG. 3 is an enlarged sectional view of the closure shown in FIG. 2;

FIG. 4 is a perspective view of the closure shown in the previous figures; and

FIG. 5 is a partial sectional view of the closure of FIG. 2 showing an alternative embodiment which includes a cover for the closure.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the drawing, FIGS. 1 and 2 show a bottle 12 sealed by means of bottle closure 11 which embodies the principles of this invention. Bottle 12 may be made of any suitable substance such as glass or a semirigid plastic, such as polyethylene or polyvinyl, and is shown in the drawing as an opaque plastic. The bottle is provided with an elongated neck 13 having external threads 14 near the top thereof.

Bottle closure 11 is a unitary device with a cup-shaped container portion formed with a substantially cylindrical side 15, a connecting tapered side 16 and a flat base 17. The taper of side 16 is actually slight, but is shown somewhat exaggerated for emphasis. The transition between cylindrical side 15 and tapered side 16 is gradual so that closure 11 may be easily but firmly inserted into neck 13. Furthermore, in addition to facilitating entry of the cap into the neck of the bottle, tapered

portion **16** of flexible closure **11** permits the diameter of cylinder **15** to be equal to or slightly larger than the interior diameter of neck **13** to enhance the tight seal formed therebetween. The length of cylinder **15** is such that the seal between it and neck **13** remains effective even though the cap **11** may be partially unscrewed. The top of the cap is flared outwardly to provide a cylindrical rim **21** having an outer surface **22** which is knurled in a standard manner, and which has molded threads **23** on its inner surface adjacent cylindrical side **15**. These threads are formed to mate with threads **14** of bottle neck **13**. Curved lip portion **24** which joins rim **21** to cylinder **15** provides an annular inner surface which firmly engages top rim **25** of neck **13** when the cap is tightly screwed thereon.

Significant surface variations often exist on the inside and on the rim of the neck of most bottles, whether they are made of glass or plastic, thereby compounding the sealing problems. For this reason closure **11** is preferably made of a nonrigid plastic such as a flexible polyethylene. It may thus readily conform to the shape and the irregularities of the bottle neck in which it is inserted. Also a slight amount of flexibility enhances the tightness of the seal which is possible at top rim **25** of the bottle neck. This seal increases in tightness as closure **11** is screwed onto neck **13** with increasing force, causing cylindrical rim **21** to be pulled downward and inward due to its reverse flared construction with respect to the cup to which it is connected.

The thickness and resilience of this bottle closure also protects the neck of glass bottles from chipping or from damage to the bottle threads. Another advantage of this closure is that pressure in the container caused by thermal expansion causes the closure to tighten on the bottle since such upward force would cause the cylindrical portion **15** of the closure to expand slightly. Commensurate with this advantage is the fact that such a flexible closure allows for and absorbs the expansion of the bottle contents and prevents bursting of the bottle.

When closure **11** is properly secured to bottle **12**, only the knurled portion **22** of cylindrical rim **21** and curved lip portion **24** are external of neck **13**. With so little of closure **11** exposed, the possibility of breakage during handling is extremely small. Furthermore, it can be seen that the firm contact provided by this closure between curved annular lip portion **24** and rim **25** of the bottle neck and between cylinder **15** and the inside of the neck produce a double seal which is substantially leakproof even under extreme handling conditions.

When it is desired to use closure **11** as a measuring cup, it is unscrewed and removed from the top of the bottle and may be set upon a flat surface on flat base **17**, hand held or placed in a rack as desired. The contents of bottle **12** may be poured into closure **11** in the amount desired and graduations **26** are provided in the event that less than a full measure is to be used. Normally a bottle and cap will be constructed for a specific substance so that the amount of fluid used is generally one capful or an integral multiple thereof. When the fluid is poured from closure **11**, it passes over curved lip portion **24**, making no contact with either threads **23**, the outside of side **15** of the knurled outer surface **22** of cylindrical rim **21**. Therefore, neither the threads not the sides of the closure which make contact with the inside of neck **13** of bottle **12** are contaminated with the fluid being measured. With this bottle cap construction, its use as a measure in no way diminishes the ease with which the bottle is opened and closed and the substance measured thereby cannot adversely affect its ability to make a good seal. Furthermore, since closure **11** need not be inverted over bottle **12** when it is replaced as a closure device, no spillage occurs to contaminate the outside of the bottle and environs.

This bottle closure is particularly advantageous for several reasons. One is that the total height of the bottle is increased only by the thickness of the curved lip portion **24** of the cap. Since the height of the bottle is not increased by any significant amount, storage and shipping containers may be commensurately reduced in size. Also since the closure must be replaced on the bottle after each use in order to close the bottle, there is no danger of auxiliary measuring utensils being left around uncleaned where they may become an element of danger, such as in a household where small children abide. Elimination of the need for separate measuring utensils also prevents the possibility of cross contamination which may occur when various items are cleaned together. The bottle closure of this invention is equally useful with long, small-neck bottles, such as shown in FIG. **1**, or with wide-mouth bottles.

It is well to note that this novel closure may be made from a variety of resilient materials which are commercially available, among which are various types of polyethylene, polypropylene, rubber and suitably plasticized resilient vinyl polymers and copolymers.

It it is desired to keep dust and other foreign matter out of closure **11** during shipping and storage, a paper covering **27** may be adhered across the top of the closure. Such a covering may be provided with a pressure sensitive adhesive so that the covering is easily removed without leaving a residue around the lip of the cap. This covering may be replaced after each use if desired. For commercial purposes, the interior of closure **11** may be filled by the manufacturer or retailer with instruction sheets, advertising material, coupons or the like. This would be especially helpful where bottles are shipped or sold without an external container in which such materials could be enclosed.

An alternative embodiment is shown in FIG. **5** wherein cover **31** is tightly secured to closure **11** by means of mating threads **32** and **33** on the cover and closure respectively. This configuration is especially useful where a second product is intended to be used with the primary material in the bottle and is included with closure **11**. Such things as colors, catalysts or other additives may be conveniently transported in this way so that the contents of closure **11** are added to the material in the bottle before its use. Subsequently, cover **31** may be discarded and the closure used in the normal way as previously described.

Having described the invention, various modifications and improvements will now likely occur to those skilled in the art, which are within the spirit and scope of the invention set forth herein.

What I claim is:

1. A closure for a container, said container having external threads extending down the side of its neck, said closure comprising:

a cup-shaped body having a wall which is smoothly tapered throughout its length, said wall being formed with measuring graduation marks on its inner surface;

a cylindrical rim formed with threads on the inside and outside surfaces thereof, said inside threads being configured to mate with the threads on said bottle neck, said inside threads being substantially coextensive with the surface of said cylindrical rim;

an annular lip smoothly interconnecting the top of said body wall with said cylindrical rim; and

a cover having a relatively flat top and a contiguous cylindrical side formed with threads on the inside surface thereof, said threads being adapted to mate with the threads on the outside of said cylindrical rim, said cover engaging said cylindrical rim so as to form a seal between the flat surface of said cover and said annular lip and an additional seal between the cylindrical side and threads of said cover and said cylindrical rim;

substantially the entire surfaces of said body, cylindrical rim and annular lip facing said bottle neck being in intimate contact with said neck when said closure is secured thereto;

said closure being formed of flexible plastic material thereby to enable it to conform to that portion of said bottle neck which it contacts.

2. A closure for a container, said container having external threads extending down the sides of its neck from a point adjacent the rim thereof, said closure comprising:

a cup-shaped body having a wall which is smoothly tapered throughout its length, said wall being formed with measuring graduation marks on its inner surface, said cup-shaped body being provided with a flat base upon said closure is adapted to stand on a flat surface;

a cylindrical rim formed with threads on the inside surface thereof, said threads being configured to mate with the threads on said bottle neck, said threads being substantially coextensive with the inside surface of said cylindrical rim;

an annular lip smoothly interconnecting the top of said body wall with said cylindrical rim; and

a removable cover having one surface coated with a pressure sensitive adhesive and being configured to cover the normally open top of said cup-shaped body;

substantially the entire surfaces of said body, cylindrical rim and annular lip facing said bottle neck being in intimate contact with said neck when said closure is secured thereto;

said closure being formed of flexible plastic material thereby to enable it to conform to that portion of said bottle neck which it contacts.