

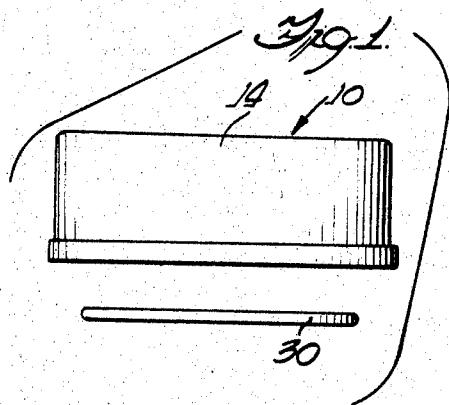
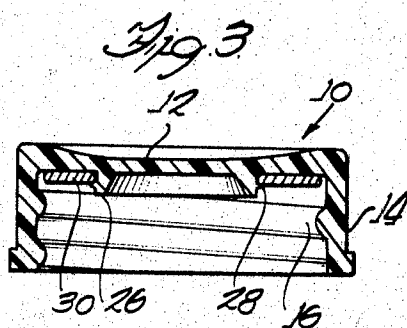
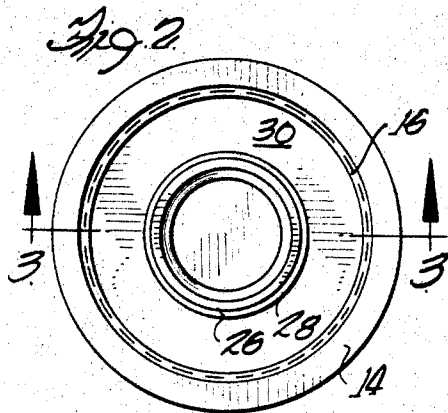
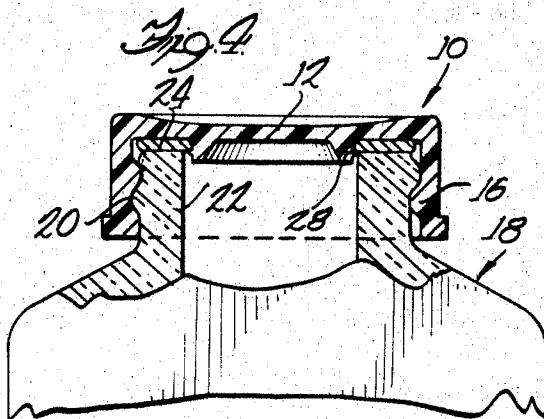
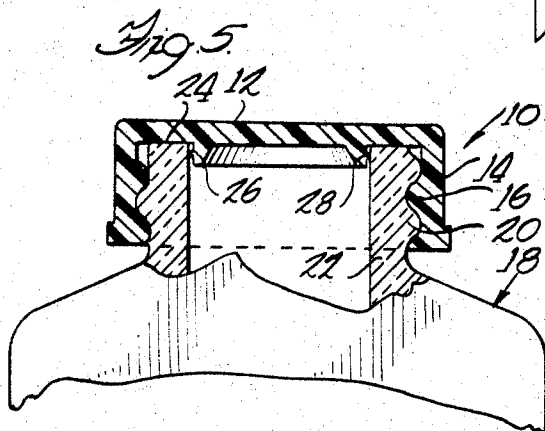
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3,435,976

CLOSURE CONSTRUCTION

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CLOSURE CONSTRUCTION

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10 Claims

ABSTRACT OF THE DISCLOSURE

A closure for a bottle or the like has a flexible concavo-convex integrally formed with a depending, internally threaded, skirt. A projecting ring concentric with the surrounding skirt extends from the convex undersurface of the top. The ring is annularly relieved for reception of a discrete seal ring which may be locked in place thereby against such undersurface.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to closures for containers such as bottles or the like, and more particularly pertains to a closure adapted to effect multiple seals with a container cylindrical discharge portion.

Description of the prior art

In copending application Ser. No. 647,570, filed June 20, 1967 now Patent No. 3,382,996, an integral closure member is disclosed having a flexible top which is externally, normally concave and which is formed integrally with an internally threaded depending skirt. Upon threadedly engaging a container neck, the top may be flexed into a horizontal disposition thereby providing visible evidence that the closure is desirably engaged with the container in sealing engagement. The closure hereinafter described in detail possesses this characteristic in addition to possessing auxiliary sealing capabilities.

The closures disclosed in U.S. Patents Nos. 3,160,303, 2,987,206 and 2,663,463 possess top portions which flex slightly, but not to the extent permissible with applicant's closure. Also, the multiple sealing action inherent in the following closure is nowhere suggested in the prior art.

SUMMARY

It is an object of this invention to provide a closure which possesses a flexing top, visually revealing the degree of seal effected, while also effecting multiple seals with the cylindrical discharge portion of a bottle or the like. The multiple seals are effected by means of the flexing closure top portion whose convex undersurface engages a container terminus, and a centrally projecting ring extending from the top undersurface which engages the internal periphery of a bottle cylindrical discharge portion thereby effecting a separate seal therewith.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded elevational view illustrating an integral closure member and a seal ring insert;

FIG. 2 is a bottom plan view of a closure member made in accordance with this invention illustrating a seal ring locked in place;

FIG. 3 is a sectional view taken on line 3—3 of FIG. 2;

FIG. 4 is a fragmentary sectional view illustrating a closure and seal ring made in accordance with this invention in sealing engagement with a discharge neck of a bottle or the like;

FIG. 5 is a view similar to FIG. 4 illustrating the use

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of the closure provided by this invention alone without the presence of a seal ring.

THE INVENTION

Referring now to FIG. 1, an integral closure 10 is illustrated which is preferably formed of polypropylene or other plastic which may be flexed indefinitely without evidencing signs of strain or cracking. As will be more apparent from FIGS. 3 through 5, the closure 10 comprises a flexible top portion 12 which is joined about its annular periphery to a depending skirt portion 14. Female threads 16 are formed on the interior of the skirt 14 and are adapted to engage male threads such as are normally found on the cylindrical discharge portion of a container such as bottle 18 illustrated in FIGS. 4 and 5.

It will be noted from these latter two figures that as the female threads 16 engage male threads 20 formed about the outer periphery of cylindrical discharge portion 22 of the bottle 18, distal terminus 24 of the bottle portion 22, which terminus is normally in a single plane as illustrated, is urged against the initially convex undersurface of the closure top 12 as seen in FIG. 3 and continues to urge the flexible top into substantially a horizontal disposition as illustrated in FIG. 5.

It may be thus visually ascertained by merely noting the concavity or planar disposition of the top portion 12 of the closure 10, the exact degree of seal which is effected between the closure undersurface and the distal terminus 24 of the bottle or like container. Inasmuch as the top portion 12 is flexible, it resiliently serves as a lock preventing back off and unthreading of the closure in those instances in which the container closure assembly is jostled or moved about in the course of transport or handling.

As explained in copending application 647,570 such back off is extremely undesirable and may be dangerous in those instances in which the containers hold poisonous fluids or fluids giving off noxious and disagreeable odors. Also, the container may hold volatile liquids which are costly and which should be retained in fluid-tight condition until employed by the ultimate consumer.

As is apparent from FIGS. 3 through 5 of the drawing, the closure 10 has a projecting ring-like portion 26 downwardly projecting from the normally convex undersurface of the top portion 12 of the closure. It is seen from FIG. 5 that as the container threads 20 engage the male threads 16 disposed on the interior of the skirt 14 of the closure, a thin deformable rib 28 defining the greatest diameter of the projecting ring 26 engages the inner periphery of the cylindrical bottle portion 22. Inasmuch as the rib 28 is thin and readily deformable, it will effect a substantially fluid-tight seal with the periphery of the container neck. This latter seal is in addition to that effected by the flat terminus 24 of the container 18 as it is urged against the closure top undersurface.

In those instances in which extremely volatile fluids are handled, a separate seal ring such as ring 30 illustrated in FIGS. 1, 3 and 4 is employed. The latter ring may be composed of desired sealing materials such as wood pulp, cork or plastic affording the desired sealing characteristics. The latter ring, as is apparent from FIG. 4, will engage the upper terminus 24 of the container neck 22 effecting a desired fluid seal therewith in those instances in which an exceptional seal is desired.

Thus in those instances in which extremely volatile liquids are maintained in the container 18, a desired tight seal may be assured by utilizing the seal ring 30 which may be of soft cork or other material which will readily compress as the bottle terminus is urged thereagainst effecting a desired fluid-tight seal.

As seen from FIGS. 3 and 4, seal ring 30 is retained against the closure under surface by being locked about

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the periphery of the projecting ring 26 by means of the flexible rib 28. The rib 28 therefore assists in forming a ring-receiving recess of annulus adjacent the closure top undersurface and enables the seal ring to be readily snapped in place over the rib 28 against the closure undersurface. The rib 28 is therefore seen to serve a double function, namely, that of effecting a seal with the inner periphery of the bottle discharge neck while also serving to lock the seal ring 30 in desired position against the closure undersurface in the manner illustrated in FIG. 4. The seal ring 30 is desirably of flexible material to accommodate manufacturing variances in the outer diameters of the projecting rings 26, as well as variances in the inner diameters of the container neck portions.

It is seen therefore that a novel closure has been provided which is extremely versatile in effecting a plurality of seals. It will effect a double seal when secured in place to a container neck and may also effect a higher degree of sealing efficiency when employed in conjunction with a separate snap-in seal ring such as illustrated ring 30. The use of the discrete seal ring 30 allows for ready replaceability of such seal ring and the ability of the closure 10 to be employed in conjunction with a large number of fluids of varying volatility. The desired seal being effected by the selection of the appropriate seal ring. The provided ring 26 and rib 28 enables seal ring 30 to be securely maintained in place without the need for adhesive. The absence of adhesive provides a manufacturing saving and also eliminates a source of possible contamination of the container contents. The mechanical lock is also more reliable than the ordinary adhesive.

The foregoing disclosure has been provided by way of example only and while particular embodiments of this invention have been shown and described, it will be understood, of course, that the invention is not limited thereto since modifications may be made by those skilled in the art, particularly in light of the foregoing teachings. Therefore, it is contemplated by the appended claims to cover any such modifications as incorporate those features which may be said to constitute the essential features of these improvements, within the true spirit and scope of the invention.

I claim:

1. A closure comprising a circular top which is normally exteriorly concave, a cylindrical skirt depending from the periphery of said top which is internally threaded, a projecting ring portion concentric with said skirt projecting from said top undersurface within said skirt, said ring portion having an annular recess formed in the base thereof adjacent said undersurface, said circular top being flexible relative to said skirt portion whereby said top may assume an exteriorly planar configuration upon exertion of an axial thrust against said top undersurface.

2. The closure of claim 1 which said ring portion has a thin, readily deformable rib defining a limit of said recess; said rib projecting toward the skirt threads with which concentrically disposed.

3. The closure of claim 2 in which a seal ring is snugly received about said projecting ring portion between said rib and said top undersurface.

4. In combination, a container having a cylindrical dis-

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charge portion with a distal terminus disposed substantially in a single plane, and a closure having a normally exteriorly concave top and convex undersurface formed integrally with a depending skirt, projecting ring means concentric with said skirt depending from said top undersurface, said closure top being flexibly movable into a substantially planar disposition, first means disposed about the outer periphery of said container cylindrical discharge portion, and second means adapted to engage said first means in interlocking relationship disposed about the inner periphery of said skirt means, said container terminus urging said closure top into substantially a horizontal plane when said first and second means are interlocked; said closure ring means snugly engaging the inner periphery of said container discharge portion when said first and second means are interlocked.

5. The combination of claim 4 in which said first and second means comprise mating male and female threads respectively.

6. The combination of claim 4 in which said projecting ring means has a seal ring snugly received about the periphery thereof and normally disposed against said top undersurface, said seal ring engaging the terminus of said container when said first and second means are interlocked.

7. The combination of claim 6 in which said projecting ring means is annularly relieved adjacent said top undersurface whereby said seal ring is locked in place adjacent said undersurface.

8. A closure comprising a circular top which is normally exteriorly concave, a cylindrical skirt depending from the outer periphery of said top, said skirt being internally threaded, first means extending from the center of said top undersurface which is normally convex, seal ring means snugly disposed about the periphery of said first means, said top being flexibly movable into a planar disposition upon exertion of an axial thrust against said seal ring means.

9. A closure comprising a circular top which is normally exteriorly concave having a convex undersurface, a cylindrical skirt depending from the outer periphery of said top, said skirt being internally threaded; projecting ring means extending from said convex undersurface concentrically arranged within said skirt; a thin, annular, readily deformable rib disposed about said ring means disposed adjacent said top undersurface, said top being flexibly movable into a substantially planar disposition upon application of an axial thrust against said undersurface.

10. The closure of claim 9 in which a seal ring is locked against said closure undersurface by means of said rib and snugly engages a peripheral portion of said ring means.

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60 GEORGE T. HALL, *Primary Examiner*.