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CONTAINER AND CLOSURE

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2 Sheets-Sheet 2

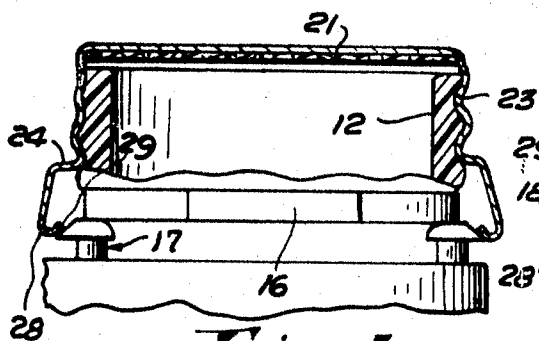


Fig. 5.

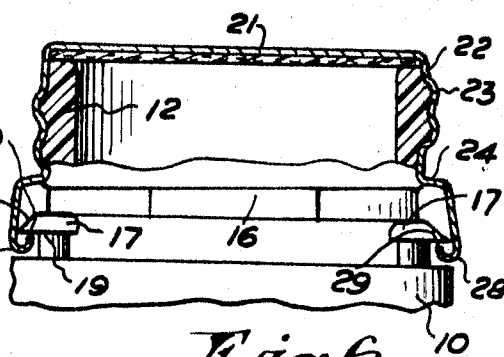


Fig. 6.

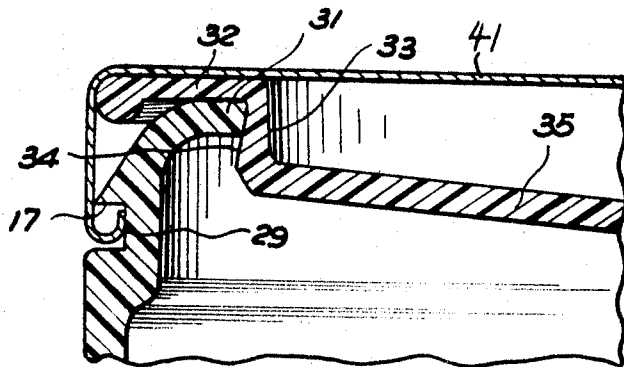


Fig. 7.

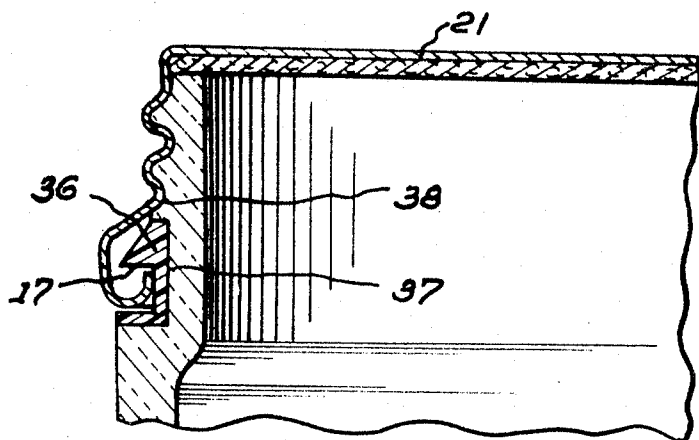


Fig. 8.

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CONTAINER AND CLOSURE

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ABSTRACT OF THE DISCLOSURE

A container having a screw threaded neck with plastic lugs below the screw threads and a metal cap screwed onto the neck and having an upwardly directed edge of the cap skirt underlying the lower surfaces of the lugs. The cap skirt has a circumferential weakened fracture line between the cap screw threads and cap skirt edge so that upon unscrewing the cap, the skirt fractures.

Background of the invention

Container and closure combinations in which a sheet metal closure is reformed to engage retaining means on the container are applied by means of rolling tools which bear upon and reform the metal against the container formations. Pilferproof package closures, separable by fracture occurring when the package is opened to provide a removable reclosure portion and a retained band, have been made with the threads or other retaining means on the reclosure portion preformed, but rolling tools still were required to conform the band to a container shoulder after the closure was in place thereon.

Aside from the matter of expense of the rolling tools, their use presents a problem when the container is made of plastic material, since plastic containers, when made in economical thicknesses, are not strong enough to withstand the pressure of such rolling tools. Moreover, containers with handles projecting near the neck are increasing in use, and these projections obstruct the operation of the usual rolling tools.

Summary of the invention

A package comprising a container having a neck provided with circumferentially spaced lugs having lower faces disposed at not more than 90° from a subtended vertical line, and a closure having its lower edge turned inward and upward to provide an edge to bear against the lower faces of the lugs.

Brief description of the drawings

FIG. 1 is an elevational view of a plastic container with the neck of plastic material formed according to the invention;

FIG. 2 is an enlarged top plan view of the container;

FIG. 3 is a vertical cross-sectional view of a closure for application to the container of FIGS. 1 and 2;

FIG. 4 is a vertical sectional view through the neck of the container of FIG. 2 and the closure of FIG. 3 with the closure partially applied;

FIG. 5 is a vertical sectional view through the neck of the container of FIG. 2 and the closure of FIG. 3 and showing a later stage in the application of the closure;

FIG. 6 is a view similar to FIG. 5 but showing the closure fully applied;

FIG. 7 is a cross-sectional view showing a package with a modified form of the container and closure including a sealing gasket and a tear-off closure; and

FIG. 8 is a cross-sectional view showing an adaptation of the invention to a glass container.

Description of the preferred embodiment

The plastic container 10 shown in FIGS. 1 and 2 has a handle 11 and a neck 12. Surrounding the neck opening is a sealing surface 13, and the neck is threaded exteriorly at 14 above a shoulder 15. Projecting from this shoulder are two diametrically opposed lugs 16 and immediately below the shoulder are two lugs 17 of greater radial projection than, and centered on the diameter normal to the center diameter of, the lugs 16. These lower lugs 17 have sloping upper faces 18 and lower faces 19 which preferably are substantially flat but may be disposed at an upward inward angle. As shown, the outer edge of each of the lugs 16 and 17 extends between about 40° and about 50° on a circumscribing line.

The closure 20 has a top panel 21 and a skirt 22 which is prethreaded at 23 to mate with the thread 14 and has a shoulder 24 between the threaded part 23 and the lower, wider skirt portion 25. The skirt is weakened on a circumferential line by slits 26 between bridges 27. The edge of the skirt is turned inwardly and upwardly at 28 to leave an edge 29 facing upwardly. The skirt portion below the weakened line comprises a locking band 30.

When the closure is screwed onto the container, the lower skirt portion has sufficient resilience to pass over the lugs 16 with very little skirt distortion. However, the lower skirt portion can pass over the lugs 17 only by reason of substantial temporary distortion induced by the camming surfaces 18, the lower skirt portion changing substantially from round toward oval, as it passes over the maximum diameter of these lugs, so that the turned edge snaps into place thereunder. The container neck and closure may be designed to leave a minimum space between the skirt edge 29 and the lug faces 19.

When the closure is removed, the edge 29 bears on the lug faces 19 and may penetrate the plastic material slightly. In any case, the faces 19 provide no outward camming action and the edge will not pass over the lugs. Accordingly, the bridges 27 are fractured by continued unscrewing of the closure and the portion 30 remains on the bottle.

In removal, the unrestrained portion of the skirt edge between parts bearing on faces 19 bows upwardly resulting in uneven tension on the bridges. In the structure disclosed, any tendency of the edge to bow upwardly is limited by the lugs 16 against which the edge 29 will bear in the event of such bowing. This assures satisfactory fracture of the bridges.

The camming lugs 17 may also be three or more in number and the distortion of the cap skirt shape will be toward triangular, square, hexagonal, etc. as dictated by the number and disposition of the lugs 17. The lugs 16 preferably are equal in number to the lugs 17, but a structure with four lugs 17 and two lugs 16, with all six lugs equally spaced circumferentially and the lugs 16 diametrically disposed would be within the structure of the invention. In this case the skirt distortion would be rectangular. The circumferential spacing of the lugs always is such that the camming action of any one lug will be opposed by similar action of at least one other lug.

The description of the preferred combination as including a prethreaded closure is not intended to be limiting. The upper skirt portion may be plain and may be reformed to match any retaining means provided on the container neck.

Once the bridges are broken the threaded portion of the closure can be used repeatedly as a reclosure while the band 30, remaining on the container, shows that the package has been opened.

The bearing of the top panel 21 of the closure on the sealing surface 13 of plastic material usually provides an efficient seal, but some packages may require a gasket for

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proper sealing. This is particularly true with friction closures in which the skirt has no retaining means above the upturned edge. In FIG. 7, I have shown a container and cooperating friction closure embodying my invention. The container has the lugs 17 and an inwardly disposed flange 31 and the closure has a flangible top panel 41 the upturned edge 29 on its skirt and contains a gasket 32 having a central recess 33 characterized by a downwardly flaring outer wall 34 and a depressed diaphragm 35. With this construction, any internal pressure on the diaphragm will tighten the bearing of the wall 34 on the lower edge of the flange 31, assuring sealing contact.

The lugs and upturned edge cooperate most efficiently when the lugs are of plastic material. In FIG. 8 I have shown an adaptation of the invention to provide the same advantage for a glass container. A plastic collar 36, having the lugs 16 and 17 is placed in a groove 37 of the glass container 38. The lugs then function as described above.

I claim:

1. A container-closure combination comprising a container having a neck which has an upper sealing surface and which has outwardly extending lugs of plastic material with downwardly sloping outer surfaces and substantially outwardly radiating lower surfaces, said lugs being spaced circumferentially for providing opposed cam surfaces below said upper sealing surface, and a metal closure comprising a top panel and a skirt portion having an inwardly disposed and upwardly directed bottom edge underlying said lower surfaces of said container lugs, said lugs being slightly penetrable by the upwardly directed edge of said skirt portion and restraining said edge from being drawn outwardly and upwardly over said lugs.

2. A container-closure combination as set forth in claim 1 in which the lower surfaces on said container lugs are disposed to form an outwardly open included angle of not over 90° with a depending vertical line.

3. A container-closure combination as set forth in claim 1 in which said container neck has an exterior screw thread formation thereon and has additional lugs of less radial extent than said first-named lugs, said additional lugs having their lower surfaces disposed above the lower surfaces of said first-named lugs, and said closure has a threaded portion to match the screw thread formation on said neck and a weakened line between said bottom edge and said threaded portion.

4. A container-closure combination as set forth in claim 1 in which said container neck has an inwardly extending

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flange and which includes a gasket having a central recess therein providing a depressed diaphragm and a downwardly flaring outer wall bearing against the lower edge of said inwardly extending flange.

5. A metal closure adapted for application to a container neck which has an upper sealing surface, an exterior screw thread formation below said sealing surface, and outwardly extending lugs of plastic material below said sealing surface, said lugs having downwardly sloping outer surfaces and substantially outwardly radiating lower surfaces and being spaced circumferentially on said neck for providing opposed cam surfaces thereon, said metal closure comprising a top panel and a resiliently distortable skirt, said skirt having a threaded portion to engage the screw thread formation on said neck and an inwardly disposed and upwardly directed bottom edge, the edge being separated from said threaded portion by a circumferential weakened fracture line, said closure skirt having a transverse diameter at said upwardly directed edge adapted to pass over container lugs having a greater transverse diameter at the outer surface of said lugs upon resilient distortion of said closure skirt so that upon application of the closure to the container said upwardly directed edge underlies said lugs on said container neck and said lugs are slightly penetrable by said upwardly directed edge and restrain said edge from being drawn outwardly and upwardly thereover.

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