

Oct. 12, 1965

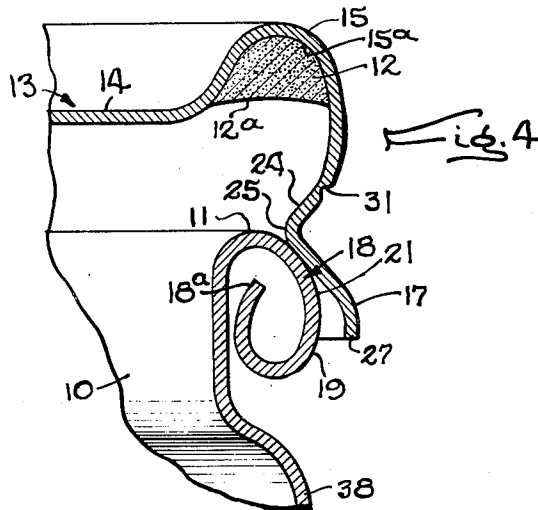
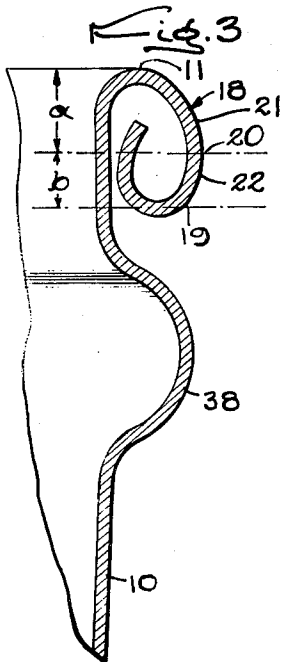
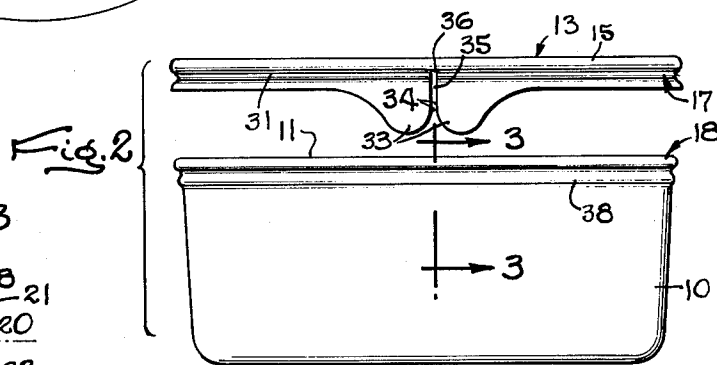
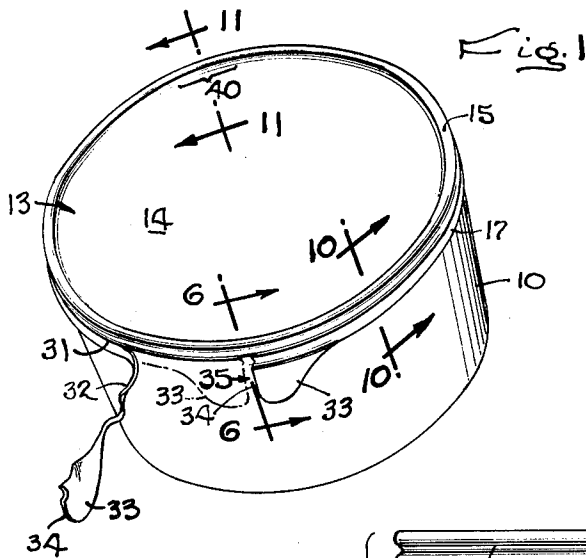
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3,211,323

COVERED CONTAINER WITH REMOVABLE TEAR STRIP

Filed June 11, 1962

4 Sheets-Sheet 1



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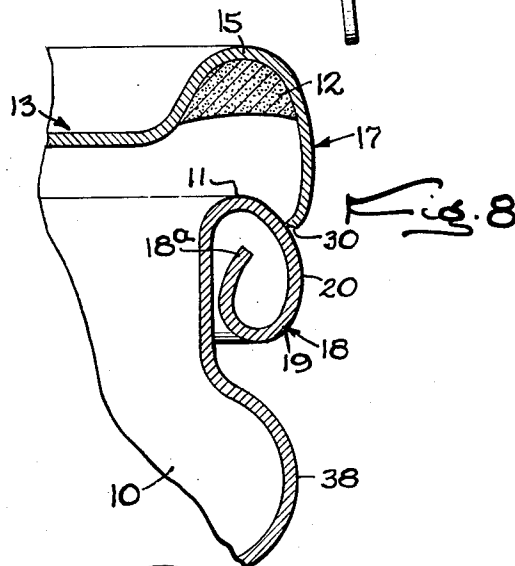
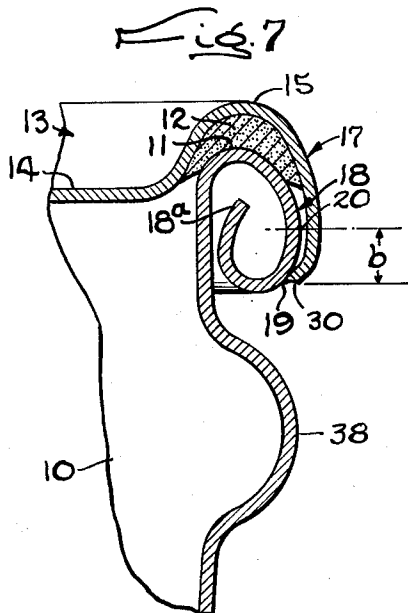
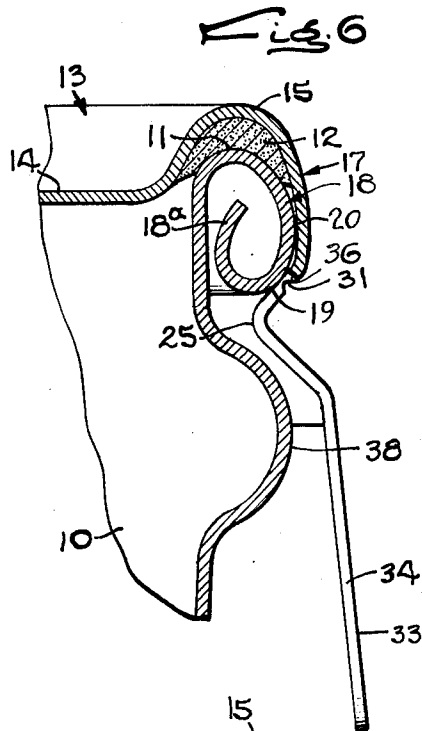
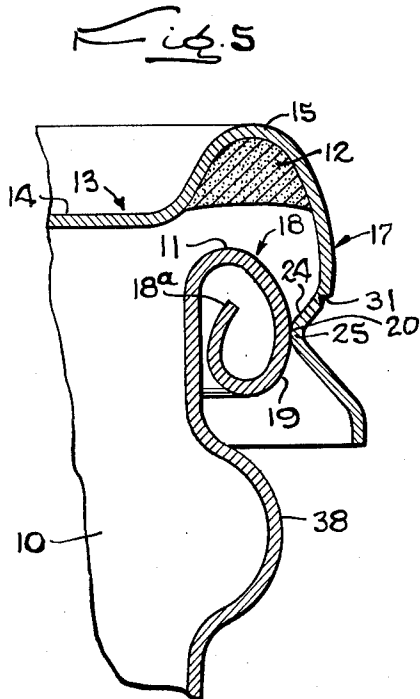
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COVERED CONTAINER WITH REMOVABLE TEAR STRIP

Filed June 11, 1962

4 Sheets-Sheet 2



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Oct. 12, 1965

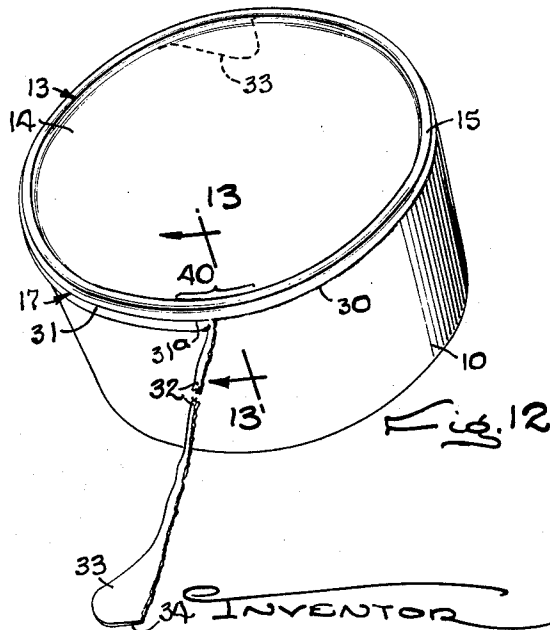
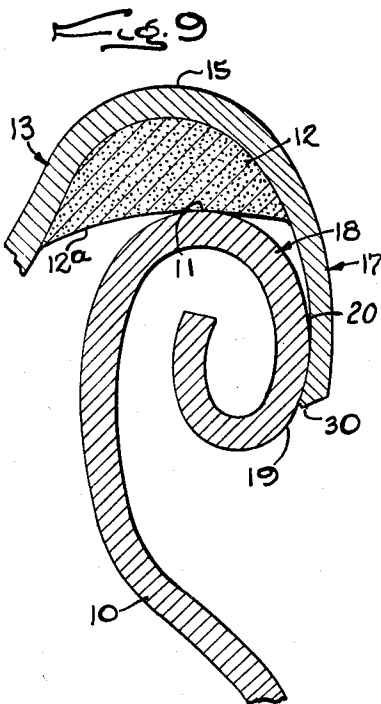
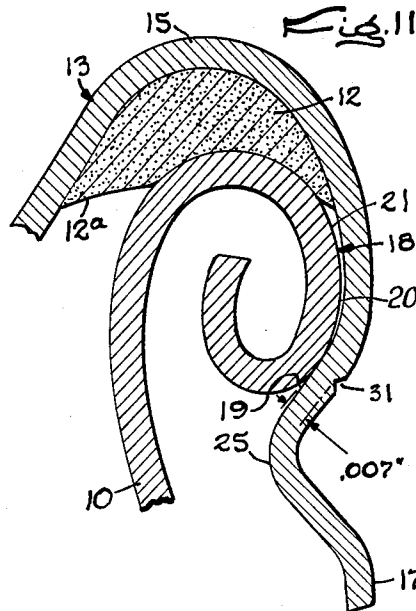
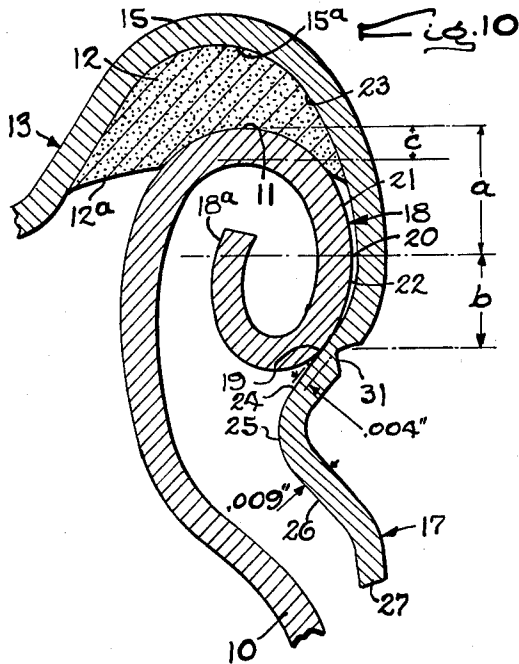
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3,211,323

COVERED CONTAINER WITH REMOVABLE TEAR STRIP

Filed June 11, 1962

4 Sheets-Sheet 3



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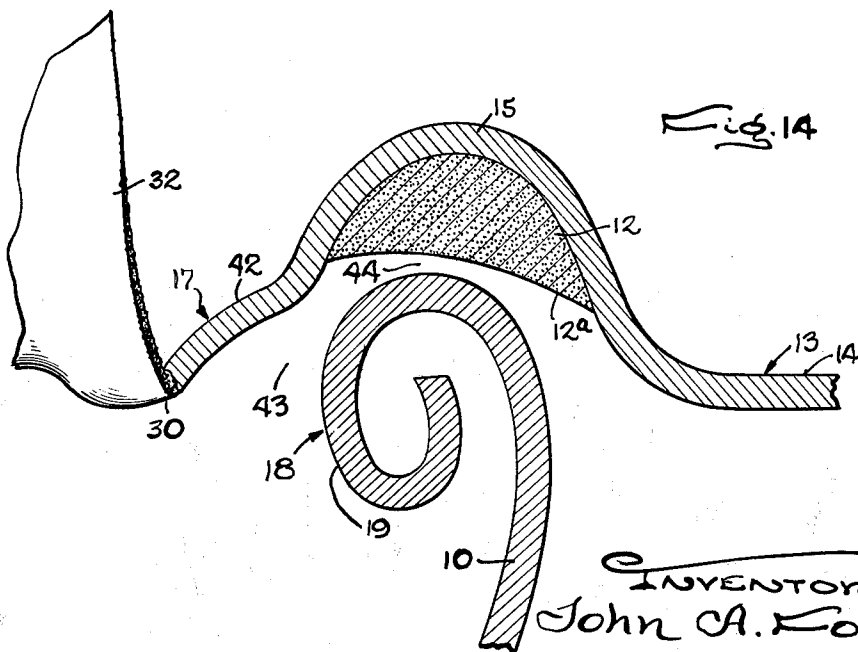
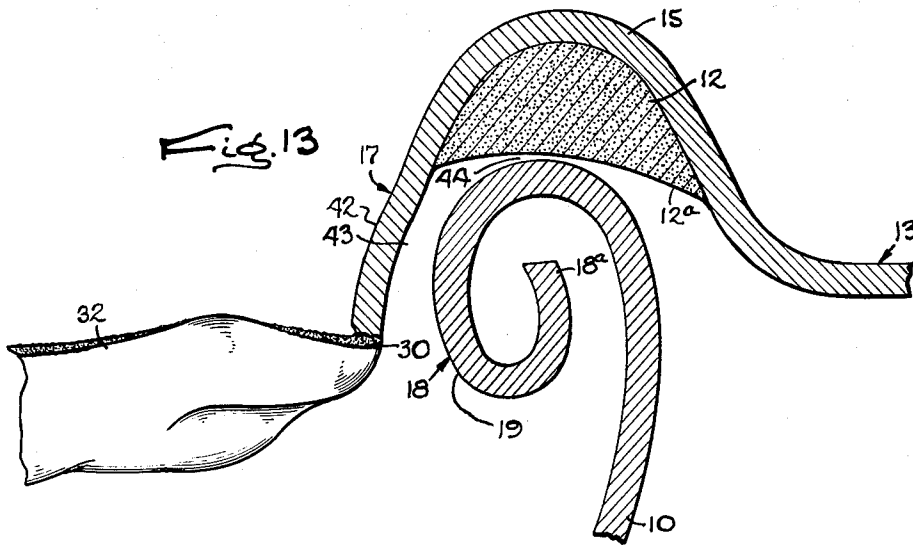
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COVERED CONTAINER WITH REMOVABLE TEAR STRIP

Filed June 11, 1962

4 Sheets-Sheet 4



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3,211,323 COVERED CONTAINER WITH REMOVABLE TEAR STRIP

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Filed June 11, 1962, Ser. No. 201,431

6 Claims. (Cl. 220—54)

This invention relates to a container of the type in which a tubular body having an external bead around the lip at its open end is closed by a cover having a gasket and a depending peripheral skirt bent around and interlocked with the bead to compress the gasket and seal the cover against the lip, the skirt being weakened along a score line intermediate its edges so that the lower portion of the skirt may be torn away to release the cover from the body.

The general object is to provide a tear strip container of the above character which, after tearing of the skirt and initial removal of the cover, is adapted for reclosure and effective resealing automatically as an incident to replacing the torn cover on the container body.

A more detailed object is to provide a cover of resilient material and locate the score line on the skirt in a novel relation with respect to the maximum diameter of the body engaged thereby so that the resiliency of the torn skirt may be utilized to achieve a snap-like reclosing of the container.

A further object is to vary the thickness of the score line of the skirt in a novel manner for facilitating removal of the cover when the sealed container is under a substantial internal vacuum.

The invention also resides in the novel shaping of the body bead and the cover skirt to achieve the foregoing objects.

Other objects and advantages of the invention will become apparent from the following detailed description taken in connection with the accompanying drawings, in which

FIGURE 1 is a perspective view of the improved container with the tear strip partially removed.

FIG. 2 is an exploded elevational view.

FIG. 3 is an enlarged fragmentary section taken along the line 3—3 of FIG. 2.

FIGS. 4, 5 and 6 are fragmentary diametrical sections showing successive steps in the assembly of the cover on the container body, FIG. 6 being taken along the line 6—6 of FIG. 1.

FIG. 7 is a view similar to FIG. 6 after removal of part of the tear strip.

FIG. 8 is a view similar to FIG. 7 after removal of the cover following removal of the tear strip.

FIG. 9 is a view similar to FIG. 8 but on a somewhat larger scale after replacement of the cover on the cup.

FIGS. 10 and 11 are tracings of actual fragmentary sections enlarged twenty times and taken respectively along the lines 10—10 and 11—11 of FIG. 1.

FIG. 12 is a perspective view of the container after removal of half of the tear strip.

FIGS. 13 and 14 are enlarged sections similar to FIG. 10 taken along the line 13—13 of FIG. 11 and illustrating different directions of pulling of the tear strip.

In the drawings, the invention is shown for purposes of illustration incorporated in a container comprising a tubular body or cup 10 closed at its bottom and open at its upper end which is defined by a lip having a rounded axially facing surface 11 abutting a gasket 12 which is secured to the underside of a generally flat cover 13 and compressed against the lip as shown in FIGS. 6 and 10 to provide a seal capable of withstanding a substantial pressure differential. While the cup may be made from

various materials, it is preferably composed of semi-resilient sheet metal such as an alloy of aluminum known as Alcoa 3003-H14 about .009 of an inch thick.

The cover is preferably composed of the same material and comprises a flat top 14 depressed within a peripheral bead 15 which opens downwardly to provide a downwardly opening groove 15^a partially filled to a depth of about .050 of an inch by the gasket 12. The latter is formed by delivering into the groove with the cover inverted an accurately measured volume of a creamy liquid which is solidified by heat to leave the exposed surface 12^a substantially flat and perpendicular to the cover axis. The gasket is relatively soft and resilient so as to possess the desired compressibility under the available pressure while providing between the cover and the body lip 11 a seal which will remain airtight for a substantial period of time. For this purpose, a polyvinyl chloride so-called puff compound sold by Dewey and Almy may be employed. By heating to about 400 degrees, this material is converted into a ring of fine foam as shown in FIG. 4.

Compression of the gasket is achieved by telescoping a skirt 17 depending from the outer edge of the cover down over a bead 18 of rounded cross-section formed around the cup lip and providing a downwardly facing shoulder or ledge 19 with which the lower edge portion of the skirt is interlocked in the final assembly (FIGS. 1, 6 and 10) to retain the compressed condition of the gasket. After blanking a sheet and drawing a generally cylindrical cup, the metal at the open end is subjected to conventional flanging and beading operations to curl the edge portion of the cup into the form shown in FIG. 3. From the arcuate upwardly facing lip surface 11, the outer surface of the bead flares gradually outwardly and downwardly at 21 to a maximum diameter 20 and then curves inwardly first gradually at 22 (FIGS. 3 and 10) and then more sharply so as to form the shoulder 19 which is thus spaced below the maximum diameter 20 a distance *b* somewhat greater than the total compression *c* (FIG. 10) of the gasket in the final assembly. Below the shoulder the metal of the bead is curved inwardly and horizontally and finally reversely and upwardly along the outer side of the cup body as indicated at 18^a thus completing the bead.

The skirt 17 is an integral continuation of the outer wall of the gasket seat 15^a slightly larger and of somewhat lesser cross-sectional curvature than the outer surface 21, 22 of the bead 18. Thus, in the final assembly (FIGS. 6 and 10), the inner surface of the skirt below the gasket is uninterrupted and converges gradually toward the bead at 23 while curving around the maximum diameter 20 of the bead and then coming into contact with the latter over a band which includes the shoulder 19. Below the latter, the skirt flares quite gradually away from the bead as indicated at 24 to a bend 25 beyond which the marginal portion of the skirt flares outward to form an internal frusto-conical surface 26 having a diameter at the edge 27 somewhat greater than the maximum diameter 20 of the bead. The conical surface 26 guides the cover onto the cup and coacts with the bead with a cam action (see FIGS. 4 and 5) to expand the resilient skirt enough to allow the bend 25 to pass the bead and then spring inwardly beneath the shoulder 19 and bring the skirt surface 24 into contact therewith in the final position (FIGS. 6 and 10) and under sufficient pressure to retain the compression of the gasket 12.

In accordance with the present invention, provision is made for tearing away the lower portion of the skirt or ribbon-like strip 32 and releasing the skirt sufficiently to permit easy removal of the cover without substantial deformation of the remaining portion of the skirt while at the same time leaving a torn edge 30 which is somewhat

smaller than the maximum diameter 20 of the bead and spaced (see FIGS. 7 and 10) a distance b far enough below the latter to engage the bead 18 and again interlock effectually the shoulder 19 with a snap-like action or in firm retaining contact so as to hold the gasket against the cup lip 11 when the cover is replaced and manually pressed down against the cup lip as shown in FIG. 9. The torn edge 30 is located in this definite position by scoring the skirt 17 in a conventional operation to form a shallow groove or score line 31 around the entire circumference of the skirt thus leaving at the bottom of the groove a weakened section about .004 of an inch thick over the major portion of its length. Herein, the score groove is V-shaped in cross-section and opens outwardly.

Tearing the strip 32 away from the cover is effected by grasping an enlargement or tab 33 constituting an extension of the lower edge of the skirt and having an edge 34 defining one side of a split 35 extending into the skirt at least to the score line 31 and preferably to a point 36 slightly above the latter but short of the gasket 12 as shown in FIG. 6. Herein, the split 35 takes the form of a notch of narrow width having sides which constitute the edges of the tab 33 and a similar second tab which may be used alternately in tearing away the lower portion of the skirt to release the cover. The notch is so narrow that, even though it may extend slightly above the score line 31, the effectiveness of the seal formed by the gasket 12 is maintained, after the initial assembly of the cover on the cup.

After grasping either one of the two alternately usable tabs 33, the user pulls the tab outwardly away from the side of the cup thus tearing away the strip 32 as illustrated in FIG. 1. The tearing is continued angularly around the cup following the score line 31 until the tear again reaches the notch 35, the lower portion of the skirt thus being torn completely away leaving the raw edge 30 around the entire periphery of the cover. The skirt remains interlocked as shown in FIG. 7 until substantially all of the strip is torn off. Only a narrow edge portion of the remaining skirt thus remains interlocked with the bead so that, in the absence of a substantial vacuum within the sealed container, the cover may, by tilting thereof under a relatively small lifting force be released and removed from the cup as illustrated in FIG. 8 to expose the contents thereof. Such removal is accompanied by slight expansion of the edge 30 in passing the maximum diameter 20 of the bead, the lower edge portion of the remaining skirt then contracting owing to the resiliency of the metal to a diameter smaller than the bead as shown in FIG. 8.

In this condition, it will be apparent that the cover may be replaced on the cup simply by telescoping the skirt down over the bead and applying enough downward pressure to cause the skirt to expand as the lower edge 30 passes the maximum bead diameter 20 and then contract inwardly beneath the shoulder 19 as the gasket 12 comes into contact with the cup lip 11 and becomes compressed slightly as shown in FIG. 9. The cover is thus held effectually on the cup, usually under a sealing pressure substantially less than in the original assembly but sufficient nevertheless to tightly reclose the cup and offer effective protection to the contents that may remain in the cup. Such effective resealing of the container is made possible by the novel spacing above described between the spacing of the score line 31 below the maximum diameter 20 of the bead 18 the distance somewhat greater than the normal compression of the gasket 12 in the initial assembly of the cover on the cup together with the formation of the skirt of sufficient stiffness and with a continuous inner surface which is not deformed appreciably either in the tearing away of the strip 32 or in the subsequent lifting of the cover to open the cup.

To prevent a prospective customer of the packaged product from having easy access to the lower edge of the skirt and forcibly lifting the cover off from the cup, a second bead 38 is formed in the wall of the cup 10 and spaced only a short distance below the lower edge of the skirt 17 in the final assembly. Herein, the radial width of

the bead is substantially equal to that of the bead 18 and the maximum diameter is spaced far enough below the latter to preclude sufficient finger entry between the beads to enable the skirt to be grasped and enough lifting force applied to dislodge the cover relative to the cup.

In the packaging of certain products in containers of the above character, it is desirable to deliver the product in a heated condition into the cup. Subsequent cooling of the product is accompanied in some instances by the development of a substantial vacuum within the sealed container. This vacuum may be of sufficient magnitude to prevent easy manual lifting of the cover off from the cup following removal of the tear strip 32. To overcome this difficulty, the present invention aims to increase the resistance of the skirt to continued tearing away of the strip at a selected point around the cup circumference and thereby induce enough outward bending and deformation of the skirt in an area above the score line 31 to substantially pull the remaining margin 42 away from the bead 18 as indicated at 43 in FIG. 13 and relieve the compression of the gasket 12 as illustrated at 44 enough to release such vacuum and permit easy removal of the cover after complete tearing of the strip away from the cover. I have discovered that such increased resistance may be achieved simply by increasing the thickness of the skirt along the score line 31 at some point or short arcuate length 40 (FIG. 1) around the cup circumference. Preferably this arc is disposed about half way around the cup from the tabs 33 so that the increased resistance will occur after about the same length of the strip has been removed irrespective of which of the two tabs 33 is used to initiate the tearing. It has been found that the desired resistance to tearing may be achieved by increasing the thickness of the skirt at score line 31 from the normal .004 of an inch (FIG. 10) to about .007 (FIG. 11) when the cover is composed of the alloy above described.

The amount of outward bending and deformation of the torn edge 30 of the skirt over the arc 40 will depend somewhat on the angle at which the tear strip is being pulled away from the cup while the thickened length 40 is being torn. If the pull on the strip 32 is substantially radial as shown in FIG. 13, the skirt is deformed enough to break the seal under a relatively small vacuum, for example 4.5 inches of mercury. To release the seal under higher vacuums, the tear strip may be pulled upwardly along an incline or even pulled substantially vertically as shown in FIG. 14. In such a case, the remaining part of the skirt 17 is separated a greater distance away from the cup and may even be lifted slightly to break the seal in the course of tearing the strip 32 away from the cover.

When constructed as above described, the cup and cover may be assembled automatically in a simple and inexpensive machine to achieve the desired sealing pressure without the necessity of the further rolling or deforming operations as required in prior containers of the present type.

I claim as my invention:

1. A sealed container comprising a cup having a rounded lip and an adjacent peripheral bead whose surface curves outwardly and downwardly to a plane of maximum diameter and then continues downwardly and inwardly first gradually and then more sharply to form a downwardly and inwardly inclined ledge, a cover of semi-resilient material having a top wall and a depending peripheral skirt telescoped over and interlocked with a snap action with said bead, a gasket of compressible material extending around the underside of said top wall within and adjacent said skirt and deformed and compressed against said cup lip, said skirt converging gradually and continuously toward and around the upper portion of said bead past said plane and then curving inwardly beneath and against said ledge so as to be maintained in contact therewith under the compression of said gasket

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at a line of contact spaced below said plane a distance substantially greater than the compression of the gasket, means providing a score line around said skirt adjacent said line of contact, a split in said skirt extending transversely thereof inwardly and upwardly from the edge thereof and intersecting said score line, and a finger tab integral with said skirt projecting from the edge thereof with one edge of the tab merging with one side of said split whereby to permit the lower marginal strip of said skirt to be pulled and torn away from said cover and said bead along said score line, said score line being substantially smaller in diameter than said maximum bead diameter whereby to leave on the skirt after tearing off said strip an inturned edge adapted, upon replacement of the cover on the cup to telescope down over said bead and contract beneath said ledge with a retaining fit effectually holding the cover on the cup with said gasket in contact with said lip.

2. A sealed container as defined in claim 1 in which the inner end of said notch terminates short of said gasket and including a second finger tab integral with the lower edge of the skirt on the side of the notch opposite said first tab whereby to permit the lower edge of said skirt to be torn away along said score line in either direction around said cover.

3. A sealed container as defined in claim 1 in which said skirt below said second plane flares outwardly to a diameter greater than said maximum diameter and provides an internal surface for guiding the skirt down over and into snap interengagement with said bead during pressing of the top axially onto said body.

4. A sealed container as defined in claim 3 including a second peripheral bead of arcuate cross-section formed on said cup immediately below said skirt to substantially close the space between the periphery of the cup and edge of the skirt.

5. A sealed container having, in combination, a tubular body having a lip at its open end and an external peripheral bead extending around the open end of said body and having an outer surface diverging downwardly from said lip to a maximum diameter in a plane axially spaced below the lip and then converging to form a downwardly and outwardly facing shoulder spaced below said plane, a cover closing the open end of said body, a gasket of resilient sealing material on the underside of said cover and compressed axially between the latter and said lip, a peripheral skirt integral with and depending from the outer edge of said cover and having an inner surface telescoped with said bead and converging inwardly and downwardly below said plane and engaging said shoulder with a tight snap fit to hold said gasket compressed, means providing a score line around said skirt adjacent said shoulder, a split extending transversely of the lower edge portion of said skirt and intersecting said score line, and a finger tab integral with the lower edge of said skirt and merging with one side of said split whereby to permit the lower marginal strip of said skirt to be pulled and torn away from said cover and said bead along said score line, said skirt at the bottom of said

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score line being of increased thickness over an arc angularly spaced around the cover from said split whereby to require an increased pull on said tab in order to tear said strip away from the cover along said arc.

6. A sealed container having, in combination, a tubular body having a lip at its open end and an adjacent external peripheral bead with an outer surface diverging downwardly from said lip to a maximum diameter in a plane axially spaced below the lip and then converging inwardly to form a downwardly and outwardly facing shoulder spaced below said plane, a cover closing the open end of said body, a gasket of resilient sealing material on the underside of said cover and compressed axially between the latter and said lip, a peripheral skirt integral with and depending from the outer edge of said cover and having an inner surface telescoped with said bead and converging continuously inwardly and downwardly around the bead below said plane and contracted against and around said shoulder so as to hold said gasket compressed, means providing a score line around said skirt spaced below said maximum plane and having a diameter substantially smaller than said maximum diameter, a notch extending transversely of the lower edge portion of said skirt and intersecting said score line, and a finger tab integral with the lower edge of said skirt and merging with one side of said notch whereby to permit the lower marginal strip of said skirt to be pulled and torn away from said cover and said bead along said score line, said score line being spaced far enough below said maximum diameter to leave the lower edge of the skirt after tearing away said strip disposed below said maximum diameter while permitting removal of the cover by expansion of said lower skirt edge, and said cover being composed of resilient material whereby the torn edge of said skirt expands and passes down over the maximum diameter of said bead when the cover is replaced on said body and pressed downwardly to reengage said gasket with said lip and then contracts and hooks around said bead shoulder below said maximum diameter.

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