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 [73] Assignee **Rieke Corporation**  
**Auburn, Ind.**

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

[52] U.S. Cl. .... 292/256.61,  
 220/60 R

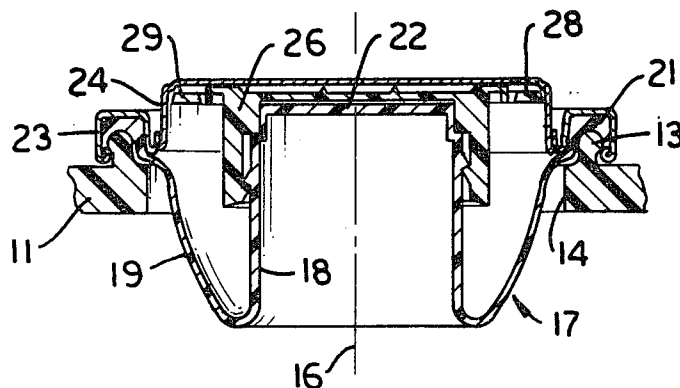
[51] Int. Cl. .... B65d 45/32,  
 B65d 43/10

[50] Field of Search ..... 292/256.61,  
 256.63, 256; 220/59, 60, 67; 229/5.7

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**UNITED STATES PATENTS**

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**ABSTRACT:** A plastic container with an opening in a wall thereof encompassed by a boss formed therein, has a plastic closure secured thereto around the opening by a rigid circular anchor ring of inverted U-shaped cross section, the boss having an outwardly projecting the lip disposed in interlocking relationship with an inwardly projecting bead on the anchor ring, with the closure base and boss below the bead squeezed together by crimping or by other means securing the anchor ring thereon.



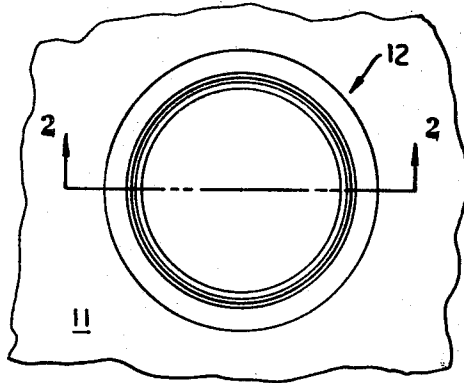


**Fig. 1.**

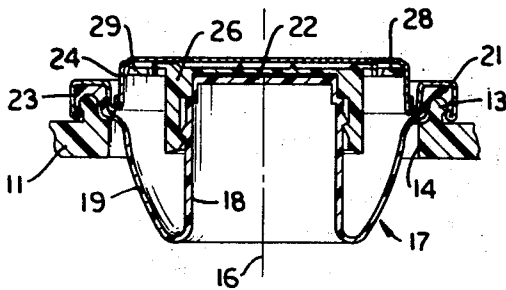


**Fig. 2.**

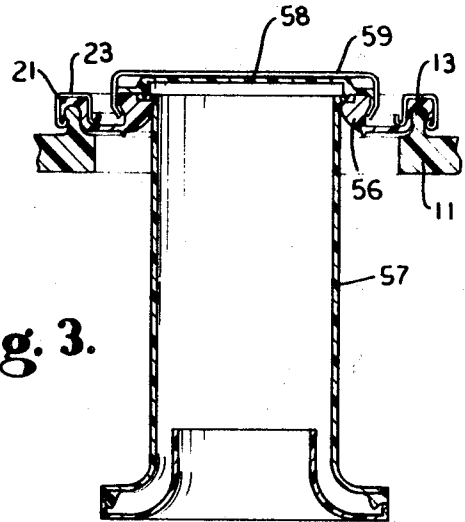


**Fig. 3.**

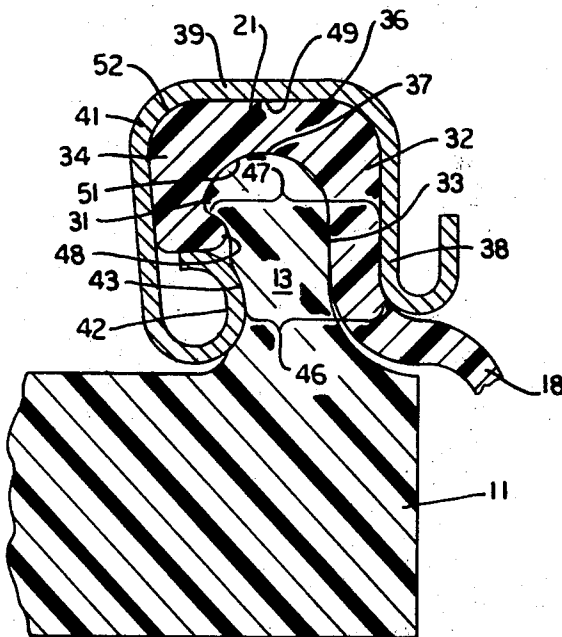


**Fig. 4.**

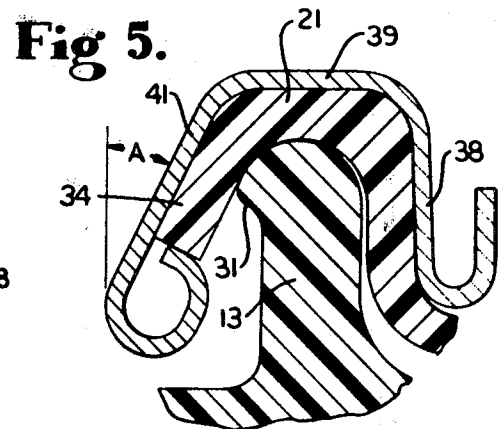


**Fig. 5.**

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## CONTAINER CLOSURE COMBINATION

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

This invention relates generally to plastic shipping containers, and more particularly to plastic closures therefor and combinations therewith.

## 2. Description of the Prior Art

Various closures for plastic containers are known. It is desirable to be able to use on plastic containers, closures of the type shown in the U.S. Pat. No. 2,561,596 issued to Irvin H. Rieke July 24, 1951; No. 2,565,699 issued to Irvin H. Rieke Aug. 28, 1951; U.S. Pat. No. 2,661,128 issued to Irvin H. Rieke Dec. 1, 1953; and U.S. Pat. No. 2,895,654 issued to Glenn T. Rieke July 21, 1959. Such closures should remain securely in position in spite of repeated extensions and retractions of the flexible, nestable and expansible dispensing spouts shown in such patents. The same is true where an extendable pour spout of the nonflexible telescopic type is employed. However, such objectives have been difficult to obtain because of the lack of rigidity and inherent tendency to cold flow that is characteristic in virtually all thermoplastic plastics that are otherwise suitable for use as shipping containers.

## SUMMARY OF THE INVENTION

Described briefly, in a typical embodiment of the present invention, a plastic container having an axially extending flange encircling an opening in a wall thereof, is provided with a radially outwardly extending lip around the circumference of the flange. The base of the plastic closure extends up along an inner cylindrical wall of the flange, over the top of the flange and around and below the lip of the flange. This generally channel-shaped annular closure base is squeezed to the flange by a rigid metal anchor ring of generally inverted U-shaped cross section with an inwardly projecting bead around its outer lower margin squeezing the flange between the inner portion of the closure and the outer portion when said outer portion has been crimped or otherwise forced inwardly. This provides an interlocking relationship between the flange lip and anchor ring bead and precludes any separation or leakage at the closure, thereby overcoming typical cold flow characteristics of the plastics employed.

## BRIEF DESCRIPTION OF THE DRAWINGS

The full nature of the invention will be understood from the accompanying drawings and the following description and claims.

FIG. 1 is a top plan view of a combination according to a typical embodiment of the present invention.

FIG. 2 is a section therethrough taken along line 2—2 in FIG. 1 and viewed in the direction of the arrows.

FIG. 3 is a section similar to FIG. 2 but illustrating a telescopic rigid spout, in contrast to the nestable flexible spout of FIG. 2.

FIG. 4 is an enlarged fragmentary portion of the section of FIG. 2, illustrating some construction details.

FIG. 5 is a view similar to FIG. 4 showing a typical construction (slightly exaggerated) before the anchor ring is secured.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawings in detail and particularly FIGS. 1, 2 and 4 thereof, a portion 11 of a plastic container is shown, this container having a circular opening in the top thereof with a closure assembly designated generally by reference numeral 12. As shown in FIG. 2, the top of the container has an axially extending flange 13 encompassing the opening 14 in the top, the flange and the opening wall 14 having colinear axes 16.

A flexible nestable spout unit 17 is shown in its nested condition and includes a neck portion 18, an inverted frustoconical body portion 19, the annular mounting portion 21 of in-

verted U-shaped cross section, and an integral outlet seal portion 22. This unit is secured in place on the flange 13 by the anchor ring 23 crimped or otherwise attached over the combination flange and mounting portion of the container and the closure, respectively. This ring is typically made of steel, but can be made of other metals or materials which can be cold formed beyond their elastic limit to a desired shape and remain in that shape to provide the rigidity needed for the intended objective as will be described. A seal cap 24 is secured to the inner margin of the ring 23 to cover the bail handled closure cap 26. Closure cap 26 is threadably received on the neck 18 of the spout unit, and may be of a type generally shown and described in the Rieke U.S. Pat. No. 2,895,654. Two portions 28 and 29 of the bail are shown in the cross section therethrough presented in FIG. 2. The cap 24 can be removed to provide access to the bail 28—29 to facilitate pulling the spout from the nested to an extended pouring position as described in the aforementioned patent, whereupon the cap can be removed and the integral seal 22 cut away to permit pouring contents from the container.

According to the present invention, and as better shown in FIGS. 3 and 4, a lip is provided on the flange 13 and, although it can be intermittent, i.e. discontinuous at spaced locations around the circumference, in the illustrated embodiment it is the annular lip 31 projecting laterally outwardly from the upper marginal portion of the flange 13. The mounting portion 21 of the closure is of an inverted U-shape in cross section, the inner cylindrical wall 32 of the channel being received on the inner cylindrical wall 33 of the axially extending flange 13, the outer wall 34 of the "U" being received at the lip of the flange, and the bridging wall 36 being received on the top end 37 of the flange.

The inner wall 38 of the channel of the anchor ring engages the inner wall 32 of the closure mounting base. The bridging wall 39 of the anchor ring channel engages the bridging wall 36 of the closure mounting base. The outer wall 41 of the anchor ring engages the wall 34 of the closure mounting base. The lower marginal portion of the outer wall is turned inwardly to form a bead 42 engaging the outer wall 43 of the flange 13.

The arrangement as thus described provides a combination wherein the inverted channel of the anchor ring has a "mouth" extending between the ends of the bracket 46 which is of a considerably smaller dimension than the dimension across the closure mounting base wall 32 and the axially extending flange at the lip 31 (dimension 47 in FIG. 4). Prior to the manufacturing step which establishes this relationship, the outer wall 41 flares outwardly to facilitate installation on flange 13. This is illustrated in FIG. 5, although angle "A" of the flare is exaggerated in the drawing for purposes of illustration. It would normally be of the order of 7°. The wall 41 is then formed downwardly and inwardly to the condition shown in FIG. 4 and described above, the wall 38 serving as a rigid inner support to back up the inward force. Consequently, the flange 13 and closure wall 32 are squeezed between the bead 42 and backup wall 38. Similarly the lower marginal portion of the skirt wall 34 of the closure mounting base is squeezed inwardly between the anchor ring wall 41 and wall 38, and under lip 31 at 48, providing an interlocking relationship between the lip and closure mounting base skirt portion 48. This relationship is maintained thereafter by the rigid nature of the anchor ring outer wall 41 and backup wall 38. This makes it impossible for the closure material to cold flow from the relationship shown.

The cross sectional distance between the top of the container flange at 37 and the bottom of the bridging portion 39 at 49 is less than the cross sectional distance between the inner surface 51 and outer surface 52 of the mounting base at any location outside a vertical line between the points 37 and 49. Considering this and the fact that the mounting ring, mounting base, and flange are circular, it is readily recognized that the cross-sectional area of the bridging portion 36 in a circle about the axis 16 is less than the cross-sectional area of the

mounting base at various radii outside a circle through the point 49. This feature further minimizes the chance of extrusion or cold flow of the closure itself from a position shown in the drawing.

Referring now particularly to FIG. 3, wherein the rigid telescopic type of spout is shown, parts identical to those of FIGS. 1, 2 and 4 are given the same reference numerals. These include the container itself, the annular axially extending flange 13, the anchor ring 23, and the mounting base 21. However the closure mounting extends from the base inward to a sleeve 56 on which the spout 57 is received, the latter being vertically slidable between the retracted position shown and an extended position. A snap-on closure cap 58 is mounted on the upper end of the sleeve portion, and a protective cover cap 59 is crimped on and over this.

Variations of closures other than those of the types shown in FIGS. 2 and 3, might also be mounted to plastic containers by incorporating the combination of features disclosed in this specification. In any event, the present invention makes it possible to employ such closures on containers made of materials to which they were heretofore virtually inapplicable.

The invention claimed is:

1. A container and closure combination comprising:

a container wall having an opening therein with an upstanding flange encircling said opening and having a radially projecting lip around said opening, said wall, flange, and lip being an integral homogeneous unit of plastic;

a closure base received on said flange; and

an anchor ring having an inverted annular channel received on said closure base, said anchor ring affixing said closure base to said flange.

2. The combination of claim 1 wherein:

said anchor ring channel has a first wall with a marginal portion projecting into interlocking relationship with said lip to prevent separation of said flange from said ring.

3. The combination of claim 2 wherein:

said anchor ring channel has a second wall, said upstanding flange and a portion of said closure base being squeezed between said first and second ring channel walls.

4. The combination of claim 3 wherein:

said lip is outwardly turned, and said projecting marginal portion is an inwardly turned bead engaging said upstand-

ing flange around its circumference.

5. The combination of claim 2 wherein:

said anchor ring is rigid and the said channel thereof has a second wall,

said closure base has an inverted annular channel with an inner wall, an outer wall and a bridging wall, said bridging wall resting on top of said upstanding flange, and said inner and outer walls being squeezed in sandwich relationship between said first and second walls of said anchor ring channel.

6. The combination of claim 5 wherein:

a circular portion of said closure base outside a line between said bridging wall and the top of said upstanding flange is of greater cross sectional area than the cross sectional area of said closure base at said line immediately between said bridging wall and the top of said upstanding flange.

7. A container closure combination comprising:

a container wall having an opening therein with a plastic flange framing said opening, said flange having a laterally projecting lip thereof;

a closure base made of plastic and received on said flange; and

an anchor ring received on said closure base and having a channel shaped cross section, with the distance across the channel mouth being less than the combined thickness of said closure and said flange at said lip, whereby said ring is locked on said flange and base.

8. The combination of claim 7 wherein:

said flange and closure base have cold flow characteristics, and said anchor ring is rigid enough to prevent cold flow of said flange and lip and closure base through said mouth.

9. The combination of claim 7 wherein:

said closure base has cold flow characteristics and includes a portion squeezed between inner and outer walls of the channel of said anchor ring into a relationship to said lip interfering with movement of said closure base axially along said flange.

10. The combination of claim 9 wherein:

said squeezed portion is a lower marginal portion of a skirt wall of said closure base.