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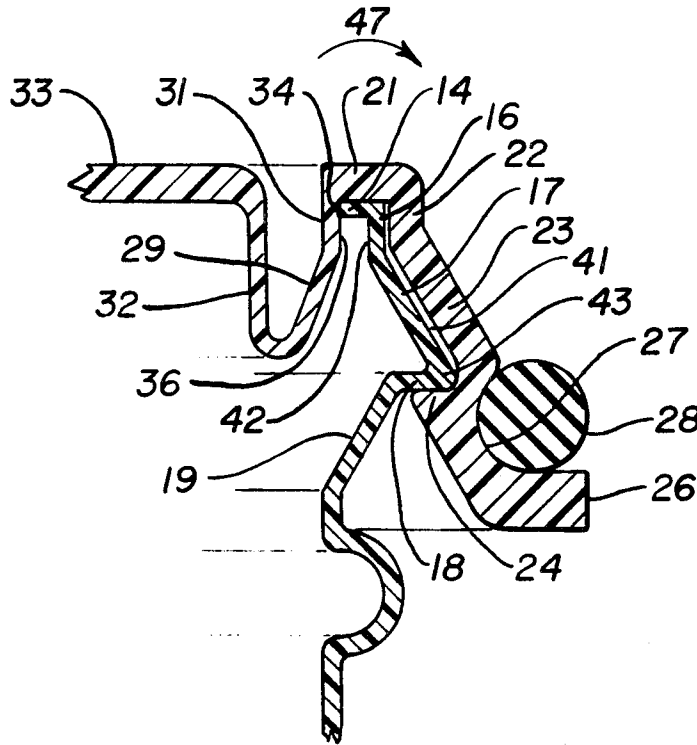
[56] References Cited		UNITED STATES PATENTS	
3,499,574	3/1970	Yates	220/60
3,510,023	5/1970	Ullman et al.	220/60
3,519,163	7/1970	Bardell	220/60

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[54] **SNAP-ON RESEALABLE LID FOR LARGE-MOUTH CONTAINERS**
 13 Claims, 4 Drawing Figs.

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 [51] Int. Cl. **H45c /00,**
 B65d /00, B65d 41/22
 [50] Field of Search 220/60, 42;
 150/5; 215/41, 95, 96, 45

ABSTRACT: A large-mouth container has an inwardly turned sealing lip at the mouth, and an outwardly projecting locking lip below the mouth. A plastic closure includes a ring skirt formed to provide a pair of channels, one receiving the sealing lip and the other receiving the locking lip. A compression ring around the exterior maintains adequate preload between the closure and container around the circle of engagement of the outward projecting lip and an inward projecting lip of the closure. The central top portion of the closure is joined to the skirt by a flexible junction portion accommodating shocks and content expansion without release of the closure.



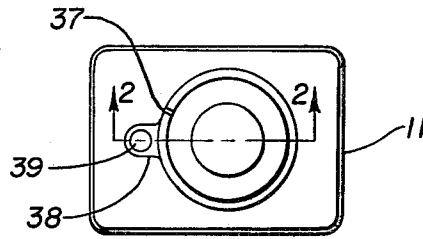


Fig. 1

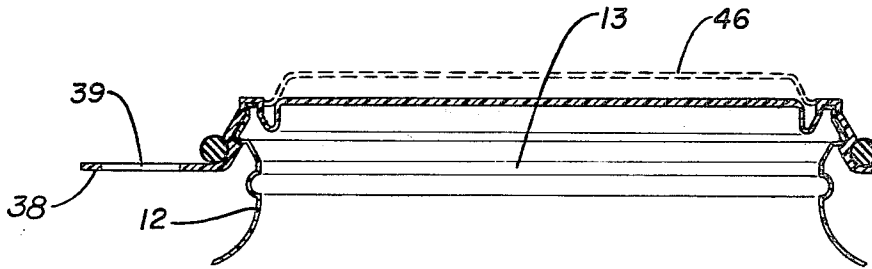


Fig. 2

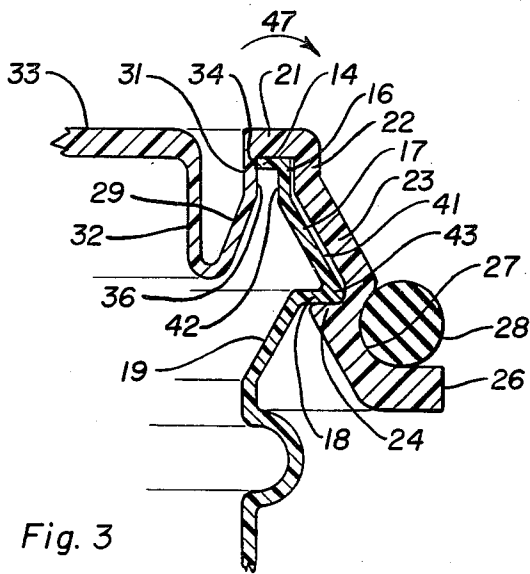


Fig. 3

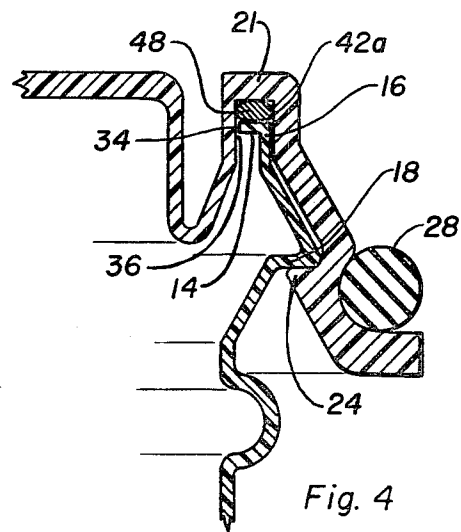


Fig. 4

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SNAP-ON RESEALABLE LID FOR LARGE-MOUTH CONTAINERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates generally to container closures, and more particularly to a closure for a large-mouth container which may be subjected to shocks and content expansion in shipping or storage.

2. Description of the Prior Art

While various products have been marketed in plastic containers for several years now, there is continuously increasing interest in marketing liquids in plastic containers of comparatively large volume. Typically such containers have an opening therein which is comparatively small and usually there is a neck on the container immediately adjacent the opening and which is of greater length than the diameter of the opening.

There is now an interest in marketing paint in plastic containers, particularly in the 1 gallon size. Several considerations are involved in doing this, including the ability to insert a paint brush of suitable size through the mouth of the container, and the facility with which paint can be poured into the container. Both considerations require a larger mouth on the container than has typically been employed heretofore in plastic containers used for marketing liquids.

Where a plastic container is to be used for marketing paint, it must be resealable so the housewife, for example, can take it to a paint store and have them add pigment to match her drapes or complexion, or whatnot, and the container must be shock proof as well. The present invention is directed toward provision of a plastic container-closure combination meeting these requirements.

SUMMARY OF THE INVENTION

Described briefly, in a typical embodiment of the present invention, a container having a large-mouth opening with an inwardly projecting lip at the opening, and an outwardly projecting lip slightly below the opening, is provided with a closure having a channel received on the upper end and an inwardly projecting annular lip abuttingly engaged with the outwardly projecting lip of the container opening. The closure has a central top portion joined to the channel portion by a flexible annular junction portion, and is movable in response to internal pressure or shock movements to tighten the locking lip on the container lip. A compression ring may be employed to maintain a normal preload of the closure on the container at the opening. The purpose of the compression ring is to compensate for the cold flow of the plastic. BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a container with closure thereon according to a typical embodiment of the present invention.

FIG. 2 is an enlarged section of the neck and closure portion taken at line 2—2 in FIG. 1 and viewed in the direction of the arrows.

FIG. 3 is a still further enlarged fragmentary portion of the section of FIG. 2 and illustrating connection and sealing details.

FIG. 4 is a section like FIG. 3 but illustrating a different embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings in detail, the container 11 may be made of high density blow-molded polyethylene, rectangular in shape to conserve shelf space, and having a neck 12 thereon (FIG. 2) providing a large mouth opening 13 adequate to receive a 4 inch paintbrush, for example. While the present invention is directed toward and particularly well adapted to large mouth containers such as this, where the diameter of the mouth is many times the height of the neck, it can also be applied to containers having openings of other proportions, as will be seen once an understanding of the invention is achieved by the reader.

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According to the illustrated embodiment of the invention, the container neck is provided with an inwardly projecting sealing lip 14 at the outlet, with a downwardly extending cylindrical portion 16, followed by a frustoconical portion 17 providing the radially projecting outwardly extending lip 18, followed by the inverted frustoconical section 19 projecting downward toward the interior of the container.

The closure is provided with various portions which can be described as a seating ring portion 21 received on the upper end of the container neck, and followed by a cylindrical 22 and frustoconical 23 skirt portion, followed by the inwardly extending lip portion 24 and the outwardly projecting flange 26 with annular groove or recess 27 receiving a compensating compression ring 28 to be described more fully hereinafter. A frustoconical wall portion 29 having the cylindrical wall portion 31 at the upper margin thereof joining the seating ring portion 21, has a flexible junction wall portion 32 joined to the lower margin thereof, with the central top portion 33 joined to the generally cylindrical junction wall portion near the top thereof.

In the practice of the invention, it is desirable that a liquid-tight seal be provided at 34. For this purpose, the outside diameter of the cylindrical portion 36 is made slightly larger than the free inside diameter of the lip 14 at 34. An example is 1/16 of an inch diameter difference for a 4 9/16 inch diameter free lip opening at 34. As a result, a cork-type action is provided as the closure is installed on the container neck, the wall 29 serving as a sort of entry wall much like the taper on a cork.

Because of cold flow characteristics of polyethylene, a self compensating compression ring 28 is provided. Where this ring is made of spring steel, it may be approximately 3/16 inch diameter cross section with an end gap 37 (FIG. 1) of 1/8 inch. Therefore, in spite of any cold flow characteristics, the interlocking snap-on relationship of the beads 18 and 24 of the container neck and closure, respectively, is maintained as desired. A tab 38 with aperture 39 therein (FIGS. 1 and 2) may be provided on the skirt flange 26 to facilitate opening the container.

From the foregoing description, it can be seen that the closure skirt 23, seating ring portion 21 and lower bead 24 form a sort of wide, generally dovetail-shaped channel 41 with a rectangular channel 42 at the one side thereof and a generally Vee-shaped channel 43 at the other side thereof, the former receiving the upper wall and lip of the container opening, and the latter receiving the outwardly turned bead 18 of the container neck.

It is desirable that the lid remain on the container in spite of generation of internal pressure therein, and particularly if the container happens to be dropped. To facilitate this, the junction of wall 29 with wall 32 is sufficiently flexible to unfold from the acute angle relationship shown in solid lines in FIGS. 2 and 3 in the event of a pressure shock in the container. The section thickness of the junction wall 32 as well as the portion 31 at the top of the entry wall are somewhat less than the central top 33 and the skirt 23. This enables the top to move to the position shown by the dotted outline 46 in FIG. 2 in the event of the most severe hydrostatic pressure which may be generated momentarily upon dropping the container. This develops a torque in the direction of the arrow 47 (FIG. 3) transmitted through the comparatively rigid section of the skirt portion 23 to the lip 24, thus keeping it firmly engaged with the bead 43 so that the closure does not become dislodged from the container. As an example, the wall section at 32 and 31 can be 0.030 inches, compared to a thickness at the ring seat 21 and skirt 23 of 0.070 inches.

Referring now to the embodiment shown in FIG. 4, details thereof may be the same as in FIG. 3, except for a somewhat deeper channel 42A in the cap to accommodate the O-ring or suitable gasket 48 friction fit therein. In this embodiment, the cap bead 24 engaging the container neck bead 18 pulls the seat portion 21 into compressing engagement with the O-ring or suitable gasket, the latter being supported by the lip 14 and wall 16 to effect the desired annular seal. In this instance, the

interference fit between the lip edge 34 and the cap wall 36 is not necessary.

It is possible that other materials can be used both for the container and the closure, although in each instance a one-piece molded plastic seems most desirable. A white neoprene band may be substituted for the spring steel compression ring, or other types of compression rings or bands might be used. It is also possible that under certain circumstances, the compression ring as such may be dispensed with, particularly where a tight interference fit is provided between not only the outside diameter of the wall portion 36 and the inside diameter of the lip 34, but also the inside diameter of the cap portion 22 with the outside diameter of the container neck wall portion at 16.

I claim:

1. A closure comprising:
 - a seating ring portion receivable on a container opening for registry of the closure with said opening;
 - a skirt portion extending downwardly from said ring portion and having inwardly projecting lip means abuttingly engageable with outwardly projecting lip means around said opening;
 - a compression ring on said skirt portion adjacent said inwardly projecting lip means;
 - and a central portion joined to said seating ring portion by a circular wall extending downwardly from said seating ring portion and then turning inwardly toward the center of the closure;
 - said seating ring portion and one portion of said downwardly extending wall cooperating to form a first annular channel, said downwardly extending wall having a lesser section thickness than the section thickness of said seating ring portion, and being more flexible than said seating ring portion.
2. The closure of claim 1 wherein:
 - said skirt portion and said inwardly projecting lip means form a second annular channel;
 - said channels cooperating with said skirt portion to form a wide annular channel of dovetail-shaped cross section.
3. The closure of claim 2 wherein:
 - said seating ring portion, said skirt portion, said central portion and said circular wall are formed of a single homogeneous unit of molded plastic.
4. A container and closure combination comprising:
 - a container neck of substantially greater diameter than height, and having an opening with a first lip extending radially inward at the opening and defining the inner circular margin of said opening, and a second lip extending radially outward below said opening;
 - a closure including a first annular channel portion received on said neck and sealed thereon at said first lip, and a second annular channel portion received on said neck and interlocking with said second lip.
5. The combination of claim 4 and further comprising:
 - a third annular channel on said closure and opening outward adjacent and below said second channel;
 - and constrictor means in said third channel for maintaining the interlocking relationship between said second channel and said second lip.
6. The combination of claim 5 wherein said closure is made of plastic and said constrictor means include a ring to compensate for the cold flow of the plastic.
7. A container and closure combination comprising:
 - a container opening wall with a first lip extending radially inward at the opening, and a second lip extending radially outward below said opening;
 - a closure including a first annular channel received on said wall and sealed thereon at said first lip, and a second annular channel received on said wall and interlocking with said second lip;
 - said first channel being inverted;
 - said closure including a first channel entry wall extending

downwardly and tapering inwardly from a diameter at least as great as the free inside diameter of said first lip to a diameter less than the free diameter of said first lip.

8. The combination of claim 7 wherein:
 - said closure has a skirt portion between said channels;
 - said first channel entry wall projects from said first channel toward the interior of said container;
 - and a central top portion is included on said closure and has a flexible marginal portion joining said channel entry portion near the point of innermost projection into the interior of said container;
 - said skirt portion being sufficiently rigid to tighten upon said second lip when said central top portion is moved outward by pressure in said container.
9. The combination of claim 7 wherein:
 - said closure has a central top portion with a downwardly turned perimetrical junction wall, said junction wall being joined at the bottom to the bottom of said entry wall.
10. The combination of claim 9 wherein:
 - said entry wall and said junction wall form an acute angle, said junction wall and the junction thereof with said entry wall being sufficiently flexible for unfolding in response to pressure in said container.
11. A closure comprising:
 - a seating ring portion receivable on a container opening for registry of the closure with said opening;
 - a skirt portion extending downwardly from said ring portion and having inwardly projecting lip means abuttingly engageable with outwardly projecting lip means around the opening;
 - a circular wall extending downwardly from said seating ring portion and then turning inwardly toward the center of the closure;
 - and a central portion joined to said seating ring portion by said circular wall;
 - said seating ring portion and one portion of said downwardly extending wall forming a first inverted annular channel;
 - said skirt portion and said inwardly projecting lip means forming a second annular channel;
 - the other portion of said downwardly extending wall tapering inwardly from said one portion of said downwardly extending wall to provide a channel entry wall;
 - said downwardly extending wall having a lesser section thickness than the section thickness of said seating ring portion and being more flexible than said seating ring portion; and
 - said closure being one homogeneous unit of material.
12. A container and closure combination comprising:
 - a container opening wall with a first lip extending radially inward at the opening, and a second lip extending radially outward below said opening;
 - a closure including a first annular channel received on said wall and sealed thereon at said first lip, and a second annular channel received on said wall and interlocking with said second lip;
 - said first channel being inverted;
 - said closure having a skirt portion between said channels;
 - said closure including a first channel entry portion projecting from said first channel toward the interior of said container;
 - and a central top portion on said closure and having a flexible marginal portion joining said channel entry portion at the point of innermost projection of said channel entry portion into the interior of said container, and
 - said skirt portion being sufficiently rigid to tighten upon said second lip when said central top portion is moved outward by pressure in said container.
13. The combination of claim 12 wherein said closure is one homogeneous unit of material.