

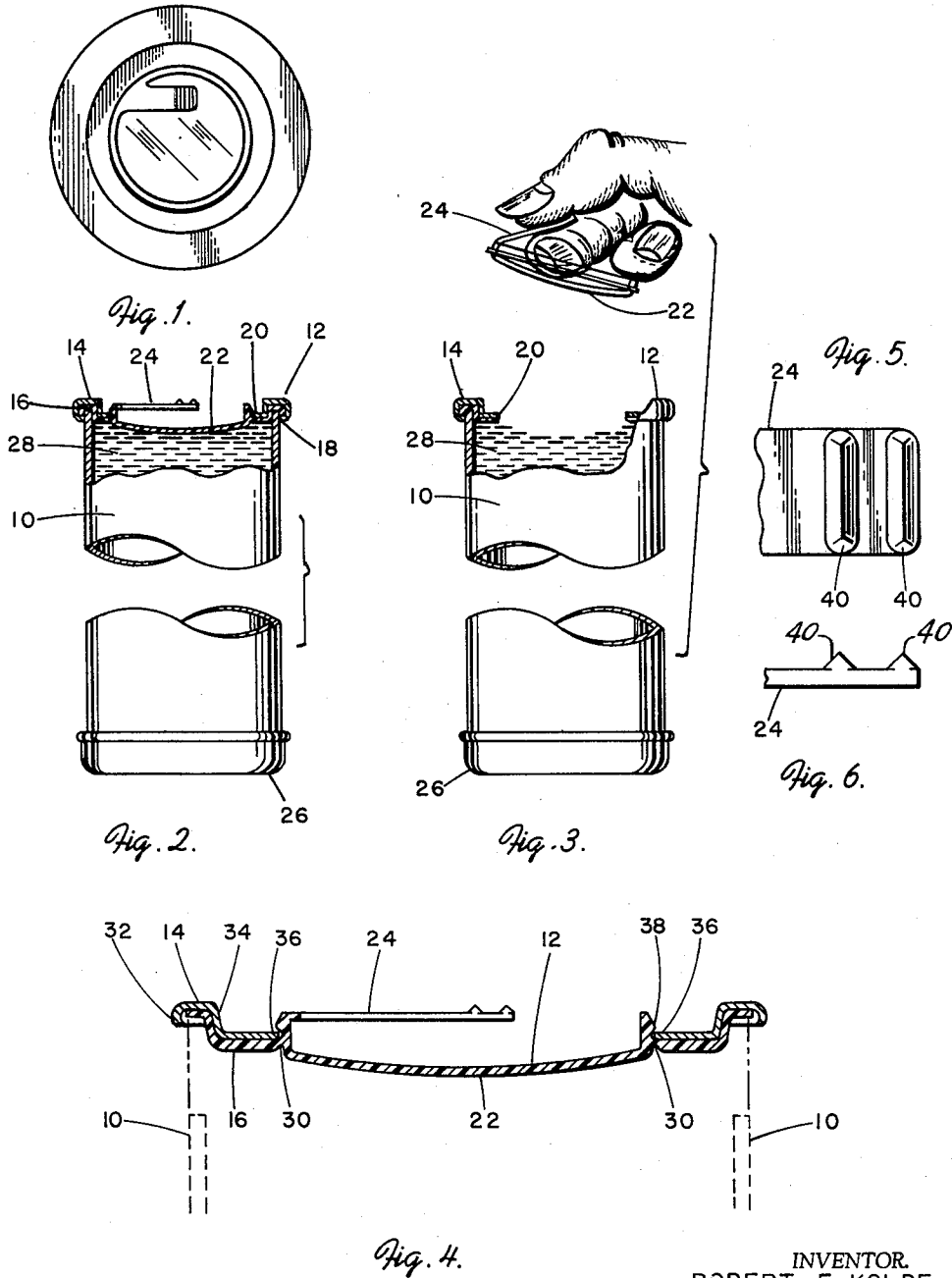
Dec. 1, 1964

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3,159,304

CONTAINER

Filed May 28, 1962



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3,159,304
CONTAINER

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Filed May 28, 1962, Ser. No. 198,024
13 Claims. (Cl. 220-54)

This invention relates to containers of a type adapted to be pre-filled and sealed at the filling plant. More particularly, the invention relates to a closure member applied to the filled container, which closure member seals the contents against leakage and contamination, and which affords a novel rip action whereby the consumer opens the container quickly and without tools.

Hitherto, sealed cans and various containers sealed with caps have been proposed having a circumferentially disposed rip strip which, when removed, allows the cap itself to be removed. Oftentimes, a tool is used in opening these prior containers and hence several hand motions are required. In any case, the rip strip construction is sometimes awkward to operate and, if the strip is of metal, the strip in being removed presents the difficulty of exposing metal edges which are sometimes sharp.

It is an object of the present invention to provide a closure for containers in which the closure structure presents a tear-away cap or plug section, whereby opening of the container is accomplished directly by tearing away the plug section itself. In use of the present improvement, the actual opening process is reduced to a simple one-motion operation of the hand.

Another object of the invention is the provision of a bipartite plug-type closure assembly for containers, one part of the assembly comprising a seal-forming liner element which includes the plug section as an integral tear-away portion thereof, and the other part comprising a comparatively strong member outside the liner, which outer member securely grips the container and which reinforces and defines with the liner an abrupt tearing edge along which the plug section is readily torn loose. More particularly, in one physically constructed embodiment of the invention, the liner element was made of non-metallic, tearable material which was co-extensive with the transverse end dimensions of the container and which provided leakproof integrity as long as undisturbed. The outer member presented a central opening precisely outlining the plug section of the liner and was formed of a thin sheet metal stamping. Thus, the edges of the outer member were readily crimpable into engagement with the outside of the container so as to form a secure mechanical connection and the inner margin of the central opening presented a rigid tearing edge to guide the tear and facilitate clean removal of the plug section of the liner. In the embodiment referred to, the container had an inside cross sectional area of which the plug section constituted at least a major portion and, in actuality, left an opening amounting to fifty-seven percent of the entire inside cross sectional area of the container.

Another object of the invention is the provision of a plug-type closure member for containers, in which a novel pull-tab member integral with the plug section of the closure member operates inherently, when grasped for pulling in a natural way, to introduce an initial angular twist to start the rip of the plug section. This start-action is an inherency of the design, due to the chord-wise eccentric relationship of the tab in its location with respect to the geometric center of the plug section.

Further features, objects and advantages will either be specifically pointed out or become apparent when, for a better understanding of the invention, reference is made

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to the following description, taken in conjunction with the drawing which forms a part hereof and in which:

FIGURES 1 and 2 are respective top plan and side elevational views of a container embodying the closure member of the present invention, the elevational view being shown partly in section;

FIGURE 3 is a sequence view showing the closure member during separation of the plug section therefrom;

FIGURE 4 is a longitudinal sectional view to enlarged scale showing the closure member prior to being affixed to the container; and

FIGURES 5 and 6 are plan and elevational views, respectively, of the end of a pull tab which is grasped to remove the plug section.

More particularly in the drawing, a container 10 carries a closure member 12 at one end consisting of a bipartite assembly which securely grips and seals that end of the container 10. The closure 12 includes a metal outer member 14 consisting of a stamping of thin metal, and a liner element 16 which is clamped between the container 10 and the outer member.

The outer member 14 has a continuous annular crimp portion 18 at the outside periphery forming a permanent mechanical connection with the end of the container 10. A central opening 20 in the outer member 14 outlines an unsupported plug section 22 integral with the liner, and this plug section carries an integral pull tab 24.

At the opposite end, the container 10 is capped at 26 in conventional way.

In FIGURE 3, the closure 12 is opened by grasping the tab 24 by hand and withdrawing the plug section 22 with a ripping motion away from the opening 20 so as to expose the contents 28 of the container.

In FIGURE 4, the two parts 14 and 16 of the closure assembly are shown following assembly, but prior to being permanently crimped to the container 10. A continuous annular weakening line 30 of reduced cross section forms an integral juncture between the circular plug section 22 of the liner and the outer sealing portion of the liner; such outer sealing portion can be seen to be substantially co-extensive in dimensions with the metal outer member 14. An angular flange 32 carried by the outer member 14 imbeds itself in the wall of the container 10 when the portion 18 is crimped, so as to grip the container wall against a generally confronting cylindrical portion 34 of the closure member. The margin 36 of the central opening of the member 14 reinforces and provides a rigid tearing edge which outlines the weak juncture line 30 in the liner 16. The juncture line 30 confronts an integral, laterally projecting bead 38 extending in a circular path about the plug section 22 so that the juncture and bead straddle and grip this margin 36. No further means of securing these two parts in assembly together is necessary.

Inasmuch as the tab 24 joins the main plug section 22 along an eccentric angular juncture, initial pulling motion on this tab 24 exerts shear with a twisting action on the weakening line 30, which therefore starts to tear in the immediate vicinity of the shorter longitudinal edge of the tab 24. Continued pull on the tab 24 causes the rip in the weakening line to describe a complete shear path around the opening outlined in the member 14. The plug section 22 thus readily removes from the plane of the opening 20 and is thrown away.

As shown in FIGURES 5 and 6, the free end of the pull tab 24 carries a plurality of closely spaced apart thumb grips 40 which are transversely disposed to prevent slip-page from the end of the tab.

Following is an example of the materials and dimen-

sions used in one physically constructed embodiment of the invention:

Liner 16	One-piece molded plastic.
Container 10	Grease tube of conventional cylindrical shape.
Tube material	Grease-impervious cardboard.
Normal inside diameter of tube 10	2 inches.
Tube contents 28	Grease lubricant.
Wall thickness of plug section 22	0.030 inches.
Thickness of reduced section weakening line 30	0.005 inches.
Plug section 22 (unsupported)	1.515 inches outside diameter.

In the closure linear of the particular grease gun tube referred to, the plastic which is selected is inert to grease, and a thermoplastic polyethylene resin or some other suitable plastic is used. One make of polyethylene resin known as Marlex 2520 is found to be a satisfactory material for the liner. It is noted that the plug section 22 has an inverted dome shape of radius R. This shape imparts a good structural design in resisting the weight of the grease contents 28 in case the container 10 is left inverted for a sustained period. In this case, the pressure evenly distributes along the tear line so that no local point will start to rip.

Variations within the spirit and scope of the invention described are equally comprehended by the foregoing description.

What is claimed is:

1. A container having a closure securely engaged therewith at one end; said closure comprising an outer member, and further comprising a liner between said container and said member so as to provide an effective intervening seal; said outer member generally reinforcing said liner and presenting an opening in which a portion of the liner is unsupported; said liner having overall integrity but being relatively weak immediately adjacent said opening, and presenting a pull tab for removal of said unsupported portion as outlined by the opening in the outer member.

2. A container having a closure securely engaged therewith at one end; and presenting a removable section; said closure comprising an outer member, and a liner between the container and the outer member; said outer member and said liner being generally co-extensive with respect to one another in their overall dimensions, and provided with a through opening in the outer member outlining an exposed removable section of the liner; there being a weakened tear line in the liner circumscribing said exposed section and lined up with the outline of the margin of the opening, whereby said margin reinforces the liner to afford a firm tearing edge when the removable section of the liner is removed.

3. A non-metallic container having a closure securely embedded therein at one end, and presenting a removable section; said closure comprising an outer member, and a liner between the container and the outer member; said liner having a peripheral section generally co-extensive with the outer member so as to be clamped in sealing contact with the container in the area of engagement between the closure and the container; said liner having a plug section joined along a circular juncture line to the peripheral section; there being a complementary opening in the outer member outlining the juncture line of the plug section, for reinforcing the peripheral section thereat to afford a firm tearing edge.

4. A container having a closure securely engaged therewith at one end and presenting a removable section; said closure comprising a metal outer member and a liner between the container and the metal member, said liner having a peripheral section generally co-extensive with

the metal member so as to be clamped in sealing contact with the container in the area of engagement between the closure and the container; said liner having a plug section joined along a juncture line to the peripheral section; there being an opening in the metal member outlining the juncture line of the plug section for reinforcing the peripheral section thereat to afford a firm tearing edge; said plug section arranged within said opening with said juncture line at one side of the plane of the opening, and with a projecting bead formed at the other side of the plug section so that the juncture and bead confrontingly straddle and grip the metal margin of the opening.

5. A container having a closure securely engaged therewith at one end and presenting a removable section; said closure comprising an outer member, and a plastic liner between the container and the outer member; said liner having a peripheral section generally co-extensive with the outer member so that the plastic is clamped in sealing contact with the container in the area of engagement between the closure and the container; said liner having a plug section joined along an integral juncture line of plastic to the peripheral section; there being an opening in the outer member outlining the juncture line of the plug section for reinforcing the peripheral section thereat to afford a firm tearing edge for the plastic juncture line; said plug section arranged within said opening with said juncture line at the internal side of the plane of the opening and with a projecting bead formed on the external side of the plug section so as to grip the opening; and external means secured to the plug to facilitate ripping the plug section free along said plastic juncture line and drawing it from the opening.

6. A non-metallic container having a closure securely engaged therewith at one end, and presenting a tear-away plug section; said closure comprising a metal outer member, and a liner between the container and the outer member; said liner having a peripheral section generally co-extensive with said outer member, so as to be clamped in sealing contact with the container in the area of engagement between the closure and the container; said outer member being imbedded in crimped relation into the non-metallic wall of the end of the container and clamping the peripheral section of the liner in sealing contact with the container in the area of engagement between the closure and the container; said liner having a plug section joined along a tear junction line to the peripheral section; there being an opening in the outer member outlining the junction line between the two sections of the liner, so as to provide a reinforcement of the tearing edge when the plug is torn away.

7. In a bipartite closure member of containers: a liner, and an outer member in assembly therewith; said outer member and said liner being generally co-extensive with respect to one another in their overall dimensions, and provided with a through opening in the outer member outlining an exposed removable section of the liner; there being a weakened tear line in the liner circumscribing said exposed section, and lined up with the outline of the margin of the opening, whereby said margin reinforces the liner to afford a firm tearing edge when the removable section of the liner is removed.

8. In a bipartite closure for containers: a plastic liner, and an outer member in assembly therewith for reinforcing said liner; said outer member presenting an opening in which a portion of the liner is unsupported; said liner having overall integrity, but being relatively weak adjacent said opening and presenting a pull tab for removal of said unsupported portion as outlined by the opening in the outer member.

9. A closure assembly comprising: a liner; an outer member for reinforcement of and attachment of said liner to a container; said liner having a peripheral section generally co-extensive with the outer member for establishing sealing contact with the container; said liner having a plug section joined along a juncture line to the peripheral sec-

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tion; there being an opening in the outer member outlining the juncture line of the plug section for reinforcing the peripheral section thereat to afford a firm tearing edge; said plug section arranged within said opening with said juncture line at one side of the plane of the opening, and provided with an appendage secured to the plug at the opposite side of the opening to facilitate ripping the plug section free along the juncture line and drawing it from said opening.

10. In a closure member having an outer member for supporting a liner: an improved liner having a peripheral section adapted to conform to the outer member so as to be generally co-extensive therewith in their overall dimensions; said liner having a plug section joined along a juncture line to the peripheral section; said plug section adapted to fit within an opening in the outer member with said juncture line at one side of the plane of the opening, and provided with external means secured to the plug on the opposite side of the plane of the opening for drawing the plug section free by ripping it along said juncture line.

11. In a closure assembly of the type including an outer member having a liner side on which it reinforces a liner, and having an external side: an improved liner having a peripheral section adapted to be generally co-extensive in overall dimensions with the outer member, and having a plug section adapted to be received within an opening in the outer member; said plug section joined to the outer section of the liner along a juncture line of reduced cross section and being of inverted dome shape so as to be on the liner side of said opening in offset relation thereto; a chordally disposed pull tab disposed generally in plane of said plug on the external side of said opening; and a laterally disposed annular bead formed about the plug section on the external side thereof, so that the juncture line of reduced cross section and the bead confront one another in forming a re-entrant angled engagement with the margin of said opening.

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12. A generally dish-like liner for container closures; said liner presenting an external side and an inner side adapted to be exposed to the contents of the container; said liner formed with a center section and an outer peripheral section thereabout and arranged with a circular juncture line therebetween; said center section being of inverted dome shape so as to project on the inner side in the direction of said contents and sustain the force of same; and means for exerting a pull on said center section and secured thereto on the external side of the liner; said circular juncture line being of reduced thickness as viewed in cross section so as to define a tear line for shearing out the center section when said means exerts a pull thereon.

13. In a generally dish-like liner for container closures and having an external side of which at least a center section is adapted to form an exposed portion of the liner: and improved construction whereby said liner comprises a center section adapted to be exposed and an outer peripheral section thereabout and together arranged with a juncture line therebetween; and a tearing tab for exerting a pull on said center section and secured thereto on the external side of the liner; said juncture line being of reduced thickness as viewed in cross section so as to define a tear line; said center section having a dome within its periphery and joined to the tearing tab along an angular junction at the dome periphery, whereby the tab is in chordwise relation and eccentric to the geometric center of the dome in the center section.

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