United States Patent [19]

Westfall

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[54] **COMPOSITE CLOSURE**

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[52] **U.S. Cl.** **215/253,** 215/274, 215/305

[51] **Int. Cl.** **B65d 41/46**

[58] **Field of Search** 215/253, 254, 256, 274, 215/305

[56] **References Cited**

UNITED STATES PATENTS

3,656,648	4/1972	Powaloski	215/253
3,690,499	9/1972	Westfall	215/253

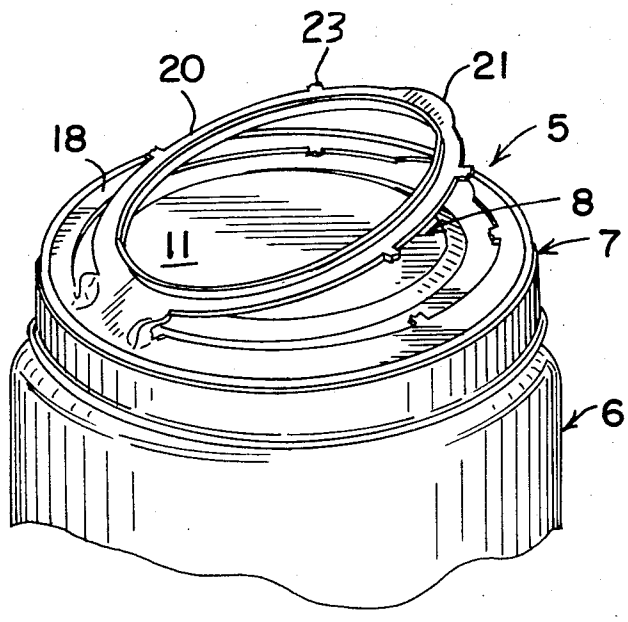
Primary Examiner—Donald F. Norton

Attorney, Agent, or Firm—Lockwood, Dewey, Zickert & Alex

[57] **ABSTRACT**

A composite press on, pull-off closure cap for hermetically sealing and maintaining a vacuum in a container. The cap is comprised of two parts, one part being an integrally formed, semi-rigid plastic fitment with a top including a lift or pull ring and with a depending skirt, and the second part being a relatively rigid, disc-shaped gasketed closure element. The closure element is retained within the fitment and when the lift ring is pulled upwardly, shoulder means on the interior of the fitment engage with the peripheral edge of the closure element and carry it along with the fitment during removal. The pull ring or lift ring is retained in inoperative condition by means of frangible connections until such time as it is desired to remove the closure cap. Thereupon, on lifting up on the ring the frangible connections are readily broken and on further lifting and pulling the lift ring through its hinge connection to the remainder of the fitment serves to remove the cap. As an improvement, the closure cap has thinned sections at the opposite ends of the hinge. During raising of the lift ring these thin sections are permanently stretched thereby accomplishing two functions. First, the stretching prevents breakage or tearing of the main part of the hinge. Second, the lift ring is prevented from returning or being restored to its original inoperative condition thereby giving the impression that the cap has not been tampered with and that the package has not previously been opened.

3 Claims, 5 Drawing Figures



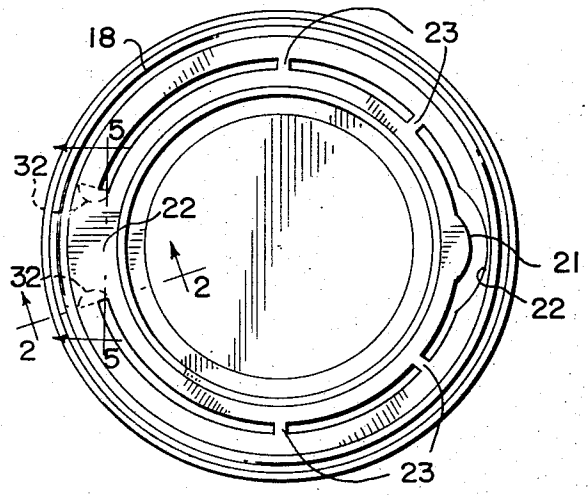


FIG. 1

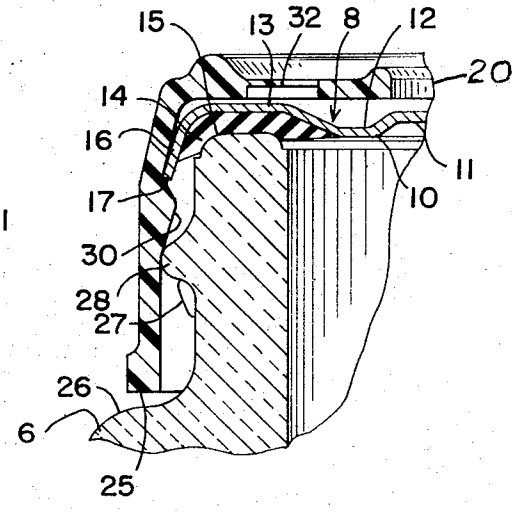


FIG. 2

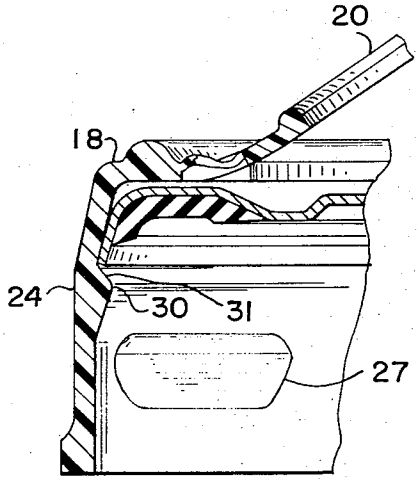


FIG. 3

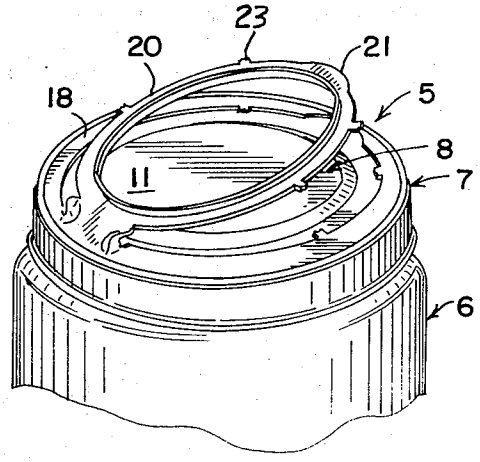


FIG. 4

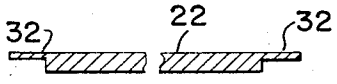


FIG. 5

COMPOSITE CLOSURE

This invention relates generally to innovations and improvements in composite closure caps for hermetically sealing and maintaining vacuum in containers.

More specifically, the invention relates to innovations and improvements in such composite closure caps comprising a semi-rigid plastic fitment in which is retained or trapped a relatively rigid closure element and having an integrally hinged lift ring as a part of each fitment. The lift ring is normally held in the plane of the top portion of the plastic fitment by means of frangible connections and in addition is permanently attached to the plastic fitment through a relatively wide integral hinge portion.

Composite closure caps of the foregoing type are in commercial use and several forms thereof are shown and described in U.S. Pat. Nos. 3,460,701 dated Aug. 12, 1969, 3,656,648 dated Apr. 18, 1972 and 3,690,499 dated September 12, 1972. Two disadvantages have been noted in composite closure caps made in accordance with the foregoing patents. For one thing, it is possible to break the frangible connections which normally retain the lift or pull ring in its original manufactured condition, use it to remove the composite closure cap and thereby open a container, and thereafter re-apply the cap and restore the lift or pull ring down to its original position in such a way that, except on close inspection, it appears not to have been raised and the connections appear not to have been broken. Thus, the tamper-proof properties of the closure cap are not completely effective under all circumstances. As a second disadvantage, it has been noted that with certain of the composite closure caps of the type shown and described in the above mentioned patents, on breaking the frangible connections that hold the lift or pull ring in place, it is possible to apply a jerk or excess removal force which may result in damage to or complete failure of the hinge connecting the lift ring to the remainder of the plastic fitment. Thus, this may prevent the package from being opened in the normal intended manner and may interfere with the normal utility of the composite closure cap for re-use as a dust cover.

Accordingly, the object of the present invention, generally stated is the provision of composite closure caps of the class described wherein once the frangible connections retaining the lift or pull rings in place are broken and lift rings pulled or lifted, thinned areas at one, and preferably both, ends of the hinge connection between the lift ring and remainder of the plastic fitment are readily and permanently stretched thereby preventing the sudden application of excessive removal forces from tearing or cracking the hinge and in addition preventing the lift rings from being restored to their original flattened condition so as to have the appearance of not having been utilized or tampered with.

Certain other objects of the invention will in part be obvious and will in part appear hereinafter.

For a more complete understanding of the nature and scope of the invention, reference may now be had to the following detailed description of a preferred embodiment thereof taken in connection with the accompanying drawings wherein:

FIG. 1 is a top plan view of a composite closure cap forming one embodiment of the present invention;

FIG. 2 is a fragmentary view on enlarged scale taken on line 2—2 of FIG. 1 and showing the closure cap in seated sealing relationship on the mouth of a typical container;

FIG. 3 is a view also taken on line 2—2 of FIG. 1 but showing or illustrating the condition of the cap when the lift or pull ring has been raised;

FIG. 4 is a fragmentary top perspective view of the closure cap of FIG. 1 on a container and illustrating the operation of the composite closure cap of FIG. 1; and

FIG. 5 is a detailed sectional view taken on line 5—5 of FIG. 1.

Referring to FIG. 4, a composite closure cap is indicated generally at 5 in seated vacuum-retaining condition on the rim of a container 6. The composite closure cap 5 comprises an integrally formed, semi-rigid plastic outer fitment 7 in which is retained or trapped a relatively rigid disc-shaped gasketed closure element 8.

Referring to FIGS. 1–3 in addition to FIG. 4, the relatively rigid, disc-shaped gasketed closure element 8 may be stamped from sheet metal such as tin plate or aluminum suitably enameled or coated on the interior and also usually on the exterior. The closure element 8 has a central panel portion 10 which may include a raised button 11 which is flexed inwardly or downwardly as long as there is a vacuum on the interior of the package and which automatically snaps or flips upwardly when the vacuum is broken, this being a known feature in closure caps of this general type. The central panel portion 10 of the closure element 8 includes a depressed annular groove 12 radially outwardly of which is an integrally formed gasket-receiving channel 13 lined with a sealing gasket 14 of known type, e.g. fluxed plastisol. It will be seen from FIG. 2 that the gasket 14 provides hermetic sealing engagement with the top seal finish 15 on the rim of the container 6.

The outer wall of the gasket receiving channel 10 of the closure element 8 is formed by a downwardly depending skirt or circumferential flange 16 terminating in a trimmed edge 17.

As previously mentioned, the relatively rigid closure element 8 is retained or trapped with the plastic fitment 7. The fitment 7 may be mass-produced by thermoforming from plastic sheet material such as high impact polyethylene. It will be understood however that the fitments may be formed from other plastic materials and by other techniques such as by injection molding.

The integrally formed fitment 7 includes a discontinuous top having an outer annular portion 18 surrounding in spaced relationship a lift or pull ring 20. Preferably, the pull or lift ring 20 has a tab 21 located diametrically opposite an integral hinge 22 interconnecting the lift ring 20 and the annular portion 18. The annular portion 18 is suitably recessed at 22 so as to accommodate the tab 21. In addition to being permanently interconnected by the hinge 22, the lift or pull ring 20 is non-permanently interconnected with the surrounding annular ring portion 18 by means of a plurality of spaced frangible connections 23—23.

Depending from the outer periphery of the annular portion 18 of the fitment 7 is a skirt 24 the bottom edge 25 of which preferably extends into close relationship with the shoulder portion 26 of the container 6.

On its interior the skirt 24 has a plurality of circumferentially spaced inwardly projecting embossments 27—27 (FIGS. 2 and 3) forming shoulder means having retention engagement with a bead 28 on the exte-

rior of the neck of the container **6.** Also on its interior and spaced above the embossments **27** the skirt **24** is provided with a circumferential inwardly projecting rib **30** the upper annular surface **31** of which constitutes a shoulder for lifting engagement with the bottom trimmed edge **17** of the closure element **8** as shown in FIGS. **2** and **3.**

As thus far described the composite closure cap **5** may be considered to be known and to correspond rather closely, for example, to the composite closure cap shown and described in U.S. Pat. No. 3,690,499. However, the composite closure cap **5** is improved with respect to the closure cap shown and described in U.S. Pat. No. 3,690,499 and similar known composite closure caps in respect to two thinned semi-circular areas of the fitment **7** which are indicated at **32—32** (FIG. **1**). In plan view the thinned areas **32** are generally semi-circular in shape and in vertical section they are substantially thinner than the adjoining plastic as indicated in FIGS. **2** and **5.** It will be noted that these thinned areas **32** are located at the opposite ends of the hinge portion **22** and also extend partially into the annular portion **18** forming part of the top of the fitment.

When it is desired to remove the composite closure cap **5** from its place on the container **6,** the user places his or her thumb nail under the tab **21** and pries upwardly thereon so as to break the adjacent frangible connections **23—23** allowing a firmer grasp on the lift ring **20** so that the remaining frangible connections **23** may be broken and the lift or pull ring **20** raised further so as to apply sufficient lifting force to remove the composite closure cap from the container **6.** This will require substantial upward lifting force it being necessary to first break the vacuum and thereafter to pull the retaining embossments **27** over the bead **28.**

When the lift or pull ring **20** is tilted upwardly, after the frangible connection **23** has been broken, the thinned semi-circular areas **32** become permanently stretched as indicated in FIGS. **3** and **4** so that when the lift ring **20** is thereafter released it will no longer lie flatwise within the annular portion **18** even when pressed down but will remain somewhat lifted as shown in FIG. **4,** for example. This will of course indicate to an observer the fact that the composite closure cap has been removed or at least the package has been tampered with. The stretched condition of the thinned areas **32** also indicates that the closure has been removed or tampered with.

In addition to providing this tamper-proof or tamper-indicating feature, the thinned semi-circular areas **32** also serve another very important function. By reason of being thinned and located at opposite ends of the hinge portion **22,** these areas yield first when the lift or pull ring **20** is raised. Even if a sudden jerk or lifting force is applied to the lift or pull ring **20,** the initial portion thereof is dissipated in stretching the thinned areas **32.** Furthermore, these thinned areas **32** tend to stretch and not to tear or crack. By so stretching they prevent the thick or main portion of the hinge **22** lying inwardly of the ends from being cracked or ripped.

It will be appreciated that thinned areas corresponding to areas **32** may be incorporated at opposite ends of the hinges in the composite closure caps shown and described in U.S. Pat. Nos. 3,460,701 and 3,656,648 as well as U.S. Pat. No. 3,690,499. Furthermore, while semi-circular configurations are satisfactory, other configurations for the thinned areas may be used such as triangular, rectangular, elliptical, etc. Also certain other minor changes may be made without departing from the spirit and scope of the invention.

I claim:

1. In a composite press-on, pull-off closure cap for hermetically sealing and maintaining a vacuum in a container whereby the closure and container in combination provide a package which is readily openable by a consumer without the use of tools, said composite closure having an integrally-formed, semi-rigid, plastic fitment with a top and a depending skirt and a relatively rigid, disc-shaped gasketed closure element retained within said fitment and having a continuous center panel terminating at the outer margin in a depending skirt or circumferential flange having a trimmed edge, said depending skirt of said fitment having interior shoulder means for lifting engagement with said trimmed edge, and said top of said fitment having an outer annular portion surrounding a lift ring joined to said annular portion by a hinge portion and a plurality of spaced frangible connections, the improvement which comprises, having the plastic material from which said fitment is formed thinned in a relatively small area adjacent at least one end of said hinge portion where it joins said annular portion whereby on lifting said lift ring after said frangible connections are broken, the thinned material in said small area is permanently stretched.

2. In a composite closure cap as called for in claim **1** said improvement including having the plastic material thinned in two relatively small areas adjacent opposite ends of said hinge portion.

3. In a composite closure cap as called for in claim **1** said improvement including having the plastic material thinned in two generally semi-circular areas adjacent opposite ends of said hinge portion.

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