

[54] **COMPOSITE CLOSURE CAP**
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3,690,499 9/1972 Westfalh et al. 215/46 R
 3,708,083 1/1973 Gronemeyer et al. 215/41

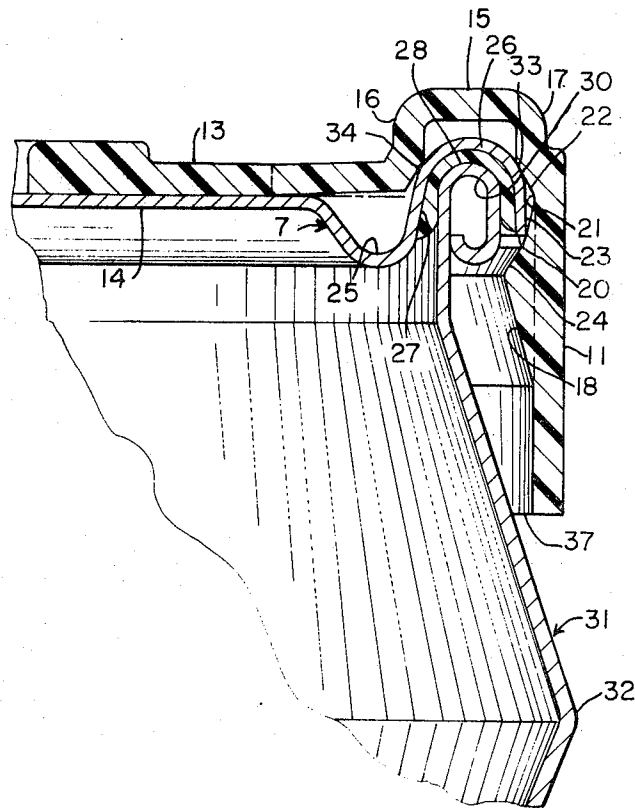
Primary Examiner—George T. Hall
Attorney, Agent, or Firm—Lockwood, Dewey, Zickert & Alex

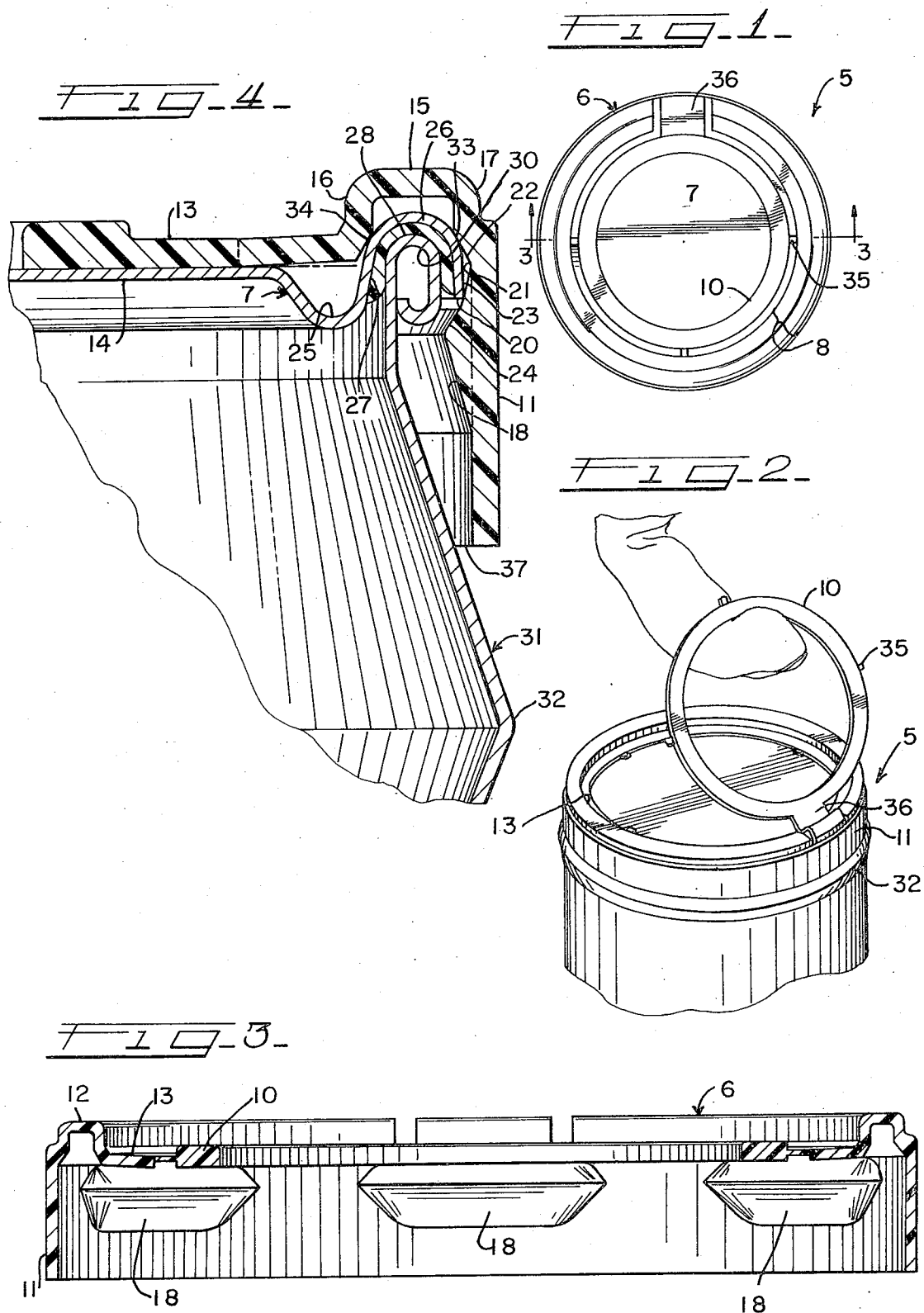
[52] U.S. Cl. **215/262, 215/41, 215/42, 215/46 A**
 [51] Int. Cl. **B65g 67/02**
 [58] Field of Search 215/40, 41, 42, 46 A

[56] **References Cited**
UNITED STATES PATENTS
 3,460,701 8/1969 Powalowski et al. 215/46 A
 3,630,405 12/1971 Podesta 215/46 A
 3,656,648 4/1972 Powalaski et al. 215/46 R

[57] **ABSTRACT**
 A composite closure cap comprising a plastic fitment or overcap retaining a gasketed closure lid and adapted for high speed machine press-on application and convenient pull-off removal with respect to a container the top opening of which provides an annular top seal finish. A tamper-proof lift ring or tab is integrally hinged to the fitment and frangibly connected to the fitment so as to be non-operative until visibly released.

6 Claims, 4 Drawing Figures





COMPOSITE CLOSURE CAP

This invention relates generally to innovations and improvements in composite press-on, pull-off closure caps of the general type disclosed in Powalowski et al. Pat. Nos. 3,460,701 and 3,656,648 and Westfall et al. application Ser. No. 167,151, filed July 29, 1971, now Pat. No. 3,690,499.

More specifically, in composite closure caps provided according to the present invention one of the important improvements and innovations is in having the plastic fitment or overcap provided with an outer annular section including a downwardly opening channel-like margin which rides in spaced relationship on a downwardly opening gasket-lined channel on a closure lid or panel carried in the fitment so as to provide shock absorbing action from straight-down blows. A further innovation and improvement is in having the gasket-lined closure lid retained snugly within the plastic outer fitment or overcap but with provision for limited relative vertical movement therebetween so as to prevent accidental lifting or dislodgment of the lid before it is intended that a package sealed therewith be opened. Still another innovation and improvement is in having the overcap or plastic fitment provided with an inwardly extending annular flange in the top portion which resiliently presses down on the top of the center panel portion of the closure lid so that there is no open space therebetween.

The object of the present invention, generally stated, is the provision of composite closure caps for press-on application in high speed capping machines and easy pull-off removal by hand incorporating the above-mentioned innovations and improvements which may be economically mass-produced with a high degree of uniformity and conformance to specifications.

Certain other and more specific objects of the invention will be apparent in view of the following detailed description of a presently preferred embodiment.

Accordingly, for a more complete understanding of the nature and scope of the invention reference may not be had to the following detailed description of a preferred and illustrative embodiment taken in connection with the accompanying drawings wherein:

FIG. 1 is a top plan view of such a composite closure cap;

FIG. 2 is a top perspective view illustrating the manner in which the composite closure cap may be removed from a container;

FIG. 3 is a vertical sectional view of the composite closure cap taken on line 3-3 of FIG. 1; and

FIG. 4 is a fragmentary sectional view on enlarged scale showing the relationship between the composite closure cap of FIG. 1-3 and the top seal finish of a container.

Referring to the drawings, a composite closure cap indicated generally at 5 comprises an outer integrally formed plastic fitment or overcap 6 which snugly retains therein a gasketed closure lid 7.

The fitment 6 may be injection molded in multiple cavity molds in large quantities from any suitable plastic material such as polystyrene, polyethylene, polypropylene, etc. It will be understood that the plastic material will be selected so as to have the appropriate physical properties including ability to withstand such handling and processing conditions and temperatures as may be required in connection with applying the com-

posite closure caps 5 to products filled with various foods or other contents.

The fitment 6 has a top portion which includes an outer annular section 8 (FIG. 1) and an inner lift ring or tab 10. A generally cylindrical skirt portion 11 integrally depends from the periphery of the outer annular section 8.

The outer annular section 8 has a downwardly opening channel-like margin 12 (FIG. 3) and an annular flange 13 extending radially inwardly therefrom. For purposes to be described hereinafter the flange 13 is made so as in the free condition to be downwardly inclined at a slight angle, e.g. 5°, from the horizontal and thereby press down on the central portion 14 (FIG. 4) of the closure lid 7 leaving no space between the inner free edge of the flange 13 and the lid. This prevents dirt or foreign material from collecting under the flange 13 and the appearance of the closure cap 5 is enhanced.

The downwardly opening channel-like margin 12 has a roof or top portion 15 (FIG. 4) and inner and outer sidewall portions 15 and 17, respectively. The skirt 11 of the overcap or plastic fitment 6 is provided on the interior with a plurality of circumferentially extending lugs or bosses 18-18 (FIGS. 3 and 4) the upper surfaces of which serve to provide supporting surfaces for the circumferential outer edge 20 of the closure lid 7.

As shown in cross-section in FIG. 4, a circumferentially extending groove 21 is provided above each of the lugs 18. Each groove 21 preferably has three surfaces, i.e., an upper surface 22 which joins a lower or intermediate surface 23 which in turn joins or merges with a still lower or bottom surface 24.

It will be seen that the surfaces 22 and 24 form acute angles with respect to the vertical while the surface 23 forms a smaller or shallower acute angle to the vertical than does the surface 24. While three distinct surfaces 22, 23 and 24 are shown in enlarged scale in FIG. 4, it will be appreciated that if desired, these surfaces could be smoothly blended into a continuous surface having different portions generally corresponding to surfaces 22, 23 and 24. The relationship of the surfaces 22, 23 and 24 or their functional equivalent of each groove 21 is important with respect to their engagement with portions of the closure lid 7 as will be explained.

The closure lid 7 in addition to the continuous center panel portion 14 has an annular groove 25 surrounding the center panel 14 and radially outwardly therefrom an integral downwardly opening lined channel 26. It will be seen that the channel 26 is of generally an inverted-U shape and is lined with a gasket or sealant 27 of known composition so as to form a hermetic seal with the top seal finish 28 on the rim 30 of a container indicated generally at 31. The closure lids 11 may be produced in known manner as by stamping from enameled or lacquered sheet metal after which the gaskets 27 may be suitably introduced and cured or fluxed as required.

The container 31 shown is formed of metal but it will be understood that it could also be formed of glass or plastic. Preferably, the container has a circumferential bead 32 formed directly below the rim or top opening 30 and the dimension of the bead 32 is such that it extends radially outwardly beyond the outer surface of the skirt 11 of the closure cap 5. Accordingly, when the capped containers 31 are placed sidewise against an-

other such as in packing into larger containers the beads 32 will engage each other and absorb sidewise blows thereby protecting the skirts 11 of the closure caps 5 from these sidewise blows that might dislodge the closure lids and break the seals provided thereby.

It will be seen that the sidewalls 16 and 17 of the downwardly opening channel-like margin 15 of the plastic fitment 6 ride on the opposite sides of the top portion of the closure lid's downwardly opening channel 26 at generally tangential engaging points 33 and 34 and that the horizontal portion 15 is spaced above the roof or crest of the channel portion 26. By virtue of this arrangement downwardly directed blows or impacts received on the top of the composite closure caps at their outer margins will be absorbed with a shock absorbing type action due to the spacing and also the yielding tangential engagement at points 33 and 34.

It will be noted from FIG. 4 that the terminal edge 20 of a closure lid 7 engages the intermediate lower surface 23 provided by each of the lugs 18 normally at a point slightly above the line where the surfaces 23 intersect the surfaces 24. This place of normal engagement allows the outer plastic fitments 6 to be moved upwardly a small distance relative to the closure lids 7 without unsealing or lifting the closure lids so as to break the seal formed between the gasket 27 and the top seal finish 28 of the container mouth. The steepness of the surfaces 23 is such that relative movement between the terminal edge 20 and the surfaces 23 is relatively easy. On the other hand the angles of the surfaces 24 are such that relative movement is prevented and these surfaces act primarily as lifting surfaces.

The gasketed closure lids 7 may be readily assembled into the plastic fitments or overcaps 6 so as to form the composite closure caps 5. The closure caps may be applied with known commercially available capping machines to filled containers 31 at high rates of speed preferably by introducing steam into the small head spaces of the filled containers. When the steam condenses in the head spaces with the closure caps in place, the ensuing vacuum perfects the resulting hermetic seals and firmly retains the closure caps in place against inadvertent or unintentional displacement or removal. In the capping process the closure caps 5 are pressed down on the filled containers allowing capping speeds in the order of 1,000 or more containers per minute in one machine.

When it is desired to open a container which is provided with one of the closure caps 5 the user grasps the lift ring or tab 10 and pulls upwardly thereon thereby initially breaking the frangible connections 35 between the lift ring and the inner edge of the flange 13 but leaving the lift ring 10 securely attached to the skirt portion 11 through the integral hinge 36. Continued lifting of the ring or tab 10 causes the bottom surface or surfaces 24 on one or more of the lugs 18 in the vicinity of the hinge 36 to engage under the terminal edge 20 and thereby break the vacuum after which the closure lid 7 may be readily removed from the container 31.

It will be seen that as long as a lift ring 10 has not been separated at the bridging connections 35-35 the customer will know that the package has not been opened. A further indication that the package has not been opened and that it remains properly sealed may be given by providing the central panel portion 14 of the closure lid 7 with a so-called "flip panel" such as

disclosed in U.S. Pat. No. 3,160,302, issued Dec. 8, 1964. As long as vacuum is maintained within the container 31 such a flip panel will be retained in its depressed or inward condition. However, when the vacuum is broken the panel will snap or flip to its outer or distended condition indicating the loss of vacuum within the package.

The close spacing at 37 (FIG. 4) between the bottom edge of the skirt 11 of a closure cap 5 and the adjacent sidewall of the container 31 serves to keep out debris and foreign objects.

I claim:

1. A composite closure for press-on application and pull-off removal with respect to a container having a top opening with an annular top seal finish, said composite closure comprising an outer integrally-formed plastic fitment and a gasketed closure lid carried within said fitment, said fitment having a top portion which includes an outer annular section with an inner lift ring and a generally cylindrical skirt portion depending from the periphery of said outer annular section, said outer annular section having a downwardly opening channel-like margin and a radially inwardly extending flange on the inner sidewall of said margin and said skirt portion having a plurality of circumferentially extending lugs on the interior thereof with an inwardly opening groove above each of said lugs with the lower side of each groove being formed by the upper side of its associated lug, said closure lid having a continuous center panel section and an integral downwardly opening gasket-lined channel the outer sidewall of which terminates in a terminal edge, the sidewalls of said fitment's downwardly opening channel-like margin riding on the upper side of said closure lid's downwardly opening gasket-lined channel with the roof of said fitment's downwardly opening channel-like margin being spaced above the roof of said closure lid's downwardly opening gasket-lined channel, and with said terminal edge of said closure lid panel section engaging a lower portion of each of said inwardly opening grooves so as to be retained thereby.

2. In the closure cap of claim 1 said radially inwardly extending flange resiliently pressing down on the top of said continuous center section of said closure lid.

3. In the closure cap of claim 1 said radially inwardly extending flange being tilted downwardly toward the center of said closure cap at a slight angle from the horizontal and with the inner marginal edge engaging a generally horizontal portion of said continuous center panel section of said closure lid so as to resiliently press down thereon.

4. The closure cap of claim 1 wherein the lower portion of each of said inwardly opening grooves has an upper section which is at a slight angle from the vertical and a lower section which is at an appreciably greater angle from the vertical with said terminal edge of said closure lid normally engaging said upper section whereby lifting of said fitment relative to said closure lid when retained by vacuum on a container permits said closure lid to remain seated on said top seal finish until a lower section of at least one of said inwardly opening grooves engages said terminal edge.

5. The closure cap of claim 1 wherein said integral downwardly opening gasket-lined channel of said closure lid is generally of inverted U-shape.

6. The closure cap of claim 1 wherein said fitment's downwardly opening channel-like margin has generally tangential riding engagement with the upper side of closure lid's downwardly opening gasket-lined channel.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,804,283 Dated April 16, 1974

Inventor(s) HENRY E. FRANKENBERG

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

- Col. 1, Line 42, change "not" to --now--;
- Col. 2, Line 22, change "15" to --16--;
- Col. 2, Line 50, after "opening" insert --gasket--;
- Col. 4, Line 38, delete "panel section" and insert instead --frictionally--;
- Col. 4, Line 43, after "center" insert --panel--.

In References Cited, change the name "Westfalh" to --Westfall--.

Signed and sealed this 10th day of September 1974.

(SEAL)

Attest:

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