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V. J. ESPOSITO, JR

3,430,777

PILFERPROOF CAP WITH INTEGRAL PRESSURE ACTUATED SEALING MEANS

Filed June 22, 1967

FIG. 1

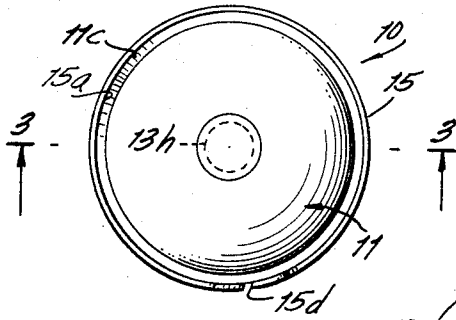


FIG. 3

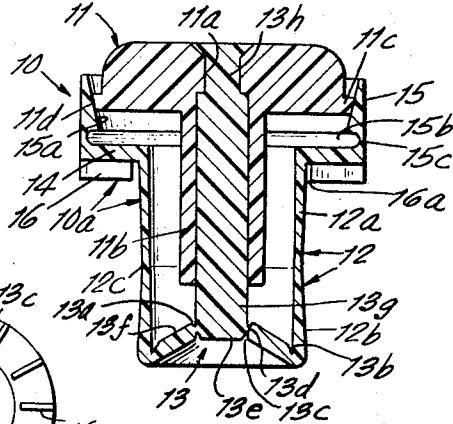


FIG. 2

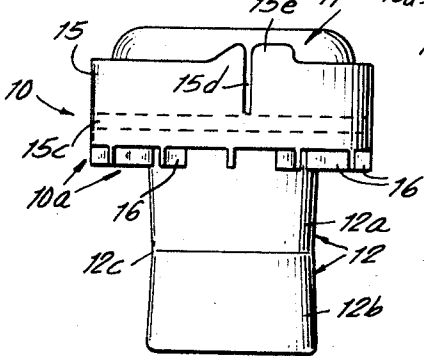


FIG. 7

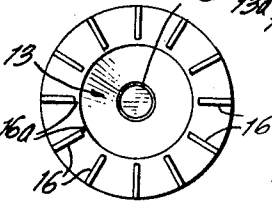


FIG. 4

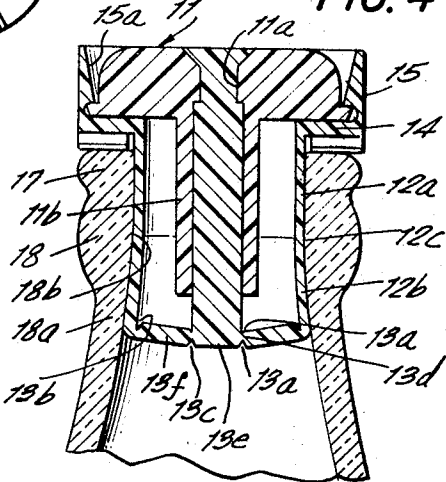


FIG. 5

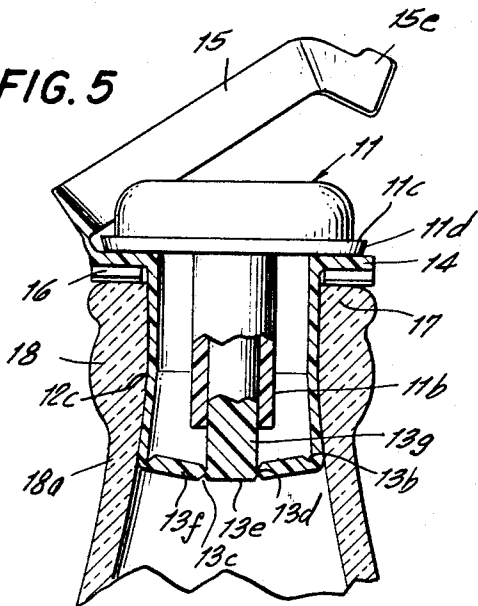
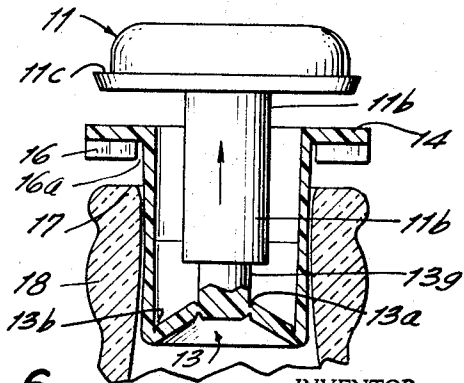


FIG. 6



INVENTOR
VINCENT J. ESPOSITO, JR.

BY

Barnett + Barnett
ATTORNEYS

1

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PILFERPROOF CAP WITH INTEGRAL PRESSURE ACTUATED SEALING MEANS

Vincent J. Esposito, Jr., 31 Jackson Ave., Wayne, N.J. 07470

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8 Claims

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ABSTRACT OF THE DISCLOSURE

A stopper-type plastic cap has means for selectively applying outward radial pressure to engage the interior surface of bottle necks for sealing, releasing and resealing the bottle. An integral annular tear strip locks the cap in a sealed condition by a snap-in undercut groove when the cap is initially applied to the neck by a downward force and requires tearing off for initial release. Compressible means is located on a surface of a radial flange extending across the bottle mouth and coacts with the outward radial pressure applying means to accommodate varying dimensions of the bottle neck.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to caps, corks or stoppers molded of elastomeric plastic material having integral means for selectively applying radial pressures to engage the necks of bottles and the like containers for sealing and resealing thereof and more particularly is directed to a pilferproof construction for such stoppers.

Description of the prior art

The invention satisfies the need for a pilferproof feature in bottle caps embodying the pressure actuated sealing means disclosed in my Patent No. 3,244,308.

SUMMARY OF THE INVENTION

Among the objects of the invention is to generally improve stoppers of the character described which may be molded of elastomeric material for use primarily on relatively narrow neck and mouth bottles of the type used for liquor, wine, champagne, carbonated and non-carbonated soft drinks and the like, which shall be economical to manufacture in quantity production by modern molding methods, which shall provide a resilient wall for positioning in the bottle neck recessed from the mouth and being deformable from a normal convex configuration for easy insertion and removal of the stopper from the bottle neck to a concave expanded position for applying radial pressure against the interior of the bottle neck thereby grip-locking the stopper therein, which resilient wall shall have an upwardly extending projection for finger manipulation of the wall between said convex and concave configurations, which stopper shall include an annular skirt integrally formed about the periphery of the wall and extending upwardly to emerge from the mouth of the bottle and terminating in a lateral flange for seating on the bottle mouth, which projection and lateral flange shall include interengaging means for locking the wall in concave expanded position when the stopper is initially inserted into a filled bottle and the projection is forced downwardly to position the wall in said concave configuration thereby locking the sealed bottle against both accidental or intentional removal of the stopper to prevent tampering with the bottle contents, which interengaging means shall include tear portions for stripping away the initial locking means to free the projection for selective finger manipulation of the wall between said convex and concave configurations, which stopper shall be ca-

2

pable of compensating for conventional variations in glass bottle mouth and neck sizes, which shall be foolproof in operation, corrosion resistant and sanitary for use on food containers, and which shall be practical and efficient to a high degree in use.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a stopper constructed to embody the invention prior to insertion into the neck of a bottle.

FIG. 2 is a side elevational view of the stopper shown in FIG. 1.

FIG. 3 is a vertical section taken on line 3-3 in FIG. 1 showing details of construction.

FIG. 4 is a vertical section similar to FIG. 3 but showing the stopper mounted on a bottle neck and locked in sealed position.

FIG. 5 is a sectional view similar to FIG. 4 but showing the tear strip being removed to release the manipulatable projection.

FIG. 6 is a sectional view similar to FIG. 5 but showing the finger manipulatable projection in raised, stopper releasing position and the stopper partially removed from the bottle neck, and

FIG. 7 is a bottom plan view drawn to a reduced scale of the stopper shown in FIG. 1 showing the resilient fins carried on the underside of the lateral flange.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring in detail to the drawing, 10 generally denotes a stopper which may be made as a two piece construction comprising a stopper portion 10a and a button 11. Stopper portion 10a may be molded as an integral unit of a suitable material having elastomeric properties, such as, rubber, polyolefins, polyvinyls, polyurethanes, ethylene-vinylacetate and the like, to comprise a tubular skirt 12, a transverse wall 13 terminating the lower end of skirt 12, a radial flange 14 terminating the upper end of skirt 12, and an annular tear strip 15 extending upwardly from the periphery of flange 14.

Skirt 12 is sized to snugly fit through bottle mouth 17, here shown to be of relatively small diameter, skirt 12 having an upper section 12a to conform to substantially cylindrical bottle neck 18, a reverse tapering lower section 12b to engage the upwardly tapering wall 18a of the bottle, and a bight region 12c for registering with the region 18b wherein neck 18 merges with bottle wall 18a.

For sealing, releasing and resealing bottle neck 18 by stopper 10, transverse wall 13 may be molded in a configuration as shown in FIG. 3 and is formed with a concentric groove 13a and a peripheral groove 13b on the upfacing side thereof. A complementary groove 13e is formed in the downfacing surface of wall 13 opposite groove 13a providing a flexible web 13d of reduced cross-section therebetween. Flexible web 13d sectionalizes transverse wall 13 into a circular central area 13e and an outer annular area 13f. This sectionalization of transverse wall 13 serves to overcome the "memory" of the material, that is, the tendency to return to the convex configuration in which stopper portion 10a is initially molded when distorted to the concave sealing configuration shown in FIG. 4 as fully described in my said Patent No. 3,244,308.

An elongated push rod 13g is integrally formed with transverse wall central area 13e to extend upwardly and axially of skirt 12 and mounts button 11 on the upper reduced diameter end 13h thereof. Button 11, which may be of the same material as stopper portion 10a in the same or a contrasting color or of any other suitable plas-

tic resinous material having more rigid properties, has an axial opening 11a to fit end 13h and may have a downwardly extending sleeve 11b concentric with opening 11a surrounding push rod 13g for strengthening purposes.

In order to achieve the initial locking of transverse wall 13 in its concave expanded bottle sealing position, button 11 has a peripheral flange 11c which may be formed with a beveled edge 11d for engaging the complementary beveled interior surface 15a of tear strip 15 to facilitate snap-in engagement of flange 11c into undercut groove 15b. The lateral exterior wall 15c of groove 15b is relatively thin providing a tear line for removal of tear strip 15.

Button 11 and stopper portion 10a after being molded separately are readily assembled by telescoping sleeve 11b into push rod 13g so that reduced diameter end 13h extends into opening 11a. The parts may be secured together by cementing, or as shown in FIGS. 3 and 4, opening 11a may be beveled at the upper end for the swaging or spreading of push rod end 13h.

To facilitate severing to unlock button 11, tear strip 15 is split by a transverse slit 15d shown in FIG. 2 to extend from the free upper edge thereof to the thin wall 15c and tear strip 15 may be widened adjacent slit 15d to provide a finger grip tab 15e.

As an optional feature to compensate for expected relatively wide tolerances in the dimensions of necks 18 and upwardly tapering walls 18a of the bottles on which stopper 10 may be used, a plurality of spaced apart radial fins 16 may be integrally formed to extend downwardly from the undersurface of flange 14 to serve as a resilient cushion between the latter and the mouth 17 of the bottle. Radial fins 16, which for increased flexibility may be separated and detached from skirt upper section 12a by spaces 16a, provide a means for aligning skirt bight region 12c with the merging region 18b of the bottle for a more precise fit between skirt reverse tapering lower section 12b and bottle upwardly tapering wall 18a when the former is spread in sealing position by transverse wall 13.

The operation of stopper 10 will now be apparent. Stopper portion 10a, molded as a one piece integral structure with transverse wall 13 in the convex position shown in FIG. 3 and with tear strip 15 attached to radial flange 14, is assembled with button 11 providing stopper 10 ready for use by insertion into the mouth 17 of a filled bottle. A downward force is then exerted to depress button 11 snapping peripheral flange 11c into undercut groove 15b aided by the coaction of beveled surfaces 11d and 15a, and simultaneously, through push rod 13g, deforming transverse wall 13 to concave position thus spreading skirt lower section 12b to engage upwardly tapering wall 18a of the bottle as shown in FIG. 4. This downward force is seen to also compress, that is distort, fins 16, when provided on flange 14, against bottle mouth 17 to a degree so that, upon release of said force, skirt bight region 12c will properly align with the merging region 18b of the bottle and the resiliency of fins 16 will coact with that of transverse wall 13 to retain a tight seal.

To initially remove stopper 10, tab 15e is gripped by the fingers and radially outward pressure applied thereto for severing tear strip 15 along thin lateral exterior wall 15c from radial flange 14 as indicated in FIG. 5. Button 11 is now free to be pulled upwardly to first return transverse wall 13 to its normal convex position and then totally dislodge stopper 10 from bottle mouth 17 and neck 18 as indicated in FIG. 6. To reseal the bottle, stopper 10 is merely replaced in mouth 17 and neck 18 and button 11 depressed to again spring transverse wall 13 to its concave position.

It will be clear from FIG. 4 that the concavity of transverse wall 13 is limited by the length of push rod 13g and the seating of button 11 on radial flange 14. The maximum concavity is thus predetermined and limited

to somewhat less than the normal convexity thereby insuring sufficient radial spread of the skirt lower section 12b for sealing stopper 10 in bottle neck 18.

The improved pilferproof construction for stoppers having integral pressure actuated sealing means herein disclosed is seen to achieve the several objects of the invention and to be well adapted to meet conditions of practical use. As various possible embodiments might be made in this invention, and as various changes might be made in the disclosed construction, it is to be understood that all matters herein set forth or shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

I claim:

1. A resealable pilferproof cap for a bottle having an upwardly tapering wall portion merging with a substantially cylindrical neck, said cap comprising a stopper portion molded of elastomeric material comprising a skirt sized to fit into the bottle neck and proportioned to conform substantially to said neck and tapering wall portion, a transverse wall integrally formed to extend across a lower end of the skirt and having a normally convex configuration deformable into a concave configuration for applying a radial force to spread the skirt for sealing against said tapering wall portion, a radial flange extending from an upper end of the skirt for engaging the bottle mouth to limit the movement of the stopper portion into the neck, a button sized and shaped to seat on said radial flange, a push rod interconnecting said button and transverse wall to space the button above said radial flange when the transverse wall is in said convex configuration and to abut said flange when the button is lowered to depress the transverse wall to said concave configuration through said push rod, and an annular tear strip integrally formed to extend upwardly from the periphery of said radial flange and surround said button, said tear strip having means engaging and locking said button in said lowered position and a thin walled annular portion along which the tear strip is manually severable from the lateral flange to unlock the button for finger manipulation of said push rod by raising the button with respect to said radial flange disposing said transverse wall to said normal convex configuration permitting removal of the cap from the bottle neck.

2. The resealable pilferproof cap defined in claim 1 in which said tear strip button engaging and locking means comprises an undercut groove, and said button is formed with a peripheral flange for engaging said undercut groove.

3. The resealable pilferproof cap defined in claim 2 in which said tear strip has a beveled interior surface for engaging a complementary beveled edge of said button peripheral flange facilitating snap-in engagement of said peripheral flange into said undercut groove when the cap is initially applied to and locked on a bottle by said button being depressed to deform said transverse wall from a normal convex configuration to the bottle sealing concave configuration.

4. The resealable pilferproof cap defined in claim 2 in which said tear strip thin walled annular portion forms the lateral exterior wall of said undercut groove and the tear strip is formed with a transverse slit extending from a free edge thereof to said lateral exterior wall to facilitate said severing.

5. The resealable pilferproof cap defined in claim 1 in which said transverse wall is sectionalized into a circular central area interconnected by a web to an outer annular area, said web being relatively thin with respect to the thickness of said circular central and outer annular areas providing an annulus of flexure to hold said transverse wall in said concave configuration.

6. The resealable pilferproof cap defined in claim 5 in which said push rod is integrally formed with said circular central area and extends axially with respect to said skirt mounting said button at a predetermined distance from said circular central area to limit the maximum concavity

5

of the transverse wall to insure said radial spread of said skirt.

7. The resealable pilferproof cap defined in claim 1 in which said radial flange has compressible means on the underside thereof for engaging the bottle mouth and contacting with said spreading of the skirt to properly align the cap with respect to said bottle tapering wall portion. 5

8. The resealable pilferproof cap defined in claim 7 in which said compressible means are a plurality of integrally formed, spaced apart, radially and downwardly extending fins. 10

6

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JOSEPH R. LECLAIR, *Primary Examiner.*

U.S. Cl. X.R.

215—55