March 21, 1961 W. E. FILLMORE 2,975,466

BALL-TYPE LIQUID APPLICATORS

Filed May 13, 1957

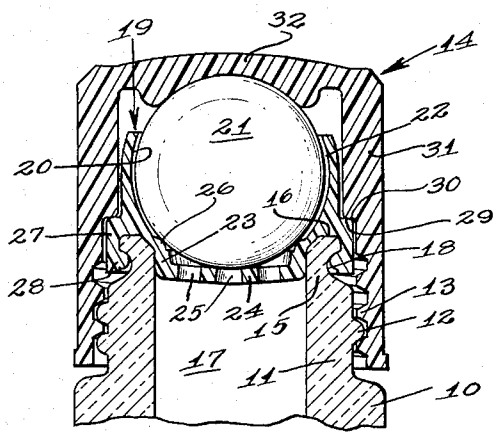


FIG. 1.

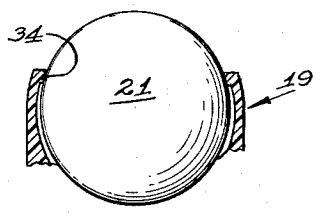


FIG. 4.

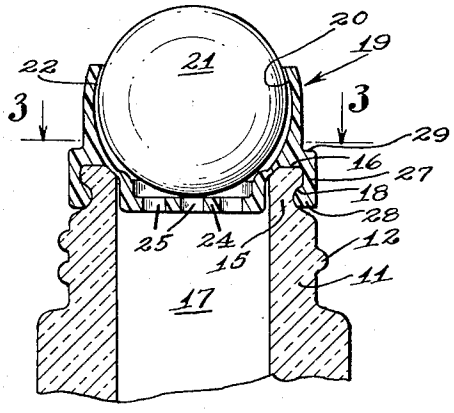


FIG. 2.

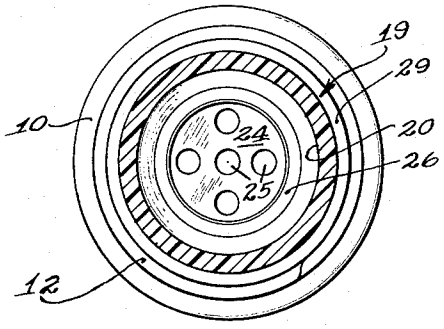


FIG. 3.

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United States Patent Office 2,975,466 Patented Mar. 21, 1961

2,975,466

BALL-TYPE LIQUID APPLICATORS

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Filed May 13, 1957, Ser. No. 658,767

1 Claim. (Cl. 15—572)

The present invention relates to improvements in ball-type liquid applicators formed largely of polyethylene or similar thermoplastic material and has for its principal object the provision of simple and effective means for avoiding "stress cracking" in certain critical zones. Applicators of the character to which the present invention pertains operate upon a principle and to some degree incorporate structure similar to the disclosure in R. H. Thomas Patent No. 2,749,566, issued June 12, 1956, titled "Dispenser."

In the specific applicator here involved and which incorporates my invention, it comprises a ball holder formed of polyethylene or similar thermoplastic material. This holder is of generally cylindrical form and has its lower end provided with an apertured transverse web and an internal ball seat immediately thereabove. A dispensing and applicator ball rests upon both the annular seat and the web end is pressed into firm contact with both incident to application of a screw closure cap or such cover.

Owing to the manufacturing methods utilized in producing this apertured web, it and contiguous portions of the holder are inherently weak in certain zones with the result that "stress cracking" in these zones often results when one applies the closure cap so tightly that the ball applies undue downward pressure upon the web sufficient to distort this element well beyond its elastic limits. This is very easily and inadvertently done.

An object of my invention is to avoid the above noted objections and incorporate in the ball holder and closure cap features which will positively prevent the possibility of application of any such degree of downward pressure upon the web.

Another object of my invention is the provision of cooperating abutments or shoulders on the ball holder and closure cap so positioned in relation to the ball, closure cap panel and associated parts as to positively terminate downward seating movement of the applicator ball short of the point at which undue pressure could possibly be applied to the web.

Other objects will be in part apparent and in part pointed out hereinafter.

In the drawings:

Fig. 1 is a vertical sectional view showing my invention incorporated in a ball-type liquid applicator which is secured to the neck of a glass container.

Fig. 2 is a view similar to Fig. 1 showing the closure cap removed and the ball separated from its seat.

Fig. 3 is a transverse sectional view taken substantially along the line 3—3 of Fig. 2 with the ball removed.

Fig. 4 is a fragmentary sectional elevational view of a slightly modified form of ball holder.

In the illustrated embodiment of my invention, it is incorporated in a fitment intended for attachment to a bottle or the like glass container **10** which is provided with a reduced neck **11** formed with external screw threads **12** intended for holding engagement with the

internal screw threads **13** of a closure cap **14**. A diametrically reduced upward extension **15** on the threaded neck **11** terminates in a flat annular radial rim **16** which defines a filling opening **17**. Immediately below the annular rim **16**, this upward extension **15** is formed with a generally downwardly facing annular abutment **18** intended for holding engagement with a portion of the applicator fitment, as will be apparent presently.

The applicator includes a ball holder **19** which is of generally cylindrical form with the upper portion of the cylinder having its interior surface **20** shaped to conform to the curvature of a portion of the applicator ball **21** and of such axial extent as to enclose a major portion of the ball as shown in Fig. 2. Inwardly or downwardly of the ball accommodating recess **22** the housing is reduced in diameter to provide a depending neck **23** which, as shown in Fig. 2, fits loosely in the container neck **11** and a transverse web **24** partially closing the lower end of the neck **23** and formed with a plurality of dispensing apertures **25**. At the upper end of the neck **23**, an annular ball seat **26** is provided, this element assuming the form of an annular rib facing generally upwardly and inwardly toward the axis of the fitment. The inherent ability of this web **24** to assume a perfectly flat position as indicated in Fig. 2 or in any event return approximately to that position from a concavo-convex form as suggested in Fig. 1, is relied upon to unseat the applicator ball **21** immediately upon removal of the closure cap **14** in order that dispensing and application of the contained liquid may be effected.

Separable connection between this ball holder and the container **10** is obtained through the formation of an attaching skirt **27** as a part of the holder, such skirt being disposed concentric with and radially outward from the neck **23** of the holder and including an annular internal bead or shoulder **28** designed for holding engagement with the abutment **18** on the glass container. This skirt is of greater diameter than that of the remaining portion of the housing or holder but of less outside diameter than the threaded neck **11** of the container. Also the design of this skirt is such that it provides at its upper end an annular radial shoulder **29** or abutment intended for engagement with a downwardly facing annular shoulder or abutment **30** which is formed internally of the attaching skirt **31** of the closure **14**. These shoulders **29** and **30** are so positioned axially in relation to the recessed panel portion **32** of the closure cap **14** that the ball **21** cannot be moved downwardly into engagement with the web **24** and seat **26** to a degree that would distort the web and adjoining portions of the neck body beyond their elastic limit. Thus both distortion of the web to such an extent that it could not function as a ball unseating means and "stress cracking" of the thermoplastic material with at least the same end result just described, are entirely avoided.

In Fig. 4, an internal annular bead **34** is formed on the ball holder **19** to aid in securing the ball **21** against possible accidental displacement outwardly, as might occur from time to time, with removal of the closure cap **14**, because of the liquid on the ball surface effecting some degree of adhesion between the ball and cap. The bead effectively prevents such separation.

Modifications may be resorted to within the spirit and scope of the appended claim.

I claim:

In a dispensing container, the combination of a rigid container having an upwardly positioned substantially cylindrical neck defining a filling opening and formed with external peripheral screw threads, said neck having an upper extension terminating in an annular radial rim, said upper extension having an external annular groove in

proximity to the rim; a ball; a ball-retaining fitment formed of an inherently resilient plastic material and including an annular ball housing disposed coaxially with the neck and having its upper interior surface shaped and dimensioned to surround a major lower portion of the surface of the ball and functioning to secure the latter against accidental removal upwardly relative to the housing, an annular extension projecting loosely into the filling opening of the container and having an annular internal ball seat immediately below and coaxial with said upper interior surface, said extension projecting into the neck beyond the seat to terminate in a support portion for the seat underlying the seat, an exterior depending attaching skirt radially outward from and concentric with said ball seat, said skirt cooperating with the annular extension to form therebetween an annular recess receiving the rim of the neck therebetween, said skirt having an internal bead fitting in the extension groove for holding engagement with said container and the skirt being of less external diameter than the screw threads of the container neck; a closure cap telescoped over the fitment and the threaded neck and including a panel portion overlying and in contact with the ball, and a depending skirt portion having internal screw threads engaging the threads of the container neck; an annular upwardly facing shoulder on the fitment overlying said annular radial rim of the container, and an internal downwardly facing

shoulder formed on the closure cap and engageable with the shoulder on said fitment, the shouders each lying in a plane substantially normal to the container axis and positioned axially in relation to the panel portion of the closure cap and the ball so as to limit possible axial downward movement of the ball in the fitment resulting from threading of the cap on the container neck to a degree less than would distort and crack the support portion of the fitment beneath the ball seat after full seating of the ball and subsequent resilent distortion of the fitment support portion, said shoulders sealingly engaging one another to seal the periphery of the ball when the ball is seated on the internal fitment seat, and said shoulders urging the fitment downwardly with the cap to sealingly engage the container rim in the fitment recess.

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