June 14, 1966 E. C. LEONARD 3,255,934

SQUEEZE-SPRAY DISPENSING PACKAGE

Filed April 7, 1964

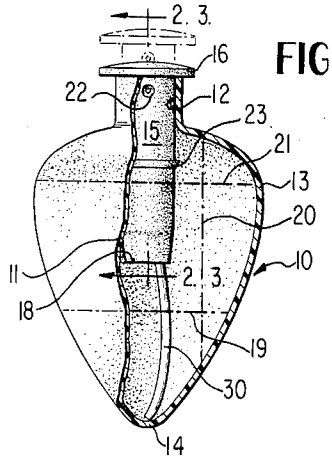


FIG. 1

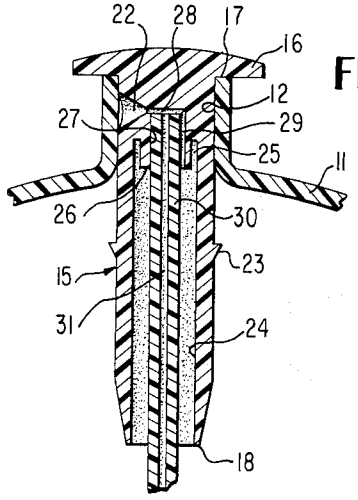


FIG. 2

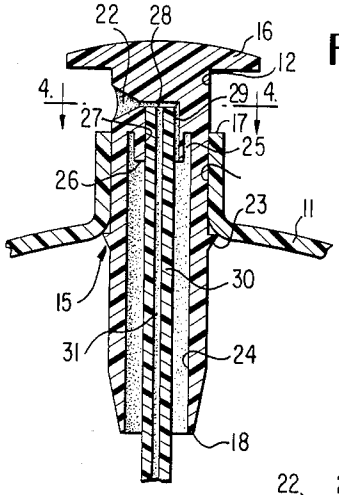


FIG. 3

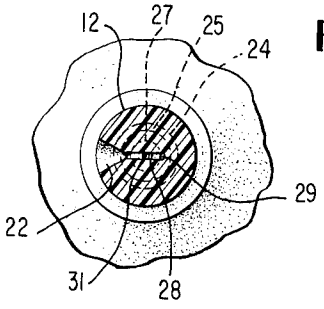


FIG. 4

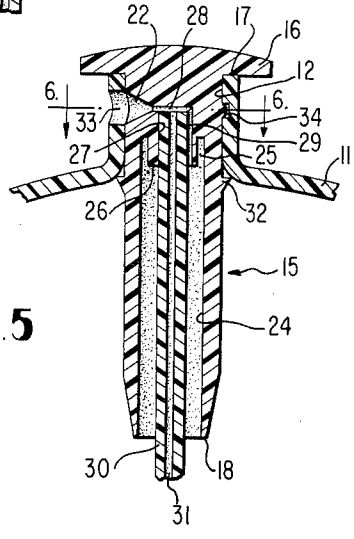


FIG. 5

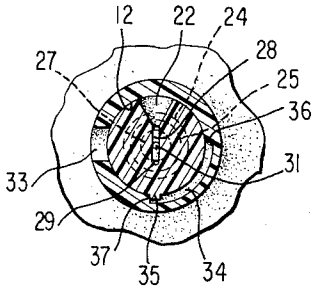


FIG. 6

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United States Patent Office 3,255,934 Patented June 14, 1966

3,255,934

SQUEEZE-SPRAY DISPENSING PACKAGE

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Filed Apr. 7, 1964, Ser. No. 358,398
8 Claims. (Cl. 222—211)

This invention relates to a squeeze-spray dispensing package, or container, and particularly to a small size container designed for storing in a non-upright position.

A large number of squeeze-spray containers are available but the construction is such that their contents can leak out through the passages within the container through which air is expelled or admitted in the squeezing operation when the container is not upright. A liquid tight closure can be secured to the container to prevent external leakage but this requires a separate cap which can be lost and, furthermore, the cap sometimes contains liquid when removed.

A further disadvantage in containers now in use is that they have flat bottoms and will not dispense all of their contents since the lower end of the liquid feeder tube lying in one corner of the flat bottom is not immersed in liquid when the contents of the container have been considerably depleted, and the container is tilted so that this corner is the elevated one. In packaging liquids in a small container in which the volume of liquid dispensed is not great, any residual liquid in the container is highly wasteful and must be avoided.

A primary object of the invention is, therefore, to produce a squeeze-spray container whose contents will not leak from the container when it is tilted from the upright position.

A further object is to provide a simple, leak-proof squeeze-spray container having an integral closing cap.

Yet still another object is to provide a squeeze-spray container from which substantially all of the contents can be dispensed.

Yet still a further object is to provide a simple, leak-proof squeeze-spray container for one time usage.

Other objects and advantages of the invention will become apparent from the description which follows:

The above objects have been accomplished by designing a squeeze-spray container having a neck plug, from which the spray is projected from a spray orifice, which is movable within the container neck between a spray dispensing position, in which the spray orifice is exposed to the atmosphere, and a sealing position, in which the spray orifice is positioned within the neck opening. To insure a liquid tight seal, the air passage within the container is extended to a central portion of the container to lie above the liquid level when the container is tilted to any position. Further, the bottle is formed in a heart shape to have a single small well or sump in the bottom in which the fluid feeding tube rests so that essentially all of the contents of the container will be dispensed.

All of the above is explained in the detailed description of two of the preferred embodiments of the invention which follows and are illustrated by the accompanying drawings in which:

FIGURE 1 is a side view of one embodiment of the dispensing container partially cut away and showing the dispenser in both the spray dispensing position and in the sealed position.

FIGURE 2 is a partial section of the container of FIGURE 1 taken along section 2—2 of FIGURE 1 with the dispenser in its sealed position.

FIGURE 3 is a partial section of the container of FIGURE 1 taken along the section 3—3 of FIGURE 1 with the container in the spray dispensing position.

FIGURE 4 is a sectional view of the container of FIGURE 1 taken along the section 4—4 of FIGURE 3.

FIGURE 5 is a partial sectional view similar to FIGURE 2 but of another embodiment of the container.

FIGURE 6 is a sectional view of the container of FIGURE 5 taken along the section 6—6 of FIGURE 5.

FIGURE 1 shows a hollow squeeze bottle dispenser **10** with external walls **11** of a flexible material and having a dispensing neck opening **12** at the top of the bottle. The container **10** is generally heart shaped with the larger upper cross sectional portion **13** at the top of the container immediately below the neck opening **12** and tapering symmetrically inwardly below this larger upper section to form a lower, small, semipointed bottom portion, or sump **14**. The container is of a volume to be only partially filled by the amount of fluid which it is intended to dispense.

Snugly, but slidably fitting within the neck opening **12** is an elongated cylindrical plug **15** of substantially the same diameter as the neck opening **12** to seal the neck but be slidably therewithin. The top portion of the plug **15** extends outwardly as an upper flange **16** of larger diameter than the remainder of the plug to overlie the rim **17** of the container neck in a manner to prevent the plug **15** from being pushed completely into the container **10**. The plug **15** is sufficiently long so that the lower end **18** extends to the central interior portion of the container **10** to lie above the fluid level of the container filled to its intended capacity when the container is tilted to any position, three typical positions of the fluid level being illustrated by lines **19**, **20** and **21** of FIGURE 1 to illustrate the upright, horizontally inclined and inverted positions, respectively of a full container. A generally conical shaped spray orifice **22**, through which the contents of the bottle are sprayed, is cut into the wall of the plug **15** immediately below the flange **16**. An outwardly extending collar **23** extends around the periphery of the plug **15** at a point below the flange **16** so as to contact the inside of the container at the junction of the neck opening **12** and the flaring portion of the container walls **11** when the spray opening **22** is a short distance above the rim **17** of the neck, as best seen in FIGURE 3.

The central portion of the plug **15** has a longitudinally extending lower bore **24** extending from the lower end **18** a substantial length of the plug to a level below that of the spray orifice **22**. Extending upwardly from the upper end of the lower bore **24**, an annular groove **25** is cut into the plug to extend upwardly above the top of the lower bore **24** as an upper recessed groove at the top of the lower bore **24**. A smaller diameter upper bore **27**, concentrically located with respect to the lower bore **24**, extends from the top **26** of the lower bore to a point which is level with the apex of the spray orifice **22**. A small diameter air passage **28** is recessed as a small groove across the upper face of the upper bore **27** to connect at one end with the inner apex of the spray orifice **22** and at the other end with passage **29** which extends downwardly as a vertical groove in the back wall of the upper bore **27** opposite the spray orifice **22**, the vertical air passage **29** terminating at the top **26** of the lower bore **24** within the plug. The upper end of a hollow flexible tube **30**, whose outer diameter is approximately equal to that of the upper bore **27**, is engagingly fitted within the upper bore **27** to have the top end of the tube **30** flush with the lower wall of the horizontal air passage **28** so that the central passage **31** of the hollow tube **30** communicates with the air passage **28**. The tube **30** is sufficiently long to extend from the air passage **28** to the sump **14** at the bottom of the heart shaped container.

To close the container and place the sealing plug **15** in a sealing position, the top of the plug **15** is pressed

downwardly within the container neck until the flange 16 contacts the rim 17 of the neck, at which time the spray orifice 22 abuts the inside of the opening 12 in the position shown in full lines in FIGURE 1 and in FIGURE 2. To place the plug in the spray dispensing position, the plug 15 is lifted vertically until the collar 23 impinges on the lower end of the neck 12 at the junction with the flaring container wall 11, at which time the spray orifice 22 lies above the rim 17 of the neck and is in communication with the atmosphere. By pressing the sides of the flexible container, air is forced through the air passages 28 and 29 from the central portion of the container via the bore 24 of the plug and draws with it fluid through the passage 31 of the fluid supply tube 30 to issue as a fine spray from the spray orifice 22, in the well-known manner.

FIGURE 5 represents a slightly different embodiment than that of FIGURE 1. In the embodiment of FIGURE 5 the arrangement of the spray nozzle 22, air passages 28 and 29, the fluid supply tube 30 and internal configuration of the neck closing plug 15 are the same as in the embodiment previously described and illustrated in FIGURES 1–4. The main difference between the two embodiments is that the plug 15 in the embodiment of FIGURE 5 is not vertically slidable within the neck opening 12 but is axially rotatable therewithin. The plug 15 has the same outwardly extending top flange portion 16 which overlies the rim 17 of the container neck as in the previously described embodiment but has an outwardly projecting collar 32 extending peripherally around the plug 15 located below the flange 16 a distance equal to that between the top rim 17 of the neck and the juncture of the bottom of the neck and flaring container wall 11 so that the plug 15 is free to rotate about its axis within the neck but cannot be moved vertically. An opening 33 of a diameter equal to the largest diameter of the conically shaped spray orifice 22 is cut through the wall of the neck 12 in the same plane as the spray orifice 22. The inside of the neck 12 has a transversely positioned groove 34 extending partially around its circumference. An abutment 35 extends outwardly from the plug 15 to ride within the groove 34. The ends 36 and 37 of the groove 34 are located so that the abutment 35 striking one end 36 will position the spray orifice 22 in communication with the opening 33 in the neck in the manner illustrated in FIGURE 5, and striking the other end 37 will position the spray orifice 22 so that no portion overlies the opening 33 in the neck and seal the container in the manner shown in FIGURE 6.

Thus, to close or open the spray dispenser in the second embodiment, the flanged top 16 is rotated as far as it will go in one direction or the other to either place the spray orifice 22 in a sealing position within the neck or in a spray dispensing position with the orifice 22 in communication with the neck opening 33.

Obviously slight variations of the above described embodiment are entirely possible. For example, instead of having a lower bore 24 of a larger diameter than the upper bore 27 within the plug, the lower bore 24 could be eliminated and the smaller upper bore 27 extended downwardly to the lower end 18 of the plug. In this case, the length of the vertical air passage 29 would be considerably extended.

While the above matter describes and illustrates preferred embodiments of the invention, it should be understood that the invention is not restricted solely to the described embodiments but that it covers modifications which would be apparent to one skilled in the art falling within the scope and spirit of the invention.

I claim:

1. A squeeze-bottle dispensing package for dispensing an established amount of fluid contained therewithin said package comprising:

a hollow container of flexible material with a neck defining dispensing opening,

an elongated plug having a transversely directed spray orifice extending into its side wall near the upper end and closely slidably fitting within said neck opening to be movable between a spray discharge position in which said orifice communicates with the atmosphere and a sealing position in which the exterior of said orifice sealingly abuts the interior surface of said neck opening,

said plug containing an internal continuous air passage having an upper portion extending transversely into said plug from said orifice and the remaining portion extending longitudinally within said plug from the inner terminal of said upper portion to communicate with an opening at the lower end of said plug,

said plug being of a length that the lower end terminates within the central interior of said container to be above the level of the established amount of liquid within the container with the plug in any position and the container in any attitude,

and a hollow tube affixed to said plug with the top end of said tube in communication with said transverse upper portion of the air passage and the lower end of said tube resting in the bottom of said container.

2. A squeeze-bottle dispensing package as described in claim 1 wherein

said container is generally heart shaped with the neck located at the larger upper end of the container and the container sides below the top section taper inwardly to form a gently rounded, semipointed bottom sump in which the lower end of said hollow tube rests.

3. A squeeze-bottle dispensing package as described in claim 1 wherein

the wall of said neck opening is pierced by an opening in the same plane as said spray orifice,

and said plug motion restricting means comprises means for retaining said plug at the same level within said neck opening for axial rotation and means for limiting said axial rotation between a position in which said orifice is aligned with said opening in said spray discharge position and a position in which said orifice is out of communication with said opening in said sealing position.

4. A squeeze-bottle dispensing package as described in claim 3 wherein

the top portion of said plug above said orifice is larger in diameter than said neck opening to form an outwardly extending flange resting on the rim of said neck to prevent downward motion of said plug within said neck,

said plug has an outwardly extending projection spaced below said flange a distance equal to the spacing between the top of said neck and the lower end of said neck opening within said container,

said projection engages the interior of said container at the juncture with the lower end of said neck opening and, in conjunction with said flange, preventing vertical motion of said plug within said neck opening but allowing axial rotation of said plug,

and said plug and container neck have an abutment and partially peripherally extending groove arrangement in which said abutment engages the ends of said groove at said spray discharge and said sealing positions, respectively, to restrict axial motion of said plug within said neck opening.

5. A squeeze-spray bottle containing a specific amount of liquid to be dispensed through a spray orifice through the sidewall of an elongated hollow plug slidably fitting within a neck opening of the bottle to be movable between a spray discharge position in which the orifice communicates with the atmosphere and a sealing position in which the orifice sealingly abuts the interior of the bottle neck, the upper portion of the plug containing an internal air passage having an upper portion extending

transversely into the plug from said orifice and the remaining portion extending longitudinally within said plug to terminate at an opening at the lower end of the plug with a midpoint of the upper portion of said air passage connected to one end of the hollow tube extending through said plug to have the other end of the tube lying in the bottom on the bottle,

said plug being of a length to have the lower end terminate within the bottle interior to be above the level of said specific amount of liquid with the plug in any position and bottle in any attitude.

6. An improved squeeze-bottle container as described in claim **5**, wherein

the upper portion of said container, terminating at its top in said neck opening, tapers inwardly below its maximum cross sectional perimeter to form a bottom sump portion having a substantially lesser cross sectional perimeter than the portions thereabove and in which the bottom of said hollow tube is located.

7. A squeeze-bottle dispensing package for dispensing an established amount of fluid contained therewithin, said package comprising;

a hollow container of flexible material with a neck defining dispensing opening in the upper portion of said container which tapers inwardly below its maximum cross-sectional perimeter to form a bottom sump portion having a substantially lesser cross-sectional perimeter than the portion thereabove,

an elongated plug having a conically shaped spray orifice extending into a sidewall near the upper end portion with the larger end of said orifice facing outwardly,

said plug closely and slidably fitting within said neck opening to be movable between a spray discharge position in which said orifice communicates with the atmosphere and a sealing position in which the exterior of said orifice sealingly abuts the interior surface of said neck opening,

said plug being of a length to have the lower end terminate within the central interior of said container to be above the level of the established amount of liquid when said container is in any attitude and the plug in any position,

said plug having a central bore extending longitudinally from the lower end portion to the same level as the apex of said spray orifice,

said bore having a cylindrical upper portion and a cylindrical lower portion which has a substantially larger diameter than said upper portion,

said plug having a transversely extending air passage formed by a recess extending across the upper face of the top end of said bore upper portion and extending between the inner apex end of said orifice and the top end of a vertical passage extending longitudinally along the upper portion of said bore and formed as a recess extending downwardly in the wall surface of said upper bore,

a flexible hollow tube of substantially the same diameter as said upper bore with one end of the tube tightly and sealingly engaged within said upper bore portion in communication with the air passage and the lower end of the tube resting in said sump,

and means for restricting the motion of said plug within said neck opening between the spray discharge and sealing positions.

8. A squeeze-spray bottle dispensing package as defined in claim **7** wherein

the wall of said neck opening is pierced by an opening in the same plane as said spray orifice,

said plug has transverse projections extending outwardly therefrom above and below said opening to engage the surfaces of said container at points faced outwardly from said neck opening and prevent vertical motion of the plug within the neck opening while allowing axial motion therein,

and said plug and container neck have an abutment and partially peripherally extending groove arrangement in which said abutment engages the ends of said groove at the spray discharge and the sealing positions, respectively, to restrict axial motion of said plug within said neck opening.

References Cited by the Examiner

UNITED STATES PATENTS

2,534,139	12/1950	McLaughlin	222—545
2,642,313	6/1953	Montenier	239—327 X
2,758,879	8/1956	Anderson	222—211 X
2,924,393	2/1960	Robert	239—327
2,961,169	11/1960	Nyden	222—211 X

FOREIGN PATENTS

918,555	2/1963	Great Britain.
951,447	3/1964	Great Britain.

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