Nov. 30, 1965 N. J. SMALLEY 3,220,044

LIQUID APPLICATOR

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FIG. 1

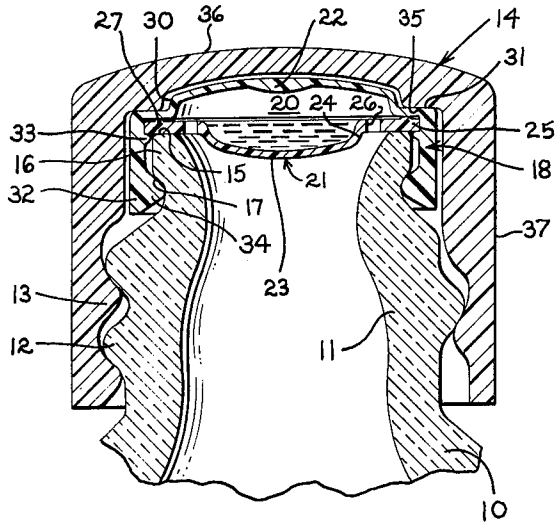
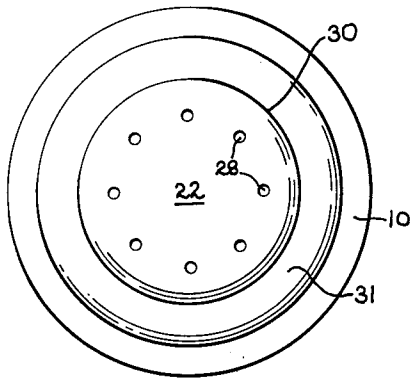


FIG. 2



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LIQUID APPLICATOR

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12 Claims. (Cl. 15—565)

My invention relates to liquid applicators and more particularly to that class of applicators particularly designed for use in applying thin films of liquid deodorants, lotions, etc., directly to the human body.

An important object of my invention is the provision of an applicator fitment which is readily attachable to the mouth of a liquid container and which forms an apertured reservoir housing a supply of liquid segregated from the main body, ready for immediate application, upon inversion of the container.

A further object of my invention is the provision of an applicator of the above character wherein the reservoir is constructed to incorporate an apertured resilient dome-like diaphragm which is flexed incident to use of the applicator to thereby subject the liquid in the reservoir to pressure and insure positive desired feeding of the liquid through the apertures.

It is also an object of my invention to provide a liquid applicator composed of a minimum number of essential elements, all so designed as to be capable of easy rapid assembling and attachment to a liquid container mouth.

Moreover, it is an object of my invention to provide a liquid applicator wherein the principal elements may be assembled in the manufacturing plant and shipped as a unit to the packer, ready for easy rapid "snap-fitting" over the container necks.

These and other objects of this invention will become more apparent from a reading of the following detailed description taken in conjunction with the drawings wherein:

FIGURE 1 is an enlarged fragmentary sectional view showing my applicator attached to a bottle neck; and

FIGURE 2 is a top plan view of the applicator of FIGURE 1 with the closure cap removed to reveal the diaphragm portion.

In the illustrated embodiment of my invention, it is associated with a conventional liquid container, such as a glass bottle **10**, including a neck **11** rising from the body (not shown) and preferably formed with external screwthreads **12** designed for holding engagement with similar threads **13** of a closure cap **14**. Obviously, lugs or equivalent holding means may be used in lieu of the screwthreads. Near the flat rim-end **15** of the neck **11** is an external annular bead **16** or rib, providing a generally downwardly facing shoulder **17**, or abutment for holding engagement with a portion of the liquid applicator **18**.

This liquid applicator **18** comprises an apertured axially compressible reservoir **20** comprising a relatively stiff or rigid inner basin-like wall **21** and an outer resilient dome-like diaphragm **22** which is axially movable under pressure applied to it incident to normal use of the applicator. Both the wall **21** and diaphragm **22** are apertured to the end that liquid may flow into and out of the reservoir as will be apparent presently.

The inner wall **21** is a disk-like element including a shallow cup, or basin-like central portion **23**. The annular peripheral wall **24** of this cup portion merges with a flat radially outwardly extending supporting flange **25** which rests upon the flat rim **15** of the container neck **11**. This flange is provided with a plurality of relatively large apertures **26** through which liquid may readily flow back

and forth between the container proper and the reservoir **20**. Also this flange extends radially outward slightly beyond the bead **16** for reasons to be explained and may well include an annular upstanding sealing bead **27** on its upper side for contact with a part of the resilient diaphragm **22**. Both the wall **21** and diaphragm **22** preferably are formed of polyethylene, the wall **21** being of high density plastic material to impart a degree of rigidity to it and the diaphragm **22** being of low density material and therefore having the resilience required. This diaphragm **22** also is somewhat thinner than the wall **21** so as to be quite easily flexed.

The diaphragm **22** is generally dome-shaped and provided with a plurality of relatively small liquid discharge apertures **28**. The diameter of this diaphragm is such that it overlies the apertures **26** in the flange **25**, thereby to allow free flow of liquid into the reservoir. A depending annular wall **30** at the periphery of the diaphragm **22** merges with the inner margin of a radially outwardly extending flange **31** which directly overlies the aforementioned radial flange **25** of the inner wall **21** of the reservoir **20**. An attaching skirt **32** depends from the outer margin of the flange **31** and internally is provided with a relatively small annular bead **33** near said flange **31** functioning to effectively hold the two reservoir elements assembled and ready for easy attachment to a liquid container. Near the lower edge of the attaching skirt **32** is an internal annular holding rib **34** which is intended to firmly engage the abutment **17** of the container neck to thereby secure the parts assembled. The flange **31**, bead **33** and rib **34** are relatively positioned to insure reliable assembly of the reservoir elements so that they remain assembled, as intended and to securely affix the applicator to the container that no leakage of liquid can occur, irrespective of the various positions assumed by the container. This latter results from the unique form and relationship of the radial flanges **31** and **25**, together with the sealing bead **27**, all of which are firmly interengaged by reason of the rib **34** pressing against the abutment **17** and as a result exert a strong axially downward pull upon the flange **31** of the diaphragm **22**.

It will be apparent that even before initial use, the reservoir basin **23** undoubtedly will be filled with liquid, such resulting from position changes during handling, shipment, etc. Thus the reservoir initially contains an adequate supply of the liquid to insure immediate flow through the diaphragm apertures incident to first inversion of the container and contact of the diaphragm with the body or other surface. Flexing of the diaphragm **22** resulting from pressing it against the body, subjects the liquid in the reservoir to pressure which positively discharges it through all of the apertures. Thus, while some of the liquid may be returned to the container, there will be an adequate amount forced through the apertures in the diaphragm to the exterior surface of the latter for application to the body surface. With reinversion of the container there will be a flow-back of some of the liquid from the reservoir to the container but a substantial quantity will remain in the basin for immediate use on the succeeding application.

To further insure against liquid leakage, the closure cap **14** is provided with an annular downwardly facing shoulder **35** substantially at the point of juncture of the panel **36** or top portion and the attaching skirt **37**. With complete application of the closure cap, it is evident that substantial downward pressure will be exerted against the marginal portions of the applicator, thereby firmly interengaging these portions and preventing passage of liquid between them.

It will be apparent from a reading of the foregoing description that modifications may be resorted to without

departing from the spirit and scope of this invention which is to be limited only by the following claims.

I claim:

1. A liquid applicator attachable to the mouth of a container, comprising a reservoir having a disk-like wall forming a central basin, a radially outwardly extending supporting flange encircling the basin in a plane near the free end of an upstanding side wall of the basin, said flange having liquid flow apertures; an axially resilient dome-like diaphragm provided with liquid dispensing apertures, said diaphragm spaced from the aforementioned wall with its concave side facing the open side of the basin; means interconnecting and creating a liquid-tight seal between marginal portions of the diaphragm and said supporting flange, and means for attaching the applicator to a container.

2. A liquid applicator according to claim 1 wherein the interconnecting means comprise an annular attaching skirt connected to marginal portions of the diaphragm and encircling the supporting flange, said skirt having an internal radial protuberance positioned to engage a peripheral part of the flange.

3. A liquid applicator according to claim 1 wherein the interconnecting means comprises a radially outwardly directed annular flange at the periphery of the diaphragm overlying the supporting flange of said wall, an annular depending attaching skirt at the outer margin of said annular flange, and an internal protuberance on the skirt holding the wall and diaphragm assembled.

4. The combination according to claim 3 wherein the means connecting the diaphragm wall and attaching skirt is a radially outwardly directed annular flange positioned parallel to and in liquid sealing contact with that part of the disk-like wall resting upon the container neck.

5. The combination according to claim 4 wherein the wall thickness of the diaphragm is less than that of the disk-like wall and the apertures in the diaphragm are smaller than those in said disk-like wall.

6. A liquid applicator according to claim 1, wherein the disk-like wall and diaphragm are formed of polyethylene.

7. A liquid applicator according to claim 1 wherein the diaphragm and wall connecting means includes an annular dome-defining wall in a plane radially outwardly

of the apertures in said supporting flange, a radially outwardly extending flange integral with the latter wall and overlying the supporting flange, and a depending attaching skirt integral with the flange on said diaphragm, said skirt encircling the supporting flange and means internally of the skirt for holding engagement with the flange of said diaphragm.

8. A liquid applicator according to claim 1 wherein the wall and diaphragm are formed of polyethylene and the apertures in the latter are smaller than those in the supporting flange.

9. In combination, a liquid container having a mouth-defining neck formed with an annular external rib near the mouth providing a generally downwardly facing abutment, a liquid applicator closing said mouth comprising a reservoir having a disk-like wall resting upon the neck and formed with a central basin depending into said mouth, said wall having liquid flow apertures about the basin; an axially resilient diaphragm of dome-like contour spaced axially outwardly from said wall and coaxial therewith, said diaphragm having liquid discharge apertures therein, and an annular peripheral wall depending immediately over the margin of the disk-like wall, and means for engaginng the flanged margin of the diaphragm and said disk-like wall.

10. The combination according to claim 9, wherein the disk-like wall and diaphragm are formed of polyethylene and a depending attaching skirt is connected to the peripheral wall and is provided internally with holding means engageable with the disk-like wall to retain the diaphragm and disk-like wall assembled.

11. The combination according to claim 9 wherein a closure cap encloses the container mouth and applicator, said closure cap having means for applying compressive pressure to the marginal portions of the diaphragm and disk-like wall.

12. The combination according to claim 11 wherein said means is a downwardly facing annular shoulder formed internally of the closure cap.

No references cited.

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