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ROLLER APPLICATOR SUPPORTING MEANS

Filed March 9, 1961

3 Sheets-Sheet 1

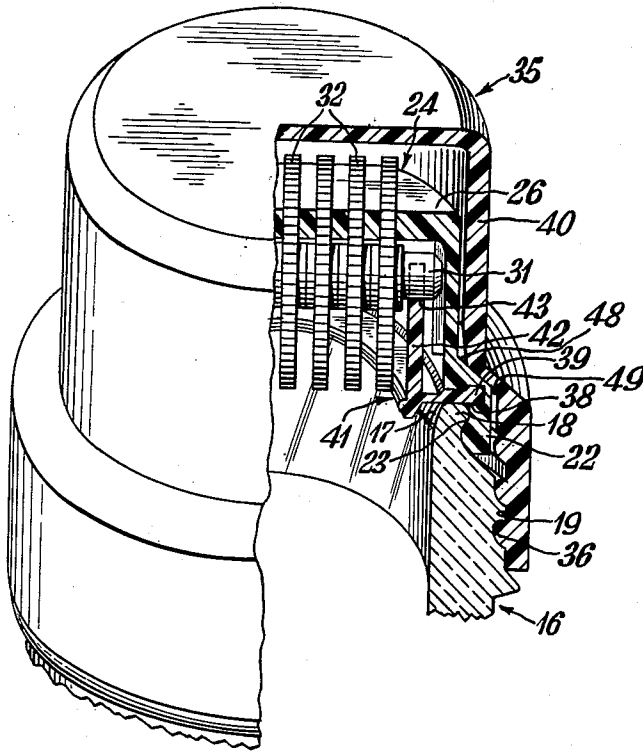


Fig. 1.

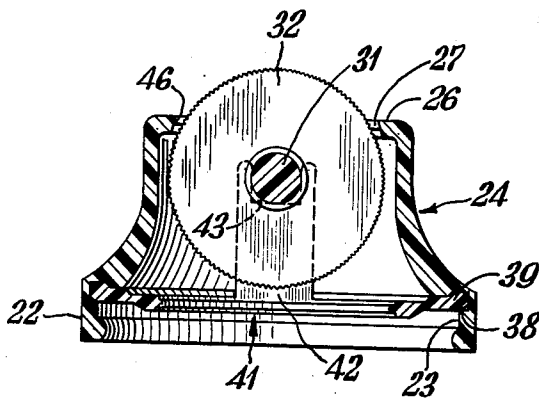


Fig. 2.

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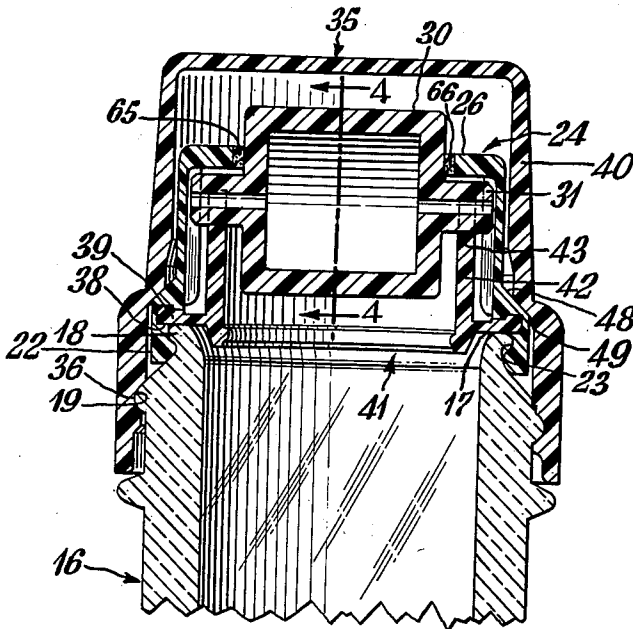


Fig. 3.

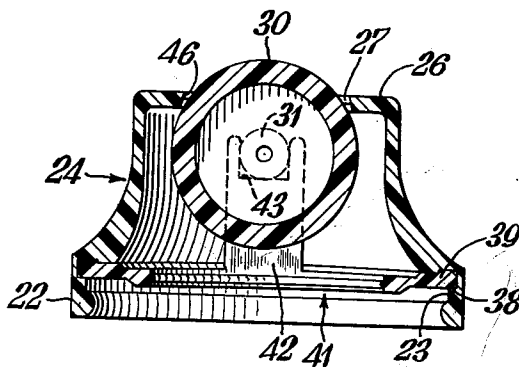


Fig. 4.

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Fig. 7.

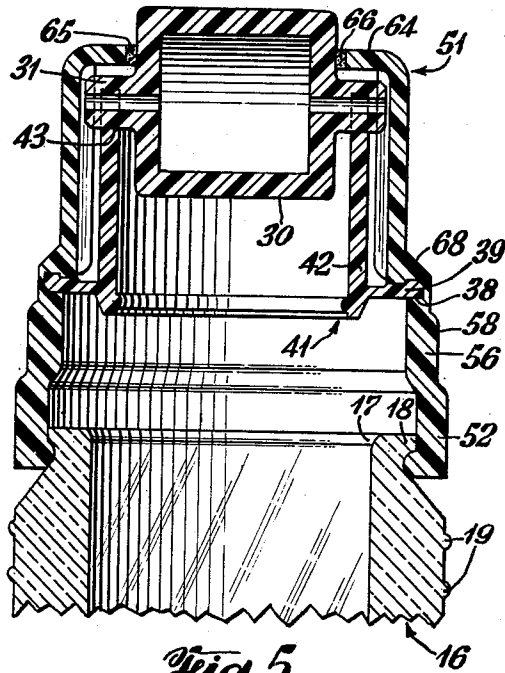
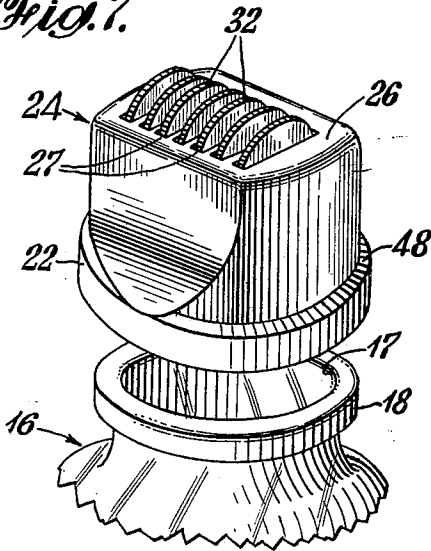


Fig. 6.

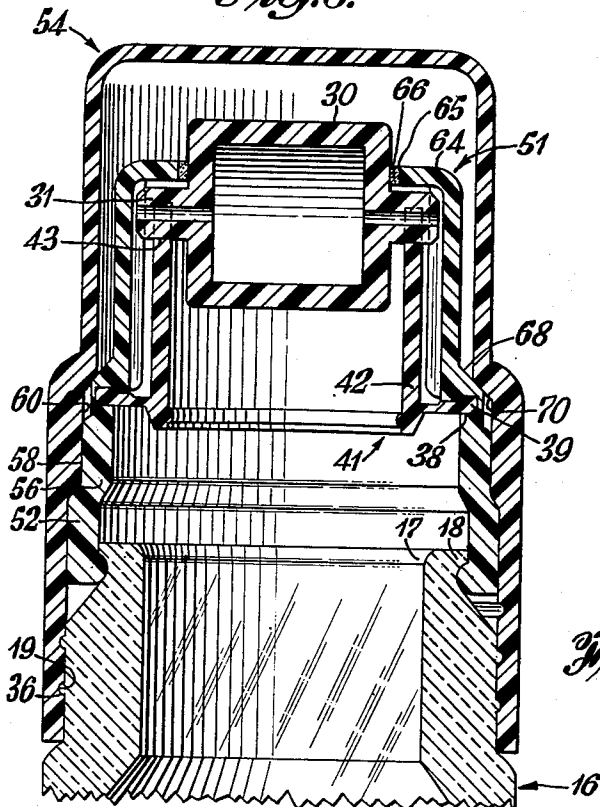


Fig. 5.

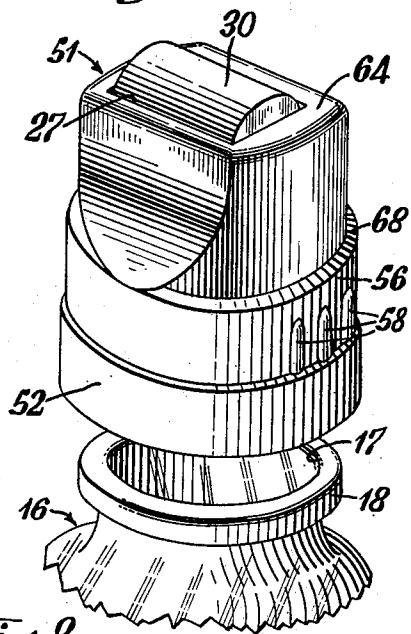


Fig. 8.

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3,083,397

ROLLER APPLICATOR SUPPORTING MEANS
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 Company, New York, N.Y., a corporation of Delaware
 Filed Mar. 9, 1961, Ser. No. 94,600
 8 Claims. (Cl. 15—574)

The present invention pertains to fluid dispensing containers having a rotatable applicator top and more particularly to a mounting assembly therefor and means for resiliently supporting and sealing the rotatable applicator within the container mouth.

Fluid dispensing containers utilizing a spherical ball usually have the ball supported within the mouth of the container by an annular ring encompassing a lower minor portion of the ball or by a series of projections bearing on a lower portion of the ball. Substantially identical means as used for supporting a spherical ball are employed for other types of rotatable applicators such as discs or elongated cylinders, or these non-spherical applicators may be supported by an axial shaft forming part of a supporting assembly for the non-spherical applicator. However, the prior art dispensers, and particularly those utilizing a non-spherical applicator supported by an axial shaft, often suffer from a number of shortcomings. Illustratively, such prior art dispensers do not have effective sealing means or are difficult to seal; the roller is susceptible of binding within the dispensing opening; they require a plurality of machined parts; they require a plurality of balanced springs; or they are supported by substantially unyielding or nonresilient means.

It is an object of the invention to provide a roller dispenser applicator which can be easily and effectively sealed to prevent escape of even the most mobile fluids from the dispenser.

It is another object of the invention to provide supporting means of a roller applicator and particularly for a non-spherical roller which does not require a multiplicity of machined parts or balanced springs, and which greatly eliminates binding of the roller.

In accordance with the foregoing objects, the present invention generally comprises a container having a fluid reservoir and a flanged open end. A resilient casing or closure comprising a hollow, sleeve-like member is provided having an open, lower annular extremity for removable attachment to the flange of the container. The other, upper or outer extremity of the casing member has a closed diaphragm provided with at least one dispensing opening. The casing has an inner transverse annular groove above the extremity attached to the container. A resilient annular washer carrying an upstanding yoke is attached within this annular groove to the casing. The washer has a thickened outer rim. An axial shaft concentrically supporting the rotatable member is mounted on the yoke with a minor portion of the rotatable member extending through the opening and projecting therebeyond. Rotation of the roller permits liquid to be transferred through the dispensing opening to the exterior of the container for ready application after the portion of the roller within the casing member has been contacted with the liquid. The walls of the resilient casing are provided externally thereof with cammable surfaces. A cap relatively rigid as compared to the resilient casing is adapted for removable attachment to the container adjacent the open end thereof. The cap is provided internally with camming surfaces for engagement with the cammable surfaces whereby, when the cap is secured to the container, the walls of the resilient casing are deformed. Deformation of the casing causes a deformation of the outer rim of the washer downwardly, which in turn produces an upward motion of the inner washer rim and associated yoke, shaft and roller into a tight sealing en-

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gagement with the walls of the dispensing opening to prevent escape of fluid from the container. The dispensing opening is smaller than the roller, permitting an upper minor portion of the roller to project therethrough. The walls defining the casing opening form a seal with the roller when the latter is moved upwardly and wedged within the opening. The outline of the dispensing opening conforms to that of a minor portion of the roller so that an effective seal is produced.

The invention will now be described in more detail with reference to the appended drawings wherein identical numerals refer to identical parts and wherein:

FIG. 1 is a partly cut away perspective view of the applying end of an assembled fluid dispenser and cap;

FIG. 2 is a cross sectional elevation of the applying end of the dispenser of FIG. 1 with the cap removed;

FIG. 3 is a cross sectional elevation of a dispenser carrying an elongated cylindrical roller with a cap attached thereto;

FIG. 4 is a cross sectional elevation taken on the lines 4—4 of FIG. 3;

FIG. 5 is a cross sectional elevation of a modified means for sealing and supporting the roller dispenser;

FIG. 6 is a cross sectional elevation of the dispenser of FIG. 5 with a cap attached thereto in sealing position.

FIG. 7 is a perspective view of the applying end of the dispenser of FIG. 1 with the cap removed therefrom; and

FIG. 8 is a perspective view of the applying end of the dispenser of FIG. 5 with the cap removed therefrom.

Referring now to the drawings and particularly to FIGS. 1—4 and 7. The dispenser comprises generally a container 16 forming a liquid reservoir. The container 16 is provided with an open end 17 having a flange 18 extending about the periphery thereof and with exterior screw threads 19.

A closure member or casing 24 is provided having an open, lower, ring-like portion 22 provided interiorly thereof with a groove 23 for engagement with the container flange 18. The closure member is also provided with an upper portion comprising a generally elliptical head which is closed by a web or diaphragm 26 provided with at least one dispensing opening 27.

The closure member 24 is provided about the interior walls thereof with a second groove 38 for reception of a rim 39 of an annular washer designated generally by the numeral 41. The washer 41 bears opposed upright posts or yoke 42 having U-shaped upper extremities defining bearing sockets 43 for the reception therein of the ends of the shaft 31. The washer 41 may comprise a single molded or otherwise fabricated piece of suitable material which preferably is constructed of the same resiliently deformable material from which the closure member 24 is constructed. The closure member is provided with beveled shoulders 48 constituting cammable means on the exterior walls thereof above ring 22. Liquid is dispensed from the dispensers of FIGS. 1—4 and 7 in the same manner as in all the embodiments of the invention namely, by contacting the portion of the roller within the casing with liquid from the container 16 and then simply rolling the rotatable applicator over the material to which it is desired to apply the liquid.

Cooperating with the closure 24 in the sealed position is a cap 35. The cap 35 is constructed of material relatively rigid compared to the resilient material of the closure member and comprises a skirt 40 provided, near the open end, with interior threads 36 for engagement with the threads 19 on the container 16. The interior of the cap 35 is further provided with a camming or inclined surface 49.

In sealing the dispensers of FIGS. 1—4 and 7, the cap 35 is attached to the container by cooperation of cap

screw threads 36 with container threads 19. Coaction between closure shoulders 48 and cap inclined surface 49 produces a downward component of force exerted on the outer rim of the washer 41. An annular portion of said washer 41, inwardly of its outer diameter, bears against the flange 18. The component of force exerted outwardly of the outer diameter of the container flange 18 causes that portion of the washer to be tilted downwardly. This in turn causes the inner portion of the washer rim and associated yoke 42 and shaft 31 to be thrust upwardly and to wedge the peripheries of the rotatable disc or discs against the arcuate surfaces 46 of openings 27 to seal the container. In addition to the upward thrust of the inner washer rim and associated parts, the casing 24 is displaced downwardly by the camming action thus aiding in the formation of the seal.

In the modification of FIGS. 5, 6 and 8 the washer 41 is spaced from the open end of the container 16 by means of an elongated lower portion 52 of the closure member 51. Opposed walls 56 of the latter have a cammable surface such as protuberant ridges 58. The cover cap 54 is provided with camming means in the form of a depending skirt 60 engageable with protuberances 58 to deform the lower portions of the walls 52 inwardly and tilting the outer portion of the washer 41 downwardly to again thrust the inner rim of the washer and associated yoke 42 and roller 30 upwardly into wedging sealing engagement with the diaphragm 64 to seal the dispensing opening. The inner rim moves upwardly upon the downward flexing of the outer rim in following the corresponding arc formed by flexing the outer rim downwardly. Deformation of the closure walls 52 is aided by casing cammable surface 68 being pressed downwardly and inwardly by cap camming surface 70.

In the various embodiments of the invention the size of the dispensing opening is smaller than that of the roller and the configuration of both the opening and roller cooperate to provide a tight seal when the roller is wedged within the opening.

Fluid dispensers constructed in accordance with the foregoing embodiments are especially useful in their ability to dispense and to apply to surfaces relatively large amounts of fluid and are also desirable because of the large quantity of fluid held in reserve on the large surface area of the discs and accessible for instant application.

When using an elongated cylindrical roller as in FIG. 5, fluid can be prevented from escaping from the container past flat end walls 65 of the cylinder by mounting between the walls and the shorter sides of the opening 27 a sealing strip or gasket 66 by suitable means such as by the use of adhesives. Alternatively, the opening and the cylindrical applicator may be dimensioned so that there is a tight fit between end walls 65 resulting in a wiping action between these parts upon rotation of the roller.

The fluid dispensing applicators constructed in accordance with the invention may be made in any desired size and may be used to dispense materials of a wide variety such as fluid cosmetics, medicaments, inks, adhesives, etc. In those instances where it is desired to use the dispenser applicator without the cap and where the fluid to be dispensed is relatively volatile, it is desirable to maintain the end walls of the closure member in a normally biased or inwardly deformed position whereby the rotatable applicator, whether this takes the form of a plurality of discs or a single continuous roller, is maintained in a tight sealing engagement with the walls of the opening in the diaphragm. Such biasing may be accomplished, for example, by mounting suitable spring means (not shown) about the closure member. Alternatively, the resilient member may be molded in such a manner that when the applicator is mounted therein, it is normally held in sealing engagement with the opening in the diaphragm. In operation, pressure of the surface

to which fluid is to be applied against the applicator forces the same inwardly of the container against the bias exerted by the end walls of the resilient closure member thereby opening the spaces between the applicator and the diaphragm sufficiently to permit fluid to be transferred through the aperture by the applicator.

The applicator of the various embodiments herein described may be constructed of any suitable material but is preferably of a moldable plastic material such as polyethylene.

It is understood that the foregoing description is merely illustrative of the principles of the invention and that modifications within the capacity of one skilled in the art are to be included within the scope of the invention.

This application is a continuation-in-part of my co-pending application, Serial No. 756,772, filed August 25, 1958, now abandoned.

What is claimed is:

1. A fluid dispensing applicator comprising a container having a neck and mouth at one end, a resiliently deformable, hollow casing having a lower circular extremity for removable attachment to the mouth of the container and adapted for sealing contact with the neck of the container, the top end of said casing axially opposite said neck sealing end having an opening therein, said casing having an inner annular groove above the lower circular extremity, a resilient annular washer held within said casing groove and attached to the casing within said groove, opposed upright posts having vertically elongated bearing sockets at their extremity integrally mounted on said washer adjacent the inner washer rim, a shaft mounted within the post bearing sockets, rotatable applicator means having a substantially circular cross section mounted concentrically upon said shaft, an outer minor portion of said rotatable applicator means protruding through the top casing opening, outer opposed cammable means on said casing below the casing annular groove in a vertical plane with the opposed upstanding posts, and a removable hollow cap having an inner camming surface engaging said opposed cammable surfaces and urging the shaft and rotatable applicator means upwardly into sealing engagement with the top casing opening.

2. The applicator of claim 1 wherein the rotatable applicator means are substantially cylindrical.

3. A fluid dispensing applicator comprising an upright container having an upper open end terminating in an annular flange, a hollow, resiliently deformable closure member having its lower extremity attached about said open end and the upper extremity of said closure member provided with a diaphragm having an opening therein, rotatable applicator means having a substantially circular cross-section and having a minor portion extending through said opening and projecting therebeyond and uniformly spaced from the edges of said opening to define fluid dispensing spaces, a resilient annular washer in said closure member, said washer having its outer rim attached to said closure member in a horizontal plane above the lower closure member extremity, an annular portion of said washer inwardly of its outer diameter adjacent the container flange, opposed upright posts having bearing sockets at their extremity integrally mounted on said washer adjacent the inner washer rim, a shaft mounted within the post bearing sockets, said shaft concentrically supporting the rotatable applicator means, outer opposed cammable surfaces on said closure member, and a removable hollow cap having an inner camming surface engaging said opposed cammable surfaces to produce a downward component of force on said cammable surfaces and the washer outwardly of that portion bearing against the container flange, whereby that portion of the washer outwardly of the container flange is forced downwardly and the inner portion of the washer is flexed upwardly in relation to the outer washer rim urging the shaft and rotatable applicator means up-

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wardly into sealing engagement with the diaphragm opening.

4. The fluid dispensing applicator of claim 3 wherein the closure member has an inner annular groove above the lower extremity and said washer is attached to said closure member within the closure member groove.

5. A fluid dispensing applicator comprising a container having an open end, a hollow, resiliently deformable casing attached about said open end, said casing provided with an opening therein outwardly of the container open end, a resilient annular washer in said casing intermediate the container open end and the casing opening, opposed posts mounted on said washer adjacent the inner washer rim extending from the washer toward the casing opening, the outer rim of said washer attached about an internal circumference of said casing substantially transversely to the opposed posts, applicator means mounted on said posts and supported thereby, an outer minor portion of said applicator means protruding through the casing opening, outer opposed cammable surfaces on said casing for urging said outer washer rim toward the container, means for abutting against the washer opposite the side of the washer having the opposed posts on which the applicator means are mounted and inwardly of the outer washer rim, and a removable hollow cap having an inner camming surface engaging said opposed cammable surfaces to produce a downward component of force on said cammable surfaces and outer washer rim while the washer inwardly of the outer rim abuts said abutable means to flex said outer washer rim downwardly, and flex the inner rim upwardly in relation to the outer

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washer rim, said flexing causing the posts and applicator means to move toward the casing opening to close said casing opening.

6. The applicator of claim 5 wherein the upright posts are integrally mounted on the washer, said posts having bearing sockets at their extremity, a shaft mounted within the post bearing sockets, the applicator means having a substantially circular cross section, said applicator means mounted concentrically on said shaft.

7. The applicator of claim 5 wherein the casing has an inner annular groove outwardly of the container open end, and the washer is attached to said casing within the casing groove.

8. The applicator of claim 5 wherein the casing opening is axially of the container open end.

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