Jan. 16, 1962 S. D. HULSH 3,016,561

SQUEEZABLE TUBE DISPENSER CONSTRUCTION

Filed Sept. 4, 1959

Fig. 1

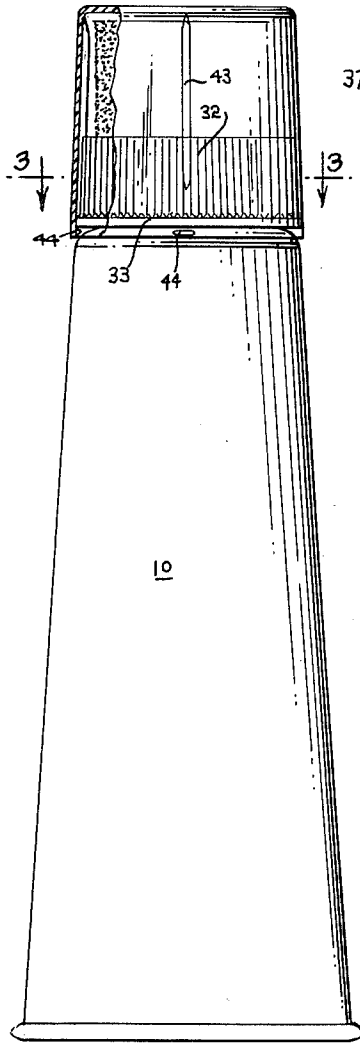


Fig. 2

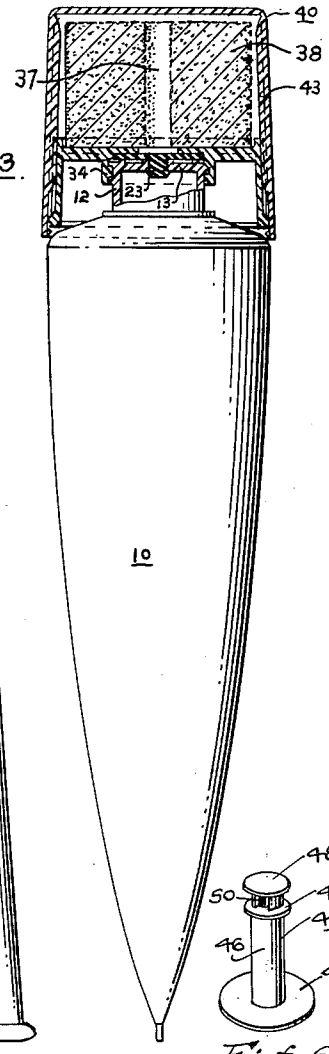


Fig. 4

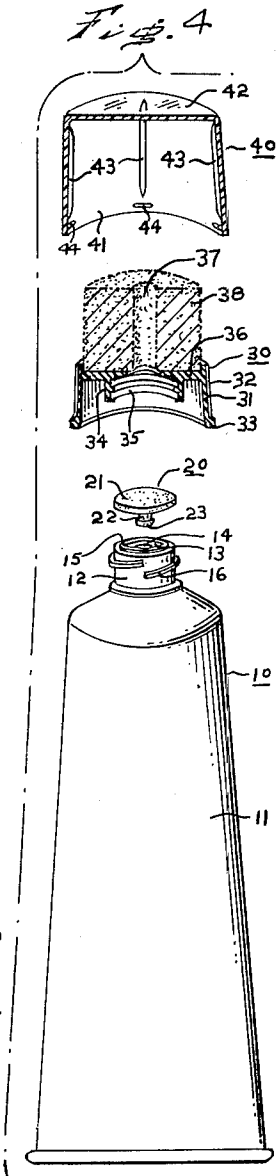
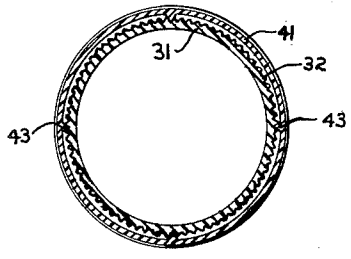


Fig. 6.

Fig. 3



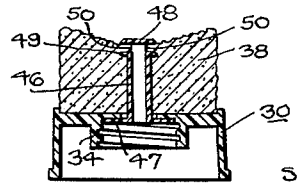


Fig. 5.

INVENTOR
SHELDON DAVID HULSH
BY
ATTORNEY

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SQUEEZABLE TUBE DISPENSER CONSTRUCTION

Sheldon David Hulsh, 530 Park Ave., New York, N.Y.

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This invention relates generally to squeezable tube dispensers, and more particularly to a type of squeezable dispenser which provides not only the function of dispensing but also serves at the same time as an applicator device, this application being a continuation-in-part of my co-pending application, Serial No. 813,025, filed May 13, 1959, now abandoned.

In the past, squeezable dispensers have been known which served as containers for a variety of substances which could be dispensed from the container by deformation of the container walls, resulting in the expressing of the container contents through an aperture. Such containers almost universally include merely an aperture and a closure cap of one type or another for sealing the container when not used. Such containers are of very limited use for applications other than the mere dispensing of some substance such as tooth paste or certain types of food products as for example jellies or soft cheeses.

My invention differs from the foregoing types of squeezable dispensers in that it is not only a dispenser of a contained substance but also serves as an applicator of that substance, as for example a container and applicator for an oven-cleaning composition. Oven-cleaning compositions, of course, in themselves are not new, but such cleaners are generally dispensed and applied by means of brushing or spraying. The brush type applicator is generally very messy to work with, whereas the spray-on or aerosol type utilizes a relatively expensive type of packaging, together with the fact that there is frequently a substantial wastage of the cleaner due to the inability of completely exhausting the contents of the aerosol container. Moreover, both the brush type oven cleaner and the spray-on type present a substantial health hazard because of the generally toxic nature of oven-cleaner substances.

The spray-on type of oven cleaner pollutes the air by causing the dispersion of relatively fine particles of the toxic cleaner material into the air during the spraying operation, such dispersed particles being inhalable by the user of the oven cleaner. The brush applied oven cleaners are used by dipping the brush into a screw capped can which tends to become loaded on the exterior of the can neck with the cleaner material, and hence foul the screw cap thread so that it becomes very difficult to reopen such a can once the closure cap has been replaced. The threads, of course, cannot be flushed with running water in the generally recommended manner since the water will also flow into the can and dilute or render useless the cleaner material contained therein.

Accordingly, it is a primary object of my invention to provide a novel squeezable dispenser in the form of a single self-contained unit which is easy to work with, inexpensive to manufacture and readily cleanable for ease of subsequent use.

Another object of my invention is to provide a novel squeezable dispenser device including a protective cover for the applicator head which simultaneously performs the function of a high leverage wrenching device permitting very tight closure of the dispenser against the possibility of opening by small children but which also allows the container to be readily opened by a person of normal adult strength.

Still another and important object of the present invention is to provide a simple and effective means for quick-detachably securing a sponge type applicator to the closure cap of squeezable dispenser, which means serves also

to distribute the contents of the dispenser to the body of the applicator sponge. By thus detachably securing the applicator sponge to the dispenser closure cap, the sponge may be removed at will to clean and recondition it after each use of the dispenser.

A still further object of the invention is to provide the dispenser cap with a sponge anchoring element which not only removably secures the sponge in operative position upon the cap, but also serves as a conduit for distribution of the dispenser contents into the sponge body in a direction radially outward from its center, thereby precluding any possibility of the material being expressed out of the container in the form of a free jet or spray.

The foregoing and other objects of my invention will become apparent from a careful reading of the following specification when taken in conjunction with the appended drawings, wherein:

FIGURE 1 is a front elevational view of a squeezable tube type dispensing applicator according to my invention with the applicator cover partially fragmented away to reveal certain details of the cooperative interaction between the cover and applicator cap;

FIGURE 2 is a side elevational view of the dispensing applicator seen in FIGURE 1 with the applicator cap, applicator cover, sealer plug, and a portion of the tube neck shown in section to reveal pertinent details of the assembly;

FIGURE 3 is a cross-sectional view through the applicator cap and cover as seen when viewed along the lines 3—3 of FIGURE 1 showing the interlock arrangement between the cap and cover;

FIGURE 4 is an exploded perspective view of the dispensing applicator construction which shows the applicator cap and its cover each in section;

FIGURE 5 is a transverse sectional view showing a modified construction of the cap and applicator sponge assembly; and

FIGURE 6 is a perspective view of the fitment employed in the modification of FIGURE 5 for delivering the material expressed from the container to the applicator sponge and for securing the latter upon the applicator cap.

In the several figures, like elements are denoted by like reference characters.

Referring now to the figures, and principally and primarily to FIGURE 4 and FIGURE 2, it will be seen that the dispensing applicator according to the invention comprises essentially four separable parts. These parts are, a deformable dispensing container **10**, a sealer plug **20** adapted to be disposed within a top aperture within the container **10**, a closure cap **30** screwably secured to the neck of the container **10**, and a cover **40** which serves not only to enclose the cap **30** but also as an effective means for securing and removing the cap to and from the container.

The container **10** includes a main body portion **11** surmounted at its top by a neck portion **12** formed with a spiral exterior thread **16**. The neck **12** is partially closed by a top wall **13** having a central aperture **14** therein, a circular ridge **15** being formed on the surface of the top wall **13**. The sealer cap **20** includes a flat disc-like portion **21** having a centrally depending stem **22**, the bottom of which stem **22** is formed with a flanged-out portion **23** of somewhat larger diameter than the stem. The stem **22** may be of substantially the same diameter as the aperture **14** in the top wall **13** of the neck **12** surmounting the dispenser body **11**, so that the sealer plug **20** when forced downward will interfit with the neck portion **12** in such a way that the stem **22** is disposed within the aperture **14** and the flange **23** is projected into the neck **12** through the top wall **13**. In such an engaged condition, the flat-disc portion **21** of the sealer plug **20** is

seated on the neck with its underside in engagement with the circumferentially extending ridge 15 rising from the top wall 13 of the neck 12. The engaged condition of the sealer plug 20 with the container 10 may be best seen in the showing of FIGURE 2 where it should be noted that the upper surface of the flange 23 on the sealer plug 20 engages the undersurface of the top wall 13 of the neck 12 so that the aperture 14 is effectively sealed.

The container cap 30 includes a pair of concentric cylindrical formations 31 and 34 formed unitarily and secured together by an annular disc top wall 36. The inside surface of the cylindrical formation 34 includes a circumferentially extending thread 35 formed complementally to the thread 16 on the exterior of the neck 12 so that the cap 30 may be screwed downwardly into firm seating engagement on the neck 12 of the container 10. The outer cylindrical formation 31 extends upwardly for a short distance above the top wall 36 so as to form a well for receiving a cylindrical sponge applicator 38, the bottom end of which may be cemented, as shown in FIGURES 2 and 4, to the upper surface of the top wall 36. The sponge applicator 38 contains an axially extending bore or through-hole 37 concentric with the hole in the annular top wall 36 so that a channel or passageway is formed extending from the top surface of the sponge applicator 38 downward into the interior of the cap, whereby it will be appreciated that when the sealer plug 20 is physically removed from engagement with the neck 12 of the container 10 the contents of the container may be expressed outward into the bore 37 for lateral distribution therefrom into and through the applicator sponge 38.

The bottom of the outer cylindrical formation 31 of the container cap 30 is flared or skirted outward as at 33 and, as will be subsequently seen, provides a lip for anchoring the applicator cover 40 to prevent the latter from falling off of the applicator cap at undesirable times. Finally, the outer cylindrical formation 31 is formed on its exterior surface with a plurality of vertically extending ridges 32 which may best be seen in the showings of FIGURES 1 and 3, and whose function will be also subsequently explained. As best seen in FIGURE 2, when the cap 30 is screwed downwardly onto the neck 12 of the container 10, and when the sealer plug 20 is disposed as shown therein, the top wall 36 of the cap 30 presses down upon the flat-disc 21 of the sealer plug 20 and hence forces the latter into circumferential sealing engagement with the ridge 15 formed on the top wall 13 of the neck 12. When the cap 30 and sealer plug 20 are assembled with the neck 12 in the manner illustrated in FIGURE 2, it is clear that squeezing pressure exerted on the body 11 of the container 10 will not result in the expressing of any of the container contents. This is so for two reasons.

Firstly, squeezing pressure applied to the body of the container 10 and tending to express the contents thereof out through the aperture 14 in the top wall 13, causes the flange 23 of the sealer plug 20 to press firmly upward against the underside of the top wall 13 and hence valve shut the aperture 14. Secondly, the sealer plug 20 is further restrained from moving outward through the aperture 14 because the disc 21 is peripherally clamped between the undersurface of the top wall 36 of the cap 30 and the ridge 15 formed on the top wall 13 of the neck 12 as aforedescribed. Hence, it is not possible to inadvertently or deliberately express the contents of the container when the sealer plug 20 is assembled into the dispenser as shown in FIGURE 2. Apart from avoiding wastage of material, the sealer plug 20 when so engaged, prevents the container contents from expressing to any degree and thereby precludes the sponge applicator 38 and the threads 16 and 35 from becoming fouled with the material from the container. The avoidance of such fouling is important since it avoids bonding of the applicator cap to the neck of the container proper and also prevents the sponge applicator 38 from becoming hard and stiff due to loading of the air spaces therein, which would render the sponge unusable in a very short time.

Referring again to FIGURE 4, the outer cover 40 is seen to be a hollow cylindrical formation closed at its top end and open at the bottom. Formed on the inside cylindrical surface 41 are a plurality of vertically extending inwardly projecting ridges 43 adapted to fit into the troughs between the ridges 32 formed on the exterior surface of the applicator cap 30 outer cylindrical formation 31. This interfitting relationship is best seen in the showings of FIGURES 1 and 3. Also formed on the inside surface 41 of the cover 40, are a plurality of inwardly extending horizontally disposed ridges 44. When the cover 40 is slipped downwardly over the cap 30, the ridges 44 pass downwardly and somewhat beyond the bottom edge of the skirt 33 formed on the bottom of the cylindrical formation 31 and latch thereunder. This latching arrangement is illustrated in the showings of FIGURES 1 and 2.

The container 10 and sealer plug 20 are preferably, although not necessarily, formed of a relatively pliable plastic material, whereas the cover 40 and cap 30 are preferably formed of a somewhat stiffer material, such as a hard plastic. The applicator sponge 38 may be made from any spongy material, foamed plastic being one satisfactory substance. The various physical parts of the dispensing applicator assembly may, of course, be made in various colors to present an attractive merchandising package, and the several parts may be transparent, translucent or opaque, according to the desired visual appearance.

In lieu of cementing the applicator sponge 38 to the cap 30, as shown in FIGURES 2 and 4, the sponge may be quick-detachably secured to the cap by means of an anchoring element 45 (FIGURES 5 and 6) in the form of a tube 46 which is provided with an annular flange 47 at its bottom end and which may be closed off at its upper end by a disc 48 of a diameter somewhat greater than that of the tube itself and of the central bore 37 of the sponge 38. Also provided upon the tube 46 in closely spaced relation to the end-closure disc 48 is an annular flange 49 of a diameter approximately equal to that of the disc to thereby, in effect, provide the tube at its upper end with a pair of axially spaced flanges.

The wall portion of the tube 46 extending between the axially spaced end-closure disc 48 and the flange 49 is provided with diametrically opposed apertures 50—50 which serve as discharge ports for the material expressed from the container body 11 into the applicator sponge 38. The sponge anchoring element 45 and all of its parts as just described is preferably formed as an integral unit of metal, plastic or any other suitable material.

As most clearly appears in FIGURE 5, the element 45 is mounted upon the cap 30 with the tube portion 46 thereof projecting above and the bottom flange 47 centered within the internally threaded central formation 34 of the cap in flatwise engagement with the centrally apertured top wall thereof, in which position the tube 46 is in axial alinement with the central aperture 14 of the neck portion 12 of the container 10. The external diameter of the tube 46 is such that it is adapted to fit snugly within the central bore 37 of the sponge 38 and when the sponge is pressed on to the freely projecting portion of the tube, as shown in FIGURE 5, the axially spaced flanged portions at the top end of the tube engage the sponge to hold it securely to the cap member. It will be understood, of course, that the inherent resiliency of the sponge permits the flanged top portion of the tube to be projected upwardly through the central bore of the tube and that when the sponge is locked to the cap by the tubular anchor 45 the central portion of the sponge is slightly compressed and so exerts an axial thrust between the cap 30 and the outer flanged portions of the anchoring element to maintain the sponge seated upon the cap as shown.

Also, it will be noted that when the sponge-fitted cap

is secured to the container 10 (with the sealer plug 20 removed as hereinbefore described), the bottom flange 47 of the sponge anchoring element 45 is securely clamped between the cap 30 and the neck portion 12 of the container and thus maintains the element 45 in rigid position as a supporting post for the sponge and as a conduit for the delivery to the sponge of material expressed from the container. It will be noted further that the laterally presenting discharge ports 50—50 of the sponge anchoring element 45 are substantially embraced by the sponge and insure that the material expressed from the container is discharged laterally on to the sponge for uniform application of the material over the outer surface of the sponge. When the outer end of the element 45 is sealed off, as by the imperforate disc 48, there is no possibility for the contents of the container to be freely jetted or sprayed axially out of the container discharge head, thus materially reducing the likelihood of injury to a person or object against which the container contents might have been inadvertently directed. The sponge-mounting arrangement as shown in FIGURES 5 and 6 is thus preferable for use in dispensing materials which for safety reasons should not be expressed from the container in the form of a freely projecting spray. However, in certain instances it may not be objectionable to provide for axial discharge of the material from the sponge-supporting tube 45 and in such case the outer end of the tube may be open, or adapted to be opened, for free discharge therefrom of the material expressed from the container. In any event, the sponge 38 is removably secured upon the tube 45 by a flange, such as that designated 49, integrally formed upon the tube.

When purchased, the dispensing applicator with its contents will generally appear as seen in FIGURE 1. In order to use the dispensing applicator, as for example when cleaning an oven, the outer cover 40 is rotated until the cap 30 is loosened, a wrenching action being provided by the interlock between the vertically extending ridges 43 formed on the inner surface of the applicator cover 40 and the ridges 32 formed on the external surface of the applicator cap 30. Having loosened the cap 30, the cover 40 may be disengaged therefrom by providing an axial pull which causes the ridges 44 formed on the inside of the cover 40 to ride outward and upward over the skirt 33 formed at the bottom of the cap 30. The cap 30 and the sponge 38, as an assembly, may then be readily unscrewed from the container to reveal the sealer plug 20 which may in turn be disengaged from the container neck 12 by grasping the edge of the disc 21 and pulling upward to thereby cause the flange 23 on the stem 22 to deform the aperture 14 and ride outward therethrough.

The cap and sponge assembly is now replaced by screwing it down upon the neck 12 and the dispenser is ready for use. By squeezing the body 11 of the container 10, the contents thereof are expressed outward through the now open top aperture 14 and outward onto the applicator sponge 38 via its bore 37 in the construction shown in FIGURE 2 or the tube 45 in the modified construction shown in FIGURE 5. Of course, the diameter of the bore 37 of the sponge 38 (as well as that of the bore through the tube 45) should be determined in accordance with the consistency of the container contents, larger diameters being suitable for paste and viscous substances and smaller diameters being more suitable for less viscous substances.

After completion of the cleaning operation, the cover 40 may be slipped downwardly over the cap 30 and locked thereto by means of the ridges 44 formed on the inside surface of the cover 40, and the assembly of cap and sponge may then be unscrewed from the container 10 and removed therefrom. The sealer plug 20 may then be replaced in the neck 12 of the container 10 and the neck area may be flushed under running water to remove all traces of the container contents and leave a clear exterior. The cap and sponge assembly, still locked within the cover 40 by means of which it was unscrewed and removed from the container 10, may now be screwed onto the neck 12 and the cover 40 removed as before. The inside of the cover 40 and the applicator sponge and cap 30 may now be also flushed in running water to thoroughly cleanse them.

If desired, the cap 30 may again be unscrewed from the neck 12 and its inside surfaces flushed with running water together with a second flushing of the neck 12. This last mentioned flushing operation is generally not necessary but when practiced insures absolute cleanliness of all of the parts of the dispensing applicator. Finally, the cap 30 may be once again screwed downwardly onto the container 10, the cover 40 slipped down over the cap 30 and locked thereto, and the cover 40 rotated to securely and tightly fasten the cap 30 onto the neck 12 and compress the sealer plug 20 as aforedescribed.

Having now described my invention in conjunction with a particularly illustrated embodiment thereof, and realizing that various modifications and variations thereof will naturally occur to those persons normally skilled in the art without departing from the essential spirit or scope of my invention, it is my intention to claim the same broadly as well as specifically as indicated by the appended claims.

What is claimed as new and useful is:

1. A dispensing applicator container comprising, a deformable container having a top wall-apertured externally-threaded neck portion, a removable and replaceable sealer plug disposed partly within the aperture of said neck portion and effective to seal said aperture against escape of the container contents therethrough, an applicator cap having an apertured top wall and depending from the underside thereof an internally-threaded portion threaded complementally to the said externally-threaded neck portion, said internally-threaded portion being substantially concentric with the aperture in said applicator cap top wall and the aperture in said neck portion top wall when said cap is screwably engaged with said container neck portion, said sealer plug being clamped between said container neck top wall and the underside of said applicator cap top wall when said sealer plug is disposed within the aperture of said neck portion and said cap is screwably engaged with said container neck portion, an absorbent applicator element secured to the upper surface of said applicator cap top wall and including an opening therethrough substantially concentric with the aperture in said cap top wall, an applicator cover, and interlock means partly associated with said cover and partly associated with said applicator cap for detachably fixedly securing said cover to said cap and said cap to said container neck, whereby said cap may be screwably engaged with said container neck portion by rotation of said cover in one direction and disengaged therefrom for removal and replacement of said sealer plug by rotation of said cover in the counter direction, said interlock means including first means for locking said cover and cap against relative rotation in either direction as said cap is screwably engaged and disengaged from said container neck portion, and second means for opposing axial shifting of said cover relative to said cap.

2. The dispensing applicator container according to claim 1 wherein said interlock means for detachably fixedly securing said cover to said cap includes means for locking said cover and cap against relative rotation as said cap is screwably engaged and disengaged from said container neck portion comprising, a plurality of ridges formed on the cap exterior and oriented substantially parallel to the axis of cap rotation, and at least one complementally shaped and parallel oriented ridge formed on the cover interior, said cover ridge being disposed between a pair of adjacent ridges on the cap when said cover is slipped down over said applicator and cap.

3. The dispensing applicator container according to claim 1 wherein said interlock means for detachably fixedly securing said cover to said cap includes means for opposing axial shifting of said cover relative to said cap comprising, a circumferentially extending ridge formed on the cap exterior and oriented substantially perpendicular to the axis of cap rotation, and at least one ridge oriented parallel to the cap circumferentially extending ridge formed on the cover interior, said circumferentially extending cap ridge being disposed between said cover parallel ridge and said cap top wall when said cover is slipped down over said applicator into locking engagement with said cap.

4. The dispensing applicator container according to claim 1 wherein said sealer plug comprises a flat disc top portion having a stem depending centrally and substantially perpendicularly therefrom, said stem terminating at its lower end in a flange projecting radially circumferentially therefrom, said sealer plug stem being of substantially the same cross-sectional shape and area as the aperture in said neck portion top wall and being of a length approximately equal to the thickness of the neck portion top wall, said sealer plug stem portion being disposed within said neck aperture with said flange and said disc portions respectively closely underlying and overlying said neck portion top wall.

5. The dispensing applicator container according to claim 4 wherein said neck portion top wall includes a ridge rising therefrom and extending in a closed loop including therewithin the top wall aperture, said sealer plug disc extends radially outward from said stem a sufficient distance to everywhere overlie said ridge, and the applicator cap top wall overlies that portion of said disc which overlies said ridge when said cap is screwably engaged with said neck portion, whereby said disc is clampable between said ridge and said cap.

6. The dispensing applicator container according to claim 1 wherein said first means comprises a plurality of ridges formed on the cap exterior and oriented substantially parallel to the axis of cap rotation, and at least one complementally shaped and parallel oriented ridge formed on the cover interior, said cover ridge being disposed between a pair of adjacent ridges on the cap when said cover is slipped down over said applicator and cap, and wherein said second means comprises a circumferentially extending ridge formed on the cap exterior and oriented substantially perpendicular to the axis of cap rotation, and at least one ridge oriented parallel to the cap circumferentially extending ridge formed on the cover interior, said circumferentially extending cap ridge being disposed between said cover parallel ridge and said cap top wall when said cover is slipped down over said applicator into locking engagement with said cap.

7. The dispensing applicator container according to claim 5 wherein said interlock means for detachably fixedly securing said cover to said cap includes means for locking said cover and cap against relative rotation as said cap is screwably engaged and disengaged from said container neck portion comprising, a plurality of ridges formed on the cap exterior and oriented substantially parallel to the axis of cap rotation, and at least one complementally shaped and parallel oriented ridge formed on the cover interior, said cover ridge being disposed between a pair of adjacent ridges on the cap when said cover is slipped down over said applicator and cap.

8. The dispensing applicator container according to claim 5 wherein said interlock means for detachably fixedly securing said cover to said cap includes means for opposing axial shifting of said cover relative to said cap comprising, a circumferentially extending ridge formed on the cap exterior and oriented substantially perpendicular to the axis of cap rotation, and at least one ridge oriented parallel to the cap circumferentially extending ridge formed on the cover interior, said circumferentially extending cap ridge being disposed between said cover parallel ridge and said cap top wall when said cover is slipped down over said applicator into locking engagement with said cap.

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