Jan. 4, 1966 P. H. SAGARIN 3,227,321

HAND-HELD AEROSOL DEVICE

Original Filed Nov. 15, 1961 2 Sheets-Sheet 1

Fig. 1

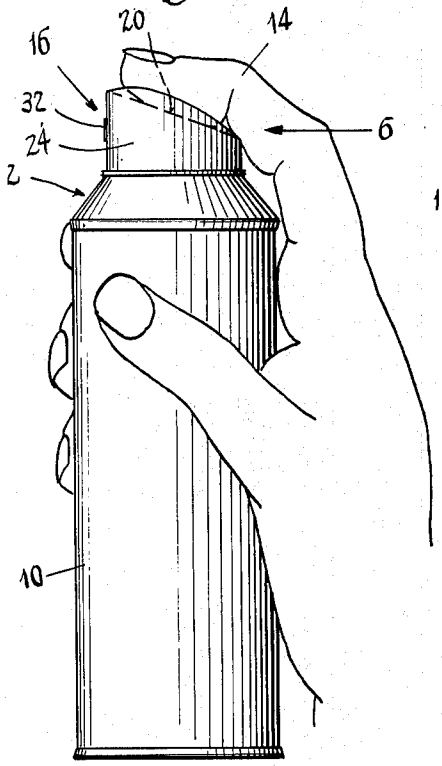


Fig. 2

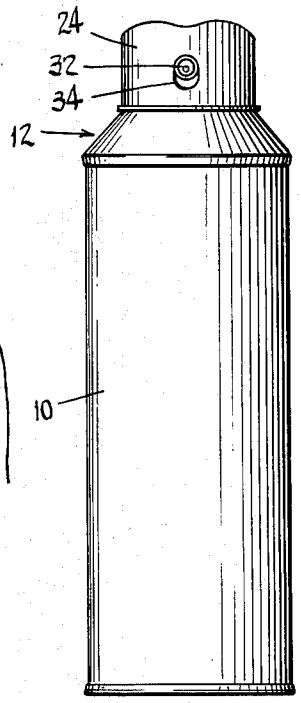


Fig. 3

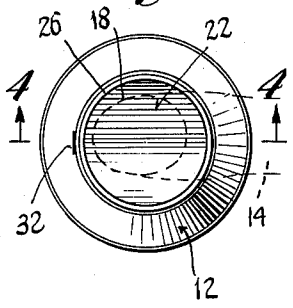


Fig. 6

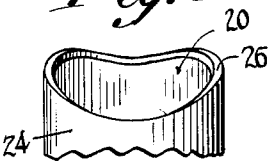


Fig. 4

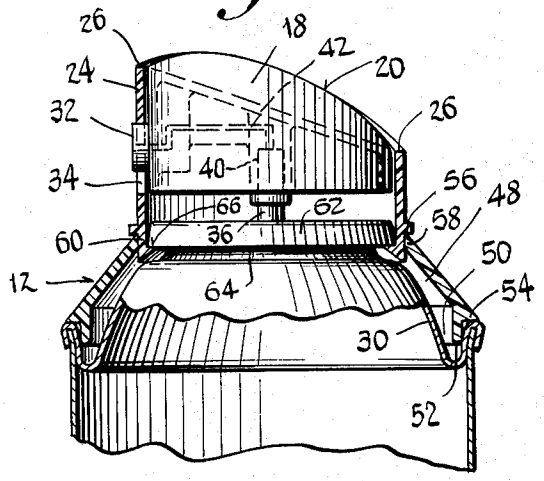
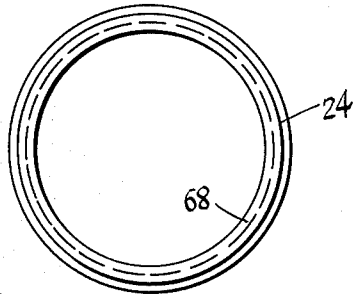


Fig. 5



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HAND-HELD AEROSOL DEVICE

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Fig. 7

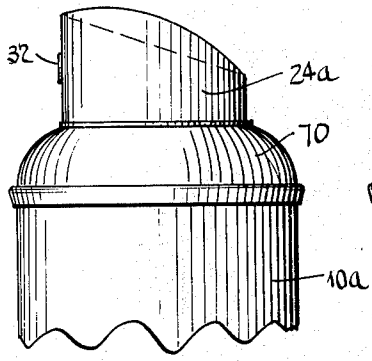


Fig. 8

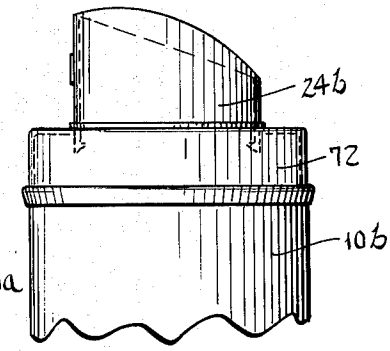


Fig. 10

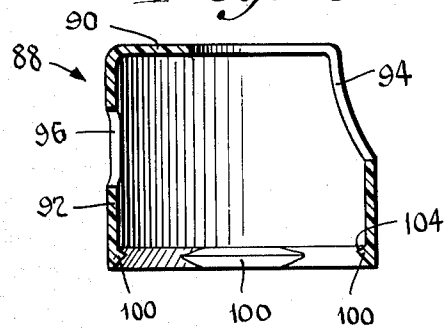


Fig. 9

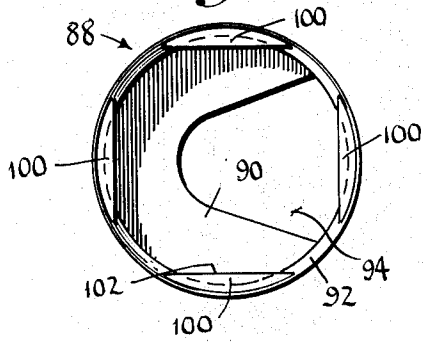


Fig. 11

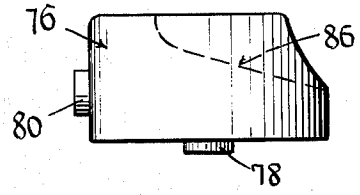
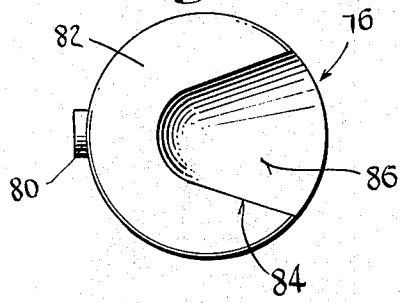


Fig. 12



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3,227,321

HAND-HELD AEROSOL DEVICE

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Continuation of application Ser. No. 152,472, Nov. 15, 1961. This application Apr. 21, 1964, Ser. No. 363,056
7 Claims. (Cl. 222—182)

This invention relates to aerosol devices, and more particularly to small hand-held devices of the type which employ pressurized containers.

The present application is a continuation of my copending application Serial No. 152,472, filed November 15, 1961 and entitled "Hand-Held Aerosol Device."

Aerosol devices of the kind referred to are also disclosed and claimed in my copending application Serial No. 143,165 filed October 5, 1961 and entitled "Hand-Held Aerosol Device."

An object of the invention is to provide a novel and improved pressurized device of the kind referred to, which is especially easy and simple to hold and operate in the proper and required manner, and particularly with one hand, and to provide in such a device an improved jumbo, guard-type cap construction which is surprisingly easy to operate.

This is accomplished, in accordance with the invention, by the provision of a novel jumbo-size cap structure having an expansive sloping top depress button surface surrounded by a large-diameter, thin or narrow sloping stationary wall edge of a cap body, enabling the operating finger to most easily actuate or depress the button with a simple and natural movement.

Another object of the invention is to provide an improved aerosol device as above set forth, which while small enough to be easily and comfortably held, still has a relatively large capacity.

A further object of the invention is to provide an improved aerosol device in accordance with the foregoing, wherein the cap construction involves relatively small or simple parts and components having a small actual mass yet presenting a massive, large or jumbo appearance while retaining functional reliability and operativeness.

A feature of the invention resides in the provision of an aerosol device as characterized, which readily lends itself to a fabrication involving molded plastic pieces whereby various attractive color combinations, finishes, etc. may be readily and economically obtained.

Another feature of the invention resides in the provision of a multi-part molded plastic cap construction, in an aerosol device as above set forth, wherein the various components may be assembled to and securely retained on the pressurized container by quick, simple assembly operations, and wherein thin-walled relatively flexible parts are so constituted and arranged as to provide stiffness and mutual reinforcement together with an interlocking detent organization and anchorage which precludes failure, malfunctioning or disassembly of the cap at all times.

An additional object of the invention is to provide, in a pressurized aerosol device of the kind referred to, a lightweight, thin-walled jumbo guard cap construction wherein the cap proper may be easily and quickly assembled to the container yet will however be securely locked thereto against accidental removal, to such an extent that it may be removed only be splitting or otherwise rupturing or destroying the components.

A further feature of the invention resides in the provision of a novel guard cap and valve actuator button assemblage, wherein the actuator button while freely slidable in the guard cap is securely held captive therein by

a plurality of effective means including an expansive top wall of the cap.

Other features and advantages will hereinafter appear.

In the drawings accompanying this specification, similar characters of reference are used to designate like components throughout the several views, wherein:

FIG. 1 is a side elevational view of an aerosol device as provided by the invention, said device being held in the hand in readiness for operation.

FIG. 2 is a front elevational view of the aerosol device shown in FIG. 1.

FIG. 3 is a top plan view of the aerosol device of FIGS. 1 and 2.

FIG. 4 is an axial sectional view, taken on the line 4—4 of FIG. 3.

FIG. 5 is a bottom plan view of the tubular cap member of the cap construction of FIGS. 1–4.

FIG. 6 is a fragmentary rear elevational view of the cap construction of the device of FIGS. 1–5, looking in the direction of the arrow 6 of FIG. 1.

FIG. 7 is a fragmentary side elevational view of an aerosol device illustrating a modified form of cap construction.

FIG. 8 is a fragmentary side elevational view of an aerosol device illustrating yet another modified form of cap construction.

FIG. 9 is a bottom plan view of a guard cap as provided by the invention, representing still another embodiment thereof.

FIG. 10 is an axial sectional view of the guard cap shown in FIG. 9, taken on the line 10—10.

FIG. 11 is a side elevational view of the valve actuator button for use with the guard cap of FIGS. 9 and 10.

FIG. 12 is a top plan view of the button of FIG. 11.

Referring first to FIGS. 1–5, the improved aerosol device of the invention as illustrated therein comprises a pressurized container 10 which is of a size adapted to be conveniently held in the hand with the dispensing end 12 thereof uppermost and adjacent the forefinger. In this figure, the forefinger 14 of the hand holding the aerosol device is shown as applied to the top of the cap construction, in readiness for depressing the valve actuator button. It will be noted that the container 10 is of fairly large diameter while still enabling it to be comfortably held, and that it has appreciable length or height, extending a considerable distance below the hand whereby it may have appreciable capacity. The diameter of the container 10 is appreciably larger than the diameter of the cap construction 16 which is disposed on the dispensing end 12, and such cap construction is also of relatively large size, being herein also referred to as a "jumbo" type cap structure.

By the present invention, in conjunction with the container 10 as above described there is provided a novel and improved cap construction 16 by which the aerosol device is especially easy and simple to hold and operate with one hand, in the proper and required manner. It will be noted from FIG. 1 that when the container 10 is held in the manner indicated, the forefinger 14 of the hand extends naturally upward and forward at a small angle, and readily overlies the top surface of the cap construction 16.

Referring to FIG. 3, the said cap construction comprises a jumbo-size valve actuator button 18 of relatively large diameter, said button having a large or expansive, exposed and accessible top surface 20 which is larger than the ball portion of the average-sized forefinger as shown in FIG. 3, and which slopes downward at about the same angle as the forefinger 14. As seen in FIGS. 1 and 7, the top surface 20 of the valve actuator button 18 is made hollow or concave whereby it has a finger depres-

sion in it and naturally fits or accommodates the rounded, ball portion of the forefinger 14. Surrounding the actuator button 18 is a thin-walled guard cap and guide 24 having a thin wall edge 26 at its top which generally conforms to and is flush with the peripheral portions of the surface 20 and button 18. As seen in FIG. 4, the cap and guide 24 is generally cylindrical and its upper end is thin walled, with the top edge 26 roughly disposed in a transverse plane, or more properly in a cylindrical surface of resolution which is almost flat (having a large radius) and which extends transversely of the axis of the cap.

The thin nature and small total area of the stationary top edge 26 in conjunction with the overall sloped configuration of the cap top and the large or expansive exposed finger engageable area of the movable button 18 all contribute in making the present actuator especially and surpisingly easy to operate, as compared with actuators having flap tops and thick stationary rims at the peripheral portions of said tops. Thus the above structural details and their cooperable relationship as revealed in the drawings constitute an important feature of the present invention.

The dispensing end 12 of the container 10 is characterized by a sloping annular top shoulder 30 which is roughly in the form of a truncated cone, and which has substantially a slope of 45° or one-half of 90°. The sloping shoulder 30 is seen to be of appreciable width, and by virtue of this characteristic together with the slope, the cap construction 16 is disposed in a raised position with respect to the upper edge of the cylindrical side walls of the container 10. In other words, the shoulder 30 provides a raised mounting for the cap construction 16, as will be readily appreciated.

I have found that with the above organization and the structure as thus far described, the operation and use of the aerosol device is made especially easy and simple. The valve depress button 18 has a projecting and readily visible orifice member 32 disposed in an elongate opening or slot 34 in the cap proper 24, which in conjunction with the slope of the top surface 20 of the button and top edge 26 of the cap provides a virtually foolproof indicator means to apprise a user of the direction of the spray, and as to the method of grasping or orienting the aerosol device when it is being used. In conjunction with this, the size of the container 10, which is somewhat tall and not too broad or large in diameter, together with the raised mounting provided by the truncated conical shoulder 30 and the jumbo-size cap construction 16 with sloping top, and further including the large or expansive top surface 20 on the depress button 18 all contribute to provide a single and very important advantage and result, that of making the aerosol device especially easy and simple to operate with one hand, and foolproof as well.

It will be readily understood from an inspection of FIG. 1 that the operating hand has a natural position, and that the forefingers is in the best possible location to apply operating force to the depress button 18. Moreover, the expansive surface as provided on the button 18 does not require any special positioning of the forefinger 14, and while the top edge 26 of the cap 24 in conjunction with the hollow or concave top face of the button 18, constitutes an effective guard to prevent inadvertent actuation of the button, it does not interfere in the least with the finger action required to press the button. The word "expansive" is used herein as meaning "wide-extending," being intended to designate a relatively large size, in accordance with one of the dictionary definitions of the term. While no single one of the structural features set forth above is responsible by itself for the overall operation noted, each is important in the combination and contributes in an important manner to provide the desired end result.

As seen in FIG. 4, the push button 18 is carried by a valve stem 36 of the type normally provided on valve carrying closures, such as the closure indicated generally by the numeral 38 in this figure. The push button 18 as well as the cap 24 are preferably formed as molded plastic pieces, and the push button has a hollowed or cored underside, together with a depending hollow boss 40 to accommodate the valve stem 36. The button has a discharge channel illustrated in broken lines at 42, which communicates with the bore of the valve stem 36 and with the bore of the projecting orifice member 32, all as seen in FIG. 4. Preferably, the valve button 18 closely slidably fits in the cap member 24, and by virtue of the orifice member 32 occupying the slot 34 the button is held captive in the cap at all times, and prevented from being dislodged.

In accordance with the present invention, in conjunction with the cap construction 16 as described above there is further provided a novel dress and reinforcement collar 48 which, in the embodiment of FIGS. 1–6, has the shape of a frustum of a cone. The collar 48 may slope at an angle of approximately 45° as shown, and has a lower edge 50 which is disposed in a deep annular groove 52 at the peripheral portion of the annular top shoulder 30 of the container. The collar 48 preferably also has a shoulder 54 arranged to engage the outer top rim of the container, which rim corresponds to the outer peripheral edge of the shoulder 30.

For the purpose of retaining the collar 48 in its operative position shown, and to enable the reactive force of the collar to compress and more securely anchor the cap member 24 to the container, said member is provided with an annular bead or shoulder 56 (hereinafter also termed an "exterior shoulder means"), which is arranged for engagement with the upper edge 58 of the collar 48. Thus, securement of the cap 24 to the container will result in the collar 48 being held captive in the desired position, and if the collar 48 is held under compression in consequence of continual downward force on it by the cap 24 the said collar will in turn have a reactive force directed in such a manner as to have an inward radial component tending to reduce in diameter or compress the lower edge portion or rim 60 of the cap member 24.

There is also provided by the present invention an improved and effective detent and anchorage means, by which the tubular cap member 24 may be easily and quickly affixed to the dispensing end 12 of the container, and securely retained thereon. The said detent means operates in conjunction with an annular shoulder 62 of the valve-carrying closure 38, the said shoulder having a flat undersurface 64 as shown. For cooperation with the shoulder undersurface 64, the invention provides novel and effective detent means on the lower edge portion 60 of the cap member 24. The said detent means is characterized by a flat shoulder surface 66 provided on an annular internal detent bead 68 constituting a portion of the lower rim of the cap member 24. The detent bead 68 has a rounded bottom surface which is cooperable with a rounded upper surface of the detent shoulder 62 of the closure 38 at the time that the cap member 24 is being applied to the container. The cap member 24 is molded of a resilient plastic substance such as polyethylene or the like whereby it may be stretched, within limits, and will return to its initial shape. Thus, upon the cap member 24 being applied to the container, a wedging action will occur between the shoulder 62 on the container and the detent means 68 on the cap member, whereby the latter and the lower rim of the cap member will be spread apart momentarily, until the detent bead 68 completely passes the shoulder 62. Thereafter, the flat surfaces 66 and 64 of the bead and shoulder respectively will be engaged with each other, and by virtue of such surfaces lying substantially in a plane which is at right angles to the axis of the cap construction, secure retention of the cap member 24 will be had at all times. The bottom edge of the body member

24 engages the annular top shoulder 30 of the container, and by the above construction the body member is securely affixed to the container top portion. Further, the action of the collar 48 is such that at its top it reinforces or backs up the lower portion of the cap member 24, preventing the latter from spreading easily once it has attained its locking position. The relative dimensions and sizes are such that the collar 48 is preferably held under continual compression, whereby it exerts a reactive force having an inward, radially directed component on the lower portion of the cap member 24, thus tending to prevent spreading of such lower portion and resulting in a secure interlocking organization which precludes removal of the cap member under normal circumstance. Such removal may only be effected by destroying or permanently deforming the cap member, which is unlikely in the normal use of the device. In addition to the reinforcement or stiffening effected by the collar 48, the provision of the external shoulder 56 on the lower portion of the cap member 24 also results in a strengthening or stiffening effect, which likewise restricts expansion or stretching of the lower edge of the cap member, minimizes the likelihood of cracking, and makes the retention still more secure.

Another embodiment of the invention is illustrated in FIG. 7. In this figure there is provided a cap member 24*a* and a collar 70 which latter may, for example, be utilized in place of the frustoconical collar 48 of FIGS. 1–4. The collar 70 has a bulbous configuration, as would be obtained from a section or zone portion of a sphere. Aside from the bulbous shape, the collar 70 functions generally in the same manner as the collar 48, providing the same advantages.

By virtue of the cap construction being made with the separate components comprising the push button 18, the separate cap member 24 and the separate collar 48, these pieces when molded of plastic substances may have various colors, and the colors may be combined to provide striking and attractive combinations without involving complicated finishing, spraying or like operations.

Yet another embodiment of the invention is illustrated in FIG. 8, wherein there is provided a cap member 24*b* and a collar 72, the latter being interchangeable with the collar 48 of FIGS. 1–4. The collar 72 has the form of a shallow cup, with a large central circular opening in that one of the walls which normally is considered as the bottom of the cup.

The collars 70 and 72 engage the cap members 24*a* and 24*b* and the containers 10*a* and 10*b* respectively, and are retained in place in a manner similar to that explained above in connection with FIGS. 1–4.

Another type of cap construction as provided by the invention is illustrated in FIGS. 9, 10 and 11. This cap construction comprises a push button 76 having a central apertured boss 78 adapted to be press-fitted onto a valve stem such as the stem 36 shown in FIG. 4. The button 76 has an orifice member 80, and differs from the button 18 in having a flat top surface 82 which is normal to the axis of the button, and in having a substantially V-shaped, finger notch or groove 84 formed with a sloping bottom 86.

Cooperable with the button 76 is a cap member 88 having a transverse top wall 90 and cylindrical side walls 92, the said walls being provided with a cut-out or notch 94 (see FIGS. 9 and 10) adapted to conform to the finger notch 84 of the button 76. The cap member 88 has a slot 96 to accommodate the orifice member 80 of the button, as will be understood.

In accordance with the invention, the cap member 88 is provided with a novel detent construction comprising a plurality of detent ledges 100 which are preferably arranged in pairs. The ledges of each pair are disposed opposite each other, and have substantially straight inner edges 102 and flat upper surfaces 104, the latter being adapted to engage the flat undersurface of the container

collar, such as the undersurface 64 shown in FIG. 4. By virtue of the detent means being in the form of individual or separate ledges, there is incorporated more yieldability resulting in less likelihood of the detents becoming damaged or permanently distorted during attachment of the cap. Accordingly, an effective retention is had since the detent ledges resume their initial shapes when the cap is in place whereby the flat surfaces 104 are effective to securely lock the cap member 88 to the container.

The cap construction of FIGS. 9–12 has the same advantages as regards ease and simplicity of operation, as the cap construction of FIGS. 1–4, since there is presented to the forefinger a large formed or concave, finger-engageable surface by the depress button, which enables the said button to be readily actuated.

The aerosol structures as above set forth are seen to be simple and readily fabricated from molded plastic substance, as by molding in simple molds, and to be easily and quickly assembled. The components interact and cooperate to provide a practical and workable organization, and represent maximum and optimum functional convenience combined with economy and low cost.

Variations and modifications may be made within the scope of the claims, and portions of the improvements may be used without others.

I claim:

1. An actuator for an aerosol dispenser comprising, in combination:

(a) a jumbo size cylindrical valve actuator button disposed with its axis vertical, said button being adapted for connection to the depressible vertical valve stem of a pressurized aerosol container to actuate the same when the button is depressed,

(b) said button having an accessible top surface of substantial slope for engagement by the forefinger and of an area appreciably larger than the ball portion of an average-sized forefinger, and said button having on its side a discharge orifice disposed and spaced a substantial distance below the highest edge portion of the button whereby the spray from the orifice issues in a direction beyond the top slope, said spray at points adjacent the orifice being below the plane of the sloping top surface of the button,

(c) a guard cap and guide for said button, comprising a thin-walled cylindrical member surrounding and closely fitting the button, the lower end of said member being adapted for mounting on the pressurized container and the upper thin-walled end comprising a continuous ring-shaped guard means in the form of a sloping narrow edge of small total area, which is normally at all points along its periphery substantially flush with adjoining areas of the expansive top surface of the button, said top button surface and flush sloping narrow edge being characterized by an overall slope which is sufficient to unmistakably indicate direction by tactual sensation,

(d) said cap member having a fully exposed and accessible essentially cylindrical exterior which is only slightly larger in diameter than the button whereby the latter constitutes essentially the entire effective top surface of the assemblage of button and cap, said cap providing for free access to the top sloping surface of the button whereby the forefinger of the hand may extend in a natural, angularly disposed force-applying manner over the button to easily depress the same while at other times the said sloping narrow top of the cap at all points guards the button against accidental operation.

2. An aerosol dispenser as in claim 1, wherein:

(a) the top expansive surface of the button has a finger depression in it, the width of said depression being at least as great as the width of an average-sized forefinger,

(b) said flush sloping narrow edge of the cap conforming in contour to the finger depression of the button to supplement the tactual sensation of the actuator to the user.

3. An aerosol dispenser comprising, in combination:

(a) a container having an annular top shoulder of appreciable width, surrounding a valve-carrying closure,

(b) a guard cap and guide for a valve button, comprising a tubular member affixed to the container and disposed within the said annular top shoulder,

(c) said tubular member having a lower rim engaged with the container,

(d) an annular generally cup-shaped collar extending around and engaged with the lower edge of said tubular member, said collar overlying and engaging the top shoulder of the container and being also positioned by said cap whereby it is held captive between the cap and container,

(e) said container having a detent shoulder disposed within the tubular member,

(f) the lower rim of the tubular member having detent ledge means engaged with the detent shoulder of the container to retain the cap in place, and

(g) the said collar constituting an outer stiffening means for the tubular member, to more securely hold the detent ledge means against displacement and thus more securely retain the cap in place.

4. A dispenser as in claim 3, wherein:

(a) the collar is under continual compression due to force exerted on it by the tubular member,

(b) the collar is generally frusto-conical in configuration and as a consequence of the compression experienced by it, the collar provides a reactive force on the tubular member which tends to cause the lower rim to more tightly engage the detent shoulder of the container.

5. A dispenser as in claim 4, wherein:

(a) the annular top shoulder of the container has an annular, deep peripheral groove in which the lower edge of the collar is disposed.

6. A dispenser as in claim 5, wherein:

(a) the tubular member is cylindrical and has thin side wall, a thin top edge and a thin lower rim.

7. A dispenser as in claim 3, wherein:

(a) the exterior shoulder means comprises a continuous circular reinforcement and stiffening bead, and

(b) the said collar constitutes an outer stiffening means for the tubular member, said reinforcement and stiffening means tending to more securely hold the detent ledge means against displacement and thus more securely retain the cap in place.

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