Feb. 21, 1961 V. H. ROEHRICH 2,972,161

APPLICATOR DEVICES

Filed Sept. 24, 1956

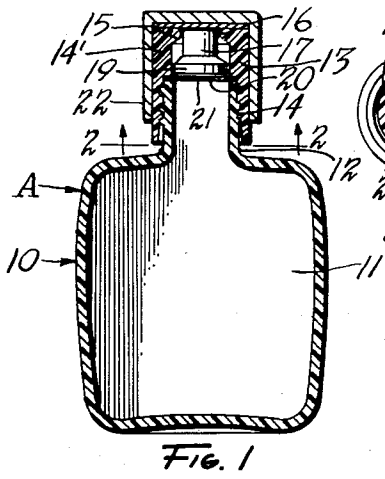



FIG. 1

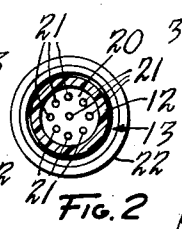



FIG. 2




FIG. 3

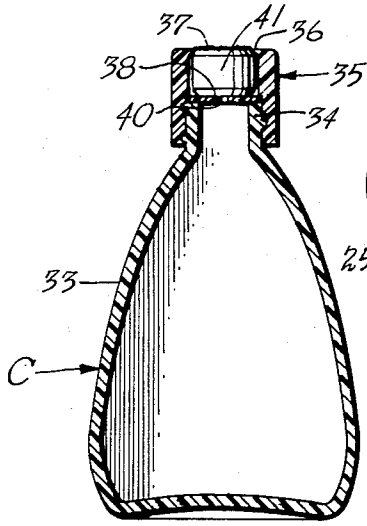



FIG. 5

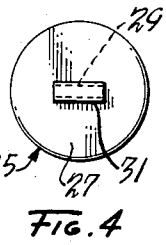



FIG. 4

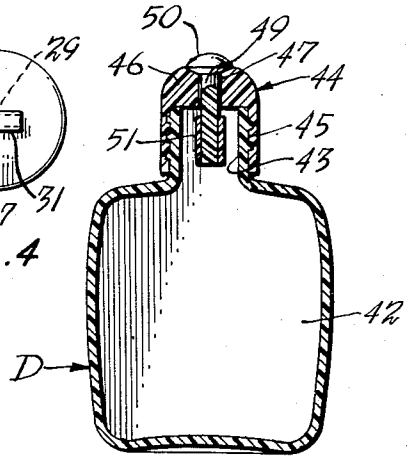



FIG. 6

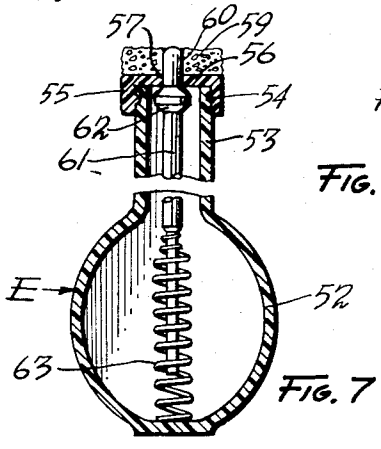



FIG. 7

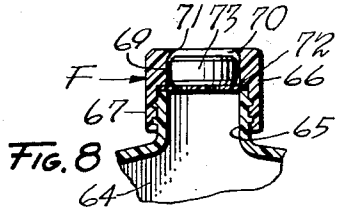



FIG. 8

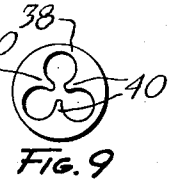



FIG. 9

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# APPLICATOR DEVICES

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4 Claims. (Cl. 15—543)

This invention relates to an improvement in applicator devices and deals particularly with an applicator useful in the dispensing of liquid and semi-solid materials.

In my previous Patent No. 2,625,159, issued January 13, 1953, I disclose an applicator suitable for the dispensing of liquid materials. The materials to be dispensed were almost of necessity flowable materials which were not too viscous to flow from the receptacle when it was tilted or overturned. The present dispenser is capable of dispensing creams, pastes, and other semi-solid materials and to provide a smooth even coating.

A feature of the present invention resides in the provision of a container of the "squeeze-bottle" type which are formed of a plastic material which is sufficiently resilient to permit the walls of the receptacle to be squeezed together sufficiently to force a portion of the contents through a discharge opening. While bottles of this type are in common use, it is often difficult to control the flow of material through the discharge opening. If the material to be dispensed is a true liquid such as a lotion, a perfume or cologne, a liquid deodorant or the like, pressing together the sides of the container has a tendency to force a stream or continuous spray of material from the discharge opening. If a thick, creamy material such as a paste dentifrice is used in a container of this type, there is a tendency for the slightly hardened material at the opening of the container to resist movement through the discharge opening but once the flow of material has started, it will issue in considerable quantity. It is this difficulty which the present invention avoids.

A feature of the present invention resides in the provision of an applicating device which includes a collapsible receptacle having a discharge opening, and having some type of plunger means in this opening which either seals or restricts this opening after the dispensing operation has started. As the plunger moves into position to seal the discharge opening when pressure is applied to the contents of the container, a predetermined amount of material is dispensed. If the plunger restricts the opening, the flow of material through the opening can still be controlled.

A feature of the present invention resides in the provision of a container of the type described having a discharge opening and having a plunger means which normally projects through the opening. When pressure is applied to the contents being dispensed, the plunger moves into position to either close or materially restrict the discharge opening. However, by pressing the outwardly projecting end of the plunger against the surface to which the material is to be applied, while still applying pressure to the bottle, the flow of material through the discharge opening may be effectively controlled. This structure is advantageous, as the movement of the plunger in the passage tends to keep the material from caking in the passage. In the event any hardening or caking of the product occurs, it may be loosened by tapping the plunger in a manner to break up this caked product.

These and other objects and novel features of the present invention will be more clearly and fully set forth in the following specification and claims.



In the drawings forming a part of the specification:

Figure 1 is a cross-sectional view through a closed container and applicator showing a form of construction thereof.

Figure 2 is a sectional view through the neck of the container, the position of the section being indicated by the line 2—2 of Figure 1.

Figure 3 is a cross-sectional view through a modified form of applicator construction.

Figure 4 is a top plan view of the cap portion of the applicator shown in Figure 3.

Figure 5 is a sectional view through another modified form of applicator construction.

Figure 6 is a sectional view through an additional modified form of applicator construction.

Figure 7 is a sectional view through another modified form of applicator construction.

Figure 8 is a sectional view through the upper portion of the preferred form of applicator.

Figure 9 is a plan view of a resilient washer of the type used in the construction of Figure 5.

The applicator illustrated in Figures 1 and 2 of the drawings is indicated in general by the letter A. This applicator includes a flexible resilient bottle **10** formed of plastic or the like, the bottle having an enlarged body portion **11** and an externally threaded neck **12**. A cap **13** is threaded onto the neck **12** of the bottle. The cap **13** includes an internally threaded sleeve or skirt **14** which is connected to an adjoining portion **14** of somewhat smaller internal diameter. The end **15** of the cap is partially closed but is provided with an axial aperture **16** extending therethrough.

A plunger **17** is slidable through the aperture **16**. The plunger **17** is provided with an enlarged diameter lower portion **19** which is of too large diameter to extend through the aperture **16**. The enlarged diameter portion **19** is freely slidable in the portion **14** of the cap and is sufficiently small so that the material within the body **11** of the bottle **10** may flow past it. Alternatively, the enlarged portion **19** may have grooves therein or apertures therethrough through which the bottle filling material may flow.

A shoulder is provided between the threaded portion **14** and the smaller diameter portion **14'** of the cap and a perforated plate **20** is interposed between the end of the bottle neck **12** and the smaller diameter cap portion **14'**. The plate **20** is shown in Figure 2 of the drawings as having a series of perforations **21** extending therethrough, although if preferred a single perforation can be employed. The perforated plate **20** acts to limit the slidable movement of the plunger **17** and holds this plunger extending partially through the aperture **15** in the cap.

A closure **22** is arranged to fit over the cap **13** and to enclose the same when the applicator is not in use. In the particular arrangement illustrated, the cap or closure **22** frictionally fits over the cap **13** although, if preferred, a threaded engagement could be provided.

When the body portion **11** of the bottle contains a liquid or a semi-solid material and pressure is applied to certain of the walls of this container, this pressure forces some of the material within the bottle through the perforated plate **20**. A measured amount of the material from the bottle will flow past the plunger and through the opening **16** before the plunger moves sufficiently so that the enlarged diameter end **19** thereof seals against the end **15** of the cap **13**. Thus each time pressure is applied to the walls of the bottle, a predetermined amount of the material to be dispensed passes through the opening **16**.

If it is desired to apply the product to a surface, such

as might be the case if a liquid or semi-solid deodorant were being applied to the surface of the skin, an even film of material can be spread upon the skin by applying pressure to the bottle and simultaneously pressing the end of the plunger 17 against the surface of the skin. When the plunger 17 is slightly retracted, the material from within the bottle can be dispensed about the plunger, this material being spread by the end of the plunger as the applicator is moved. When the pressure upon the plunger is increased, a slightly greater amount of the material will be dispensed. Thus the applicator may be used to apply a thin even film of a material on a surface such as the surface of the skin.

In Figures 3 and 4 of the drawings, I disclose a modified form of construction such as might be used in the application of a semi-solid material in a ribbon-like film. For example, this applicator may be used in the application of toothpaste to a toothbrush. The applicator is indicated in general by the letter B.

The applicator B includes a bottle-like body 23 having an externally threaded neck 24. The cap 25 fits on the neck 24 and includes an internally threaded sleeve 26 and an end closure 27. The cap is designed to be threaded upon the neck 24.

The cap closure 27 is provided with a generally rectangular slot 29 extending therethrough. This slot 29 is preferably arranged near the center of the cap and the cap is preferably made of a somewhat resilient plastic material such as polyethylene. A plunger 30 which is generally rectangular in cross section extends through the aperture 29 with sufficient play so that the material to be dispensed may pass the plunger in a desired amount when required. The plunger 30 is provided with an enlarged head 31 outwardly of the cap end 27 and is provided with an enlargement 32 within the cap. When the cap is formed of resilient plastic of the type described, the enlarged head end 31 of the plunger may be inserted through the aperture 29 by spreading the aperture temporarily. However, the enlargement 31 is of sufficient size so that the plunger will not accidentally come out of the aperture.

In operation, each time pressure is applied to the bottle body 23, a measured amount of the paste or other material is forced past the plunger 29 before the enlarged diameter portion 32 engages against the cap end 27. If a continuous flow of the material is desired, this may be accomplished by applying a slight inward pressure to the enlarged end 31 of the plunger 30. Thus by simultaneously applying pressure to the bottle body 23 and inward pressure to the plunger 30, the material may be dispensed.

Due to the flat form of the plunger 30, the material will issue in a flat stream or ribbon. If a differently shaped stream of material is desired, the plunger may be correspondingly shaped.

In Figure 5 of the drawings, a quite similar applicator C is illustrated. The applicator C includes a bottle-like body 33 having an externally threaded neck 34. The bottle body, similar to the bottle bodies 11 and 23, is made of a resilient plastic material so that the material within the bottle may be dispensed by applying a squeezing force to the walls of the body.

A cap 35 is internally threaded to accommodate the bottle neck 34. The cap 35 is provided with an end flange 36 having an aperture 37 therethrough which is preferably in the center of the cap.

A washer 38 of resilient material is mounted on the bottle neck 34 and held in place by a shoulder 39 of the cap 35. The washer 38 is made of resilient plastic or rubber like material and is cut to provide inwardly projecting fingers 40. A plunger 41 is generally cylindrical, having tapered or rounded ends. The outer, or upper, end of the plunger 41 is held against the flange 36 by the washer 38 to close the opening 37.

When inward pressure is exerted against the walls of the bottle body 33, the material within the bottle is urged against the plunger, sealing it against the flange 36. However, as the outer end of the plunger projects slightly beyond the end of the cap 35, the plunger may be retracted slightly under pressure, and some of the material within the bottle may flow past the plunger. When retracted, the outer end of the plunger is virtually flush with the end of the cap, thus forming a smooth surface for spreading the material dispensed. The interposition of the perforated washer also greatly aids in keeping viscous solutions directly under the discharge opening, so that solution, rather than air, can be discharged even when the bottle is in an upright position.

Figure 6 of the drawings shows a slightly different form of applicator D. The applicator D includes a bottle-like body 42 having an externally threaded neck 43. The bottle is preferably formed of flexible, resilient material. A cap 44 having an internally threaded sleeve 45 is mounted upon the neck 43.

The cap 44 is provided with an end closure 46 having a central aperture 47 extending therethrough. A plunger 49 extends through the opening 47 and is provided with an enlarged applicator end 50 thereupon. A sleeve 51 is pressed onto or is otherwise attached to the inner end of the plunger 49 to limit the outward movement of this plunger.

The operation of the applicator D is similar to the operation of the previously described applicators in that when pressure is applied to the body 42, a measured amount of material from the interior of the bottle body is dispensed before the aperture 47 is closed. The plunger fits freely enough in the aperture to permit the material to flow thereby. The amount of clearance or the difference in size between the plunger and its aperture is determined by the viscosity of the material to be dispensed and upon the amount of material which would normally be dispensed at a time.

In Figure 7 of the drawings a slightly different applicator E is illustrated. This applicator includes a hollow, resilient body 52 having a neck 53 thereupon the extremity of which is externally threaded as indicated at 54. A cap 55 is threaded on to the externally threaded neck portion 54 and includes an end closure 56 having an aperture 57 extending therethrough. In the particular arrangement illustrated, a porous water absorbent pad such as a disc of sponge or the like is indicated at 59 and is attached to the exterior surface of the plate 56. The pad 59 may have a central aperture 60 extending therethrough, this aperture registering with the previously described aperture 57. Instead of a sponge a fabric having a brush-like or pile texture may be employed.

The opening or aperture 60 may be omitted if the pad is made of sufficiently flexible porous material. The pad 59, if flexible, may extend over the outer end of the plunger and pressure may be transmitted to the plunger through the fabric. The operation is otherwise identical to that above described.

An applicator rod 61 is slidable within the bottle neck 53 and includes an enlargement 62 which is engageable against the inner surface of the cap closure 56 to normally close this opening. A spring 63 may be provided to normally urge the shoulder 62 into closed position.

The pad 59 is sufficiently compressible so that the plunger 61 will be retracted when the pad is pressed against a surface. For example, if the applicator is used to contain a liquid material which is to be applied to the surface of the skin, when pressure is applied to the bottle body 52 and when the pad 59 is slightly compressed, fluid will pass by the plunger and into the absorbent pad, from which it may be applied to the surface of the skin. This type of construction is similar to the previously described constructions in that the plunger is not moved by the application of pressure to the walls of the bottle body until the plunger is retracted.

Figure 8 of the drawings discloses the preferred form

of construction F. In this construction, the applicator is provided with a bottle body **64**, only a portion of which is illustrated in the drawings. The bottle body is preferably formed of resilient flexible material and is provided with a bottle neck **65**. The neck **65** is externally threaded to accommodate a cap **66**. The cap **66** is provided with a lower threaded portion **67** and an upper sleeve portion **69** of reduced diameter. The sleeve **69** is provided with an aperture **70** extending therethrough, the end of the aperture **70** being of slightly smaller diameter as indicated at **71**.

An apertured disc **72** is interposed between the end of the bottle neck **65** and the shoulder formed between the portions of the cap **66** which are of different diameter. A plunger **73** is slidably supported between the apertured plate **72** and the restricted end **71** of the aperture **70**.

When inward pressure is applied to the bottle body **64**, the plunger **73** is forced into engagement with the extremity **71** of the aperture. During the movement of the plunger, the slightly delayed movement of the plunger allows a small amount of liquid or semi-liquid material to escape past the plunger **73** through the opening **71**.

Thus it will be seen that the applicator may be used to apply a measured quantity of liquid or semi-liquid material to a surface or may apply a thin film of material to a surface as is desired. In dispensing the material, the applicant preferably employs a resilient and flexible bottle or container which may be compressed together to expel the contents.

In accordance with the patent statutes, I have described the principles of construction and operation of my applicator device, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

I claim:

1. An applicator including a hollow container of flexible resilient material provided with a discharge opening at its upper end, the walls of said container being capable of flexing inwardly to expel the container contents, a cap secured to the upper end of said container and having a generally cylindrical passage extending therethrough from said discharge opening, said passage having an inwardly tapering upper end providing a reduced diameter seat portion, a generally cylindrical plunger disposed in said passage and being properly proportioned



to permit flow of material from within said container about said plunger through said cap passage, said plunger having a substantially flat upper end with a tapered upper edge complementing said seat portion whereby said edge will bear against said seat portion to limit movement of said plunger by said material only to the extent that the upper end thereof will be flush with the upper end of said cap, and a perforated partition extending across said discharge opening against which the lower end of said plunger may bear, said plunger overlying the perforation of said partition and forming a seal for said perforation in one position thereof, said plunger thereby being slidable between one extreme position defined by said seat portion and an opposite extreme position defined by said partition.

2. The construction described in claim 1 and in which said perforated partition comprises a flexible resilient washer.

3. An applicator including a hollow resilient flexible container having a neck thereupon through which material may flow, said container having walls which may be flexed inwardly to expel the container contents through said neck, a cap attached to said neck and including an end closure having an aperture therethrough, a perforated washer inserted between said cap and said neck, a plunger slidable longitudinally of said neck, said plunger having a substantially flat outer end, said plunger bearing against said perforated washer in one extreme position thereof and sealing the perforations thereof, and said plunger engaging said end closure and providing a seal therefor in the other extreme position thereof, the flat end of said plunger being substantially flush with the outer end of said cap when in said other extreme position.

4. The construction described in claim 3 and in which said washer comprises a flexible resilient disc.

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