

12

# EUROPEAN PATENT APPLICATION

21 Application number: 83306763.0

51 Int. Cl.<sup>3</sup>: B 65 D 35/52

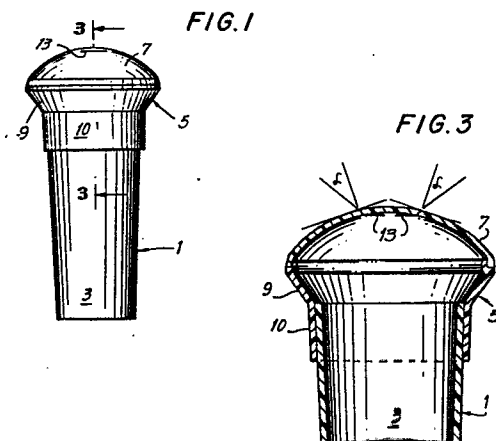
22 Date of filing: 07.11.83

30 Priority: 08.11.82 US 440041  
 43 Date of publication of application:  
 16.05.84 Bulletin 84/20  
 84 Designated Contracting States:  
 AT BE CH DE FR GB IT LI LU NL SE

71 Applicant: Bristol-Myers Company  
 345 Park Avenue  
 New York New York 10154(US)  
 72 Inventor: Berghahn, Walter G.  
 2298 Edgewood Terrace  
 Scotch Plains New Jersey(US)  
 72 Inventor: Weinstein, Jack  
 25 Dumas Road  
 Old Bridge New Jersey(US)  
 74 Representative: Jones, Alan John et al,  
 CARPMAELS & RANSFORD 43 Bloomsbury Square  
 London, WC1A 2RA(GB)

54 Dispenser with self-sealing applicator.

57 A dispenser for dispensing fluids having a self-sealing applicator head which has a flexible arcuate surface in which one or more angular slits are cut; the angular slits make an acute angle of from about 25° to about 70° with the perpendicular to the tangent of the arcuate surface at the point where the slit meets the arcuate surface.



DISPENSER WITH SELF-SEALING APPLICATOR

## I. Description

This invention relates to a self-sealing applicator for dispensing fluids and, more particularly, to an applicator of this type which is especially useful for applying fluids that have a significant viscosity (e.g. lotion or cream products).

Dispensing containers for dispensing viscous liquids including lotions and creams are known in the prior art. Some typical examples that may be mentioned that are somewhat related to the present invention are the dispensers shown in U.S. Patents 3,010,138 and 2,942,762. These are characterized generally by the fact that they have an applicator element hereinafter referred to as applicator which comprises a transverse member provided with vertically extending slits through which the contents of the container may be expressed and applied to a surface.

Applicators of the type shown in the aforesaid prior art have at least two disadvantages. In the first place, these applicators are not self-sealing. Consequently, after application of the product, they are inclined to leak, particularly when the container is maintained in a position in which the opening in the applicator faces somewhat downwardly.

A second difficulty with such applicators is that they are too flexible and readily deformed or collapsed when applied to a surface. This makes it difficult to maintain the arcuate or curved shape of the applicator which is important particularly when the applicator is employed in a lotion or cream product that is to be applied to the armpit.

It has now been found that an improved self-sealing applicator may be provided if the applicator contains one or more dispensing slits which are cut through its arcuate applying surface at an angle with respect to the perpendicular to the tangent of said arcuate surface at the slit point.

Furthermore, the improved applicator has an applicator head made of material that is sufficiently resilient to allow product to be dispensed through the slits provided for therein when pressure is applied to such product and yet stiff enough so that when combined with the proper thickness and surface curvature will not deform under normal application of force.

The applicator of the present invention can be employed in conjunction with a variety of containers designed to apply pressure to a fluid product in order to dispense the product from the container. However, to simplify the description of this invention, it will be described in conjunction with a so-called squeeze bottle or squeeze container.

In the drawing:

Fig. 1 is a front elevation of a dispensing device embodying the present invention;

Fig. 2 is a top plan view of the device shown in Fig. 1;

Fig. 3 is a partial longitudinal cross section of the device shown in Fig. 1 taken along line 3'-3' of Fig. 1;

Fig. 4 is a perspective view of another modification of this invention illustrating a self-standing dispenser unit containing an applicator embodied in the present invention;

Fig. 5 is a perspective view, partially in section, showing the manner in which the modification of this invention shown in Fig. 4 is squeezed to express product after the applicator has been removed by its supporting dish;

Fig. 6 is a top plan view of the embodiment of this invention shown in Fig. 5 showing product that has been expressed from the applicator;

Fig. 7 is a partial longitudinal view of the modification shown in Fig. 6 taken along line 7-7 and showing the applicator being applied to an armpit;

Fig. 8 is a partial enlarged view of the view shown in Fig. 7 showing details of the outer marginal portion of the applicator shown in Fig. 7;

Fig. 9 is another partial enlarged view of the view shown in Fig. 7 showing details adjacent the lower margin of the depending annular skirt of the applicator shown in Fig. 7;

Fig. 10 is a perspective view of another modification of this invention;

Fig. 11 is a top plan view of the modification of this invention shown in Fig. 10; and

Fig. 12 is a partial cross-sectional detailed view of the venting means of the modification of this invention shown in Figs. 10 and 11.

Referring to the drawings wherein the various numerals refer to the same structure in the several views, a device embodying the present invention is shown generally at 1. This comprises a flexible squeeze bottle 3 and an applicator 5 fitted over the open end of squeeze bottle 3.

Applicator 5 comprises a domed shape applicator head 7 and a depending skirt 9. Skirt 9 is provided with a collar 10 which is designed so as to form a friction fit with the neck 11 of squeeze bottle 3.

Application head 7 is designed so that it may be snapped on to a collar 10 that engages neck 11 of squeeze bottle 3. However, collar 10 and applicator head 7 may be molded as a unitary piece from a suitable flexible material described in more detail below.

As indicated, applicator head 7 is dome shaped or arcuate in outline. The curvature and dimension of the applicator head are preferably chosen to conveniently accommodate the armpit of an average adult. The dimensions of the dome shaped applicator head 7 may vary somewhat. Usually, it will have an overall outside diameter in the range of from about 1 inch to about 3 inches with the preferred range being from about 1 1/2 inches to about 1 2/2 inches; that is to say that the outside diameter of the circle formed by the lower margin of the extremities of dome shaped applicator head 7 preferably has the aforesaid dimensions.

The radius of curvature of the arcuate applicator head 7 may also vary over a range. Ordinarily, however, this will fall within the range of from about 3/4 inch to about 2 1/2 inches inclusive, with the preferred range being from about 1 inch to about 2 inches.

As pointed out above, in the preferred form of this invention, applicator head 7 is designed so that its surface curvature will not deform under normal application of force. To insure this, the thickness of the material constituting the applicator head 7 is selected so and to be within the range of about 0.020 inches to about 0.050 inches and optionally within the range of from about 0.025 inches to about 0.040 inches.

The material used in fabricating applicator head 7 is such that it is sufficiently resilient to allow product to flow through angular slits provided for therein and yet will not be deformed under normal application of force. A number of materials are known in the prior art which meet these criteria. By way of example, the following may be mentioned: low density polyethylene, linear low density polyethylene, high density

polyethylene, etc. However, the materials of choice are low density polyethylene or linear low density polyethylene. Materials of this character are marketed under the trade designations Alathon 20 and Dowlex 2552.

An essential feature of the present invention is provision of a dispensing slit or slits 13 best shown in Figs. 1 to 3. To insure that slits 13 function as self-sealing slits, they are cut through the surface of applicator head 7 so that plane of the slit forms an acute angle with the perpendicular to the tangent of the curved applicator head at each slit. This is best shown in Fig. 3 as the angle  $\alpha$ . Angle  $\alpha$  may vary somewhat depending upon the product viscosity and delivery rate desired. Usually, this will fall in the range of from about 25° to about 70°, the preferred angle being about 45°.

One or more slits 13 can be cut through applicator head 7 in accordance with this invention. Usually, however, these will be two in number which will be symmetrically disposed near the top of the dome formed by applicator head 7. In the preferred form of the invention, each slit will be a segment of the same circle which will have a diameter in the range of from about 1/4 inch to about 1 1/2 inches.

As previously mentioned, in a preferred form of this invention, container portion of the present dispenser takes the form of a squeeze bottle 3. This is necessarily made of flexible material which will usually be a flexible plastic material. A number of materials are known in the prior art which are suitable for this purpose. By way of example, the following may be mentioned: low density polyethylene, linear low density polyethylene. A material which is preferred is linear low density polyethylene (Dowlex 2552).

Another modification of this invention is illustrated in Figs. 4 through 9. This is a standing dispenser best shown in Fig. 4 in the position in which it will ordinarily be stored before and after use. This comprises a supporting base 12 which takes the form of a dish or bowl into

which the applicator 5 will fit. When stored in this fashion, the slits 13 face downwardly and the contents of the container flow downwardly under the influence of gravity to fill the space immediately behind slits 13. In this condition, the dispenser is ready for the next use. It needs only to be picked up and squeezed in the manner described in more detail below. This will cause some of the contents of the container e.g. cream or lotion 12 to be expressed through the slits 13. After the squeezing pressure is released, the cream or lotion 12 expressed as best shown in Fig. 6 is ready to be applied to the armpit of a subject.

The modification of this invention shown in Figs. 4 through 9 is also provided with an external shielding member 14 which is not readily deformed. This will take the form of an elongated cup having a widened mouth 26 which may be slipped over squeeze bottle 3. In the preferred form of this invention, shielding member 14 will be made of a rigid material such as a rigid plastic e.g. polypropylene or high impact polystyrene. However, to enable the user to apply pressure to the squeeze bottle 3 without removing the shielding member 14 which are large enough so that the fingers of the user can pass through and reach the squeeze bottle 3. This can best be seen in Fig. 5.

In the modification of this invention illustrated in Figs. 4 through 9, the applicator head takes the form of a threaded applicator head 15 preferably molded as a single piece. Applicator head 15 is likewise provided with a domed shape having the same characteristics as applicator head 7 described in the modification of this invention shown in Figs. 1 through 3. In this case, however, an annular skirt 17 is provided which is integral with applicator head 15 and depends from the underside thereof.

Threads 19 are molded on the internal surface of annular skirt 17 and are best shown in the detail drawing Fig. 9. Threads 19 are designed to mate with the threads 20 on the external surface of a squeeze bottle 3 whereby the threaded applicator 15 may be secured to squeeze bottle 3 containing the product to be dispensed.

Threaded applicator 15 is constructed with an overhang portion 21 that extends radially from the outside wall of annular skirt 17. This forms an annular space 23 which surrounds skirt 17 having a roof 25 and a side wall 17. Side wall 27 is provided with a bead 29 which is designed to engage a corresponding bead on the neck of shielding member 14 when the applicator 15 is screwed onto squeeze bottle 3.

Threads 24 are also provided on the outer surface of widened mouth 26 of shielding member 14. This is best seen in Fig. 7. Threads 24 mate with corresponding threads (not shown) in supporting base 12. By means of these mating threads, the total dispenser unit may be screwed into base 12 and the standing unit shown in Fig. 4 is obtained.

In using the modification of this invention shown in Figs. 4 through 9, the dispenser is first unscrewed from its supporting base 12. Pressure is then applied to squeeze bottle 3 through the openings 16 in shielding member 14 as shown in Fig. 5. Pressure on squeeze bottle 3 is then released sealing slits 13 and a quantity of lotion or cream 12 remains on the surface of applicator 15. This is best seen in Fig. 6. The cream or lotion 12 is then applied to the armpit 32 by running applicator head 15 over the surface of armpit 32. This is best seen in Fig. 7.

When the applicator head 15 is run over the surface of armpit 32, the pressure applied opens slits 13 momentarily. This serves to vent the package and the fluid material removed from the container is replaced by air that enters the container through slits 13.

The modification of this invention shown in Figs. 10 through 12 is very much like the construction shown in Figs. 4 through 9. In this case, however, a single cut-out 41 cut into shielding member 14 replaces the pair of symmetrical cut-outs 16 shown in said modification of Figs. 4 through 9. This modification, however, is also provided with an auxiliary venting means. In some instances, when the flexible squeeze bottle 3 is vigorously squeezed, venting through slits 13 is not always sufficient for the proper function of the applicator. To this end, an auxiliary venting



means 43 is provided in squeeze bottle 3. In the modification illustrated, this vent is disposed in the roof 44 of squeeze bottle 3. Vent 43 is cut through the floor of a small concavity 45 that is formed in roof 44. Vent 43 takes the form of an upper V-shaped trough 46 and a lower slit 47. When the fluid material is expressed from squeeze bottle 3, the vacuum created therein causes air to rush into V-shaped trough 46 and open slit 47. When the pressure is equalized, slit 47 closes sealing off the contents of squeeze bottle 3 from the atmosphere.

In use, the modifications of this invention illustrated in Figs. 1 through 3 on the one hand and 10 through 12 on the other, are employed in essentially the same manner described above in connection with the modification shown in Figs. 5 through 9. Only slight modifications in the procedure are necessary to accommodate the particular construction.

Although the invention has been described with reference to specific forms thereof, it will be understood that many changes and modifications may be made without departing from the spirit of this invention.

CLAIMS

1. A dispenser for dispensing fluid comprising a container portion for storing said fluid and a self-sealing applicator portion for applying said fluid to a surface; said applicator portion being positioned so as to be in communication with fluid maintained in said container portion; said applicator portion having an arcuate surface and being adapted to accommodate the armpit of an average individual; said applicator portion also being constructed of flexible material and provided with at least one angular slit cut through its surface whereby the interior of said container portion is made to communicate with the atmosphere when pressure is applied to said fluid; said angular slit being such that it makes an acute angle of from about  $25^{\circ}$  to about  $70^{\circ}$  with the perpendicular to the tangent of the arcuate surface of said applicator portion at the point where said slit meets said arcuate surface; said container portion being adapted to apply pressure to the fluid contents of said container portion whereby the fluid contents of said container portion may be expressed through said angular slits when pressure is applied to said fluid contents and whereby said angular slits are self-sealed when the pressure on said fluid contents is relieved.

2. A dispenser according to claim 1 in which said arcuate surface has a radius of curvature in the range of from  $3/4$  inch to about  $2 \frac{1}{2}$  inches.

or 2

3. A dispenser according to claim 1/in which said applicator portion has an overall diameter in the range of from about 1 inch to about 3 inches.

2, or 3

4. A dispenser according to claim 1, in which at least two of said angular slits are cut through the surface of said applicator portions; said slits forming segments of a circle having a diameter in the range of from about  $1/4$  inch to about  $1 \frac{1}{2}$  inches.

any one of to 4

5. A dispenser according to/claims 1/in which said container portion is also made of flexible material whereby pressure may be applied to the fluid contents of said container portion by squeezing said container portion.

6. A dispenser according to claim 5 including shielding means being relatively rigid whereby the inadvertent application of pressure to said flexible container portion and the inadvertent expression of fluid from said container portion is avoided; said shielding means being provided at specified places thereof with means for selectively applying pressure to said flexible container portion.

7. A dispenser according to claim 6 in which said means for selectively applying pressure to said flexible container portion comprises a single opening or a cut through the said shielding means; said opening being of sufficient dimension so that average fingers may pass therethrough to engage and squeeze said flexible container portion.

8. A dispenser according to claim 6 in which said means for selectively applying pressure to said flexible container portion comprises a pair of openings being of sufficient dimension so that average fingers may pass therethrough to engage and squeeze said flexible container.

any one of

9. A dispenser according to/claims 1 to 8 including a self-standing base, said self-standing base being adapted to engage and support said dispenser in the region of its applicator portion so that said dispenser is supported in a standing position with the slit(s) in said applicator portion facing downwardly.

1/3

FIG. 1

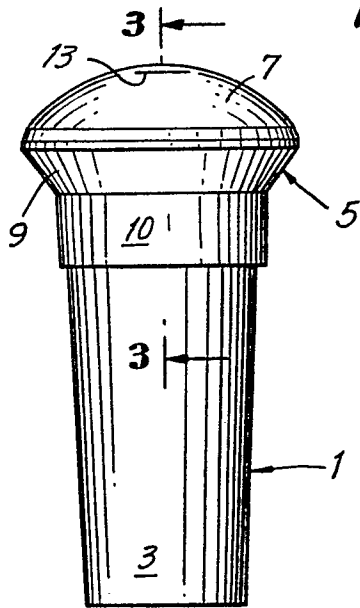


FIG. 3

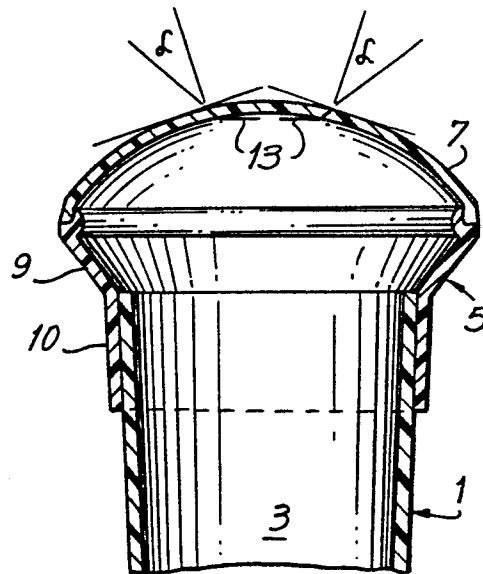


FIG. 2

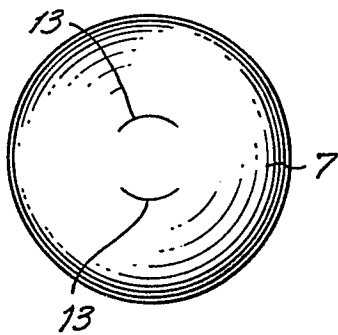
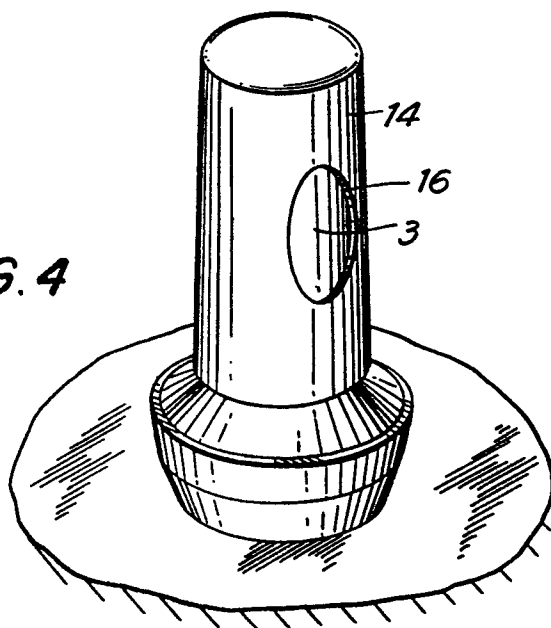


FIG. 4



2/3

FIG. 6

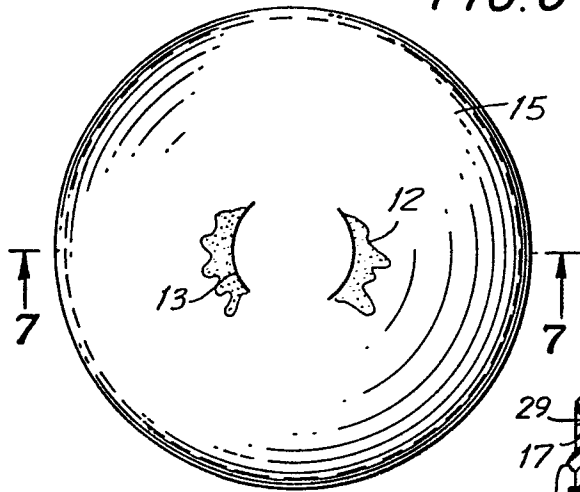


FIG. 7

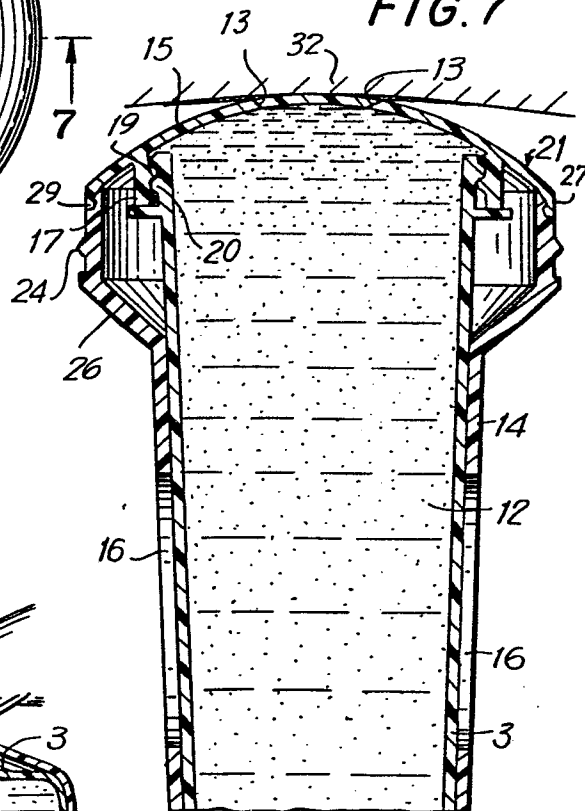


FIG. 5

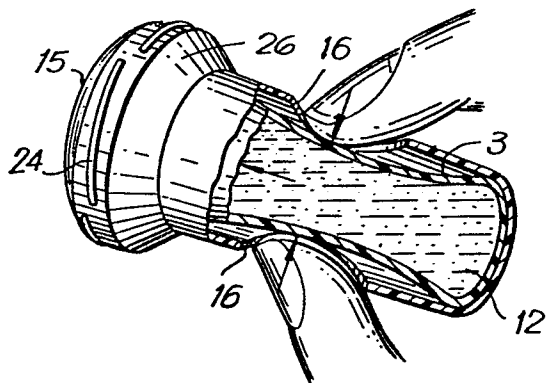


FIG. 9

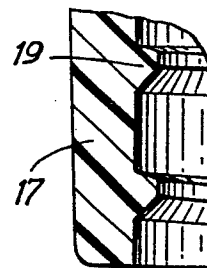
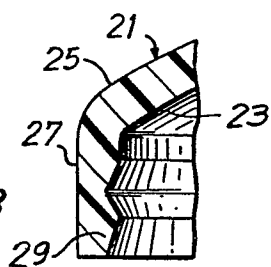


FIG. 8



3/3

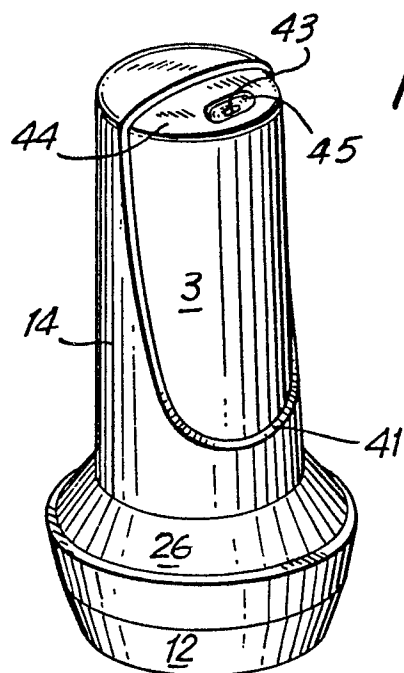


FIG. 11

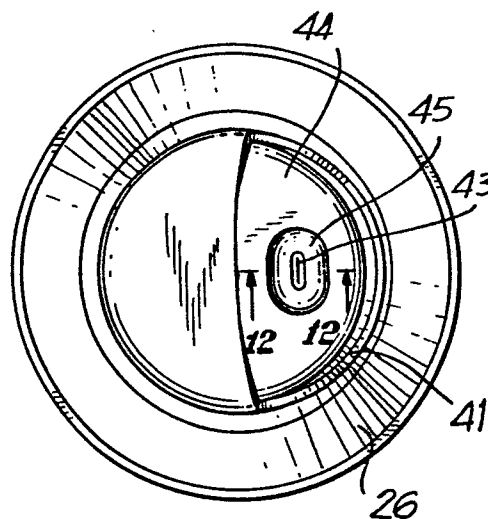


FIG. 12

