

Nov. 28, 1961

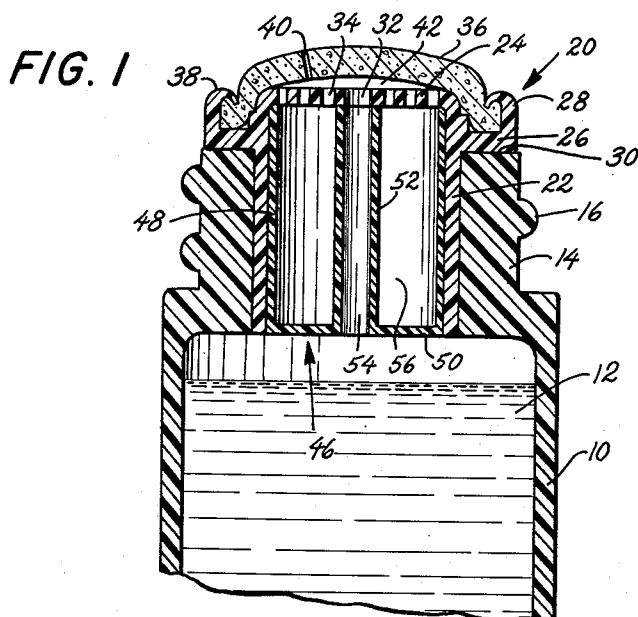
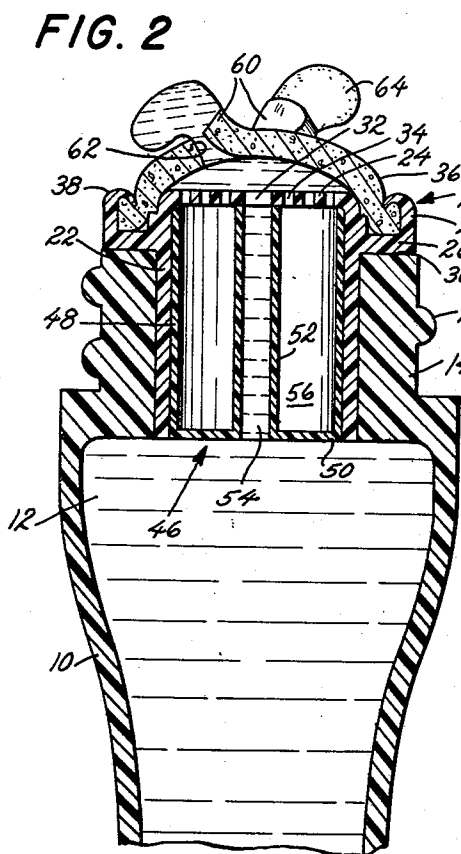
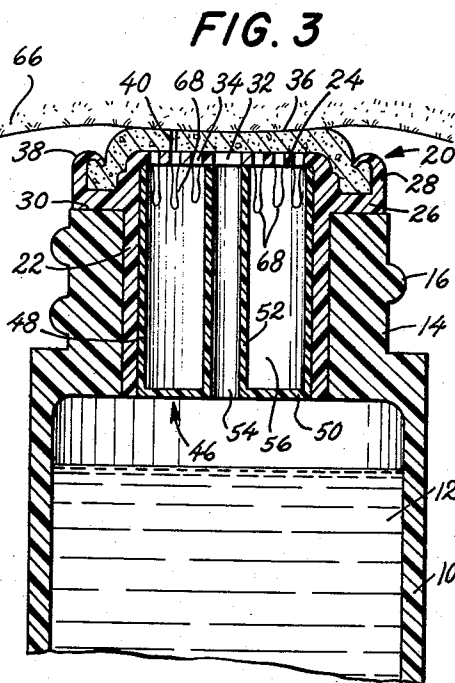
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3,010,138

DISPENSER DEVICE FOR VISCOUS FLUIDS

Filed Nov. 6, 1959

3 Sheets-Sheet 1



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FIG. 4

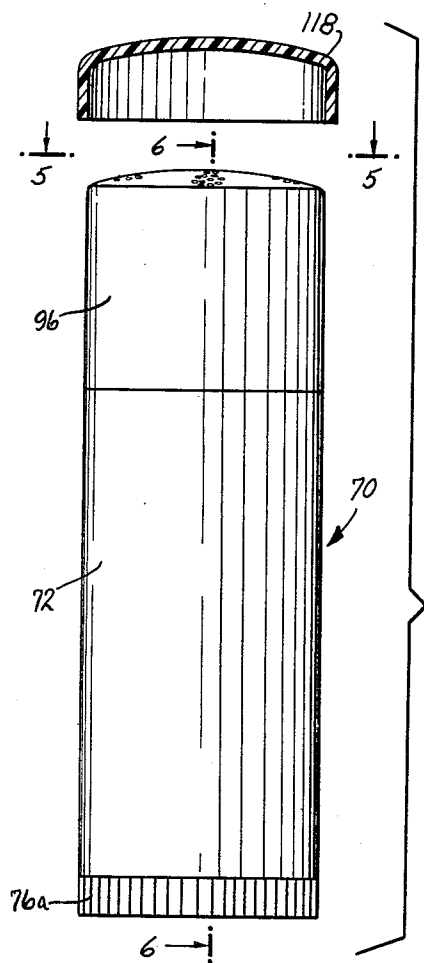


FIG. 5

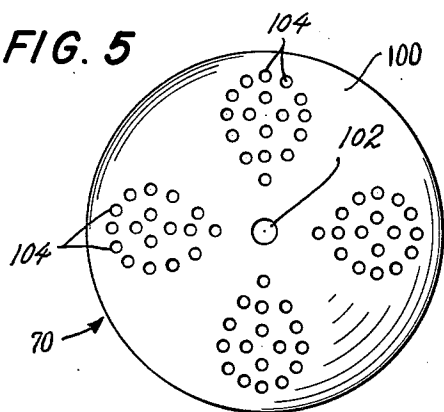
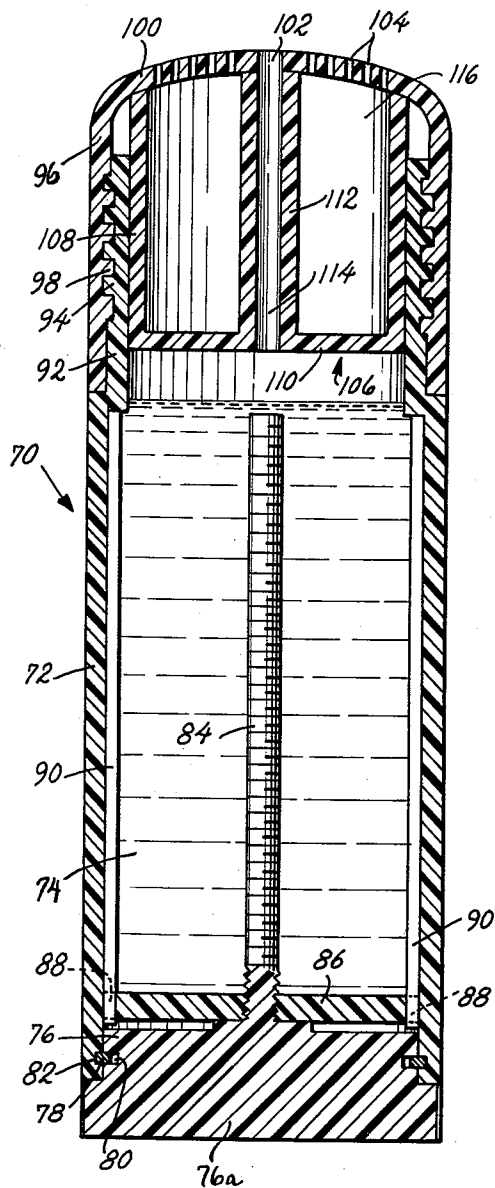


FIG. 6



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FIG. 7

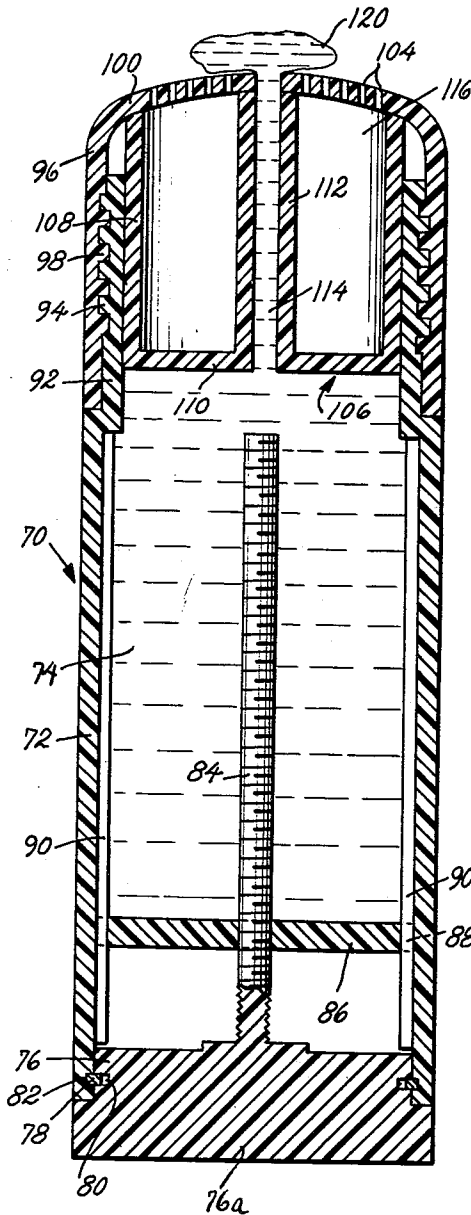
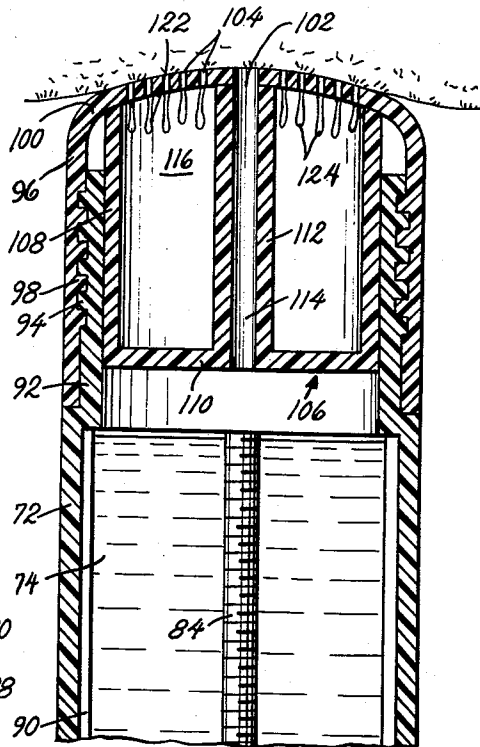


FIG. 8



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DISPENSER DEVICE FOR VISCOUS FLUIDS

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Filed Nov. 6, 1959, Ser. No. 851,296

8 Claims. (Cl. 15-515)

The present invention relates to improvements in dispenser devices for viscous fluids, such as creams, and in particular relates to an improved dispenser overlying the mouth of a container and adapted to dispense a small amount of viscous fluid from the container and apply the same to a surface.

In my co-pending United States patent application Serial No. 845,183, filed October 8, 1959, and entitled Viscous Fluid Dispenser, I have disclosed a dispensing device for viscous fluid containers which are adapted to feed the contained viscous fluid under pressure through the mouth thereof. Such containers are presently being marketed in such forms, for example, as flexible plastic squeeze bottles, swivelly-operated containers, and the like. The dispensing device disclosed in my aforementioned co-pending patent application generally comprises a rigid transverse wall overlying the mouth of the container and having a plurality of openings therein, and a flexible porous membrane which overlies said transverse wall. The viscous fluid is forced from the container through the transverse wall and through slit openings in the porous membrane forming in globules on the surface of said membrane. These globules of said viscous fluid are then rubbed on a surface, such as the user's skin, to spread the viscous fluid in a uniform and fine film over said surface, and the excess fluid is through the porous membrane and passes back through the opening in the transverse wall into the interior of the container.

While the above-described dispensing device has proven effective in dispensing small amounts of viscous fluid and applying the fluid in a uniform and controlled quantity to the surface, it has presented one serious disadvantage in certain applications. This arises from the fact that excess fluid applied to the surface is drawn back through the dispensing device into the interior of the container where it mingles with the fresh, unused fluid contained therein. Consequently, when the excess fluid becomes soiled or contaminated in its application to the surface, its re-entry into the storage interior of the container tends to contaminate the entire fluid stored therein, and render it undesirable for further use. This is particularly true where the viscous fluid is in the nature of an underarm deodorant.

It is the object of the present invention to provide a dispensing device of the type described which is effective in removing excess viscous fluid applied to the surface, but which includes means for preventing the fluid from re-entering that portion of the container which stores the fresh viscous fluid.

Another object of the present invention is the provision of a dispensing device of the character described in which fluid re-entry openings in the transverse wall communicate with an enclosed chamber which serves as a storage reservoir to hold the excess fluid drawn back through the dispensing device and to keep the excess fluid separated from the fresh and unused fluid in the container.

In accordance with the invention, the dispensing device shown in my aforementioned co-pending United States patent application is provided with an enclosed storage reservoir communicating with these fluid re-entry apertures in the transverse top wall of the dispenser, but being out of communication with the central fluid outlet opening in the transverse top wall in such a manner that only said transverse top opening communicates directly with the interior of the container. Thus, when fluid is

fed under pressure to the mouth of the container, it passes freely through the central outlet opening and to the outer surface of the porous membrane, but as the fluid is reabsorbed through the porous membrane it passes through the re-entry apertures and is stored in said reservoir.

As a particular advantage of the invention, it has been found that in many instances where a reservoir chamber is provided in accordance with the invention, the outer porous membrane can be eliminated and the device will work effectively without such porous membrane.

Additional objects and advantages in the invention will become effective during the course of the following specification when taken in connection with the accompanying drawings in which:

FIG. 1 is a central longitudinal section through the upper portion of a flexible container of the "squeeze bottle" type having mounted therein a dispenser insert made in accordance with the present invention, the insert also being shown in section;

FIG. 2 is a sectional view similar to FIG. 1, but showing the container in its squeezed or compressed condition with the viscous fluid therein being fed to the exterior surface of the dispenser;

FIG. 3 is a sectional view similar to FIGS. 1 and 2 but showing the dispenser device in the process of being wiped against the surface, and showing the excess viscous fluid returning to the interior of the dispenser;

FIG. 4 is a side elevational view of a container of the swivel type which incorporates a modified type of dispenser device made in accordance with the invention, the cover for the container being shown in section and exploded form;

FIG. 5 is an enlarged top plan view of the container shown in FIG. 4;

FIG. 6 is an enlarged sectional view taken along line 6-6 of FIG. 4;

FIG. 7 is a sectional view similar to FIG. 3, but showing the container parts in a position to feed viscous fluid to the exterior of the container; and

FIG. 8 is a partial sectional view similar to FIGS. 6 and 7, but showing the dispenser portion of the container in the process of being rubbed against a surface, and the excess fluid being readmitted to the interior of the dispenser portion.

Referring in detail to the drawings, there is shown in FIGS. 1-3 a container and dispensing device of a type similar to that shown in my aforementioned co-pending U.S. patent application, Serial No. 845,183. The container 10 is adapted to hold a supply of cream or other viscous fluid 12, and while it may be of any of the well-known types which are adapted to feed the viscous fluid under pressure through the mouth thereof, it is illustrated herein, in the form of a flexible and compressible plastic bottle which may be formed of polyethylene or other similar bendable material. The flexible body of the container 10 may be squeezed for the purpose of forcing the contained viscous fluid 12 out of the container through the neck thereof. The container 10 has a neck 14 provided with external threading 16.

In accordance with the invention, the dispensing device 20 is provided to overlie the mouth of the container 10 and to dispense a controlled amount of the viscous fluid or cream 12 to a suitable application surface such as the user's skin. The dispenser 20 may be formed integrally with the container 10, although in its best commercial application the dispenser is made in the form of an insert which is fitted within, or otherwise attached to, the neck 14 of the flexible container 10. This permits the container to be readily filled with cream in the usual manner through

the container mouth, and the dispenser insert is then attached to complete the assembly.

The insert 20 has a body portion preferably molded of a suitable thermoplastic material and including a central cylindrical portion 22 having a flat top wall 24. An annular lateral flange 26 is also formed integrally with the cylindrical portion 22 and extends outwardly from the surface thereof. The plane of the flange 26 is parallel to and located below the plane of the top wall 24. The annular flange 26 terminates in an upstanding flange extension 28. The flange 26 extends entirely around the periphery of the cylindrical portion 22 and its flat lower surface defines a transverse shoulder 30.

The top wall 24 of the cylindrical portion 22 has a central opening 32, and a series of smaller apertures or perforations 34 arranged around said central opening 32. As will be presently explained, the central opening 32 serves as a fluid exit opening from the container, while the apertures or perforations 34 serve as re-entry openings whereby the fluid may pass back into the dispenser 20. The apertures 34 are closely spaced from each other and are preferably distributed evenly over the entire area of the top wall 24 surrounding the central outlet opening 32.

The dispensing device or insert 20 also includes an outer applicator membrane 36 which is in the form of a circular disc of flexible material of sufficient porosity to permit some penetration by the viscous fluid 12 in the container 10. For this purpose, the membrane 36 may be made of rubber and contain fine perforations for porosity, although it is preferred to employ a porous plastic foam such as that indicated in the drawings. It has been found that best results are obtained from the use of the plastic foam material known commercially as "neoprene," this material being obtainable in various foam densities so as to provide a selection to accommodate fluids of varying densities.

In assembling the dispensing device 20, the disc-shaped applicator membrane 36 is placed over the top wall 24, and its marginal circumferential edge bent downwardly and inserted in the space or channel between the upstanding flange extension 28 and the outer wall surface of the cylindrical portion 22. The top portion of the flange extension 28 is then softened, as by heating, and is peened over to form a bight 38 which overlies and grasps said membrane marginal portion to mount the latter securely in the position shown in the drawings. The bight 38 forms an air-tight and liquid-tight seal around the circumference of membrane 36 so that the insert body is sealed against leakage of the viscous fluid contained in the flexible container.

The membrane 36 is provided with one or more through openings which permit the passage of the viscous fluid to pass therethrough from the interior of the container to the outer surface of the membrane. The through openings may be in the form of arcuate slits 40 which are spaced about the membrane 36. These arcuate slits 40 each form large segment portions of a circle and define flap valves which open to permit the viscous fluid to pass to the exterior of the membrane 36.

It will be observed that the membrane 36 contacts the peripheral edge of the top wall 24 and is normally domed toward its center so as to be maintained spaced from the upper surface of said top wall 24. This spacing defines a chamber 42 which is located between said top wall 24 and the inner surface of the applicator membrane 36.

The dispenser 20 also includes a reservoir member 46 in the form of a cylindrical cup having a side wall 48 and a bottom wall 50. An upstanding post 52 is formed integrally with the bottom wall 50 at the center thereof and extends longitudinally upward through the center of the reservoir member 46 to the top edge thereof, the top edge of the post 52 being aligned with the top edge of the side wall 48. The post 52 is formed with a through longitudinal bore 54 which extends through the entire

reservoir member 46 from the bottom surface to the top surface thereof. The bore 54 is made of a diameter equal to the diameter of the central opening 32 in the top transverse wall 24. The central post 52 defines an annular chamber 56 between the side wall 48 and said post 52.

The reservoir member 48 is made of such sufficient diameter as to be force fit within the dispenser cylindrical body portion 22, although it may be heat sealed or otherwise bonded therein if desired.

In the mounted position of the reservoir member 46, its top edge abuts the lower edge of the transverse top wall 24, and the longitudinal bore 54 in the central post 52 is in communication with the central outlet opening 32 in said top wall 24, as shown in FIG. 1. The reservoir member 46 is preferably made of such length that its bottom wall 50 is flush with the bottom edge of the insert cylindrical portion 22, although its length is not critical. It is desirable, however, to form the reservoir member of as great a length as possible in order to provide for maximum storage capacity in the annular chamber 56. It will be observed that in the mounted position of the reservoir member 48, the top wall apertures 34 communicate with the annular chamber 56.

The assembly may also include a closure cap (not shown) adapted to be threadably engaged with the external threading 16 on the container neck 14. Such closure cap would function to form an air-tight seal about the outer surface of the membrane 36 to prevent drying out of any cream contained in said porous membrane. Such closure cap may be of the type shown in my prior U.S. Patent No. 2,853,728, or disclosed in my aforementioned pending U.S. patent application Serial No. 845,183.

The insert 20 is mounted on the container 10 by inserting the cylindrical portion 22 within the container neck 14 until the shoulder 30 engages the top surface of the container neck. The cylindrical portion 22 is made of sufficient diameter to provide a tight fit within the container neck 14, so that it will remain in its mounted position even under the internal pressure generated by squeezing the flexible container 10.

The viscous fluid 12 within the container 10 may be a cream, jelly, emulsion, or the like. In operation, the flexible container 10 is held in the hand and squeezed so that its wall is deformed and pressed inwardly as indicated in FIG. 2. Such inward deformation of the container wall increases the pressure within the container 10, forcing the viscous fluid 12 upwardly through the central longitudinal bore 54 in the reservoir member 46 and then through the central outlet opening 32 in the top wall 24, the fluid filling the chamber 42 between the membrane 36 and the top wall 24. As the wall of the container 10 is continued to be squeezed or deformed, the pressure of the viscous fluid 12 in the chamber 42 is exerted against the inner surface of the flap portions formed by the arcuate slits 40 in the porous membrane 36. FIG. 2 shows these flap portions 60 lifting upwardly and flexing outwardly from the main body of the membrane 36 to form enlarged openings 62 in the membrane. The viscous fluid is extruded through these enlarged openings 62 to the exterior of the membrane 36 where it gathers in the globular forms shown at 64 in FIG. 2.

The user may visually determine when a sufficient amount of the viscous fluid is fed to the outer surface of the membrane 36, at which time he need merely release the squeezing pressure on the wall of container 10. The flexible container wall then returns to its original undeformed shape and a vacuum is formed in the interior of the container 10, causing the membrane flap portions 60 to be drawn back to their original positions in which their outer surfaces are flush with the outer surface of the membrane 36. As the flaps 60 move back to their original positions, some of the viscous fluid is drawn back through the enlarged openings 62, leaving only the small globules 64 of the viscous fluid on the surface of membrane 36.

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FIG. 3 illustrates the manner in which the membrane 36 is then placed against the surface 66 on which the cream or other viscous fluid is to be applied, and is rubbed or stroked against said surface 66 to spread the viscous fluid globules evenly thereover. During the spreading application, several operations occur simultaneously. The fluid globules 64 are spread out over the external surface 66 and also over the surface of the membrane 36. The porosity of the membrane 36 causes said membrane to absorb excess viscous fluid until it is saturated. During the stroking or rubbing application, however, the membrane 36 is compressed between the surface 66 and the top wall 24, so that the viscous fluid absorbed in the said membrane is squeezed therefrom. The perforations or apertures 34 in the top wall 24 permit the fluid to leave the membrane 36, the fluid passing through said perforations 34 into the annular chamber 56 of the reservoir member 46.

FIG. 3 illustrates the manner in which the excess fluid removed from the application surface 66 by the membrane 36, is squeezed from the compressed membrane and passes through the apertures 34 as droplets 68, entering the interior of the annular chamber 56. Since the apertures 34 are evenly spaced over the entire area of the top wall 24, and the membrane 36 is pressed flat against said top wall, the fluid is removed from all parts of the membrane, leaving the latter unsaturated and ready to absorb an additional supply of excess fluid on the next stroke.

It will thus be apparent that during the application of the viscous fluid to the surface, the membrane serves to spread the fluid evenly over the surface while at the same time absorbing the excess fluid on a surface. The stroking or rubbing action of applying the fluid also cleans out the membrane by removing the excess fluid therefrom, and the top wall apertures 34 direct this fluid back into the dispenser 20. As was previously indicated, the advantage of the present invention is that the excess fluid, having been wiped off the surface 66, is not returned to the interior of the container 10 to mingle with the unused fluid 12, but rather is directed into the reservoir member 46 where it is stored within the annular chamber 56 and is separated thereby from the fresh fluid 12 in said container. The wiping or stroking application operation is continued until a selected amount of fluid has been applied to the surface, the fluid having been applied in a uniform film, and the excess fluid having been removed and stored within the reservoir member 46.

Because the excess fluid is returned to a segregated reservoir, and does not have to be squeezed back into the interior of the container against the internal pressure thereof, it is possible to utilize the invention in a dispenser which has no porous membrane. FIGS. 4 through 8 illustrate such type of dispensing device and also show its application to a container of the swivel type.

The container 70 shown in FIGS. 4 through 8, includes a tubular main body member 72 in which the supply of viscous fluid 74 is stored. The container 70 also includes a separate circular bottom wall 76 which fits snugly within the lower end of the cylindrical body portion 72 and is held therein by a snap ring 78 located within corresponding slots 80 and 82. The circular bottom wall 76 is rotatable within the cylindrical body portion 72 for purposes of dispensing the viscous fluid, in a manner which will be presently described. The bottom wall 76 has an enlarged lower extension portion 76a of an outer diameter at least equal to the outer diameter of the cylindrical body portion 72, and located beneath the latter in a position to be grasped and used as a finger piece to rotate the bottom wall 76 relative to the cylindrical body portion 72.

An upstanding threaded post or rod 84 is formed integrally with the bottom wall 76 and extends longitudinally through the center of the container 70. A cream carrier plate or disc 86 is threadably mounted upon the

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rod 84, this disc 86 having opposed slots 88 in its periphery, the slots 88 receiving longitudinally extending keys 90 integral with the inner surface with the container body portion 72. The keys 90 permit the fluid carrier disc 86 to slide up and down within the interior of the container, but prevent said carrier disc 86 from rotating relative to the body of said container.

The aforementioned swivel container construction is conventional and well known, and is presently being widely marketed, so that no claim is made herein to its specific construction. Suffice to say, however, that when the bottom wall 76 is rotated relative to the container body 72, the threaded rod 84 rotates with said bottom wall 76, thereby causing the cream carrier disc 86 to be raised and lowered depending upon the direction in which said bottom wall 76 is rotated. When the cream carrier disc 86 is raised within the container, it forces the contained viscous fluid 74 upwardly under pressure toward the mouth of the container.

The cylindrical body portion 72 of the container 70 has an inwardly-offset upper extension wall portion 92 which is externally threaded as shown at 94. A hollow headpiece 96 fits over this offset wall portion 92 and is attached to the external threading thereof by its own internal threading 98. The headpiece 96 has a transverse top wall 100 having a central fluid outlet opening 102 surrounded by a plurality of spaced fluid inlet apertures 104. As shown in FIG. 5, the inlet apertures 104 are preferably arranged in the form of clusters about the central outlet opening 102 for aesthetic purposes, but such arrangement is purely optional. It is desirable, however, that the inlet apertures 104 extend substantially across the entire diameter of the top wall 100.

The dispenser portion of the container 70 also includes a cup-shaped reservoir member 106 of a construction similar to the reservoir member 46 showing the embodiment of FIGS. 1 to 3. The reservoir member 106 has a cylindrical wall 108 and a bottom wall 110. An upstanding post 112 is formed integrally with bottom wall 110 and has a through bore 114 extending longitudinally from the lower surface of the bottom wall 110 to the top surface of the post 112. The post 112 defines an annular chamber 116 between the cylindrical wall 108 and the central post 112, which chamber 116 serves as a receptacle for the excess fluid admitted to the dispenser.

In mounted position, the reservoir member 106 is inserted into the offset wall portion 92 and is affixed or otherwise attached thereto, as by force fitting or heat sealing. The headpiece 96 is then attached to the container by means of the interfitting threads 94 and 98. The reservoir member 106 is so constructed and mounted that when the headpiece 96 is attached to the container, the top edge of the reservoir member cylindrical wall 108 and the top surface of the upstanding post 112 abut the lower surface of the top wall 100, in the manner shown in FIG. 6. If the top wall 100 is domed as illustrated in FIG. 6, the top surface of the reservoir member 106 is shaped accordingly.

In the assembled condition of the container 70, the longitudinal bore 114 of the reservoir member 106 registers with the top wall fluid outlet opening 102, so that the longitudinal bore 114 and said outlet opening 102 serve as a communication between the interior of the container and the outer surface of the top wall 100. At the same time, the inlet apertures 104 communicate with the annular chamber 116. The container 70 may also be provided with a cover or closure cap which covers over the top wall thereof and prevents the viscous fluid 74 within the container from drying out during storage. This closure cap may be in the form of the simple cup-shaped cover 118 shown in FIG. 4, which cover is sized to embrace the top portion of the headpiece 96 and fit frictionally thereon.

When the threaded rod 84 is turned in a direction to raise the viscous fluid carrier disc 86, the contained

viscous fluid 74 is forced upwardly under pressure in the container 70, passing through the bore 114 and exiting through the outlet opening 102 in the form of a globule 120, as shown in FIG. 7. The outer surface of the top wall 100 is then rubbed or stroked against a surface, such as the surface 122 in FIG. 8, spreading the globule over said surface 120. As the rubbing or stroking is continued, the excess fluid on the surface reenters the dispenser portion of the container 70 through the inlet apertures 104 in the form of droplets 124, shown in FIG. 8. These droplets 124 enter the annular chamber 116, and are stored therein, being segregated from the remainder of the unused viscous fluid 74 in the container. Little or no excess fluid reenters the outlet opening 102 because the bore 114 is already filled with viscous fluid under pressure of the fluid carrier 86.

While preferred embodiments of the invention have been shown and described herein, it is obvious that numerous additions, changes and omissions may be made in such embodiments without departing from the spirit and scope of the invention.

What I claim is:

1. Dispensing means for a container capable of holding a supply of viscous fluid and feeding the same under pressure to an outlet, said dispensing means comprising a transverse wall adapted to overlie the container outlet, an external applicator surface, a fluid outlet opening in the transverse wall in communication with the external applicator surface, a conduit communicating at one end with the outlet opening and adapted at its other end to communicate with the interior of the container for feeding viscous fluid under pressure from the interior of the container through said outlet opening to said external applicator surface, a plurality of fluid re-entry apertures in said transverse wall and spaced around said outlet opening in communication with said external applicator surface, and a fluid reservoir beneath said transverse wall communicating with all of said re-entry apertures and closed off from the interior of said conduit, said applicator surface being adapted to be wiped against an exterior surface for distributing the viscous fluid fed through said outlet opening upon said exterior surface with the excess viscous fluid on the latter passing through said re-entry openings and into said fluid reservoir.

2. Dispensing means for a container capable of holding a supply of viscous fluid and feeding the same under pressure to an outlet, said dispensing means comprising a transverse wall adapted to overlie the container outlet, a reservoir beneath said transverse wall and substantially co-extensive therewith, an external applicator surface, a fluid outlet opening in the transverse wall in communication with said external applicator surface, a closed conduit extending through said reservoir and communicating at one end with the outlet opening and adapted at its other end to communicate with the interior of the container for feeding viscous fluid under pressure from the interior of the container through said outlet opening to said external applicator surface, a plurality of fluid re-entry apertures in said transverse wall and spaced around said outlet opening, said fluid re-entry apertures communicating with the interior of said reservoir, said applicator surface being adapted to be wiped against an exterior surface for distributing the viscous fluid fed through said outlet opening upon said exterior surface with the excess of viscous fluid on said exterior passing through said re-entry openings and into said fluid reservoir.

3. Dispensing means according to claim 2 in which

said fluid outlet opening is centrally located in said transverse wall and said conduit comprises a bore extending centrally through said reservoir and registering with said fluid outlet opening.

4. Dispensing means for a container capable of holding a supply of viscous fluid and feeding the same under pressure to an outlet, said dispensing means comprising a transverse wall adapted to overlie the container outlet, a fluid outlet opening in the transverse wall, a conduit communicating at one end with the outlet opening and adapted at its other end to communicate with the interior of the container for feeding viscous fluid under pressure from the interior of the container to said outlet opening, a plurality of fluid inlet apertures in said transverse wall and spaced from said outlet opening, a fluid reservoir located beneath said top wall and substantially co-extensive therewith, said reservoir communicating with said inlet apertures and being closed off from the interior of said conduit, and a flexible porous membrane overlying the upper surface of said top wall, and having an external applicator surface, said membrane having at least one slit opening therein which communicates with the fluid outlet opening of the transverse wall for the passage of viscous fluid from the interior of the container through said conduit, fluid outlet opening, and slit opening to the external applicator surface, said membrane being adapted to be pressed and wiped against an exterior surface to spread the viscous fluid upon the latter, with the excess viscous fluid passing through the porous membrane and through the fluid inlet apertures into the reservoir as the membrane is pressed against the transverse wall.

5. Dispensing means according to claim 4 in which the central portion of the membrane is spaced above the transverse wall to define a fluid-receiving area therebetween.

6. Dispensing means according to claim 4 in which the slit openings of the membrane are in alignment with the fluid outlet opening.

7. Dispensing means for a container capable of holding a supply of viscous fluid and feeding the same under pressure to the mouth thereof, said dispensing means comprising a tubular insert adapted to be mounted within the mouth of said container and including a transverse top wall adapted to overlie the container mouth and an annular wall depending from said top wall, a fluid outlet opening in the transverse wall, a conduit communicating at one end with the outlet opening and adapted at its other end to communicate with the interior of the container for feeding viscous fluid under pressure from the interior of the container to said outlet opening, a plurality of fluid inlet apertures in said top wall and spaced from said outlet opening, said annular wall defining a fluid reservoir located beneath the top wall and substantially co-extensive therewith, said reservoir communicating with said inlet apertures and being closed off from the interior of said conduit.

8. Dispensing means according to claim 7 in which said tubular insert also includes a flexible porous membrane mounted on said insert in overlying relationship with said top wall, said membrane having at least one opening communicating with the outlet opening of said top wall.

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