May 26, 1964 R. H. THOMAS 3,134,131

ROLLER DISPENSER

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FIG. 1

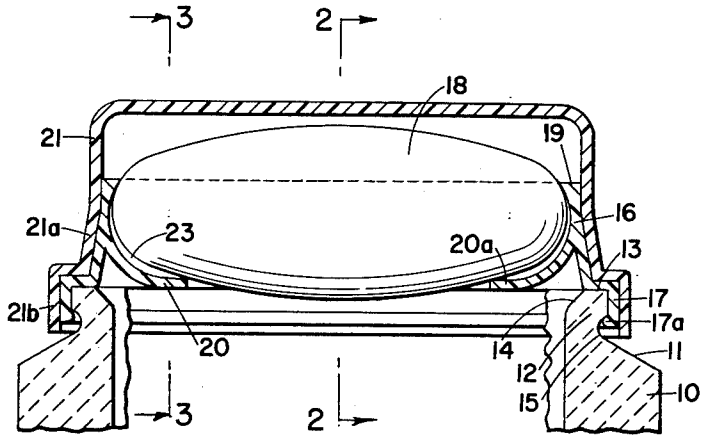


FIG. 2

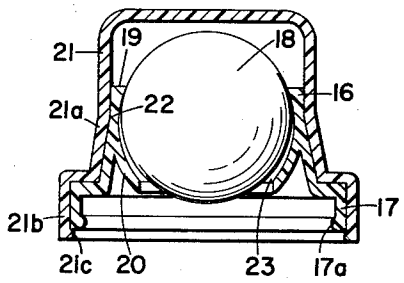


FIG. 3

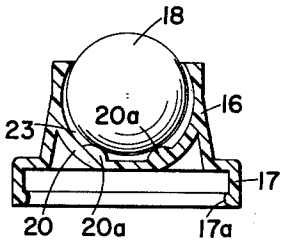
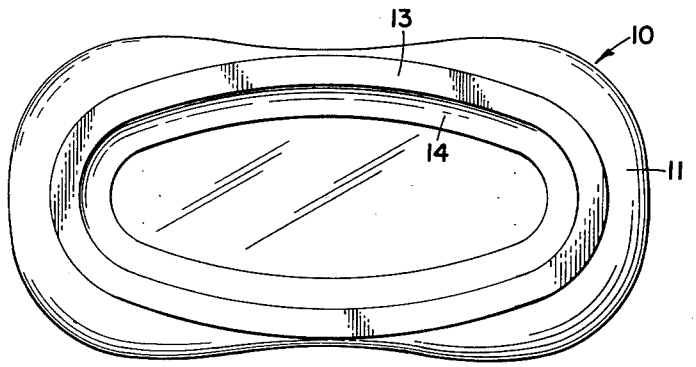


FIG. 4



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ROLLER DISPENSER

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FIG. 5

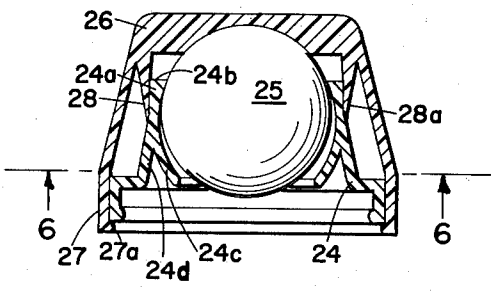


FIG. 6

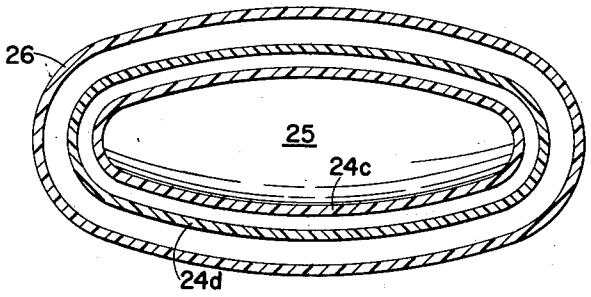
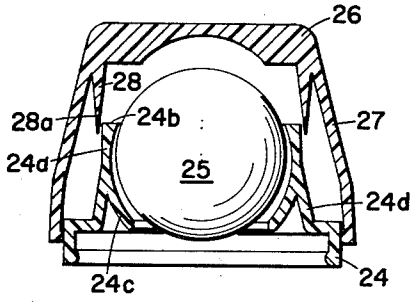


FIG. 7



United States Patent Office 3,134,131 Patented May 26, 1964

3,134,131

ROLLER DISPENSER

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This invention relates to means adapted for application to a bottle or other type of container carrying a liquid or fluid cream or paste for enabling the dispensing and application of a film or small quantity of the liquid or other fluid preparation to a surface to be treated. It may be used, for example, to apply a deodorant preparation or similar fluid to regions or surfaces of the human body.

In applicant's Patent No. 2,749,566, granted June 12, 1956, there is shown a ball type dispenser adapted for the same general purposes as the present invention. However, with the use of a ball as the applicator member, the quantity of fluid which may be dispensed on a single pass of the member over a surface is limited.

A primary object of the present invention has been to provide a rotatable applicator member which is adapted to apply a liquid or fluid paste quickly, by a single pass or stroke, to a relatively large surface area. For this purpose the ball of the dispenser disclosed in the above-mentioned patent has been replaced by an elongated, roller type, applicator member adapted to turn about its longitudinal axis. This has presented various problems in the provision of an effective seal for the container when not in use, to prevent leakage of the contents of the container and to prevent vaporization of the volatile constituents thereof.

The foregoing problems have been solved, in accordance with the present invention, by the employment of a roller having a substantially elliptical cross-section in planes parallel with the longitudinal axis thereof. A special fitment has been provided for retaining the elliptical roller for rotation about its longitudinal axis, and a special cap has been provided for cooperation with the fitment to produce the desired sealing action around the portion of the roller which extends outwardly beyond the fitment, when the unit is carried in a purse or is stored on a shelf or the like. The arrangement is such that objectionable caking of the fluid preparation on the surface of the roller is prevented during extended periods in which the dispenser is not being used.

In accordance with the invention, moreover, provision is made for the retention of a small quantity of the fluid preparation around that portion of the roller inwardly of the line along which the sealing action, referred to above, takes place. This is accomplished by forming, around such portion of the roller, a narrow passage in which the fluid is retained by capillary action.

Other objects, features and advantages of the invention will appear from the detailed description of certain embodiments of the same which will now be given in conjunction with the accompanying drawings, in which:

FIG. 1 is a vertical sectional view through the top of a container and a roller dispensing unit constructed in accordance with the invention, said view being taken along the major axis of the roller of the unit in a plane through the vertical axis of the container;

FIG. 2 is a transverse vertical sectional view taken along the line 2—2 of FIG. 1;

FIG. 3 is a transverse vertical sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is a top plan view of a preferred form of the container used in connection with the invention;

FIG. 5 is a vertical sectional view, similar to FIG. 2, showing a modified construction of a closure cap embodied in the unit;

FIG. 6 is a horizontal sectional view taken along the line 6—6 of FIG. 5, in the direction indicated by the arrows; and

FIG. 7 is a view, similar to FIG. 5, showing the closure cap spaced slightly above the roller retaining fitment.

Referring now to the drawings, a container 10 is provided to retain the fluid preparation to be dispensed and applied. This container is preferably formed of glass or other quite rigid material. If the material of which the container is formed is of a character which may be flexed upon the application of a squeezing pressure, it has been found difficult to insure the desired sealing action which will be hereinafter described. At least the upper portion of the container should be of such a rigid character as to resist distortion of its shape under the application of forces to which it may become subjected in the course of use, storage or transportation.

The container is preferably provided at its upper end with a large opening having a generally elliptical contour. To facilitate application of the dispensing unit and closure cap contemplated by the present invention, the upper end of the confining wall of the container is preferably provided with a sloping surface 11 at the inner end of which there is an upwardly and outwardly extending neck portion 12. The latter has a flat horizontal surface 13 at its upper end and an inclined surface 14 extending inwardly and downwardly from the surface 13 to merge with the wall defining the discharge opening of the container. This arrangement is such that a groove 15 is provided in the neck portion of the container, this groove being of substantially elliptical contour.

Applied to the neck of the container is a fitment 16, preferably formed of a suitable plastic having resilience and the capability of being flexed upon the application of a suitable force. This fitment, as viewed from the top, has a generally elliptical contour conforming with that of the neck portion 12 of the container. It has a downwardly extending skirt 17 at the lower end of which there is preferably provided an inwardly extending rib 17*a* adapted to snap into the groove 15 as the fitment is applied to the container. Within the fitment there is mounted a roller 18 having a substantially elliptical contour in planes passing through the longitudinal axis of the roller, as is apparent in FIG. 1. In any transverse plane at right angles to the axis of the roller, its contour is circular, as shown in FIGS. 2 and 3. The fitment 16 has an upwardly extending wall, the upper end of which is in a plane somewhat above the longitudinal axis of the roller when the latter is assembled in the fitment. This vertically extending wall of the fitment has, at its upper end, an inwardly projecting portion 19 presenting a relatively sharp edge which is normally spaced slightly from the adjacent surface of the roller but which is adapted to be urged into engagement with the roller upon the application of a closure cap in the manner to be described. The edge provided by the portion 19 of the fitment serves to retain the roller 18 within the cavity at the upper end of the fitment, but due to the resilience and flexibility of the fitment, this edge may be readily urged outwardly to a sufficient extent to enable the roller to be introduced to assume the position shown in FIGS. 1–3.

The fitment has a curved flange portion 20 which extends inwardly and downwardly from the substantially vertically extending surrounding wall of the fitment. This flange preferably extends inwardly to a greater extent adjacent the ends of the roller 18, as shown in FIG. 1, than in the regions along the sides of the roller, as shown in FIG. 2. The roller 18 may rest directly upon the inner edges of the end portions of the flange, as shown in FIG. 1, but it is spaced slightly from the remainder of the flange which extends completely around the lower portion of the roller. In lieu of having the roller rest directly upon the inner edges of the end portions of the

flange, these portions may be provided with small spherical projections 20*a* upon which the ends of the roller rest. In either event, there is provided a narrow passage 23 between the surface of the roller 18 and the flange 20, this passage being sufficiently narrow, in directions transverse to the axis of the roller, to bring about the retention, by capillary attraction, of a small amount of the fluid preparation which enters this passage upon the inversion of the container. This makes possible the prompt application of the fluid upon rotation of the roller as it is drawn or rubbed over the surface to which the fluid is to be applied. It will be understood that when a small portion of the contents of the contanier 10 is to be dispensed and applied to a surface, the container is inverted so that the contents may flow be gravity into engagement with the portion of the roller exposed to the contents of the container and into the passage 23, from which it is carried by the rotation of the roller and applied to the desired surface as the roller is moved across that surface.

After the desired application has been made, the container is closed by the application of a cap 21 having the same general elliptical contour, as view from the top, as the roller member 25. In the form of the invention shown in FIGS. 1 and 2, the side wall of the cap has a portion which is substantially vertical, or perpendicular to the top of the cap, for some distance downwardly from said top, but the wall flares outwardly, as indicated at 21*a*, below the vertical portion mentioned. At its lower end the cap has a downwardly extending flange 21*b* adapted to snugly surround the portion 17 of the fitment. If desired, the cap may be provided with a small inwardly extending bead 21*c* around the lower end of the flange 21*b*, this bead being adapted to snap inwardly beneath the lower end of the flange 17 of the fitment for the purpose of firmly retaining the cap in place. It will be noted that the upper vertical portion of the wall of the cap is adapted to retain the lip 19 of the fitment in close engagement with the surface of the roller 18 when the cap is applied in the position shown in FIGS. 1 and 2. The outwardly inclined portion 21*a* of the cap wall serves to cam the upper portion of the fitment inwardly in the course of applying the cap. It will be apparent that the vertical portion of the wall of the cap enables the latter to be pressed downwardly to a sufficient extent to permit the bead 21*c* to snap into retaining position beneath the flange 17 of the fitment 16, without further inward pressure on the lip 19 of the fitment.

The cap should be formed of a more rigid material than the fitment. It may suitably be formed of a plastic of this character which will cause inward flexing of the upper portion of the fitment in the manner explained rather than an outward bulging of the cap itself. In a preferred embodiment of the construction it has been found desirable to employ a low density polyethylene for the fitment and a high density polyethylene for the cap. As used herein the term "low density" should be understood to mean a density of between 0.910 and 0.925. High density should be understood to mean a density of between 0.941 and 0.965. These densities are as determined in accordance with the ASTM standards.

In FIG. 5 a different form of cap 26 is shown. This cooperates with a fitment 24 which may be of the same form and construction as the fitment 16. In has an upwardly extending portion 24*a* provided at its upper end with a lip 24*b* which completely surrounds the upper portion of a roller 25 and has a inner edge conforming with the contour of the roller in the plane of said edge. A lower, inwardly and downwardly curved flange 24*c* of the fitment 24 follows the contour of the roller and provides a support for the ends of the roller in the manner described in relation to the flange 20 of the fitment 16. Cap 26 has a wall 27 of elliptical contour in horizontal cross-section and a rib or projection 28 which extends downwardly from the top of the cap and is preferably triangular in cross-section. Rib 28 extends completely around the helical contour of the cap and has its main portion spaced inwardly from the outer wall of the cap. The point 28*a* of the triangle formed by any cross-section through the rib is at its lower end and this is spaced slightly outwardly of the upper end of the portion 24*a* of the fitment. The inner surface of rib 28 may be inclined outwardly at a small angle, as indicated in FIG. 7, to insure the normal location of the lower edge of the rib outwardly of the top surface of portion 24*a* of the fitment as the cap is about to be applied. The arrangement is such that as the cap is applied, from the position shown in FIG. 7 to that shown in FIG. 5, the lower end 28*a* of the rib rides along the outer surface of portion 24*a* of the fitment and urges this inwardly to engage the lip 24*b* against the surface of the roller. It will be understood that this action takes place completely around the elliptical contour of the roller in the plane of the lip 24*b*. Since the cap, as explained above, is formed of a more rigid material than the fitment, the rib 28 will flex the upper portion of the fitment inwardly in the manner explained. There may be some outward yielding of the lower end of the rib also, but the net result will be to provide the desired sealing action. A slight outward flexing of the lower end of the rib 28 makes possible a downward movement of the cap, in applying it to the container, slightly further than is required to bring about the sealing engagement of the upper portion of the fitment with the elliptical roller. This makes it possible to insure snapping of the bead 27*a* inwardly below the lower end of the fitment without undo tolerance requirements in the formation of the parts.

As shown in FIGS. 5 and 7, the lower end of wall 27 of the cap is preferably provided with an inwardly extending bead 27*a* adapted to snap over the lower end of the bottom flange of the fitment. In removing the cap from the container, the lower end of the flange 27 will be flexed outwardly sufficiently to enable the bead 27*a* to ride upwardly along the flange of the fitment, and in doing so will tend to urge the bead on the fitment flange more firmly into the groove 15 of the neck of the container.

While a preferred embodiment of the invention and certain modifications thereof have been described in considerable detail, it will be understood that further modifications may be made within the scope of the appended claims.

What is claimed is:

1. A fluid dispenser and applicator which comprises a rigid container for the fluid to be dispensed, said container having an opening through which the fluid may be introduced and discharged, a fitment applied to said container and arranged to provide a passage alined with said opening and to close the latter, said fitment being formed of a resilient, flexible plastic and carrying a roller which is substantially elliptical in cross-sections taken in planes parallel with the longitudinal axis thereof, said fitment having a portion thereof projecting upwardly above a horizontal plane extending through the longitudinal axis of said roller, said portion being normally spaced slightly from the surface of said roller completely around the elliptical contour thereof, said portion of said fitment being of elliptical contour and serving to retain said roller within the fitment, and a cap slidably engaged with said fitment by axial movement in relation thereto and having an upwardly and inwardly sloping surface thereon engaging the outer peripheral surface of said portion of said fitment to urge the same into sealing engagement with the surface of said roller completely around the elliptical contour thereof outwardly of the horizontal plane through the axis thereof.

2. A fluid dispenser and applicator of the character set forth in claim 1 in which said container is provided with a neck portion surrounding said opening, said neck portion having an outer surface of elliptical contour in planes

transverse to the axis of said neck portion and of the same dimensions throughout the length thereof, said neck portion having a groove extending around the same beneath said surface, said fitment having an inner surface of substantially the same elliptical contour as said surface on the neck portion for snugly engaging said outer surface of said neck portion, and said fitment having inwardly projecting means at its lower end adapted to snap into said groove in said neck.

3. A fluid dispenser and applicator of the character set forth in claim 2 in which said fitment is formed of a low density polyethylene and said cap is formed of a high density polyethylene.

4. A fluid dispenser and applicator of the character set forth in claim 1 in which said cap is formed of a more rigid material than said fitment and is provided with a downwardly extending projection having its major portion spaced from the inner wall of said cap, said projection having a greater resistance to flexing than said portion of the fitment and having thereon said sloping surface of the cap which is of elliptical contour and which engages said portion of said fitment to urge the latter laterally into sealing engagement with the surface of said roller.

5. A fluid dispenser and applicator of the character set forth in claim 4 in which said projection extends downwardly from the top of said cap, said surface of elliptical contour being on the inner surface of said projection.

6. A fluid dispenser and applicator of the character set forth in claim 5 in which at least a portion of the inner surface of said projection slopes outwardly from the upper toward the lower end thereof, the lower portion of said surface being spaced slightly outwardly of the outer surface of said portion of the fitment as the cap is disposed directly above said fitment, and the upper end of said surface of said projection then extending inwardly of the outer surface of said portion of the fitment.

7. A fluid dispenser and applicator of the character set forth in claim 5 in which said projection is of triangular cross-section with the apex of the triangle at the lower end of the projection.

8. A fluid dispenser and applicator of the character set forth in claim 7 in which the inner surface of said projection slopes outwardly from the upper toward the lower end thereof, the lower end of said surface of the projection being spaced slightly outwardly of the outer surface of said portion of the fitment as the cap is disposed directly above said fitment, and the upper end of said surface of the projection then extending inwardly of the outer surface of said portion of the fitment.

9. A fluid dispenser and applicator of the character set forth in claim 4 in which said cap has an inwardly extending projection adjacent its lower end adapted to snap inwardly beneath a shoulder adjacent the lower end of said fitment as the cap is fully applied to said container, said downwardly extending projection within said cap being capable of slight outward flexing toward said inner wall of the cap after said portion of said fitment has been urged into sealing engagement with the surface of said roller, whereby said cap may be moved downwardly to a limited extent after said sealing engagement has been effected, thus enabling said inwardly extending projection adjacent the lower end of said cap to snap beneath said shoulder adjacent the lower end of said fitment.

10. A fluid dispenser and applicator of the character set forth in claim 1 in which said cap has an inwardly extending projection adjacent its lower end adapted to snap inwardly beneath a shoulder adjacent the lower end of said fitment as the cap is fully applied to said container, said surfaces on said cap and said fitment which cooperate to urge said portion of said fitment into sealing engagement with the surface of said roller being so formed and constructed that said cap may be forced downwardly over said fitment to a limited extent after said upwardly projecting portion of the fitment has been brought into sealing engagement with the surface of said roller.

11. A fluid dispenser and applicator of the character set forth in claim 1 in which said sloping surface on said cap merges into a vertically disposed surface thereon having throughout its height the same elliptical contour and same dimensions in all horizontal planes throughout the height of said vertically disposed surface as the upper end of said sloping surface, said cap having inwardly projecting means adjacent the lower end thereof adapted to snap into position beneath a shoulder adjacent the lower end of said fitment after the cap has been applied to a sufficient extent to effect the sealing engagement between said portion of said fitment and the surface of said roller, said vertically disposed surface on said cap enabling further downward movement of said cap after said sealing engagement has been effected to permit said inwardly projecting means to be carried below said shoulder adjacent the lower end of said fitment.

References Cited in the file of this patent

UNITED STATES PATENTS

2,749,566	Thomas	June 12, 1956
2,923,957	Gentile	Feb. 9, 1960
2,997,731	Schultz	Aug. 29, 1961
3,036,328	Schaich	May 29, 1962
3,039,132	Hambley	June 19, 1962

FOREIGN PATENTS

571,532	Italy	Jan. 10, 1958
1,215,460	France	Nov. 16, 1959