

Sept. 18, 1962

J. J. CLAREY

3,054,535

LOTION BOTTLES AND PACKAGES

Filed July 1, 1957

FIG. 1

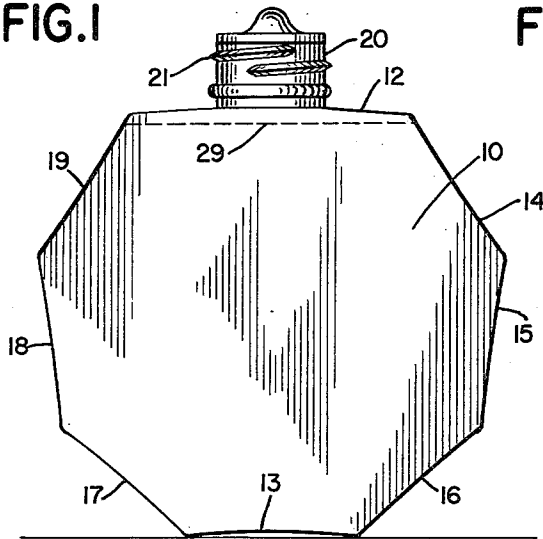


FIG. 2

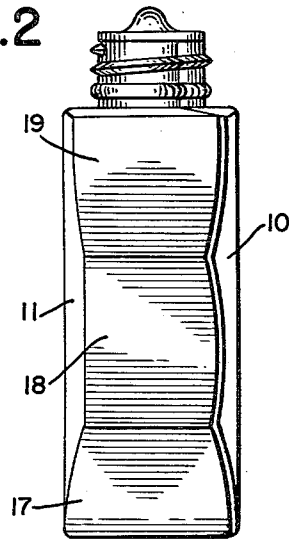


FIG. 4

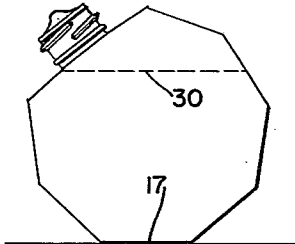


FIG. 5

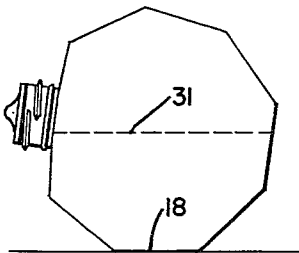


FIG. 6

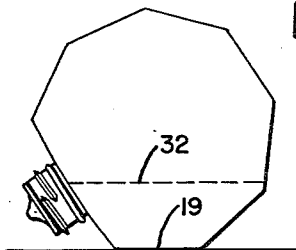


FIG. 3

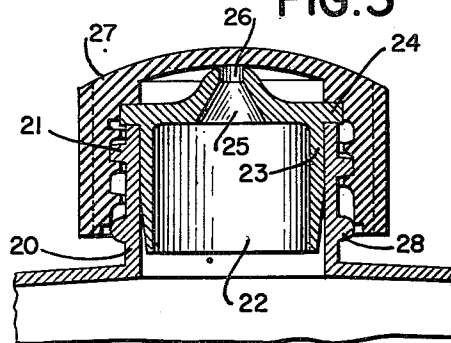
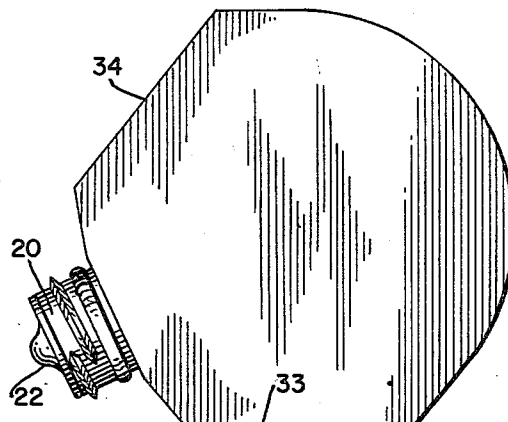


FIG. 7



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LOTION BOTTLES AND PACKAGES

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3 Claims. (Cl. 222-215)

This invention relates to a squeeze bottle formed of a suitable plastic adapted for the packaging of a viscous, fluid composition intended to be used in small increments. It is particularly adapted for use in connection with compositions intended for frequent use and which it is desired to make available for use with a minimum of effort and without loss of time. An important application of the invention is in connection with the packaging and dispensing of a lotion type dentifrice. The invention also encompasses the complete package, comprising the bottle and its contents.

Heretofore it has been the most common practice to formulate a dentifrice in paste form and to package the same in a collapsible tube, formed of metal or the like, which may be squeezed and folded to eject the paste through a suitable nozzle or dispensing neck and to reduce the size of the container as the contents is consumed. Such containers have, however, been unsightly as the contents have been gradually consumed and, due to the differing habits of various individuals, the form of the package, as the contents have been consumed, has varied widely. Moreover, an excessive amount of space on a shelf is required for such a container. In many instances the procedure followed in ejecting the contents of the tube has prevented the complete utilization of the contents and frequently efforts to eject the final portions of the contents have led to rupturing of the wall of the tube. This has been particularly true when the nature of the paste and the more or less careless use of the container has led to the caking of the remaining paste after a portion has been consumed.

In accordance with the present invention the dentifrice has been compounded in a fluid state, rather than as a paste, and it has been packaged in a squeeze bottle, instead of a collapsible container. The squeeze bottle is formed of a resilient plastic material, such as polyethylene or polymethylene, which is resilient and capable of returning to its original form after a squeezing action upon the release of the squeezing pressure. Due to the fluid nature of the dentifrice, it may be readily ejected upon the squeezing together of the resilient walls of the container. The contemplated dentifrice is, however, provided with sufficient body or stiffness to enable it to remain as a lump on a tooth brush, or the like, onto which it is ejected.

Certain difficulties have been encountered in the packaging and dispensing of a dentifrice of the character indicated, in and from a squeeze bottle, in that the dentifrice has had a tendency to adhere to the wall of the container to such an extent that, as a substantial part of the lotion has been consumed, a considerable amount of time has been required, after the bottle has been inverted, to enable the contents of the bottle to get into such a position in relation to the discharge nozzle or neck that it may be discharged therefrom by the air pressure created upon the squeezing of the bottle.

An important object of the present invention has been to devise a special form of container which will enable it to be so positioned on a shelf or the like, when not in use, as to insure the maintenance of a portion of the contents over or closely adjacent to the discharge nozzle or neck so that when the container is squeezed the contents will be instantly ejected. The bottle or container is preferably provided with a nozzle or neck having a suffi-

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ciently small discharge passage that the fluid contents will not flow therefrom upon the inversion of the bottle, without a squeezing action upon the walls of the bottle. The cross-sectional area of the discharge passage may thus vary in accordance with the viscosity, surface tension and other characteristics of the contents which determine its ability to flow by gravity through the passage. While it is contemplated that the bottle will be closed and sealed by a suitable cap, when not in use, it is desirable that the relationship between the composition or general nature of the contents of the bottle, the material of which the bottle is formed and the cross-sectional area of the passage through the nozzle or neck be such that the contents, in the nature of a viscous fluid lotion rather than a paste, will not flow by gravity through said passage upon inversion of the bottle with the cap removed therefrom. However, the discharge passage should be of such dimension that an adequate amount of the lotion will be forced therethrough upon the squeezing of the bottle. Normally a single squeezing of the bottle should be sufficient to discharge the amount of dentifrice desired for a brushing operation.

An important feature of the invention is the construction of the bottle in such a form that it may be placed on a shelf or other support in such a position that the contents will tend to flow toward the discharge passage. For this purpose supporting legs may be provided around the neck or nozzle having the discharge passage and these legs may extend outwardly beyond the end of the neck or nozzle to permit the outer ends of the legs to support the container from a flat surface. The ends of the legs may be considered as providing a surface, or plurality of surfaces, arranged to support the bottle from a shelf with the neck of the bottle extending downwardly toward the shelf. However, it is considered preferable, in accordance with the invention, to provide the bottle or container with a plurality of flat surfaces around its periphery, any one of which surfaces may be placed upon a horizontal surface to support the bottle. These flat surfaces on the bottle may be suitably disposed in different positions in relation to the location of the discharge neck or nozzle of the bottle. One such surface may, for example, be provided on a portion of the surrounding wall directly opposite the neck or nozzle and so formed that when this surface is placed upon the supporting shelf, or the like, the neck or nozzle will extend vertically upward. This will be found satisfactory when the bottle is substantially full. However, as the contents of the bottle is gradually being depleted other flat surfaces around the periphery of the bottle may be used to support the same from a shelf and these other flat surfaces may be arranged to so support the bottle that its neck or nozzle projects at different angles from the vertically upward direction mentioned above. Certain of these other surfaces will serve to support the bottle with its neck or nozzle extending downwardly from the horizontal. It has been found that a bottle of octagonal contour, in a plane taken along the axis of the bottle and parallel with the front and rear walls thereof, is particularly desirable. However, other contours in the indicated plane may be used to provide the advantages of the invention. Of primary importance is the provision of means for so supporting the bottle on a shelf or the like that the contents may be caused to flow by gravity toward the discharge outlet. A single flat surface around the periphery of the bottle, in a region adjacent the discharge neck or nozzle and in a plane at an acute angle to the axis of the latter, will serve the main purpose. It is desirable, however, to provide a configuration which permits the bottle to be placed upon a shelf in different positions so that the discharge outlet may be directed at different angles as the lotion within the bottle is being gradually depleted.

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Preferably the improved bottle is provided with substantially flat front and rear faces to facilitate printing thereon of decorative matter or information as to the nature and use of the contents. The provision of such flat surfaces, moreover, facilitates the reading of the matter printed thereon. It is desirable to so position this printed matter that it may be most readily read and impressed upon the mind of the user.

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

FIG. 1 is a front elevational view of a squeeze bottle constructed in accordance with the invention, the closure cap being omitted;

FIG. 2 is a side elevational view of the bottle shown in FIG. 1 as seen from the left of that figure;

FIG. 3 is a sectional view through the neck portion of the bottle showing a nozzle element therein and a cap applied to the neck;

FIGS. 4, 5 and 6 are views illustrating different positions in which the bottle of FIG. 1 may be supported on a shelf, in addition to the position indicated in FIG. 1; and

FIG. 7 is a front elevation view of a squeeze bottle having a different configuration from that shown in FIG. 1.

Referring now to FIGS. 1 and 2, there is shown a squeeze bottle of substantially octagonal configuration as viewed from the front. This bottle has a substantially flat, but slightly curved, front face 10 and a similar rear face 11. Interconnecting the front and rear faces of the bottle is a series of substantially flat wall sections disposed in planes perpendicular to the front and rear faces and arranged to provide the octagonal configuration of FIG. 1. These interconnecting wall sections include a top wall 12, a bottom wall 13 and side walls 14, 15, 16, 17, 18 and 19. From the top wall 12 there projects outwardly a neck 20 provided with a thread 21 or other means, such as a bayonet joint formation, by which a removable cap may be secured to the neck. Within the neck there is firmly seated a nozzle element 22 (FIG. 3) having a side wall 23 snugly cooperating with the inner surface of the neck. An outwardly extending flange 24 adjacent the top of the nozzle is arranged to rest upon the outer surface of the neck. At the top of the nozzle element there is provided a central passage having a frusto-conical portion 25 extending into a cylindrical portion 26. The diameter or cross-sectional area of the latter is such that the contents of the bottle, to be hereinafter described, will not flow by gravity through the same upon inversion of the bottle. This diameter or cross-sectional area should have the appropriate relationship to the viscosity, surface tension and adhesive properties of the contents with respect to the material of which the nozzle is formed to prevent such gravitational flow. A removable cap 27 provided with internal threads adapted to cooperate with the threads 21 on the neck of the bottle may be applied to the latter when the bottle is not in use. The crown of the cap, when the latter is fully applied to the neck, is preferably urged into firm engagement with the outer end of the nozzle element, to form a seal at this point and thus prevent evaporation of any of the constituents of the contents of the bottle. Adjacent the lower end of the neck 20 a circumferential bead 28 may be provided to cooperate with the lower end of the cap to assist in providing an effective seal.

The bottle may be formed of any suitable plastic material having desirable resilience and elasticity which enables the squeezing of the walls to reduce the capacity of the bottle and then return to their original form upon release of the squeezing action. The material of which the bottle is formed should also be resistant to reaction with the constituents of the lotion packaged in the bottle and should resist the passage of the lotion, or any of its con-

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stituents, through the walls of the bottle. It has been found that polyethylene is a particularly suitable material for this purpose, especially for the packaging of a dentifrice lotion which usually carries certain amounts of flavoring oils and the like which, due to their volatility and other characteristics, tend to permeate through the walls of containers formed of many plastic materials, particularly when the bottles are retained over a long period of time on a shelf. Polyethylene also has properties which enable it to form an effective seal in relation to other more rigid surfaces, such as that which would normally be provided on the detachable cap. The polyethylene which is preferably employed in the construction of the bottle may be of the regular or ordinary type commonly used in squeeze bottles of the spray type. It may also be of the higher density form of polyethylene material, commonly known as polymethylene. This is somewhat harder and more rigid than the ordinary polyethylene and affords even greater resistance than does ordinary polyethylene to penetration or permeation of gases and liquids. Still greater resistance to penetration of and permeation through the bottle walls by the more volatile ingredients of the dentifrice lotion, with attendant loss of such ingredients, may be achieved by interposing an additional barrier in the form of a liner or coating over the interior walls of the bottle. Such liners or coatings must, of course, be chemically inactive with respect to the various ingredients of the bottle contents. Suitable liners or coating materials are, of course, various vinyl chlorides, vinylidene chloride or epoxy resins. The thickness of the various walls of the bottle should be sufficient to enable the bottle to maintain its configuration, when placed on a shelf, and at the same time permit easy distortion, particularly of the front and rear walls, upon the application of a squeeze action. Wall thicknesses conventionally used in the production of squeeze bottles of the spray type may suitably be employed.

The nozzle element 22 may be formed of any suitable plastic material, but in the preferred embodiment it is also formed of polyethylene or polymethylene. This enables the formation of a tight seal between the nozzle and inner wall of the neck of the bottle upon the mere press-fit insertion of the nozzle element. Also, it enables a good sealing action to be provided at the outer end of the nozzle as the cap 27 is applied. This cap may also be formed of polyethylene, but it is preferably formed of a more rigid type of plastic, such as polystyrene or "Bakelite." As indicated above, the sealing of the discharge nozzle is provided effectively even when a rigid cap is employed due to its cooperation with the more resilient and yielding plastic of which the bottle and nozzle are formed.

The lotion packaged in the bottle may be of any suitable character having the properties hereinabove mentioned. It should have sufficient viscosity and stiffness to prevent it from flowing freely into the spaces between the bristles of a brush or dripping from the brush and it should not be so fluid as to be discharged through the orifice of the nozzle upon mere inversion of the bottle. At the same time it should not have the stiffness of paste since this would interfere with its ready discharge upon the squeezing of the bottle.

Typical formulations which have been found suitable for the purposes of the invention contain water to the extent of between 5% and 35%, an additional liquid carrier which was humectant properties, such as glycerine, propylene glycol or a 70% aqueous solution of sorbitol, this additional carrier being present to the extent of from 5% to about 70%, a filler material, such as finely divided calcium carbonate or dicalcium phosphate, to the extent of 20% to 50%, and small percentages, i.e. from a fraction of 1% to 2%, each, of other constituents such as sodium lauryl sulfate, or other surface active agents, flavoring oils or the like, thickeners such as sodium car-

boxymethyl cellulose, complex magnesium aluminum

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silicates, and saccharin. Such formulations which have been found to provide an excellent lotion dentifrice are more fully described and claimed in the pending application of Murray et al., Serial No. 665,413 filed June 13, 1957, now abandoned.

Lotions compounded from the indicated constituents, within the ranges mentioned, have been found to have the desired properties of viscosity, surface tension and the like to form an excellent dentifrice. The plastic viscosity of formulations of the character mentioned, as determined by a Rotational Rheometer, type S.T.K., sold by Drage Products, Inc., has been found to be between about 18 and 22 poises. The "yield value," as determined by the same instrument was found to be about 850 dynes per square centimeter. Yield values of between about 200 and 1100 dynes per square centimeter are satisfactory. By the use of a Brookfield viscosimeter, using a No. 5 spindle at 4 r.p.m., the apparent viscosities of these compositions was found to be between about 20,000 and 100,000 centipoises. They may be readily packaged in and dispensed from a squeeze bottle of the character described and will not flow by gravity through the orifice of the nozzle element 22 upon mere inversion of the bottle. It has been found in this connection that for lotions of the character indicated the passage 26 in the nozzle may suitably have a diameter of $\frac{3}{32}$ of an inch. This may be varied somewhat with the specific formulation of the lotion.

When the bottle is filled the lotion may assume a level such as indicated at 29 in FIG. 1. The bottle may then be retained on the shelf in the position indicated in FIG. 1 since the lotion will quickly descend, to cover the inner end of the passage through the neck, upon inversion or tilting of the bottle. After the level of the lotion has dropped to about that indication at 30 in FIG. 4, it will be found desirable to support the bottle on a shelf by either of its surfaces 16 and 17. When the lotion level drops to that indicated at 31 in FIG. 5, it is desirable to place the bottle on the shelf with either of its surfaces 15 and 18 against the top of the shelf. As the lotion level drops further to the point indicated at 32 in FIG. 6, it has been found desirable to support the bottle from either of its surfaces 14 and 19. If desired, the bottle may always be supported from the shelf by one of the latter surfaces since, as indicated above, there will be no danger of discharge of the contents by gravity at any time. The important thing, for speed of ejection of the lotion when desired, is to so dispose the bottle on the shelf that the lotion will, at all times, be in or close to the region of the inner end of the passage through the neck of the bottle.

By way example, a bottle of the character described above, adapted to retain three fluid ounces of lotion, may have a maximum width of 3" and a maximum thickness of $1\frac{1}{4}$ ". The neck may have an outside diameter of about $\frac{3}{4}$ " and a height of about $1\frac{1}{32}$ ", the overall height of the bottle without the nozzle element and cap being about $3\frac{3}{4}$ ". When the nozzle and cap are applied to the bottle the overall height may be increased about $\frac{3}{16}$ ". The opening through the neck of the bottle may be about .57" and the wall thickness of the nozzle element may be about $\frac{3}{64}$ " in the major part of its skirt portion and about $\frac{1}{16}$ " in its top portion.

As hereinabove indicated, the bottle may have a variety of other configurations within the purview of the invention. As is shown in FIG. 7, the bottle may, in lieu of having an octagonal configuration, be provided with flat surfaces 33 and 34 in regions adjacent the neck of the bottle and disposed in planes at an acute angle to the axis of the neck. The rest of the surrounding wall of the bottle may be curved as shown. The bottle may then be placed on the shelf with either the surface 33 or the surface 34 in engagement therewith. This insures the projection of the neck of the bottle in a downward direction from the horizontal and thus insures that most of the

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time the lotion will cover the inner end of the opening through the neck of the bottle, and even when the contents are almost depleted the contents of the bottle rapidly enter the opening through the neck, in spite of the slow flowing characteristics of the contents due to viscosity, adhesion to the walls of the bottle, and the like.

If desired, the bottle of FIG. 7 may be provided with only one flat surface 33 and the rest of the contour of the bottle may be curved. Also, it will be clear from the foregoing that in lieu of the octagonal configuration of FIG. 1, the contour of the bottle may be formed by a greater or lesser number of flat surfaces, one or more of which will permit placing of the bottle on a shelf with the neck or discharge nozzle extending downwardly at an appropriate angle from the horizontal.

While several illustrative embodiments of the invention have been disclosed in considerable detail and various modifications have been suggested, it should be understood that other changes may be made in the form of the bottle and the nature of its contents, within the scope of the invention as defined by the appended claims.

What is claimed is:

1. As an article of manufacture a squeeze bottle formed of a resilient plastic, a viscous lotion in said bottle capable of flowing slowly by gravity but having such surface tension and adhesion in relation to the surface of said plastic as to flow at a slow rate within said bottle upon inversion of the latter, said lotion having a plastic viscosity of about 18 to 22 poises, a yield value of about 200 to 1100 dynes per square centimeter and an apparent viscosity of 20,000 to 100,000 centipoises, said bottle having substantially flat front and rear faces which have a height substantially equal to their width and having a partially arcuate peripheral wall extending between said front and rear faces, said bottle having a nozzle projecting from its peripheral wall providing a restricted unobstructed discharge orifice for said lotion, said restricted discharge orifice having a cross section of $\frac{3}{32}$ of an inch, the size of the restricted orifice in relation to the plastic viscosity, yield value and apparent viscosity of said lotion being insufficient to permit flow by gravity through said orifice, the peripheral wall of said bottle having at least one surface in a region adjacent said nozzle by which said bottle may be supported on a horizontal shelf with said nozzle extending downwardly from the horizontal, said bottle being capable of being squeezed to force said lotion through said orifice as a lump when said lotion is disposed over the latter and being adapted to return to its original shape even when empty upon discontinuance of the squeezing action.

2. An article of manufacture of the character set forth in claim 1 in which said squeeze bottle is formed of a resilient plastic selected from the group consisting of polyethylene and polymethylene.

3. As an article of manufacture a squeeze bottle formed of a resilient plastic, a viscous lotion in said bottle capable of flowing slowly by gravity and having such surface tension and adhesion in relation to the surface of said plastic as to flow at a slow rate within said bottle upon inversion of the latter, said bottle having substantially flat front and rear faces which have a height substantially equal to their width and having a partially arcuate peripheral wall extending between said front and rear faces, said bottle having a nozzle projecting from its peripheral wall providing a restricted discharge orifice for said lotion, the said orifice having a sufficiently small discharge passage to prevent the lotion from flowing therefrom upon inversion of the bottle without a squeezing action upon the walls thereof, the peripheral wall of said bottle having at least one surface in a region adjacent said nozzle by which said bottle may be supported on a horizontal shelf with said nozzle being located below the bottle top in relation to said surface, the said nozzle extending downwardly from the horizontal at an acute angle to the horizontal axis thereof to permit the lotion to flow by gravity toward

the discharge orifice and to provide a portion of the lotion over the discharge orifice so that when the bottle is squeezed the contents will be instantly ejected, said bottle being capable of being squeezed to force said lotion through said orifice as a lump when said lotion is disposed over the latter and being adapted to return to its original shape even when empty upon discontinuance of the squeezing action.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,054,535

September 18, 1962

John J. Clarey

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 66, for "was" read -- has --; column 5, line 35, for "indication" read -- indicated --; line 52, for "way example" read -- way of example --.

Signed and sealed this 22nd day of January 1963.

SEAL)

test:

ERNEST W. SWIDER
Testing Officer

DAVID L. LADD
Commissioner of Patents