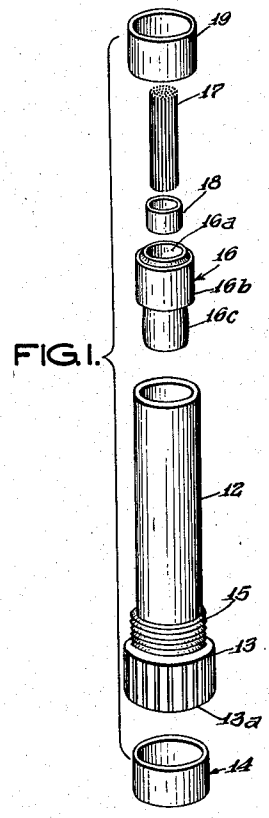
Nov. 24, 1953 J. B. McCABE ET AL 2,659,919

DEVICE FOR DISPENSING LIQUID PREPARATIONS THROUGH A BRUSH

Filed Sept. 10, 1949

FIG. 1.



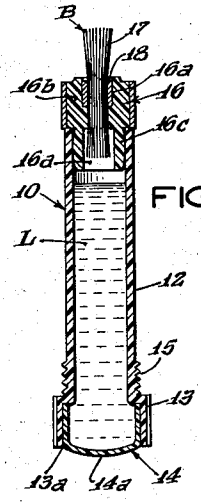
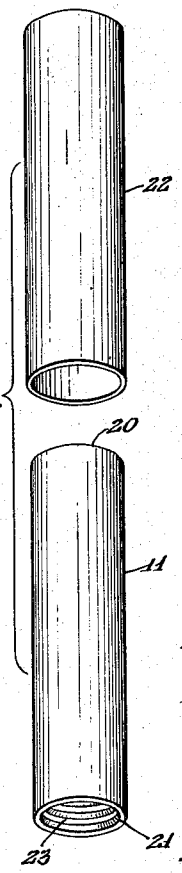


FIG. 2.

FIG. 3.



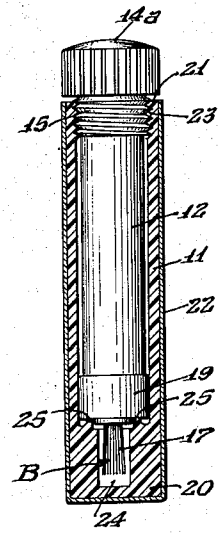


FIG. 4.

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DEVICE FOR DISPENSING LIQUID PREPARATIONS THROUGH A BRUSH

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4 Claims. (Cl. 15—136)

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Our invention relates to a novel and improved device for dispensing liquid preparations through a brush.

We provide a compact and portable container in which a suitable quantity of liquid preparation may be stored, and which includes means for dispensing a small amount of said liquid preparation through a self-contained brush, with which the liquid may be advantageously applied. This combined container and dispenser is adapted to be made in a size slightly larger than a conventional lipstick case, so that it may be conveniently carried about on the person. The dispenser is particularly adapted to dispense liquid preparations of a viscous nature such as nail polish, nail lacquer, liquid lip preparations, etc., although it may also be used for the dispensing of nonviscous liquids such as perfumes, etc.

The dispensing means provided with the container is adapted to be manually operated with the use of a single hand and without regard to the volatility of the liquid contained therein.

Other objects and advantages of our invention will be readily apparent in the course of the following description when taken in connection with the accompanying drawings which illustrate a preferred embodiment of the invention, and in which:

Fig. 1 is an exploded perspective view showing the container and its associated parts, the closure cap of the device not being shown;

Fig. 2 is a vertical section which shows the container in its assembled form and in an upright position, the container being partially filled with a liquid preparation;

Fig. 3 is an exploded perspective view of the closure cap 11 and its outer shell 22; and

Fig. 4 is a vertical section showing the entire device in the assembled condition in which it would be carried about on the person, the closure cap being attached to the container body and said container body being shown in an inverted position.

The device generally comprises a container 10 and a closure cap 11. The container 10 comprises an outer rigid casing 12 which is preferably made of Bakelite or other suitable material which will not chemically react with the ingredients of the contained liquid preparation. The casing 12 may be cylindrical, and is made with open front and rear ends.

The rear end of casing 12 is provided with an integral, enlarged knurled head 13 which is hollow, and which has an outer open end 13a. Into this open end 13a a cup-shaped flexible insert

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or plug 14 is fixedly secured by a force fit. Plug or insert 14 is made of a flexible plastic such as polyethylene. Plug 14 being thus affixed within the open end 13a of the knurled head 13, provides a liquid-tight and gas-tight seal for said open end. The end wall of plug 14 is convexly shaped to provide a flexible diaphragm 14a which may be distended or pressed inwardly from the outside of said container 10. When the insert 14 is in its fixed position, as shown in Fig. 2, the rear surface of diaphragm 14a is substantially flush with the rear edge of head 13.

The outer surface of casing 12 is provided with an external helical thread 15 commencing adjacent to, and extending forwardly of the knurled head 13. The thread 15 is used to removably secure the closure cap 11 to the container 10.

An insert 16 is also provided at the front end of casing 12. Said front insert 16 is made of a flexible plastic such as polyethylene and has a through and through longitudinal bore 16a, an enlarged head 16b and a sleeve 16C which has a small diameter than said enlarged head 16b. Said sleeve 16C has a diameter of such a size that it may be forcibly inserted within the front open end of casing 12, and said sleeve 16C being flexible, it is assembled in sealing relation with the front end of the casing 12 by means of a force fit.

A plurality of brush bristles 17 are inserted within a ring 18, said ring being also made of polyethylene or other suitable flexible plastic. The bristles are preferably made of animal hair or a soft synthetic material which is suitable for applying a contained liquid preparation. The ring 18 is forced into the bore 16a at the front end of insert 16 in which position it is firmly and frictionally held. The ring 18 fits tightly around the group of bristles 17 approximately at the centers of said bristles, so that said bristles are rigidly clamped in the position shown in Fig. 2 in which the front ends of said bristle 17 protrude from the front of casing 12, and the rear ends of the bristles extend into the rear open end of bore 16a.

The ring 18 is preferably made of the same material as the insert 16 in order that the bristles may be firmly held without the possibility of a different degree of thermal expansion between said ring 18 and the rigid front head 16b of insert 16.

In actual practice, we prefer to hold the front insert 16 in inverted position, insert the bristles 17 into position within bore 16a, and then force the ring 18 into position within said bore 16a.

The enlarged front head 16*b* of insert 16 is preferably encased by a metal ring 19 which is of substantially the same dimensions as said head 16*b* and is tightly secured thereabout by any suitable means.

Metal ring 19 is provided to prevent objectionable thermal expansion of its encased parts.

When the sleeve 16C of front insert 16 is force fitted within the front end of casing 12, the inner edge of enlarged head 16*b* abuts the forward edge of casing 12, as is clearly shown in Fig. 2. The metal ring 19 is thus located externally and forwardly of the Bakelite casing 12, said ring also protruding circumferentially beyond the wall of said casing 12.

In the assembled position of Fig. 2, the bore 16*a* of insert 16 communicates with the internal recess of casing 12, so that the liquid preparation L in said recess will contact the rear ends of bristles 17 when the container 10 is held in an inverted position shown in Fig. 4 with the front insert 16 facing downwardly.

The bristles 17 are preferably sufficiently fine and are clamped together sufficiently by ring 18 to provide a substantially liquid-tight or non-drip seal when the dispensing device is not in actual use but is inverted. The bore 16*a* in front insert 16 is also made sufficiently long and has a sufficiently small diameter to insure this non-drip seal.

The closure cap 11 is made of Bakelite or other material which has a low heat conductivity and a low permeability to radiated heat, in order to provide effective heat insulation for the container 10. Said closure cap 11 is shaped to house the entire casing 12 with the exception of the enlarged head 13. Closure cap 11 has a front closed end 20 and a rear open end 21.

A metal shell 22 may be optionally provided for ornamental purposes, said shell 22 tightly encasing the closure cap 11. The shell 22 may be force fit about said closure cap, or adhesive may be used for affixing said members.

The open end 21 of closure cap 11 is provided with an internal thread 23. This thread 23 matches the external thread 15 of casing 12, so that the container 10 may be removably secured to closure cap 11. The threads are preferably right handed so that when the container 10 is inserted in closure cap 11 and the knurled head 13 is turned clockwise relative to closure cap 11, said closure cap is brought to its secured position shown in Fig. 4.

As shown in Fig. 4, the closed front end 20 of closure cap 11 is provided with a relatively small recess or bore 24 which is positioned to receive and house the bristles 17 when closure cap 11 is screwed to its secured position. Said bore 24 is large enough, however, to prevent all or practically all of said bristles 17 from contacting the sides of said bore 24. The inner face of the closed end 20 is also provided with an annular circumferential ridge or rib 25 which surrounds the bore 24. When the closure cap 11 is in its secured position shown in Fig. 4, this rib 25 presses or digs into the front face of the relatively soft polyethylene head 16*b* of insert 16, thus forming a matching sealing groove which provides a liquid-tight and gas-tight seal around the bore 24 and its contained bristles 17.

Hence, when the closure cap 11 is in its secured position and the device is inverted and even shaken by ordinary transportation, the liquid preparation in container 10 does not leak through bristles 17 into bore or recess 24 because the pressure of the interior of container 10 is the same as the pressure within bore 24. No appreciable amount of liquid will pass through bristles 17 even if diaphragm 14*a* is accidently depressed while the closure cap 11 is in secured position. In such case, the forward end of bristles 17 will not be saturated with the liquid and said brush B will remain dry or substantially dry.

It will be noted that in the closed position of the device shown in Fig. 4, the wall of casing 12 is spaced from the wall of closure cap 11. Thus an air space is provided between container 10 and closure cap 11 except at the threaded portions 15 and 23 thereof, in order to insulate said container 10 from any passage of heat through closure cap 11. This insulation is provided to prevent heat entering casing 12 and causing the pressure of air and vapor in said casing 12 to increase to a point where some of the contained liquid is forced through bristles 17.

It will be noted, that in this regard, the casing 12 and closure cap 11 are preferably made of the same material so that any heat entering the device will tend to increase the pressure equally in both the recess 24 and the interior of casing 12.

When the dispenser is to be used, the closure cap 11 is removed from the container 10 and said container is held in a vertical position with the front end thereof pointing downwardly. In this position, the inner ends of the bristles 17 are immersed in the contained liquid L. When the flexible diaphragm 14*a* is depressed by the thumb, the air and vapor immediately below said diaphragm is compressed, and a small quantity of the liquid preparation is forced through the bristles 17, resulting in partial or complete saturation of said bristles. The liquid may then be rapidly applied by rubbing the brush over the finger nail or the like.

In ordinary use, the liquid which has been taken up by the brush will be sufficiently dispensed, so that when the rubbing application is stopped, none of the liquid preparation will drop out of the brush. The bristles 17 do not provide a perfect air seal. When the diaphragm 14*a* is released, its flexible nature will induce it to assume its normal convex shape, and the pressure within the container 10 will be reduced. Enough air will leak through the brush into the interior of said container 10, so as to provide air pressure in the container which is equal to external atmospheric pressure. If the device is inverted after application and the diaphragm 14*a* is released, any excess liquid remaining on the bristles 17 will be drawn back through said bristles into the interior of casing 12.

If the container is intended to be used to dispense a non-viscous, free-flowing liquid preparation such as perfume, the diameter of the bore 16*a* and also of the ring 18 is sufficiently reduced, and the length of bore 16*a* is sufficiently increased.

While a preferred embodiment of the invention has been shown and dscribed herein, it is obvious that numerous changes, omissions, and additions may be made without departing from the spirit and scope of the invention.

What we claim is:

1. A device for containing and dispensing a liquid preparation which is viscous and vaporizes at a temperature slightly above room temperature under normal atmospheric pressure, said device comprising a hollow tubular casing which is closed at its upper end, an extension member closing off the bottom end of said casing, said extension

member having a through-and-through bore which communicates with the hollow interior of said casing, a brush applicator which comprises a plurality of bristles extending longitudinally through said extension member bore and extending forwardly thereof, the central portion of said applicator being clamped within the wall of said extension member bore at the forward portion thereof, the rear portion of said applicator being wholly located within said extension member bore and being spaced from the wall thereof, the portion of said extension member bore in which the rear portion of said applicator is located being of smaller diameter than the diameter of the hollow interior of said casing, a portion of said casing being compressible from its normal shape by pressure on the exterior thereof to decrease the interior volume thereof and force said liquid preparation through said bristles, said casing portion being sufficiently resilient to return to its normal shape when said pressure is released, said device also including a closure cap which has a closed end and an open end, said closure cap being shaped to house the greater part of said casing, the open end of said closure cap having connecting means adapted to releasably secure said closure cap about said casing, the closed end of said closure cap having a wall which contains a longitudinal recess which houses the forward end of the brush applicator when said closure cap is secured to said casing, the closed end of said closure cap also having an internal annular projection disposed circumferentially around said recess and positioned to firmly abut said extension member adjacent to said brush applicator when said closure cap is secured to said casing, whereby to provide a gas-tight and liquid-tight seal around said brush applicator and said recess, said casing and said closure cap being made of a material which has a low heat conductivity and a low permeability to radiated heat.

2. A device according to claim 1 in which the greater portion of said casing is spaced from the interior of said closure cap.

3. A device according to claim 1 in which said connecting means comprises respective interfitting threaded portions at the open end of the inner face of the wall of said closure cap and on the outside of the closed upper end of the side wall of said casing, said casing being spaced from said closure cap except at the end portions of the side wall of said casing.

4. A device for containing and dispensing a liquid preparation which comprises a hollow tubular casing which is closed at its upper end, an extension member closing off the bottom end of said casing, said extension member having a through-and-through bore which communicates with the hollow interior of said casing, a brush applicator which comprises a plurality of bristles extending longitudinally through said extension member bore and extending forwardly thereof, the central portion of said applicator being clamped within the wall of said extension member bore at the forward portion thereof, the rear portion of said applicator being wholly located within said extension member bore and being spaced from the wall thereof, the portion of said extension member bore in which the rear portion of said applicator is located being of smaller diameter than the diameter of the hollow interior of said casing, a portion of said casing being compressible from its normal shape by pressure on the outside thereof to decrease the interior volume thereof, said casing portion being sufficiently resilient to return to its normal shape when said pressure is released, said extension member bore extending sufficiently rearwardly of said applicator and being of sufficiently small diameter relative to the diameter of said applicator and the bristles being held sufficiently closely together, all in relation to the surface tension of the liquid preparation, whereby to retain substantially all of said contained liquid preparation rearwardly of said brush applicator against the force of gravity when the internal pressure of said casing equals external pressure.

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