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LIQUID CONTAINER AND APPLICATOR

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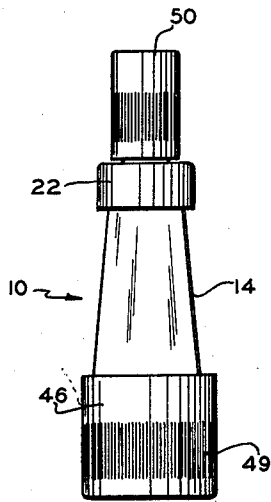


Fig. 1

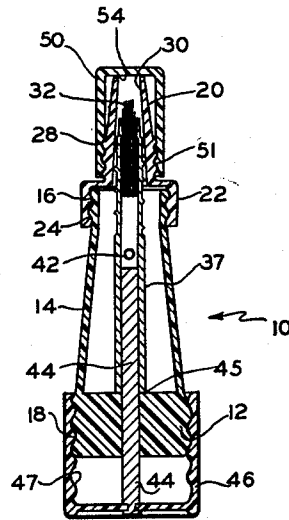


Fig. 2

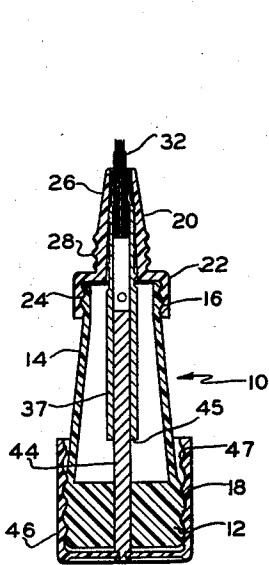


Fig. 3

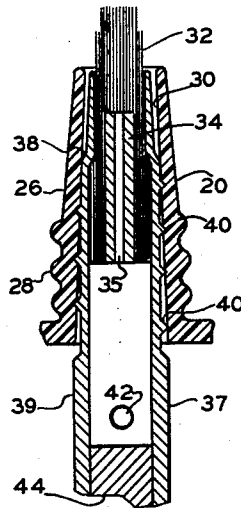


Fig. 4

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6 Claims. (Cl. 15—136)

This invention relates generally to containers for fluids, and has particular reference to an improved squeeze bottle type of liquid container which includes, in association therewith, novel applicator means for distributing the liquid stored in the container.

Fluid containers of the type under consideration are those that are generally used for storing and dispensing liquids such as finger nail lacquer and shoe polish. In conventional containers of this type, the applicator is usually in the form of a brush that depends from the underside of the cap or top for the container so as to project into the liquid stored in the container when the cap is in position. However, whenever the cap is removed to apply the liquid, or if it is not securely attached to the container when the latter is stored, spillage of the fluid may easily occur if the container is upset. Another disadvantage of the conventional construction described is that the applicator may become damaged if it is not returned immediately to the container after use and secured therein. Thus, if the liquid is of the quick drying type such as nail polish, it may dry on the brush causing the hairs thereof to stick together to such an extent as to render future use of the applicator objectionable unless thoroughly cleaned.

The primary object of the present invention, therefore, is to provide an improved container of the character described wherein the possibility of spilling fluid from the container is reduced to an absolute minimum.

Another important object of the invention is to provide a container of the character described having a resilient, compressible body so that pressure applied to the body will cause a controlled amount of the fluid within the container to be delivered to an applicator member associated therewith.

A further important object of the invention is to provide a container of the character described wherein the applicator member is permanently connected to the container body, and manually operable means are provided on the exterior of the body for effecting extension of the applicator beyond the confines of the container when it is desired to apply the fluid stored therein, and to effect retraction of the applicator back into the container after the fluid has been applied.

A still further important object of the invention is to provide a container construction having an applicator associated therewith wherein the means for moving the applicator into and out of the container also serves to provide, in part, a path of flow for fluid in the container to the applicator.

Another important object of the invention is to provide a container construction having a self-contained applicator wherein improved means are provided for mounting the applicator with respect to both the applicator actuating mechanism and the container itself.

The provision of a novel arrangement of parts forming a leak-proof container construction forms still another object of the invention.

Other objects and advantages of the invention will be-

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come apparent from the following detailed description thereof read in conjunction with the accompanying drawings which illustrate a preferred embodiment of the invention for the purpose of disclosure.

5 In the drawings:

Figure 1 is a side elevation of a container assembled in accordance with the invention;

Figure 2 is a vertical section through the container shown in Figure 1;

10 Figure 3 is a view similar to Figure 2 showing the container with the cap removed and the applicator in extended position; and

Figure 4 is an enlarged sectional view corresponding to the upper portion of Figure 3 to show the details of the applicator sub-assembly.

Having reference now to the drawings, wherein like reference numbers designate the same part in each of the views, the container body 10 is shown having an enlarged base portion 12 integrally connected to a tapered section 14. The outer surface of the upper and lower ends of the body are provided with threads 16 and 18. Preferably, the body is formed of a plastic material that is readily compressible for a purpose to be later made apparent.

20 Cooperating with the body portion 10 to form a chamber for the accommodation of a fluid is a nozzle 20 having a lower section 22 provided with an internal thread 24 and an upper section 26 provided with an external thread 28. The nozzle is formed of a relatively soft plastic material and the internal thread 24 designed so that upon application of the nozzle to the body portion an interference fit between threads 16 and 24 sufficient to assure a fluid seal for the prevention of the escape of fluid through the threaded connection is provided. The nozzle 20 is provided with passage 30 extending throughout its axial extent to accommodate an applicator together with a portion of its actuating mechanism.

The applicator includes a brush 32 composed of a plurality of hairs assembled about a core 34, Figure 4, of a metallic material having a relatively strong resistance to deformation such as brass. The brush 32 and core 34, which is provided with an axial passage 35, are mounted within one end of a tube 37 formed of a material having a relatively weak resistance to deformation such as aluminum. A portion of the outer end of the tube 37 is swaged to provide an annular shoulder 38 in the manner shown in Figure 4 to fixedly connect the applicator to the sleeve.

40 The tube 37 is further provided with a portion 39 having an outer diameter in excess of the width of the nozzle passage 30 at its inner end. Intermediate the swaged outer portion and the portion 39, the outer surface of the tube 37 is provided with threads 40 having a relatively sharp crest for penetrating the relatively soft wall of the nozzle passage. Thus, a complementary thread is formed in the wall of the passage 30 as relative movement between the tube 37 and nozzle 20 occurs in a manner to be presently described. The parts are so dimensioned that a liquid seal along the areas of contact between the tube 37 and nozzle 20 obtains by virtue of the tight tolerance-free connection involved.

45 Tube 37 is provided with an opening 42 permitting communication between the interior of the tube and the liquid accommodating chamber formed by the body 10 of the container and the nozzle 20.

50 Rigidly secured to and within the portion of the tube 37 below the opening 42 is a rod member 44. The rod and tube are so arranged that a shoulder 45 adapted to limit inward movement of the applicator is provided. The free lower portion of rod 44 extends through an opening provided in the base portion 12 of the body member 10 in such a manner that escape of fluid through

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the opening is prevented. This is achieved by forming the opening in the relatively pliable material of the base with a diameter that is slightly smaller than the diameter of the rod. Fixedly secured to the lower end of rod 44, outside the body of the container, is a cap 46, the inner surface of which is provided with threads 47 for engagement with threads 18 on the body member. The outer surface of cap 46 is provided with a knurl 49.

Completing the assembly is a cap or cover member 50 having a thread 51 on the inner surface thereof adapted to engage the external thread 28 on nozzle 20 in the manner shown in Figure 2.

In assembling the container, the applicator assembly and cap 46 are first connected to the container body and then, before attaching the nozzle 20, the body chamber is filled with the particular liquid that is to be dispensed. Thereafter, the nozzle is secured in position on the container body, and the top cap 50 is attached to the nozzle in the usual manner.

When it is desired to dispense fluid from the container, the top cap 50 is removed and bottom cap 46 is manipulated in a direction causing upward movement of rod 44. Engagement of the bottom wall of cap 46 with the base portion 12 of the body member, as indicated in Figure 3, limits the extended movement of the brush 32. At this point, however, a substantial portion of the brush will have been projected beyond the outer end of the nozzle as indicated in Figure 3. Thereafter, pressure applied to the compressible body member 10 forces the liquid confined within the chamber to flow into the tube 37 through opening 42 and from thence into the brush through the axial opening in the core 34. From the brush, the fluid may be applied directly to any desired object or surface.

After usage, manipulation of cap 46 in the opposite direction causes downward movement of the rod together with retraction of the applicator or brush to the position illustrated in Figure 2. The extent of the retraction is limited by engagement of the shoulder 45, formed by the lower end of the tube 37, with the upper surface of the base portion 12 of the body member. Cap member 50 is then attached to the nozzle in the manner described above. It will be noted that cap 50 is proportioned so that its top wall forms a seal with the upper end of nozzle 20 when the cap is fully applied as is shown at 54 in Figure 2.

Since liquid can escape from the container only through the applicator brush, and then only when the body member has been squeezed to force a controlled amount of the liquid through the tube opening 42 into the brush, it will be apparent that upsetting the container will not cause any measurable amount of the liquid to be lost. Moreover, even if the container remains in an upset position for some length of time, very little liquid will be spilled because only a small amount will flow through the opening 42 unless positive pressure is applied to the container body by squeezing. With respect to liquid remaining on the brush after use, which could cause stiffening of the bristles if a quick drying material such as nail lacquer were allowed to dry on the brush, the seal between the top cap 50 and upper edge of the nozzle prevents air from entering the container interior and thus substantially eliminates this possibility.

From the foregoing description, it will be seen that the invention described herein provides a container construction with a self-contained applicator that is economical in construction and highly practical in operation. As will be apparent to those familiar with the art, the invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The embodiment disclosed is therefore to be considered in all respects as illustrative rather than restrictive, the scope of the invention being indicated by the appended claims.

What is claimed is:

1. In a combined liquid container and applicator; a

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hollow, compressible body member open only at its upper end, a nozzle member forming a top closure for said body member and having an axial passage there-through, a tubular element positioned in said body and extending up into said nozzle passage, a brush supported by the upper end of said tubular element within said nozzle passage, a rod telescopically secured in the lower end of said tubular element and extending downwardly through the bottom of said body member, and a cap threadedly mounted on the exterior of said body member and operably connected to said rod whereby rotation of the cap serves to extend the brush to a position such that at least a portion thereof projects from the nozzle or retracts the brush to a position entirely within the nozzle, said tubular element forming a liquid-tight seal with said nozzle member when said brush is in extended position, said tubular element being in communication with the interior of said body member and also with the interior of said brush whereby liquid in the body member is forced through the element to the brush when the body member is compressed.

2. Structure as defined in claim 1 wherein said brush comprises a plurality of bristles arranged circumferentially about a hollow core element, said tubular element encircling said bristles and core and being displaced inwardly thereagainst to effect a connection between the core, bristles and tubular element.

3. Structure as defined in claim 1 wherein said tubular element is formed of relatively hard material and is provided with exterior threads having a relatively sharp crest, and said nozzle member is formed of relatively soft material such that said threads impress complementary threads on the surface of the nozzle member to prevent passage of liquid therebetween.

4. Structure as defined in claim 1 together with a container top cap engageable with the top of said nozzle member and forming a liquid tight seal therewith when fully engaged.

5. In a combined liquid container and applicator: a hollow upstanding body member formed of pliable, resilient material, the bottom of said body member being formed integrally with side wall thereof and having a thickness substantially greater than that of the side wall, a cup shaped cap enclosing the thickened bottom of said body member and providing a base on which the member is adapted to stand, said cap being threadedly engaged with the exterior of said thickened bottom whereby rotation of the cap operates to move it longitudinally with respect to the body member, said body member being formed with an open top, a nozzle member forming a top closure for said body member, said nozzle member being formed of the same material as the body member and having an axial passage therethrough, a brush positioned in said nozzle passage, means passing with a liquid-tight fit through said body member bottom to operably connect said cap to said brush whereby rotation of the cap serves to extend the brush to a position in which at least a portion thereof projects from the nozzle member or retracts the brush to a position entirely within the nozzle member, and means on said connecting means for forming a liquid tight seal with said nozzle member when said brush is in its extended position, said connecting means including means for permitting liquid in the body member to pass into the interior of the brush when the resilient side wall of the body member is squeezed.

6. Structure as defined in claim 5 wherein said brush comprises a multiplicity of bristles arranged circumferentially about a hollow core element through which the liquid passes into the interior of the brush.

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