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MIXING TUBE

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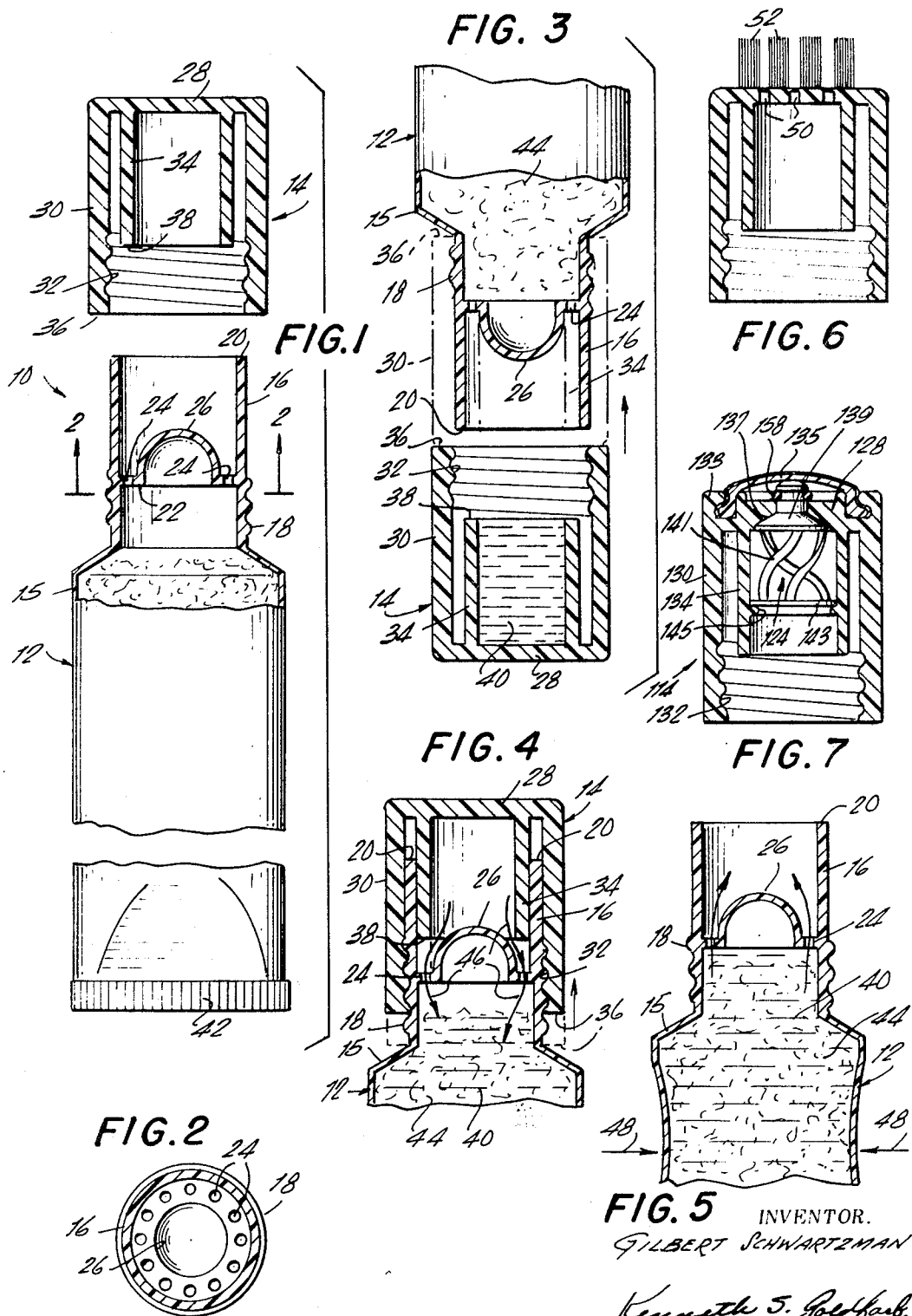


FIG. 5 INVENTOR.
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MIXING TUBE
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8 Claims

ABSTRACT OF THE DISCLOSURE

A mixing tube for use with two materials which have an extended shelf life when not mixed, but which must be used relatively soon after mixture to prevent deterioration. The mixing tube includes a squeezable tube and a cap with the tube having a plug engageable with a cylindrical projection depending from the cap to initially prevent mixture of the materials, but which allows for mixture of the materials upon loosening of the cap.

This invention relates to a mixing tube, and has for its primary object the provision of a single package assembly for facilitating the separate shelf storage of two substances adapted to be thereafter mixed, and for further facilitating the application of the mixture.

The present invention is especially adapted for use with two materials or substances which have an extended shelf life when not mixed, but which must be utilized relatively soon after mixture to prevent deterioration. Various cosmetics, medications, hair dyes, pigments, epoxy adhesives, polishes, cleansing solutions and the like have the foregoing characteristics. For example, conventional hair dyes employ a base material such as a peroxide solution or the like, with which a pigmented material or solution is mixed for immediate application on the hair. The color is determined by the make-up of the pigmented solution. If the pigmented material is mixed with the base and allowed to stand, the mixture may rapidly deteriorate and thus become unusable. It is often very messy to mix these solutions together using separate containers, and the present invention overcomes these difficulties by providing a unitary storage and mixing facility. Embodiments of the invention also have the additional advantage of providing for convenient application of the mixed fluid by providing for controlled flow of the mixed fluid onto the applicator surface.

One of the important objects of the invention resides in the provision of a tube having an extended neck provided with an apertured web having a centrally disposed plug adapted to seat in a central container cylinder depending from a threaded cap so that in a fully closed position the plug seals the container and in a partially closed position the material in the container is allowed to pass from the container into the tube.

Another object of the invention resides in the provision of a squeezable tube or like container that permits the separate shelf storage of two substances of an unstable mixture and which facilitates the mixture of the two substances and further facilitates the application of the mixture immediately after mixing all without removing the substances or requiring any exterior handling thereof.

Previously, certain mixing containers had been devised such as that disclosed in my previous United States Patent No. 3,347,410 issued Oct. 17, 1967 for "Mixing Assemblies for Applicators." The instant invention has advantages thereover because in at least one embodiment thereof only two plastic molded parts are employed thereby simplifying the entire construction and use while substantially reducing cost of production.

Still further objects and features of this invention re-

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side in the provision of a mixing tube which is simple and inexpensive to manufacture, easy to use, capable of mixing fluid, such as hair coloring dyes and the like, of various viscosities in an effective manner, and which is especially adapted for use in connection with cosmetics, medications, hair dyes and tints, polishes, and the like.

These, together with the various ancillary objects and features of the invention, which will become apparent as the following description proceeds, are attained by this mixing tube, preferred embodiments of which have been illustrated in the accompanying drawings, by way of example only, wherein:

FIG. 1 is an exploded vertical sectional view of a mixing tube construction in accordance with the concepts of the present invention;

FIG. 2 is a horizontal sectional view taken along the plane of line 2—2 in FIG. 1;

FIG. 3 is a view similar to FIG. 1, but showing the mixing tube in a position during filling thereof;

FIG. 4 is a partial sectional view showing the mixing device in mixing position;

FIG. 5 is a vertical sectional view similar to FIG. 4 showing the mixing tube during the stage of final dispensing of the mixed product;

FIG. 6 is a sectional view illustrating details of a modified form of cap; and,

FIG. 7 is a vertical sectional view of an additional modified embodiment of the invention.

With continuing reference to the accompanying drawing, wherein like reference numerals designate similar parts throughout the various views, reference numeral 10 is used to generally designate an embodiment of the present invention. The embodiment 10 is formed of two main parts, a squeezable tube, generally indicated at 12, and a cover generally indicated at 14.

The tube 12 includes a tube body 15 preferably molded out of any suitable synthetic plastic material and is provided with an elongated neck 16 having a lower threaded portion 18. Integrally formed inside the neck and well spaced from the open end 20 thereof is a web 22 provided, as is best shown in FIGS 1 and 2, with a plurality of spaced openings 24 therein. These openings 24 are of a selected size and shape as well as of a selected number in order to take into account the viscosity of the materials packaged. The web 22 includes a hemispherical plug 26 which rises toward the open end 20 from the center thereof.

The cap 14 is provided with a top 28 and a cylindrical outer wall 30 provided at its lower end with internal threads 32. The threads 32 are adapted to be threadedly engaged with the threaded portion 18. Downwardly projecting from the top 28 of the cap is a cylindrical projection 34 which terminates short of the lower end 36 of the cap and just beyond the start of the threads 32. The cylindrical projection 34 is concentric with the outer wall 30. When the cap 14 is screwed tightly down upon the neck 16 of the tube 12, the plug 26 will frictionally engage, close, and extend into the cylindrical projection 34 and forms a seal therefor. Further, the lower edge 38 of the cylindrical projection is adapted to engage the web 22 and seal the openings 24.

If, for example, a material such as a pigmented material is placed in the container 40 defined by the cylindrical projection 34 and the top 28 and thereafter the tube in an inverted position is threadedly engaged with the cap 14, then the pigmented material will be sealed in the container 40 after which the tube 12 may be filled and have the lower end thereof crimped as at 42 to seal another material such as a base material 44 within the tube. Thereafter, as shown in FIG. 4, the cap may be loosened or partially removed permitting the pigmented material to flow in the direction of arrows 46 through

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the openings 24 to admix with the base material in the tube. Applying pressure as indicated by arrows 48 on the side walls 15 of the tube, the mixed materials may then be dispensed.

In FIG. 6 there is shown a modified form of the invention wherein one or more apertures 50 may be formed in the top of the cap so as to permit material to flow therefrom. These apertures 50 may be provided with closure means such as tear tapes, frangible closures, or the like and bristles 52 may be fixed to the top so that material may flow thereon and thereafter be applied without the necessity of ever completely removing the cap from the tube.

Referring now to FIG. 7, herein there is shown a novel cap 114 which is provided with a cylindrical side wall 130 having internal threads 132. The side walls 130 include a flange 133, which is used to hold a cover 135 in position, the cover extending across an opening 137 formed in the top 128 of the cap 114. A valve assembly 124 of the type shown in my United States Patent No. 3,203,026 may be employed and includes a valve head 139. Helical coils 141 are integrally formed with the valve head 139 and a mounting ring 143 is adapted to seat on a rib 145 integrally formed with the cylindrical projection 134, which corresponds to the projection 34 of the embodiment shown in FIG. 1. In this form of the invention, a gasket 158 is provided to form a positive seal for the valve assembly so that material within the container formed by the cylindrical projection 134 and the top 128 will be completely sealed until the top 114 is partially removed from the tube. Then, after initial depression of the valve head, the contents of the tube when mixed with the material contained by the cylindrical projection 134 may then be dispensed and applied in a convenient manner.

A latitude of modification, substitution and change is intended in the foregoing disclosure, and in some instances, some features of the invention will be employed without a corresponding use of other features.

I claim:

1. A mixing tube comprising a first container having a first material therein, first container provided with a neck having an open end and a threaded portion, a web integrally formed with said neck and extending across said neck spaced from said open end, said web having a central plug rising upwardly therefrom, said web having at least one opening therethrough, and a cap having a threaded means having a top and a cylindrical projection integrally formed with and depending from said top forming a second container, said plug extending into and frictionally engaging said cylindrical projection, a second material in said second container, said plug normally pre-

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venting contact between said first material and said second material, and threaded means on said cap threadedly engaging said threaded portion for threadedly advancing said cap partially off of said neck so that said plug is separated from said cylindrical projection to allow said second material to mix with said first material.

2. A mixing tube according to claim 1, wherein said first container is a squeezable tube.

3. A mixing tube according to claim 1, wherein said cylindrical projection is engageable with said web for overlying and closing said opening.

4. A mixing tube according to claim 1, wherein said plug is hemispherical in shape.

5. A mixing tube according to claim 1, wherein said top is provided with an aperture therein, and closure means for initially closing said aperture so that after mixing of said first and second materials said closure means may be removed to permit the mixed materials to be dispensed without entirely removing said cap.

6. A mixing tube according to claim 5, including bristles on said top.

7. A mixing tube according to claim 1, wherein said top is provided with a valve opening therein forming a valve seat, a valve assembly including a valve head engageable with said valve seat to close said opening and being movable with respect to said valve seat to control flow of mixed materials through said valve opening, said valve assembly further including a mounting ring, a rib on said cylindrical projection holding said mounting ring, said valve assembly also including resilient helical coils integrally connected to said mounting ring urging said valve head against said valve seat, and cover means secured to said top and extending across said opening so that upon depression of said cover said valve head is pushed away from said valve seat against the forces exerted by said helical coils.

8. A mixing tube according to claim 7, wherein said first container is a squeezable tube, said cylindrical projection being engageable with said web for overlying and closing said opening, said plug being hemispherical in shape.

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