This invention relates to metal tubes, such as those used for packaging tooth paste, and to the provision of protective means for said tubes preventing contamination of the product by the metal of the tube. It is known, for example, that certain products attack the metal of the tube with results which may cause discoloration of the product or even toxicity thereof. In order to prevent such reaction it has been customary to provide a protective layer or coating on the tube interior, and to attach a non-metallic dispensing neck or spout to the tube as illustrated in U.S. Patent 2,122,325. The spout is usually preformed of plastic material, is attached to the tube breast, by swaging a flange of the breast thereover, and is so formed as to present a threaded exterior to receive the tube cap and provide a non-contaminating surface adjacent the joint point of the tube so that product remnants trapped in the cap and necessarily brought thus into contact with the neck threads will not become discolored thereby.

It is apparent that the nature of making the connection of the spout with the container is somewhat complicated mechanically, results in rather an irregular exterior appearance to the tube breast which makes breast decoration difficult or impossible, and generally results in costly tube assembly procedures, impairment of tube appearance, or both.

It is an object, therefore, of the present invention to provide a non-metallic threaded surface at the neck of a metal tube in a manner such that the same can be readily and easily placed in automatic fashion, and in a manner which will permit ready decoration of the tube breast. It is also an object of the invention to accomplish the above results in a way which generally will not detract from the appearance of the assembly, or perhaps even enhance it. The foregoing object is achieved according to the present invention by forming the tube with an integral metal neck portion of somewhat thinner wall than that ordinarily used, and providing a preformed plastic shroud attachment or outsert embracing and supported by the neck portion and carrying the threads or other cap connecting means on its exterior surface. The outsert is molded of somewhat resilient material and the tube neck portion and outsert are provided with cooperating outline features whereby the outsert may merely be positioned over the neck portion and snapped into place. The outsert also includes a thin radiating skirt or lip so designed as to come lightly into contact with the breast surface and be deflected thereby when the outsert is forced home so that the tolerances of the neck portion and outsert dimensions need not be critically held. The main body of the outsert can thus be somewhat shorter than the neck portion to allow a small overtravel permitting easy reliable operation of the locking elements which hold the parts in snapped together position and still avoid the chance for an unsightly crack between the outsert and breast.

Additional objects, features and advantages will appear hereinafter as the description proceeds.

In the drawing:
FIG. 1 is a fragmentary elevation of the upper end of a complete tube assembly according to the present invention;
FIG. 2 is a fragmentary side elevation of the upper end of a metal tube with the outsert removed and showing the improved neck portion shaped to receive the outsert;
FIG. 3 is a transverse section taken substantially on line 3-3 of FIG. 1;
FIG. 4 is an axial section to a larger scale, taken substantially on line 4-4 of FIG. 3;
FIG. 5 is a fragmentary section taken substantially on line 5-5 of FIG. 4.

Referring to the drawing, numeral 11 indicates a collapsible metal tube of the type normally formed of lead, aluminum or tin by impact extrusion and designed to package and dispense paste or cream products. The tube is equipped with an integrally formed breast 13 and neck portion 15. The tip of the neck portion 15 has an exterior toothed formation providing a large number of closely arranged axial flutes 17. Just below the ends of the flutes is provided a retaining ring 19 preferably having a sloping upper cam surface 21 and defining just beneath itself an annular groove 23. It will be noted that the configuration of the neck portion is such that it can be readily formed on conventional tube making machinery, the flutes 27 and cam surface 21 being shaped coincidentally with the impact extrusion operation and the groove 23 being turned coincidentally with the customary trimming operation on the tube.

An outsert 25 for attachment to the tube 11 includes a sleeve portion 27, an interlocked top flange 29 and an outwardly extending bottom flange 31. The sleeve portion 27 is of a size to closely embrace the neck portion 15 of the tube and has on its inner surface a series of teeth or projections 33 corresponding in size and spacing to the flutes 17, the lower end of each projection being rounded off as indicated at 35, FIGS. 4 and 5. Below the ends of the projections is provided an inwardly extending locking bead 37 designed to pass over the retaining ring 19 with an interfering fit and snap into place in the groove 23.

The outsert 25 is made of a resilient material of somewhat resilient nature, any of various synthetic resilient materials such as the polyolefins being suitable. The outwardly flaring flange or radiating skirt 31 tapers towards a relatively thin flexible annular peripheral area 39 and is so proportioned that the periphery strikes the breast 13 of the tube 11 just prior to sealing of the locking bead 37 in the groove 23 so that the flexible peripheral area 39 is slightly deflected from its normal position of repose, so that the skirt 31 is spaced from the smooth surfaced breast 13, and hence exerts a slight resilient pressure against the tube breast to provide the appearance of a substantially continuous surface. By this arrangement an important advantage is gained, for it is possible to so shorten the main body of the sleeve portion 27 at its lower end that it will not normally touch the upper surface of the breast when in position. Thus there is a small amount of overtravel permitted in placing the outsert, and the correct locking action of bead 37 and ring 19 is assured. Notwithstanding this advantage, it is still possible to use reasonably wide dimension tolerances since the peripheral area 39 of flange 31 maintains easy resilient contact with the tube breast and prevents the formation of any gap between the lower end of the outsert and the tube breast.

The upper flange 29 of the outsert is preferably so located as to come into contact with the upper end of the tube neck portion substantially at the same time that the locking bead 27 seats. The interior of the tube is normally protected by a coating of waxy or resinous lining material 41 which extends up into the neck portion 15 and meets or substantially meets the flange 29 so that all metal surfaces which the product is likely to touch are effectively shielded and the purity and appearance of the product are preserved.

With regard to the decoration of the tube it will be
noted that the breast 13 is of customary conical form and is free of bulges or flanges related to the attaching of the plastic outsert 25. Consequently ordinary coating equipment, such as the conventional breast-coating rollers, can be used to secure the usually-required external breast decoration. Breasts of the swage-connection type must normally be left uncoated due to economic considerations.

If the outsert 25 is of a matching color with the breast decoration it will lend a remarkable appearance of unity with the breast. Exceptional decorative effects can also be achieved by coating the breast with a color suitably related to the color of the outsert, either different but similar, or sharply contrasting.

In operation, the tube 11 is formed by impact extrusion and trimmed and grooved to provide the result shown in FIG. 2, an interior coating 41 preferably being provided. The exterior surface including the breast 13 is decorated in customary fashion. Outserts 25 are formed, as by injection molding using material of the desired color. An outsert 25 is then placed over the neck portion 15 of a tube 11 and is installed merely by a straight push against the outer end while the tube is held on a suitable mandrel (not shown). The cam surface 21 spreads the bead 37 slightly and it presently snaps into groove 23 where it is substantially locked against removal. It is especially pointed out that because of the large plurality of flutes 17 extending about the neck portion with uniform spacing, as well as the rounded inner ends 35 of the teeth, the placing of the outsert over the neck portion is all that is required. Because of these features and relationships the parts will not require rotational orientation but will seek their own proper meshing position accordingly. The assembly is very simple and readily lends itself to accomplishment by usual automatic hoppiering techniques. While the number of flutes and teeth shown is exactly corresponding, it will be understood that the number of teeth may be a fraction of the number of flutes and be equally spaced about the periphery with an angular spacing equal to a whole number of flute spacings, and that the flutes and teeth may be placed on the opposite members if desired and still achieve the same result without impairing the effectiveness of the relationship so far as automatic assembly is concerned.

For convenience any one of these described arrangements may be referred to as "a 360 degree assemblable mutual interfitting relationship," and they will be so referred to hereinafter.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description and it will be apparent that various changes may be made in the form, construction, and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages.

We claim:

1. In the combination of a collapsible tube unit comprising a metal body having a breast portion and a neck portion integrally formed with the body and an outsert of resilient plastic material attached to said tube unit and embracing and enclosing said neck portion, preformed toothed means on said neck portion and said outsert providing a 360 degree assemblable mutual interfitting relationship between the outer surface of said neck portion and the inner surface of said outsert preventing relative rotation thereof, means providing a snap-together locking connection between said outsert and said neck portion, and an outwardly and downwardly flared skirt portion on the lower end of said outsert which converges to a relatively thin peripheral lip, said skirt portion being angularly disposed toward said breast portion whereby said lip is held in close deflected engagement with said breast portion when the parts are assembled and said locking connection means is fully engaged.

2. The combination of a collapsible tube unit comprising a metal body having a breast portion and a neck portion integrally formed therewith, and an outsert of resilient plastic material attached to said tube unit and including a neck sleeve and a radiating skirt at the lower end thereof, said neck portion of said tube unit being slightly shorter than the neck sleeve of the outsert with the latter embracing and enclosing the former, preformed toothed means on said neck portion and said outsert providing a 360 degree assemblable mutual interfitting relationship between the outer surface of said neck portion and the inner portion of said outsert preventing relative rotation thereof, and means providing a snap-together locking connection between said outsert and said neck portion, said radiating skirt converging outwardly and downwardly to a relatively thin lip and being angularly disposed toward said breast portion whereby said lip is held in close deflected engagement with said breast portion when the parts are assembled and said locking connection means is wholly engaged.

3. As a new article of manufacture and sale, a preformed plastic plastic material adapted for a snap-in-place assembly with the neck portion of a collapsible tube having axial flutes therein and a retaining ring adjacent the base thereof and adapted to embrace and overlie the central region of the tapered breast portion of the tube adjacent the neck, said outsert comprising a sleeve portion for engaging and embracing the neck portion of the tube and having cap attachment means on its exterior surface and axial tooth means on its interior surface meshable with said neck portion flutes and slidable therein to prevent relative rotation between said outsert and said tube neck portion, an interior peripheral locking bead adjacent the lower end of said sleeve portion and having a minimum diameter less than the maximum diameter of the retaining ring on the neck portion, an inwardly directed flange at the upper end of said sleeve portion for concealing the free end of the neck portion of the tube, and an outwardly and downwardly flared skirt portion on the lower end of said sleeve portion which converges to a relatively thin peripheral lip, said skirt portion having an angular inclination with respect to the breast portion of said tube whereby said lip is adapted to be held in close deflected engagement with said breast portion when said outsert is assembled to said tube and said locking bead is snapped over the retaining ring on said neck portion.

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