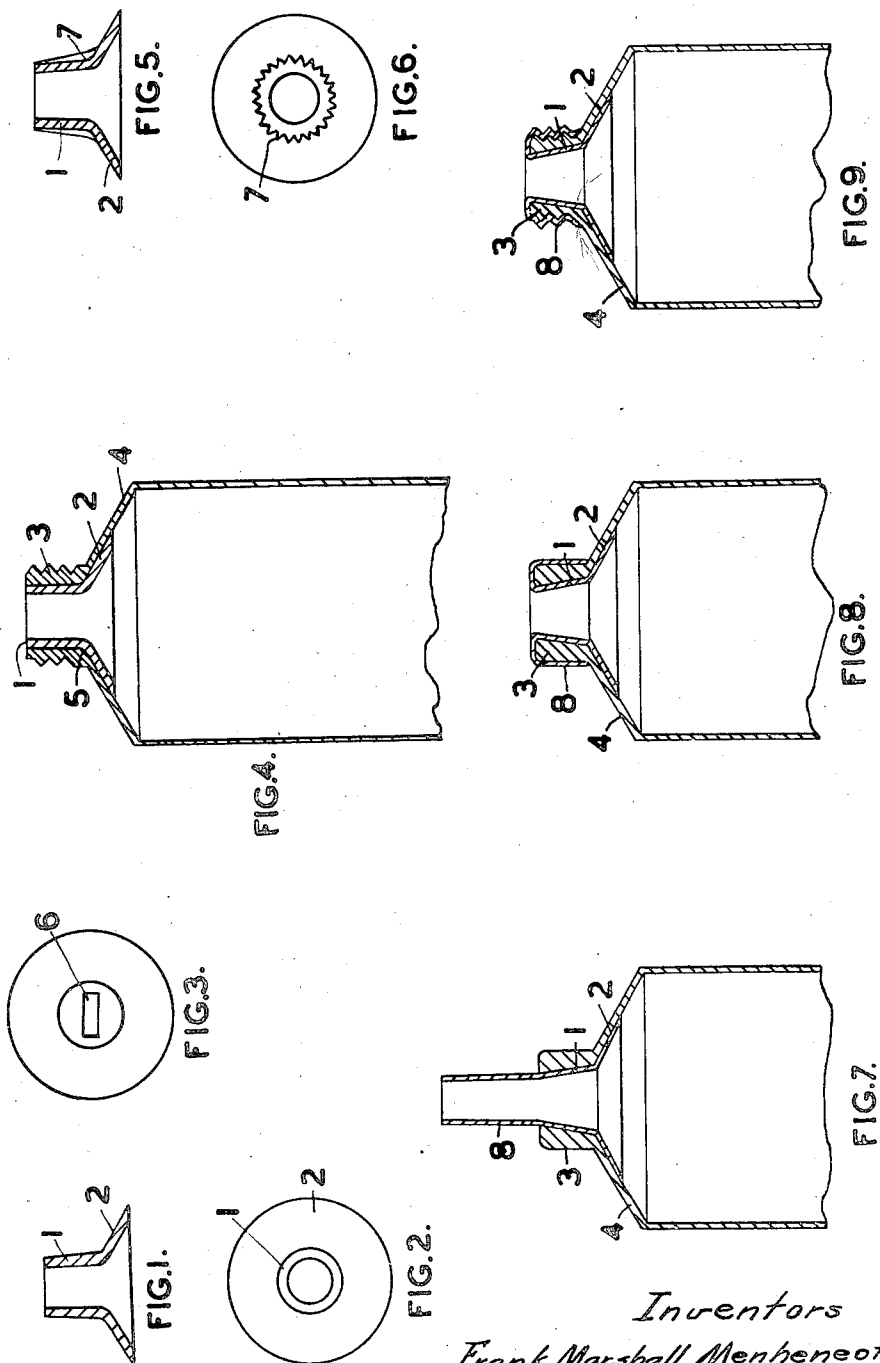


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COLLAPSIBLE TUBE WITH A NON-CONTAMINATING
INSERT FOR THE NECK THEREOF
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COLLAPSIBLE TUBE WITH A NONCONTAMINATING INSERT FOR THE NECK THEREOF

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This invention relates to collapsible tubes, and more particularly to tin-plated lead collapsible tubes. It is known that in tin-plated lead collapsible tubes wherein the shoulder and nozzle are also made of tin-plated lead there is liable to be an exposure of lead inside the nozzle and in particular at the inside edge where the nozzle joins the shoulder; furthermore, the ejection of the contents through the nozzle is liable to wear away some of the tin and expose lead inside the nozzle. The lead which is exposed contaminates and discolours the contents of the tube. It is also known to overcome this difficulty by making the shoulder and nozzle of non-metallic plastic material but the use of such a shoulder and nozzle renders it necessary to provide special means whereby the barrel of the tube can be joined thereto and there is moreover a liability of the contents seeping between the said parts.

The object of the present invention is to make use of a collapsible tube having a shoulder and nozzle of tin-plated lead but to provide a very simple and efficient means of protecting from contact with the contents of the tube those parts, mentioned above, where there is likely to be an exposure of lead.

According to the invention, the inside of the nozzle, the inside edge where the nozzle joins the shoulder, and the surrounding inside surface of the shoulder near the said edge, are prevented from contact with the contents of the collapsible tube by an insert of non-contaminating material consisting of a tube flared at one end, the flared portion fitting closely against the inside of the shoulder while the tube fits into the nozzle. By a "non-contaminating material" is meant a material which will not contaminate the contents to be placed in the collapsible tube.

The accompanying drawings show, by way of examples, how the invention may be carried out in practice.

Figures 1 and 2 are a vertical section and plan view respectively of an insert according to the invention.

Figure 3 is a plan view of an alternative form of insert.

Figure 4 is a section through the upper part of a collapsible tube showing an insert in position.

Figures 5 and 6 are a vertical section and plan view respectively of a fluted insert.

Figures 7, 8 and 9 are sections through the upper part of a collapsible tube showing successive stages in the placing in position of another alternative form of insert.

Referring to Figures 1 and 2 the insert shown

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is preferably made of a non-metallic plastic material although other material which will not contaminate the contents to be placed in the tube can be employed; for instance, the insert may be made of pure tin. The insert consists of a tubular part 1, which may be slightly tapered on the outside as shown, and a flared part 2.

Figure 4 shows the insert of Figures 1 and 2 placed in position in a collapsible tube. The insert is introduced, of course, from the inside of the collapsible tube and is forced into the nozzle 3, the outside of the tubular part 1 being slightly larger than the hole of the nozzle so that the application of a certain amount of force is necessary to ensure a tight fit. The flared part 2 of the insert should be so designed that it will fit closely against the inside of the shoulder 4 of the collapsible tube.

The position at which an exposure of lead is most likely to occur in a tin-plated lead collapsible tube is the inside edge at 5 where the inside surface of the nozzle meets the inside surface of the shoulder. There is also likely to be an exposure of lead inside the nozzle above this edge and also on the inside surface of the shoulder for a certain distance below this edge. The flared part 2 of the insert should be large enough to cover all that portion of the inside of the shoulder 4 where a fracture of the tin-plating is likely to cause an exposure of lead.

It will be seen that the top of the insert is level with the top of the nozzle. The effect of this is that when the cap is screwed on it will close the top of the insert and so prevent any possibility of the contents of the collapsible tube seeping around the top edge of the insert and down between the inside of the nozzle and the outside of the insert.

If desired, the insert can be coated with adhesive prior to insertion although this is not particularly necessary since there will be no pressure tending to separate the insert from the nozzle; in fact, the pressure of squeezing out the contents will tend to maintain the tightness of the fit. As an alternative or an addition to the use of an adhesive there may be provided ridges or other projections upon the outside of the tube of the insert so that when the said tube enters the nozzle the comparatively soft metal of the nozzle will close around the projections and provide a positive grip which action may be ensured by the application of pressure around the nozzle. Here again, the use of such projections is not particularly necessary for the reason stated.

Figures 5 and 6 show an example of an insert

provided with ridges upon the outside surface of the tube of the insert. In this case the insert is fluted with the ridges 7, these ridges having no depth at the top of the tube and increasing in depth to the bottom of the tube. As such an insert is forced into the nozzle, the ridges will penetrate the soft metal thereof and will ensure a tight fit.

The hole in the tube of the insert can be of any desired shape. Thus, if it be desired that the contents should be squeezed out in the form of a ribbon, the hole can be of suitable rectangular cross-section as shown at 6 in Figure 3.

Figures 7, 8 and 9 show successive stages in the placing in position of an insert which can be rolled around the outside of the nozzle. The insert should be made of a non-contaminating material which is capable of being spun or rolled. A suitable material is pure tin. Referring to Figure 7, it will be seen that the insert has an extended portion 8 which projects outside the nozzle. By spinning, or by other means, the portion 8 is turned over the nozzle so as to cover the outside thereof as shown in Figure 8. The screw threads are then formed upon the outside of the turned-over portion 8 instead of upon the outside of the nozzle, as shown in Figure 9. When a screw thread is formed upon a tin-plated lead nozzle there is also liable to be an exposure of lead on and between the threads but with the method described with reference to Figures 7, 8 and 9 the screw threads are rolled or pressed upon the pure tin, or other non-contaminating material, of the insert so that no lead can be exposed.

The present invention has the advantage that it enables a collapsible tube to be made wholly of tin-plated lead the necessary protection of the contents from exposed lead being obtained by the use of an insert which can be cheaply constructed and easily fixed in place.

What we claim is:

1. A collapsible tube having a shoulder and a nozzle projecting from said shoulder, and an insert of non-contaminating material consisting of a tubular portion and a flared end, the tubular portion being provided with external longitudinal ridges, said flared end fitting closely against the inside of said shoulder and said tubular portion fitting into said nozzle with said ridges penetrating the material of said nozzle, said insert preventing the inside of said nozzle and the inner surface of said shoulder adjacent said nozzle from contacting the contents of said tube.

2. A collapsible tube according to claim 1 wherein the longitudinal ridges on said tubular portion deepen toward said flared end.

3. A collapsible tube according to claim 1 wherein the longitudinal ridges on said tubular portion deepen toward said flared end and have no depth at the end of the tubular portion remote from said flared end.

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