June 27, 1944. G. W. TEMPLE 2,352,456

COLLAPSIBLE TUBE

Filed July 5, 1941

Fig. 1.

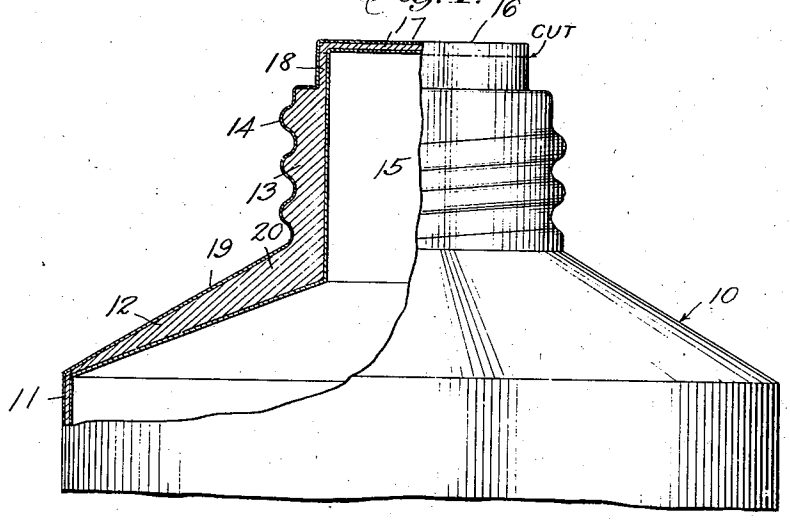
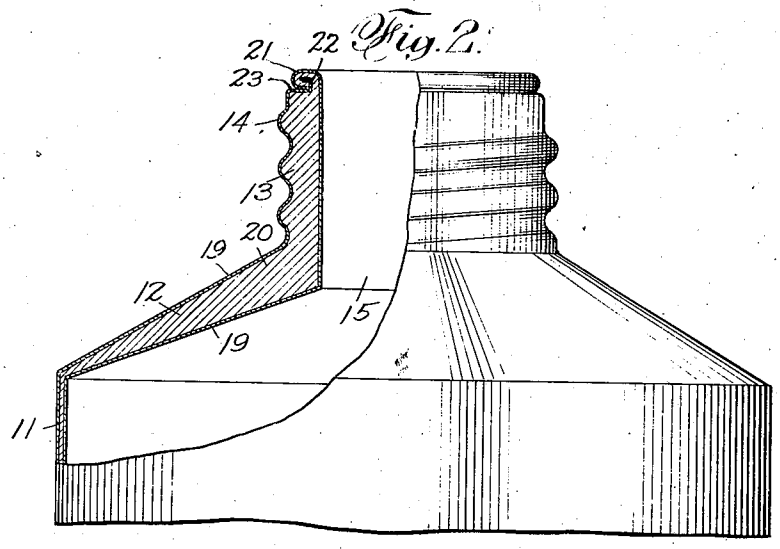


Fig. 2.



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COLLAPSIBLE TUBE

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3 Claims. (Cl. 222—92)

This invention relates to collapsible tubes and to the method of making such tubes of metals such as lead which might contaminate or otherwise injuriously affect the contents, or which might become affected thereby.

Collapsible tubes are customarily extruded in a press from non-ferrous metals such as tin, aluminum and zinc or alloys thereof. In certain cases, lead has been used for the tube as where the contents might affect or be affected by other metals. Lead is more abundant and cheaper than the other metals mentioned, but owing to the chemical action upon lead of many ingredients of the pharmaceuticals inserted into collapsible tubes and sold therein, it has not heretofore been extensively used for such tubes except under the peculiar circumstances referred to.

Even if the tube were extruded by well-known processes from a tin-coated lead slug, finishing operations upon the press-extruded tube, such as trimming and threading the neck of the tube, would cut away the tin coating and undesirably expose the underlying lead.

I have found, however, that a lead tube can be extruded from a tin-coated slug in such a manner that all surfaces of the sandwiched lead are covered with tin. By forming on the neck of the tube at its discharge opening a projecting thin tin-coated cup provided with an end flat closure wall and with a substantially cylindrical wall and then trimming off the end wall to expose the discharge opening, the cylindrical wall with its thin exposed lead edge may be rolled over to carry said exposed edge against the exterior surface of the tube, thereby inexpensively providing a tin-coated lead tube having no exposed lead surfaces.

My invention therefore contemplates the provision of a tin-coated lead or the like collapsible tube provided with a downwardly and outwardly rolled bead, lip or wall arranged outwardly of the discharge opening, and with rolled external screw threads whereby the tube may be extruded, trimmed and finished largely by the usual methods and machinery except for the rolling of the lip and threads, which rolling may be accomplished by the use of suitable simple tools rapidly and automatically.

My invention further contemplates the provision of a simple and inexpensive method of making such tubes in quantity.

The various objects of the invention will be clear from the description which follows and from the drawing, in which,

Fig. 1 is a fragmentary front elevation, partly in section, of the tube as it appears before the projecting cup thereof has been trimmed and rolled over.

Fig. 2 is a similar view of the tube with the thin wall rolled into a bead.

In the practical embodiment of the invention which I have shown by way of example, the tube is extruded in a press of the usual type by means of suitable dies. Preferably, a "tin"-coated "lead" slug is used from which to extrude the tube. Since the extruding operation is well-known, no further description thereof is deemed necessary.

It will be understood, however, that the terms "lead" and "tin" in this specification mean those specific metals as well as any other metals suitable for extrusion from a coated slug into a tube, and that said terms refer to different suitable metals, one adapted to be coated by or sandwiched between layers of the other.

As a result of the extruding operation, the partly finished tube **10** (Fig. 1) is formed, having a thin cylindrical body **11**, the thicker tapered conical shoulder **12**, the comparatively thick neck **13**, (with or without the external screw threads **14** thereon) and the discharge passage **15** closed by the cup-like and very thin projection **16**. The formation of said projection is an important intermediate step in the manufacture of my improved tube from two different metals, one metal coating the other. The projection has a preferably flat end wall **17** and a substantially cylindrical wall **18** extending integrally from the end wall to the neck **13** and surrounding the opening or discharge passage **15**. The tin coating **19** however covers all surfaces of the tube, both interior and exterior with the heavier lead layer **20** sandwiched therebetween.

After the tube **10** has been extruded in the press, it is mounted on the mandrel of a trimming and finishing machine, where the open end of the tube is trimmed off to cut the tube to the required length, and the threads **14** are rolled in by suitable pressure tools (if the threads have not been previously formed) without breaking the tin coating.

The neck end of the tube is also trimmed and finished. This is done by first trimming off the end wall **17** of the cup-like projection **16** on the line marked "cut" in Fig. 1. Such trimming exposes a lead edge on the wall **18**, which of course is undesirable and cannot be left in that condition owing to the possibility of contact therewith by the tube contents. Consequently, the wall **18** is bent on itself to form a bead and then partly

flattened into the position thereof shown in Fig. 2 wherein the extreme end edge 22 thereof is arranged in contact with the exterior surface of the wall 18 and is protected by the bent part of the wall. The bending of the wall 18 may be accomplished by a rolling operation by means of a suitable tool entering the exposed discharge opening remaining after the end wall 17 has been trimmed off. Such tool may be arranged on the turret of the trimming machine.

The doubled wall or bead 21 resulting from the above-described rolling operation is forced against the top wall or edge 23 of the tube neck and somewhat flattened, and does not interfere with the threads 14, nor with the cap which is screwed on the threads. It will be understood that if desired and found convenient, the wall 18 may be rolled inwardly instead of outwardly in an obvious manner.

After the tube has been thus finished, it may be subjected to the usual enamelling and capping operation in the manner well-known in the art.

It will be seen from the above that I have provided a simple method for making tin-coated lead tubes and particularly for finishing said tubes without exposing any lead surface thereon, and that I have provided a method and tube designed to meet the requirements of practical use.

While I have shown and described certain specific embodiments of my invention, I do not wish to be understood as limiting myself thereto, but intend to claim the invention as broadly as may be permitted by the state of the prior art and the scope of the appended claims.

I claim:

1. A tin-coated lead collapsible tube having a neck provided with a discharge opening and having a comparatively thin tin-coated annular lead bead extending from an end surface of the neck and integral therewith and surrounding the discharge opening, the thickness of the tin-coated lead wall forming the bead being uniform and being less than the thickness of the neck, a shoulder at the junction of the neck and the bead, part of the bead resting on said shoulder, said bead terminating in an edge having a lead surface, said edge being arranged in the interior of the bead.

2. A tin-coated collapsible tube having a lead body, said tube having a substantially cylindrical neck of one thickness and having a wall projecting from the end of the neck and of a lesser thickness, said wall being doubled on itself and extending first outwardly, then downwardly and then inwardly to arrange the free edge of said wall against an adjacent part of said wall, thereby to conceal and protect said edge.

3. In a collapsible tube, a neck terminating in an annular shoulder extending inwardly from the outer surface of the neck, a substantially cylindrical wall of less thickness than that of the neck, said wall extending from the neck at said shoulder and having an inner surface continuous with the inner surface of the neck, and a curved extension projecting from the wall and doubled on itself and arranged beyond the neck at said shoulder, the terminal edge of the extension being adjacent an outer surface of the wall.

GEORGE W. TEMPLE.