

June 2, 1936.

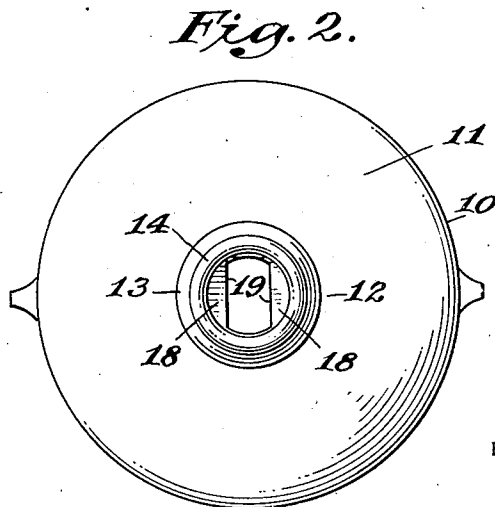
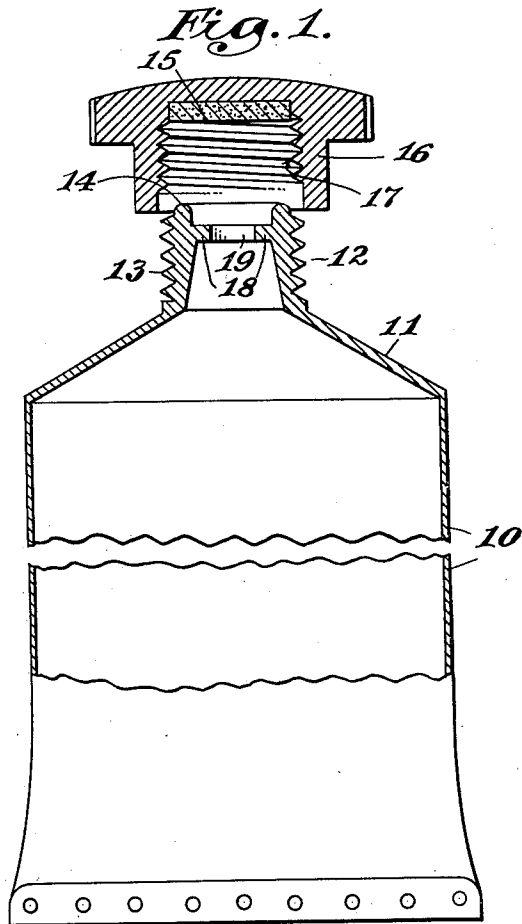
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2,042,836

COLLAPSIBLE TUBE

Filed Jan. 19, 1934

2 Sheets-Sheet 1



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Fig. 3.

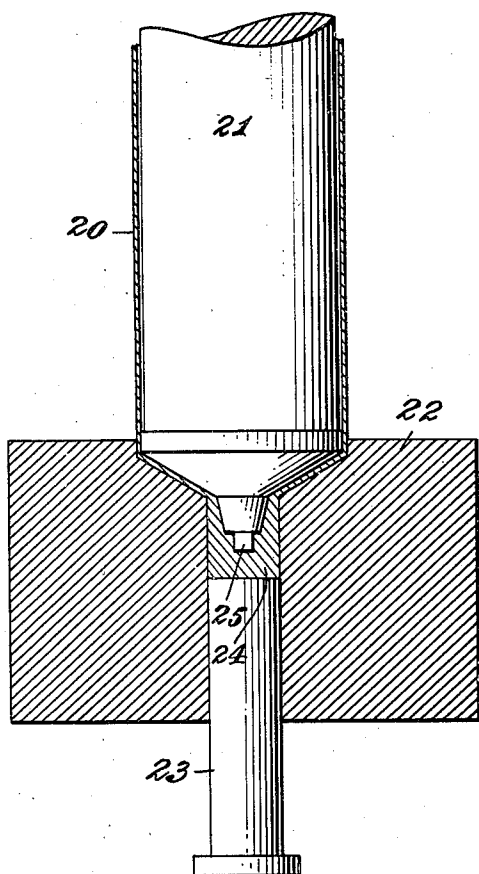


Fig. 4.

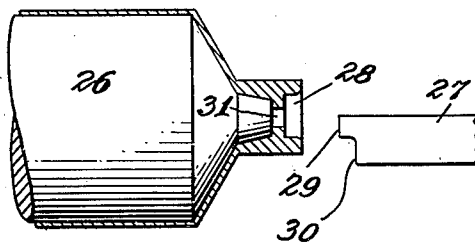


Fig. 5.

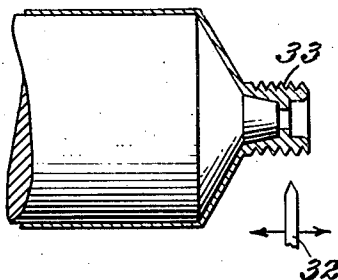
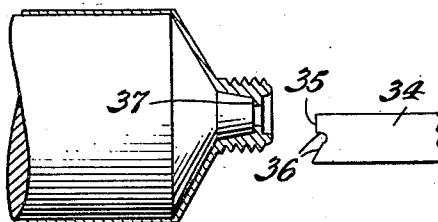


Fig. 6.



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UNITED STATES PATENT OFFICE

2,042,836

COLLAPSIBLE TUBE

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corporation of New Jersey

Application January 19, 1934, Serial No. 707,233

3 Claims. (Cl. 221-60)

This invention relates to an improved form of collapsible tube adapted for the packaging of tooth pastes, shaving creams, cold creams, adhesives, shoe polishes, edible pastes, and a variety of similar pasty or semi-fluid commodities. The preferred method herein disclosed of making the improved form of tube is being made the subject matter of a separate, divisional application.

10 A particular feature of the invention is the provision, on a tube of the character mentioned, of a special form of neck adapted to provide a most effective seal for the end of the tube. For this purpose a special sealing ring is provided at the end of the neck to cooperate in an effective manner with the usual sealing disk of cork or other yielding material placed in the cap. The sealing ring is preferably formed as an integral, annular extension of the neck of appropriate form and dimension to cooperate properly with the sealing element of the cap. While the improved construction is of special value in connection with tubes having substantially rectangular discharge openings adapted to form 15 ribbons of the material squeezed from the tubes it may be applied with advantage to other types of tubes as well.

Other features and advantages of the invention will appear from a detailed description of the same which will now be given in conjunction with the accompanying drawings in which:

Figure 1 is a side view of a tube embodying the invention, a portion being shown in section along a central plane.

35 Figure 2 is an end view of the tube with the cap removed, and

Figures 3 to 6 inclusive are schematic views illustrating various stages in a preferred method of making the tube.

40 Referring now to Figure 1 the tube is shown as provided with a main body portion 10 having a suitable wall thickness to withstand the strains due to filling, handling and using the tube. It may be formed of any suitable material depending upon the intended use. If it is to be used for the packaging of tooth paste or an edible paste or the like it is preferably formed of substantially pure tin. For other purposes it may suitably be formed of lead or 45 aluminum or other readily extrudible materials. Adjacent the top a conical portion 11 joins the body with a neck designated generally at 12. The neck is preferably of somewhat greater wall thickness than the body of the tube and is provided over a suitable portion of its length with

external threads 13. These may, if desired, extend throughout the length of the neck although preferably they begin a short distance in from the outer end of the neck and terminate at, or slightly in from, the lower end of the neck.

5 The outer end 14 of the neck is preferably well rounded, smooth and regular or even. This is to permit it to cooperate readily and effectively with a sealing disk 15 within a cap 16. Threads 17 formed over a suitable portion of the inner wall of the cap are adapted to cooperate with the threads 13 on the tube to secure the cap in place. A suitable distance in from the end 14 of the neck there is formed a partition or, partial closure 18 provided with a discharge opening 19 of suitable form and dimension. The opening is illustrated as being of rectangular form so as to produce a flat ribbon of paste. It might be made elliptical or round or star shaped or of any other suitable form depending upon 20 the form of the ribbon of paste desired.

When the tube is to be used, it will be understood, the cap is tightly screwed upon the neck and the paste is forced into the tube through the bottom under pressure. Subsequently the 25 bottom of the tube is closed by appropriately folding it and applying a clip. If a tight seal is not provided between the end of the neck and the disk 15 the paste under pressure will ooze out between the cap and neck. Furthermore it is important not only to prevent this leakage of paste but it is also desirable to make the tube completely air tight. The filled tubes are sometimes kept on the shelf in a store or home for a number of months before they are used. If 35 the tubes are not airtight the contents will have a tendency to dry out and cake adjacent the point of air leakage. For this same reason it is important to make the tube air tight not only when first filled but also after each use. This can only be effectively accomplished by providing a regular, smooth surface 14 at the end of the neck particularly if a relatively hard type of sealing disk is used. In re-applying the cap it will never be returned quite to its former position and therefore any irregularity in the edge of the sealing ring is apt to produce air leakage.

The depth of the sealing ring from the outer edge 14 to the outer surface of the partition 18 may vary according to circumstances. It should 40 be great enough to insure an effective seal and proper cooperation with the sealing disk. If the partition 18 were made flush with the end 14 it would be difficult to insure a perfect, air-tight seal at all times. Furthermore, with such a con- 55

struction the sealing disk would be partly squeezed into the opening 19 as the cap is applied and when the cap is later removed the projection from the disk would remain engaged with the opening and due to the wrench action the disk would be withdrawn from the cap. It is important to have the partition 18 set-in a distance sufficient to prevent squeezing of any part of the sealing disk into the opening 19. If a soft cork disk is used the distance should be relatively great, say between $\frac{1}{8}$ " and $\frac{1}{4}$ " or even more while if a harder, less compressible disk is employed the distance may be made even less than $\frac{1}{8}$ ". On the other hand, when a harder type of sealing element, such as paper or metal foil or the like, is employed, the accuracy and regularity of the outer edge 14 becomes of increasingly greater importance. The purpose of terminating the threads 13 some distance in from the end of the neck is to prevent the outermost turn from biting into the sealing disk and removing it from the cap in the same manner as explained with relation to the opening 19.

A preferred way of producing the foregoing type of tube will now be explained in conjunction with Figures 3 to 6, inclusive. A tube 20 is first produced by the action of a punch 21 upon a slug deposited in the cavity of a die 22. In the course of extruding the tube a knockout pin 23 will recede to an appropriate extent to produce a neck 24 on the tube of suitable length and with a relatively large amount of metal at the end. An extension 25 is preferably provided on the punch to form a recess or indentation in the end of the neck having the shape of the opening desired in the finished tube.

The extruded tube is now subjected to a series of finishing operations upon a single machine or a series of machines, as desired. For all of these operations the tube is preferably mounted upon a rotatable mandrel 26 adapted to grip the interior wall of the neck. In the first operation a roughing tool 27 is brought into and against the end of the tube to form a recess 28. This tool is provided with cutting edges 29 and 30 for this purpose. The depth of the cut is sufficient to remove the metal which closes the end of the tube and thus produces an opening 31 out of the recess formed by the extension 25. In the next operation a thread cutter 32 forms threads 33 in the exterior surface of the neck. Finally a tool 34 is brought into cooperation with the end of the tube to finish the various surfaces. This tool

is provided with cutting edges 35 and 36 which not only finish the outer surface of the partition 37 but also the inner, outer and end surfaces of the annular sealing ring. The outermost portions of the thread 33 are removed in this way and the end of the neck is given a smooth, even, regular surface, preferably rounded.

While a particular form of tube and a preferred method of making it have been explained in considerable detail, it will be understood that various changes may be made in the article and in the steps by which it is produced without departing from the general spirit and scope of the invention.

What I claim is:

1. An article of manufacture comprising a collapsible tube having a body portion and a neck portion with a discharge passage there-through, partition means in said passage spaced from the end of said neck to partially close the passage and provide an elongated opening therein, a sealing ring connected with the end of said neck, said ring having a smooth outer face, and a cap for said neck having a flat gasket inserted and retained therein to cooperate with the outer face of said sealing ring, said gasket being held spaced from said partition means by said ring.

2. An article of manufacture comprising a collapsible tube having a body portion and a neck portion with a discharge passage therethrough, partition means in said passage spaced from the end of said neck to partially close the passage and having a non-circular aperture therethrough, a sealing ring connected with the end of said neck, said ring having a smooth outer face, and a cap for said neck having a flat disc-shaped gasket inserted and retained therein to cooperate with said sealing ring, the central portion of said gasket always remaining spaced from said partition means.

3. An article of manufacture comprising a collapsible tube having a body portion and a neck portion with a discharge passage therethrough, partition means in said passage spaced from the end of said neck to partially close the passage, said partition having a single discharge opening therein, a sealing ring connected with the end of said neck and having a smooth, outer face, and a cap for said neck having a flat gasket therein arranged to engage and extend across said sealing ring always out of contact with said partition.

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