

Jan. 18, 1944.

D. DESKEY
COLLAPSIBLE TUBE
Filed Dec. 5, 1940

2,339,464

FIG. 1.

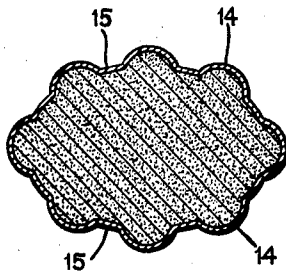
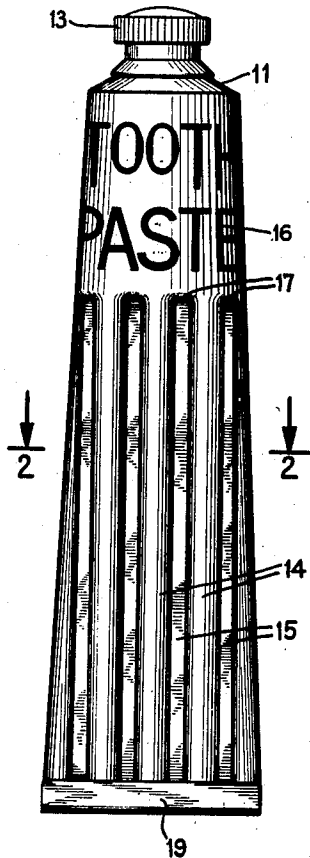


FIG. 2.

FIG. 3.

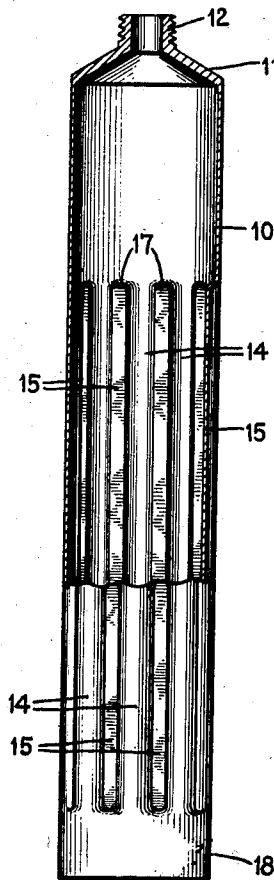
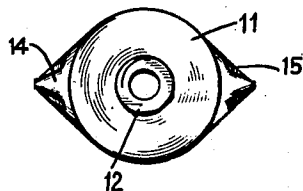


FIG. 4.



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2,339,464

COLLAPSIBLE TUBE

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Application December 5, 1940, Serial No. 368,567

3 Claims. (Cl. 221—60)

This invention relates to improvements in collapsible tubes of the type employed in the packaging of toothpaste, shaving cream, and a variety of other creamy or pasty materials or even liquids or finely divided solids. It has particular reference to thin-walled tubes of this character which are extruded from soft metals or metals which are rendered soft by appropriate heat treatment, such as tin, lead, aluminum, or the like or mixtures of the same.

An object of the invention has been to provide a tube of the character mentioned which is strong and resistant to deformation in the course of ordinary handling but which is readily collapsed in the normal use of the same. This object has been attained without increasing the wall thickness of the tube, which would increase its cost, and without interfering seriously with the desired decoration of the tube and the application thereto of appropriate trade marks or descriptive matter. In fact, the improved tube of the present invention lends itself readily to a wide variety of new decorative schemes.

Other objects and advantages of the invention will appear from a detailed description of an illustrative form of the same which will now be given in conjunction with the accompanying drawing, in which:

Fig. 1 is a front elevational view of a collapsible tube constructed in accordance with the invention, the tube being shown in filled and sealed condition.

Fig. 2 is a transverse sectional view through the tube along the line 2—2 of Fig. 1.

Fig. 3 is a view partly in longitudinal section along the axis of the tube and partly in side elevation, the tube being shown prior to filling, and

Fig. 4 is a top plan view of the tube.

Referring now to the drawing, the tube may originally be of the type conventionally employed in the packaging of tooth paste and may comprise a tubular wall 10, of cylindrical form, extending at its upper end into a relatively rigid, inclined shoulder portion 11, which partially closes the top of the tube, and a neck 12 which is preferably threaded to receive a screw-threaded cap 13 that completes the closure of the tube and provides access to its contents. This tube may be extruded in the conventional way by the action of a punch on a slug of the appropriate metal deposited in a recess in a die of suitable construction. In this way the wall 10, shoulder 11 and neck 12 may be formed as an integral unit. The threads in the neck are formed in a separate

operation by either rolling or cutting and the lower end of the tube may be trimmed off in the usual way to any desired length.

The wall 10 is preferably made quite thin in order to conserve the metal of which the tube is formed and thus keep to a minimum the cost of the tube. A wall thickness of about .003 of an inch may suitably be employed. Shoulder 11, on the other hand, is considerably thicker, at least several times thicker, and may well be about .025 of an inch. Accordingly, the shoulder will lend considerable stiffness to the upper end of the tube and will, therefore, resist accidental deformation of the tube adjacent its upper end. As will be later explained, the extreme lower end of the tube may also be stiffened substantially by the closing or sealing of the same after the tube has been filled. However, the main body of the tube, intermediate its upper and lower ends, is considerably more subject to indentation or deformation. Prior to filling and closing of the tube the entire lower part is unsupported and therefore easily marred in the course of handling. Thus, when tubes of this character are handled in the course of finishing and packing the same prior to filling and are further handled in the course of filling, packing and shipping the same, and sometimes in arranging a display, it is difficult to avoid indenting the thin wall and thus spoiling the neatness and attractiveness of the design on the surface of the tube. If the wall is indented prior to the printing or other decorating operations, these are interfered with.

Accordingly, to overcome these weaknesses and disadvantages of prior tubes, the improved tube is provided with corrugations in the wall 10 over that part of its area which is most likely to be deformed, i. e., the part which is not stiffened and strengthened by the shoulder 11 or by other means. The corrugation of the tube, to provide projecting rib portions 14 and intermediate indentations 15, may be accomplished in any of a variety of ways. Thus, in the course of finishing the tube after extrusion it may suitably be rolled in contact with a corrugated roller or cylinder adapted to impart the desired configuration to a selected portion of the tube wall. The mandrel which supports the tube in the course of this operation may suitably be indented or corrugated to conform with the corrugations of the cylinder or a slight clearance may simply be provided between the tube and the supporting mandrel in the region in which the corrugations are to be formed. The corrugating operation may be performed either before or after the tube

has been decorated by coating or printing operations but is preferably performed as early as possible in the manufacture of the finished tube so as to be of maximum benefit. If the corrugated portion of the tube is to be coated or otherwise decorated this should ordinarily be done prior to the corrugating step.

For the purpose of strengthening and stiffening the tube, the corrugations might be extended throughout the length of the wall 10 up to the shoulder 11. However, this would interfere with the application and proper display of the usually desired printed matter 16 indicated in Fig. 1. Moreover, it is unnecessary to extend the corrugations to the top of the tube in view of the previously mentioned stiffening effect of the relatively rigid shoulder 11. In the vicinity of this shoulder the wall of the tube is equally as stiff and resistant to deformation, without corrugation, as the lower portion of the tube with its corrugation. Ordinarily, it will be found desirable to extend the corrugations over the major portion of the length of the tube since the stiffening provided by the shoulder 11 is not sufficiently effective to resist deformation as far down as the mid-point in the length of the tube. As shown, the upper ends 17 of the corrugations are not more than about one-third of the way down from the shoulder 11.

At its lower end the tube may also be provided with a short, smooth section 18, below the corrugated portion, to facilitate sealing of the tube after it has been filled. It will be understood that in the use of the tube, the paste or liquid or the like will be introduced through the lower, fully open end of the tube and the tube will then be closed or sealed in any of the conventional ways. Thus, the portion 18 may be pinched together and folded upon itself several times, in any known manner, and then crimped or simply squeezed firmly, or after the folding operation a clip 19 may be applied or, if desired, the end of the tube may simply be pinched together and either soldered or welded in a known manner to effect a seal. In any case, and particularly in the event that a soldered or welded seal is employed, the corrugations may be extended completely to the end of the tube. However, when folding or crimping of the end is relied upon to seal the tube, the provision of the smooth portion 18 is desirable. In fact, the smooth portion 18 may safely be extended upwardly to a somewhat greater extent than is required for the sealing of the tube since the folding and crimping, and particularly the application of a separate clip, will materially stiffen and strengthen the lower end of the tube. Even the pinching and soldering or welding of the lower end will add some rigidity. Accordingly, provision may be made for the application of printed matter at both ends of the tube, if desired, leaving only a wide band around the mid-section of the tube to be corrugated.

While the invention has been disclosed primarily in connection with a tube of the conventional tooth paste type, having a neck at its upper end through which the contents of the tube

is squeezed as it is to be used, the invention is also applicable to other types of collapsible tubes. It is applicable, for example, to tubes of the types illustrated in the Friden Patents No. 2,112,085 and No. 2,160,963. It is also applicable to containers of the type now available in which the top is completely closed by a substantially flat disc, in lieu of the inclined shoulder 11 and neck 12, this disc being removed by the thumb nail, or by cutting the tube with a knife or the like, when the contents of the package are to be used. In connection with all of these and other types of collapsible tubes, the provision of corrugations in a region adjacent the lower or filling end of the tube, or in a central region intermediate the two ends, will serve to minimize accidental deformation of the tube in the course of handling the same.

The corrugations employed in the body of the tube may be of a variety of different forms and spacing. They may be relatively broad and widely spaced, as shown, or they may be finer, or more closely spaced, or arranged in groups. Normally it is preferable to extend the corrugations longitudinally but, if desired, they may be arranged in other ways, either transversely or diagonally of the tube, or in a way to form special designs or configurations.

While a preferred form of tube has been disclosed in considerable detail and several modifications have been suggested, it will be understood that numerous other variations may be employed without departing from the general principles and scope of the invention.

What I claim is:

1. A collapsible, thin metal tube comprising an extruded tubular wall and an integrally connected, relatively rigid member at least partially closing one end of the tube formed by said wall, said wall being corrugated for the major part of its length to impart stiffness thereto but being smooth adjacent said relatively rigid member to facilitate printing thereon, the construction being such as to maintain nearly uniform collapsing characteristics and resistance to deformation substantially throughout the length of the tube.

2. A collapsible, thin metal tube comprising an extruded tubular wall and an integrally connected, relatively rigid member at least partially closing one end of the tube formed by said wall, said wall being smooth adjacent said member to facilitate printing thereon but being corrugated over a substantial portion of the length of the tube including its mid-portion.

3. A collapsible, thin metal tube comprising an extruded tubular wall and an integrally connected, relatively rigid member at least partially closing one end of the tube formed by said wall, said wall being smooth adjacent said member to facilitate printing thereon and also adjacent the opposite end thereof to facilitate sealing the same and being corrugated over a substantial part of its length intermediate said smooth portions to impart stiffness to the wall.

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