

May 14, 1957

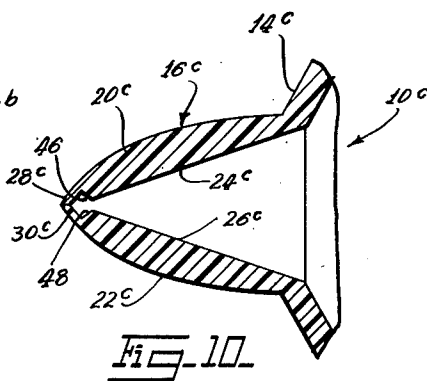
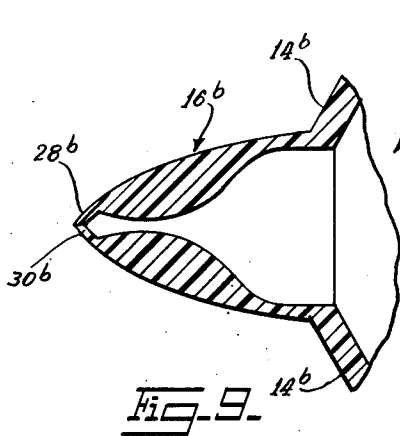
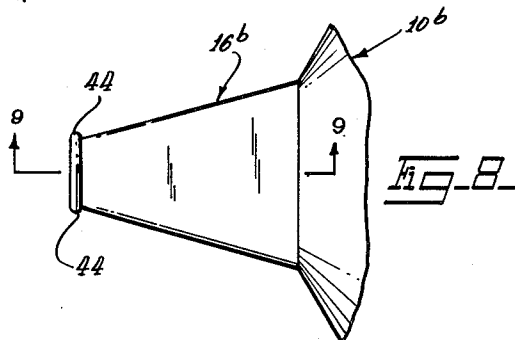
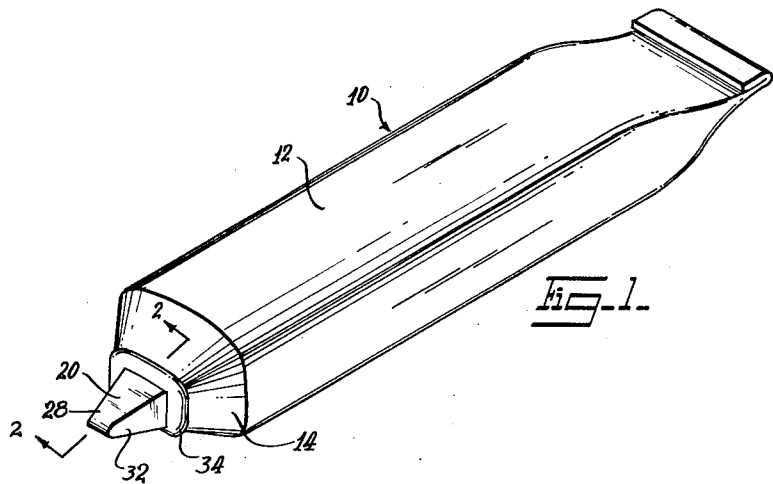
J. M. LUTZ

2,792,149

COLLAPSIBLE CAPLESS TUBE FOR TOOTHPASTE OR THE LIKE

Filed Oct. 28, 1954

2 Sheets-Sheet 1



INVENTOR.
JOSEPH M. LUTZ
BY
Golden Holachek
ATTORNEY

May 14, 1957

J. M. LUTZ

2,792,149

COLLAPSIBLE CAPLESS TUBE FOR TOOTHPASTE OR THE LIKE

Filed Oct. 28, 1954

2 Sheets-Sheet 2

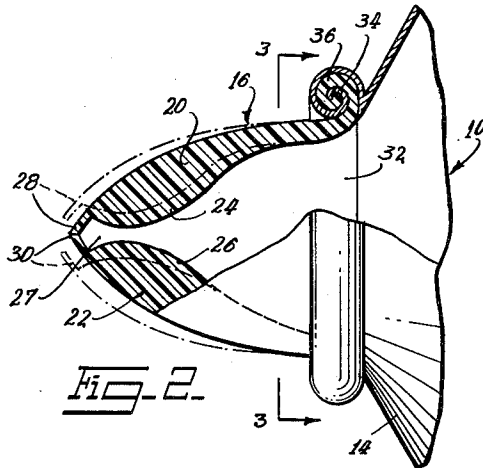


Fig. 2

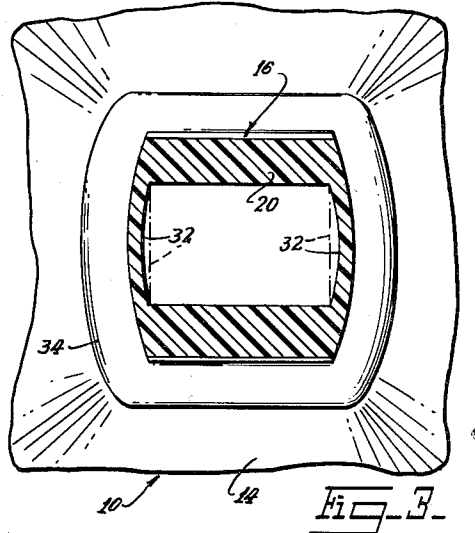


Fig. 3

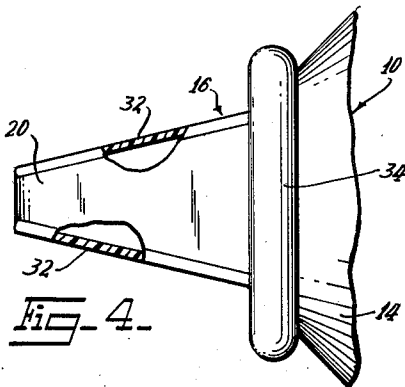


Fig. 4

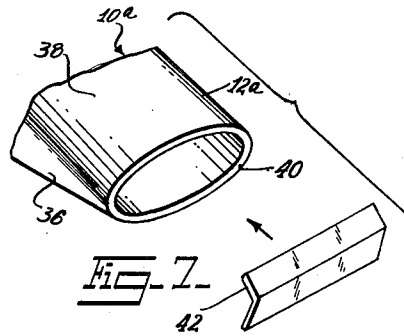


Fig. 7

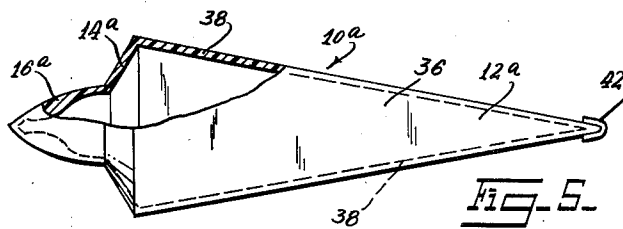


Fig. 5

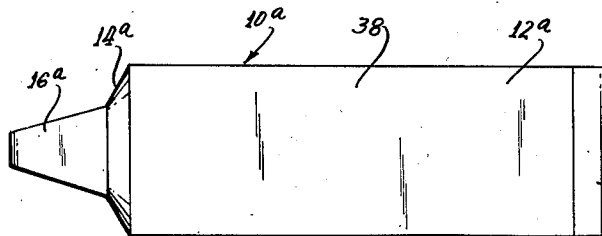


Fig. 6

INVENTOR.
JOSEPH M. LUTZ
BY
Goldman & Holschuh
ATTORNEY

1

2,792,149

COLLAPSIBLE CAPLESS TUBE FOR TOOTHPASTE OR THE LIKE

Joseph M. Lutz, New York, N. Y.

Application October 28, 1954, Serial No. 465,205

6 Claims. (Cl. 222—107)

This invention relates to collapsible tubes formed of metal, plastic, or the like, such as those used as containers in which toothpaste, shaving cream and other fluid, pasty products are sold.

Ordinarily, a tube of the type stated is provided with a removable cap, which is generally threaded onto the neck of the tube. As has been recognized by others in the art, this construction has certain notable disadvantages. For example, a certain amount of time is consumed in unthreading the cap, and then threading it back onto the neck after the desired quantity of the product has been forced through the neck. Further, a cap of the type stated tends to become lost, leaving the tube uncovered.

The main object of the present invention, in view of the situation as it has existed in the art, is to provide a collapsible tube which will be capless, in the sense that the portion of the tube through which the product is dispensed is adapted to remain normally closed to serve as a cap, is capable of being opened with a minimum of difficulty when a portion of the tube contents is to be dispensed, and remains at all times a permanent part of the tube.

Another object is to provide a device as stated which will be of relatively simple construction, will be capable of being assembled with the tube body with comparative ease and at relatively low cost, will open immediately when a comparatively slight pressure is applied to the tube body tending to collapse the same, and will be adapted to dispense the product in a regularly shaped, ribbon-like form.

Yet another object is to provide a capless tube as described, wherein the portion through which the product is dispensed will be integrally formed with lips that are specifically shaped to facilitate a clean cutting off of the ribbon, after the same has been extended out of the tube to the desired length.

Yet another object is to provide a capless tube as stated wherein the head will be so shaped as to be resiliently distendable, with portions of the walls of the head being so dimensioned relative to other portions as to be freely spreadable, while other wall portions remain comparatively stationary.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a perspective view of a tube formed in accordance with the invention, the dispensing head being attached to a tube body of metal.

Fig. 2 is an enlarged longitudinal sectional view through the head on line 2—2 of Fig. 1, the dotted lines showing the same in open position.

Fig. 3 is a sectional view on line 3—3 or Fig. 2.

2

Fig. 4 is a top plan view of the head, portions being shown in section.

Fig. 5 is a view partly in side elevation and partly in longitudinal section of a modified form in which the head and the tube body are integrally formed of plastic material.

Fig. 6 is a top plan view of the tube shown in Fig. 5.

Fig. 7 is a fragmentary, exploded perspective view of the rear end of the tube body shown in Figs. 5 and 6, preliminary to filling of the tube and closing of the same.

Fig. 8 is a top plan view showing the top portion of a second modification.

Fig. 9 is a sectional view on line 9—9 of Fig. 8.

Fig. 10 is a view similar to Fig. 9 showing a third modification.

The reference numeral 10 has been applied generally in Figs. 1—4 of the drawing to a collapsible tube such as one adapted to hold toothpaste or similar pasty, fluid products. A tube of the type stated conventionally includes a thin-walled, collapsible body 12, to which squeezing pressure is applied, for the purpose of reducing the interior area of the tube, thus to force the pasty contents thereof through the neck. At one end, the relatively flexible body 12 is integral with a comparatively inflexible, approximately frusto-conical neck 14, having a center opening in which is mounted a head generally designated 16 and adapted to be deformed into a position in which it will permit the flow of the tube contents out of the opening.

The head 16 is integrally formed from a single piece of material, such as a resiliently distendable plastic. It will be understood, however, that rubber or the like can be used. In any event, the head 16 includes top and bottom walls 20, 22, said top and bottom walls converging in a direction away from the body as best shown in Fig. 2.

As shown in Fig. 2, the top and bottom walls 20, 22 have longitudinally curved outer surfaces converging in a direction away from the neck 14. The inner surfaces of said top and bottom walls 20, 22 have been designated at 24, 26 respectively. These are also longitudinally curved, though oppositely to the outer surfaces in the area of the tapered outer end portion of the head. The opposite curvature of the inner and outer surfaces of the respective walls, at this location, results in a progressive thickening of the top and bottom walls in a direction away from the neck 14, forming a restricted throat 27 between the thickest portions of the walls. Between said throat and the outer ends of the top and bottom walls, the top and bottom walls are rapidly decreased in thickness and merge into convergent, thin-walled lips 28, 30, respectively, which are normally closed.

The head is also formed with side walls 32 integral with the top and bottom walls, said side walls 32 being thin-walled and bulged outwardly to a slight extent in their closed position (see Fig. 3).

The head, as shown, is formed of a resiliently distendable plastic material, and at its base has a circumferential, continuous lip interengaged permanently with a mating lip 34 of the neck 14. The lip 34 extends about the opening of the neck and when seen in cross section is spirally shaped as shown in Fig. 2. The lip 36 formed upon the base of the head is correspondingly spirally shaped for interengaging of said lips 34, 36.

In use of the device as shown in Figs. 1—4, when a relatively light squeezing pressure is applied to the tube body 12, the tube contents, seeking an outlet, exert pressure upwardly and downwardly in Fig. 2 against the inner surfaces 24, 26, in the area of the restricted throat 27. This forces the top and bottom walls 20, 22 away from one another to the dotted line positions of Fig. 2, thus spreading the lips 28, 30. The tube contents pass

3

through the lips, being shaped by the lips into a ribbon-like form. When the squeezing pressure is released, the inherent resiliency of the head material asserts itself, causing a return of the lips to their normally closed position shown in full lines in Fig. 2.

When the top and bottom walls shift apart from one another, the side walls 32 flex to the dotted line positions shown in Fig. 3, said side walls thus moving inwardly to a slight extent towards one another. This facilitates movement of the top and bottom walls, which constitute, together with their lips 28, 30, spreadable jaws, away from one another. When the squeezing pressure exerted with the finger tips is released, the side walls return to their full line positions shown in Fig. 3, thus causing the lips to move to closed position.

In Figs. 5-7 there is shown a modified form in which the capless, collapsible tube 10^a is formed in a single operation, with the tube body, neck, and head all being integrally formed from resiliently distendable plastic material. In this form, the head 16^a, considered per se, is identical to the head 16, and hence will not be described in detail.

The tube body 12^a in the modification, however, is not a conventional, metallic tube body such as that shown in Figs. 1-4. Instead, the tube body is formed of plastic material throughout, and includes approximately triangular side walls 36 integral along their respective longitudinal edges with rectangular top and bottom walls 38 converging in a direction away from an approximately frusto-conical neck 14^a. The neck 14^a is integral both with the head and with the tube body, and is of thicker material than the material of the walls 36, 38 of the tube body. Thus, the neck 14^a is more resistant to flexure than are the walls 36, 38, thus to provide a relatively firm support for the head 16^a.

In the modified form, the tube may be filled in the manner shown in Fig. 7. Initially, the rear end 40 of the tube body 12^a is formed open, to provide a filling opening. Then, a transversely extending strip of bendable metal 42, folded longitudinally and centrally thereof, and initially open as shown in Fig. 7, is applied to the rear end of the tube body and is crimped tightly thereupon into clamping engagement with the tube body, said strip when crimped having a U-shaped cross section as shown in Fig. 5.

In Figs. 8 and 9, a second modification 10^b is shown, and this has a plastic body terminating at its head end in a neck 14^b, said body and neck being formed as shown in Figs. 5-7. The neck 14^b is integral with a head 16^b, which is identical to that of the first form, with the exception that the lips 28^b, 30^b thereof have lateral projections 44, extending outwardly from the opposite sides of the smaller end of the head, as shown in Fig. 8. This construction is particularly adapted to facilitate the formation of the tube contents into a wider flat ribbon when said contents are dispensed.

In Fig. 10 a third modification 10^c is shown, having a plastic tube body formed in the manner shown in Fig. 5. The body merges into a relatively thick neck 14^c integral with a head 16^c.

In this form of the invention the top and bottom walls 20^c, 22^c have longitudinally curved outer surfaces, similar to the first form. However, the inner surfaces 24^c, 26^c are straight, and due to the curvature of the outer surfaces of the top and bottom walls, said walls are thickened adjacent the lips 28^c, 30^c thereof. The surfaces 24^c, 26^c merge adjacent said lips into sharply divergent end surfaces 46, 48.

It will be understood that each of the several different types of head and body forms can be selectively used with one another. In other words, the tube body shown in Figs. 5-7 can be used with any of the several heads illustrated. Conversely, any of the heads illustrated can be used with the metallic tube body shown in Fig. 1.

In all forms of the invention, there is the common characteristic wherein a predetermined changing in thick-

4

nesses of the side and top walls results in certain portions of the head spreading apart while other portions remain comparatively stationary. Further, in all forms the device is adapted to function in such a manner as to cause the head to be tightly closed at all times when the tube is not in use, with the head opening, however, under comparatively low squeezing pressure for the purpose of providing a dispensing opening through which the tube contents will flow in a ribbon-like form.

Still further, in each form of the invention there is included, on the resiliently spreadable walls, cutting lips, and when said walls are spread, the cutting lips move apart to form the dispensed material into a ribbon. The lips, when returned to closed position, act to effect the clean cutting of the ribbon dispensed through the opening of the tube neck.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. A capless tube for fluent, pasty substances, comprising a thin-walled collapsible plastic tube body, a neck thereon, and a resiliently deformable head having a permanent connection to the neck, said head including a pair of opposed, convergent side walls and a pair of opposed, convergent top and bottom walls, the walls of each pair converging in a direction away from the tube body, the walls of at least one pair normally contacting at their convergent ends and being resiliently spreadable under pressure exerted thereagainst by the tube contents on squeezing of the tube, to form a dispensing opening for said contents, the tube neck including an inwardly directed lip engaging the head at the base thereof to hold the same permanently connected to the neck, said base being formed as an outwardly directed, continuous lip of spiral cross section, the neck lip being of spiral cross section and being interengaged with the lip of the head.

2. A capless tube for fluent, pasty substances, comprising a collapsible tube body, a neck thereon, and a resiliently deformable head having a permanent connection to the neck, said head including a pair of opposed, convergent side walls and a pair of opposed, convergent top and bottom walls, the walls of each pair converging in a direction away from the tube body, the walls of at least one pair normally contacting at their convergent ends and being resiliently spreadable under pressure exerted thereagainst by the tube contents on squeezing of the tube, to form a dispensing opening for said contents, said top and bottom walls being approximately trapezoidal in outer configuration, said side walls being approximately triangular in outer configuration.

3. A capless tube for fluent, pasty substances, comprising a collapsible tube body, a neck thereon, and a resiliently deformable head having a permanent connection to the neck, said head including a pair of opposed, convergent side walls and a pair of opposed, convergent top and bottom walls, the walls of each pair converging in a direction away from the tube body, the walls of at least one pair normally contacting at their convergent ends and being resiliently spreadable under pressure exerted thereagainst by the tube contents on squeezing of the tube, to form a dispensing opening for said contents, said top and bottom walls being approximately trapezoidal in outer configuration, said side walls being approximately triangular in outer configuration, the top and bottom walls being integrally formed with cutting lips for severing a ribbon formed of the tube contents and dispensed through said opening.

4. A capless tube for fluent, pasty substances, comprising a collapsible tube body, a neck thereon, and a

5

resiliently deformable head having a permanent connection to the neck, said head including a pair of opposed, convergent side walls and a pair of opposed, convergent top and bottom walls, the walls of each pair converging in a direction away from the tube body, the walls of at least one pair normally contacting only at their convergent ends and being resiliently spreadable under pressure exerted thereagainst by the tube contents on squeezing of the tube, to form a dispensing opening for said contents, the top and bottom walls being substantially thicker than the side walls for the major portion of their area, and constituting those walls that are resiliently spreadable under said pressure, the top and bottom walls being inwardly convex, said side walls being bulged outwardly slightly to permit spreading of the top and bottom walls.

5. A capless tube for fluent, pasty substances, comprising a collapsible tube body, a neck thereon, and a resiliently deformable head having a permanent connection to the neck, said head including a pair of opposed, convergent side walls and a pair of opposed, convergent top and bottom walls, the walls of each pair converging in a direction away from the tube body, the walls of at least one pair normally contacting at their convergent ends and being resiliently spreadable under pressure exerted thereagainst by the tube contents on squeezing of the tube, to form a dispensing opening for said contents, the top and bottom walls being substantially thicker than the side walls, and constituting those walls that are resiliently spreadable under said pressure, the top and

6

bottom walls being inwardly convex, said side walls being bulged outwardly slightly to permit spreading of the top and bottom walls, the top and bottom walls including spreadable lips bounding said opening, said lips having extensions projecting laterally outwardly of the head.

6. A capless tube for fluent, pasty substances, comprising a collapsible tube body, a neck thereon, and a resiliently deformable head having a permanent connection to the neck, said head including a pair of opposed, convergent side walls and a pair of opposed, convergent top and bottom walls, the walls of each pair converging in a direction away from the tube body, the walls of at least one pair normally contacting at their convergent ends and being resiliently spreadable under pressure exerted thereagainst by the tube contents on squeezing of the tube, to form a dispensing opening for said contents, the tube body, neck and head being integrally formed of plastic material.

References Cited in the file of this patent

UNITED STATES PATENTS

878,182	Blake	Feb. 4, 1908
1,070,689	Irrgang et al.	Aug. 19, 1913
2,546,709	Abarr	Mar. 27, 1951
2,591,354	Harris	Apr. 1, 1952
2,663,461	Brown	Dec. 2, 1953

FOREIGN PATENTS

381,875	Great Britain	Oct. 13, 1932
---------	---------------	---------------