

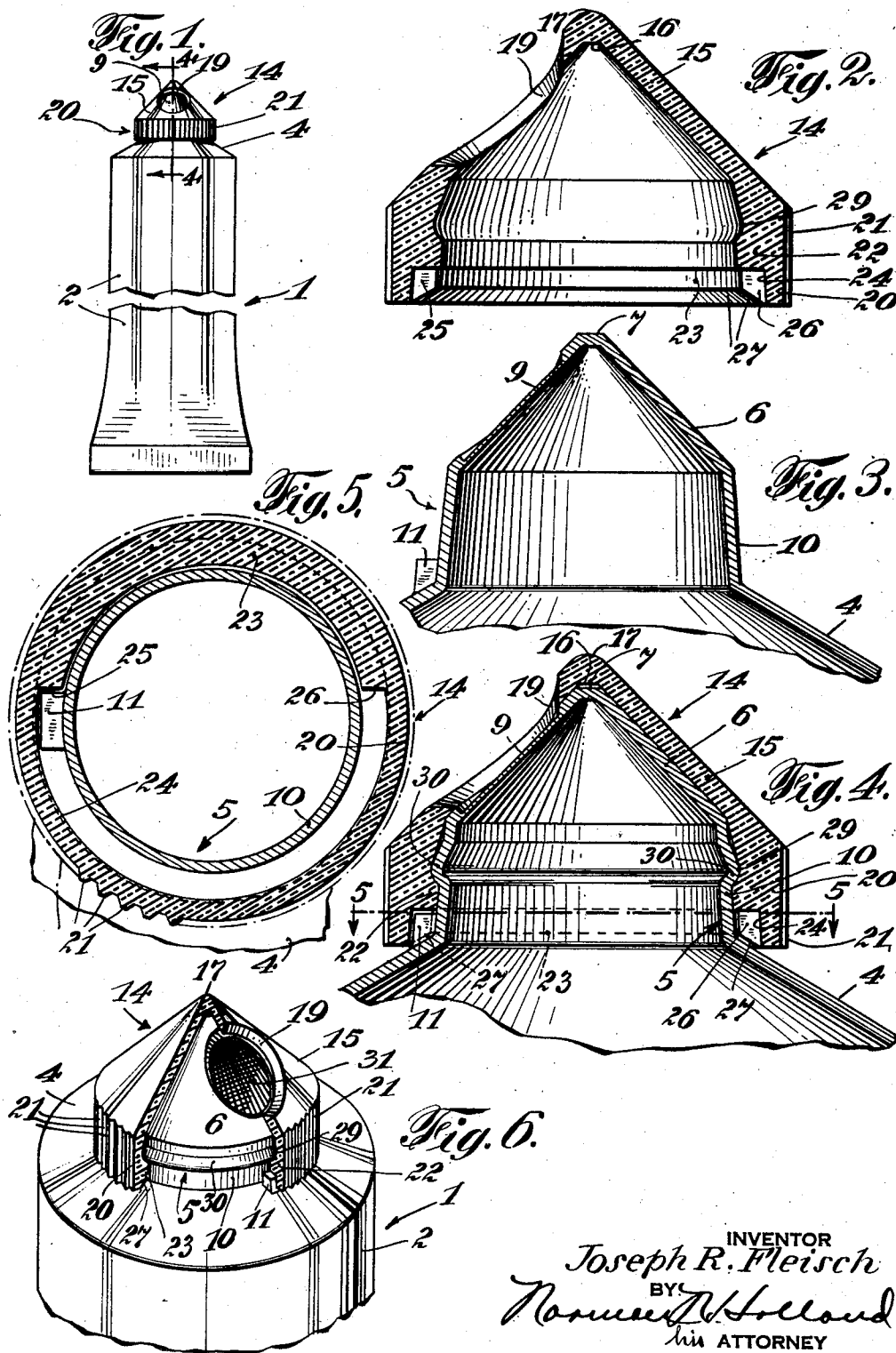
Sept. 29, 1936.

J. R. FLEISCH

2,056,005

COLLAPSIBLE TUBE

Filed Sept. 15, 1933



INVENTOR
Joseph R. Fleisch
BY
Norman W. Holland
his ATTORNEY

UNITED STATES PATENT OFFICE

2,056,005

COLLAPSIBLE TUBE

Joseph R. Fleisch, Clifton, N. J., assignor to Anchor Cap & Closure Corporation, Long Island City, N. Y., a corporation of New York

Application September 15, 1933, Serial No. 689,547

11 Claims. (Cl. 221-60)

The present invention relates to sealed packages, and more particularly to a collapsible tube and the parts thereof.

The common type of package for tooth paste, shaving cream, salves and other pasty materials, comprises a tube formed of relatively soft metal having an outlet or nozzle and a cap threaded upon the outlet to seal the contents of the tube. In order to dispense the product, the cap is removed by unscrewing and the tube is squeezed or collapsed to force portions of the product through the outlet. As a result, the caps are frequently lost or thrown away after they are removed, whereby no means are available for sealing the remaining contents to prevent accidental discharge, deterioration, and hardening or caking of the product. Consequently, a substantial amount of the product is wasted or becomes unfit for further use. If the caps are dropped and found again, they may pick up dirt and contaminate the product, or the liner may fall out, causing the consumer considerable inconvenience.

In order to overcome the above objections, tubes having caps irremovably retained thereon have been utilized. The chief difficulty with these is that they are too complicated, require expensive apparatus to manufacture and assemble them, and in many instances they provide inadequate seals. These factors increase the cost of the packages to such an extent that packers cannot utilize them on a competitive basis.

The present invention aims to provide a simple, inexpensive sealed package for various products, such as tooth paste and other pasty or viscous materials. The present invention also contemplates the provision of a package which forms an effective seal, prevents loss of the cap or liner and provides an effective reseal for preserving the undispensed portions of the product. The invention further contemplates the provision of an improved package which can be made at substantially the same cost as the cost of the inferior conventional package. In addition, the present invention aims to provide a cap which is attractive in appearance and is adapted to serve as an applicator for dispensing the contents.

An object of the present invention is to provide an inexpensive collapsible package for pasty substances and the like.

Another object of the invention is to provide a tube which is closed at both ends and is provided with a conical portion adapted to be punctured to provide a dispensing aperture.

Another object of the invention is to provide

a collapsible tube having a cap irremovably mounted thereon which is adapted to form an effective reseal.

Another object of the invention is to provide an improved cap which is attractive in appearance and may be used as an applicator.

Another object of the invention is to provide a tube closed at both ends, the dispensing end thereof having a thinned portion to facilitate puncturing, formed by a depression on the exterior of the tube to make the location of the thin spot visible from the exterior of the tube.

Another object of the invention is to provide a cap having a conical top portion facilitating the provision of a substantially larger aperture for a cap of given diameter and facilitating the proper centering of the cap on the tube.

A further object of the invention is to provide a sealed collapsible tube constructed of parts which may be manufactured and assembled by simple inexpensive operations.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawing, forming a part of the specification, wherein

Fig. 1 is a fragmentary side elevational view showing a preferred embodiment of the present invention;

Fig. 2 is a sectional view of a preferred closure cap of the present invention;

Fig. 3 is a fragmentary sectional view of a preferred container prior to applying the cap thereon;

Fig. 4 is a sectional view, taken along the line 4-4 of Fig. 1, showing the cap applied to the container;

Fig. 5 is a sectional view, taken along the line 5-5 of Fig. 4; and

Fig. 6 is a perspective view, partly in section, showing the cap and container after the tube has been opened for use.

Referring again to the drawing, and more particularly to Figs. 1, 2 and 3, there is shown a container 1, such as a collapsible tube, having a tubular portion 2 adapted to be closed at its lower end, preferably after the tube is filled in the usual manner, an inclined portion 4 forming a shoulder, 55

and a top portion 5 adapted to receive a suitable closure cap. Preferably, the top portion 5 of the tube comprises a substantially conical portion 6 having a flat apex portion 7 adapted to center the cap on the top portion. A suitable weakened portion or thin spot 8 is formed in the conical portion. This portion is adapted to be punctured to provide an aperture for dispensing the product from the tube and by reason of the conical shape of the top portion, a substantially large aperture is provided. The thinned portion 8 is preferably formed by a depression from the exterior of the tube. In this way, the location of the thin spot is visible to the person puncturing and the aperture in the cap can be made to register with it more easily. In addition, the film being attached to the inner surface of the tube minimizes any tendency for the metal to break when it is rolled back during the punching operation.

A neck portion 10, merging into the shoulder 4, is formed beneath the conical portion 6 for receiving the skirt of a closure cap and preferably is inclined upwardly at an angle of about four degrees to facilitate centering the cap. A stop portion or projection 11 is formed on the neck portion substantially at the junction of the neck portion and the shoulder portion for permitting limited rotation of the closure and, preferably, is in radial alignment with the weakened portion 8.

A preferred closure cap 14 is shown herein formed of molding material such as phenolic condensation products and synthetic resins, which is attractive in appearance and which is not affected by any chemical action of the product. Preferably, the cap comprises a conical top portion 15 adapted to conform to and fit the conical portion 6 of the container and having an inner apex 16 adapted to substantially fit the apex 7 of the container. The outer apex 17 of the cap is preferably rounded to improve the appearance thereof and to facilitate its use as an applicator for dispensing the contents of the package, when desired. A suitable aperture 19 is formed in the conical portion 15 below the apex 17 for dispensing the product, and is adapted to register with the thinned portion 8 of the tube. The lower portion of the cap is provided with an integral skirt portion 20 adapted to be rotatably attached to the neck portion 10 and preferably has suitable ribs or knurls 21 formed therein to decorate the cap and provide gripping means to facilitate rotation thereof.

The thinned portion 8 of the tube hermetically seals the contents of the tube, which enables the product to reach the consumer in the best possible condition. It also makes the package tamper-proof. One cannot sample or tamper with the contents without puncturing the film 8. This enables the purchaser to know that the contents are in their original condition, a feature greatly desired by manufacturer and consumer. The utilization of the film 8 also reduces the cost of the tube. It is not practical to make an offset aperture in the tube because of the accuracy required of the cooperating parts utilized in the manufacture. A variation of one or two thousandths of an inch in the thickness of the film, occasioned by wear or imperfections in the tool, is relatively immaterial but such variations in tools for puncturing the end would be fatal. For these reasons, it is less expensive to form the aperture in the tube by a separate punching operation, where it is desired to pack a product in an apertured tube. Preferably, the caps are also formed, for the same reasons, with a film of molded material over the aperture, which is broken away before the cap is

applied to the container. By utilizing this method of manufacture, the tubes can be made to compete in cost with conventional tubes, which is important.

In order to attach the cap to the container, the inner part of the skirt is provided with an inwardly extending rib 22 tapered to fit the neck portion 10 and spaced from the lower edge of the skirt to form an annular recess 24 adapted to receive the stop portion or projection 11 on the shoulder of the tube. A substantially semi-circular rib 23 is formed within the recess 24, having end portions 25 and 26 adapted to abut against the stop portion 11 to permit limited rotation of the cap. Preferably, the recess 24 is in radial alignment with the aperture 19, so that upon assembling the package, entry of the projection 11 into the recess 24 is facilitated by aligning the aperture with the weakened portion. The lower portion of the rib 23 may be tapered at 27 to fit the shoulder of the container so that it does not interfere with the rotation of the cap. If desired, a pair of spaced projections may be provided in the recess 24 instead of the rib 23. In order to attach the cap, a suitable recess 28 is formed above the rib 22 for permitting a portion of the tube to be expanded therein, as described hereinafter.

In Fig. 4, the cap is shown applied upon the container and rotatably mounted thereon by forming a projection 30 in the neck portion to extend radially outwardly and fit into the groove 29. When the cap is in the position shown herein, the aperture 19 registers with the weakened portion 8 of the container, while the corresponding conical surfaces of the cap and container fit snugly to provide a seal and are relatively rotatable. As shown in Fig. 5, the end portion 25 of the rib 23 abuts against the stop portion 11 to prevent further counter-clockwise rotation of the cap and to facilitate registry of the aperture portion 9 and the aperture 19. If the cap is rotated in a clockwise direction, the end portion 26 permits substantially a half turn so that the conical portion of the cap seals the aperture portion 8.

In Fig. 6, a perspective view of the cap and container is shown, with portion 9 punched out to provide an aperture 31. The metal of the tube is ductile, permitting the film to be punctured by any suitable instrument, such as a pointed wooden peg. The metal does not break but coils about the inner periphery of the opening, which gives a smooth contour to the exterior or visible side of the aperture. The cap fits the tube sufficiently tight to seal the opening, when the cap is rotated to close the opening. In this manner, the cap forms an effective reseal in every instance, while the contents of the package are being dispensed.

The parts of the present invention may be made by utilizing the simplest and least expensive methods. The closure caps may be molded by means of a mold member providing the outer contour of the cap, and a pin forming the inner portions thereof. When the pin is retracted from the mold member, the groove portion 29 will cause the cap to remain on the pin and be withdrawn from the mold. The cap may then be stripped from the pin by a stripping member, due to the slightly plastic or flexible properties of the cap material. The caps are then polished and inspected and are ready for assembly upon the tubes. The tubes are preferably made in the conventional manner, but a closed upper end por-

tion having a weakened portion 9 stamped there-
 in is formed in place of a threaded neck portion.
 The caps are applied upon the tube by placing
 them on the end portion, either by hand or au-
 5 tomatic machinery, and, in every instance, are
 held snugly in proper position by the conical por-
 tion which prevents shifting thereof prior to be-
 ing attached. A suitable tool is inserted into
 the open end of the tube to spin or expand a por-
 10 tion of the neck 10 radially outwardly to form
 the projection 30, which extends and fits into the
 recess 29, whereby the cap is rotatably mounted
 on the container. The recess 29 is preferably
 hook shaped in cross-section to give a good grip
 15 under the projection 30 and ample clearance
 above the projection. The tapered neck 10 facili-
 tates forming the projection 30 with less com-
 plicated tools and also facilitates application of
 caps. The containers may then be lithographed
 20 or otherwise decorated before or after the cap is
 applied and thereafter filled and closed at the
 lower end by existing machines utilized for these
 purposes.

As noted herein, the containers are securely
 25 sealed at both ends to prevent leakage or spoil-
 age of the product during shipment. When they
 reach the ultimate consumer, they are opened
 by turning the cap to the position shown in Fig.
 4 and punching the weakened portion 9 inwardly
 30 to form the aperture 31. By reason of the de-
 pression on the exterior, the location of the thin
 spot is visible and can be made to register with
 the aperture in the cap without difficulty. To
 make this initial opening of the tube easy for the
 35 consumer, a suitable wooden peg may be included
 with each tube. The product, which may be
 tooth paste, for example, is then dispensed by
 squeezing the tube to force out the desired quan-
 tity of paste and applying it to a tooth brush
 40 by moving the conical portion across a tooth
 brush. The apex portion 17, in this manner, is
 used as an applicator to place the paste properly
 upon the brush. After the desired quantity of
 45 paste has been used, the cap is rotated to its
 closed position, whereby the conical part seals the
 aperture 31 to preserve the remaining contents of
 the package and to prevent caking of the product,
 as frequently happens when caps are lost from
 conventional tubes.

It will be seen that the present invention pro-
 50 vides an inexpensive container for tooth paste,
 shaving cream, salve and the like, which may be
 conveniently manufactured without complicated
 or expensive machinery. The parts of the pack-
 55 age provide a hermetic seal which may easily be
 broken by the consumer and also provide an ef-
 fective reseal. Furthermore, the cap or liner can-
 not be lost and cannot be dropped and contami-
 nated. Likewise, the consumer is not inconven-
 60 ienced with removing and replacing the cap or
 struggling with it to match the thread of the caps
 with the threads of the tube. In addition, the
 means for connecting the cap upon the container
 are concealed and do not mar the appearance of
 65 the cap, whereby a more attractive package is
 provided. The package is rugged in construction
 and fully capable of withstanding the rough use
 to which it may be subjected.

As various changes may be made in the form,
 70 construction and arrangement of parts without
 departing from the spirit and scope of the in-
 vention and without sacrificing its advantages,
 it is to be understood that all matter herein is
 to be interpreted as illustrative and not in a lim-
 75 iting sense.

Having thus described my invention, I claim:

1. A closure cap formed of thermo-plastic ma-
 terial such as synthetic resins, comprising in com-
 5 bination a conical top portion having an aper-
 ture therein, a depending skirt, a hook-shaped
 groove in said skirt for rotatably mounting the
 cap on a container, an annular inwardly project-
 ing rib beneath said groove having an inclined
 face for engaging the neck of the container, and a
 10 pair of stop portions formed in the skirt beneath
 said rib to permit limited rotation of the cap on
 the container.

2. A closure cap constructed of thermo-plastic
 material comprising, in combination, a top por-
 15 tion having an aperture therein, a skirt portion,
 a groove substantially hook shaped in section
 for rotatably mounting the cap on a collapsible
 tube, and a rib concealed in said skirt beneath
 said groove having a pair of stop faces for per-
 20 mitting limited rotation of the cap.

3. A sealed package comprising a collapsible
 tube having an upwardly tapered neck portion,
 and a closure cap having a tapered rib fitting
 against said neck portion and having a substan-
 25 tially hook shaped groove above said rib, said
 neck portion being provided with an outwardly
 extending arcuate bead fitting into said hook
 shaped groove for rotatably mounting said cap
 upon said tube.

4. A collapsible tube comprising the combina-
 30 tion of a body part and a top portion having a
 weakened area adapted to be punctured to form
 an aperture, said weakened area being provided
 by a recess at the exterior of the top portion
 whereby said weakened area is visible from the
 35 exterior of the tube and ascertainable without
 the use of index means.

5. A collapsible tube comprising the combina-
 40 tion of a body part, a top portion having a weak-
 ened area formed by a depression on the exterior
 of the tube, and a closure cap rotatably secured
 to said top portion having an aperture therein
 adapted to register with said weakened area
 45 whereby said depression is visible and ascertain-
 able without the use of index means.

6. A collapsible tube comprising the combina-
 50 tion of a body portion, a top portion having a
 conical part, said conical part having a thinned
 area formed by a recess on the exterior of said
 conical part, a closure cap having an internal
 conical part adapted to rest upon the conical part
 of said top portion, and having an aperture there-
 55 in adapted to register with said recess, and means
 for rotatably securing said closure cap to said
 top portion.

7. A closure cap comprising, in combination,
 a conical top portion having an aperture therein,
 a skirt portion integral therewith, an annular
 radially inwardly extending rib having an in-
 60 clined container engaging surface formed inde-
 pendently of the exterior of said skirt, a groove
 above said rib for rotatably mounting the cap
 on a container, and inwardly extending means
 beneath said rib formed independently of the
 65 exterior of said skirt for permitting limited ro-
 tation of the cap on the container.

8. A sealed package comprising a collapsible
 container having an upwardly tapered neck por-
 70 tion and a projection on said neck portion, and
 a closure cap having a tapered rib fitting against
 said neck portion, an arcuate circumferential
 groove substantially hook-shaped in section above
 said rib adapted to receive a corresponding bead
 formed in said neck portion to rotatably mount
 75 said cap upon said container, and a second rib

in said cap below said first rib provided with a stop face for permitting limited rotation of said cap.

5 9. A sealed package comprising a collapsible tube having an upwardly tapered neck portion and a weakened portion above said neck portion adapted to be punctured, and a closure cap having a discharge opening adapted to register with said weakened portion, a tapered rib fitting
10 against said neck portion, and a substantially hook-shaped groove above said rib, said neck portion being provided with an outwardly projecting rib fitting into said hook-shaped groove.

15 10. A closure cap comprising in combination, a top portion having an aperture therein, a depending skirt having an arcuate groove therein, said groove having its smaller diameter at the lower

side thereof and its largest diameter at the upper side thereof, a rib below said groove having an inclined face for engaging the neck of a container and stop means for permitting limited rotation of the cap on the container.

5 11. A collapsible tube comprising the combination of a body part, a top part having a thin portion formed by a substantially circular recess at the exterior of the top part adapted to be punctured to provide an aperture, and a closure
10 cap covering said top part and rotatably attached to said tube having a substantial circular aperture therein adapted to register with said recess, whereby said recess is visibly ascertainable from
15 the exterior of the tube without the use of index means.

JOSEPH R. FLEISCH.