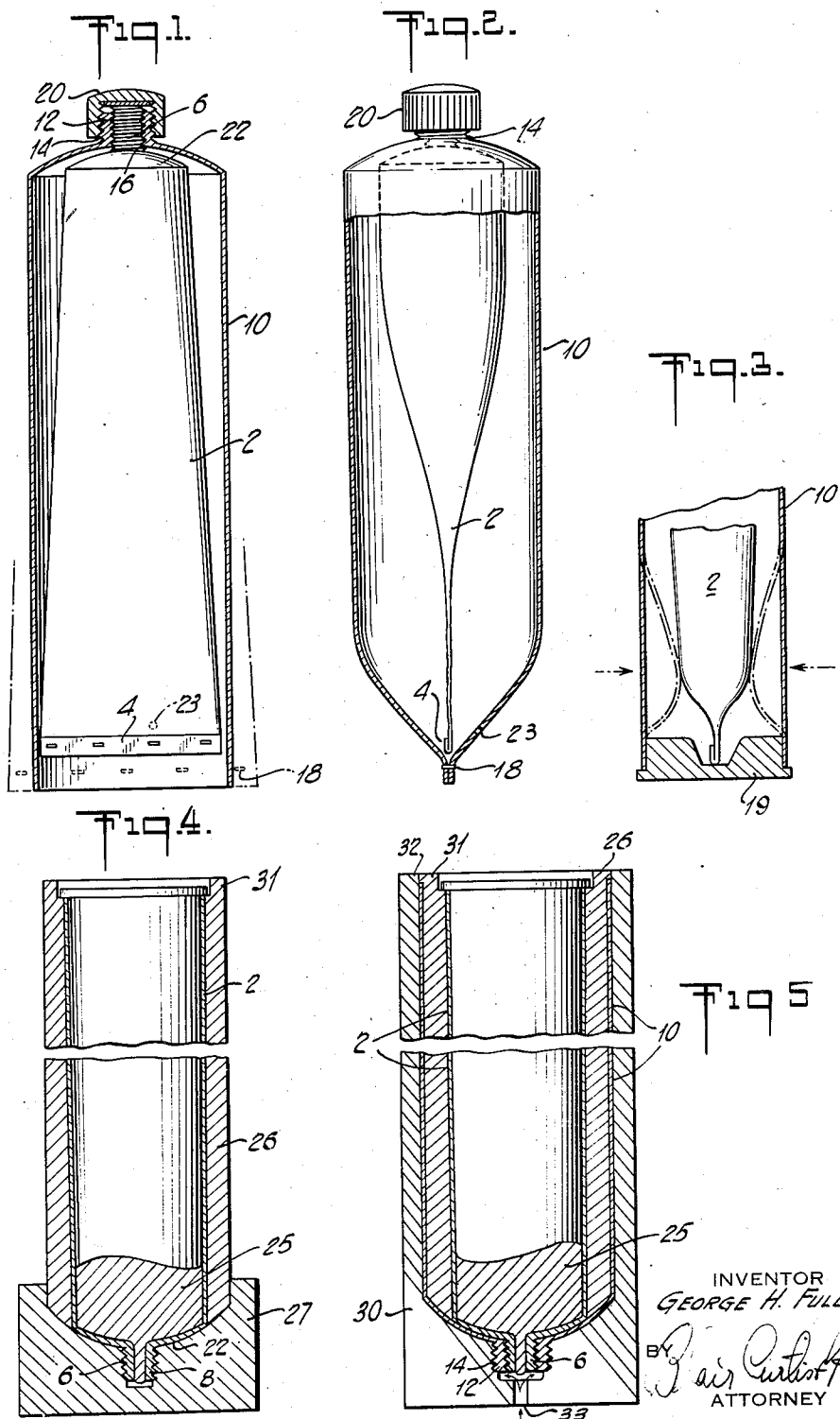


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G. H. FULLER
DISPENSING CONTAINER

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DISPENSING CONTAINER

George H. Fuller, Greenwich, Conn.

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3 Claims. (Cl. 222-105)

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This invention relates to containers for pastes, creams, ointments, and the like, of the type which may be collapsed to force or extrude the paste or cream from the container and it has for its general object the provision of a container for such uses which is so constructed that it will not present the unsightly appearance of the usual collapsible container when in use.

Although attempts have heretofore been made to substitute for the tin or other soft metal alloys, usually employed in making collapsible tubes for pastes, creams, ointments and the like, some other material, such as the organic plastics, no really satisfactory substitute has been found. In particular, the organic plastics do not always prevent the loss of moisture essential oils or other constituent through the tube walls and, in many cases, such plastics are deteriorated by ingredients of the tube contents.

Moreover, in such tubes the flexible plastic merely replaces the metal foil of the ordinary tube, being deformed and collapsed in the same way to extrude the contents. Many consumers consider such tubes, whether metal or plastic to be quite unsatisfactory because of their unsightly appearance when collapsed and the defacement of labels. Ladies prefer jars for cosmetics because they are neat and decorative on the vanity table and most men are annoyed by the twisted irregularly squeezed condition of collapsible tubes in the family medicine cabinet, and still more annoyed if a tube whose label is no longer legible delivers vanishing cream or boric acid ointment onto his tooth brush.

The present invention, therefore, aims to provide a container for pastes, creams, ointments, soaps and other extrudable materials which will have all of the advantages of the ordinary collapsible tube, so far as its being impervious to the contents thereof and not subject to attack by such contents, and so far as ease of extrusion is concerned, while avoiding the unsightly appearance presented by the ordinary collapsible tube after the contents have been partially extruded.

More particularly the invention contemplates an elastic covering for an ordinary collapsible metallic container or tube which will be sufficiently flexible and sufficiently resilient that, while it can be deformed readily to effect collapsing of an enclosed collapsible tube to extrude the paste, or other contents thereof, it will, when released, return to a smooth attractive form, fully displaying the label thereon, while leaving in its collapsed

condition that part of the inner tube upon which it has been pressed.

An important feature of the invention is the possibility of using, in the formation of the covering tube, one of the commercial organic elastic plastic such, for example, as plasticized compositions of the vinyl polymers and copolymers, vinylidene polymers, polyamides, cellulose acetate, or other cellulosic plastics, the various natural and synthetic rubber, etc., thereby permitting the ready formation of attractive covering tubes of any desired permanent coloring or decoration.

Other objects and important features of the invention, to which reference has not hereinabove specifically been made, will appear hereinafter when the following description and claims are considered in connection with the accompanying drawings. In this specification and the accompanying drawings I have set forth one embodiment of my invention and have suggested various modifications and alternatives. It should be understood that these are not intended to be exhaustive or limiting of the invention, but on the contrary are given with a view to enabling others not only to practice my invention, but so fully to understand it and the principles thereof that they will be enabled readily to modify and adapt these examples and to embody the invention in many forms, each as may be best adapted to the conditions of a particular use.

In these drawings:

Figure 1 is a view partly in section of a collapsible tube enclosed within an elastic plastic tube in accordance with the present invention;

Figure 2 is a view showing the collapsible tube in its partially collapsed condition while the elastic enclosing tube still maintains its original shape;

Figure 3 is a fragmentary view corresponding to the bottom of Figure 2, but showing a modification;

Figure 4 is a view partly in ventral axial section and partly in elevation of a mold for making the inner tube;

Figure 5 is a view similar to Figure 4 with a base and sleeve added for molding the elastic tube.

As is well known, the ordinary collapsible tubes in which tooth paste, cosmetic creams, ointments, etc., are marketed are made of a tin or other soft metal alloy which is readily deformable so that the tube may be collapsed to extrude its contents, the original tube 2, usually of circular cross section, being flattened and clipped at its end 4,

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after filling. Thus a tube which, for example, is one inch in diameter at the full circle and five inches long, will, when flattened, have a width at its flattened end of, say, one and five-eighths inches.

Since such a tube, if smoothly collapsed throughout will have this width substantially throughout its length, it is preferable, to make the elastic covering tube of substantially larger inner diameter than the external diameter of the collapsible inner tube. Advantageously the elastic tube is of diameter equal to the collapsed width of the inner tube.

As shown in the drawings, the inner collapsible tube 2 is identical with standard tubes now in common use. Before filling and closing its clipped end, it has a uniform circular section and its delivery end is made heavier with a neck 6, preferably threaded on its outside in the usual manner and provided with the usual discharge opening 8. Because these tubes are standard and made commercially in existing dies it is an advantage of this invention that they can be used without change. My invention is not, however, limited to such tubes, and, where new dies are to be made, my invention makes possible a saving of metal by reduction of thickness in the delivery end of the tube.

This metal tube is enclosed in a plastic tube 10 of a plastic sufficiently resilient that, in the thickness used, it may be deformed sufficiently to collapse the inner tube without going beyond its elastic limit.

As herein shown, the plastic tube 10 is also preferably provided with a neck 12 threaded upon its exterior, as shown at 14, and preferably also threaded on its interior, as shown at 16, to fit the threads on the neck 6 of the collapsible tube 2. This permits convenient assembly of the tube combination, since the tube 2 may first be filled and clipped at its end as shown at 4. The tube 2 may then be inserted in the tube 10 and its neck 6 screwed into the inner threads 16 of the neck 12 of the outer tube 10, thus connecting the two tubes together. If desired the neck 12 may be shrunk upon the neck 6 in any suitable manner. For example, the neck 12 may be made with its neck opening slightly smaller than the outside of neck 6. In such case the metal threads may be forced and turned into the plastic so as to form the thread, or the plastic neck 12 may be swollen with a volatile swelling agent or stretched mechanically and then shrunk on the metal neck 6. Thereafter the bottom end of the tube 10, which preferably extends somewhat below the clipped end 4 of the tube 2, may itself be clipped as shown at 18 or, as shown in Figure 3, a bottom cap 19 may be secured in place by shrinking, cementing or heat sealing, to effect a complete closure of the tube 10.

A plastic or other suitable cap 20, internally threaded to fit over the outer threads 14 of the neck 12 of the outer tube 10, may serve as a closure, the neck 6 of the inner tube 2 preferably extending slightly above the neck 12 so that the cap 20 effects a tight closure of the opening 8 in the neck 6.

Taking the illustrative dimensions given above, a plastic covering tube 10, one-half inch longer than the clipped inner tube 2, that is, five and one-half inches long and one and five-eighths inches in inside diameter, would ordinarily permit clipping below the end of the inner tube 2 to effect a complete enclosure of the inner tube 2.

Although the method of making and connect-

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ing the two tubes just described constitutes a simple and satisfactory practical method, it will be understood that the invention is not limited to this procedure nor to the particular way of connecting the two tubes shown and described. For example, the metal tube and the plastic tube can be made on the same mandrel, the metal tube being made in the usual way by pressing a small block of tin in a die which forms the neck 6 and shoulder 22 and extrudes the metal into the sides with substantially a foil thickness and the plastic being then molded directly over the metal in a second mold before the metal tube is removed from the mandrel. The metal in such case is advantageously coated with a lubricating agent which will prevent adherence of the plastic; or, one may make in this way a collapsible or rigid container in which the metal lining adheres to the plastic, and thus after each use returns to or retains its smooth attractive form with its label smoothly and clearly displayed.

In Figures 4 and 5 is illustrated another method, and an apparatus, for making a combination tube of the present invention. The inner metal tube may be made in a conventional manner, e. g., a mandrel or plunger 25 may be pressed onto a measured billet of block tin or other suitable metal in a mold composed of a sleeve 26 and a base 27. The sleeve 26 is of inner form corresponding to but slightly larger than the exterior of the mandrel, so that the metal forced between them makes the thin wall of the collapsible tube. At its upper end the mandrel 25 fits tightly to the sleeve 26 and at its bottom end the sleeve fits tightly to the base 27.

During the forming of the metal tube 2 these die parts are held tightly pressed together so that the extrusion of the metal is confined to the cavity between the mandrel 25 and sleeve and block 26—27. If, however, some flash is formed by extrusion between the bottom of sleeve 26 and its seat on block 27, it will be unobjectionable; and the mold may even be designed intentionally to produce such extrusion so as to provide a metal backing for the shoulder of the plastic tube.

After the metal tube 2 is formed the sleeve 26 and mandrel 25 with the tube 2 between them are removed from the base 27 and inserted into the plastic mold 30 which fits the exterior of the assembly at its upper edge 31, and is held suitably spaced therefrom over the rest of the exterior, e. g., by projection 32. A suitable plastic is then injected through the opening 33 in a manner well understood in the art of injection molding; after which the mold 30, sleeve 26 and mandrel 25 are removed, leaving the combined metal and resilient plastic tube substantially as shown in Figure 1.

This method of dual molding on a common mandrel is of advantage even when other features of the invention are not used. Thus, where attractive appearance of molded plastics is sought for collapsible tubes, jars or other containers, but the material to be filled therein is such as would swell, soften or otherwise deteriorate the plastic, a foil lining may first be formed on a mandrel in the same manner as described above, and this lining and its mandrel be removed together from the metal forming die and fitted in to a plastic mold in which a plastic covering or body is formed, e. g., in the same manner as set forth above in connection with Figure 5 (except for the omission of sleeve 26 in this operation). Other

methods of applying the metal lining to the mandrel before molding plastic thereon may be used, but the method described has important advantages.

This latter method may also be used for making spaced wall tubes such as that shown in Figure 1, if the plastic and metal are such as do not adhere strongly or the metal is coated with a material to prevent such adherence. After molding, the mandrel with both tubes thereon is transferred to a larger female mold and a hot liquid injected into the plastic tube expanding it against the mold. If the mandrel is of a low expansion material, e. g., Invar, the hot liquid will loosen the metal tube and facilitate removal from the mandrel.

Tubes for dispensing paste or other plastic substance which have the resilient recovery feature of the present invention require the metal and plastic tubes to be separable by a sufficient air space to accommodate the deformation of the inner metal tube 2 and for equalizing air pressure upon the inner surfaces of the elastic tube 10 to permit its recovery to a smooth shape after being squeezed to collapse a part of the metal tube. Since each deformation decreases the cross-sectional area of the inner tube 2, it increases the free space between the tubes, and since it is usually advantageous to seal the tubes together at the neck 12, in order to prevent leakage of the contents of the inner tube into the space between the two tubes, an air vent or bleed hole 23, may be provided in the wall of the outer tube 10 at a point remote from the opening 8.

Although my invention is not limited to use of any particular materials, I prefer to use opaque or at most semi-transparent plastic materials, so that the smooth, neat appearance of the plastic tube after recovery hides the unsightly appearance of the collapsed metal tube. The labels, instructions, decoration, etc., may be of course printed or molded on the plastic tube and it is an important advantage of this invention that such printed matter and decorations remain clear and prominent as long as the container is used.

Although there is advantage in the methods of forming the metal and plastic tubes as described it should be understood that my invention may be carried out in other ways and with other methods of forming a thin impervious metal tube and a plastic tube or jar, etc.

The invention makes possible important economies in the metal, since the plastic affords mechanical strength and withstands the mechanical abuse, so that the metal need be of thinner foil dimensions than could have been used before. This is particularly important with the present scarcity of tin.

From the foregoing description it will be seen that the invention provides a novel container, comprising a collapsible tube, which completely overcomes and avoids the unsightly appearance of the ordinary partially collapsed collapsible tube, especially on dressing tables, without interfering with the efficient functioning of the collapsible tube to extrude its contents. Moreover, the protective elastic covering tube 10 serves somewhat to prevent such irregular pressures on the collapsible tube 2 as sometimes cause cracks in the collapsible tube and partial loss of the contents thereof.

What I claim is:

1. In a container adapted to be used in dispensing pastes, creams, ointments and the like, in combination, a collapsible tube for containing the

material to be dispensed, said collapsible tube having a neck provided with a discharge opening, and a resilient tube substantially enclosing said collapsible tube and sealed to said collapsible tube at a point adjacent to the neck thereof, said resilient tube having an unobstructed air vent formed therein to provide for continuous equalization of air pressure between the interior and exterior thereof, said resilient tube being spaced from said collapsible tube to accommodate and mask deformations of the collapsible tube and being deformable within its elastic limit to effect collapse of said collapsible tube, the ends of both said collapsible and resilient tubes remote from said neck being flattened to insure complete collapsibility of said collapsible tube and thereby insure complete utilization of the material contained in said collapsible tubes.

2. In a container adapted to be used in dispensing pastes, creams, ointments and the like, in combination, a collapsible tube for containing the material to be dispensed, said collapsible tube having a threaded neck provided with a discharge opening, a resilient tube formed of a synthetic, organic plastic substantially enclosing said collapsible tube and secured thereto adjacent to said neck, the neck of said collapsible tube extending outwardly beyond the adjacent portion of said resilient tube and being formed to receive a cap adapted to close said discharge opening, said resilient tube having an unobstructed air vent formed therein to provide for continuous equalization of air pressure between the interior and exterior thereof, said resilient tube being spaced from said collapsible tube so as to accommodate and mask deformation of the collapsible tube and being deformable within its elastic limit to effect collapse of said collapsible tube, and a cap threaded onto the exterior of said resilient tube neck, the end of said collapsible tube neck extending beyond said resilient tube neck whereby the interior of said cap engages the end of said collapsible tube neck to close said discharge opening.

3. In a container adapted to be used in dispensing pastes, creams, ointments and the like, in combination, a collapsible tube for containing the material to be dispensed, said collapsible tube having a threaded neck provided with a discharge opening, a resilient tube formed of a semi-transparent, synthetic, organic plastic substantially enclosing said collapsible tube, said resilient tube having a neck that is externally threaded and also internally threaded to receive the threaded neck of said collapsible tube, said resilient tube having formed therein at a point remote from its neck an unobstructed air vent permitting continuous equalization of air pressure between the interior and exterior thereof, said resilient tube being spaced from said collapsible tube to accommodate and mask deformation of the collapsible tube and being deformable within its elastic limit to effect collapse of said collapsible tube, the ends of both said collapsible tube and said resilient tube remote from said neck being flattened to insure complete collapsibility of said collapsible tube, and a cap threaded onto the exterior of said resilient tube neck, the end of said collapsible tube neck extending beyond the end of said resilient tube neck whereby the interior of said cap engages the end of said collapsible tube to close said discharge opening.

GEORGE H. FULLER.

(References on following page)

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
825,448	Farron	July 10, 1906
863,260	Butterfield	Aug. 13, 1907
1,698,404	Hopkins	Jan. 8, 1929
1,760,945	Grigsby	June 3, 1930
1,769,065	Lefkowitz	July 1, 1930

5

Number
1,828,154
1,869,594
2,008,487
2,084,273
2,262,612

10

Number
146,146

Name	Date
Sigveland	Oct. 20, 1931
Johnston	Aug. 2, 1932
Blount	July 16, 1935
Beach	June 15, 1937
Kopitke	Nov. 11, 1941

FOREIGN PATENTS

Country	Date
France	June 16, 1931