F. D. GEARHART.

COLLAPSIBLE CONTAINER.

APPLICATION FILED FEB. 17, 1919.

1,322,426.

Patented Nov. 18, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

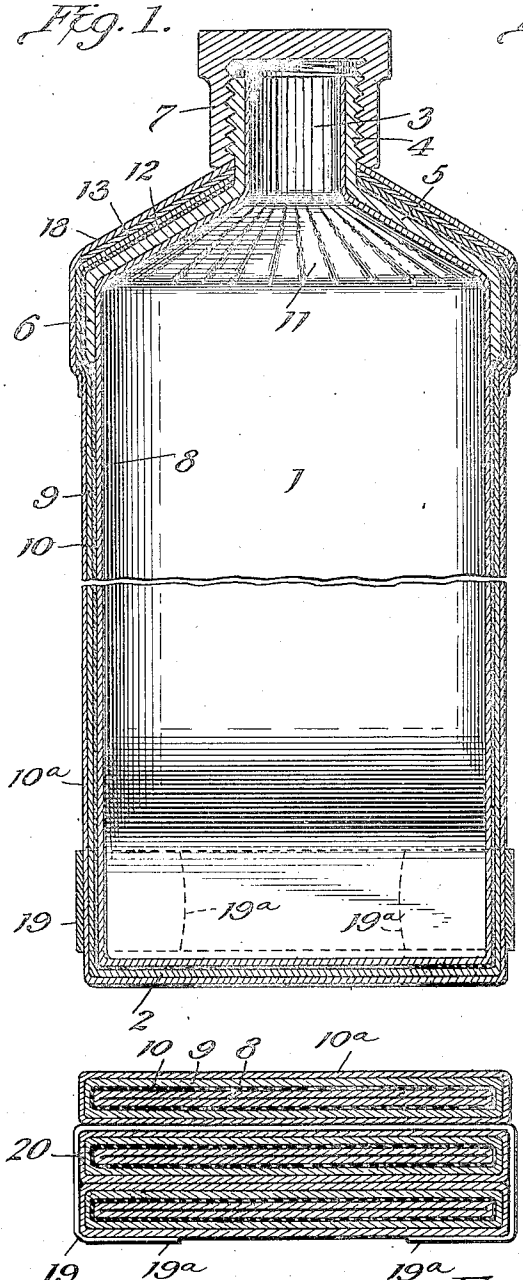
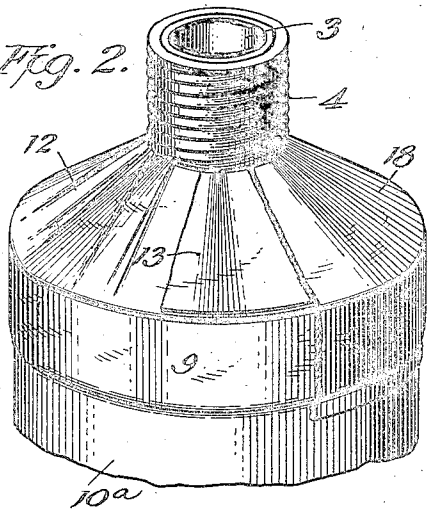


Fig. 2.



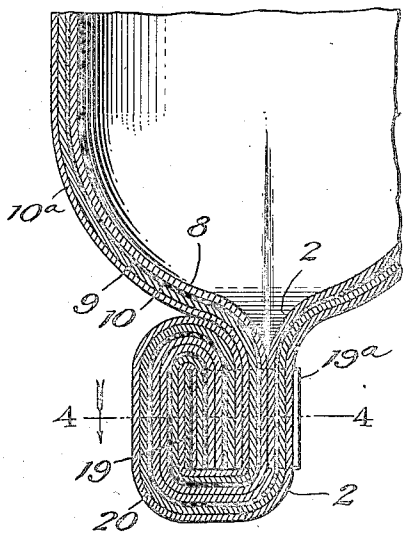


Fig. 3.

Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 5.

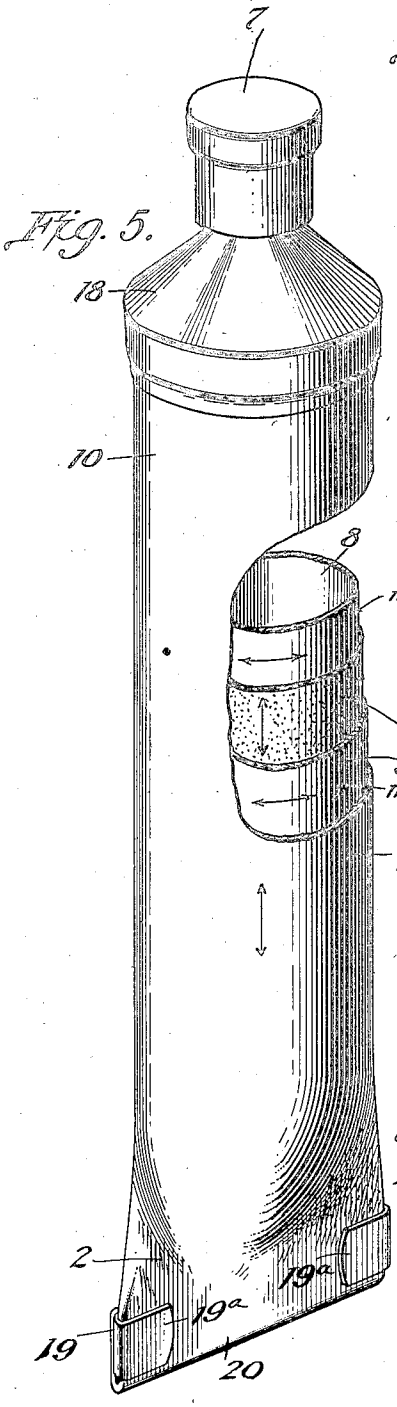
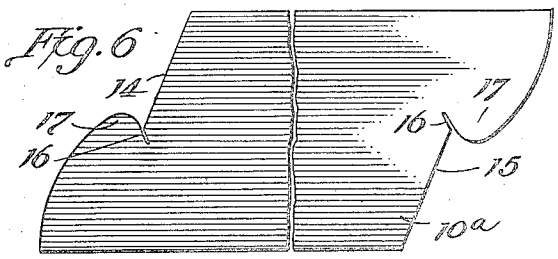


Fig. 6.



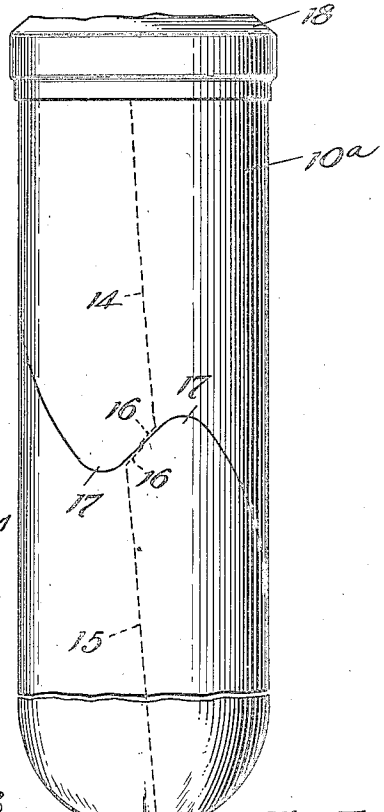


Fig. 8.

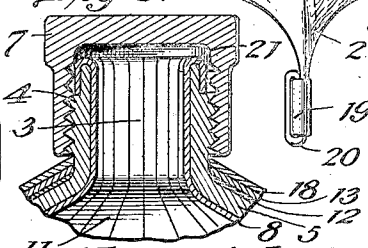


Fig. 7.

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UNITED STATES PATENT OFFICE.

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COLLAPSIBLE CONTAINER.

1,322,426. Specification of Letters Patent. Patented Nov. 18, 1919.

Application filed February 17, 1919. Serial No. 277,504.

To all whom it may concern:

Be it known that I, FREDERICK D. GEARHART, a citizen of the United States, residing at Lock Haven, in the county of Clinton and State of Pennsylvania, have invented certain new and useful Improvements in Collapsible Containers, of which the following is a specification.

This invention relates to collapsible tubes of that type which are commonly used as containers for paste, paint or other materials of viscous consistency.

The object of the invention is to produce a durable container, constructed of inexpensive material at low cost and designed to withstand the considerable strain imposed upon the discharge end of the tube, particularly when the tube is nearly empty and is handled with considerable force to exude or discharge the last of its contents.

Other objects which relate to various peculiarities of construction will appear as the description develops.

In the accompanying drawings:—

Figure 1, is a longitudinal sectional view through the complete container, shown on an enlarged scale.

Fig. 2, is a perspective view of the upper end of the container with the cap removed and parts broken away, to clearly illustrate the subjacent portions.

Fig. 3, is a longitudinal section on a somewhat larger scale of the lower end of Fig. 1, the line of section being at right angles to that of Fig. 1.

Fig. 4, is a transverse section on the line 4—4 of Fig. 3.

Fig. 5, is a perspective view of the complete tube broken away to better illustrate the construction of the tube proper.

Fig. 6, is a view of the tube casing with the middle portion broken away.

Fig. 7, is an elevation of a portion of the tube showing more particularly the interlocked edges of the tube casing.

Fig. 8, is a sectional view of the discharge end of the tube, showing a slight structural modification.

In said drawings:—

1 indicates the collapsible tube having a closed end 2 and a discharge opening 3 at its opposite end. The opening 3 is of comparatively small diameter defined by the exteriorly threaded neck 4 of a truncated head 5, having an annular flange 6 which determines the diameter of the tube.

The head 5 is preferably formed by molding fiber, hard rubber composition or similar material, as also is the cap 7 screwed upon the neck 4 to close the tube.

The tube proper, 1, consists of an inner tube 8, an outer tube 9 and an impervious intermediate tube 10. The inner tube 8 has its end extended into the head 5 and out through the neck 3, as shown in Fig. 1. This inner tube conforms to the inside contour of the head and, to accommodate it to the diminishing diameter of the head 5 and to the comparatively small diameter of the outlet opening, its end is longitudinally crimped or fluted as indicated at 11. This utilizes all of the material composing the end of the tube and serves to greatly strengthen the tube at its discharge end where the greatest pressure, incidental to the discharge of its contents, is sustained.

The intermediate tube 10, is formed over the inner tube to provide a liquid tight inclosing seal therefor. Its impervious character may be a consequence of the particular material, as for instance, either rubber or the like, from which it is formed, or it may be secured by treating paper or other material of a similar character with a liquid proofing material, as for instance, by coating or impregnating the paper, or other material, therewith.

Covering and protecting the impervious intermediate tube 10, the coextensive outer tube 9 has its upper end similarly crimped and is imposed upon the intermediate tube throughout its area. This outer tube 9 may be of any suitable material, for instance, paper, and its crimped upper end is covered and given a smooth finish by cover 13, of paper, pressed fiber or other suitable material.

The tube casing 10^a which incloses the outer tube 9, is preferably formed of heavy paper and terminates at the edge of the flange 6. This casing 10^a usually bears printed matter, constituting a label for the tube, and is preferably formed, as shown in Figs. 6 and 7, with interlocking edges 14 and 15, formed by cutting each edge at an angle, as shown, for approximately one-half of its length and terminating in a kerf 16 beyond which an extended tongue 17 is

formed. The tongues 17, at the opposite edges of the casings, are non-coincident and each overlaps the opposite edge of the casing, as shown in Fig. 7, when said casing is rolled into tubular form and its edges brought together in such way that each kerf 16 receives the material located beyond the inner end of the other kerf. If desired the overlapping portions of the tube casing may be held in close adhesion by paste or cement but the interlocking of the meeting edges of said casing may suffice in view of the fact that both ends of the casing are securely retained in a manner to be described.

Covering and inclosing the head 5 and its flange 6, together with the upper end of the outer tube 9 and the cover 13 imposed on the head, is a head casing 18 fitting closely about the base of the neck 4 and extending somewhat beyond the edge of the flange, for the purpose of producing sharp turns or bites in the outer tube 9 and also a bite in the upper edge of the casing 10^a. The outer tube and casing are thus securely gripped between the flange 6 of the head and the locking edge of the head casing.

The head casing 18 may be formed of any suitable material, as for instance, heavy paper, fiber, rubber or metal which will serve to give the end of the container a finished appearance and also serve to hold the outer tube and casing firmly against the head. The lower end of the tube is collapsed and held by a soft metal key 19. The end of the tube is first folded back upon itself with the body portion of the key 19 located in the fold. This double end of the tube is then folded up beside the tube as clearly shown in Fig. 3, and the extended ends 19^a of the key 19 are then bent around the opposite side of the tube to hold the folded end of the latter and thus accomplish the dual purpose of securely closing the lower end of the tube and providing a transverse hand-hold or roll 20 upon which the tube may be gradually wrapped for the purpose of expelling its contents through the discharge opening 3.

Attention may now be directed to the fact that the crimping of the adjacent ends of the inner, outer and intermediate tubes and their attachment to the head of the tube in the manner described, results in the production of a very durable container, constructed of inexpensive material, and the tendency of which to break, tear or pull apart will be resisted, even when subjected to the vigorous handling necessary to completely discharge the container of its contents.

A further feature of durability resides in the fact that in the construction of the tube care is taken to have the grain of the paper or other material of which the several layers or tubes is formed, disposed in different directions. For instance, the grain of the inner tube 8 and of the outer tube 9 extends transversely of the tube, while the grain of the intermediate tube 10 is disposed longitudinally of the tube. (See arrows Fig. 5.)

Also, it may be added, that the material employed for rendering the intermediate tube impervious to the liquid or semi-liquid contents of the container may be any of the well known compounds for this purpose applied by impregnation or coating while hot. The use of such material not only renders the tube impervious but insures the close adhesion of the parts or layers of the tube structure.

Within the purview of my present invention a number of modifications may obviously be made. For instance, if desired, the upper end of the inner tube 8 may be carried through and slightly beyond the neck 4 and folded back over the outer edge of the neck, as indicated at 21 in Fig. 8, the diameter of the neck at this point being exteriorly reduced to accommodate the end of the tube.

Furthermore, while the employment of the tube casing is ordinarily contemplated, the tube is entirely efficient for many purposes without this additional protection.

What I claim is:—

1. A container of the class described, including a head and inner and outer collapsible tubes, extended inside and outside of said head.

2. A container of the class described, including inner and outer tubes of collapsible material, and a non-collapsible head having its wall interposed between the end portions of the inner and outer tubes, said end portions of the tubes being crimped to conform to the surface of the head.

3. A container of the class described, including a non-collapsible head, having a discharge opening, and a collapsible tube, including an inner tube having its outer end crimped to conform to the inner contour of the head and extended through the discharge opening.

4. A container of the class described, including a non-collapsible head of truncated form, having a discharge opening, and a collapsible tube, including inner and outer tubes imposed against the inner and outer surfaces of the truncated head and crimped to conform to the diminishing diameter thereof.

5. A container of the class described, including a non-collapsible truncated head having an open neck extended therefrom, and a collapsible tube having inner and outer layers or tubes crimped upon the inner and outer surfaces of the head, the inner tube being extended through the neck, and a head cover inclosing the head and assisting in the retention of the outer tube thereon.

6. A container of the class described, in-

cluding a non-collapsible head, inner and outer tubes imposed upon the inner and outer surfaces of the head, and a head casing inclosing the head and extended under the edge thereof to securely retain the outer tube.

7. A container of the class described, including collapsible inner and outer tubes, and a non-collapsible head interposed between said tubes and having an exteriorly threaded neck through which the end of the inner tube is drawn, a head casing inclosing the head and assisting in the retention of the outer tube, and a cap screwed upon and inclosing the neck.

8. A container of the class described, including a non-collapsible truncated head having a peripheral flange and an exteriorly threaded neck, a collapsible inner tube imposed against the inner surface of the head throughout the entire area thereof and crimped to conform to the diminishing diameter of the head, a collapsible outer tube having its end portion crimped and imposed upon the outer surface of the head, a cover imposed upon the crimped portion of the outer tube, and a head casing inclosing the head and having the edge thereof extended under the edge of the peripheral flange to form a retaining bite in the outer tube.

9. A container of the class described, including a non-collapsible head, inner and outer tubes having their end portions imposed upon the inner and outer surfaces of the head, a tube casing surrounding the outer tube, and a head casing inclosing the head and extended under the edge thereof to engage and retain the outer tube and casing.

10. A container of the class described, including a truncated head, inner and outer collapsible tubes having crimped portions imposed upon the inner and outer surfaces of the head, a tube casing surrounding the outer tube, a head casing inclosing the head and extended under the edge thereof to securely retain the outer tube and the tube casing, and an impervious intermediate tube between the inner and outer tubes.

11. A container of the class described, including a non-collapsible truncated head, having a reduced exteriorly threaded neck defining a discharge opening, an inner tube having its end portion crimped to conform to the interior surface of the head and neck, an intermediate impervious tube crimped to conform to the outer surface of the head, an outer tube having its end similarly crimped, a cover for the crimped portion of the outer tube, a tube casing surrounding the outer tube and terminating at the head, a head casing inclosing the head and extended under the edge thereof to grip and retain the outer and intermediate tubes and the tube casing, and a cap threaded upon the neck.

12. A container of the class described, including a non-collapsible head having a reduced neck, and a collapsible tube composed of a plurality of tubes or layers, the innermost of which is crimped and secured to the inner surface of the head and neck and extended back over the edge of the latter.

13. A container of the class described, including a head, inner and outer collapsible tubes extended inside and outside of said head and an impervious intermediate tube between the inner and outer tubes.

14. A container of the class described, including a non-collapsible head, inner and outer tubes imposed upon the inner and outer surfaces of the head, an impervious tube intermediate of the inner and outer tubes and a head casing inclosing the head.

In testimony whereof I affix my signature in the presence of two witnesses.

FREDERICK D. GEARHART.

Witnesses:

J. F. CULVERWELL,

GLADYS DENISON.