A collapsible dispensing tube providing a flexible walled portion having a dispensing nozzle selectively closed with a flip cap on one end and a closed base on another end. Press-to-close sealers are formed on the inner surface of the flexible wall at spaced intervals from the closed end of the flexible wall to the dispensing nozzle. After the content is gradually squeezed toward the dispensing nozzle the sealers are pressed-to-close together to attach the opposed inner surfaces of the flexible wall from the base toward the dispensing nozzle to sequentially form closure seals across the flexible portion of the tube. This prevents the reverse displacement of the content in the tube that occurs when the tube is squeezed in its middle and therefore eliminates the need to roll up the flexible portion of the tube to efficiently dispense the content thereof.
COLLAPSIBLE DISPENSING TUBE WITH INTERNAL PRESS-TO-CLOSE SEALERS TO PREVENT REVERSE FLOW OF THE CONTENT TOWARDS THE CLOSED END

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Application No. 61/646,896 filed on May 14, 2012.

TECHNICAL FIELD AND INDUSTRIAL APPLICABILITY OF THE INVENTION

[0002] The present invention relates to a container for fluid and viscous materials. More specifically, the present invention is an improved tubular container with flexible walls, which may be collapsed utilizing press-to-close sealers to prevent reverse flow of the content held therein.

BACKGROUND OF THE INVENTION

[0003] Collapsible tubes are used to package many products which can be gradually dispensed through the open end as needed by the consumer. These products include toothpaste, hair products, lotion, medicine, glue, cosmetics. These contents are commonly dispensed from the open end of the collapsible tube by squeezing the closed end. The majority of these tubes provide a flexible housing or defining an internal cavity to be filled with the content to be dispensed. These tubes generally have a single open end, which is selectively sealable with a cap or other structure. Removing the cap by pressing or squeezing the tube dispenses the fluid or viscous content out of these tubes.

[0004] While this is generally effective, inefficiencies arise when a tube of this type is squeezed anywhere other than the base of the tube causing some portion of the material to be displaced rearward toward the base of the tube. This becomes a significant problem as the tube becomes less full.

[0005] Most common way of dealing with this problem is to roll the tube up from its base to form closure structure across the tube. This closure limits the rearward displacement of the contents of the tube in the manner in which the portion of the remaining contents to be dispensed effectively. However, this can be a frustrating and ineffective procedure as the tube often becomes unrolled either due to the resistance of the tube wall or due to improperly squeezing the tube anywhere other than the base of the tube.

DESCRIPTION OF THE RELATED ART

[0006] Many dispensing tubes attempting to make it easier to dispense the material contained therein have been disclosed in the relevant art. These have included dispensing tubes adapted to partially prevent rearward displacement of the material contained therein during dispensing, dispensing tubes with flexible walls which collapse in different configurations to force the material held therein out of an opening in the tube, and dispensing tubes which rely on an attachable device to aid in dispensing of the material held therein.

[0007] U.S. Pat. No. 5,884,811, issued Mar. 23, 1999 to Mark R. Bunchman discloses a flexible walled dispensing tube having, in one embodiment, an interlocking fasteners and also alternating ridges and grooves which are arranged transversely across the length of the tube. The grooves of each face registers with the ridge of the opposing face to provide rigidity to the envelope as it becomes flattened during use.

After that interlocking fasteners will secure the opposed surfaces together to prevent rearward flow of the material.

[0008] U.S. Pat. No. 5,361,959, issued Nov. 8, 1994 to James A. Robertson, Jr., discloses a dispensing tube, which utilizes an attachable retaining device that holds the tube in a rolled position as it is being collapsed. The retaining device must be detached in order to continue to roll the tube and then reattached after each use to hold the tube in the rolled position.

[0009] U.S. Pat. No. 5,169,030, issued Dec. 8, 1992 to Jack R. Lewin, discloses a flexible walled dispensing tube, which partially prevents the rearward displacement of the material contained therein during dispensing through the use of flexible diaphragm members, which divide the tube into several chambers. Each diaphragm member has a one way valve therein which allows the material in the tube to pass through each diaphragm toward the tube opening while preventing the material in one chamber from passing into a rearward chamber.

[0010] U.S. Pat. No. 4,235,653, issued Nov. 25, 1980 to Sieben Ausnit, discloses a container formed of a flexible web folded into an open mouth bag. The flexible walls of the bag have releasable interlocking fasteners formed on their inner surfaces, which act to hermetically seal the bag.

[0011] U.S. Pat. No. 3,946,903, issued Mar. 30, 1976 to Carol Parker, discloses a dispensing tube having flexible walls that are spirally fluted. The walls of the dispensing tube of Parker are adapted to collapse in accordion fashion as the bottom of the tube is twisted to force the material out of the opening in the top of the tube.

[0012] U.S. Pat. No. 2,891,700, issued Jun. 23, 1959 to Michael Maynard, discloses a dispensing tube having, in one embodiment, projections formed on the inner surface of the flexible walls of the tube. The projections prevent a transverse closure band from being formed inside the tube to avoid trapping a portion of the material contained in the tube rearward of the transverse closure band so that the contents of the tube may be completely dispensed.

[0013] U.S. Pat. Nos. 2,268,993, issued Jun. 6, 1939 to Rudolph M. Sanders, 2,250,022, issued Jul. 22, 1941 to Malcolm E. Hofman, and 2,649,995, issued Aug. 25, 1953 to Nathan Muskyn, disclose dispensing tubes having flexible walls which collapse in accordion fashion when the rearward end of the tube is urged toward the opening in the tube to dispense the material contained therein.

[0014] U.S. Pat. Nos. 1,286,875, issued Dec. 3, 1918 to William E. Emmerson and 3,155,281, issued Nov. 3, 1964 to John Stracey, disclose dispensing tubes having flexible walls that are collapsed in accordion fashion as the material held therein is being displaced. The dispensing tubes of Emmerson and Stracey utilize threaded base members, which act to collapse the dispensing tubes when the base members are twisted.

[0015] However, none of the above inventions and patents, taken either singularly or in combination, is seen to describe the instant invention as claimed. Thus a collapsible dispensing tube solving the problems mentioned above is desired.

[0016] It is further desirable to have a tube which can be economically mass produced and manufactured

SUMMARY OF THE INVENTION

[0017] The collapsible dispensing tube of the present invention provides a flexible walled compartment portion having a closed base at one end thereof and a dispensing
nozzle, which may be selectively sealed with a flip cap or threaded cap at the other end thereof. The opposite sides of the inner surface of the flexible portion have first and second profiles of the press-to-close sealer mechanism which are arranged thwartwise across the length of the flexible portion.

[0018] One profile of sealer mechanism is formed on one side of the inner surface and corresponding profile is formed in the opposed inner surface, allowing both surfaces to become locked together. Typically the sealers will secure the opposed surfaces together sequentially from the base toward the dispensing nozzle, forming thwartwise closures across the flexible portion of the tube. This limits the rearward displacement of the content in the tube that would occur when the tube is squeezed at its middle and therefore eliminates the need to roll up the flexible portion of the tube to dispense the content therein.

[0019] Accordingly, it is a principal object of the invention to provide a collapsible dispensing tube, which does not need to be rolled in order to dispense the entirety of content held therein.
[0020] It is another object of the invention to provide a collapsible dispensing tube, which dispenses the material held therein in an efficient manner.
[0021] It is a further object of the invention to provide a collapsible dispensing tube which utilizes press-to-close sealers formed on the inner surface of the tube to attach the flexible side portions of the tube to limit the rearward displacement of the content held therein.

[0022] Still another object of the invention is to provide a collapsible dispensing tube for the purposes described which is inexpensive, dependable, easy to use and fully effective in accomplishing its intended purposes.

[0023] These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] FIG. 1 is a partially cut away plan view of the collapsible tube of the present invention in a partially used state.
[0025] FIG. 2 is an enlarged, cross sectional view of the tube taken along line 2-2 of FIG. 1.
[0026] FIG. 3 is a side view of the collapsible tube of the present invention in a fully used state.
[0027] FIG. 4 is a top view of the collapsible tube of the present invention in a fully used state.
[0028] FIG. 5 is a cross sectional view of the collapsible tube taken along line 5-5 of FIG. 4.
[0029] Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF INVENTION

[0030] Referring to the drawings, FIG. 1 illustrates a collapsible dispensing tube 20 of the present invention adapted to efficiently collapse and dispense fluid or viscous materials such as toothpaste. The tube 20 generally comprises a content holding flexible portion 24 and a nozzle assembly 26 through which the material is to be dispensed. The flexible portion 24 and the nozzle assembly 26 are joined together by shoulder 30.

[0031] The flexible portion 24 is formed by a continuous wall 30 formed of a pliable material, such as any variety of thermoplastic materials, which are well known in the art. The flexible portion 24 includes a closed base 36 at one end thereof, an opposite forward end 38, which is open, and a longitudinal axis Y extending in the length thereof. The base 36 of the flexible portion is closed (i.e., heat sealing, crimping, etc.) by joining a first half of the inner surface of the flexible wall 30 with an opposing second half of the inner surface of the flexible wall 30.

[0032] The first and second halves of the inner surface of the flexible wall 30 have a number of press-to-close sealer profiles 32 and 34 formed thereon, respectively, and arranged thwartwise to the longitudinal axis of the flexible portion 24. The first closure profile 32 on the first half of the inner surface of the flexible wall 30 confront the second closure profile 34 on the second half of the inner surface of the flexible wall. This allows each male closure profile 32 to engage with one female closure profile 34 when the first and second halves of the flexible wall 30 are squeezed together. This is illustrated in FIG. 2 and FIG. 5.

[0033] A number of closure pairs including a male participant 32 and a female participant 34 are formed on the inner surface of the flexible wall 30 at spaced intervals along the longitudinal axis thereof.

[0034] Each of said split arrow shaped male profiles 32 with a distal end is flexible and extends upwards in a direction towards second half of said flexible portion, and each of said female L-shaped profiles 34 extends downward in a direction towards the first half of said flexible portion. Each female profile 34 is adapted and configured to receive a male profile 32, so that a notch 34 thereon fixedly receives the distal end 32. In this arrangement, the male participant 32 and the female participant 34 will fixedly engage when a cross section of the first and second halves of the flexible wall 30 are squeezed together to thereby form a thwartwise closure 48 on the flexible portion 24.

[0035] As the flexible portion 24 is squeezed to urge the content held therein toward the open forward end thereof, the content held in the flexible portion of the tube would be dispensed through the nozzle assembly 26. The nozzle assembly 26 includes a shoulder 50, a nozzle 52, and cap 54. The shoulder 50 is a conical shell having a front surface and a rearward margin, with a hole formed through the radial center of the front surface.

[0036] The nozzle 52 is integral with the surface of the shoulder 50 around the hole formed there through, so that it extends forward from the front surface of the shoulder 50. The nozzle 52 is preferably a hollow cylinder, which is open at both ends to define a passageway through which the fluid and viscose material may be dispensed. The nozzle 52 is selectively shaped to receive the flip cap 54 to be secured on the nozzle 52 to seal the passageway defined by the nozzle 52. This can be seen in FIGS. 1, 3, and 4.

[0037] The shoulder 50 is connected to the open forward end 38 of the flexible portion 24. The opposite end of the shoulder 50 is sealed to the forward end 38 of the flexible portion 24 around the entire circumference thereof so that the shoulder 50 interconnects the flexible portion 24 with the nozzle assembly 26 of the tube.

[0038] Referring now to FIGS. 3 and 4, it can be seen that the first and second halves of the flexible wall 30 near the forward end thereof will be drawn toward each other as the tube becomes empty. As this happens the cross section of the flexible portion of the tube 24 will change from a generally circular shape to the flattened, narrow shape illustrated in FIG. 5.
In use, a user will remove the cap 54 from the nozzle 52 and squeeze the flexible portion 24 of the tube to dispense content therein from the nozzle. As the volume of content will decrease inside the flexible portion 24 users will apply pressure thwart wise against the opposite sides of the flexible portion 24 at the press-to-close sealer location marking 56. With application of external pressure, the confronting male profile 32 and female profile 34 will engage and become locked together. This creates the thwart wise closure seal 48, which prevents content therein from flowing toward the base 36. With additional use, the user will apply external pressure above the thwart wise closure seal 48 until to create a new closure seal located closer to the nozzle assembly 26. Eventually, the entire flexible portion 24 will flatten as the user squeezes the remaining content from the tube 20.

It is to be understood that the collapsible dispensing tube of the present invention is not limited to the embodiment described above, but encompasses any and all embodiments within the scope of the following claims.

What is claimed is:

1. A collapsible dispensing tube for dispensing quantities of fluid and viscose materials, comprising:
   - a flexible compartment portion with an open end and a closed base opposite said open end, said compartment defining a first half inner surface and a second half inner surface thereof;
   - a nozzle assembly connected to said flexible portion at said open end thereof; and
   - a first closure profile formed on said first half inner surface and a second closure profile formed on said second inner surface of said flexible wall, said first and second profiles being arranged at spaced intervals along longitudinal axis of said flexible portion, each of said first profiles include a thwart wise spaced male profile, and each of said second profiles include a corresponding thwart wise spaced female profile connectable to said male profile to thereby form a closure seals across said flexible portion.

2. The collapsible dispensing tube as defined in claim 1 wherein each of said male profiles is flexible and extends upwards in a direction towards second half of said flexible portion, and each of said female profiles extends downward in a direction towards the first half of said flexible portion.

3. The collapsible dispensing tube as defined in claim 2 wherein each of said male profiles has a split arrow shaped tip formed on a distal end thereof and each of said female members includes an E-shaped notch adapted to fixedly receive said male profile.

4. The collapsible dispensing tube as defined in claim 1 wherein said nozzle assembly comprises:
   - a shoulder portion connected to said flexible wall at said open end thereof;
   - a nozzle integral with said shoulder portion and extending outwardly therefrom, said nozzle having a passageway communicating with said content holding cavity; and
   - a cap adapted and configured to be pressed on or otherwise secured on said nozzle to close said passageway.

5. A collapsible dispensing tube for dispensing quantities of fluid and viscose materials, comprising:
   - a flexible compartment portion with an open end and a closed base opposite said open end, said compartment defining a first half inner surface and a second half inner surface thereof;
   - a nozzle assembly integral with said shoulder portion connected to said flexible portion, said nozzle assembly having a passageway in communication with said content holding cavity;
   - a first closure profile formed on said first half inner surface and a second closure profile formed on said second inner surface of said flexible wall said first and second profiles being arranged at spaced intervals along longitudinal axis of said flexible portion, each of said first closure profiles includes a thwart wise spaced male participant, and each of said second closure profiles a corresponding number of thwart wise spaced female participants connectable to said male participants to thereby form a thwart wise closure seals across said flexible portion.