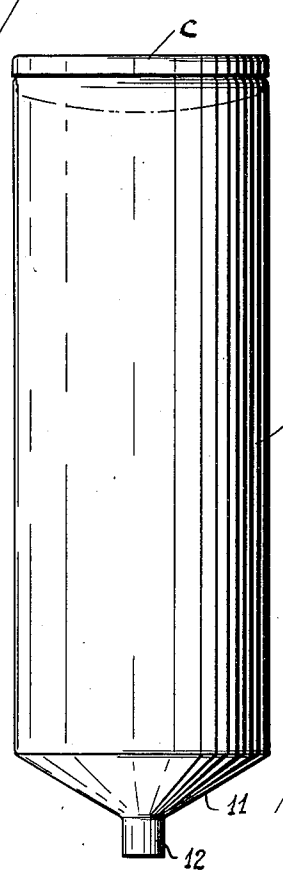
Aug. 10, 1937. H. F. COLVIN 2,089,185

FLEXIBLE CONTAINER

Filed Dec. 31, 1935

Fig. 1.



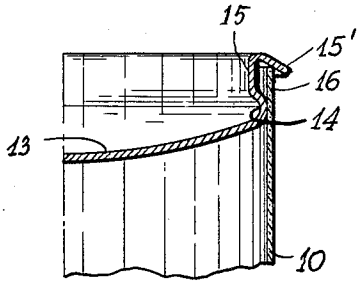


Fig. 2.

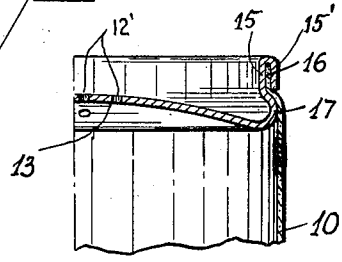


Fig. 3.

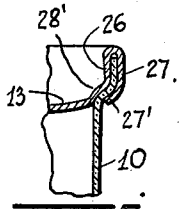


Fig. 7.

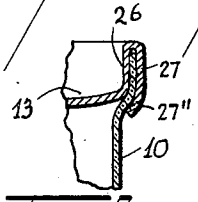


Fig. 8.

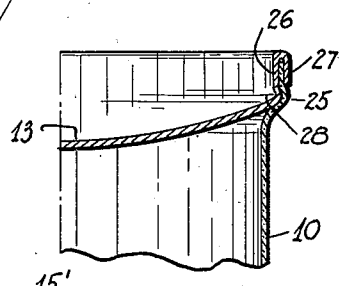


Fig. 6.

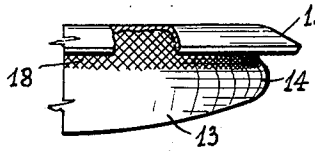


Fig. 4.

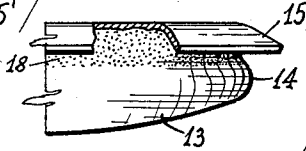


Fig. 5.

INVENTOR.
Henry F. Colvin.
BY Maxwell E. Sparrow
ATTORNEY.

Patented Aug. 10, 1937 2,089,185

UNITED STATES PATENT OFFICE

2,089,185

FLEXIBLE CONTAINER

Henry F. Colvin, South Orange, N. J.

Application December 31, 1935, Serial No. 56,947

16 Claims. (Cl. 221—60)

This invention relates to means and method for closing flexible containers. It relates particularly to closure means and method for containers in the form of tubes having relatively thin walls of pliable, yieldable and/or flexible material, such as metal tubes of lead, zinc, aluminum or their alloys, or tubes of non-metals such as celluloid, pyroxylin, other ethers and esters of cellulose, or hornlike materials having approximately the physical properties of cellulosic materials.

The closure and method of this invention are adaptable particularly to containers of cylindrical shape, or of other shapes but having a cylindrical wall at the end which is to be closed. The container may have an independent aperture for the dispensing of its contents or the closure member may be perforated to form the dispensing means as well as the closure means. This invention is primarily concerned with the effective locking, preferably liquid-tight, engagement between the tubular body of the container and its closure after the supply of content material has been introduced into the container.

While the "clip" type of closure is employed generally with satisfaction on metal collapsible tubes, this type of closure has not always been satisfactory for cellulosic tubes, and on both metal and non-metal tubes it is sometimes desirable to retain the roundness of the end of the tube rather than to flatten it with a clip. Heretofore the application of circular closures has been attempted, but with little success, owing to the difficulty of effectively and permanently fastening the same onto such tubular containers.

It is an object of this invention to provide method and means for effectively, efficiently and economically producing locking and sealing engagement between a tubular container and its closure.

It is a further object of this invention to provide a closure for such tubes wherein a portion of the tube surface may be clamped against a shoulder on such closure.

A further object of the invention is to provide the closure with means to increase the gripping of the tube end by the closure.

While this invention is not restricted to the use of particular materials for container or closure, it is especially effective and useful for non-metallic containers and metal closures, and by way of illustration of a preferred form of the invention it will be so described hereinafter.

In the accompanying drawing I show what I now consider to be a preferred form of the invention, together with other alternate forms, all falling within the scope of the invention as hereinafter claimed. The disclosure is not to be regarded as restrictive but rather to illustrate certain embodiments of my invention, which it is understood may take many other detail forms.

Referring now to the drawing:

Fig. 1 is a side elevation view of a tube incorporating my closure means.

Fig. 2 is a partial sectional detail view of a preferred form of metallic closure and of the end of a cellulosic tube, before the latter is in locking engagement with the closure.

Fig. 3 is a partial sectional view of a closure and end of tube in locking engagement. In this view the closure illustrated incorporates dispensing means.

Fig. 4 is a partial detail view of a closure with a knurled channel wall.

Fig. 5 is a partial detail view of a closure with a roughened surface channel wall.

Fig. 6 is a partial sectional detail view showing a modified form of closure; and

Figs. 7 and 8 illustrate in fractional sectional detail other modified forms of the invention.

In Figure 1 of the drawing there is disclosed a collapsible seamless tube or body 10 of relatively thin cellulosic material. Body 10 may have a contracted portion 11 having a discharge or dispensing nozzle 12. The other end, as made, is open, to provide a filling orifice. A suitable cap (not shown) may be provided for nozzle 12. A bottom element or closure C, of metal, is secured to body 10 at the filling orifice to complete a form of container.

Closure C, as shown in Figure 2 in its form before being made fast to the body 10, comprises a bottom 13, a shoulder portion 14 the outside diameter 17 of which is substantially the same as the inside diameter of the body 10, a short cylindrical portion 15 having a diameter smaller than that of the body 10, and an outstanding flange portion 15'. As the closure member C is inserted into the open end 16 of the tube 10 this flange 15' serves as a stop against the end of body 10.

The engagement and seal between the closure C and the body 10 is effected by rolling or spinning the flange 15' toward the cylindrical portion 15, carrying in with it the outer end 16 of body 10, which is thereby clamped over the shoulder 14 of closure C and retained in the channel formed by the spaced adjacent walls of portions 15, 15'. The deformation of the end of the tube 10, and its

clamping against the shoulder 14 effects a tight and permanent engagement.

In Figure 3 the closure C is illustrated in an alternate form, incorporating in itself dispensing holes 12' in the bottom 13. The detail of the closure and tube engagement is the same as in Figure 2, except that in Figure 3 the flange 15' has been spun or rolled into its final position.

To assure a tight grip between the wall of the closure and that of the tube, the outer surface of the closure C may be knurled or roughened as shown at 18 in Figs. 4 and 5.

In Figures 6, 7 and 8 alternate forms of closure detail are disclosed. In Figure 6 the closure is illustrated as having its shoulder 28 of a larger diameter than the inside diameter of the body 10. The outer end 25 of the body may be preformed of larger diameter than the main portion 10, or the end 25 may be expanded to the diameter shown by the insertion of the closure. The engagement and seal is effected as in Figures 1, 2 and 3, by the spinning or rolling in of flange 27 to pinch the end of the tube against the wall 26, clamping the tube on the shoulder 28.

In Figure 7 the end of the tube 10 is either preformed to a large diameter or is expanded by the insertion of the closure, which in this case has a recessed shoulder 28' against which the tube wall is clamped by the spinning in of the edge 27' of the closure flange 27.

In Figure 8 the end of the tube 10 is either preformed to a larger diameter or is expanded by the insertion of the closure, which here has a shoulder formed between the bottom 13 and the cylindrical portion 26. The spinning in of edge 27'' of closure flange 27 clamps the tube wall against this shoulder.

I desire it understood that the invention is not to be confined to the particular forms shown and described, the same being merely illustrative, and that the invention can be carried out in other ways without departing from the spirit thereof, and therefore, I claim broadly the right to employ all equivalent instrumentalities coming within the scope of the appended claims, and by means of which objects of my invention are attained and new results accomplished, as it is obvious that the particular embodiments herein shown and described are only some of many that can be employed to attain these objects and accomplish these results.

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

1. In an article of the character described, a body having a thin wall of yieldable material, and a closure member having a portion of its external surface of a size substantially the same as that of the inside of said thin wall, said member having another portion of its external surface of a size different from the aforesaid size, and said member having a third portion closed upon said thin wall causing the inside of said wall to conform to the outside of said second portion, and causing said wall to be clamped between said second and third portions of said closure member.

2. In an article of the character described, a cylindrical body having a contracted end and a wall of thin section at the end opposite thereto to be closed, and a closure for said opposite end, said closure comprising portions of two different sizes and an outstanding flange, and the wall being over one of said portions and clamped against the other of said portions by the closing-in of said flange.

3. An article of the character described comprising a container having a contracted end and a thin wall at the other end to be closed, and a closure member having a portion, the outside size of which is substantially the same as the inside size of said wall and an extending flange portion closed-in upon said wall to a size less than the original outside size of said wall, whereby said closure member is permanently attached to said container.

4. An article of the character described comprising a container having a contracted end and a thin wall at the end opposite thereto, and a closure therefor comprising a bottom portion, a side portion, a shoulder between said bottom portion and said side portion, and a flange portion extending from said side portion and closed upon said wall pressing said wall against said side portion and clamping said wall against said shoulder whereby said closure is retained upon said container.

5. In a container, a body having at one end a relatively thin cylindrical wall of yieldable material, and a closure for said end, said closure being provided with an annular portion having an external surface of a size substantially the same as that of the inside of said wall and being further provided with a cylindrical portion having an external surface of a size different from the aforesaid size, the inside of said wall conforming to the outside of said cylindrical and annular portions, said closure having a third portion embracing the outside surface of said wall lockingly engaging the wall with the cylindrical and annular portions of said closure.

6. In a container, a body having at one end a relatively thin cylindrical wall made of cellulosic material or material having similar physical properties, and a metallic closure for said end, said closure being provided with an annular portion having an external surface of a size substantially the same as that of the inside of said wall and being further provided with a cylindrical portion having an external surface of a size different from the aforesaid size, the inside of said wall conforming to the outside of said cylindrical and annular portions, said closure having a third portion embracing the outside surface of said wall lockingly engaging the wall with the cylindrical and annular portions of said closure.

7. In a container, a body having at one end a realtively thin cylindrical wall, and a closure for said end, said closure being provided with an annular portion and a cylindrical portion of dissimilar diameters, the inside of said wall conforming to the outside of said annular and cylindrical portions, said closure having a third portion embracing the outside of said wall lockingly engaging the wall with the cylindrical portion and against the annular portion of said closure.

8. In a container, a body having at one end a relatively thin cylindrical wall made of cellulosic material or material having similar physical properties, and a metallic closure for said end, said closure being provided with an annular portion and a cylindrical portion of dissimilar diameters, the inside of said wall conforming to the outside of said annular and cylindrical portions, said closure having a third portion embracing the outside of said wall lockingly engaging the wall with the cylindrical portion and against the annular portion of said closure.

9. In a container, a body having at one end a contracted part and at its other end a wall of

thin section, and a closure for said end, said closure having portions of two different sizes and an outward flange, said wall abutting against one of said portions and clamped at least against the other of said portions by said flange.

10. In a container, a body having at one end a contracted part and at its other end a relatively thin wall made of cellulosic material or material having similar physical properties, and a metallic closure for said other end, said closure having portions of two different sizes and an outward flange, said wall abutting against one of said portions and clamped at least against the other of said portions by said flange, and means to assure a tight grip between said closure and said wall.

11. In a container, a body having at one end a relatively thin wall, and a closure for said end, said closure comprising a bottom portion, a side portion, a shoulder between said bottom portion and said side portion, and a flange portion extending from said side portion, said wall being between said side portion and said flange and abutting against said shoulder, said flange being closed upon said wall and pressing said wall against said side portion and clamping said wall against said shoulder to retain said closure upon said body.

12. In a container, a body having at one end a relatively thin cylindrical wall made of cellulosic material or material having similar physical properties, and a closure for said end, said closure comprising a bottom portion, an annular side portion, an annular shoulder between said bottom portion and said side portion, and an annular flange portion extending from said side portion, said wall being between said side portion and said flange and abutting against said shoulder, said flange being closed upon said wall and pressing said wall against said side portion and said shoulder to retain said closure upon said body.

13. In a container, a flexible body having a relatively thin wall and a contracted end, and a closure, said closure having a bottom and a downward-extending annular portion terminating in an upward-extending outer flange spaced therefrom, producing a channel therebetween, said body wall opposite said contracted end being inserted within said channel and in locking engagement with the said portion and said flange, the diameter of the inserted end of said wall being different from that of the remainder of said wall, whereby the body and the closure are permanently held in such engagement.

14. In a container, a flexible tubular body having a contracted end, and a closure, said closure having a bottom for the opposite end of said body, an annular channelled portion extending from said bottom, an annular shoulder between said bottom and said channel, the said opposite end of said body being located between and in clamping engagement with walls forming said channel, and said body abutting said shoulder by which the closure and the body are in locking engagement.

15. In a container, a flexible tube and a contracted end, and a closure for the opposite end of the tube, said tube and closure being made of dissimilar material, said closure having a bottom for said tube and a downward-extending annular wall terminating in an upward-extending outer flange spaced therefrom, producing a channel therebetween, said opposite end of said tube being inserted within said channel and in locking engagement with the said wall and said flange, said wall having an annular shoulder against which the said tube abuts, the diameter of the inserted end of said tube being different from that of the remainder of said tube, whereby the tube and the closure are permanently held in such engagement.

16. An article of the character described comprising a container having a flexible tubular body and a contracted end, and a closure having a bottom for the opposite end of said body, a downward-extending annular wall terminating in an upward-extending outer flange spaced therefrom, an annular shoulder between said bottom and said wall, said wall and said flange being adapted to hold said opposite end of said body in clamping engagement against said shoulder.

HENRY F. COLVIN.