

April 19, 1932.

F. B. COONEY

1,854,451

CLOSURE FOR COLLAPSIBLE TUBES

Filed Dec. 13, 1928

*Fig. 1.*

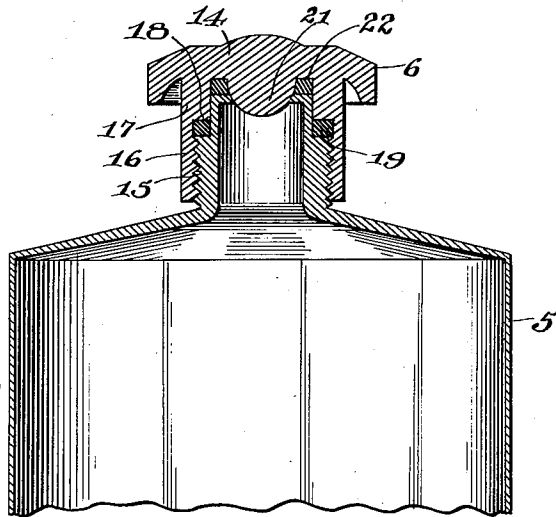
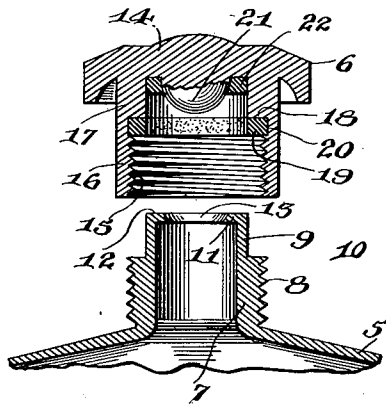


*Fig. 2.*



Inventor

*Frank B. Cooney,*

By *C. F. Gorpel,*

Attorney

## UNITED STATES PATENT OFFICE

FRANK B. COONEY, OF SANDUSKY, OHIO, ASSIGNOR TO THE AMERICAN CRAYON COMPANY, OF SANDUSKY, OHIO, A CORPORATION OF OHIO

## CLOSURE FOR COLLAPSIBLE TUBES

Application filed December 13, 1928. Serial No. 325,857.

The present invention relates to improvements in closures for collapsible tubes, and has for an object to provide an improved complementary cap and neck construction for collapsible tubes, such as the tubes in which tooth paste is sold, whereby the tubes at the cap end will be made both gas and liquid tight, reliably avoiding leakage, which is a common fault with present open mouth tubes.

Another object of the present invention is to secure the above results without departing greatly from the standard construction and without entailing the use of special machines or apparatus for the making of the new device, but to so modify and rearrange the neck and cap construction as to provide a plurality of seals to prevent the entrance of air or the escape of gas, liquid, plastic or viscous material from the interior of the tube.

Although the invention is particularly applicable to the closure constructions of collapsible tubes, it is understood that the invention is not limited to the same but may be applied generally to closures whenever used.

With the foregoing and other objects in view, the invention will be more fully described hereinafter, and will be more particularly pointed out in the claims appended hereto.

In the drawings, wherein like symbols refer to like or corresponding parts throughout the several views,

Figure 1 is a fragmentary longitudinal section taken through a collapsible tube with the closure in place and illustrating one form of the present invention, and

Figure 2 is a similar view with the closure cap removed.

Referring more particularly to the drawings 5 designates a collapsible tube, such as may be pinched to expel the contents when the cap, represented generally at 6, is removed.

In accordance with the usual construction the tubes are provided with externally threaded necks and the caps with cylindrical, internally threaded flanges for screwing on and off said necks in the act of closing and opening the tubes. As leakage has been of frequent occurrence in the use of such tubes, it

is proposed to modify the standard construction in the following respects.

The neck of the container 5 is made of an inner thickened portion 7 having the external threads 8, and the outer reduced portion 9 forming with the thickened lower portion 7 an annular shoulder 10. At the outer end of the reduced portion 9 of the neck is an in-turned flange 11 having a flat external seat 12 and a beveled internal seat 13 surrounding the entrance opening of the tube or container 5.

The cap 6 is formed generally of the top portion 14 and the cylindrical flange. The internal threads 15 of the flange are shown as produced in an outer reduced portion 16. The reduction of the portion takes place internally and provides with the thickened inner wall 17 a shoulder 18 against which is placed an annular gasket 19. The outer edge or rim 20 of the cylindrical cap flange against which the gasket 19 seats is preferably plain and unthreaded and under-cut with respect to the threads 15, so that the innermost portion of the thread will serve to maintain the gasket 19 in place, it being understood that the gasket 19 is of rubber or some other elastic and compressible material, which may be sprung in behind the threads 15, whereupon it will expand by its own inherent resiliency out against the wall portion 20 and serve to thereafter retain itself in place.

A projection 21 is provided on the cap, such projection extending axially of the cylindrical flange portion and having its support upon the top part 14. The projection 21 is preferably rounded and has beveled walls or surfaces designed to come into contact with the beveled and ground surface 13 of the neck. The projection 21 is so constructed as to leave an annular space about the projection wherein a second elastic and compressible gasket 22 may be seated against the top portion 14 and the cylindrical flange.

In other words this gasket 22 is lodged in the corner portion between the wall 17 and the top part 14 of the cap. The cap may have a knurled edge if desired for facility in rotating it on and off the threads of the neck.

In the use of the device, in Figure 1, the cap is shown as in place. It will be seen that

the gasket 19 is disposed between the shoulder 18 of the cap and the shoulder 10 of the container neck. The gasket is squeezed between these shoulders in the act of rotating the cap 6 home upon the neck threads 8. It will be apparent that the threads 15 of the cap have easy access to the threads 8 of the neck on account of the cutaway portions at the outer portion of the neck and at the outer portion of the cap.

From an inspection of the drawings, it will be noted that the reduced portion 9 provides a continuously smooth surface between the end seat 12 and the shoulder 10 which marks the place where the raised screw threads 8 commence. By this arrangement, when the cap is removed and when material is being discharged from the tube, the shoulder 10 will prevent any excess material, which passes from the seat 12 onto the reduced portion 9, from reaching the screw threads 8. By this arrangement, therefore, the material is prevented from accumulating in the screw threads so as to effect easy application and removal of the cap. Furthermore, owing to the fact that the surface of the reduced portion 9 is smooth, the material which reaches it finds no anchorage for firm adherence and can be readily wiped off.

The projection 21 is shown in Figure 1 as lying within the entrance opening and against the beveled seat 13; and the gasket 22 is shown as engaging the external flat seat 12 of the flange 11, being squeezed against said flange and between the adjacent portions of the cap.

It will thus be apparent that a seal is provided by the engagement of the projection 21 upon the beveled seat 13; a second seal is had by the engagement of the gasket 22 with the seat 12, and a third seal by the presence of the gasket 19 against the shoulder 10. The possibilities of leakage are in this way greatly reduced over the heretofore used form of tube, and to this extent the new form of closure will effect a great saving to the manufacturers whose products are put out in this form.

Manufacturers are assured that the contents of such packages will reach the consumer without being soiled by leakage.

I have illustrated and described a preferred and satisfactory embodiment of my invention, but it is obvious that changes may be made therein within the spirit and scope thereof as defined in the appended claims:—

What is claimed is:—

1. A container including a neck having an end with a flat seat surrounding a beveled delivery orifice, an exterior seat intermediate the length of the neck, a removable closure for the container having two seats therein cooperating respectively with said end flat seat and intermediate seat and disposed opposite thereto, thereby providing two pairs of opposing seats, and a compressible gasket

disposed between each pair of opposing seats, whereby to provide a double seal and thus prevent the escape of gas or liquid from the container by reason of the delivery orifice.

2. A container including a neck having an end with a flat seat surrounding a delivery orifice, an exterior seat intermediate the length of the neck, a removable closure cap for the container having a projecting portion extending inwardly into the delivery orifice, with the exterior of the projecting portion seated against the wall defining the delivery orifice, and two seats in the cap each having a compressible gasket therein, one being disposed about the end seat of the neck and the other disposed opposite the intermediate seat of the neck, whereby a tight fit is formed between said cap and the delivery orifice so that gases or liquids are prevented from escaping from said container.

3. A container having a delivery nozzle provided with an external shoulder separating a threaded region and a plain region, a closure cap for the nozzle having an internal shoulder separating a threaded region and a plain region, the threaded region of the closure cap screw-threading with the threaded region of the nozzle and the plain region of the closure cap contacting intimately with the plain region of the nozzle, and a compressible sealing washer interposed between the shoulders of the closure cap and nozzle.

4. A container having a delivery nozzle provided with an end seat surrounding a delivery orifice, an external shoulder on the nozzle separating a threaded region and a plain region, a closure cap for the nozzle having a central portion entering the interior of the nozzle and intimately contacting the wall defining the delivery orifice, a cylindrical flange on the closure cap having an internal shoulder separating a threaded region and a plain region, a compressible sealing washer between the closure cap and end seat of the nozzle, a compressible sealing washer disposed between the shoulders of the nozzle and cylindrical flange, and the threaded region of the cylindrical flange screw-threading with the threaded region of the nozzle so as to be effective in compressing the two sealing washers in their respective positions and thus prevent the escape of gas or liquid from the nozzle by reason of the delivery orifice.

5. In a container having an outlet opening with an internal flange seat and an external flat surface seat about the opening, said container also having a shoulder stepped down from the entrance opening and lying in a plane parallel to the plane of the flat surface seat, a closure cap removably engaged with said container and having a rounded projection extending substantially centrally and inwardly of the cap for passing inward-

ly into the outlet opening beyond the flange seat and intimately contacting the flange seat, said cap having an annular space extending about the projecting portion, a compressible gasket fitted about the projection and occupying said annular space, said gasket adapted to seat against the flat external seating surface and constitute for the projection a compressible addition to the flange seat, said cap also having an internal shoulder stepped down from said gasket and adapted to come opposite the external shoulder of the container in a plane between the plane of the latter and the plane of the flat surface seat, and a compressible gasket mounted between said shoulders.

6. In a collapsible container having a neck with an inner enlarged externally threaded portion and an outer reduced unthreaded portion, said neck having an external shoulder between the enlarged and reduced portions, said neck also having an internal flange providing a flat external seat stepped above the shoulder and offset inwardly therefrom, said flange having an internal beveled seat, a removable cap having a top and a cylindrical portion provided with a lower reduced portion having internal threads to cooperate with the threads of the neck and an upper enlarged portion forming an internal shoulder with the reduced lower portion, a gasket carried by the cap against said shoulder and adapted to seat on the external shoulder of the neck, a projection extending internally from the top of the cap into the cylindrical portion and adapted to seat against the beveled internal seat of the flange, and a gasket surrounding said projection and adapted to engage against the external flat seat of the flange.

7. A container including a neck having an end orifice through which to deliver material from the container, said neck having a flat inwardly flanged end seat surrounding the end orifice, raised screw threads surrounding said neck and having a shoulder intermediate the length of said neck, the commencement of said screw threads being spaced a relatively wide distance from the end seat to prevent the excess material discharged over the end seat from reaching the screw threads, and the exterior surface of the neck about the end seat being continuously smooth so as to prevent gathering thereby of the excess material discharged over the end seat, and a removable cap provided with internal screw threads to cooperate with the raised screw threads of the neck and having grooves with concentric gaskets therein, which rest against the end seat and shoulder respectively, the side wall of each of said grooves being shaped to intimately overlies the end seat and shoulder, to effect a seal with the cap when applied to the neck.

8. A container having a delivery nozzle

provided with a seat surrounding a delivery orifice, an external shoulder on the nozzle separating a threaded region and a plain region, a closure cap for the nozzle having a central portion entering the interior of the nozzle and intimately contacting the wall defining the delivery orifice, a cylindrical flange on the closure cap having an internal shoulder separating a threaded region and a plain region, a compressible sealing washer disposed between the shoulder of the nozzle and cylindrical flange, and the threaded region of the cylindrical flange screw-threading with the threaded region of the nozzle so as to be effective in compressing the sealing washer in its respective position and thus prevent the escape of gas or liquid from the nozzle by reason of the delivery orifice.

In testimony that I claim the foregoing as my invention, and have signed my name hereto.

FRANK B. COONEY.