March 25, 1941. V. HALL 2,236,031

COLLAPSIBLE TUBE

Filed April 2, 1940

Fig. 1.

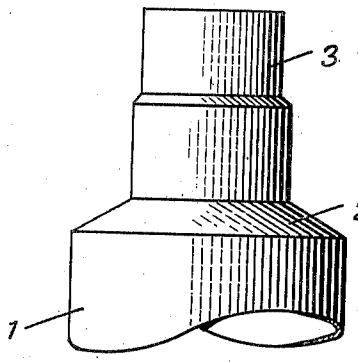


Fig. 2.

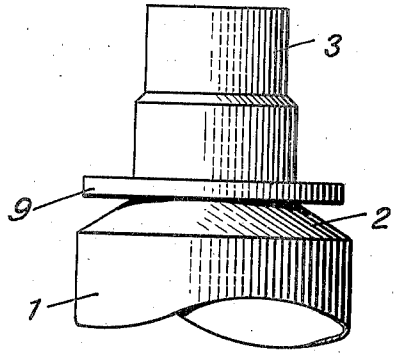


Fig. 3.

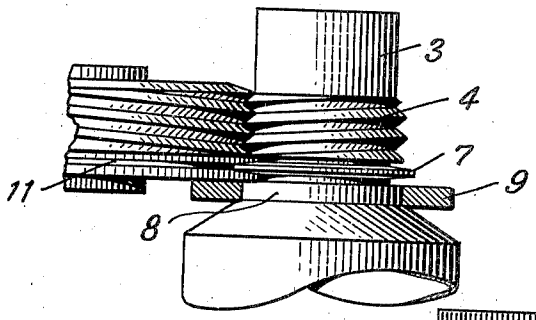


Fig. 4.

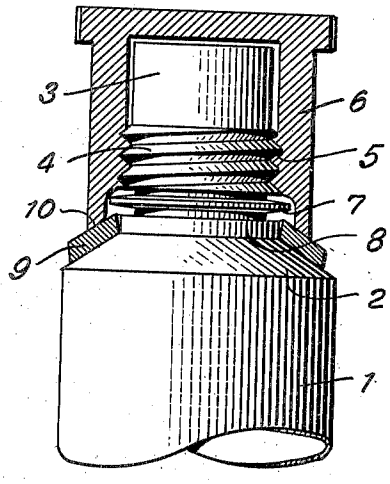
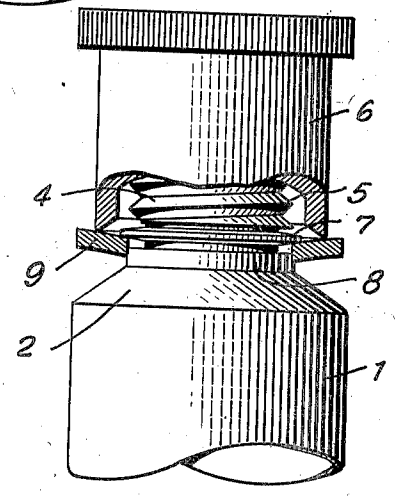


Fig. 5.



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COLLAPSIBLE TUBE

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5 Claims. (Cl. 221—60)

This invention relates to collapsible tubes, and pertains more particularly to closures therefor.

In the manufacture of collapsible tubes, it has been customary practice to provide a cap having screw threaded engagement with the neck of the tube and having an internal portion which seats against the neck of the tube to seal the tube against leakage. While such closures are generally satisfactory for many purposes, they are objectionable for certain other purposes. In the case of cementitious preparations, for example, it is found that if the material in the tube spills over onto the threads while the tube is in use, and the cap is subsequently screwed down to seal the tube, the material tends to harden on the threads, and frequently makes it difficult or impossible to remove the cap thereafter. In the case of applicator tubes in which a brush or other applicator member projects from the neck of the tube, it has also been difficult to obtain a satisfactory seal, since the applicator member usually is mounted in the neck of the tube and interferes with the seating of the cap against the neck.

It is an object of the present invention to provide a closure for collapsible tubes adapted for use either with ordinary tubes or with applicator tubes which will eliminate these objections and will provide a tight seal, while at the same time permitting easy removal of the cap.

Other objects and advantages of the invention will appear hereinafter.

A preferred embodiment of the invention selected for purposes of illustration is shown in the accompanying drawing, in which,

Figure 1 is a side elevation of a tube.

Figure 2 is a similar view showing the washer in place.

Figure 3 is a similar view showing the method of forming the retaining flange.

Figure 4 is a similar view of the tube and cap assembly, the cap being shown in section.

Figure 5 is a similar view showing the cap being removed.

Referring to the drawing, and particularly to Figure 4, the tube comprises the usual tubular body portion 1 terminating in a shoulder 2, and having a neck 3 extending upwardly from the shoulder. The neck is provided with a threaded portion 4 which engages internal threads 5 in the cap 6. Located immediately below the threaded portion of the neck is an annular flange 7 having an outside diameter slightly larger than the outside diameter of the threaded portion of the neck. Below the flange is another unthreaded portion 8 of the neck which joins the shoulder 2 of the tube. Surrounding the portion 8 of the neck is a washer 9 which is adapted to be engaged by the lower edge 10 of the cap which compresses the washer against the shoulder 2 of the tube in order to effect a tight seal. Preferably the lower edge of the tube is beveled as shown in Figures 4 and 5 so that it is substantially parallel to the surface of the shoulder.

The washer 9 may be made of any suitable material such as felt, rubber or leather, for example. The diameter of the central aperture of the washer 9 is less than the diameter of the flange 7, so that the flange 7 may serve as a retaining flange for the washer as hereinafter explained. Accordingly a special method of manufacture and assembly is employed, as follows.

The tube as originally formed in the usual extrusion press is illustrated in Figure 1. The upper portion of the neck of the tube has a diameter slightly less than the lower portion of the neck which is subsequently shaped to provide the threads 4 and flange 7. As the next step in the manufacturing process, the washer 9 is placed on the neck as shown in Figure 2, and the diameter of the aperture of the washer is such that the washer fits snugly around the lower portion of the neck. The threads 4 and flange 7 are now formed, and both may be formed in a single operation by means of a special tool 11 as shown in Figure 3. As shown the lower edge of the forming tool is applied to the neck above the washer, thus leaving the washer surrounding the portion 8 of the neck.

The tube is now ready for application of the cap 6, which is screwed down to force the washer into engagement with the shoulder 2 and to compress the washer between the shoulder and the lower edge 10 of the cap.

In using the tube, if the contents of the tube are of an adhesive or sticky nature, the principal adhesion occurs between the lower edge 10 of the cap and the upper surface of the washer. The washer itself covers and protects the shoulder 2 and adhesion seldom occurs between the shoulder and the lower surface of the washer. Accordingly, when the cap is unscrewed, the initial movement of the cap usually carries the washer with the cap, i. e. the washer adheres to the cap and rotates with it. Further rotation of the cap, however, causes the washer to engage the retaining flange 7, and as rotation continues the beveled edge 10 peels away from the washer as shown in Figure 5, so that it is relatively easy to break the adhesion therebetween.

Furthermore, it will be noted that the seal is effected outside of the threads rather than inside as in the usual tube closure. For this reason the volatile fluids frequently used as solvent or carrier mediums for the contents of the tube are able to penetrate to the threads so as to prevent the material from hardening on the threads.

The cap illustrated is of the conventional flat headed type, but it will be understood that for applicator or other special purpose tubes the upper part of the cap may be shaped as necessary.

It will be understood that the invention may be variously modified and embodied within the scope of the subjoined claims.

I claim as my invention:

1. A collapsible tube comprising a tubular body portion, a tubular neck, a shoulder between said body portion and said neck, a retaining flange projecting outwardly from said neck spaced from said shoulder and from the upper edge of said neck, the outside diameter of said flange being greater than the outside diameter of the neck above and below said flange, and a washer surrounding said neck between said flange and said shoulder, the inside diameter of said washer being less than the outside diameter of said flange.

2. A collapsible tube comprising a tubular body portion, a tubular neck, a shoulder between said body portion and said neck, a retaining flange projecting outwardly from said neck spaced from said shoulder and from the upper edge of said neck, the outside diameter of said flange being greater than the outside diameter of the neck above and below said flange, a washer surrounding said neck between said flange and said shoulder, the inside diameter of said washer being less than the outside diameter of said flange, and a cap fitting over said neck and extending downwardly around and below said flange, the lower edge of said cap engaging said washer to seal the tube.

3. A collapsible tube comprising a tubular body portion, a tubular neck, a shoulder between said body portion and said neck, screw threads on said neck, a retaining flange projecting outwardly from said neck below the termination of said threads between said threads and said shoulder and spaced from said shoulder, and a washer surrounding said neck between said flange and said shoulder, the inside diameter of said washer being less than the outside diameter of said flange.

4. A collapsible tube comprising a tubular body portion, a tubular neck, a shoulder between said body portion and said neck, screw threads on said neck, a retaining flange projecting outwardly from said neck between said threads and said shoulder and spaced from said shoulder, the outside diameter of said flange being greater than the outside diameter of said neck, and a washer surrounding said neck between said flange and said shoulder, the inside diameter of said washer being less than the outside diameter of said flange.

5. A collapsible tube comprising a tubular body portion, a tubular neck, a shoulder between said body portion and said neck, screw threads on said neck, a retaining flange projecting outwardly from said neck between said threads and said shoulder and spaced from said shoulder, the outside diameter of said flange being greater than the outside diameter of said threads, a washer surrounding said neck between said flange and said shoulder, the inside diameter of said washer being less than the outside diameter of said flange, and a screw threaded cap engaging the screw threads on said neck, said cap extending downwardly around and below said flange, the lower edge of said cap engaging said washer to seal the tube.

VICTOR HALL.