July 11, 1933. H. B. FINLEY 1,917,833

COLLAPSIBLE TUBE STRUCTURE

Filed Dec. 15, 1931

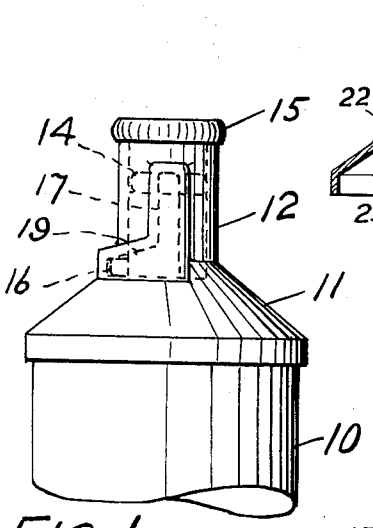



FIG. 1.

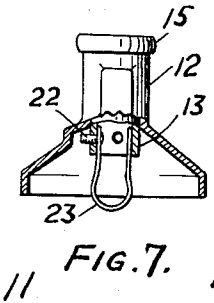



FIG. 7.

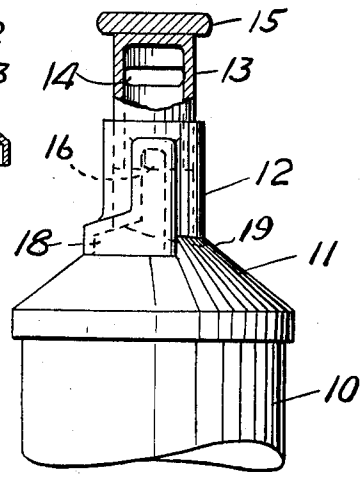



FIG. 2.

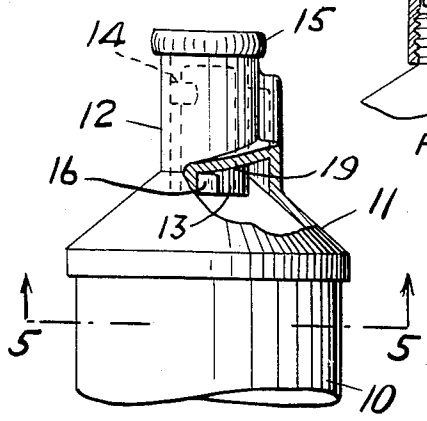



FIG. 3.

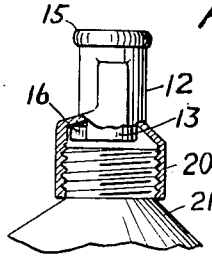



FIG. 6.

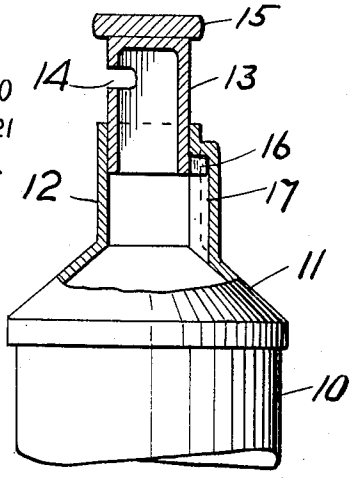



FIG. 4.

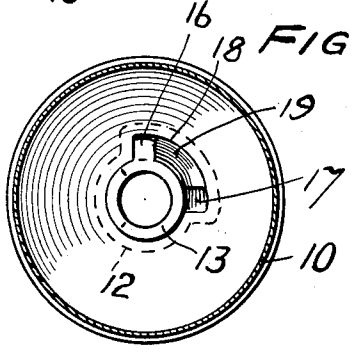



FIG. 5.

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# UNITED STATES PATENT OFFICE

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## COLLAPSIBLE TUBE STRUCTURE

Application filed December 15, 1931. Serial No. 581,128.

The subject of my invention is a cap structure for use with collapsible tubes. My cap structure provides a means for preventing the accidental escape of the product from the tube and for permitting of its ready expulsion when desired and means for retaining the cap structure in correct connection or attachment to the neck of the tube and for retaining it in closed position thus sealing the neck of the tube.

One important feature of my invention is the provision of an outlet opening in the cap structure intermediate of its length so that the outlet opening is wiped by the neck of the tube when the cap structure is moved to closed position.

Another important feature of my invention is the location of the cap structure within the neck of the tube. By means of this construction I am enabled to readily form the bayonet slot or other means for retaining the cap structure on the tube at the same time that the neck, and, if desired, the tube is formed and in the same die.

Another feature of my invention is the provision of a cam surface on the bayonet slot or other retaining means. This cam surface provides a means for retaining and securely locking the cap structure in closed position.

For a further exposition of my invention reference may be had to the annexed drawing and specification at the end whereof my invention will be specifically pointed out and claimed.

In the drawing,

Figure 1 is a side elevation of my device with the cap structure in closed position.

Figure 2 is a side elevation of my device with the cap structure in open position and partially broken away.

Figure 3 is a side elevation of my device at right angles to Figures 1 and 2 with parts broken away.

Figure 4 is a side elevation of my device with the cap structure in open position and with parts shown in cross section.

Figure 5 is a cross section on line 5—5 of Figure 3.

Figure 6 is a side elevation partly in cross section.

Figure 7 is a sectional view of another modification.

In the drawing my device is shown as consisting of a collapsible tube 10 of metal alloy. Tube 10 has at one end an end 11 of generally conical shape. End 11 may be integral with tube 10 or may be firmly attached thereto. End 11 carries a projecting neck 12 which may likewise be integral or firmly attached to end 11. Slidably mounted within neck 12 is a feeding member 13 which has a feeding opening 14 therein. At its upper end feeding member 13 carries a cap 15 which projects laterally beyond the sides of feeding member 13 so that the under sides of cap 15 cooperate with the projecting end of neck 12 to limit the inward motion of the feeding member. On its inner end feeding member 13 carries a projection 16 which forms a part of the retaining means for the feeding member. Neck 12 has a portion of its wall formed to provide a chamber 17 which extends substantially parallel to the axis of the tube which is of proper size to closely embrace projection 16. At its lower end neck 12 is provided with a second chamber 18 extending partially circumferentially thereof and communicating at one end with chamber 17. Cooperating with chambers 17 and 18 there may be provided a cam surface 19 which cooperates with projection 16, upon turning of cap 15 to securely lock the cap structure including feeding member 13, cap 15 and projection 16, in closed position with projection 16 occupying the lower end of chamber 18 in the position shown in Figure 3.

From an inspection of the drawing, particularly Figure 5, it will be clear that chambers 17 and 18 are open at their bottom ends to the interior of tube 10 and of end 11. It will thus be seen that these chambers can be formed at the same time that neck 12 and end 11 are formed and that they can be formed in the same die. For this reason the structure comprising neck 11 and neck 12 is exceedingly simple and inexpensive to manufacture.

The operation of my device is obvious. If the tube is closed in the position shown in Figure 1, a person desiring to secure a supply of the material within the tube, grasps the cap 15 and turns it slightly so that the projection 16 comes into alignment with the chamber 17. The cap 15 and with it the feeding member 13 is then pulled out so that the feeding opening 14 is exposed. Material within the tube may then be expelled through the feeding opening 14 by pressing

upon the tube. When a sufficient supply of the material has been secured, cap 15 is pressed inward and turned thus restoring the cap structure to its sealing position. Because of the intermediate position of feeding opening 14 in feeding member 13 the material projecting from the feeding opening 14 is wiped away by the projecting end of neck 12. There is, therefore, no tendency for the accumulation and retention of small amounts of the material outside of the member 13 and across the opening 14 and exposed to the atmosphere. This is a desirable feature because many of the materials used in such tubes as these harden upon exposure to the atmosphere and clog or jam the feeding openings.

If the cap structure is carelessly operated and only partially returned towards its inner position, upon turning the cap structure projection 16 cooperates with cam surface 19 and withdraws the cap structure into its full inner position where it is securely retained by the engagement of projection 16 in the end of chamber 18.

It may be remembered that the space within the cap structure is full of the product when in closed position, and this facilitates the expulsion of the product when the cap structure is pulled out.

In Figure 6 there is disclosed a modification of my device. In this modification the neck 12 is separate and detached from the tube 21. The neck 12 carries at its lower end an enlarged chamber 20 having on its inner surface screw threads or other means whereby the device may be attached onto the neck of the tube. Otherwise the device is similar to that already described. Mounted within neck 12 is a feeding member 13 having at one end a projecting cap 15 and at its other end a projection 16 cooperating with chambers formed in the side of neck 12.

Figure 7 shows projection 22 in the form of a pin mounted on one end of a spring clip 23 and projecting through a hole in feeding member 13. The other end of spring clip 23 bears against the inner wall of feeding member 13. Thus the pin 22, clip 23 and feeding member 13 may be assembled and inserted from the exterior through the open end of the neck 12.

The feeding member 13 may be made of metal, metal alloy or phenol condensation product.

I do not intend to be limited in the practice of my invention save as the scope of the prior art and of the attached claims may require.

I claim:

1. A collapsible tube structure including a collapsible tube, a neck on said tube having an opening therethrough, a cap structure slidably mounted within said neck and having an opening therein adapted to be wiped in an intermediate position of its movement by said neck, a chamber on said neck extending axially thereof and communicating at its inner end with the interior of said tube, a second chamber on said neck extending partially circumferentially thereof and communicating with said first mentioned chamber, and a projection on said cap structure cooperating with said chambers to retain said cap structure in its extreme positions adjacent said neck.

2. A collapsible tube structure including a collapsible tube, a neck on said tube having an opening therethrough and a projecting end, a feeding member slidably mounted within said neck and having an opening therein intermediate its ends and adapted to be wiped by the end of said neck, a projecting cap on said member cooperating with the end of said neck to limit the inward movement of said member, a chamber on said neck extending axially thereof and communicating at its inner end with the interior of said tube, a second chamber on said neck extending partially circumferentially thereof and communicating with said first mentioned chamber, a cam surface on said neck and cooperating with said second chamber, and a projection on said member cooperating with said chambers and with said cam surface to retain said member and said cap adjacent said neck.

3. A feeding device for use with collapsible tubes including in combination a neck having an opening therethrough, a cap structure slidably mounted within said neck and having an opening therein adapted to be wiped in an intermediate position of its movement by said neck, a pin projecting through a wall of said cap structure, a spring clip mounted within one end of said cap structure and carrying said pin at one end, and engaging means on said neck for receiving the end of said pin therein.

4. A feeding device for use with collapsible tubes including in combination a neck having an opening therethrough, a cap structure slidably mounted in said neck and having an opening therein adapted to be wiped in an intermediate position of its movement by said neck, a chamber formed in the wall of said neck and closed to the exterior of said device and extending axially of said neck, a second chamber formed in the wall of said neck and closed to the exterior of said device and extending partially circumferentially of said neck and communicating with said other chamber, and means on said cap structure slidably enclosed in said chambers and positioning said cap structure relative to said neck.

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