

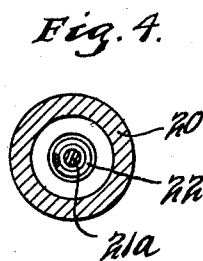
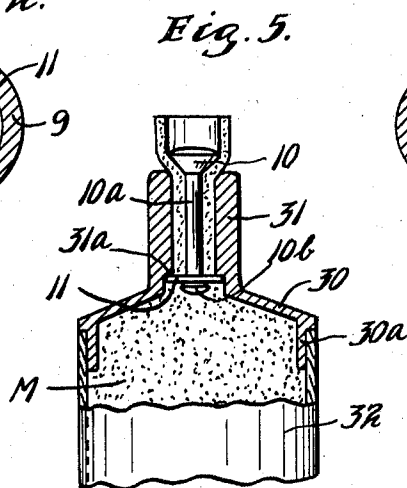
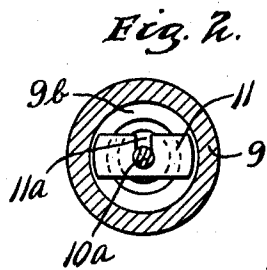
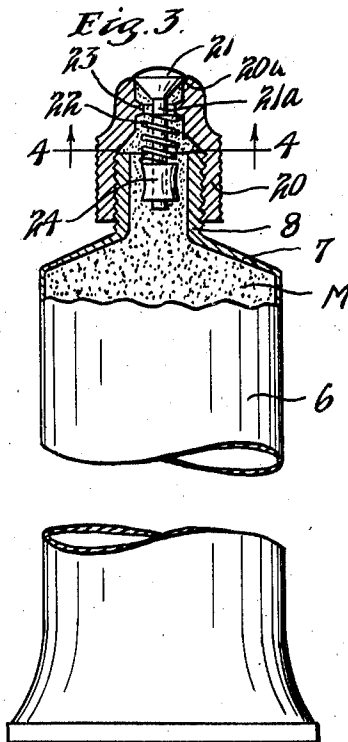
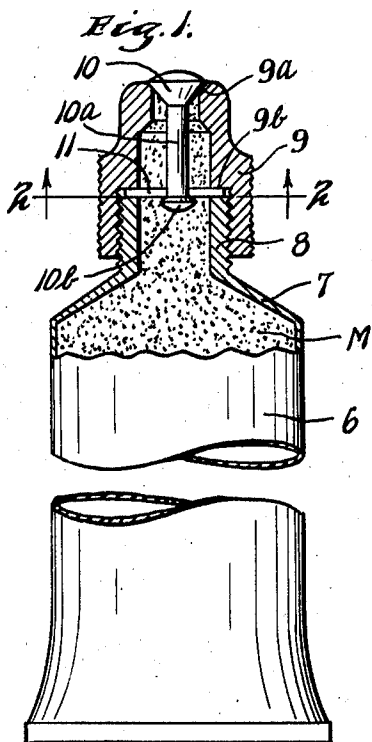
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CLOSURE FOR COLLAPSIBLE TUBES

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## UNITED STATES PATENT OFFICE

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## CLOSURE FOR COLLAPSIBLE TUBES

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4 Claims. (Cl. 221—60)

This invention relates to receptacles or containers for creamy or pasty material of the type wherein the contents are extruded by means of pressure applied thereto. Such containers in the form of collapsible tubes are widely used for tooth paste, shaving cream, paints, vaseline, and the like.

In collapsible tubes and containers and analogous containers of the type above described, a removable threaded cap is usually provided closing the dispensing spout, and this structure is objectionable both from the standpoint that some material continues to be extruded after pressure upon the tube has been released, smearing and wasting considerable material, and also from the standpoint of sanitation, inasmuch as the open end of the tube and contents are subjected to germs.

It is an object of my invention to provide a very simple, inexpensive and highly efficient closure or dispensing cap for containers of the class described which would be automatically opened by the pressure of the contents and which will immediately close to cut off extrusion of the material upon release of said pressure.

More particularly, it is an object of my invention to provide a dispensing or cut-off closure associated with the spout or neck of a collapsible tube or analogous container which includes a valve applied externally to the discharge end of the neck and simple and efficient yieldable means mounted within the neck for normally holding said valve tightly closed against its seat.

It is a further object to provide a closure structure in the class described which may be associated with collapsible tubes and the like without adding to the expense of the usual threaded closure cap.

These and other objects and advantages of the invention will be more fully apparent from the following description made in connection with the accompanying drawing, wherein like reference characters refer to similar parts throughout the several views, and in which:—

Fig. 1 is a fragmentary view partly in side elevation and partly in longitudinal section showing one form of my invention applied to a collapsible tube;

Fig. 2 is a cross section taken on the line 2—2 of Fig. 1, showing the anchoring or abutment element to which the inner end of the elastic valve stem is secured;

Fig. 3 is a fragmentary view partly in side elevation and partly in longitudinal section showing a somewhat different embodiment of my invention;

Fig. 4 is a cross section taken on the line 4—4 of Fig. 3; and

Fig. 5 is a fragmentary view mostly in longitudinal section showing a preferred form of my invention applied to a collapsible tube and illustrating the open position of the valve with the creamy or pasty contents in the process of extrusion.

With reference to the form of the invention shown in Figs. 1 and 2, my closure mechanism is applied as an attachment to a conventional type of collapsible tube having the usual flexible body 6, tapered shoulders 7, and diminished and rigid neck 8, to contain creamy or pasty material M, such as, for example, tooth paste, vaseline, shaving cream, and the like.

As shown, a cap or thimble 9 is threaded and detachably secured upon the exterior of the tube neck 8, said cap having an axial passage therethrough, which may, if desired, be diminished somewhat at its outer end and which terminates in a peripheral valve seat 9a for engaging a truncated conical valve.

The valve shown in Figs. 1 and 2 comprises a truncated conical plug 10, having integrally formed with or affixed thereto a valve stem 10a constructed of elastic material, such as gum rubber. The inner end of stem 10a has an enlargement or retaining head 10b which is secured within a transverse retaining or abutment plate 11 disposed within the axial discharge passage cap 9.

I prefer to cast or otherwise form the valve 10, valve stem 10a and retaining head 10b integrally from suitable material, such as gum rubber, having a relatively high degree of elasticity and some degree of compressibility, although, of course, other suitable materials may be utilized, provided the stem 10a is elastic and will normally hold the valve 10 tightly seated against its seat 9a.

The retaining plate 11, as shown, is seated against a shoulder 9b formed in the medial portion of the internal peripheral wall of the cap 9 and may be clamped, if desired, between said shoulder and the outer end of the neck 8. The retaining plate 11 may be provided, as shown, with a keyhole slot 11a communicating with one of the longitudinal edges thereof for receiving stem 10a with the retaining head 10b disposed beneath said plate.

In assembling the device, stem 10a is stretched to effect engagement of the head 10b with plate 11, and, in the completed device, the stem is under constant tension adequate to positively seat the truncated conical valve.

Upon squeezing the body 6 of the tube or otherwise applying pressure to the contents, the pasty or creamy material is forced through the axial passage in the cap 9 and exerts outward pressure against valve 10, opening the valve and stretching and increasing the tension upon valve

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stem 10a. The material will be extruded from the container in tubular form and immediately upon releasing the pressure from the container and/or contents the tension stem 10a will positively seat, the valve cutting off the discharge of material. The discharge opening as will be noted, will be completely covered by the valve and there is no opportunity for contamination of the contents through germs.

In the form of the invention illustrated in Figs. 3 and 4, the collapsible tube is of similar structure to the form illustrated in Fig. 1 and the cap 20 is of similar general shape having threaded engagement with the exterior periphery of the rigid neck 8 of the tube and provided with an axial discharge passage. In this latter form, however, the valve 21 carries a relatively non-elastic stem 21a mounted substantially axially of the cap and carries a resilient element, such as a contractile coil spring 22, which is interposed in the abutment shoulders 23 provided in the internal peripheral wall of the cap just inwardly of the valve body and an abutment collar 24 which may be crimped or otherwise secured to the end of stem 21a. Abutment shoulders 23 may comprise lugs cast upon the interior of the cap 20 or may be in the form of an annular flange formed upon the internal periphery of said cap. The valve 21 and stem 21a are preferably constructed integrally from any suitable material, such as metal, fiber, or the like.

In operation, the valve 21 is normally held against its seat 20a by means of coil spring 22, which applies inward pressure against the affixed abutment collar 24. When outward pressure is placed upon the contents of the collapsible tube or container the valve is forced outwardly and longitudinally, opening the discharge end of the tube and the material will be extruded in tubular form. Upon releasing said pressure, the spring 22 quickly cuts off further extrusion of the material tightly seating the valve.

In Fig. 5, a simple and inexpensive form of the invention is shown simulating closely the form illustrated in Figs. 1 and 2. In the form of Fig. 5, however, my improved closure structure and cut-off is built into the spout and neck of the collapsible tube rather than being applied thereto as an attachment. In said form, the collapsible tube has the spout portion, including shoulders 30 and neck 31, cast or otherwise formed integrally, said neck as shown having an axial discharge passage or bore provided adjacent its inner end with an annular retaining shoulder 31a which engages the retaining plate 11. The flexible body 32 of the tube surrounds an attachment flange 30a and is secured thereto in a conventional manner after my closure structure has been assembled. The valve and valve stem are substantially identical with the form of my invention illustrated in Fig. 1, being preferably constructed integrally from elastic material, such as gum rubber, the end of the valve engaging the keyhole slot in retaining plate 11 being provided with an enlargement 10b.

The open position of the valve is shown in Fig. 5 with the pasty or creamy material being extruded in tubular form.

It will be apparent that the form of my invention illustrated in Fig. 5 may be manufactured as cheaply, if not more cheaply than the usual closure structure used at this time for collapsible tubes comprising merely a removable threaded cap.

From the foregoing description, it will be seen that I have provided a positive, quickly responsive, automatic closure for collapsible tubes and other containers wherein material is extruded by pressure thereagainst, adapted to effect satisfactory discharge or extrusion of the material, and further, positively and quickly cutting off discharge of the material when the actuating pressure has been released.

As is previously recited, my structure further prevents contamination of the material therein as well as subjection of a portion of the contents to evaporation and subsequent hardening, which is prevalent in well known types of collapsible containers.

It will, of course, be understood that various changes may be made in the proportions, forms, details and arrangements of parts without departing from the scope of my invention.

What is claimed is:—

1. In combination with a receptacle having a neck provided with a longitudinal discharge passage, a valve seat at the outer end of said neck, a valve mounted axially and externally of said seat, said valve having a stem extending longitudinally of said discharge passage, said stem being constructed of elastic material and means within said neck for anchoring the inner end of said stem to normally hold said valve against its seat.

2. In combination with a collapsible tube having a longitudinally extending discharge neck, a valve seat at the outer end of said neck, a valve mounted axially and externally of said seat, said valve having attached thereto an elongated stem extending axially within said neck, said stem being constructed of longitudinally stretchable elastic material and means for anchoring the inner end of said stem to normally hold said valve against its seat.

3. In combination with a receptacle having a neck provided with a longitudinal discharge passage, a valve seat in the outer end of said neck, an integrally formed valve including a head disposed externally of said seat, and an elongated valve stem extending axially within said discharge passage, said valve being constructed of highly stretchable elastic material and means for anchoring the inner end of said stem to normally hold said valve against its seat.

4. In combination with a receptacle having a neck provided with a longitudinal discharge passage, a valve seat in the outer end of said neck, a valve mounted axially and externally of said seat, said valve having attached thereto a stem extending axially within said neck, said stem being constructed of highly stretchable and elastic material and a relatively narrow anchoring member extending transversely to the interior of said neck and connected with the inner end of said stem to normally hold said valve against its seat.

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