Sept. 29, 1936. C. E. LUNDGREN 2,055,694

COLLAPSIBLE TUBE CLOSURE

Filed Nov. 14, 1935

FIG. 1.

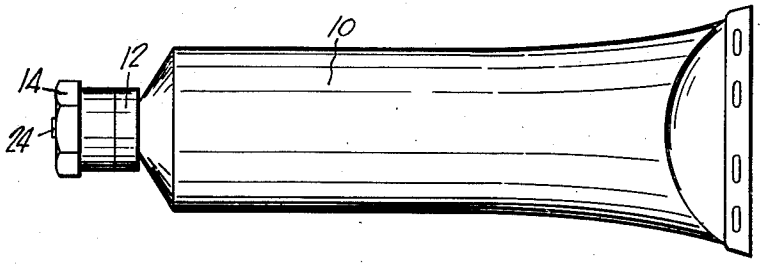


FIG. 2.

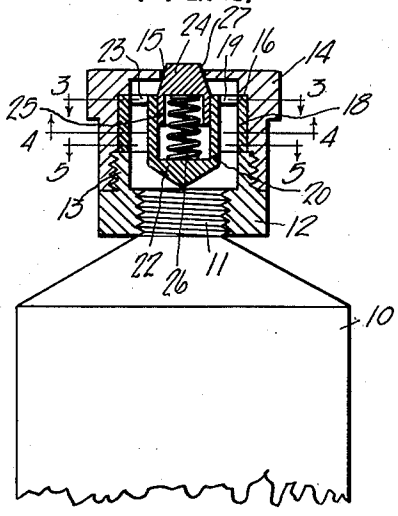


FIG. 4.

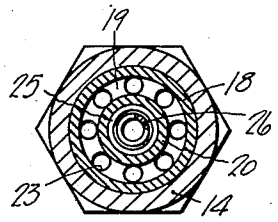


FIG. 5.

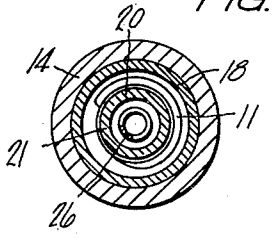


FIG. 3.

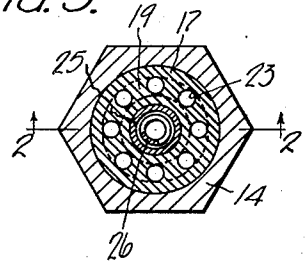
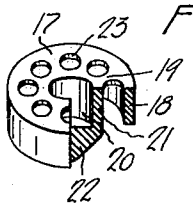


FIG. 6.



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COLLAPSIBLE TUBE CLOSURE

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Application November 14, 1935, Serial No. 49,773

7 Claims. (Cl. 221—60)

This invention relates to collapsible tube closures, and particularly to a device of this character which is self-closing, and which opens to discharge the contents of the tube upon application of pressure to said tube.

The primary object of the invention is to provide a device of this character wherein application of pressure to a tube shifts a valve in a direction opposite to the direction of pressure application to permit discharge of the container contents.

A further object is to provide a device of this character with a spreader which serves to direct contents expelled from the tube in a predetermined path of movement and to support a valve or closure.

A further object is to provide a device of this character with an outwardly tapered spring pressed closure member longitudinally shiftable relative to a spreader by which pressure-expelled tube contents are divided to permit subsequent radially inwardly directed movement thereof against said tapered closure member to open the same during application of pressure to the tube.

Other objects will be apparent from the description and the appended claims.

In the drawing:

Figure 1 is a side view of a collapsible tube provided with my improved closure.

Figure 2 is a longitudinal sectional view of the closure taken on line 2—2 of Fig. 3.

Figure 3 is a transverse sectional view of the closure taken on line 3—3 of Fig. 2.

Figure 4 is a transverse sectional view of the closure taken on line 4—4 of Fig. 2.

Figure 5 is a transverse sectional view of the closure taken on line 5—5 of Fig. 2.

Figure 6 is a perspective view of the spreader with parts cut away.

Referring to the drawing, which illustrates the preferred embodiment of the invention, the numeral 10 designates a conventional collapsible tube provided with an externally screw threaded neck 11. To the neck 11, I apply my improved closure by means of an adapter ring 12 having an axial screw threaded opening fitting around said neck. Ring 12 is provided with a coaxial annular externally screw threaded extension 13 whose outer diameter is preferably less than the diameter of said ring and whose inner diameter is greater than that of neck 11. A cap 14 is screw threaded on annular extension 13 of ring 12, the outer end of said cap being provided with a central opening 15. In spaced relation to the outer end of cap 14 the side walls of said cap are provided with an inwardly directed shoulder 16, said shoulder being substantially spaced from the end of ring extension 13.

Within cap 14 is mounted a spreader 17, best illustrated in Fig. 6. Spreader 17 comprises an outer annular wall 18 which is clamped by said cap between the end of ring extension 13 and shoulder 16 of said cap. Integrally formed with wall 18 is an inwardly extending transverse wall 19, from which extends a cup-shaped central portion 20 whose wall 21 is concentric with and inwardly spaced from wall 18, and which is open at its outer end adjacent wall 19. The base 22 of cup-shaped portion 20 is of conical exterior shape and its apex is preferably juxtaposed to the end of tube neck 11 and in substantially coaxial relation thereto. A plurality of equispaced openings 23 are provided in transverse wall 19 intermediate walls 18 and 21.

Slidably mounted within cup-shaped portion 20 of spreader 17 is a valve member 24 whose inner end is provided with a central hollow open end or skirt 25 into which extends one end of a coil spring 26 whose opposite end bears on base 22 of the cup-shaped portion of the spreader. The outer end 27 of valve 24 is provided with a frusto-conical outline or shape which normally projects through cap opening 15 to close or seal the same.

In the normal relation of parts the spring 26 urges valve 24 outwardly, positioned and guided by the interfitting valve skirt 25 and the wall 21 of the spreader, whereby the tapered outer portion thereof positively engages the entire circumference of the wall of cap opening 15 to seal the same and the tube. Upon application of pressure to the tube to expel the contents thereof in the usual manner, the contents of the tube are divided or diverted by the conical base 22 of the spreader 17 into the annular passage between walls 18 and 21 of the spreader. As the application of pressure to the tube continues, equal portions of the contents thereof are forced through each of the plurality of openings 23, and are thence directed radially inwardly between the cap end and the outer end of the spreader and against the tapered outer end 27 of the valve 24. The radially inwardly directed pressure of the contents of the tube against said tapered portion of the valve longitudinally inwardly shifts said valve to permit expulsion of said tube contents. When the application of pressure is discontinued, the spring 26 forces the valve outwardly and thus effectively recloses the valve and tube.

I claim:—

1. A closure for a collapsible tube comprising a hollow cap fitting on the discharge end of said tube and having a discharge opening in its outer nd, a spreader disposed in said cap in spaced relation to its outer end and comprising a central portion having a substantially conical end and an opposed hollow end, a transverse apertured wall portion projecting laterally from the hollow end of said central portion, and a ring portion carried by said wall portion in spaced concentric relation to said central portion to provide an annular channel therebetween communicating with said apertures, a spring mounted in the hollow end of said central spreader portion, and a valve member having a guide skirt longitudinally shiftable in said hollow end and spring pressed to close said opening, the outer end of said valve being tapered.

2. A closure for a collapsible tube comprising an adapter fitting on the discharge end of said tube, a cap mounted on said adapter having an internal shoulder spaced from its end and a discharge opening in its end, a spreader having an annular passage concentric with said cap extending for the major portion of its length and defined at one end by a transverse apertured wall, said spreader being clamped between said shoulder and adapter, and a spring pressed tapered valve member shiftably carried by said spreader and normally closing said discharge opening.

3. A closure for a collapsible tube comprising an adapter for connection with the discharge end of said tube, a cap mounted on said adapter having a discharge opening in its end, a spreader clamped between said cap and adapter in spaced relation to the end of said cap, said spreader having an annular passage therethrough, and a spring pressed tapered valve shiftably carried by said spreader at the center thereof and normally closing said discharge opening.

4. A spreader adapted to be mounted in a closure for a collapsible tube comprising an outer annular member, a cup-shaped member positioned in spaced concentric relation to said annular member, and a transverse wall interconnecting said members at one end thereof, said wall being provided with a plurality of equi-spaced apertures extending therethrough.

5. A spreader adapted to be mounted in a closure for a collapsible tube comprising a central member having a substantially conical end and an opposed valve mounting hollow end, a transverse apertured wall projecting outwardly from the hollow end of said central member, and a ring carried by said wall in spaced concentric relation to said central member to provide a channel communicating with said wall apertures.

6. A closure for a collapsible tube having a threaded discharge portion, comprising means concentric with said discharge portion for spreading the tube contents discharged through said portion, a cap threaded on said discharge portion and clamping said spreading means in operative relation to said discharge portion, said cap having a discharge opening therein, and a spring pressed valve normally closing said cap opening, said valve being carried by said spreading means.

7. A closure for the discharge portion of a collapsible tube, comprising a cap mounted on said tube and having an opening therein, a member clamped in fixed relation to said discharge portion by said cap, said member being adapted to spread tube contents expelled through said discharge portion, and a spring pressed valve carried by said member and normally closing said cap opening.

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