

June 28, 1932.

L. J. CAMPBELL.

1,865,233

CLOSURE FOR COLLAPSIBLE TUBES

Filed June 12, 1930

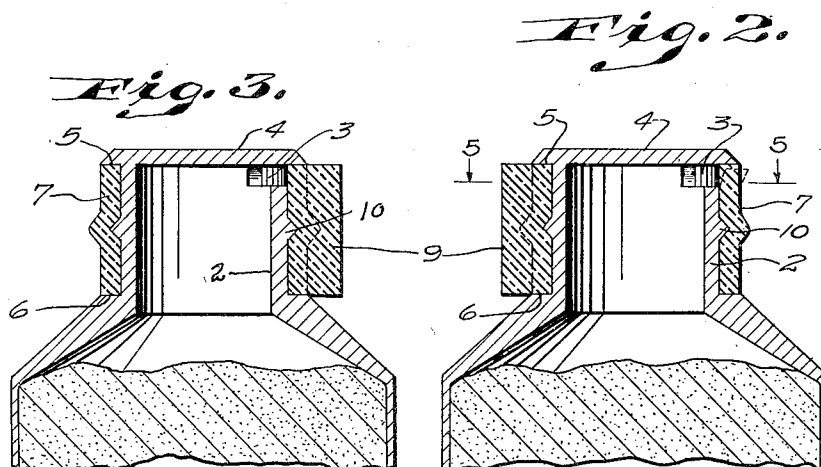
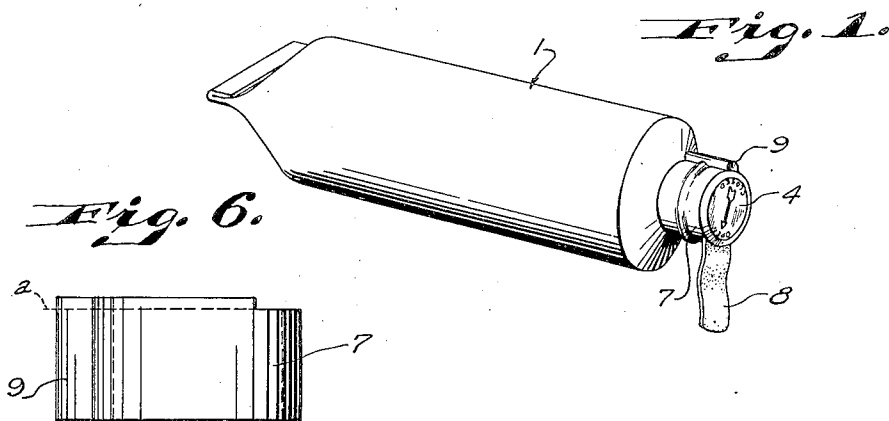
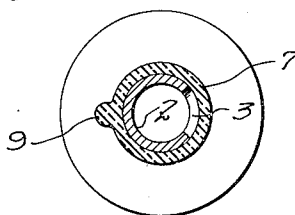
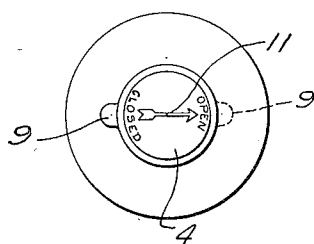


Fig. 4.

Fig. 5.



INVENTOR.

LEON J. CAMPBELL.

BY

Bottom, Hednall, Leck, & Kamenetzky
ATTORNEYS

UNITED STATES PATENT OFFICE

LEON J. CAMPBELL, OF BUCHANAN, MICHIGAN

CLOSURE FOR COLLAPSIBLE TUBES

Application filed June 12, 1930. Serial No. 460,614.

This invention relates to self-closing closures for the discharge openings of collapsible tubes as employed for dispensing plastic and semi-plastic materials, such as tooth paste, shaving cream, cold cream and the like.

One object of the invention is to provide a closure in the form of an elastic band or sleeve for controlling the flow of material out of the tube through a lateral discharge opening therefor.

Another object of the invention is to so form the band or sleeve that when applied to the tube at the discharge opening, the sleeve will have a certain part of its wall section more rigid than another part, so that when the rigid part is over the opening, it will not give under the internal pressure produced when the tube is squeezed and will thus form a permanent closure or seal for the opening. The flexible part of the sleeve when over the opening will flex under the pressure produced on squeezing the tube and permit the content of the tube to be forced out of the opening in the form of a ribbon.

A further object of the invention is to provide shoulders on opposite sides of the discharge opening, and to make the sleeve in that portion serving as the permanent seal slightly longer than the distance between the shoulders, so that the sleeve wall will be compressed between the shoulders when applied to the tube, and thus provide the resistance necessary to prevent the escape of the content from the tube when the tube is squeezed.

The invention consists further in the matters hereinafter described and claimed:

In the accompanying drawing:

Fig. 1 is a perspective view of a collapsible tube provided with a closure of my invention;

Figs. 2 and 3 are vertical sectional views showing the closure in its positions providing the permanent and temporary seals for the discharge opening of the tube;

Fig. 4 is a top plan view of the tube;

Fig. 5 is a horizontal sectional view taken on line 5—5 of Fig. 2; and

Fig. 6 is a view showing the band or sleeve before being applied to the tube.

In the drawing, 1 indicates the collapsible tube and 2 the rigid neck at the discharge end

of the same. The neck 2 is provided with a discharge opening 3 in the side thereof beneath a rigid wall section 4 made integral with the outer end of the neck and permanently closing the same so that any material discharged from the tube at the neck will be required to pass through the lateral discharge opening 3.

The wall section 4 projects beyond the neck to provide an annular shoulder 5 which faces a similar shoulder 6 provided on the neck below the opening 3 preferably at the base or lower end of the neck as shown in Figs. 2 and 3.

Surrounding the neck and filling the space between the shoulders 5 and 6 is a band or sleeve 7 of the elastic material, such as rubber. The sleeve 7 is made to be turned on the neck but has a sufficiently tight or snug fit thereon to be held against accidental rotation. The sleeve is made to provide permanent and temporary seals or closures for the discharge opening 3. This is accomplished by providing the sleeve with two sections in its circumferential wall, one section being held or made rigid or stiff enough to resist outward flexure by internal pressure when the tube is squeezed, and the other section being sufficiently elastic to yield under such pressure. This is brought about by making the wall of the sleeve throughout the greater portion of its circumference of a length slightly greater than the distance between the shoulders, so that when the sleeve is slipped over the neck between the shoulders, such wall section will be compressed, and provide a permanent seal or closure for the opening 3 when the sleeve is turned to bring such wall section over the opening as shown in Fig. 3. The remaining circumferential portion of the sleeve has a length substantially equal to the distance between the shoulders so that when the sleeve is turned to bring such portion at the opening 3 the sleeve will flex outwardly under an internal pressure when the tube is squeezed, and permit the content of the tube to flow out of the same over the upper edge of the sleeve directly beneath the shoulder 5 in the form of a flat ribbon 8 as shown in Fig. 1. To add rigidity to the permanent seal forming por-

tion of the sleeve, I provide the same with an enlarged portion forming an exterior rib 9 which not only offers more resistance to internal pressure to prevent escape of material from the tube, but also provides a handle or means by which the sleeve may be grasped for turning it about the neck to bring the permanent and temporary seal forming portions at the opening 3. Fig. 6 shows the sleeve as made. The dotted line *a* indicates generally the extent to which the sleeve is compressed.

The neck may be provided with an exterior annular rib 10 between the opening 3 and the bottom shoulder 6 to cause the sleeve to so tightly grip the neck in the region of the rib that the content of the tube when squeezed is prevented from seeping past the rib and out beneath the lower edge of the sleeve. The rib has inclined walls to keep the sleeve from shifting on the neck to lose its compression between the shoulders.

The wall section 4 over the top of the neck may be provided on its outer surface with suitable designations to indicate when the sleeve is in position, forming either a permanent seal or closure for the discharge opening 3, or a temporary closure therefor. The designations are shown in Fig. 4, and consist of the words "Open" and "Closed", the former being disposed at the discharge opening 3 and the latter diametrically opposite the same. I may also stamp or otherwise provide a representation of an arrow 11 in the outer surface of the wall section 4 with the point of the arrow at the word "Open" and the tail end at the word "Closed". By these designations the user of the tube equipped with my improved closure may know in what position to turn the sleeve to either permanently close the discharge opening or condition it for the discharge of material from the tube. With the rib 9 projecting outward from the sleeve at one side and being directly opposite the wall section which provides the temporary closure for the discharge opening, the operator may know in which direction to turn the sleeve to either permanently or temporarily close said opening.

The closure of my invention is a self-closing one, in that it automatically closes at all times the discharge opening in any position of the sleeve, and thus prevents leakage from the tube in the normal handling of the same. The closure cannot be removed from the tube except by forcibly expanding it and slipping it over the neck, and therefore the closure when applied to the tube remains thereon, and cannot be lost or misplaced as can happen with closures which are in the form of screw caps which are merely threaded onto the neck and which must be completely removed to permit the content of the tube to be discharged therefrom. Moreover, with the closure forming a seal for the discharge open-

ing in any position of the closure, there is no opportunity afforded for the content of the tube to ooze out of the tube when it is not in use, and consequently the tube content is maintained soft and in a condition for use at all times in that it cannot dry or become hard as when it is exposed as possible in the closures heretofore employed. Moreover, with the sleeve fitting tightly against the upper shoulder, the sleeve when it is turned will have a rubbing action against the shoulder and thus clean the shoulder as well as the sleeve of accumulation of material and prevent drying to hinder the free and easy movement of the sleeve when turning it to condition the discharge opening for an out-flow of material therefrom. Furthermore, the closure of my invention being in the form of an elastic sleeve may be easily and cheaply made in that it can be produced in long tubular sections which may be cut to the lengths desired, and then slipped over the end of the neck in the space between the shoulders without machining or any other expensive operation being performed, either on the tube, on the closure, or in the assembly of the sleeve on the neck.

The details of structure described may be variously changed and modified without departing from the spirit and scope of my invention.

I claim as my invention:

1. A collapsible tube of the character described having a rigid neck closed at its outer end and having a discharge opening in its side wall, said neck having shoulders on opposite sides of said discharge opening, and an imperforate elastic sleeve fitting about the neck in the space between said shoulders and extending over the discharge opening to normally close the same, said sleeve having one portion compressed between the shoulders to provide a permanent seal for the discharge opening and the remaining portion free for flexure to provide a temporary seal for said opening, said free portion when at said opening yielding under internal pressure on squeezing the tube to permit a flow of material through said opening and from the tube in the form of a ribbon between one of the shoulders and over the adjacent outer edge of the sleeve, said sleeve being rotatably mounted on the neck between said shoulders whereby either portion of the sleeve may be positioned over said discharge opening.

2. A collapsible tube of the character described having a rigid neck closed at its outer end and having a discharge opening in its side wall, said neck having shoulders on opposite sides of said discharge opening, an imperforate elastic sleeve fitting about the neck in the space between said shoulders and extending over the discharge opening to normally close the same, said sleeve having one portion compressed between the shoul-

ders to provide a permanent seal for the discharge opening and the remaining portion free for flexure to provide a temporary seal for said opening, said free portion when at said opening yielding under internal pressure on squeezing the tube to permit a flow of material through said opening and from the tube in the form of a ribbon between one of the shoulders and over the adjacent outer edge of the sleeve, said sleeve being rotatably mounted on the neck between said shoulders whereby either portion of the sleeve may be positioned over said discharge opening, and means on the sleeve at the compressed portion thereof to reinforce the same against outward flexure and to provide a grasping portion for turning the sleeve.

3. A collapsible tube of the character described having a rigid neck closed at its outer end and having a discharge opening in its side wall, said neck having shoulders on opposite sides of said discharge opening with the latter disposed adjacent one of said shoulders, and an imperforate elastic sleeve fitting about the neck in the space between said shoulders and extending over the discharge opening to normally close the same, said sleeve yielding under internal pressure on squeezing the tube to permit a flow of material through the discharge opening and from the tube in the form of a ribbon between the shoulder adjacent the opening and over the adjacent edge of the sleeve, and a circumferential rib on the neck between the shoulders and engaged by the sleeve to prevent shifting of the sleeve longitudinally of the neck.

In testimony whereof I affix my signature.
LEON J. CAMPBELL.