

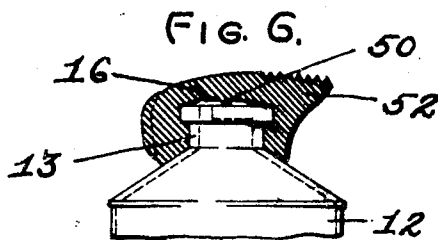
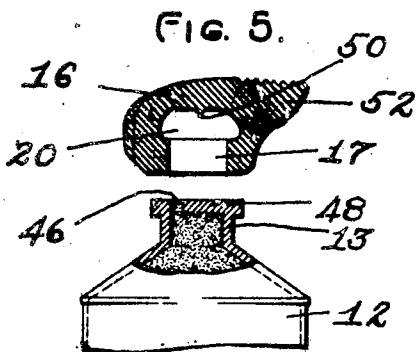
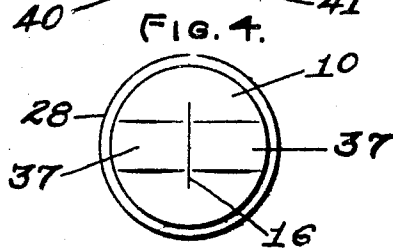
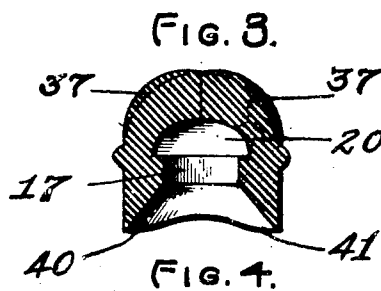
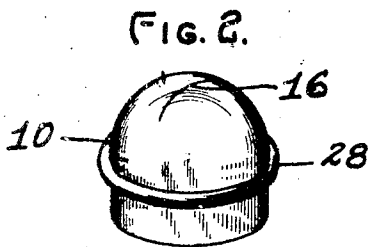
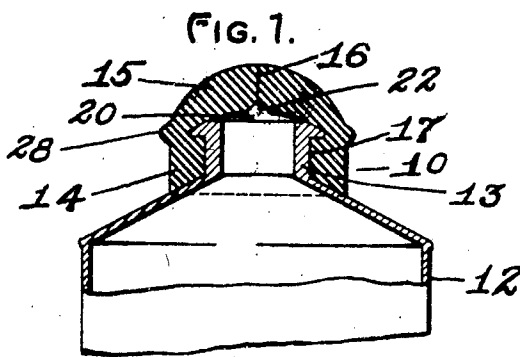
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CAP FOR COLLAPSIBLE TUBES

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CAP FOR COLLAPSIBLE TUBES

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This invention relates to a cap or closure member especially designed and adapted for use on collapsible tubes or containers such as are commonly used for holding toothpaste, paints, and like materials.

The invention has for an object to provide an efficient and inexpensive cap or closure member for containers of the character described, which may be economically made and the construction of which is such as to automatically cut off the continued flow of the contents of the container after the pressure upon the container has been removed, thereby preventing the waste of the toothpaste or other material and avoiding the unsightly appearance which usually accompanies the use of such collapsible tubes.

With this general object in view, the invention consists in the cap or closure member hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing, Fig. 1 illustrates in vertical section one form of a cap or closure member embodying the invention, in operative position upon the nozzle of a collapsible tube; Fig. 2 is a perspective of the cap shown in Fig. 1; Figs. 3 and 4 are views in section and plan illustrating a modified form of the cap shown in Fig. 1; Fig. 5 is a view of a portion of the collapsible tube with still another modified form of the cap shown in Fig. 1, with the cap removed from the container and in its unexpanded condition; and Fig. 6 represents the cap shown in Fig. 5 expanded and fitted onto the nozzle of the tube.

In general the cap or closure member comprising the present invention is made of rubber or similar resilient material and is provided with a body portion having a cavity in its under side which is provided with a lower portion of a size to adapt it to fit snugly over the tip or nozzle of the collapsible tube and with an upper portion which is preferably larger than the lower portion to form a

chamber whose upper wall forms the head of the cap, said head having a slit extended through it and forming an outlet mouth through which the material within the tube is discharged under pressure exerted on the collapsible tube. The head of the cap is made of substantial thickness to provide the slit with walls of substantial thickness, which contact with each other substantially their entire width or thickness when the cap is off the tube, and which enable the walls to be separated at their inner ends when the body portion is expanded or enlarged to be fitted tight upon the nozzle and yet leave a substantial width of the walls of the slit in contact to form a tight joint between said walls and thereby effectively close the mouth in the cap. The lower or inner walls of the slit when separated from each other by the expansion of the body portion when the cap is fitted on the nozzle of the tube form a substantially wedge-shaped entrance or guiding opening for the mouth of the cap which facilitates separation of the walls of the mouth by the paste or like material when pressure is applied to the outside of the collapsible tube. The chamber above referred to is made shallow or of such depth as to bring the lower surface of the head in substantially close proximity to the upper surface of the nozzle when the cap is fitted thereon and forms a shoulder which cooperates with an external flange on the nozzle of the tube to effectively secure the cap to the tube. In order to assist in enabling the resiliency of the body portion of the cap to automatically close the slit after pressure is relieved from the collapsible tube to thereby stop the continued flow of the toothpaste or other material from the slit in the cap, it is preferred to provide the cap with an annular projecting rim around the base of the body portion of the cap. The cap may also be provided with a relatively thickened portion on opposite sides of the slit in order to assist in effecting

the automatic closing of the slit under such conditions.

Referring now to the drawing, 10 represents the cap and 12 a collapsible tube or container provided with a tip or nozzle 13 upon which the cap 10 is tightly fitted to seal the tube when the paste or other material is not being discharged therefrom. The cap 10 is made of rubber or like resilient material and is provided with a body portion 14 having a head 15. The head 15 of the rubber cap is made of substantial thickness and is provided with a slit 16 whose walls are designed to be separated to form an open mouth through which the toothpaste or other material from within the collapsible tube may be discharged when pressure is applied to the tube in the usual manner.

The cap 10 is provided in its under side with a cavity having a lower portion 17 of a size to adapt it to be stretched over the nozzle 13 and with a larger upper portion forming a chamber 20 whose upper wall forms the head of the cap. The chamber 20 allows the head 15 to be moved toward the lower portion 17 when the body portion 14 is expanded to fit the tip or nozzle of the tube fluid-tight, and said chamber is made shallow or of such depth as to bring the lower surface of the head 15 into substantially close proximity to the upper surface of the nozzle when the cap is fitted thereon, as illustrated in Fig. 1.

The lower portion 17 of the cavity in the body portion is of a diameter less than that of the nozzle or tip 13 of the collapsible tube, and it will be observed that the walls of the slit 16 are in contact for the entire thickness of the same when the cap is detached from the nozzle and in what may be termed its relaxed condition. When the cap is applied to the nozzle, as represented in Fig. 1, the lower portion or inner surface of the head is expanded, operating to move the slitted portion of the head nearer to the nozzle or tip and operating at the same time to separate the lower portion of the walls of the slit to form a substantially wedge-shaped opening 22 for the entrance of the paste or material when pressure is applied to the exterior of the collapsible tube.

The separation of the lower portion of the walls of the slit does not impair the contact of the remaining or upper portion of the walls of the slit, but on the other hand tends to increase such contact, as the portion of the head at the outer surface thereof is more or less compressed when the body portion is expanded; consequently the container or tube is effectively closed at its mouth while the tube is not in use.

When it is desired to use some of the contents of the tube, the operator may apply sufficient pressure to the collapsible body portion and cause the contents of the tube to be

forced into the chamber 20 and expand the walls thereof, and thus separate the walls of the slit or mouth 16 in the cap which allows the contents to be forced out in ribbon form. When the desired amount or quantity of toothpaste or other contents of the tube has been discharged therefrom, as described, the pressure is removed from the collapsible tube and the resiliency of the walls of the cap again restore the walls of the mouth or slit 16 to their contacting position, automatically cutting off the further flow of the paste or other material.

In order to assist the inherent resiliency of the cap in closing the slit 16 after pressure has been removed from the body of the collapsible tube, I have found it desirable to provide the cap with an annular reenforcing rim 28, as illustrated in Fig. 2. The rim 28 also appears to assist in maintaining open the wedge shaped opening 22, even after the cap has been used for relatively long periods of time. This rim 28 is preferably molded as a part of the cap and is expanded slightly under the pressure of the material filling the chamber 20 during the use of the tube so that when the external pressure is removed from the collapsible tube, the tension set up in the rim portion 28 assists materially in insuring a positive closing of the slit 16, thus contributing to the efficient operation of the cap. The form of cap illustrated in Figs. 1 and 2 appears to best serve all conditions to which the caps are subjected, including the ease with which the cap may be stretched onto the tube and the efficiency of operation required.

In the modification illustrated in Figs. 3 and 4, the cap may be provided with a scalloped bottom edge arranged with respect to the slit 16 as illustrated in Fig. 3, providing elongated portions 40, 41 of the wall and which are designed to engage the usual tapered portion of the tube or container around the base of the nozzle, to thereby set up a slightly increased compression in the portions of the wall of the cap upstanding from such portions 40, 41 when the head of the cap is expanded outwardly under the pressure of the paste or other material being extruded through the slit 16, so that when the external pressure is removed from the tube, such increased compression in the portion of the walls of the cap opposite the slit, may assist in effecting positive operation in the closing of the slit. For a similar purpose I may also prefer to mold the cap in the form illustrated in Figs. 3 and 4, wherein the portion of the surface of the cap on opposite sides of the slit 16 may be thickened as at 37 as compared with the portions of the cap at each end of the slit. These relatively thickened portions 37 of the cap also assist in insuring positive operation in closing the slit.

In Figs. 5 and 6, I have illustrated still

another modification of the present cap, wherein the slit 16 is formed at one side of the center of the cap and in one position of the cap is adapted to register with an opening 46 located at one side of the center of the nozzle. The cap is designed to be rotated relative to the nozzle to bring the slit 16 in line with the opening 46 in the nozzle when it is desired to use the paste or other material and also to permit the slit in the cap to be positioned opposite an unperforated or solid portion 48 of the nozzle. The cap may be provided with a projecting rib or dam 50 for assisting in sealing the opening in the nozzle when the cap has been turned into its closed position. In the form illustrated in Figs. 5 and 6, the cap may be provided with a thumb piece 52 for assisting in opening the slit.

While the preferred embodiments of the invention have been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:—

1. A cap of resilient material for collapsible tubes and like containers having a nozzle, comprising a body portion having a cavity in its under side, the lower portion of said cavity being of a size adapted to fit about the nozzle of the tube, the upper part of said cavity being larger than the lower portion and of a depth so as to form a shallow chamber whose upper wall forms the head of said cap, the said head having its lower surface in substantially close proximity to the upper surface of said nozzle when the cap is fitted on the latter and being of substantial thickness and provided with a slit extended through it, said slit having its walls normally in contact.

2. A cap of resilient material for collapsible tubes and like containers having a nozzle, comprising a body portion having a cavity in its under side, the lower portion of said cavity being of a size adapted to fit about the nozzle of the tube, the upper part of said cavity being larger than the lower portion so as to form a chamber whose upper wall forms the head of said cap, the said head being of substantial thickness and provided with a slit extended through it whose walls are normally in contact and having a sealing member extended from its under surface into said chamber.

3. A cap of resilient material for collapsible tubes and like containers having a nozzle, comprising a body portion having a cavity in its under side, the lower portion of said cavity being of a size adapted to fit about the nozzle of the tube, the upper part of said cavity being larger than the lower portion so as to form a chamber whose upper wall forms the head of said cap, the said head being of substantial thickness and provided

with a slit extended through it, said slit having its walls normally in contact, and a thumb piece extended laterally from said head at one side of said slit.

4. A cap of resilient material for collapsible tubes and like containers having a nozzle, comprising a body portion having a cavity in its under side, the lower portion of said cavity being of a size adapted to fit about the nozzle of the tube, the upper part of said cavity being larger than the lower portion so as to form a chamber whose upper wall forms the head of said cap, the said head being of substantial thickness and provided on one side of its center with a slit whose walls are normally in contact and provided on the opposite side of said center with a laterally projecting thumb piece.

5. A cap of resilient material for collapsible tubes and like containers having a nozzle, comprising a body portion having a cavity in its under side, the lower portion of said cavity being of a size adapted to fit about the nozzle of the tube, the upper part of said cavity being larger than the lower portion and of a depth so as to form a shallow chamber whose upper wall forms the head of said cap, said head having its lower surface in substantially close proximity to the upper surface of the nozzle when the cap is fitted onto the latter and being of substantial thickness and provided with a slit extended through it, said slit having its walls normally in contact, and a reenforcing rim extended around the periphery of the cap at the base of the upper cavity therein for the purpose specified.

6. A cap of resilient material for collapsible tubes and like containers having a nozzle, comprising a body portion having a cavity in its under side, the lower portion of said cavity being of a size adapted to fit about the nozzle of the tube, the upper part of said cavity being larger than the lower portion and of a depth so as to form a shallow chamber whose upper wall forms the head of said cap, said head having its lower surface in substantially close proximity to the upper surface of the nozzle when the cap is fitted onto the latter and being of substantial thickness and provided with a slit extended through it, said slit having its walls normally in contact, the portions of the cap opposite the sides of the slit being relatively thicker than the portions of the cap opposite the ends of the slit, for the purpose specified.

7. A cap of resilient material for collapsible tubes and like containers having a nozzle, comprising a body portion having a cavity in its under side, the lower portion of said cavity being of a size adapted to fit about the nozzle of the tube, the upper part of said cavity being larger than the lower portion and of a depth so as to form a shallow chamber whose upper wall forms the head of said cap, said head having its lower surface in substantially

close proximity to the upper surface of the nozzle when the cap is fitted onto the latter and being of substantial thickness and provided with a slit extended through it, said slit having its walls normally in contact, the portions of the wall of the cap opposite the sides of the slit being longer than the portions opposite the ends of the slit, for the purpose specified.

10 In testimony whereof I have signed my name to this specification.

FRANCIS J. COSTELLO.

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