Feb. 10, 1942. A. M. ANDREWS 2,272,653

SELF-SEALING CAP

Filed June 10, 1940

Fig. 1.

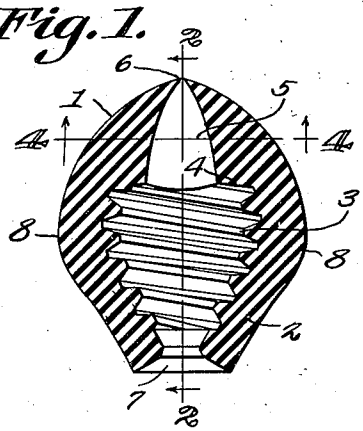


Fig. 2.

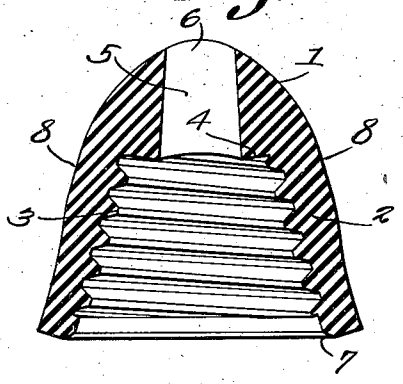


Fig. 3.

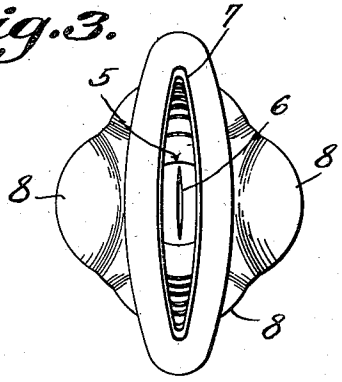


Fig. 4.

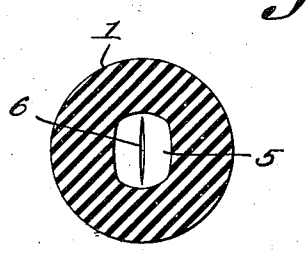


Fig. 5.

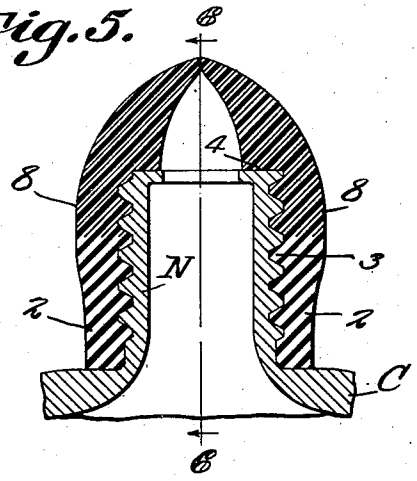
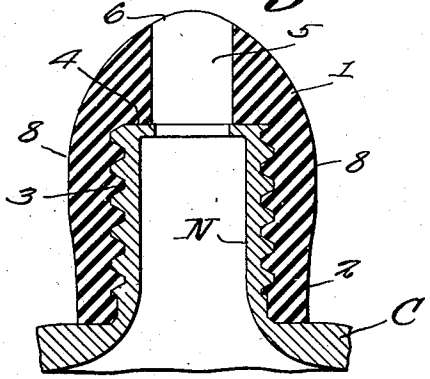


Fig. 6.



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SELF-SEALING CAP

Alton M. Andrews, Modesto, Calif.

Application June 10, 1940, Serial No. 339,823

1 Claim. (Cl. 221—60)

This invention relates to a self-sealing cap designed primarily for use on collapsible dispensing tubes such as those in which are sold shaving cream, tooth paste, etc.

Heretofore caps having valved outlets have been produced but in every instance, as far as I am aware, they have depended upon the resiliency of the material from which they are made, in order to effect closing of the outlet in the cap after material has been dispensed.

It has been found in practice that efficient caps of this type cannot be produced commercially because the slits or openings provided therein, regardless of their shape, cannot be individually cut but must be molded in the cap when it is vulcanized or cured and, consequently, must remain partly opened with the result that there is no resiliency in the cap tending to close the outlet so as to seal the cap.

An object of the present invention is to provide a resilient cap so shaped, when molded, that application of the cap to the neck of a tube or other container, will change the shape of the cap in such a manner as to create a tension in two directions close to a slit constituting the outlet opening in the cap, and, although this slit is formed by molding and is slightly parted or open in the cap before its application, the distortion of the cap when being applied to the neck of the container, will be such as to thrust through the material of the cap against the sides of the slit, tending to close them together while at the same time a pull will be exerted upon the ends of the slit, tending to stretch it and thereby further insuring tight closing of the opening when the cap is in position on the container.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

In the accompanying drawing the preferred form of the invention has been shown.

In said drawing

Figure 1 is a central vertical transverse section through the cap showing the shape thereof prior to application to the neck of a container.

Figure 2 is a section on line 2—2, Figure 1.

Figure 3 is a bottom plan view of the cap.

Figure 4 is a section on line 4—4, Figure 1.

Figure 5 is a section through the cap similar to Figure 1 but showing the cap distorted and in position on the neck portion of a container thereby to close together the sides of the outlet slit.

Figure 6 is a section on line 6—6, Figure 5.

Referring to the figures by characters of reference, 1 designates the dome-like end of the cap from which is extended an integral skirt 2 interiorly screw-threaded as at 3. The socket or recess in the cap having the threaded wall, terminates at a shoulder 4 and extending from this shoulder and through the center of the dome-like end 1, is an opening 5. At the outer end of this opening there is provided an outlet slit 6. The inner end of the opening, which is substantially in line with the shoulder 4, is substantially circular but as the opening progresses toward the slit, it assumes gradually a substantially elliptical shape as indicated in Figure 4, its opposed walls gradually merging into the substantially straight sides of the slit 6.

The base or open end of the cap is normally in the form of an ellipse, as shown at 7, the long diameter of this ellipse being parallel with the long dimension of the slit 6 while the short diameter of the ellipse is at right angles to the long dimension of the slit 6.

The wall of the cap is thickened by molding elongated nodes 8 thereon, these nodes extending above and below the plane of shoulder 4 and tapering down to the main surface of the cap. Two of the nodes are bisected by the plane in which are located the long dimension of slit 6 and the long diameter of the elliptical base 7. The other nodes 8 are intersected by a plane at right angles to the slit 6 and elliptical base 7. Thus the cap is provided with an increased amount of material below the ends of the slit 6 and also below the sides thereof.

Obviously a cap such as herein described can be readily molded, the slit 6 being also produced by the molding operation, this being possible due to the fact that it is not essential that, on the completion of the molding operation, the opposed walls of the slit be pressed together. Thus caps can be produced rapidly and at very low cost.

When it is desired to apply a cap to the neck portion N of a container C the elliptical open end of the cap is distorted from its normal shape, shown in Figure 3, until it is made substantially round so that it thus can be placed on neck N and, if desired, screwed thereonto. In spreading apart the elliptical open end of the cap along the small diameter thereof, a thrust is set up through the material of the cap within those sides thereof being pulled apart at the open end

and this thrust will be transmitted through the adjacent nodes 8 and the top portion of the dome-like end 4 against the opposed sides of the slit with the result that these sides will be pressed tightly together. This action will be facilitated due to the fact that during the lateral stretching of the elliptical open end of the cap, those portions of the open end at the ends of the long diameter thereof, will be pulled toward each other, thus causing the adjacent portions of the material in the wall of the cap to be pulled or stretched. This action will be transmitted to the ends of the slit 6 with the result that said slit will be stretched in the direction of its length while its opposed walls are being pushed together. Consequently an effective seal is set up due to this action within the walls of the cap.

The operation explained might be described as a leverage action. Considering those sides of the walls in line with the short diameter of the open end of the cap as levers with the thickened nodes 8 the fulcrums and viewing also as levers those portions of the walls and the nodes beyond or in line with the ends of slit 6, it will be noted that two of these levers will swing apart at the centers of the sides of the elliptical opening at the base while their opposite ends will thrust against the sides of slit 6 and, during this operation, the levers at the ends of the elliptical opening will swing toward each other at one end while the other ends thereof pull on the ends of slit 6 and tend to stretch the slit.

When the container C is collapsed or a portion of the contents are otherwise caused to exude through neck N, the exuding portion will enter the opening 5 and press against the outwardly converging opposed walls thereof, shown in Figures 1 and 5, at the same time causing the slit 6 to open laterally against the pressure being exerted by the adjacent portions of the cap. As soon as the pressure against the cap by the material being dispensed, has been removed, the pressure of the material of the cap will be sufficient to force the side edges of the slit together, thereby sealing the cap against the admission of dust, moisture, etc.

What is claimed is:

The combination with the neck of a container, said neck having an outlet opening, of a self-sealing cap of resilient material having a recess in one end for receiving the neck of the container, the other end of the cap being dome-like and having a slit, there being an opening in the cap leading from the recess to the slit and of greater diameter at the recess than the opening in said neck, the recessed end of the cap being elliptical with its long dimension in a plane extending longitudinally of the slit, said cap providing walls for the opening which converge along curved lines to the sides of the slit, said converging walls cooperating with the outer surface of the cap at the sides of the slit to define opposed edges positioned to close together when opposed portions of the cap are pressed toward each other at the slit, those portions of the cap wall between the sides of the slit and the recessed end being thickened whereby said wall is stiffened to transmit thrust to the sides of the slit from the corresponding sides of the recessed end when said end is spread laterally from normal elliptical shape, those portions of the cap wall between the ends of the slit and the recessed base being thickened, whereby said portions are stiffened to transmit a pulling force to the ends of the slit to elongate the slit when the recessed end is spread laterally from normal elliptical shape.

ALTON M. ANDREWS.