April 11, 1944. H. P. McNAIL 2,346,383

COLLAPSIBLE TUBE CAP

Filed Feb. 3, 1941

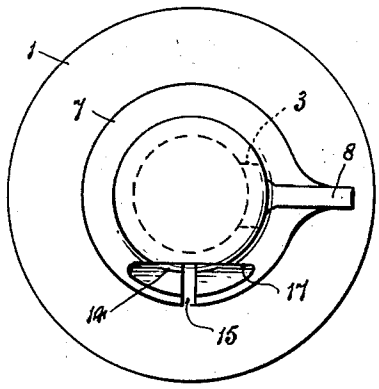


Fig. 1.

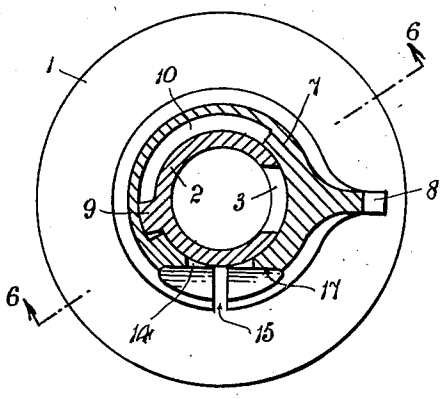


Fig. 4.

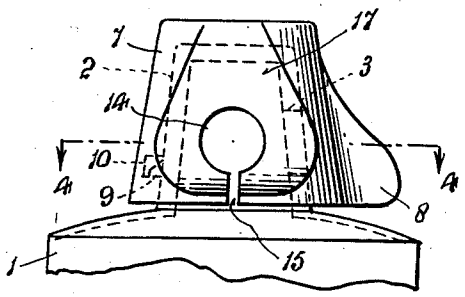


Fig. 2.

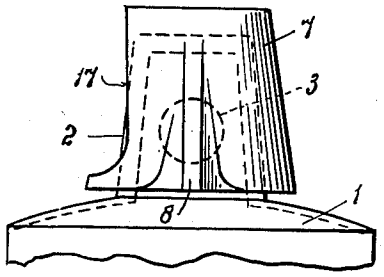


Fig. 3.

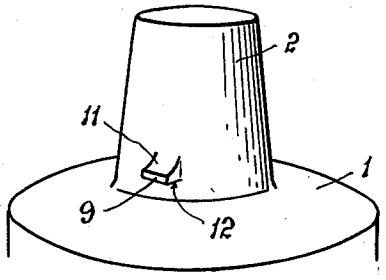


Fig. 5.

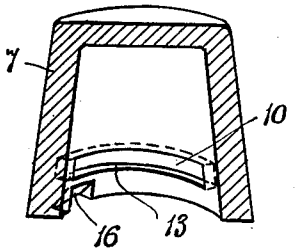


Fig. 6.

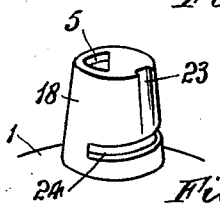


Fig. 7.

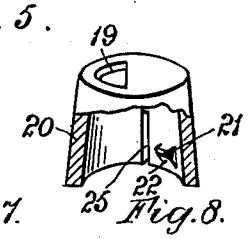


Fig. 8.

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UNITED STATES PATENT OFFICE

2,346,383

COLLAPSIBLE TUBE CAP

Howard P. McNail, Detroit, Mich.

Application February 3, 1941, Serial No. 377,177

1 Claim. (Cl. 221—60)

This invention relates to closures for containers, such as collapsible tubes to which it is more especially applicable although not necessarily limited thereto; and has for its object to provide a closure arrangement which is both simple in construction and positive in operation, and which may be produced, as by molding, at such a low cost as will render it attractive from a manufacturing standpoint.

It is also an object of the invention to provide such a closure wherein the cap may be readily made of attractively colored opaque or translucent molded plastic, without necessitating metal or other inserts, or the addition thereto, separate parts requiring assembly work.

A further object is to provide, in the contemplated structure, a one-piece cap capable of permanent attachment to the nozzle or neck of the tube or container, and of easy operation by rotation for the opening and closing of the outlet of the said tube or container.

A still further object is to provide in such closure a form of radially expansible cap having a pin-and-slot connection with the nozzle or neck of the tube or container so arranged that the pin may be snapped into the slot of the connection by virtue of the expansible nature of the cap.

Still further objects and advantages subsidiary to the aforesaid objects, or resulting from the construction or operation of the invention as it may be carried into effect, will become apparent as the said invention is hereinafter further disclosed.

In carrying the said invention into effect, I may provide a tube or container with a nozzle or neck having a non-central opening or outlet therein, preferably in the side wall thereof, a pin or projection integrally extending from the side wall of the said nozzle or neck, and a cap adapted to fit over and enclose the said nozzle or neck; the said cap being slotted to permit radial expansion and provided with an internal groove extending around part of the internal surface of the cap to receive the said pin, whereby the cap may be locked on the nozzle or neck in a manner capable of partial rotation thereon as limited by the extent of the said slot. I provide both the nozzle and the cap with openings which may be brought into registration when the cap is rotated to one of the positions permitted by the limitations of the said slot. All of which is more particularly described and ascertained hereinafter, by way of example, having reference to the accompanying drawing, wherein:

Figure 1 is an end view of a tube embodying the improved closure;

Figure 2 is a front elevation of the same;

Figure 3 is a side elevation of the same;

Figure 4 is a cross section of the closure, taken on the plane indicated by the line 4—4, in Figure 2;

Figure 5 is a perspective view of the nozzle end of the tube with the cap removed;

Figure 6 is a sectional view of the cap, taken on the plane indicated by the line 6—6, in Figure 4;

Figure 7 is a perspective view of a modified form of the tube nozzle;

Figure 8 is a perspective view, partly in section, of a correspondingly modified form of cap.

Similar characters of reference designate similar parts in the several figures of the drawing.

A collapsible tube 1 is shown having a hollow nozzle or neck 2 that is preferably tapered from the base to the outer end, as shown, and is provided with an off-center opening or outlet which, in the example Figures 1 to 4 is shown as being through the side wall of the nozzle at 3, and in the example Figure 7 through the end wall of the nozzle as at 5.

7 is a hollow cap having an inner configuration adapting it to snugly fit over the said nozzle of the tube and provided with a projecting thumb piece 8 whereby it may be manually rotated when in position on the said nozzle. Pin-and-slot means are provided for both locking the cap on the said nozzle and for determining a limited rotational movement of the said cap thereon, and, in the case of the first example Figures 1 to 6, the pin or projection 9 is formed integrally, as by molding, on the side wall of the nozzle 2, and the groove or slot 10 formed, as by molding, on the inner surface of the side wall of the cap 7.

The pin or projection 9 is preferably formed with an inclined upper surface 11, as clearly shown in Figure 5, and a flat under surface 12, which flat surface is intended to extend over and engage the lower wall 13 of the groove 10. This groove 10 extends partially around the inner surface of the cap 7 to permit when engaged by the pin 9, the rotation of the cap to an extent limited by the length of the said groove 10, which I prefer to be about one quarter of a revolution of the cap. Thus, in the first example, the opening 14 which I provide in the side wall of the cap may be moved into and out of register with the discharge opening 3 the side wall of the tube nozzle, as will be readily apparent.

To permit ready and simple attachment of the cap to the nozzle of the tube, I provide for radial

expansion in the cap so that it may be forced over the pin or projection 9 and snapped into locked assembled position, with the said pin properly engaged in the groove 10 of the cap, and this radial expansion feature is simply attained by slitting the side wall of the cap upwardly of the base to a sufficient extent. A very desirable and effective method is to simply sever the wall of the cap between the base and the opening 14, as at 15, so that the presence of the said opening 14 assists in providing the expansible feature sought.

To further assist the entry of the pin or projection 9 into the groove 10 of the cap, I may provide an inclined recess or guide way 16 on the inner side of the edge of the cap, the inclined wall of which recess will cooperate with the inclined surface 11 of the pin 9 to facilitate the entry of the pin into the groove and the snapping of the cap over the said pin or projection.

Still further, I may cam or incline the groove 10 relative to the base of the cap so that it will operate against the underside of the pin or projection 9 to draw the cap more tightly on to the tapered surface of the nozzle tube as the cap is rotated to a "closed" position.

Where the opening 14 is provided in the side of the cap, as shown in the first example, I prefer to cut away the surrounding part of the said cap to provide a flat surface 17 which will facilitate access to material being ejected from the tube and permit easy cleaning of surface material from that area, and which will minimize wastage of such material.

Referring to the modification, Figures 7 and 8, it will be seen that the same principles and elements hereinbefore referred to are embodied in a slightly different but equivalent form, the discharge opening 5 of the tube being provided in an off-center manner in the end of the nozzle 18, and the opening 19 corresponding to the opening 14 of the first example being similarly provided in an off-center manner in the end of the cap 20. The pin 21 in this case is shown as being formed on the inside of the side wall of the cap 20, the under side 22 of the said pin being levelled and the inclined guide slot 23 is formed in the side wall of the nozzle 18 extending downwardly to the arcuate groove or recess 24 formed in the side wall of the said nozzle 18.

25 is the slit in the side wall of the cap 20 to afford the expansible function whereby the projection 21 may be snapped into the groove 24.

The arrangement described provides a closure of the utmost simplicity, free from threads, and from more than a minimum number of parts; is capable of production by simple molding or forming processes without necessitating complication by additional parts or inserts; the cap, once applied to the nozzle by simply snapping into position, is permanently locked thereon and cannot thereafter be removed or lost; and the closure when properly constructed is clean, leakproof, smooth in operation, and pleasing in appearance.

It should be understood that, while a feature of the invention is that the nozzle and the cap elements may be and preferably are each of one-piece construction, it is not desired to forego the right to make them of more than one piece, if so desired, while retaining the operative features distinguishing the invention from the prior art and accomplishing the objects sought. Thus the projection 9 or 21, for example, may be in the form of an insertion incorporated in the process of manufacture or assembly notwithstanding that the novel construction described renders such complication unnecessary.

This invention may be developed within the scope of the following claims without departing from the essential features of the said invention, and it is desired that the specification and drawing be read as merely illustrated of a practical embodiment of the said invention.

What I claim is:

A closure for a container, comprising an outwardly tapered apertured part for dispensing contents from said container, an inverted substantially cup shaped internally tapered part telescoped over the apertured part for free turning movement thereon and having a discharge-way for registry with the aperture in the outwardly tapered part, one of the parts having a groove, and also provided with a bevelled guideway leading from a free edge thereof directly to the said groove, a fixed latching projection on the other part for riding the guideway to have it engaged in the groove on the telescoping of the parts together for latching the same, and a split area formed in the last named part and entering the discharge-way for the spreading of such area yieldingly on the riding of the projection in said guideway for the snapping engagement of the projection in the groove.

HOWARD P. McNAIL.