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E. J. TOWNS
BOTTLE CAP

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Fig. 1.

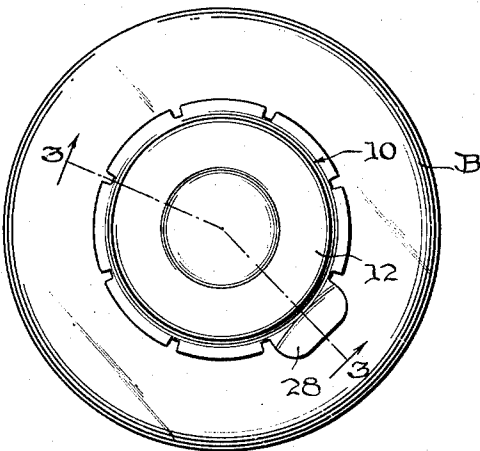
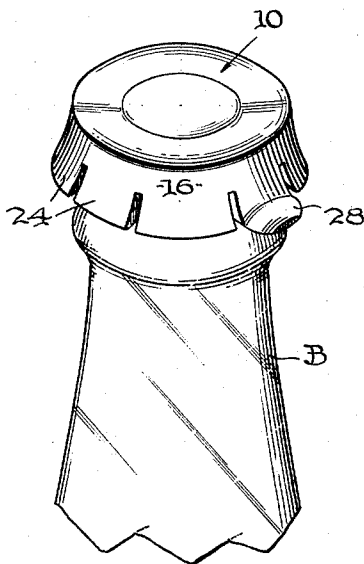


Fig. 2.

Fig. 3.

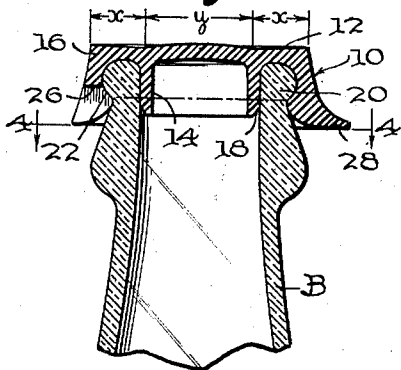


Fig. 5.

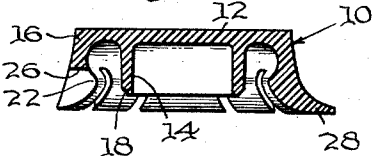


Fig. 6.

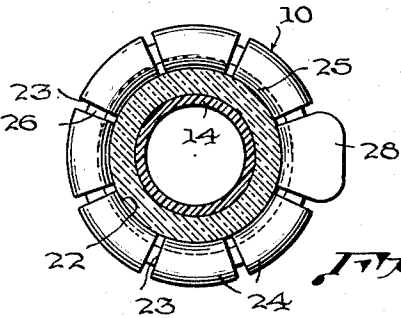
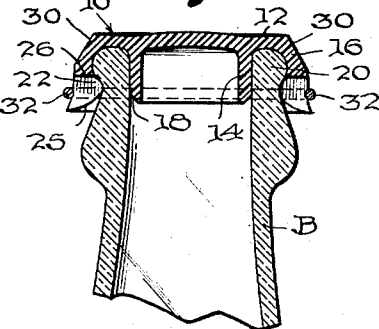


Fig. 4.

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BOTTLE CAP

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2 Claims. (Cl. 215-41)

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This invention relates broadly to bottle caps and more particularly to a bottle cap forming a combined stopper and cap type closure for bottles, jars, etc.

Bottle caps of this general type are known in the art and are generally characterized by a number of inherent disadvantages which make them unpopular in use. Among these disadvantages are high initial cost, short life as an effective seal, a difficulty in application to or removal from a bottle due to characteristics of the material or type of locking means used, and poor design and construction resulting in loss of beverages, foods, or gases due to leakage.

Accordingly, the chief object of the present invention is to obviate the foregoing and other disadvantages characterizing many known structures.

Another important object of the present invention is to provide a bottle cap which may be readily applied to bottles, etc., manually or by conventional capping machinery, readily removed from the bottle manually, and reused indefinitely without permanent distortion of the cap or lessening the effectiveness of its sealing characteristics.

Another important object of the present invention is to provide an improved bottle cap of thermoplastic material having strength, stiffness and friction characteristics which combine to form a self-reinforcing combined cap and plug type bottle closure.

A further important object of the invention is to provide a bottle cap having bead gripping fingers and a seal which, when in sealing position upon the neck of a bottle will act to increase its grip thereupon.

A still further important object of the invention is to provide a bottle cap having a seal and bottle bead engaging fingers which, when in operative position upon a bottle act to increase the sealing effect.

Another object of the invention is to provide an improved bottle cap which may be readily and economically manufactured and of long effective sealing life.

Other objects and advantages of the invention will become apparent during the course of the following description.

In the drawings I have disclosed two embodiments of my invention. In these showings:

Figure 1 is a perspective view of the bottle cap comprising the present invention in operative position upon a bottle;

Figure 2 is a top plan view thereof;

Figure 3 is a central vertical section view thereof;

Figure 4 is a bottom plan view of the bottle cap;

Figure 5 is a central vertical sectional view of

the bottle cap in its unstressed condition when not in operative position upon a bottle; and

Figure 6 is a central vertical sectional view of another form of the invention in operative and locked position upon a bottle.

Referring to the drawings, numeral 10 designates the bottle cap as a whole which is entirely of plastic material and may be molded in a die by compression or injection molding. I have determined that solid ethylene polymer, when molded into the structure to be described, is particularly well adapted for the purpose in that it combines strength and substantial stiffness with resilience, resumes its original shape after temporary distortion, and having a lower coefficient of friction, for example, than rubber, it may readily be snapped on or off a bottle neck. Accordingly, my bottle cap is preferably formed of solid ethylene polymer or other thermoplastic having substantially the same characteristics.

The plastic cap 10 comprises a thin flat top 12, a depending open-ended sealing tube 14 formed centrally of and integral therewith, and a depending bead-engaging annular skirt 16. The tube 14 tapers slightly toward its open end which is beveled as at 18 to facilitate its insertion in a bottle, and its circumference adjacent the top 12 is slightly larger than the mouth of the bottle to be capped thereby.

The outer surface of the skirt 16 flares downwardly and outwardly from the top 12 while the inner surface conforms to the shape of the neck of the bottle B and its annular bead 20. It is to be noted that the space between the tube 14 and the skirt 16 is slightly smaller than the beaded neck of the bottle when the cap is not positioned thereon (Figure 5) so that when the cap is in operative position upon a bottle (Figure 3), the tube 14 is radially compressed and the skirt flexed radially outwardly as will be more fully described.

The cap 10 is retained upon the bottle neck by the inwardly directed annular bead 22 of the skirt 16 which is permitted to flex sufficiently for removal of the cap by the provision of a plurality of circumferentially spaced slits 23 which thus form the bead 22 into a plurality of substantially stiff but sufficiently resilient fingers 24 for engagement under the bottle bead 20. The bottom surfaces of the fingers 24 curve inwardly and upwardly as at 25 to assist in centering the cap upon the bottle neck. It is to be noted that the fingers 24 terminate as at 26 at a point below the major diameter of the bottle bead 20 so that removal of the cap requires a slight flexing or distortion of the solid portion of the skirt 16.

In order that the removal of the cap 10 may be readily effected, one of the fingers 24 is thickened and extended outwardly so as to form a removal tab 28. As will be apparent, upward

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pressure of the thumb on the bottom of the tab will displace the cap from the bottle.

In the use of the cap 10 for the resealing of beverage bottles, etc., the cap is positioned over and on the bottle mouth where it is more or less automatically centered by the upward and inwardly curving bottom surfaces 25 of the resilient fingers 24. Downward pressure upon the cap now causes the beveled end 18 of the sealing tube to enter the mouth of the bottle B which it closely fits. The slight taper of the outer surface of the tube 14 effects a pressure tight seal between the sides adjacent the top 12 and the inner surface of the bottle neck. As the tube 14 is pressed into sealing engagement with the bottle mouth, the bead 22 on the fingers 24 is snapped over the bead 20 on the bottle neck to retain the cap thereon with a grip well in excess of that which is necessary to withstand the maximum gaseous and/or liquid pressure which the bottle can stand without shattering.

An important feature of this combined plug and cap type bottle cap construction resides in its self reinforcing characteristics. When in sealing position upon a bottle the cap is in a stressed condition (Figure 3) as contrasted with its unstressed position as shown in Figure 5. In the sealing position, the bottle neck and bead 20 force the skirt 16 and its gripping fingers 24 radially outward as stated, and about the top of the bottle as a fulcrum tending to urge the tube 14 more tightly against the inner side of the mouth of the bottle. This also forces the outer annular surface of the cap 12 to incline downwardly and radially inward as indicated at X. The tube 14 is further more tightly seated due to its taper so that a leak proof seal for gas or liquid is thus effected.

At the same time, the radial compression of the sides of the tube 14 causes the central portion of the cap 12, indicated at Y, to bow up into a crown which stresses are dissipated throughout the cap and, in turn, tend to force the skirt 16 and its fingers 24 more tightly against the bottle neck. It will be noted that these forces and the sealing action of the tube 14 are increased by liquid or gaseous pressure acting within the tube 14.

Thus a perfect seal is effected by the tube 14 which is retained in position by the skirt and its fingers 24, the tube and skirt each functioning to assist the function of each other due to the stresses set up by their design. Due to the stiffness of the plastic and its low coefficient of friction with glass, the cap is readily removed by upward pressure of the thumb on the tab 28 whereupon it returns to the unstressed condition shown in Figure 5.

A slightly modified form of the invention is disclosed in Figure 6 wherein the junction of the top 12 and skirt 16 has been beveled as at 30 to facilitate the positioning of a locking ring 32 about the cap. In all other respects, this embodiment is identical with the embodiment shown in Figures 1-5 inclusive which is adapted for the resealing of bottles, etc., after the original and conventional crown cap has been removed. The cap and locking ring shown in Figure 6 is particularly intended to be used in connection with the original bottling and capping of beverages as it cannot be accidentally displaced in transit although it may also be used subsequent thereto for recapping and locking.

In its use, the locking ring 32 may, manually or by capping machinery, be readily positioned over the cap 10 due to the beveled surfaces 30

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and moved downwardly into firm engagement with the surface of the flared skirt fingers 24. Due to the relatively soft nature of the surface of the solid ethylene polymer of which the cap is made, the ring 32 is self seating therein and will retain its locking position until it is physically forced upwardly.

It is to be noted that the ring 32 does not force the fingers 24 into engagement with the bead 20, but merely locks them in this position. Removal of the ring permits the fingers to flex outwardly when the tab 28 is pushed upwardly to remove the cap.

It will now be appreciated that the present invention provides a highly improved closure for bottles, jars, etc., which may be economically manufactured, is strong and tough yet sufficiently resilient and which combines highly effective sealing and position-retaining structure so as to be self reinforcing while being readily applicable to or removable from bottles.

It is to be understood that the forms of my invention herewith shown and described are to be taken as preferred examples of the same and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

I claim:

1. A closure of substantially stiff resilient polyethylene for application to bottles having a neck bead comprising a substantially flat top having a centrally positioned tapered tube depending therefrom for sealing engagement with the inner sides of a bottle mouth, and a flared skirt depending from said top and including a plurality of gripping fingers conforming with and engaging the lower portion of said bead, said fingers being formed by slitting said skirt vertically at spaced points about its circumference to points just below the maximum diameter of the bead whereby the unslit portion of said skirt engages the upper and maximum diameter portions of said bead, the spacing of said tube and skirt being less than the thickness of a bottle neck and bead whereby while positioned on a bottle, said tube and said skirt act thereagainst to increase their sealing and gripping actions respectively.

2. A closure as recited in claim 1 wherein one of the fingers of said skirt extends outwardly to form a removal tab.

EDWARD J. TOWNS.

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