April 29, 1969 P. S. VAN BAARN 3,441,161

BOTTLE CAP

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Fig. 1.

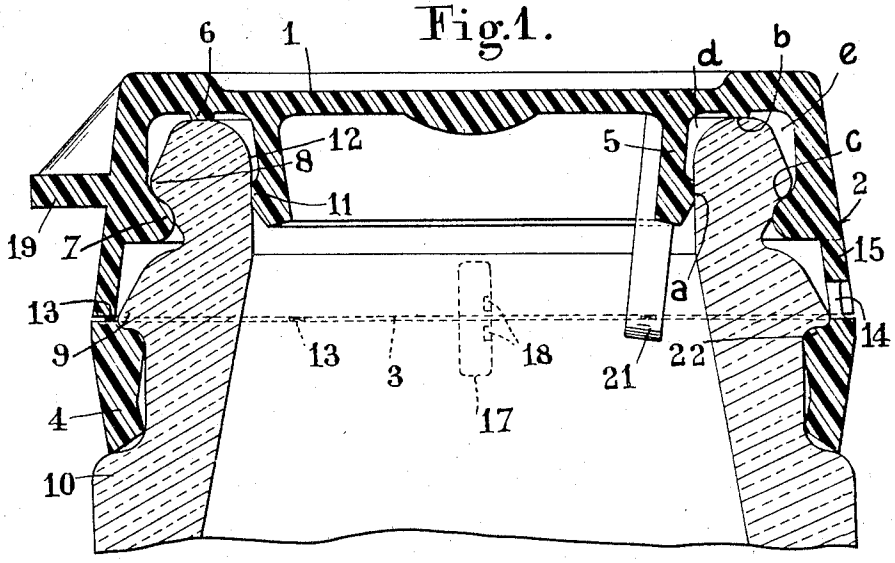
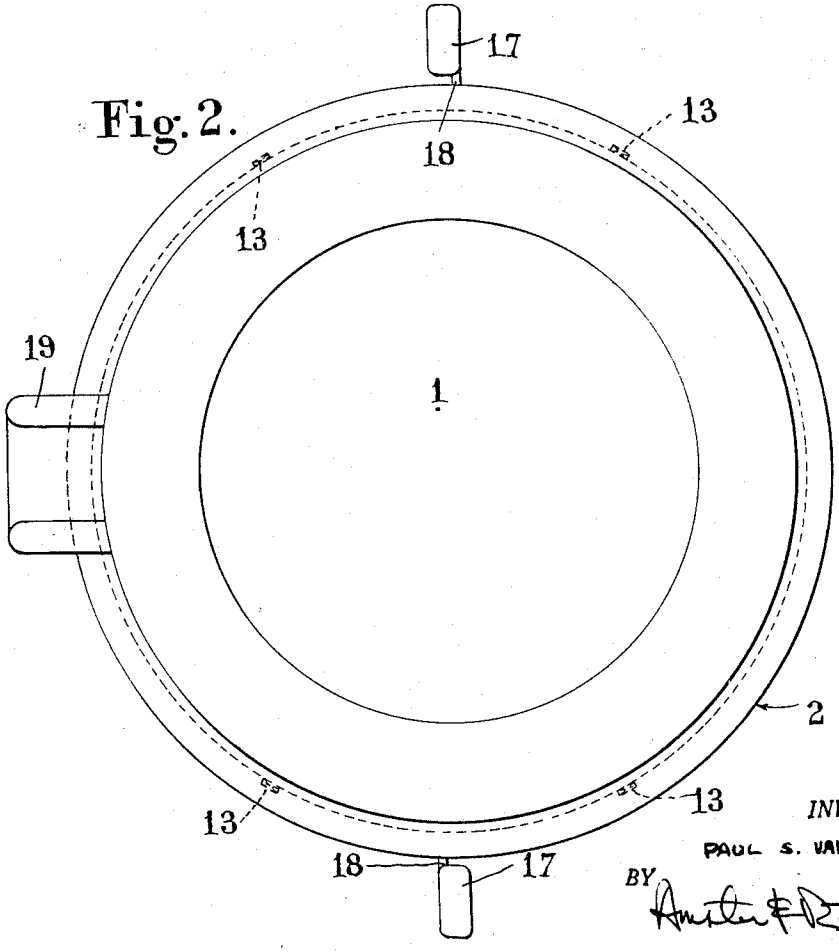


Fig. 2.



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Fig. 3.

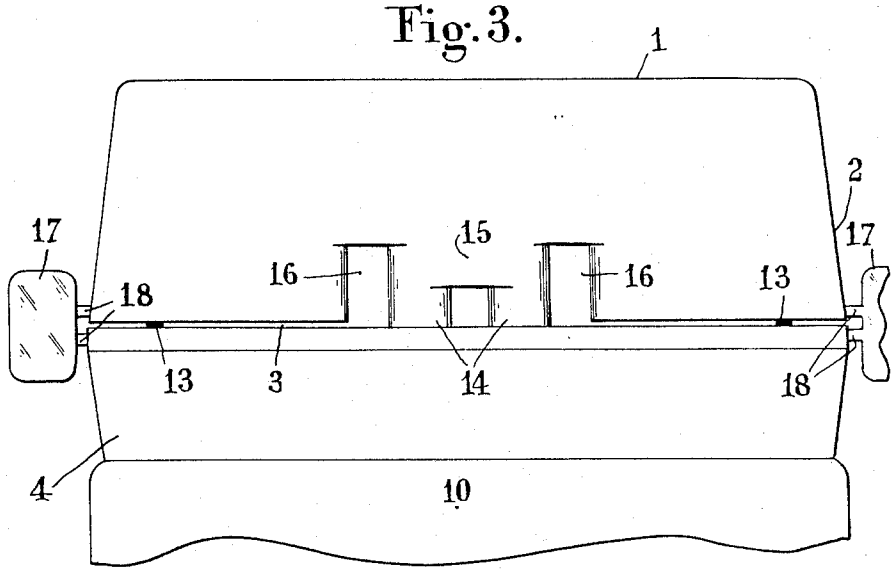


Fig. 4.

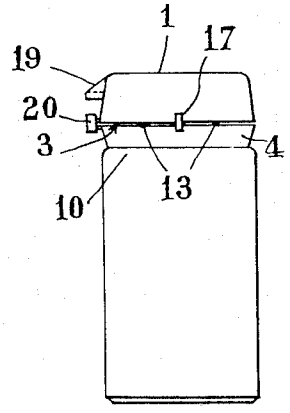
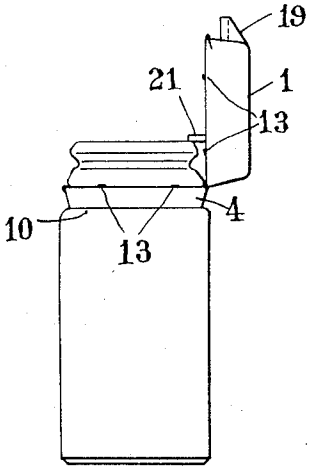


Fig. 5.



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Fig. 6

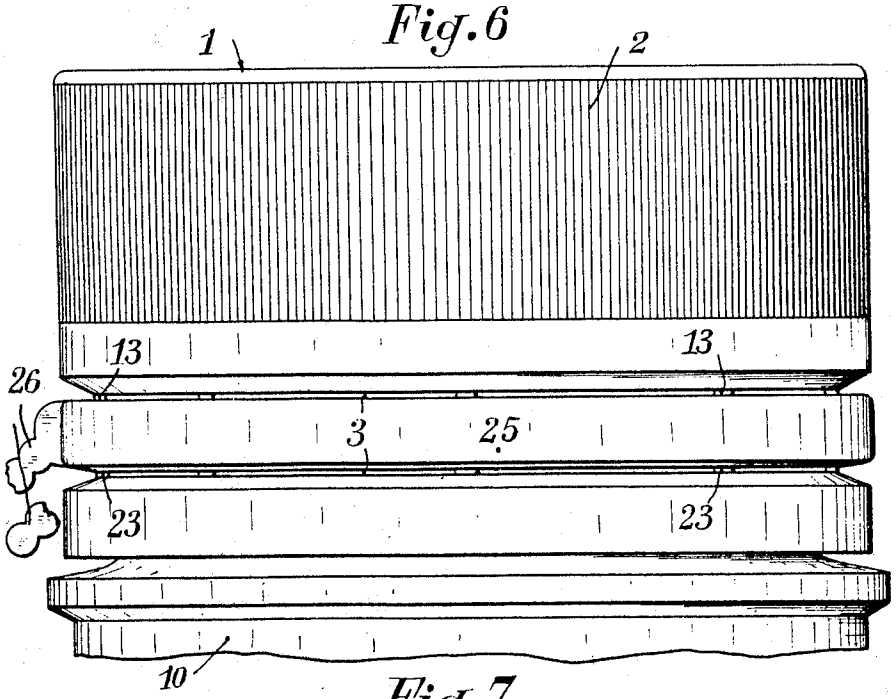
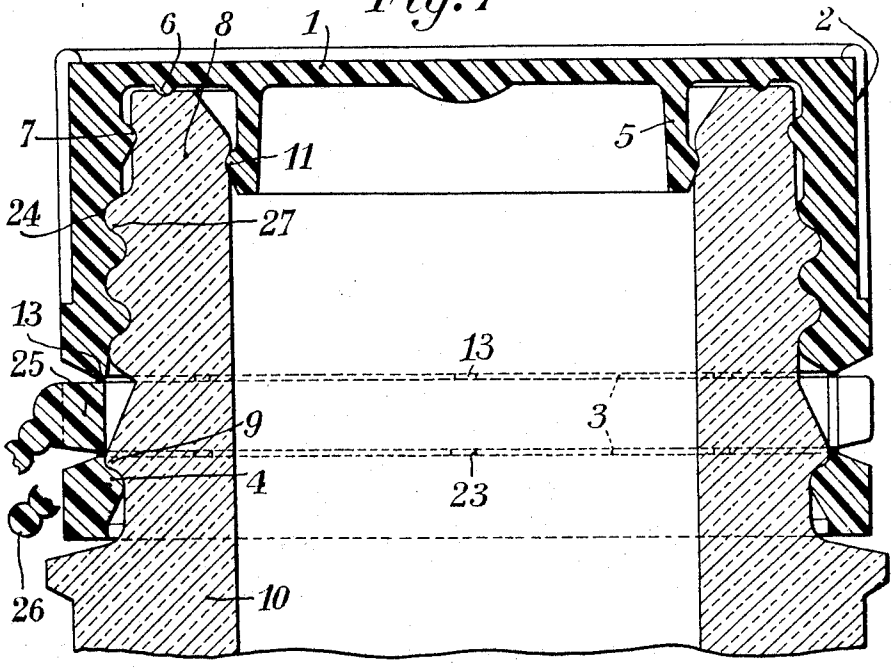


Fig. 7



United States Patent Office 3,441,161 Patented Apr. 29, 1969

3,441,161

BOTTLE CAP

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Continuation-in-part of application Ser. No. 576,942, Sept. 2, 1966. This application Mar. 9, 1967, Ser. No. 632,484

Int. Cl. B65d *41/22, 41/20*

U.S. Cl. 215—40 6 Claims

ABSTRACT OF THE DISCLOSURE

A bottle cap comprising an upper and lower pair of body sections hinged together and initially joined by a rupturable security seal and having a hand grip in a protective position to the rupturable security seal.

This is a continuation-in-part of my copending application Ser. No. 576,942, filed September 2, 1966, now abandoned.

The present invention relates generally to caps for containers of the type having a neck thereon bounding a neck opening into the container, and more particularly to an improved cap serving as an effective closure for such a container when force fit upon the neck thereof.

There are numerous known types of caps of plastic material for stopping containers, which generally comprise an annular body with a closed end adapted to be fit elastically over the neck of the container; some such stoppers also have an inner depending annular sealing lip engaging against the inner wall bounding the neck opening of the container.

Some caps also have a so-called security strip delineated on the cap body, which security strip is effective to be pulled off either completely or only partially so as to leave a hinge for the cap connecting the two body sections together which are formed by removal of the security strip. A cap with a delineated removable strip oriented circumferentially about the body requires special tooling and is not easily and economically made.

Another difficulty that has been encountered with such plastic caps is to obtain a seal, and for this reason it has been proposed that beads and recesses be provided in the neck opening of the container to be engaged by peripheral ridges provided inside the cap body, but this proposal would increase the manufacturing cost of the container.

An object of the present invention is to provide a cap of plastic material for security stoppering of containers, said cap having good sealing properties, having an upper section hinged to a lower section which remains at all times mounted on the neck of the container, and which does not require any security tearstrip but has improved means for detecting any tampering.

For this purpose, the cap has an upper section, for example, with a flat upper wall or top provided internally with a circular sealing lip intended to fit elastically against the inner wall of the neck of the container, an annular sealing ridge on an internal annular zone of the movable cap section between the cap body and said sealing lip, and a peripheral sealing lip provided on the surface of the annular sealing lip facing the neck of the container.

According to one feature of the invention, the cap body, throughout almost the whole of its circumference is delineated by an arrangement of slots and rupturable connections into two sections, a top section with the closed end and a bottom section forming a neck-engaging ring intended to remain in place on the neck of the container and held in place thereon.

In molding, the bottom section of the cap body is made integral with the top section firstly by a strip of material forming the hinge and secondly by a number of said rupturable connections or wall sections of minimal extent.

Further, in order to safeguard the container contents against tampering, seal members are connected between the edges of the two body sections thereby requiring removal preparatory to opening movement of the top section.

The top section of the body, on the side opposite the hinge, has a laterally extending grip to facilitate manipulating it through movement breaking the interconnected wall sections between the two body sections.

By way of example, illustrative and in no way restrictive, an embodiment of a stopper cap according to the invention will now be described in detail with reference to the accompanying drawing, wherein:

FIG. 1 is a view in diametral section of the cap in place on a container.

FIG. 2 is a top view of the cap.

FIG. 3 is a side view showing the securing tabs and hinge.

FIG. 4 is a side view of the cap locked on the container.

FIG. 5 is a view of the cap with hood raised.

FIGS. 6 and 7 are views similar to FIGS. 3 and 1, respectively, but are of another embodiment of the cap in which the removable part thereof is threadable on the container.

The cap comprises a flat-topped upper wall **1** with a hollow, cylindrical body. The body has a line of delineation therethrough along a circumference **3**, forming a top section **2** having the closed top and a bottom section or ring **4** intended to remain in place on the neck **10** of the container.

Molded in one piece with the top wall **1**, there is an inner annular sealing lip **5**, and in the annular portion between the body **2** and lip **5**, a circular sealing ridge **6**. The body section **2** has on its inner face a circular rib **7** above the circular arrangement **3** of alternately spaced slots and rupturable wall sections.

The container to be stopped has a neck with two concentric rings **8** and **9**, these rings contributing to the tightness with which the cap over the neck opening is maintained and also the extent of the contact of the inner lip **5**, aided by a circular lip **11**, which is made against the inner neck surface **12**. Also contact is made by the circular ridge **6** with the top of the neck, and contact by the circular rib **7** beneath the ring **8** on the neck of the container; that is, at the points marked *a*, *b* and *c* in the drawing. The air trapped in the chambers *d* and *e* formed by the clearance between the cap and neck impedes leakage of the contents of the container by capillarity.

The top and bottom sections **2** and **4** of the body are interconnected by plural wall sections **13** and by a hinge **14**. The hinge consists of a strip of material **15** left between two openings **16** in the edge of the top section **2** of the body and of course joins the top section to the bottom ring **4**.

The cap is forced over the mouth of the bottle, the body section **2** slipping over the neck until the bottom body section **4** is snapped under the bottom ring **9** on the container. The wall sections **13** and hinge **14** provide sufficient initial rigidity and a unitary construction to the cap.

To secure inviolability and retention of the cap **1** on the container, one or more removable seal members **17** are preferably removably connected, as at two or more points **18**, along the circumference **3** of the body, bridging the slots delineating the top and bottom body sections. Thus, removal of these sections must precede relative opening and closing movement of the cap sections.

A laterally extending lug or grip **19** is provided on the upper cap section **1** in conventional manner to facilitate

manipulating this section through opening and closing movement relative to the lower cap section 4.

To reduce the risk of inadvertent removal of all of the seals 17, it is advisable to locate at least one, specifically designated 20 herein, under the grip 19. This location serves to both protect the seal 20 and, as indicated in FIG. 4, also blocks access to the grip 19 from the direction of approach thereto for manipulating cap section 1 through opening movement, thereby requiring removal of the seal 20 prior to removing the cap section 1 from the neck 12.

According to another known arrangement, a projection 21 is added to the inner lip 5 to serve as a stop against the edge of the container when the cap is open (FIG. 5).

The bottom cap section 4 may advantageously have an inner thickening 22 to assist its retention on the shoulder 9.

To use the cap, one need only tear off the tabs 17 and 20, and force open the cap by its grip 19, wherein the walls 13 in response to this force will give way readily.

Reference is now made to the cap embodiment of FIGS. 6 and 7 in which like parts are designated by the same reference numbers 1 through 21. The major difference in this embodiment is that the top section 2 has internal threads 24 which threadably engage with threads 27 on the container neck 10. Thus, the hinge 14 of the embodiment of FIGS. 1–5 is dispensed with. Additionally, a medial strip 25 is adapted to be removed preparatory to removing the top section 2. That is, wall sections 13 and 23 initially form an integral construction of the top section 2, medial strip 25 and bottom section or ring 4 but these wall sections are easily ruptured to free the top section 1 so it can be threadably disengaged from the container neck 10. The strip 25 preferably has a finger grip 26 to facilitate the grabbing and pulling of this member during the stripping operation.

A latitude of modification, change and substitution is intended in the foregoing disclosure and in some instances some features of the invention will be employed without a corresponding use of other features. Accordingly, it is appropriate that the appended claims be construed broadly and in a manner consistent with the spirit and scope of the invention herein.

What is claimed is:

1. A cap for a container having a neck thereon bounding a neck opening into said container, said cap comprising a body having an axial opening therein of a predetermined extent adapted to accommodate said neck of the container therein in a force fit in an operative position of said cap on said neck, an upper wall on said body adapted to serve as a closure for said neck opening in said operative position of said cap, said body being delineated into an upper section and a lower section by an arrangement of spaced slots therein, and interconnecting wall sections located between said slots oriented about said body, a hinge connecting said upper and lower sections for relative movement therebetween, said wall sections being of a comparatively minimal extent to facilitate the rupturing thereof preparatory to said relative movement of said upper and lower sections about said hinge, a laterally extending grip on said upper section for manipulating said upper section in movement, and at least one removable seal member in a prescribed location on said body connected across a slot between said body sections such that removal thereof is required preparatory to said relative movement of said body sections, said prescribed location of said one seal member being beneath said grip whereby said grip protects said seal member against inadvertent removal and said seal member obstructs access to said grip from a direction to cause said relative movement of said body sections.

2. A cap as defined in claim 1 including a sealing lip spaced inwardly of said body and dependent from said upper wall so as to extend within said neck opening and sealingly engage the surface on said neck bounding said neck opening in said operative position of said cap on said neck.

3. A cap as defined in claim 2 including a sealing ridge formed on said upper wall at a location between said body and said sealing lip adapted to sealingly engage said neck in said operative position of said cap on said neck and also maintain said upper body section in a clearance position from said neck for forming sealing chambers in said clearance therebetween.

4. A cap as defined in claim 2 wherein said sealing lip is annular in configuration and includes a sealing lip formed on the surface thereof in facing relation to said body for sealingly engaging said neck within said neck opening.

5. A cap for a container having a circular neck thereon bounding a circular neck opening into said container, said cap comprising a hollow, annular body closed at one end and of a corresponding diameter to accommodate said neck of the container therein in a force fit in an operative position of said cap on said neck, an annular sealing lip depending from said closed end of said body for sealing said neck opening in said operative position of said cap, said body being delineated into an upper section and a lower section by an arrangement of alternately spaced slots and interconnecting wall sections circumferentially oriented about said body, a hinge connecting said upper and lower sections for opening and closing movement therebetween, said wall sections being of a comparatively minimal extent to facilitate the rupturing thereof preparatory to said opening movement of said upper section relative to said lower section, a laterally extending grip on said upper section for manipulating said upper section in at least said opening movement, and a removable seal member connected across a slot between said body sections such that removal thereof is required preparatory to said relative movement of said body sections formed on said upper section in a location beneath said grip whereby said grip protects said seal member against inadvertent removal and said seal member obstructs access to said grip from a direction to manipulate said upper section through said opening movement thereof.

6. A cap as defined in claim 5 including a sealing ridge formed on said upper wall at a location between said body and said sealing lip adapted to sealingly engage said neck in said operative position of said cap on said neck and also maintain said upper body section in a clearance position from said neck for forming sealing chambers in said clearance therebetween.

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DONALD F. NORTON, *Primary Examiner.*

U.S. Cl. X.R.

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