

[54] **RINSABLE BOTTLE CAP SEAL DEVICE**

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[58] Field of Search.....215/41, 42, 7, 46 A

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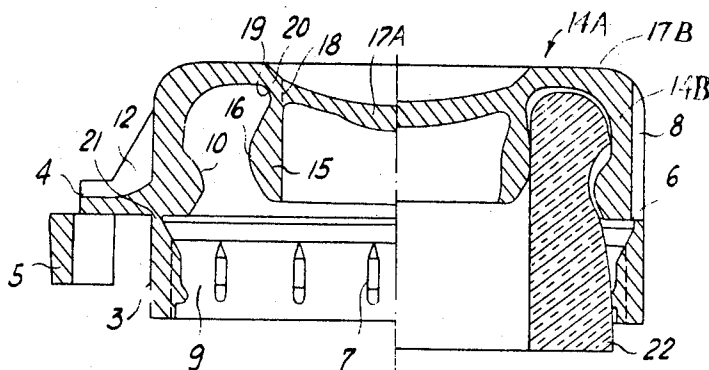
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[57] **ABSTRACT**

A snap-on bottle cap seal device is made of an elastic material, such as a plastic, and is formed of a reusable sealing cap and a ring-shaped safety strip detachably secured to and extending circumferentially about the lower end of the cap when it is initially secured on a bottle. The centrally disposed portion of the top surface of the sealing cap is concave and a tubular projection extends downwardly from the under side of the centrally disposed portion for engagement within the mouth of the bottle being sealed. An inwardly directed protuberance is formed on the inner surface of the skirt of the sealing cap and an outwardly directed protuberance is formed on the lower end of the tubular projection so that both protuberances provide a sealing effect against opposite surfaces of the bottle. A lifting lug is formed on the lower edge of the sealing cap and a tear-off tab, attached to the safety strap, is secured by small web sections to the lug. Passages are formed between the safety strip and the bottle and the passages extend between the lower end of the strip and grooves formed in the lower outer surface of the sealing cap. The passages are arranged to effect a rinsing of the sealing device after the bottle has been filled and sealed.

7 Claims, 5 Drawing Figures



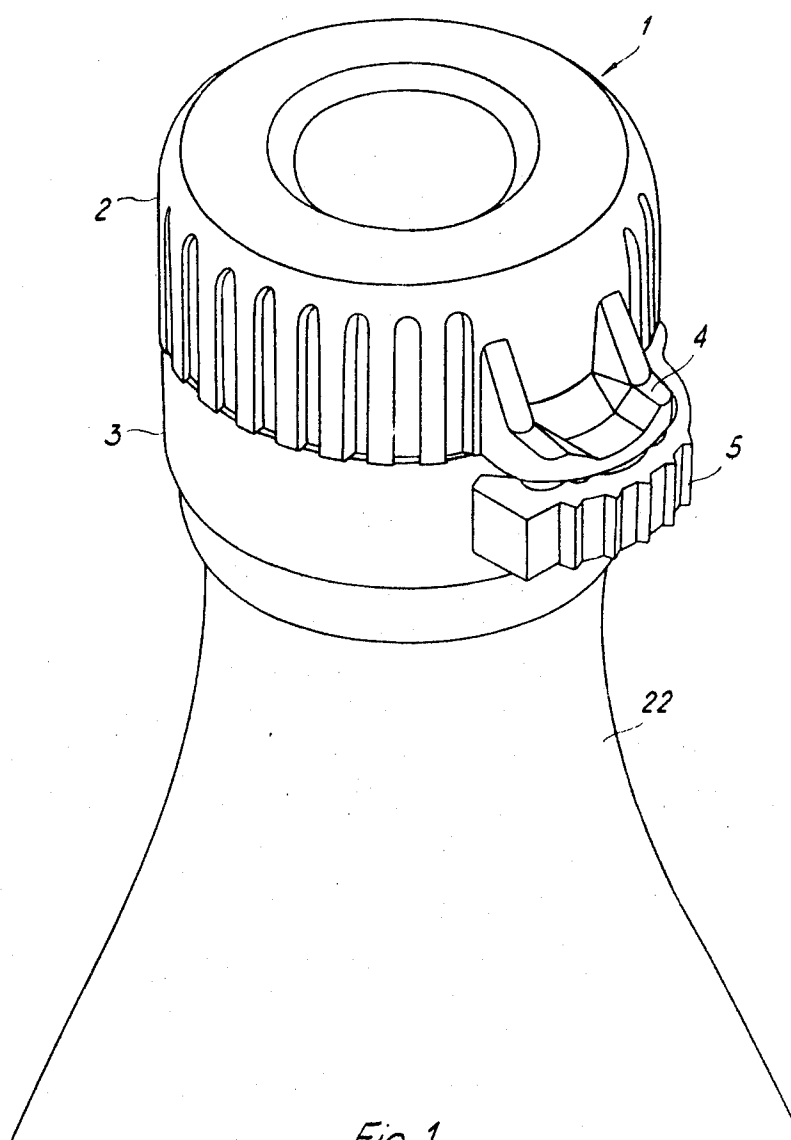


Fig. 1

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Fig. 2

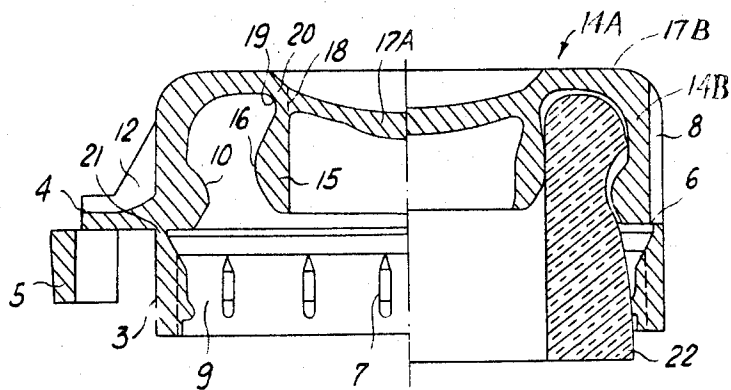
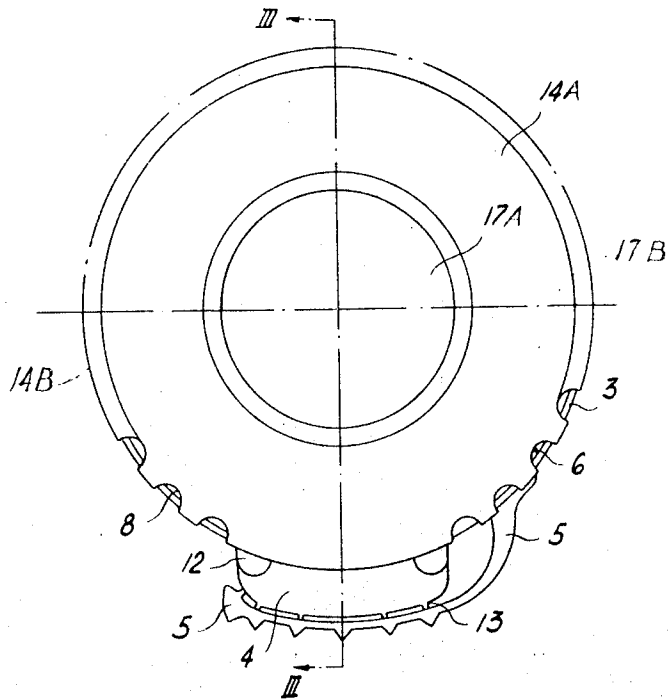


Fig. 3

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Fig. 4

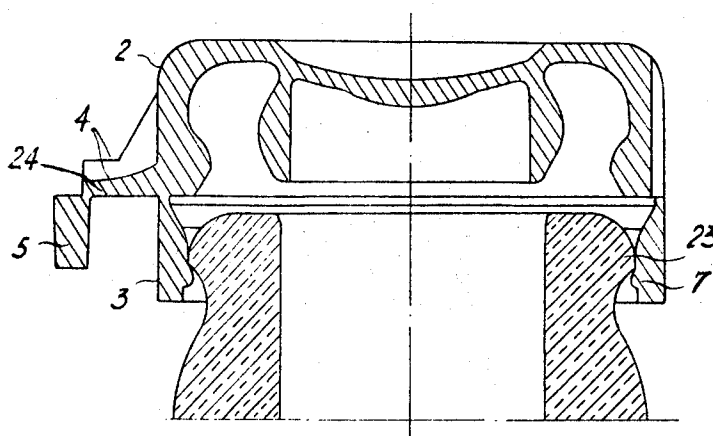
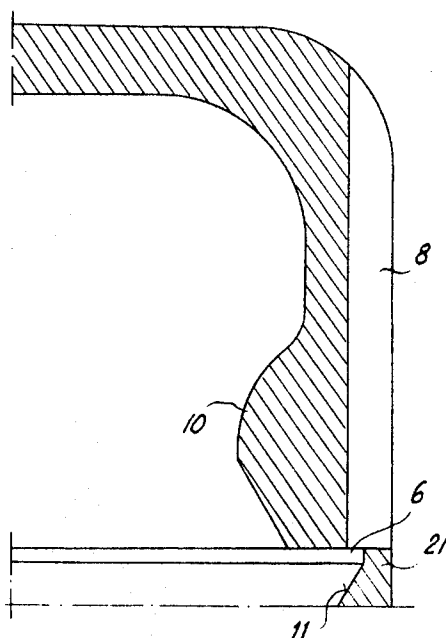


Fig. 5

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RINSABLE BOTTLE CAP SEAL DEVICE

SUMMARY OF THE INVENTION

The invention is directed to a bottle cap seal device formed of an elastic material and, more particularly, it is directed to a sealing cap provided with a detachable safety strip which extends around the lower edge of the sealing cap. Further, a lifting lug is provided on the sealing cap for removing and reusing the cap and a tear-off tab is attached to the safety strip and is secured to the lifting lug when the device is initially assembled on a bottle.

Known plastic seals used for bottles filled with a liquid under pressure have the disadvantage that, unlike metallic seals of conventional design, they are not suitable for mechanical filling and cleaning, they do not withstand the bottling pressure during shipping, they are difficult to open, and they cannot be used as a pilfer-proof seal.

The primary object of the present invention is to provide a bottle seal device formed of elastic material which does not have the above mentioned disadvantages and also can be rinsed after the liquid is filled into the bottle and the bottle is sealed.

Another object of the invention is to provide a safety seal easily detachable from the sealing cap which secures the cap on the bottle before its contents are used. When the safety strip is separated from the sealing cap, the sealing cap can be easily removed and replaced for again sealing the bottle.

The sealing device, in accordance with the present invention, can be mechanically sorted, aligned and secured on the bottle and properly rinsed of any residue of the filling liquid after the bottle has been sealed. Furthermore, the seal device has an adequate pressure resistance, it can be used as a pilfer-proof seal and can be easily opened and closed. Therefore, the seal device is characterized by a safety strip attached to the lower edge of the sealing cap and secured about the bottle. Passages are provided between the safety strip and the bottle which extend from the lower edge of the strip to its upper edge where they communicate with the lower ends of grooves formed in the outer surface of the sealing cap. After the seal has been effected, the passages through the safety strip can be used for rinsing the seal device of any residue left over from the filling operation.

The passages provided between the safety strip and the bottle are provided by inwardly projecting axial ribs formed on the interior surface of the strip and the upper edge of the safety strip is arranged to provide a communicating opening between the upper ends of the passages and the lower ends of grooves formed in the outer surface of the circumferential skirt defining the lower part of the sealing cap.

Preferably, the seal device is made of an elastic flexible material, particularly a thermoplastic material. Thermoplastic materials which are suitable for forming the seal device are polyethylene, polypropylene, polyamides and plasticized polyvinyl chloride.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated and described a preferred embodiment of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a seal device, in accordance with the present invention, positioned on a bottle;

FIG. 2 is a top view of the seal device shown in FIG. 1;

FIG. 3 is a sectional view taken along line III—III in FIG. 2 with the left hand half of the view representing the seal device before it is placed on a bottle and the right hand half of the view illustrating the seal device secured on a bottle;

FIG. 4 is an enlarged detail view of a portion of the seal device shown in FIG. 3; and

FIG. 5 is an axial sectional view showing the seal device resting but not in sealed engagement on the upper end of a bottle.

DETAILED DESCRIPTION OF THE INVENTION

In FIG. 1, the bottle seal device 1 is shown secured on a bottle 22 and it consists of a sealing cap 2 and a safety strip 3 which is detachably secured to the sealing cap around its bottom edge. Extending laterally from the lower edge of the sealing cap is a release lug 4. Located below the release lug 4 is a tear-off tab 5 which is secured to the safety strip 3 and is detachably connected along its upper inner edge at several points to the lower outer edge of the release lug.

When the seal device 1 is to be removed from the bottle 22, the end of the tear-off tab 5 is initially broken off from the release lug 4 and then, by pulling outwardly on the tab, the safety strip 3 is removed from the sealing cap and is displaced from around the neck of the bottle. With the safety strip 3 removed, the sealing cap can be separated from the bottle by pressing upwardly on its release lug.

As shown in FIGS. 2 and 3, the sealing cap 2 is formed of a closure plate 14A which extends across the mouth of the bottle and a skirt 14B which extends downwardly from the circumferential edge of the closure plate 14A about the exterior surface of the bottle mouth. The closure plate 14A has a circular center section 17A and an annular section 17B disposed concentrically about the center section. While the annular section 17B is disposed in a horizontal plane, as shown in FIG. 3, the center section 17A has a concave configuration, that is it curves inwardly and downwardly from the annular section 17B. The side wall or skirt 14B extends downwardly from the outer edge of the annular section 17B and has a circumferentially disposed inwardly directed bulge 10 formed on its inner surface and, as can be noted in the right hand half of FIG. 3, the protuberance 10 extends under the lid of the bottle 22 and retains the sealing cap on the bottle.

On the lower or inner surface of the closure plate 14A a downwardly extending tubular-shaped projection 15 is provided which is arranged to extend into the mouth of the bottle. Intermediate its upper and lower ends, on its outer surface, the tubular projection 15 has a circumferentially arranged bulge 16 which also provides a sealing action with the bottle when the cap is in the sealing position. At its upper end the tubular projection 15 is joined to a ring-like support part 20 which forms the circumferential periphery of the center section 17A. The upper surface of the support part 20, disposed above the projection 15 and adjacent the inner periphery of the annular section 17B provides a surface which forms an angle of inclination of about 35° to 55°, for example, an angle of 45°, with the central axis of the cap. Thus, at the circumferentially extending edge 18 at the intersection of the center section 17A and the inner wall of the projection 15 the edge 18 is inset downwardly into the upper end of the projection 15. At the upper end of the projection 15 directly below the inner edge of the annular section 17B of the closure plate 14A a ring-shaped constriction 19 extends into the surface of the projection toward the center section 17A of the closure plate.

As can be noted particularly from the left hand side of FIG. 3 and from FIG. 5, the centrally arranged portion of the center section 17A is reinforced, that is it is thicker than the radially outer portion thereof and has a lens-like appearance.

The arrangement of the sealing cap 2 permits the cap to withstand high internal pressures without being displaced from the bottle opening. At high internal pressures the center section 17A tends to move upwardly and flatten out, note the right hand portion of FIG. 3, and transmits forces radially outwardly to the ring-shaped support section 20 and to the tubular projection 15. Accordingly, the protuberance 16 on the outer surface of the projection 15 is pressed firmly against the inside surface of the bottle mouth for increasing the tightness

of the seal and increasing its adhesion to the surface of the bottle.

The side wall or skirt 14B of the cap is provided with a plurality of axially extending laterally spaced grooves 8. At the lower end of the skirt 14B it is attached to the safety strip 3, as can be seen in FIGS. 3 and 4, by a relatively thin intermediate piece 21 so that the safety strip can be relatively easily detached from the bottom edge of the cap.

As shown in FIG. 3, a plurality of axially extending ribs 7 are formed on the interior surface of the safety strip 3 and the lower portion of these ribs are disposed in contacting engagement with the outer surface of the bottle when the seal device is secured on the bottle. Due to the ribs 7 the remaining inner surface of the safety strip 3 is spaced outwardly from the bottle surface and forms an open space which extends from the lower to the upper edges of the safety strip. At the upper limit of the inner surface of the safety strip, its surface tapers outwardly along a bevelled surface 11 and merges with the inner part of the intermediate piece 21. Accordingly, the space 9 between the inner surface of the strip 3 and the bottle is wider adjacent the lower end of the skirt on the sealing cap 2.

The depth of the grooves 8 formed into the outer surface of the skirt 14B is such that openings 6, note FIG. 4, are formed between the lower ends of the grooves 8 through the intermediate piece 21 into the upper ends of the spaces 9 inwardly of the safety strip. These openings 6 make it possible to rinse the seal, after the bottle has been filled and the seal secured to it, for removing any residue of the filling material which might adhere to the interior of the safety strip 3. Because air can circulate through the passages 9 between the strip 3 and the bottle, the formation of mold is prevented in the event any residue of the filling material remains within the strip. In FIG. 5 a seal device 1 is illustrated similar to that displayed in FIGS. 1 to 4 which is positioned loosely on the opening to the bottle with a so-called dragging takeover of the filled bottles. In this arrangement the ribs 7 effect a preliminary clamping of the seal device on the bottle. The lower ends of the ribs 7 extend further inwardly than the remaining surface of the ribs so that the seal device is clamped securely on the mouth of the bottle. During the final mechanical closing of the bottle mouth, the seal device is pressed by a die downwardly onto the bottle into a position corresponding to that shown in the right hand half of FIG. 3.

The release lug 4, as indicated in the drawing, is secured to the skirt 14B of the sealing cap 2 and has a flat lower portion 24 which extends horizontally from the skirt and is in the plane of the lower edge of the skirt. The surface of the part 24 is provided with a corrugation for easier lifting. A pair of support webs 12 are secured to the release lug 4 and to the skirt 14A. These support webs 12 facilitate the replacement of the sealing cap 2 on the bottle after the seal device has been opened.

When the seal device is secured on the bottle the tear-off tab 5 provides, to a great extent, a shield for the bottom portion of the release lug 4.

The tear-off tab 5 is radially arranged on the safety strip 3 and is connected to the strip in the immediate proximity of the release lug 4. For its length, the tear-off tab overlaps the safety strip, however, it is also arranged so that the top edge of the tear-off tab is connected with the bottom edge of the release lug at several points by narrow webs 13 so that the tear-off tab can be easily detached from the release lug.

This arrangement of the tear-off tab acts as a protection for the lower surface of the lifting lug and also enhances the pilfer-proof characteristic of the seal device.

This preferred arrangement of the seal device prevents the loose devices from being wedged with one another with the result that the devices can be used without any problems in mechanical sorting and filling plants.

As indicated above, the arrangement of the tear-off tab 5 and the release lug 4 make it impossible to remove the cap by hand without destroying the arrangement of the sealing device

on the bottle. Accordingly, it can be appreciated that this arrangement also provides a safety seal for the bottle.

I claim:

1. A bottle cap seal device formed of an elastic material comprises a snap-on sealing cap having a closure plate arranged to extend across the mouth of a bottle and a skirt extending angularly downwardly from the circumferential edge of said closure plate and arranged to enclose the sides of the bottle at its mouth, an annular shaped bulge formed on the inner surface of said skirt and spaced from the junction of said skirt and closure plate for engaging the exterior surface of the bottle at a position spaced from its mouth, a safety strip secured in a detachable manner to the circumferentially extending edge of said skirt spaced from said closure plate and arranged to encircle the bottle when the device is in the sealing position thereon, wherein the improvement comprises means cooperating with said safety strip and sealing cap for forming passages between the interior surface of the safety strip and the bottle with the passages extending between the upper and lower circumferentially extending edges of said strip and with openings formed from said passages through the junction of said safety strip and the lower edge of said skirt so that rinsing fluid can be circulated through the openings and the passages for rinsing any residue contained between said safety strip and the bottle.

2. A bottle cap seal device, as set forth in claim 1, wherein said means for forming the passages between the safety strip and the bottle comprising a plurality of inwardly projecting ribs extending in the axial direction of said sealing cap formed in spaced relationship on the interior surface of said safety strip, the inner surface of said safety strip between said ribs being spaced from the surface of the bottle when the device is secured thereon with the ribs in contact with the bottle, and a plurality of axially extending grooves formed in the exterior surface of said skirt and extending upwardly from the circumferential edge thereof spaced from said closure plate, said grooves being formed into said skirt a sufficient distance so that openings are formed at the circumferential edge of said skirt adjoining the upper circumferential edge of said safety strip which communicate with the passages formed between the said safety strip and the bottle.

3. A bottle cap seal device, as set forth in claim 2, wherein the inner surface of said safety strip adjacent the upper edge thereof connected to said skirt has an outwardly bevelled surface forming a frustoconically shaped annular groove at the upper edge of said safety strip with the radially outer upper edge of said annular groove being disposed radially outwardly from the radially inner surface of said grooves in said skirt so that the openings provided from said grooves into the passages within said safety strip communicate with said annular groove.

4. A bottle cap seal device, as set forth in claim 3, wherein the lower edge of said annular groove is disposed in plane including the upper ends of said ribs on the interior surface of said safety strip so that said annular groove is disposed upwardly from said ribs.

5. A bottle cap seal device, as set forth in claim 4, wherein each of said ribs on the interior surface of said safety strip having an inwardly directed protuberance formed on the lower end thereof spaced adjacent the circumferential edge of safety strip remote from said sealing cap, whereby when initially positioned on the mouth of a bottle before being displaced into sealing engagement therewith said inwardly directed protuberances on said axial ribs provides a preliminary securement of the device on the bottle.

6. A bottle cap seal device, as set forth in claim 5, wherein a release lug is secured to and extends outwardly from said skirt of said sealing cap.

7. A bottle cap seal device, as set forth in claim 6, wherein the device is formed of a flexible plastic material selected from one of the group consisting of polyethylene, polypropylene, polyamides and plasticized polyvinyl chloride.

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