July 7, 1959 W. A. HOEF 2,893,585

BOTTLE CAP

Filed Dec. 10, 1956

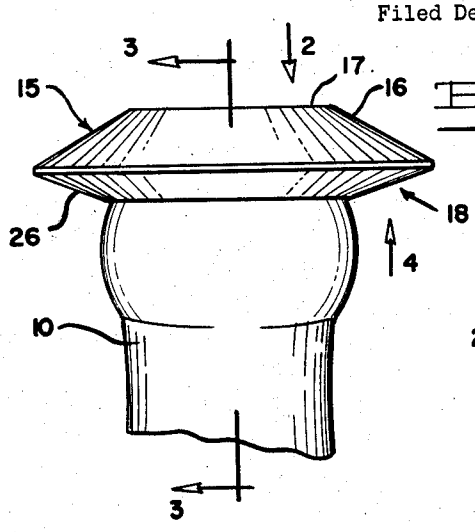


FIG. 1

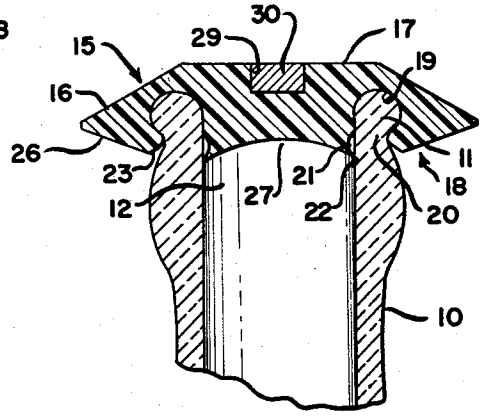


FIG. 3

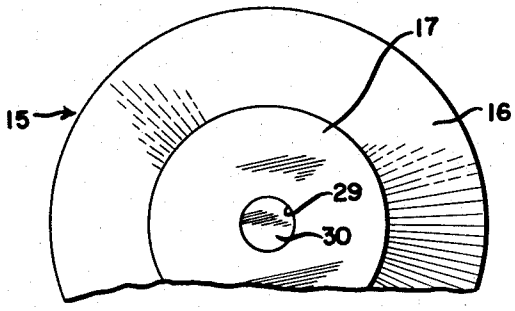


FIG. 2

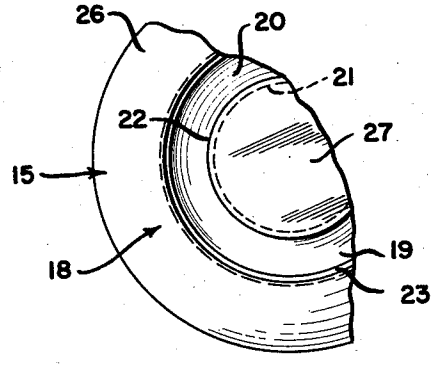


FIG. 4

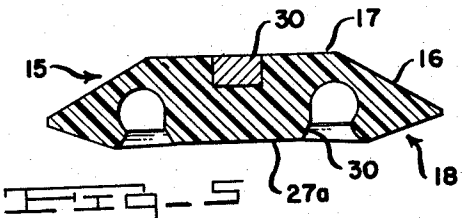


FIG. 5

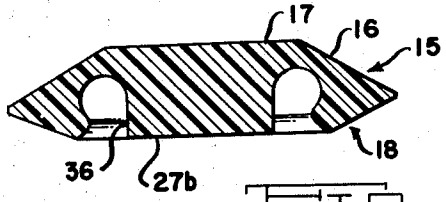


FIG. 6

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BOTTLE CAP

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1 Claim. (Cl. 215—41)

This invention relates to bottle caps and more particularly to a cap for temporarily tightly sealing the top of a crown or soft drink bottle and formed to prevent the escape of gases contained in the fluid within the bottle under normal pressure but to release and permit the escape of gas under abnormally high pressures.

The conventional crown or soft drink bottle available on the market, has a standard size mouth provided with a glass lip at the opening of the bottle. When the bottle is packaged with beer or a soft drink or the like, a metal cap is clamped over the lip and this cap seals the gas contained within the carbonated drink. However, once the bottle is opened, the metal cap can no longer be used to tightly seal the bottle for preventing the gas from escaping from the partially used contents of the bottle. Many types of temporary bottle caps are currently available on the market, but almost none of them are successful in tightly sealing the bottle to completely prevent the escape of gas therefrom. There are one or two mechanical type metal caps available which tightly seal the top of the bottle, but are so constructed that in the event of a rise in pressure within the bottle, such as due to the exposure of the bottle to a warm atmosphere near a room radiator or the like, the high pressure gas cannot escape through the cap but causes the bottle to explode.

Thus, it is an object of this invention to provide an inexpensive easily constructed and easily handled bottle cap which can be easily manipulated upon the top of a standard crown or soft drink bottle and which will completely prevent the escape of any gas from the partially used contents of the bottle but at the same time will release upon any abnormal rise of pressure within the bottle to prevent the bottle from exploding.

Another object of this invention is to provide such a cap with a permanent magnet secured thereto, so that the cap may be stored upon any handy metal object, such as a refrigerator wall, when not in use.

These and other objects of my invention will become apparent upon reading the following description, of which the attached drawings form a part.

With reference to the attached drawings,

Fig. 1 illustrates the cap secured to the top of a standard soft drink bottle with only the neck of the bottle being shown, and with the cap and bottle shown in approximately double their normal size.

Fig. 2 is a fragmentary top view of the bottle cap taken in the direction of arrow 2 on Fig. 1.

Fig. 3 is a cross-sectional view of the cap and bottle neck taken in the direction of arrows 3—3 of Fig. 2.

Fig. 4 is a fragmentary view of the underside of the cap taken in the direction of arrow 4 of Fig. 1.

Figs. 5 and 6 are cross-sectional views of modifications of the cap.

In Figs. 1 and 3, the neck of a conventional glass crown or soft drink bottle, generally designated as **10**, is illustrated. As illustrated in Fig. 3, an annular lip or bead **11** is formed at the mouth **12** of the bottle. This construction is conventional and just about all crown or soft drink

bottles on the market today are provided with this standard size and shape construction.

Once the conventional metal bottle cap is removed so that the consumer can use the contents of the bottle, the gas contained within the soft drink immediately begins to escape. Where part of the contents are not immediately used up, but instead remain in the bottle, the bottle cap of this invention generally designated as **15** may be used to tightly seal the top of the bottle to prevent the escape of the gas. This bottle cap is formed in a flattened, truncated, conical shape having a conical wall **16**, a small top base **17** and a large bottom base **18**.

The cap is preferably constructed of a plastic material characterized by being relatively stiff but somewhat resilient. One plastic material which has been found to be suitable for this construction is a polyethylene plastic manufactured by the Koppers Company, Inc. of Pittsburgh, Pennsylvania, and identified by this company as "Dylan Polyethylene 3700." The cap may be molded from this plastic or cut and machined from bar stock. Another suitable material is Du Pont's polyethylene "Alathon, formula 22."

Obviously, many other types of plastics would be suitable for this construction so long as the plastic itself is resilient enough to be bent and forced over the top of the bottle but at the same time is sufficiently stiff to hold its form and to tightly retain its shape when on the bottle mouth.

An annular groove **19** is cut into the bottom base **18** and is shaped to conform to the lip **11** of the conventional soft drink bottle. The mouth **20** of annular groove **19** is undercut at **21** to form an annular tip **22** and is also relieved at **23** opposite the tip. The relief cut **23** permits the cap to be placed, in a tipped position against the bottle lip **11**, and then by the application of manual pressure to the cap, the lip **11** slips by the flexible tip **22** and the undercut **21** until the lip is squarely within the groove **19**. The groove **19** completely envelops the lip top, inside, and outside surfaces to seal the lip in three places.

The cap base **18** is formed as a flattened, truncated cone **26** from the relief cut **23** to its peripheral edge. The center portion **27**, of the cap base may be formed in a concave shape as shown in Fig. 3. This concave shape is best suited to hold against gases under pressure and further, in cooperation with the undercut **21**, makes the tip **22** quite flexible. Thus, a fourth seal is formed between the flexible tip **22** and the bottle.

It is also contemplated to cut a disk or conical shaped pocket **29** into the cap small base **17** and in substantial axial alignment with the axis of the cap body **15**. A disk type permanent magnet **30** is slipped into the pocket **29** and is frictionally held in the pocket, so that the cap when not in use may be placed up against any metal object handy to the householder and will remain there until it is next needed for use.

Operation

In operation, the mouth **20** of the annular groove is aligned with the lip or bead **11** of a soft drink bottle but with the cap tipped relative to the bottle and the cap is forced onto the bottle by the application of manual pressure. When on the bottle, the cap forms a four way seal with the bottle: At the top of the lip, at the inside, and at the outside of the lip, and at the resilient tip **22**. With this sealing, no gas can escape from the bottle.

There are times, however, when the pressure within the bottle builds up to the point where the bottle itself may explode. This has happened in cases where a partially used soft drink bottle was placed near a radiator or other warm object in a room. If the cap is so tight as not to permit the escape of gas under abnormal pressure, then there is a danger of the bottle itself exploding.

However, in this case upon an abnormal rise in pressure, the cap pops open. The reduced cross-section between the annular groove **19** and the conical wall **16** provides a degree of flexibility which permits the cap to pop open under abnormal pressure. The amount of material in the reduced cross-sections depends upon the safety factor designed into the cap. Thus, for example, a specific reduced cross-section may be used for a specific pressure point at which the cap is to pop open.

Modifications

Fig. 5 shows a modification made identical with the embodiment of Fig. 3, with the exception that the edge of the base center part **27***a* is tapered at **35** and the flexible tip **22** is omitted.

Fig. 6 is likewise identical to Fig. 3, but here the base center part **27***b* is uncut and is left with a straight peripheral edge **36**. In addition, the magnet is omitted.

This invention may be further developed within the scope of the following attached claim and accordingly, it is desired that the foregoing description be read as being merely illustrative of an operative embodiment of this invention and not in a strictly limiting sense.

I claim:

A bottle cap for temporarily closing and tightly sealing the top of a bottle of the type having an annular bead formed on the top thereof, comprising a body formed in the shape of an upper and a lower frustro-conical portion, both integrally joined at their large bases and both

being flattened, thus providing a cross-sectional shape in the form of two trapezoids, one inverted relative to the other and joined at their large bases with the conical wall surfaces each extending away from the large bases at a sharp acute angle and with the angle formed by the two conical walls meeting being an acut angle also, and with the altitudes being considerably smaller than the base daimeters; a continuous annular groove formed in the lower conical portion at the area where the small base would otherwise joint the side wall, the groove being of a cross-sectional shape which corresponds to the cross-section of a bottle bead, the plane passing through the widest point of the groove being within the upper portion and slightly above the large bases, and the groove forming a narrowed cross-section of body material between the groove bottom and the wall of the upper conical portion near the junction between this wall and the small base of the upper conical portion; the body being formed of a relatively stiff, but slightly flexible, plastic material.

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