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BOTTLE CAP

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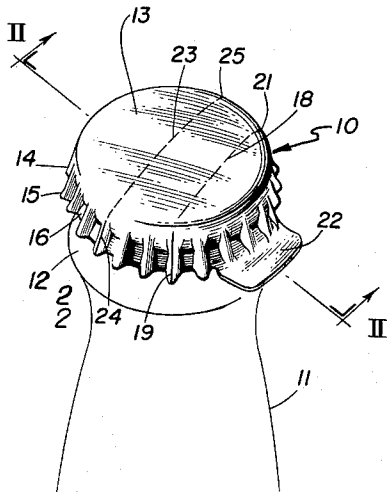


FIG. 1

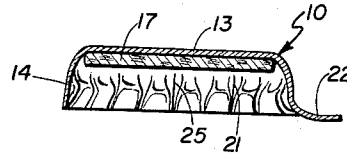


FIG. 2

FIG. 3

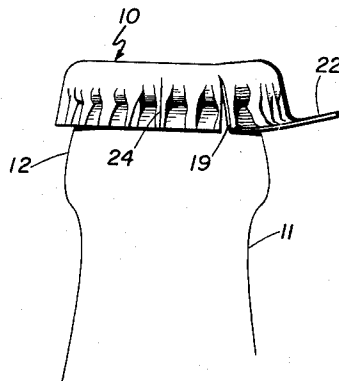
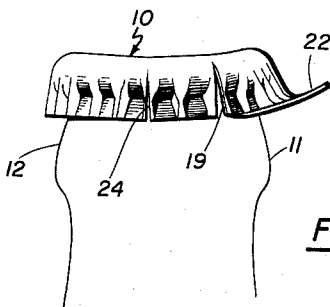


FIG. 4



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3,200,982
BOTTLE CAP

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This invention relates to a bottle cap and, more particularly, to a closure for a soft drink bottle or the like which seals the bottle against the escape of liquid or carbon dioxide.

It is common practice in the bottling industry, particularly in the bottling of carbonated soft drinks and of beer, to provide the bottle with a metallic cap which contains a cork seal and which is crimped tightly on a lip at the top of the bottle to prevent accidental removal. It is, therefore, necessary, in order to gain access to liquid in the bottle, to remove the cap; because of the effectiveness of the crimping operation in fastening the cap to the top of the bottle, this cannot be done without considerable force, usually requiring a tool such as a bottle opener. The necessity for using a bottle opener is a source of considerable dissatisfaction to the consumer of the liquid, particularly since obtaining a bottle opener sometimes requires an extensive search; at other times the user may wish to remove the cap when he is on a picnic or the like and a bottle opener is not available; he must then make use of an inadequate substitute. Bottle caps have been evolved in the past which were self-opening but they have suffered from a number of disadvantages, one of these disadvantages being that, if the cap were easily removable, the carbon dioxide pressure would throw the cap up into the air and permit the liquid to be ejected from the bottle. If, on the other hand, the cap did not open readily so that gas was allowed to escape in a more leisurely manner, it was difficult to remove the cap from the bottle. These and other difficulties experienced with the prior art methods and devices have been obviated in a novel manner by the present invention.

It is, therefore, an outstanding object of the invention to provide a bottle cap which may be removed without the use of auxiliary tools.

Another object of this invention is the provision of a bottle cap having its own integral bottle opener.

A further object of the present invention is the provision of a self-opening bottle cap of the cork-seal crimped type which is inexpensive in construction, which may be used without changing present bottle-capping equipment, and which may be used in present-bottle dispensing machines without modification thereof.

It is another object of the instant invention to provide a bottle cap which has the means for removing it from the bottle without the use of a special tool and yet which cannot be opened accidentally.

A further object of the present invention is the provision of a self-opening bottle cap which is constructed so that the user does not break his fingernails or injure his fingers.

A further object of the present invention is the provision of a self-opening bottle cap which operates in two stages, one stage of opening serving to release carbon dioxide from the bottle without removing the cap from the bottle, and the second stage to remove the cap from the bottle easily without injury to the user.

With these and other objects in view, as will be apparent to those skilled in the art, the invention resides in the combination of parts set forth in the specification and covered by the claims appended hereto.

The character of the invention, however, may be best understood by reference to one of its structural forms as illustrated by the accompanying drawings in which:

FIG. 1 is a perspective view of a bottle cap embodying the principles of the present invention,

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FIG. 2 is a sectional view of the invention taken on the line II-II of FIG. 1,

FIGS. 3 and 4 show the use of the bottle cap at various stages of removal from the bottle.

Referring first to FIG. 1, wherein are best shown the general features of the invention, it can be seen that the bottle cap, indicated generally by the reference numeral 10, is shown in use with a bottle 11. The bottle is the conventional type used with soft drinks and beer. It has a narrow upper lip and an annular bead 12 extending around the bottle some distance below the lip and is conventionally made of glass. The cap 10 is formed with a flat circular top 13 from the outer periphery of which extends a depending skirt or flange 14. The top and flange are formed from a single piece of sheet metal and the skirt is crimped about the lip of the bottle, providing alternate raised portions 15 and depressed portions 16. Fastened to the inside or undersurface of the top 13 of the cap is a cork seal 17 of the usual type, the seal being large enough in diameter to fit entirely across the lip surface of the bottle to seal it against the escape of carbonation as well as the liquid contained in the bottle.

Extending across the top 13 is a score line 18 which geometrically might be considered a chord of the circle defining the periphery of the top 15 of the cap. The score line may take the form of a stamped depression or it may be a scratch in the metal forming the top. In any case, it constitutes a line along which the metal may bend more easily than along other lines. In any case, the line lies inwardly of the inner edge of the lip of the bottle and, in other words, is chordal to the inner circle of the lip of the bottle. Extending down the skirt 14 from one end of the score line 18 is a cut 19 and from the other end of the score line 18 extends a cut 21 which passes down the flange. Both of the flange cuts 19 and 21 extend down to the lower edge of the flange, but the flange between these cuts does not necessarily terminate along the same conventional line as the rest of the skirt. On the contrary, some of the metal extends downwardly and outwardly of the bottle to form a tab 22. The tab is formed of sheet metal and is integral with the rest of the cap; it is curved to provide an area which is readily engaged on the underside by the thumb of the user. The upper part of the tab merges with the flange 14 and, therefore, carries the usual crimping similar to the rest of the flange.

The circular top 13 of the cap is provided with another score line 23 which, in a general way, passes through the center of the circular top and is parallel to the score line 18. At the ends of this score line the flange 14 is provided on one side with a cut 24 and on the other side with cut 25. In the preferred embodiment, each of the cuts 19, 21, 24, and 25 extends entirely through the metal in the lower part of the flange 14 but, as it proceeds up the skirt, does not extend entirely through the metal but gradually becomes a mere scratch merging into the score line 18 or 23.

The operation of the invention will now be readily understood in view of the above description. The cap is placed on the bottle in the usual manner, usually in the bottling machine with the cork seal 17 pressed against the upper lip of the bottle and pressed tightly thereagainst to prevent leakage of carbonation or of liquid. Crimping takes place in such a manner that the depressed portions 16 extend under the bead of the lip and lock the cap in place. At the same time, with the usual type of crimping, it is practically impossible to remove the cap without the assistance of a tool. When the bottle cap of the present invention is properly in place on the bottle, the tab 22 does not extend outwardly from the bottle any considerable distance and, therefore, does not protrude in such a manner as to present any problem. For instance, the

bottle with the cap and tab in place can be handled in the usual bottle-labeling machinery without difficulty. It can be inserted in bottle cases and, eventually, it can be placed in a soft drink dispensing machine without any danger of the tab catching on the machinery or edges and without any danger of premature removal of the cap. In the present case, the tab can be positioned well inside of the machine so that it is not accessible to a person who wishes illegally to remove the cap without placing a coin in the machine.

When it is desired to remove the cap to have access to the contents of the bottle, it is only necessary to grasp the bottle in the left hand and place the index finger of the right hand on the top 13 of the cap. Then, the thumb of the right hand is placed under the tab 22 and pressed upwardly. Because of the mechanical advantage obtainable, due to the length of the tab 22, a considerable separating stress is provided along the cuts 19 and 21. Furthermore, because of the well-known principle of concentration of stress at re-entrant angles, an extreme tearing stress is felt at the root of the cuts 19 and 21. This stress at the root of the cuts is such that, as the tab 22 is pulled upwardly and outwardly from the bottle, a tear immediately starts at the root of the cuts and moves quickly up the cuts 19 and 21. Further movement of the tab causes a bending, as is clear in FIG. 3, of the bottle cap connected with the tab 22 about a hinge formed by the score line 18. Since the score line is well inside the lip of the bottle, the bending of this portion of the cap in the manner described separates the seal from the upper lip of the bottle so that the seal between the cap and the bottle is broken. This means that the carbon dioxide pressure is released. Nevertheless, the cap is still physically in place on the bottle and the release of the carbon dioxide does not throw the cap into the air. Then, further movement in this same manner will cause separation along the cuts 24 and 25 in the manner shown in FIG. 4. The cap will bend about the score line 23 and a short amount of movement in this manner causes the cap to be entirely free of the bottle. It can then be readily removed without any great physical strain or danger of damage to the user. The bottle cap can then be removed from the bottle and the contents of the bottle can be drunk directly from the bottle or the user may pour the liquid into a separate container for drinking.

It can be seen that by the practice of the present invention it is possible to provide a self-opening bottle cap made from a single piece of metal (with the exclusion of the cork seal, of course) without the use of a great deal of extra sheet metal or extra expense. The cap can be applied to a bottle by a conventional bottle-capping machine without extensive modification of the machine. No auxiliary tool is necessary for the removal of the cap and the bottle cap is particularly useful at picnics or in the woods where a bottle opener is not readily available. It avoids the use in such circumstances of inadequate substitutes which are liable to break the bottle or hurt the user. At the same time, the removal of the cap does not involve the danger of the cap being thrown forcefully away from the bottle against a ceiling or possibly to strike a bystander. At the same time, after the gas pressure has been released, the cap can be operated slightly further in the same direction to remove it from the bottle without any problem to the user.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, however, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The invention having been thus described, what is

claimed as new and desired to secure by Letters Patent is:

1. A bottle cap, comprising
 - (a) a crown member having a flat circular body and an annular flange extending away from the body along the periphery thereof, the flange being crimped around the lip of a bottle,
 - (b) a tab member extending laterally of the crown member generally in the plane of the bottom edge of the flange integral with a limited portion of the flange,
 - (c) a first weakening means consisting of a pair of notches associated with the flange in the vicinity of the tab to facilitate the upwardly bending of the flange and crown in the vicinity of the tab for release of gas pressure from the bottle, and
 - (d) a second weakening means consisting of a pair of notches associated with the flange at a position approximately in the center of the crown and spaced substantially from the first weakening means to facilitate removal of the cap from the bottle.
2. A bottle cap as recited in claim 1, wherein the said first weakening means consists of a tear line extending down the flange to the points of intersection of the tab with the flange.
3. A bottle cap as recited in claim 1, wherein the said first weakening means consists of notches formed in the edge of the flange adjacent the intersection of the tab therewith.
4. A bottle cap as recited in claim 1, wherein the second weakening means is located on the opposite side from the tab of an imaginary line extending across the cap through the center and generally perpendicular to the line of action of the tab.
5. A bottle cap as recited in claim 4, wherein the second weakening means consists of two notches in the flange equally spaced from corresponding sides of the tab.
6. A bottle cap, comprising
 - (a) a crown member having a flat circular body and an annular flange extending away from the body along the periphery thereof, the flange being crimped around the lip of a bottle,
 - (b) a tab member extending laterally of the crown member generally in the plane of the bottom edge of the flange integral with a limited portion of the flange and adapted to be pulled upwardly,
 - (c) a first weakening means consisting of two notches in the flange, each located adjacent a side of the tab to facilitate upward bending of the flange and crown in the vicinity of the tab, a first imaginary line joining the notches constituting a chord of the circular body, the line crossing well within the inner diameter of the lip of the bottle, so that bending of the cap about the line causes release of gas pressure from the bottle, and
 - (d) a second weakening means consisting of two notches in the flange located at the ends of a second imaginary line extending across the circular body parallel to the aforementioned first imaginary line approximately in the center of the crown and substantially spaced therefrom to permit lifting of the cap from the bottle while bending the cap about the second line.

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