June 16, 1964 V. R. WELBER 3,137,403

BOTTLE CAP

Filed Sept. 21, 1961

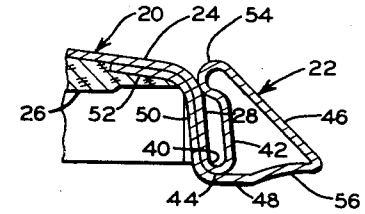

FIG. 2.

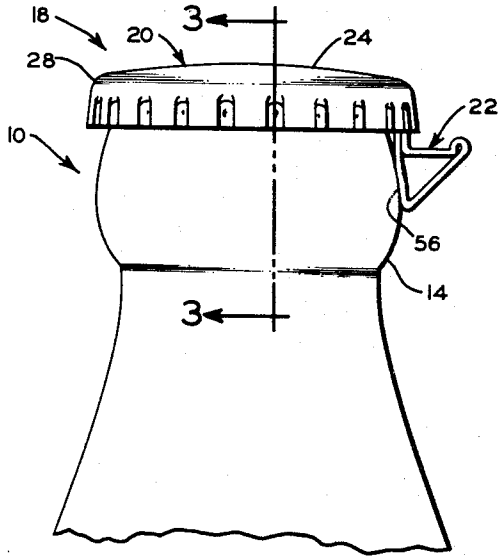

FIG. 1.

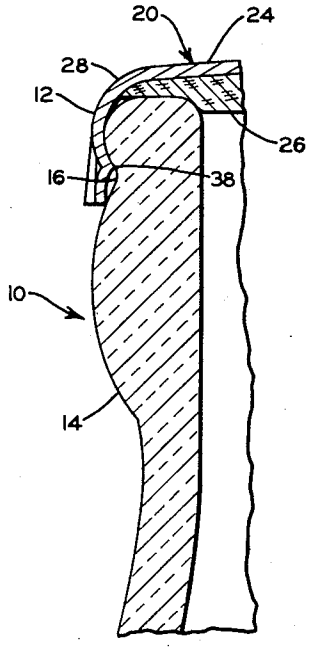

FIG. 3.

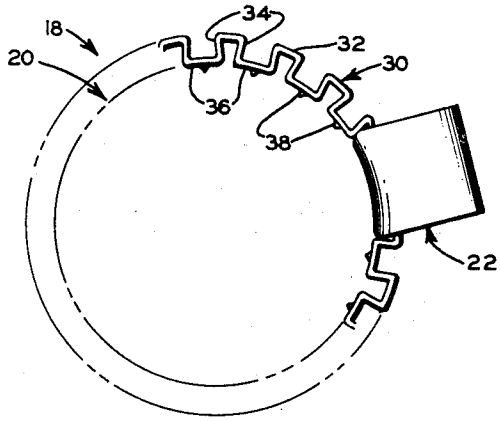

FIG. 4.

INVENTOR.
VIRGIL R. WELBER
BY
Owen & Owen
ATTORNEYS

United States Patent Office 3,137,403 Patented June 16, 1964

3,137,403

BOTTLE CAP

Virgil R. Welber, 2015 Fernwood, Toledo, Ohio

Filed Sept. 21, 1961, Ser. No. 139,638
1 Claim. (Cl. 215—46)

This invention relates to an improved bottle cap and more particularly to a bottle cap having an opening tab combined therewith.

Many types of container closures are now known, which closures are provided with various types of opening tabs to aid in the removal of the closures from the containers. Substantially all of these closures can be removed and replaced any number of times and are designed to be used only after the original closures have been removed from the containers and discarded. Such closures generally have been made of rubber or resilient plastic material rendering them easy to remove and to replace which, however, has rendered them unsuitable for use as original closures on the containers. In addition, such closures generally have been too expensive for original use with the containers.

The present invention relates to a bottle cap which can be removed directly by hand without the necessity of employing a bottle opener, which are frequently unavailable just when needed. The new bottle cap is designed specifically for original use with bottles as sold to the consumer, and particularly for bottles containing consumable liquids under a positive pressure. This is particularly made possible because the new cap can be secured to a bottle as tightly as presently-known, conventional bottle caps so that the contents of the bottle will be as safe during shipping and handling with the new cap as with a conventionl one. Further, the new cap can be affixed to a bottle by means of a substantially conventional capping machine.

The new bottle cap includes an opening tab which provides a better lever action during opening of the cap so that the crimps thereof can be spread and the cap loosened and separated from the bottle with less effort. Further, the new tab does not interfere with the capping machine when the cap is applied to a bottle and the tab is in a lower position against the side of the bottle. In this position, the tab also is less subjected to forces which might tend to cause accidental opening of the bottle during shipping and handling.

It is, therefore, a principal object of the invention to provide an improved bottle cap, particularly for bottles containing liquids under pressure.

Another object of the invention is to provide an improved bottle cap for original use with a bottle as sold to consumers.

A further object of the invention is to provide a metal bottle cap with an improved tab rendering the cap easier to open manually without the use of a bottle opener.

Still another object of the invention is to provide an improved bottle cap which is less expensive than manually-removable bottle caps now known.

Still a further object of the invention is to provide a manually-removable bottle cap with crimps which spread more easily and which enable the cap to be removed more easily from a bottle.

Other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment thereof, reference being made to the accompanying drawing, in which:

FIG. 1 is a fragmentary view in elevation of a bottle and a bottle cap embodying the principles of the invention;

FIG. 2 is a fragmentary, enlarged view in vertical cross section of the bottle cap shown in FIG. 1;

FIG. 3 is a fragmentary view in cross section taken along the line 3—3 of FIG. 1; and

FIG. 4 is a bottom view of the bottle cap shown in FIGS. 1–3.

Referring to the drawing, a neck of a typical bottle carrying liquid refreshments under pressure is indicated by the numeral **10** and includes a neck bead **12** (FIG. 3) and, in many instances, a reinforcing ridge **14** located therebelow, a channel **16** being formed immediately below the bead **12**. Bottles of this nature are commonly used for consumable liquids such as soft drinks and beer which are under pressure in the bottles.

A bottle cap according to the invention is indicated by the numeral **18** and includes a main cap portion **20** and an opening tab **22**. The cap portion **20** is basically similar to a conventional bottle cap, including a circular top wall **24** with a sealing liner **26** and an annular side wall **28** having a multiplicity of crimps **30** spaced therearound. The crimps **30** differ substantially from the crimps of conventional bottle caps, the conventional crimps being generally V-shaped. In contrast, the crimps **30** (see FIG. 4 particularly) of the cap portion **20** terminate in outer blunt or generally flat walls **32** with side walls **34** which diverge from one another as they extend outwardly from the bottle. This configuration is of importance because it enables the crimps **30** to be spread more easily than the V-shaped crimps heretofore known. Hence, the cap portion **20** can be more easily removed from the bottle and yet the crimps **30** hold the cap portion **20** on the bottle substantially as effectively as crimps of conventional caps.

The side walls **34** of the crimps **30** are connected by webs **36**, each of which has a sharp projection **38** (see FIG. 3) which can be formed by a capping machine when the cap portion **20** is affixed to the bottle. The projections **38** fit more effectively with the channel **16** below the neck bead **12** to provide a more secure fit. The projections, in a preferred form, are approximately $\frac{1}{64}$ inch in diameter and $\frac{1}{32}$ inch long.

The tab **22** is made of a single strip of metal integral with an outer edge **40** of the side wall **28**. The tab **22** has a first leg **42** including a short connecting portion **44**, a second or generally diagonal leg **46** bent downwardly from the first one, and a third or generally horizontal leg **48** bent from the second leg **46** in the same direction as the second leg **46** is bent from the first leg **42** and extending radially outwardly from the lower edge of the annular side wall **28**. A fourth leg **50** extends upwardly from the third leg **48** along the inner surface of the side wall **28** with an extension **52** of the leg **50** being located immediately under the circular top wall **24**, between this wall and the liner **26**. Between the first leg **42** and the second leg **46**, and integral therewith, is a bearing projection **54**, the purpose of which will be discussed shortly.

When the over-all cap **18** is to be affixed in sealing relationship with the neck bead **12** of a bottle, the tab **22** is placed in a downward position as shown in FIG. 1 with the connecting portion **44** extending straight down from the side wall **28** to provide clearance for the capping machine which forms the projections **38** in the webs **36** to provide maximum sealing engagement between the cap **18** and the bottle **10**. With the tab **22** in the downward position, the third leg **48** lies adjacent the neck and has a concave portion **56** to enable the tab to fit more closely with the reinforcing ridge **14** of the bottle **10**. After capping, the bottle **10** is then shipped with the tab **22** in the downward position, not only because it would require an extra operation to move the tab **22** to its upward or operative position but also because the tab is closer to the bottle and is less subject to any accidental force during shipping or handling which might tend to

force the tab 22 upwardly and separate the cap from the bottle.

When the consumer is ready to open the bottle 10 and consume the contents thereof, he merely swings the tab 22 to its upward position, shown in FIG. 2, and then forces the tab 22 upwardly by applying force against the outer end of the third leg 48. When this is done, the bearing projection 54 bears against the side wall 28 between the crimps 30 and the circular top wall 24 to serve as a leverage point. As the third leg then moves upwardly, it pulls the fourth leg 50 outwardly, pivoting around the projection 54, thereby also pulling the adjacent portion of the side wall 28 outwardly and separating the projections 38 of the crimps 30 from the channel 16 below the neck bead 12. The force against the third leg 48 of the tab 22 is then continued until the remaining crimps 30 spread further and the cap portion 20 separates completely from the bead 12. It will thus be seen that the force applied through the tab 22 is similar to that applied by a bottle opener except that this force can be applied directly manually, preferably by the thumb of the consumer.

The extension 52 of the leg 50 remains fixed between the top 24 and the bead 12 as the leg 48 is pushed upwardly to minimize the chance that the leg 50 can be pulled outwardly from under the side wall 28 and thus render the tab 22 ineffective. The bearing projection 54 contacts the side wall 28 sufficiently below the top wall 24 to prevent the possibility that the projection 54 will be bent upwardly and pushed over the top wall 24. The tab 22 can still be used if this occurs, however, since the upper portion of the first leg 42 will still constitute a pivot point as it bears against the side wall 28.

In one specific embodiment of the invention, aluminum with a thickness of 0.016 inch was used to make the cap 18. The tab 22 was bent from a strip $\frac{5}{16}$ inch wide with the connecting portion 44 having a length of $\frac{1}{16}$ inch, the main portion of the leg 42 having a length of approximately $\frac{5}{32}$, the projection 54 having an over-all length of approximately $\frac{3}{32}$, the second leg 46 having a length of $\frac{5}{16}$ inch, the third leg 48 having a length of $\frac{5}{16}$ inch, and the fourth leg 50 having an over-all length of $\frac{1}{4}$ inch including the extension 52 which has a length

of approximately $\frac{1}{16}$ inch. The dimensions and construction of the tab will vary somewhat for different strengths of metal. For heavier or stronger metals, the fourth leg 50 may be shorter and at the same time the third leg 48 and the second leg 46 can be longer to provide greater leverage in removing the cap portion from a bottle. More resilient metal can also be used for the cap 18 so that the various portions thereof will resume their original shape after being deformed and removed from a bottle. In such an instance, the cap can be adapted for repeated use.

Various modifications of the above described embodiment of the invention will be apparent to those skilled in the art and it is to be understood that such modifications can be made without departing from the scope of the invention, if they are within the spirit and tenor of the accompanying claim.

I claim:

A one-piece bottle cap comprising a circular top wall, a side wall structurally integral with said top wall and extending away therefrom, said side wall having a multiplicity of crimps in an outer portion thereof to fit with a neck bead of a bottle of the type containing liquid under pressure, a tab integral with an outer edge of said side wall, said tab including a first leg extending away from said outer edge, a second leg, a third leg bent from said second leg, said tab between said first and second legs contacting said side wall below said top wall when said third leg extends outwardly in a predetermined position from said side wall, said third leg having a concave portion near said second leg to fit with a reinforcing ridge of the bottle neck, and a fourth leg bent from said third leg and extending inside said side wall.

References Cited in the file of this patent

UNITED STATES PATENTS

1,978,272	Lawrence	Oct. 23, 1934
2,046,173	Lenhoff	June 30, 1936

FOREIGN PATENTS

485,915	Italy	Oct. 22, 1953
506,784	Italy	Dec. 24, 1954