Oct. 4, 1966 J. S. BOZEK 3,276,613

CROWN CAP

Filed Dec. 18, 1964

FIG. 1

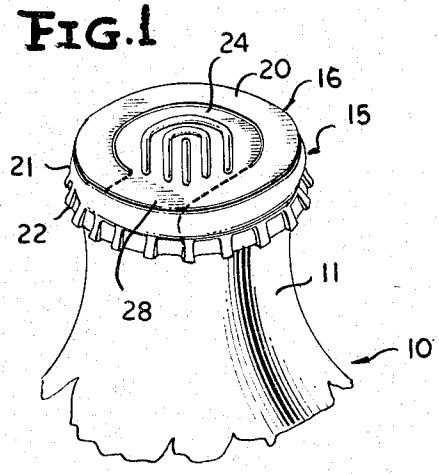


FIG. 2

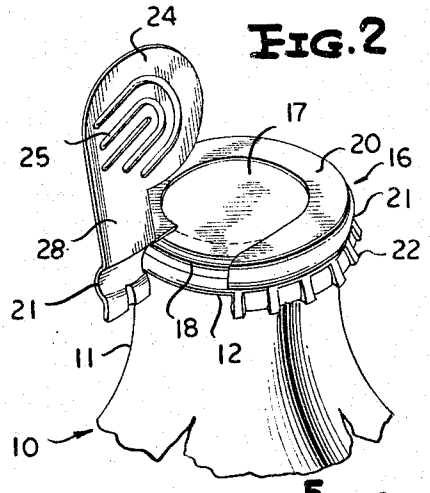


FIG. 3

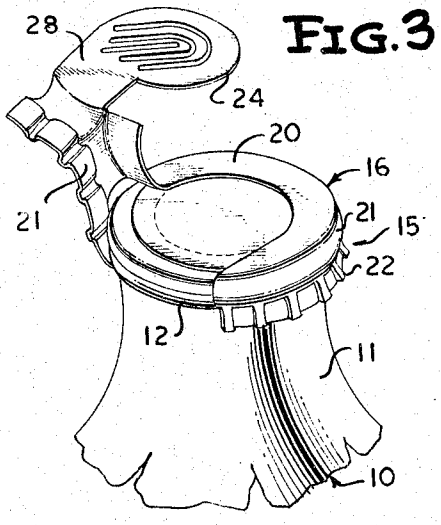


FIG. 4

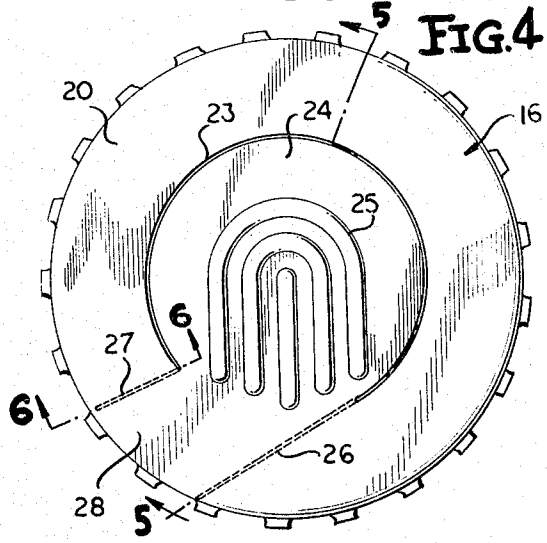


FIG. 5

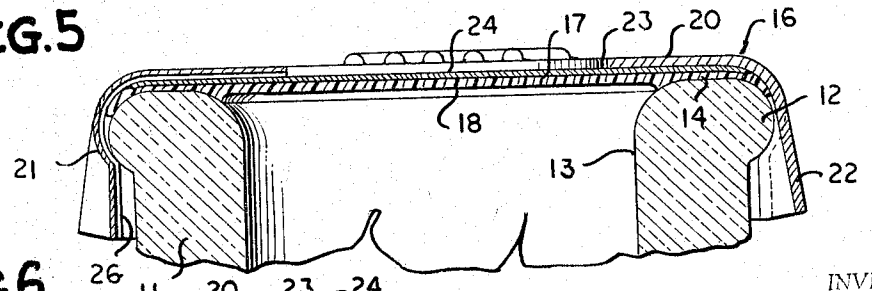
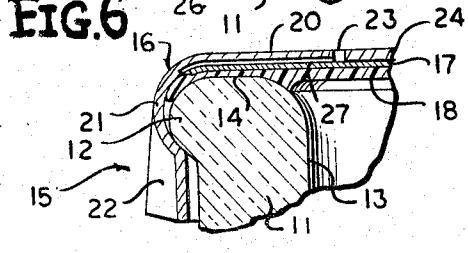


FIG. 6



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United States Patent Office

3,276,613

Patented Oct. 4, 1966

3,276,613

CROWN CAP

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Filed Dec. 18, 1964, Ser. No. 419,337
7 Claims. (Cl. 215—46)

This invention relates in general to new and useful improvements in closures for containers, and more specifically to a novel crown cap.

This invention particularly relates to a crown cap which is intended to be utilized as a closure for bottles containing products packaged under pressure. There are presently in use crown caps of the easy opening type with each crown cap including a crown shell which has an end panel thereof formed with a cut line defining a pull tab, and at least the end panel having weakening lines extending outwardly from the cut line to define a tear strip which may be torn from the crown shell with the pull tab in the opening of an associated bottle. This particular type of easy opening crown cap has several deficiencies which are very undesirable. In the first place, when the pull tab and tear strip are removed from the crown shell, this leaves a small strip of metal having sharp edges which is very apt to be dropped or thrown away and which can later injure a person. Secondly, when the pressure within the bottle is excessive, and the tear strip is torn entirely from the crown shell, the pressure within the bottle will effect a blowing off of the released crown cap. A third deficiency of existing types of crown caps is that when the tear strip is torn entirely from the crown shell and there is a sticking of the crown cap to the container, either a can or a bottle, there remains on the crown shell a sharp edge which may be accidentally engaged during one's effort to remove the crown cap from the container. A primary object of this invention is to provide a novel crown cap of the easy opening type which overcomes the afore-mentioned deficiencies.

In the past the tear strip has been in direct alignment with the pull tab so that one can easily pull the pull tab toward one's self and effect a tearing away of the tear strip. It is quite obvious that it is undesirable to pull a pull tab and tear strip toward one's self because of the sharp edges on the tear strip. It has been found that in lieu of having the tear strip aligned with the pull tab, if the tear strip is slanted with respect to the pull tab, the natural tearing action will be at an angle to one's self with the result that the tear strip will be torn from the crown shell along one edge thereof in advance of the tearing of the tear strip along the outer edge thereof and the crown shell can be completely ruptured through the skirt thereof without the tear strip being torn therefrom. By providing the crown shell with a tear strip which is completely tearable with respect to the remainder of the crown shell or only along one edge of the tear strip, it will be seen that the tear strip does not become separated from the crown shell and thus is not separately discarded. Also, since one still has a grip on the crown shell, it cannot be accidentally blown off of the container. Furthermore, since one is still gripping a portion of the crown shell after the rupture of the crown shell, the pull tab may be utilized for the purpose of pulling the crown cap off of the container.

A still further advantage of the crown cap of this

invention is that while the crown cap is still fixedly secured to the container, the crown shell may be ruptured at one point only and the crown cap sufficiently released from the container to effect a venting of gases from within the container while at the same time the crown cap is sufficiently firmly attached to the container to prevent the accidental blow-off of the same.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawing.

In the drawing:

FIGURE 1 is a top perspective view of the neck portion of a container with the open end of the container being closed by means of a crown cap formed in accordance with this invention.

FIGURE 2 is a top perspective view similar to FIGURE 1 showing the crown cap in its initial stage of being removed from the container.

FIGURE 3 is another top perspective view similar to FIGURE 1 and shows a further stage in the removal of the crown cap from the container.

FIGURE 4 is an enlarged plan view of the crown cap and shows the specific configuration of the crown shell thereof.

FIGURE 5 is an enlarged fragmentary vertical sectional view taken along the line **5—5** of FIGURE 4 and shows specifically the details of the construction of the crown cap and the relationship thereof with respect to the neck of the container.

FIGURE 6 is an enlarged fragmentary vertical sectional view taken along the line **6—6** of FIGURE 4 and shows further the details of the crown cap.

Referring now to the drawings in detail, it will be seen that there is illustrated in FIGURE 1 a container which is generally referred to by the numeral **10**. The container **10** is illustrated as being in the form of a bottle, but may be in the form of a can having the general configuration of a bottle. The container **10** includes a neck **11** which terminates at the upper end thereof in an outwardly directed bead **12** (FIGURE 5) and an open mouth **13** (FIGURE 5). As is also shown in FIGURE 5, the neck **11** of the bottle has a terminal end wall **14**. The container **10** is closed by a crown cap which is formed in accordance with this invention, the crown cap being generally referred to by the numeral **15**.

The crown cap **15**, as is clearly shown in FIGURE 5, includes a crown shell, generally referred to by the numeral **16**, a disc **17** positioned within the crown shell, and a sealing liner **18** underlying the disc **17** and in sealing engagement with the crown shell **16**.

The crown shell **16**, with the exception of the easy opening feature thereof, is of the same general configuration as customary crown shells and includes an end panel **20** and a depending skirt **21**. A lower portion of the skirt **21** is crimped, as at **22**, beneath the bead **12** of the container neck **11** so as to securely retain the crown cap **15** in place on the container **10**.

In order to facilitate the opening of the container **10** without the use of a conventional bottle opener, the crown shell **16** has formed in the end panel **20** thereof a cut line **23** which defines a pull tab **24**. The pull tab **24** is provided with suitable embossing or ribbing **25** to reinforce the pull tab **24** against bending and to increase the rigidity thereof. The cut line **23** is illustrated as being

circular, but it could be of other configurations. A first weakening line **26** extends from one end of the cut line **23** and extends down along the skirt **21**, as is shown in FIGURE 5. The weakening line **26** is preferably in the form of a score and the score has been illustrated as being on the inner surface of the crown shell **16**, although it is within the realm of this invention to place the score line in the outer surface of the crown shell **16**. Also, while it is preferred that the weakening line **26** extend entirely to the lower edge of the skirt **21**, it is feasible to terminate the weakening line **26** short of the lower edge of the skirt **21**.

The crown shell **16** is provided with a second weakening line **27** which is disposed generally parallel to the weakening line **26**, but is not necessarily parallel thereto. It is also to be noted that the weakening line **27** is disposed generally normal to the cut line **23**. The weakening line **27**, like the weakening line **26** is in the form of a score and is preferably formed in the inner surface of the crown shell **16**. The weakening line **27** terminates adjacent the intersection of the end panel **20** with the skirt **21**, but may extend into the skirt **21** a short distance, as is generally shown in FIGURE 6.

Referring once again to FIGURE 5 in particular, it will be seen that the disc **17** completely underlies the end panel **20** and serves to reinforce the same so as to prevent the accidental rupture of the liner **18**. On the other hand, the liner **18** extends outwardly of the disc **17** and is directly engaged with the skirt **21** so as to form a seal with the crown shell **16**, thus preventing any leakage of gas or liquid between the crown shell **16** and the disc **17**. The liner **18** is preferably of the molded-in-place type, but as far as this invention is concerned, it may be of any desired suitable type.

When it is desired to open the container **10**, one's fingernail is engaged beneath the pull tab **24** remote from a tear strip portion **28** of the end panel **20** which is defined by the weakening lines **26** and **27**. The pull tab **24** is thus lifted. After the pull tab **24** has been lifted a slight distance, it is grasped between one's fingers and pulled generally in the direction of the tear strip **28**. Due to the fact that the tear strip **28** is disposed at an angle with respect to the normal direction of pull exerted on the pull tab **24**, it will be seen that a tearing force is first exerted along the weakening line **26** and thereafter along the weakening line **27**. Thus, when one pulls the pull tab **24** in a normal opening operation, most of the tearing stress will be applied along the weakening line **26** and rupture of the crown shell **16** entirely through the skirt **21** thereof along the weakening line **26** will be assured. At the same time, in view of the fact that the tearing force is primarily concentrated along the weakening line **26**, after the tear strip **28** has been torn from the end panel **20** along the weakening line **27**, the tearing of the tear strip **28** along that general line will discontinue and the tear strip **28** will remain attached to the crown shell along the skirt thereof, as is clearly shown in FIGURE 2. It is to be understood that when the skirt **21** of the crown shell is ruptured along the weakening line **26**, there will be a slight releasing of the pressure exerted on the disc **17** and the liner **18** by the crown shell **16** with the result that the portion of the liner **18** in the vicinity of the rupture in the crown shell will be permitted to lift slightly so as to vent gases under pressure from within the container **10**. As the pull on the pull tab **24** continues, the tear strip **28** and a portion of the skirt **21** will swing around the general circumference of the container **10**, as is shown in FIGURE 2. At this time, it is pointed out that although the liner **18** may have lifted slightly with respect to the neck **11** of the container so as to vent gases under pressure from within the container **10**, this lifting will be relatively slight, and will not be noticeable in FIGURE 2.

Referring now to FIGURE 3 in particular, it is to be noted that a continued pull on the pull tab **24** in a direction circumferentially of the container **10** will result in the pulling away of the skirt of the crown shell **16** from beneath the bead or shoulder **12** sufficiently so that the entire crown cap may be removed as a unit. Although the liner **18** and the disc **17** have not been illustrated as lifting from the neck of the container in FIGURE 3, it is to be understood that the bonding of the liner **18** with respect to the crown shell **16** will be sufficient to effect the removal of the entire crown cap assembly as a unit when a further lifting force is applied to the pull tab **24**.

Although only a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the disclosed crown cap assembly without departing from the spirit and scope of the invention, as defined by the appended claims.

I claim:

1. In an easy opening crown cap assembly, a crown shell comprising an end panel and a depending skirt, said end panel being formed with a cut die defining a pull tab, said cut line having ends terminating in spaced relation, and partial depth score lines formed in said end panel outwardly from said cut line ends and defining a tear strip integrally connected to said pull tab, the relationship of said score lines and said cut line being such that the distance along one of said score lines from said cut line to said skirt is greater than the corresponding distance along the other of said score lines, and said one score line extending down said skirt with the other score line terminating adjacent the intersection of said end panel and said skirt, whereby when a pull is exerted on said pull tab, said crown shell will rupture along said score lines with said skirt being parted along said one score line and said tear strip and pull tab remaining attached to said skirt for facilitating the removal of said crown shell.

2. The crown shell of claim **1** wherein said tear strip slopes generally away from the portion of said one score line extending along said skirt whereby the motion required to remove said crown shell is a continuation of the motion required to tear said crown shell along said score lines.

3. The crown shell of claim **1** wherein said one score line is in aligned continuing relation with respect to said cut line.

4. The crown shell of claim **1** wherein said one score line is in aligned continuing relation with respect to said cut line, and said tear strip slopes generally away from the portion of said one score line extending along said skirt whereby the motion required to remove said crown shell is a continuation of the motion required to tear said crown shell along said score lines.

5. The crown shell of claim **1** wherein said cut line is generally circular, said one score line extending generally tangentially from said cut line at one of the ends thereof, and said other score line extending generally normal from said cut line at the other end thereof.

6. The crown shell of claim **1** wherein said cut line is generally circular, said one score line extending generally tangentially from said cut line at one of the ends thereof, and said other score line extending generally normal from said cut line at the other end thereof, and said tear strip slopes generally away from the portion of said one score line extending along said skirt whereby the motion required to remove said crown shell is a continuation of the motion required to tear said crown shell along said score lines.

7. A crown cap assembly of the easy opening type comprising a crown shell having an end panel and a depending skirt, said end panel being formed with a cut line defining a pull tab, said cut line having ends terminating in spaced relation, and partial depth score lines formed in said end panel outwardly from said cut line ends and defining a tear strip integrally connected to said pull tab, a disc underlying said end panel and bearing on said end panel outwardly of said pull tab, and a sealing liner completely underlying said disc and sealed relative to said crown shell

along portions of said skirt, the relationship of said score lines and said cut line being such that the distance along one of said score lines from said cut line to said skirt is greater than the corresponding distance along the other of said score lines, and said one score line extending down said skirt with the other score line terminating adjacent the intersection of said end panel and said skirt, whereby when a pull is exerted on said pull tab, said crown shell will rupture along said score lines with said skirt being parted along said one score line and said tear strip and pull tab remaining attached to said skirt for facilitating the removal of said crown shell.

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