

Aug. 10, 1965

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3,199,705

THREE-PIECE EASY OPENING CROWN CAP CLOSURE

Filed Nov. 4, 1963

2 Sheets-Sheet 1

FIG. 1

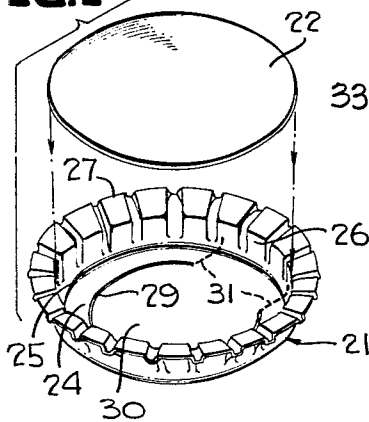


FIG. 2

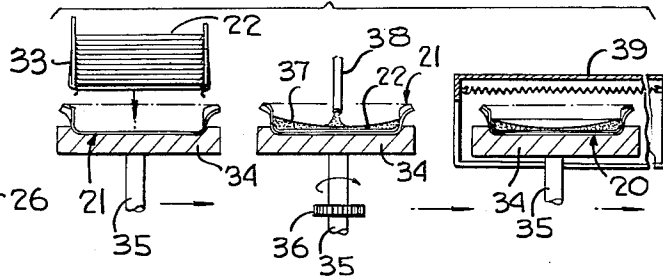


FIG. 3

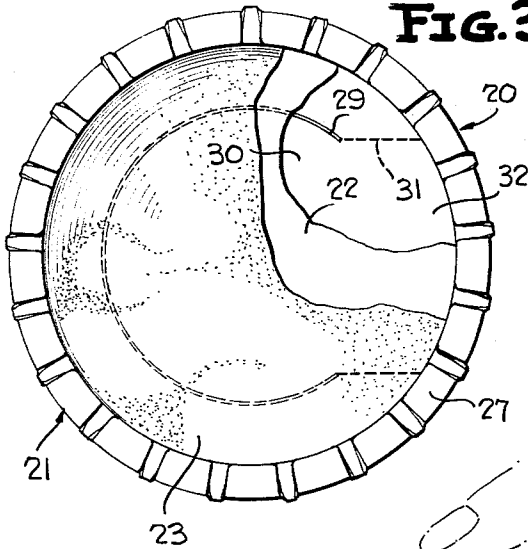


FIG. 4

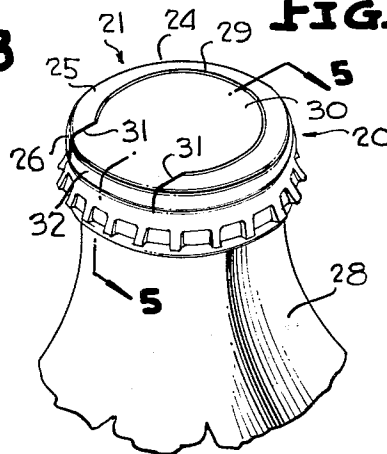


FIG. 5

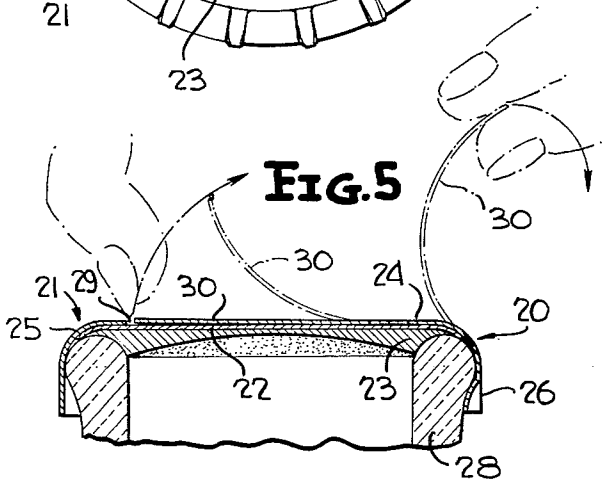
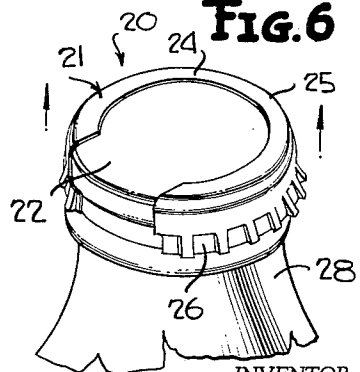


FIG. 6



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FIG. 7

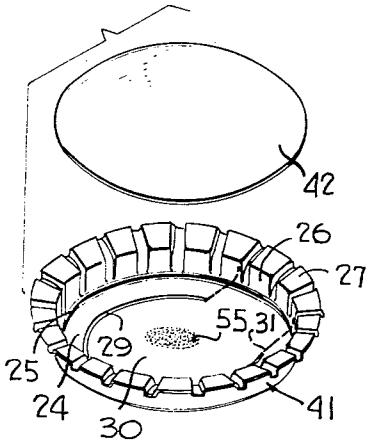


FIG. 8

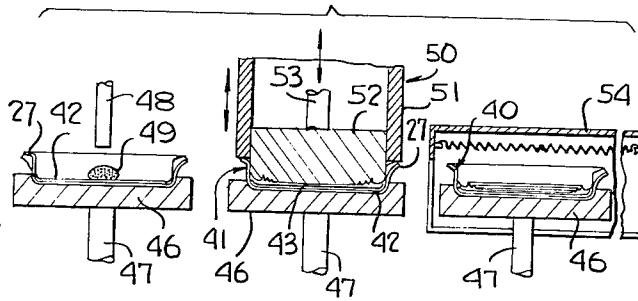


FIG. 9

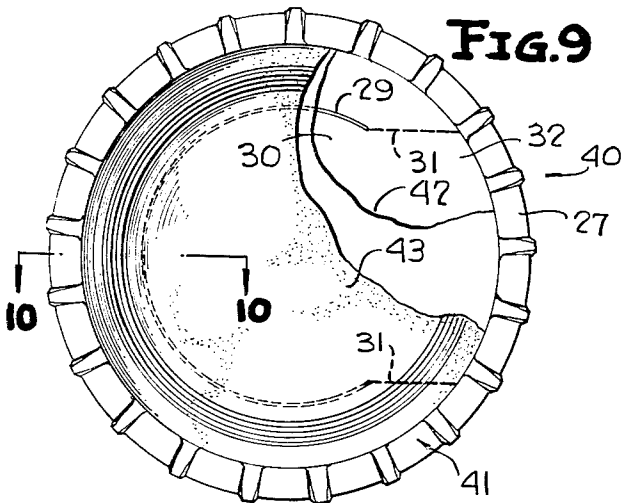


FIG. 10

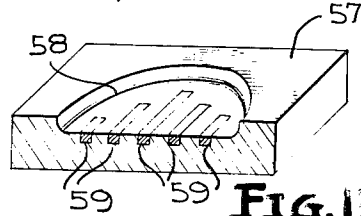
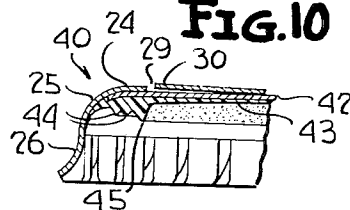


FIG. 13

FIG. 11

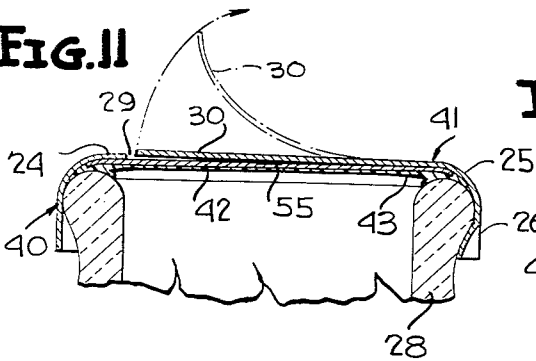


FIG. 12

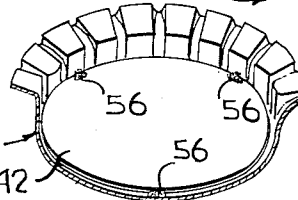


FIG. 14

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THREE-PIECE EASY OPENING CROWN CAP CLOSURE

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3 Claims. (Cl. 215—46)

This invention relates in general to new and useful
improvements in closures for containers, and more par-
ticularly to a novel closure of the crown cap type.

At the present time the commercially produced crown
caps for bottles are of a construction wherein it is neces-
sary that a special opener be utilized in the removal of
the crown cap. There are many instances where a person
desires to open a bottle closed by a crown cap and an
opener is not available. Unconventional types of open-
ers, including pliers, a ledge on a piece of machinery,
etc., are then brought into use with the portion of the
bottle engaged by the crown cap often being chipped in
the removal of the crown cap with the result that the
drinking of the contents of the bottle becomes a dan-
gerous undertaking. Accordingly, it is the primary object
of this invention to provide a novel crown cap which
is constructed in a manner wherein a locking portion of
the shell thereof may be torn therefrom and the crown
cap removed from a bottle without the use of any open-
ing device.

In accordance with this invention it is proposed to
provide a conventional type of crown cap shell with a
central removable portion cut therefrom and defining a
pull tab which is integral with a tear strip portion, and
the crown cap shell being further formed whereby a pull
on the pull tab will result in the removal of the tear strip
portion from the shell and the severing of the locking
portion of the shell whereby the remaining part of the
locking portion of the shell is free to be expanded in the
manual removal of the crown cap from an associated
bottle.

In view of the fact that the crown cap shell is to be of
a perforate construction, the crown cap shell per se can
no longer function as a closure. Accordingly, in accord-
ance with this invention, it is further proposed to pro-
vide the specially formed crown cap shell with a sealing
disc disposed in backing relation to the cut portion of the
shell with the disc performing the sealing requirement
normally fulfilled by a conventional type of shell.

It is a further object of this invention to provide the
two-piece crown cap assembly set forth above with a
lining which performs the dual function of securing the
disc within the shell and forming a seal between the
crown cap shell and disc on the one hand and a bottle
on the other hand when the crown cap assembly is in
place on a bottle.

Still another object of this invention is to provide a
novel three-piece crown cap closure which is of the easy
opening type and which three pieces include a shell, a
disc within the shell and a liner securing the disc in the
liner being effective to form the required seal of the
crown cap closure with a bottle, and the shell being spe-
cially formed so that it may be readily torn from a bot-
tle without the use of any type of opening device.

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Another object of this invention is to provide a novel
method of assembly and securing together the com-
ponents of an easy opening crown cap closure which in-
cludes a shell and a disc seated within the shell, the meth-
od including the steps of spinning the assembled shell
and disc and while so spinning these members, applying a
lining material to the interior of the shell with the lining
material being of a relatively free flowing type so that it
is spun out past the edge of the disc onto the shell and
bridges the shell and disc to form a seal between the two
and simultaneously functions to retain the disc within
the shell.

Another object of this invention is to provide a method
of forming a three-piece easy opening crown cap closure
of the type including a shell specially adapted to be
manually torn from a bottle and a disc within the shell
covering perforate portions thereof, the method includ-
ing the steps of applying a glob of lining material on the
disc and then pressure molding the lining material so that
it flows outwardly to define an outer sealing portion spe-
cially configured to form an effective seal with a bottle,
the outer sealing portion extending outwardly beyond the
disc and being adhesively secured to the shell whereby
the lining material also functions to retain the disc in
the shell and form a seal between the disc and the shell.

Still another object of this invention is to provide a
novel method in accordance with the foregoing wherein
the disc is initially secured to the shell prior to the appli-
cation of the lining material whereby the disc is held in
the proper position and when the lining material is pres-
sure molded within the shell and the die utilized for this
purpose is removed, the lining material and the disc will
not adhere to the die and be removed from the shell.

With the above and other objects in view that will here-
inafter appear, the nature of the invention will be more
clearly understood by reference to the following detailed
description, the appended claims and the several view il-
lustrated in the accompanying drawings.

In the drawings:

FIGURE 1 is an exploded perspective view showing
the disc and shell prior to assembly.

FIGURE 2 is a schematic sectional view taken through
apparatus showing the sequence of assembling the crown
cap closure.

FIGURE 3 is a bottom view of the crown cap closure
and shows the specific relationship of the components
thereof.

FIGURE 4 is a fragmentary perspective view of a neck
portion of a bottle having the crown cap of this inven-
tion applied thereto.

FIGURE 5 is an enlarged fragmentary vertical sec-
tional view taken along the line 5—5 of FIGURE 4 and
shows the crown cap closure attached to the bottle, the
view also showing in phantom lines the several positions
of the shell in the process of removing the crown cap
closure from the bottle.

FIGURE 6 is a fragmentary perspective view similar
to FIGURE 4 and shows a portion of the shell removed
whereby the grip of the shell on the bottle is released.

FIGURE 7 is an exploded perspective view showing a
crown cap shell and disc prior to assembly.

FIGURE 8 is a schematic vertical sectional view taken
through apparatus for the application of a lining to the
interior of the assembled shell and disc.

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FIGURE 9 is a bottom view on a large scale of the crown cap closure.

FIGURE 10 is a fragmentary vertical sectional view taken through the crown cap closure and shows the specific cross section of the lining thereof.

FIGURE 11 is an enlarged fragmentary vertical sectional view taken through the crown cap closure applied to a neck of a bottle and shows the specific details of the crown cap closure, the removable portion of the shell being shown in a partially removed position by phantom lines.

FIGURE 12 is a fragmentary bottom perspective view of an assembled shell and disc with a portion broken away and shown in section, the disc being welded to the shell.

FIGURE 13 is a fragmentary top perspective view with parts broken away and shown in section of a magnetic platen.

FIGURE 14 is a top perspective view with parts broken away and shown in section of a vacuum platen.

Referring now to the drawings in detail, it will be seen that there is illustrated in FIGURES 3, 4 and 5 a crown cap closure, generally referred to by the numeral 20. The crown cap closure 20 is of the easy opening type and is formed of three pieces. These pieces include a shell, generally referred to by the numeral 21, a disc 22 and a lining 23.

The shell 21 is of the same general configuration as a conventional type of crown cap shell and includes an end panel 24 which may be slightly crowned, an outer transversely curved portion 25 and a depending fluted or crimped skirt 26. The skirt 26 initially has a pronouncedly flared edge portion 27 which is conventional and which permits the crown cap closure 20 to be readily positioned on a bottle 28. The edge portion 27 is then deformed inwardly around the neck portion of the bottle 28 in a conventional manner to snugly secure the crown cap closure 20 on the bottle 28 in sealed relation. At this time the lining 23 functions to form an effective seal between the crown cap closure 20 and the bottle 28 while the crimped skirt 26 retains the crown cap closure 20 on the bottle 28 in the conventional manner.

In order that the bottle 28 may be readily opened without the use of any type of opener, the end panel 24 is provided with a cut line 29 which defines a pull tab 30. It is to be noted that the cut line 29 is generally C-shaped in outline and is preferably concentric with the outline of the end panel 24. The opposite ends of the cut line 29 terminate in a pair of parallel score lines 31 which extend generally radially outwardly across the remainder of the end panel 24 and around the outer transversely curved portion 25. It is to be understood that the extent of the score lines 31 may vary depending upon the depth thereof, the pull desired to effect the opening of the bottle 28 and the pressure requirements of the crown cap closure. However, normally the score lines 31 will terminate in an upper part of the skirt 26 and short of the crimping or fluting thereof.

The disc 22, which is preferably formed of metal but may be formed of any suitable material, is of a size to completely underlie the cut line 29 and a major portion of each of the score lines 31. The general configuration of the disc 22 and the relationship thereof with respect to the shell 21 is clearly shown in FIGURE 5.

The lining 23 may cover the inner surface of the crown, as is clearly shown in FIGURE 3, but ring type liners may also be used. The lining 23 may be formed of any suitable sealing material which would be customarily utilized in conjunction with crown caps and which would adhere to the material of the shell 21 and the disc 22. It is to be understood that this invention is not restricted to the material of the lining 23 although at the present time when the disc and the shell are lacquered with a vinyl resin coating, presently utilized types of vinyl chloride plastisols may be utilized. However, certain

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plastisols have been developed so as to eliminate the necessity for lacquering. Rubber base sealing compositions dispersed in solvents or water base latices may also be used. Furthermore, as far as this invention is concerned, it is immaterial as to whether or not the disc and shell are lacquered and the type of the lining material is immaterial as long as it meets with the requirements of the conventional types of crown cap closures and will adhere to the shell and disc either coated or uncoated, as desired, under the particular circumstances.

It will be seen that the lining 23, which covers the inner surface of the closure is shaped for the proper engagement with the mouth of the bottle 28 to form a seal therewith, and at the same time bridges across the peripheral edge of the disc 22 and the adjacent material of the shell 21 so that the lining 23 serves as means for retaining the disc 22 within the shell 21 and forming a seal between the disc and the shell.

When it is desired to open the bottle 28 closed by the crown cap closure 20, one's finger nail is inserted beneath the pull tab 29, and the pull tab 28 is lifted so that it may be gripped between one's fingers as is shown in the upper right-hand portion of FIGURE 5. An upward pull on the pull tab 30 generally towards the score lines 31 will result in the movement of the pull tab 30 out of the plane of the end panel 24, as is shown in FIGURE 5 and further movement of the pull tab 30 will result in the rupture of the shell 21 along the score lines 31. A continued movement of the pull tab 30 will result in a complete tearing away of a tear strip portion 32, generally defined by the score lines 31, entirely through the skirt 26 so that the gripping force of the crimped skirt 26 on the neck of the bottle 28 is eliminated, the crown cap closure 20 being shown with the shell 21 thereof interrupted in FIGURE 6. By controlling the removal movement of the pull tab and tear strip, either the tear strip may be completely torn from the shell 21, as is shown in FIGURE 6, or in a continuous movement the tear strip may be utilized to completely rupture the skirt 26 in alignment with one only of the score lines 31 and the same shell tearing motion may be utilized in the removal of the entire crown cap closure 20 from the bottle 28.

When the tear strip 32 is torn from the shell 21, then the shell 21, together with the disc 22 and the lining 23, will merely be lifted off of the bottle 28 in the direction of the arrows shown in FIGURE 6.

Reference is now made to FIGURES 1 and 2 in particular wherein it will be seen that the shell 21 and the disc 22 are separately formed. The disc 22 is dropped into the shell 21 in any desirable manner utilizing for example a suitable hopper 33. At this time the shell 21 may be mounted within a suitable holder 34 which is mounted on a shaft 35 for rotation about the axis of the shaft 35. After the disc 22 has been dropped into the inverted shell 21, the holder 34 is rotated, for example by rotating the shaft 35 by means for a gear 36. As the assembled shell 21 and disc 22 are being rotated, the lining material 37 is being applied in the center portion of the shell 21 by means of a nozzle 38 as is shown in the middle portion of FIGURE 2. Since the shell 21 is being rapidly rotated, it will be seen that the lining material 37, which is readily flowable, will flow outwardly so as to cover the inner surface of the disc 22 and to the skirt 26 to assume the position best shown in FIGURE 2. It will be apparent that the lining material 37 overlaps the peripheral edge of the disc 22 and both forms a seal between the disc 22 and the shell 21, and serves to hold the disc within the shell during the shipment and handling of the crown cap closure 20.

After the assembling of the crown cap closure 20 is completed, it is transferred into a suitable oven 39 wherein the lining material 37 is baked or otherwise set or cured. The three-piece crown cap closure 20 is now

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complete and ready for assembling on a bottle 28 in the manner previously described.

Referring now to FIGURES 9, 10 and 11, it will be seen that there is illustrated a modified form of crown cap closure, generally referred to by the numeral 40. The crown cap closure 40 is very similar to the crown cap closure 20 and includes a shell 41, which may be identical with the shell 21. A disc 42, which may be identical with the disc 22 is positioned with the shell 41 and is retained in place therein in sealed relation with respect to the shell by means of a lining 43. In lieu of being in the form of a spun ring, the lining 42 is molded to define a plurality of concentric pointed rings 44 and 45 which are deformable for forming a desired seal with the mouth of the bottle 28. The seal between the lining 43 and the bottle 28 is best shown in FIGURE 11. The lining 43, although it is molded as opposed to being spun, as in the base of the lining 23, also extends outwardly beyond the periphery of the disc 42 and is bonded to the inner surface of the shell 41 outwardly of the peripheral edge of the disc 42. Thus, the lining 43 forms an effective seal between the disc 42 and the shell 41 separate and apart from the seal formed by the lining 43 between the crown cap closure and the bottle 28.

Referring now to FIGURE 8 is particular, it will be seen that after the disc 42 is positioned within the shell 41, the assembled disc and shell are positioned within a platen 46 which is carried by a suitable support 47. As the platen 46 moves past a nozzle 48, a glob 49 of lining material is disposed on the central portion of the disc 42. Then the assembled disc and shell are moved beneath a suitable die or mold structure generally referred to by the numeral 50. A cylindrical hold down member 51 is brought to bear against the pronounced flared edge portion 27 of the shell skirt so as to clamp the shell 41 within the platen 46. In certain instances the hold down member 51 will not be required and in lieu thereof some other device which performs only a stripping operation will be provided. Then a die or mold member 52 having a configurated undersurface is moved down towards the disc 42 by means of a plunger 53 and serves to effect the outward flowing and shaping of the glob of lining material.

While there is a tendency for the molded lining 43 to adhere to the die or mold 52 and be elevated therewith together with the disc 42 when the mold 52 is withdrawn, this does not normally happen if the lining material flows past the edge of the disc 42 and adheres to the shell 41. However, it might be desirable to adhere or fasten the disc 42 to the shell 41 temporarily or permanently during the insertion of the disc or during molding of the liner to maintain the proper positioning or to make sure the liner and disc are not pulled out during the molding operation.

After the application of the contoured lining 43, the crown cap type closure assembly 40 is transferred into an oven 54 for the purpose of curing the lining material and then effecting the bonding of the lining material to both the disc 42 and the shell 41.

There are numerous manners of maintaining the positioning and centering and preventing the separation of the disc 42 from the shell 41 during the withdrawal of the die or mold 52 after the shaping operation on the glob 49 of lining material. In FIGURE 7 the underside of the shell 41 is provided with a glue 55 so as to adhesively secure the disc 42 to the shell 41 sufficiently to prevent the accidental movement of the disc during handling and removal of the disc 42 from the shell 41 at the end of the lining molding operation.

In FIGURE 12 the disc 42 is illustrated as being secured to the shell 41 by means of a plurality of spot welds 56. The number and pattern of the welds 56 may be varied, as desired.

It is not necessary to secure the disc 42 to the shell 41

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to prevent the accidental removal of the disc 42 together with the molded lining 43. The securing of the disc 42 in place during the molding operation may be accomplished by utilizing a special platen 57 which differs from the platen 46 in that the crown cap receiving socket 58 thereof is provided with a plurality of magnetic bars 59. The bars 59 apply a sufficient attractive force on the disc 42 to retain the disc in place during the liner molding operation.

If it is desired to provide suitable disc retaining means which will function when the disc is formed of materials other than magnetically attractive metals, a platen 60 illustrated in FIGURE 14 may be utilized. The platen 60 is of the non-magnetic type and the base of the socket 61 formed therein may be provided with a vacuum passage 62 to which a plurality of grooves 63 are connected. A suitable fitting 64 connects a vacuum line 65 to the vacuum passage 62. It is to be understood that the vacuum of the platen 60 may be effective on the crown cap closure 40 through the cut lines 29 thereof to effect a vacuum hold down force on the underside of the disc 42.

It is to be understood that in accordance with this invention, it is preferable that the shells of the several crown cap closures, with the exception of the easy opening features thereof, be of a conventional construction and that the lining materials are preferably conventional lining materials. It is not intended in any way to limit this invention to either specific lining materials or specific materials for the formation of the shell and disc. It is, however, essential that the lining material in addition to performing its usual function of effecting a seal between the crown cap and the associated container, also serves to form a seal between the shell and the disc. When the disc is not secured to the shell in advance of the application of the lining material, it is also desirable that the lining material serve to retain the disc within the shell. Also, it is desirable that the disc remain associated with the shell during the removal of the crown cap from the bottle to reduce to a minimum the number of the separate components that have to be removed from the bottle.

In accordance with this invention, when it is desired to open a bottle closed with one of the crown cap closures of this invention, it is merely necessary to initially lift up on the pull tab portion 30 with one's finger nail. After the pull tab portion 30 has been lifted out of the plane of the end panel 24, it may be gripped between one's thumb and forefinger and a tension applied thereto in the manner shown in FIGURE 5 so that the tear strip 32 may be torn from the remainder of the shell along the score lines 31 and down across the skirt 26 and through the peripheral edge thereof. Although the pull tab 30 has been illustrated as being plain, it is to be understood that it may be configurated to effect the gripping thereof and the configuration of the gripping surface may be ornamental, if desired.

Although only preferred embodiments of the invention have been specifically illustrated and described herein, it is to be understood that minor variations may be made in the disclosed easy opening crown cap closure within the spirit and scope of this invention, as defined in the appended claims.

I claim:

1. An easy opening crown cap closure comprising a shell including an end panel and a skirt, a cut line in said end panel defining a pull tab readily bendable out of the plane of said end panel and an end panel wall portion completely surrounding said pull tab, said cut line having spaced ends, a pair of weakening lines extending across said end panel wall portion outwardly from the ends of said cut lines and partially down said skirt to define a tear strip integrally connected to said pull tab for removal thereby, a rigid metal reinforcing disc bridging said pull

tab and being firmly seated on said end panel wall portion to prevent the rupture of the crown cap closure by inward deflection of said pull tab, and a sealing liner bonded to both said shell and said disc to seal against flow around said disc and between said disc and said liner.

2. The crown cap closure of claim 1 wherein said sealing liner completely overlies said metal disc and has an outer portion particularly adapted to form a seal with a container neck.

3. The crown cap closure of claim 1 wherein substantially all of said cut line is of a constant radius and has a center located at the center of said end panel.

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