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3,380,609

ROLL-ON CROWN WITH RING TAB

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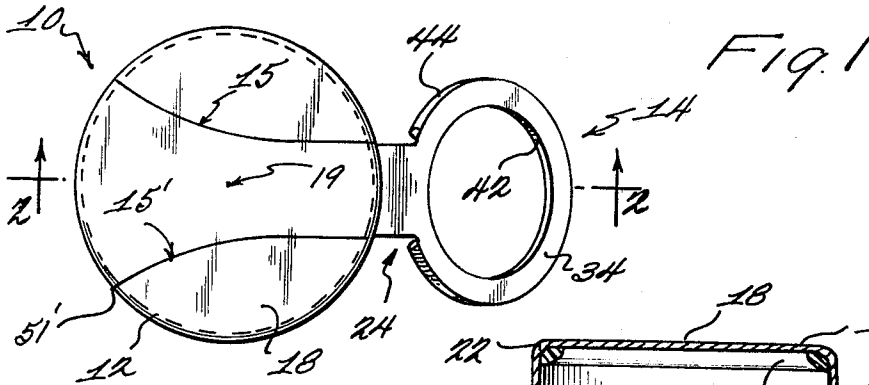


Fig. 1

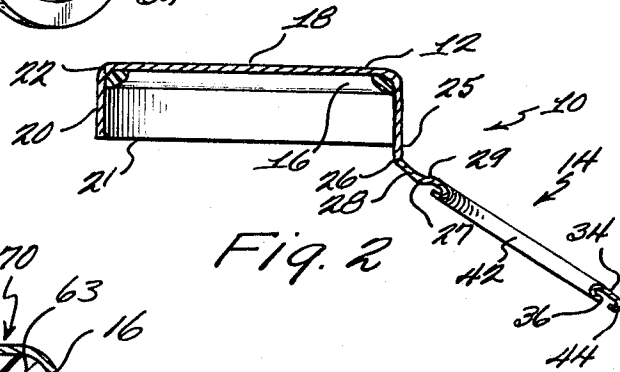


Fig. 2

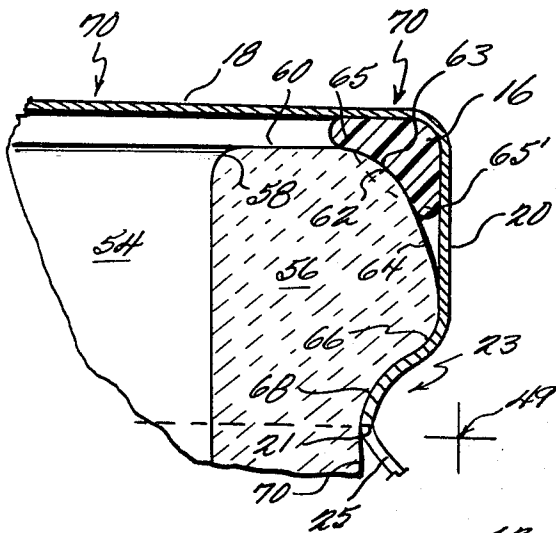


Fig. 3

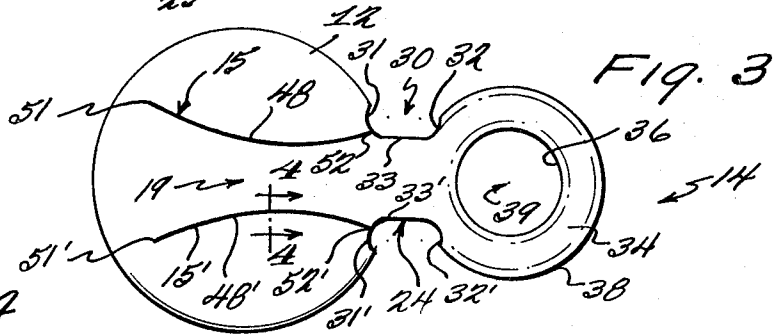
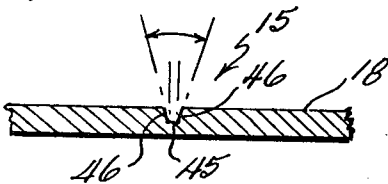


Fig. 4



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ROLL-ON CROWN WITH RING TAB

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ABSTRACT OF THE DISCLOSURE

A roll-on type tear-off closure for containers having a depending ring tab connected to the tear strip body of the closure by a short flange. The tear strip is formed by arcuate score lines in the closure shell and the inner and outer edges of the ring tab are turned downwardly and toward one another to provide smooth gripping edges.

This invention relates to an improved closure for containers and more particularly to an improved tear-off closure of the roll-on type, and to a method for using the same. Specifically, this invention relates to a new ring tab for roll-on closures of the tear-off type, as well as certain other specific improvements to be more apparent hereinafter.

Roll-on closures of the tear-off type are known, for example, in the copending and commonly assigned application of Scharf et al., Ser. No. 367,434, filed May 14, 1964, now Patent No. 3,246,784, dated Apr. 19, 1966, and typically comprise a light gauge cup-shaped metal shell with a relatively smooth top wall and a depending cylindrical side wall capable of being rolled about a bead on a container mouth. The top wall is provided with an incision defining a pull tab that is adapted to be raised up by the finger of a user, then to be pulled back with a tearing action to remove the shell from the container mouth. A metallic disc is provided inside of the metal shell to prevent leakage through the pull tab incision, and a gasket is provided inside the metal disc and aluminum shell to seal the disc and shell structure against the container mouth. Usually, the gasket is a resilient sealing liner, for example of a plastisol material, which is inserted or applied to the inside of the closure shell in the area where the top thereof meets the depending side walls. In applying the closure to the container mouth, a pressure is applied against the top of the closure to compress the sealing liner against the upper closure mouth while the side walls are being rolled on, formed, or crimped about the lower outside mouth of the container to provide a good seal until the closure is removed by tearing. The pull tab or tear tab, as they are sometimes called, may also take the form shown in Scharf Patent No. 3,195,755 or Luviano Patent No. 3,195,756, both dated July 20, 1965.

Another removable sealing cap assembly has been proposed by Taylor et al. Patent No. 3,130,056, dated Apr. 21, 1964, by Hart Design Patent No. 200,884, dated Nov. 13, 1965 and by Koll Patent No. 3,216,602, dated Nov. 9, 1965. Each of these patents generally provides a light gauge metal shell that has no incision through the top or uppermost sides thereof but is provided with a depending tongue or tab that is aligned with score lines passing up from the tab along the sides of the closure and at least onto the top thereof, usually passing completely across the top and terminating at the other side thereof or slightly down the depending side walls on the opposite side from the tongue and beginning of the score lines. The tear tongue or tear tab usually extends downwardly from the closure and lies snugly against the tapering neck por-

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tion of the container. This is desired since a tongue or tear tab that projects upwardly or outwardly from the closure would be subject to objectionable accidental twisting or tearing during ordinary handling and vending, which might cause leakage, or loss of pressure, or simply a non-eye-appealing appearance to the consumer.

It is of course the general object of tear tabs, pull tabs and the like to permit opening of beverage containers simply and easily by the fingers of the ordinary user and without the use of other appliances or instruments. It is particularly desired in the usual case of tear tabs and pull tabs to be removable with the littlest possible effort, for example, even by the fingers of a child, while yet providing a sufficient balance of strength to insure that the beverage will not leak from the container or undergo a leakage or loss of pressure prior to use, even after ordinary handling.

One objection to the use of most pull tabs and tear tabs is that they are difficult to grasp by the finger of a user, since the pull tab normally lies where it is difficult to grasp, for example in the plane of the metal shell. According to Scharf et al. Patent No. 3,246,784 and Scharf Patent No. 3,195,755, it is intended that the pull tab or tear tab will raise slightly above the surface of the metal shell when the metal shell is bowed slightly upward through the combined action of the pressure in the beverage container and the stretching and twisting forces resulting from application of the closure to the container mouth by rolling or crimping. In Luviano Patent No. 3,195,756, this effect is accentuated by forming the edges of the pull tab to provide a better gripping surface that stands away from the remainder of the closure shell and by providing a recessed area in the metallic liner, thus offering still greater separation from the closure shell and a better finger gripping area. However, while the type of tear tab or pull tab just described is desirable in many instances due to compact size and certain economies in production, these tabs are not completely satisfactory in all instances of use because the tabs integrally formed from the top surface of the metal shell are still generally difficult to grip. That is, the pull tab is usually not separated sufficiently from the remainder of the metal shell to be gripped easily by a finger, and it is often necessary to raise the tab by prying with a finger nail or even with a sharper and stronger object, such as a knife point.

One advantage of the depending tear tongue type construction is that it makes possible the elimination of a separate metal disc beneath the closure shell since no incisions, prior to opening, pass completely through the metal shell and hence, sufficient sealing is obtained through use of a single metal shell and gasket disposed therein. However, this structure is subject to the disadvantage that the tear tongue or tear tab lying against the container neck is difficult to raise by the fingers of a user and is difficult to grasp and apply sufficient force to easily tear the closure of the container. There is also the objection that most, if not all, of these tear tongues and tear tabs in the art of roll on closures for beverages under pressure, are formed of flat pieces of metal which raise the possibility of injury to the finger of the ordinary user, particularly children. Also, the existing tear tongues and tear tabs provide relatively little surface area and a relatively difficult shape to be easily grasped by the fingers of a user while applying force sufficient to remove the closure from the container. This is particularly difficult if moisture or other lubricating material is present on the tear tongue or on one's fingers.

It is therefore a principal object of this invention to

provide an improved tear off closure of the roll on type which will avoid the objections of present and prior art constructions and provide a tear tab or tear tongue that is better suited to the fingers of a user.

It is another principal object of this invention to provide a tear off closure of the roll on type with an improved tear tongue or tear tab that will permit greater ease of use by the ordinary consumer, and strike a better balance between the desires of the consumer for greater ease of removal, and the desires of the bottling trade for avoiding damage during handling and vending by the use of a tear off device that is too easily grasped by undesired objects.

Other and further objects of this invention, together with an appreciation for the advantages thereof, will become more apparent as this description provides.

Broadly stated, the foregoing and other objectives are accomplished by providing a roll on closure of the tear off type with a depending ring tab, as hereinafter described. The objects of the invention are also generally satisfied, and certain advantages obtained by providing a ring tab of specific shape which is connected to the roll on closure by a flange of improved configuration, and by providing score lines of a different shape than heretofore known. Certain advantages are also obtained and economies realized with the sealing liner that is applied within the improved closure of the present invention, being specifically shaped to provide satisfactory sealing in use by reason of the general strength and yet good tearing qualities of the present closure, but employing lesser sealing material than has generally been employed heretofore in roll on closures.

The advantages of the invention are also illustrated in the drawing, wherein:

FIGURE 1 is a top plan view of the finished closure according to the present invention;

FIGURE 2 is a cross sectional side elevation taken along lines 2—2 in FIGURE 1;

FIGURE 3 is a plan view of the blank that is employed in forming the improved closure according to the present invention, and showing the particular shape of the connecting flange, metal areas used to form the ring tab, and showing the score line configuration according to the present invention;

FIGURE 4 is a broken out sectional view taken along lines 4—4 in FIGURE 3 to show the shape of the groove defining the score lines; and

FIGURE 5 is a broken out sectional view, greatly enlarged, showing a portion of the closure and sealing liner according to the present invention, applied to a container mouth of a known type.

Turning now to the drawings, the closure according to the present invention, indicated generally by the reference numeral 10, is defined by two main parts, i.e., the shell member 12 and the ring tab member 14. The ring tab 14 is connected to the shell 12 by a flange indicated generally at 24, and two score lines, described in more detail hereinafter, are provided on the metal shell at 15 and 15' to facilitate tearing.

The shell 12 is formed preferably of a light gauge metal such as aluminum, for example, of 0.0009 inch thickness, that is formed around a center point 19 into a relatively flat top shell portion 18 and a depending right cylindrical skirt 20 generally terminating at 21. The skirt 20 is preferably connected to the flat top portion 18 through a smoothly rounded curve 22. While the top portion 18 is relatively flat in the relaxed state, it will be understood, according to the usual practice in the art, that the top portion 18 will become bowed slightly upwardly when the closure 10 is applied in sealing relation to a container of a fluid under pressure, due both to the force of the internal fluid pressure and due to the effect of the roll on type crimping action used to apply a closure of the present type to the container mouth. As an illustration, the shell 12 may be formed of a substantially circular metal

plate having a diameter of 1.438 inches which, after turning at 22 through corner radius of about 0.062 inch, will provide a closure having 1.065 inch internal diameter and an overall skirt height of 0.245 inch. A resilient sealing liner, preferably formed from a resilient vinyl chloride plastisol material, for example of the type disclosed in Wilckens U.S. Patent No. 3,047,176, dated July 31, 1962, is disposed on the interior of the closure where the cylindrical skirt 20 meets the top portion 18. In the relaxed state, the sealing liner 16 is generally described as a small circular ring having an outward rounded curved shape on a center line outside the shell and eccentric toward the side of the skirt 20 with an inside diameter of 0.843 inch, such that the horizontal thickness is 0.100 inch and the vertical thickness is 0.131 inch.

The connecting flange, indicated generally at 24, depends from a portion of the cylindrical skirt 20, beginning with a downward segment 25 which lies in the plane of the skirt 20. The connecting flange 24 is then bent outwardly from segment 25 about a corner 26 on an 0.030 inch radius and is then bent upwardly at a corner 27 defining between the corners 26 and 27 a relatively flat plane 28. The connecting flange then rises at 29 to the plane of the ring tab 14 such that the area 28 is about 0.033 inch below the ring tab plane. Viewed in FIGURE 3, it will be seen that the connecting flange 24 is provided with cutouts generally indicated at 30, which are oval shaped by reason of the rounded corners at 31 and 31' and 32 and 32' which are turned about the center points shown such that in plan view the connecting flange 24 has relatively flat sides 33 and 33' terminating at either end in rounded corners 31, 32, etc. The utility of the arcs 31 and 31' is illustrated hereinbelow, while the rounded corners 32 and 32' facilitate formation of the ring tab edges 42 and 44, without tearing, and by providing smooth edges adjacent the connecting flange. The last mentioned center points are 0.700 and 0.890 inch from the center point 19 in the blank of FIGURE 3, while the connecting flange is about $\frac{3}{8}$ inch wide.

The ring tab 14 is oriented in side elevation with respect to the shell, at a minimum angle of about 30° and a maximum angle of about 45°. The minimum angle of 30° permits use of the present invention on metal beverage cans and glass cans; while the maximum angle permits use of the present invention on standard beer bottle shapes and the like, such that in either case the ring tab will lie reasonably snugly against the neck of the container with which it is used. As shown in FIGURE 3, the ring on the tab 14 is formed from a circular piece of metal 34 formed about the center line 39 and having an inner edge 36 with a diameter of about 0.515 inch and an outside edge 38 with a diameter of about 0.920 inch.

As shown in FIGURE 2, the edge 36 is turned downwardly and rearwardly through a smooth curve to provide a comfortable interior gripping edge 42 having a thickness of about 0.050 inch. The outer edge 38 is also turned downwardly and inwardly but along a sharper corner to provide the outside gripping edge 44. Since the outside edge 44 has a sharper curve than the inside edge 36, the upper surface 34 of the ring tab 14 will slant downwardly across the plane of the ring tab along an angle of about 17°. Since the inward edge 36 and the outward edge 38 terminates in a flat plane beneath the ring tab, the overall cross sectional shape of the ring tab will resemble an air foil. After formation, the inner gripping surface 42 will have a diameter of about 0.635 inch and the outer surface 44 will have a diameter of about 0.835 inch.

Turning to FIGURES 3 and 4, it will be seen that the score lines 15 and 15' are of circular arc shape, as indicated at 48, that are rotated about a center point that is remote from the center point of the shell 19, for example, as indicated by the point 49 which may be 1.429 inch vertically removed from the center point 19 and

0.286 inch horizontally removed from such center point. Thus, if the arcs 48 have a radius of 1.250 inch, they will curve inwardly from the beginning points 52 and 52' to a closest point of about 0.358 inch apart toward the center point 19 of the shell, but then begin to curve outwardly before reaching center point 19 to terminate at 51 and 51' which are preferably at the corner radius 22 or extend slightly thereover and down a portion of the right cylindrical skirt 20 as has been the practice in the art. Preferably, the score lines 15 have the truncated shape shown in FIGURE 4 with a narrow flat bottom 45 about 0.0025 inch wide, provided with outwardly sloping side wall 46 with an included angle of about 50°, the overall depth of the score lines being about 0.0045 inch to provide sufficient strength to retain a beverage under pressure within a container during sealing and handling, but to permit easy removal of the closure by tearing.

As shown in FIGURE 3, the score lines are not parallel with, or aligned with, the edges of the connecting flange, but preferably curve away from the connecting flange to intersect the arcs 31 and 31' at 52 and 52'. This configuration is desired for greater ease in tearing, and particularly greater ease in initiating a point of tear. That is, raising of the ring tab and connecting flange will create a bending and twisting action on the arcs 31 and 31'. The apex of the angle of twist or bend will be in the score lines. The arcs 48 and 48' also meet the arcs 31 and 31' approximately at the point of greatest shear. This construction therefore concentrates the shearing and bending stresses at two points to provide the most effective use of the force applied. The area to be torn from the closure is then narrowed, as the curved score lines 48 and 48' converge, to provide progressively faster and easier tearing, since progressively less metal must be bent and torn. Thereafter, the diverging shape of the score lines would cause an increase in the required tearing force if the closure was not already severed. Since the closure is half opened however, by tearing to the diverging area of the score lines, the force now required tends to simply remove the closure from the container rather than permit tearing completely through the closure. Hence, the closure will usually be removed with a single tearing operation.

As shown in FIGURE 5, the roll on closure according to the present invention is desirably applied to a suitable glass container, such as that described and claimed in Scharf et al. Patent No. 3,246,784, and having an opening 54 surrounded by a mouth 56. The mouth 56 is shaped from the relatively smooth straight opening 54 with a smooth outward curve 58 that terminates in a substantially horizontal plane 60 at the top of the container. The mouth then slopes downwardly a 62 through a larger curve that increases in radius through the area 64 and then decreases somewhat in radius at 66 to curve inwardly, then curving outwardly on a more gentle radius at 68 and dropping into the neck of the bottle at 70. The closure shell 12 is applied to the container with a vertical pressure indicated by the arrows 70 combined with a roll on crimping action that is applied against the lower cylindrical skirt 20 to compress the sealing liner 16 inwardly at 63 along the mouth curve 62, causing the liner to bulge outwardly at 65 and 65' such that the final shape is shown in solid lines, while the beginning shape is shown in dotted lines. The right cylindrical skirt will generally terminate along the line 21; while the straight portion 25 of the connecting flange for the ring tab will be curved slightly due to the roll on crimping action.

The closure of this invention can be fabricated in a sequence of metal forming operations that are known in the art. Typically, an almost continuous strip of light gauge metal will be provided with the score lines 15 and 15', and other shaped indicia, after which the metal blank shown in FIGURE 3 will be stamped out and then drawn into the shape of shell member 12. The ring tab formation,

shaping and edge turning may desirably take place prior to severing the blank from the metal strip. After formation of all elements, the closure may then be inverted for the application of an adhesive favoring lacquer coating, after which the plastisol liner is inserted either as an integral molding, or by spin casting, followed by curing.

Once the closure 10 has been assembled in the manner described above and it is desired to close a beverage container or the like, the closure 10 is pressed over the mouth of the bottle 54 with its skirt or side wall 20 depending downwardly about the mouth bead 56 as shown in FIGURE 5. By a suitable rolling and downwardly pressing operation, the lower free edge 21 of side wall 20 is stretched around the curved portion 62 and onto the inwardly curved portion 68 of the bead. Since the shell 12 of the cap 10 is preferably made of aluminum and is rolled and pressed downwardly and formed about the bead, the major portion of the cylindrical wall 20 of the shell 12 is also stretched and form fitted to the shape of the bead so that it assumes the shape thereof. As sealing pressure is applied to the cap 10, the liner 16 coacts with the upwardly facing surface 62 of the bead and expands or cold flows from the beginning shape indicated in dotted line, to move in either direction, as shown at 65 and 65', thus forming a very effective seal across the curved surface 62 of the bead, as shown in FIGURE 5.

Once the closure 10 has been applied to a bottle and it is desired to open the same, the tear tongue or pull tab 14 is elevated from the position shown in FIGURE 2 and then pulled so as to rip up the side wall 20 completely across the top 18 of the aluminum shell structure 12, and then down the opposite side wall 20. When this has been accomplished with the tab being completely torn through the opposite side wall 20 on at least one side, a continued pull will remove the closure from the container. Even if the tear tongue is torn completely from the closure, removal of the remaining metal shell is easily accomplished by lifting and bending since the metal is of light gauge.

It will be seen from the foregoing description and drawing that the objectives of this invention have been fully accomplished. However, it will be understood that the invention will be susceptible to some changes and modifications by those skilled in the art without departing from the scope of the appended claims.

I claim:

1. A tear-off crown closure of the roll-on type for sealing a container of a beverage under pressure or the like, comprising an aluminum shell having a flat top portion and a depending skirt portion formed of a right circular cylinder rotated about an axis that is perpendicular to the plane of said top portion, said top portion being concentrically mounted on said skirt portion and connected thereto through a smoothly rounded curved portion; a resilient gasket disposed in said aluminum shell; and a ring tab, said ring tab depending from an area of said skirt portion and being connected thereto by means of a short connecting flange such that the ring tab will be remote from the aluminum shell, said aluminum ring tab having inwardly rolled inner and outer edges providing a smooth finger grip, said inner edge being completely circular and said outer edge being substantially circular and interrupted by said connecting flange and by a pair of cutouts on each side of said connecting flange, the outer surface of said aluminum shell also being substantially circular and interrupted by said connecting flange and a pair of cutouts on each side of said connecting flange such that the aluminum shell and ring tab cutouts on each side of the connecting flange are substantially symmetrical and define a partial oval shape with each cutout defining a rounded portion of the oval; and a pair of oppositely disposed smoothly curved score lines on said aluminum shell, said score lines starting from the outer edge of the cylindrical skirt adjacent to said flange and on either side thereof, and said score lines passing substantially across the flat top portion, terminating ap-

proximately where the skirt meets the smoothly rounded curved portion substantially on the opposite side of the closure from the ring tab, the radius of curvature of the score lines being approximately twice that of the aluminum shell, said score lines curving first inwardly from the ring tab towards one another and then outwardly, with the closest point between the score lines being eccentric with respect to the center of the aluminum shell on the side of the ring tab.

2. The closure of claim 1 wherein the curved score lines intersect the cutouts adjacent the connecting flange such that a twisting shear force on the score lines will be experienced by pulling the ring tab upwardly when the closure is secured on a bottle mouth, whereby the closure can be easily severed along at least one score line and removed from the container.

3. A tear-off crown closure of the roll-on type for sealing a container of a beverage under pressure or the like, comprising an aluminum shell having a flat top portion and a depending skirt portion formed of a right circular cylinder rotated about an axis that is perpendicular to the plane of said top portion, said top portion being concentrically mounted on said skirt portion and connected thereto through a smoothly rounded curved portion; a resilient gasket disposed in said aluminum shell; and a ring tab, said ring tab depending from an area of said skirt portion and being connected thereto by means of a short connecting flange such that the ring tab will be remote from the aluminum shell, said ring tab having inwardly rolled inner and outer edges providing a smooth finger grip, said inner edge being completely circular and said outer edge being substantially circular and interrupted by said connecting flange and by a pair of cutouts on each side of said connecting flange, said ring tab rolled inner edge being rounded downwardly and rearwardly with respect to the upper surface of the aluminum shell in a substantially smooth round curve, viewed in cross-section, and said ring tab rolled outer edge being turned downwardly and inwardly but at a sharper angle than said rolled inner edge, viewed in cross-section, such that the upper surface of the ring tab is inclined outwardly and downwardly from the rolled inner edge at an angle of approximately 17° with respect to the plane of the ring tab and such that the ends of the rolled edges lie beneath the ring tab in a flat plane, a cross-section through the inner and outer rolled edges resembling an air foil approximately 0.050 inch in thickness at the widest point, permitting the inner surface of the ring tab to be relatively easily grasped and raised by the finger of a user; and a pair of oppositely disposed smoothly curved score lines on said aluminum shell, said score lines starting from the outer edge of the cylindrical skirt adjacent to said flange and on either side thereof, and said score lines passing substantially across the flat top portion, terminating approximately where the skirt meets the smoothly rounded curved portion substantially on the opposite side of the closure from the ring tab, the radius of curvature of the score lines being approximately twice that of the aluminum shell, said score lines curving first inwardly from the ring tab towards one another and then outwardly, with the closest point between the score lines being eccentric with respect to the center of the aluminum shell on the side of the ring tab.

4. The closure of claim 3 wherein the length of the rolled inner edge measures about 0.06 inch in cross section and the length of the rolled outer edge measures about 0.0425 inch in cross section.

5. A tear-off crown closure of the roll-on type for sealing a container of a beverage under pressure or the like, comprising an aluminum shell approximately 0.009 inch thick having a flat top portion and a depending skirt portion formed of a right circular cylinder rotated about an axis that is perpendicular to the plane of said top portion, said top portion being concentrically mounted on said skirt portion and connected thereto through a smooth-

ly rounded curved portion; a resilient gasket disposed in said aluminum shell; and a ring tab, said ring tab depending from an area of said skirt portion and being connected thereto by means of a short flange such that the ring tab will be remote from the aluminum shell, said ring tab having inwardly rolled inner and outer edges providing a smooth finger grip; and a pair of oppositely disposed smoothly curved score lines comprising grooves depressed approximately half way through said aluminum shell, each of said grooves defining said score lines having a truncated shape in cross-section comprising a flat bottom surface approximately 0.0025 inch wide and side surfaces projecting outwardly therefrom with an included angle of approximately fifty degrees, said score lines starting from the outer edge of the cylindrical skirt adjacent to said flange and on either side thereof, and said score lines passing substantially across the flat top portion, terminating approximately where the skirt meets the smoothly rounded curved portion substantially on the opposite side of the closure from the ring tab, the radius of curvature of the score lines being approximately twice that of the aluminum shell, said score lines curving first inwardly from the ring tab towards one another and then outwardly, with the closest point between the score lines being eccentric with respect to the center of the aluminum shell on the side of the ring tab.

6. A tear-off crown closure of the roll-on type for sealing a container of a beverage under pressure or the like, comprising an aluminum shell having a flat top portion and a depending skirt portion formed of a right circular cylinder rotated about an axis that is perpendicular to the plane of said top portion, said cylindrical skirt having an inner diameter of approximately 1.065 inch and a height of approximately 0.245 inch, said top portion being concentrically mounted on said skirt portion and connected thereto through a smoothly rounded curved portion having approximately a 0.062 inch radius; a resilient gasket measuring approximately 0.1 to 0.131 inch on a side with an inwardly facing surface being a curve of approximately 0.843 inch inside diameter disposed in said aluminum shell; and a ring tab, said ring tab depending from an area of said skirt portion and being connected thereto by means of a short flange such that the ring tab will be remote from the aluminum shell, said ring tab having inwardly rolled inner and outer edges providing a smooth finger grip; and a pair of oppositely disposed smoothly curved score lines on said aluminum shell, said score lines starting from the outer edge of the cylindrical skirt adjacent to said flange and on either side thereof, and said score lines passing substantially across the flat top portion, terminating approximately where the skirt meets the smoothly rounded curved portion substantially on the opposite side of the closure from the ring tab, the radius of curvature of the score lines being approximately twice that of the aluminum shell, said score lines curving first inwardly from the ring tab towards one another and then outwardly, with the closest point between the score lines being eccentric with respect to the center of the aluminum shell on the side of the ring tab, said connecting flange being bent outwardly approximately 0.098 inch below the cylindrical skirt on a radius of approximately 0.030 inch and depressed with respect to the plane of the ring tab approximately 0.033 inch; said ring tab, after formation having inside and outside diameters of approximately 0.635 and 0.835 inch, respectively; the connecting flange being approximately three-eighths inch wide with straight sides about 0.19 inch long terminating at each end in curves of about 0.1 inch radius that extend into the periphery of the ring tab and cylindrical skirt outer edges, the center of the ring tab being only about 1.315 inch from the center of the aluminum shell, measured prior to shaping all elements from a blank of about 1.438 inch aluminum shell diameter and about 0.920 inch ring tab diameter; and the score lines being circular arcs with an approximately one and one-quarter

inch radius on a center line about 1.429 inch out from the aluminum shell center line and about 0.286 inch over from the aluminum shell center line on the side of the ring tab in a direction perpendicular to the first mentioned direction, measured prior to shaping all elements. 5

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