United States Patent

[11] 3,633,781

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Original application Dec. 16, 1968, Ser. No. 785,443, now Patent No. 3,581,690, which is a continuation-in-part of application Ser. No. 731,852, May 24, 1968, now abandoned. Divided and this application July 8, 1970, Ser. No. 61,004

[54] **CROWN-TYPE CLOSURE WITH DOUBLE REMOVABLE LINER UNIT ENCLOSING TRAPPED INDICIA**
8 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **215/39,** 215/40

[51] **Int. Cl.** **B65d 41/10,** B65d 23/00

[50] **Field of Search** 215/39, 40; 113/80, 121

[56] **References Cited**

UNITED STATES PATENTS

3,257,021	6/1966	Brockett	215/40 X
3,361,281	1/1968	Kehe	215/49

Primary Examiner—George T. Hall
Attorney—Pennie, Edmonds, Morton, Taylor and Adams

ABSTRACT: The closure cap or crown for bottles disclosed, comprises a crown shell having a print covered by a size coat, a removable liner unit including a first removable liner coating in the shell over the size coating carrying printed indicia, such as a question, and being either transparent or opaque, a second liner coating of transparent plastic material covering the first liner coating and the printed indicia thereon, and an annular sealing ring at the periphery of the second liner coating.

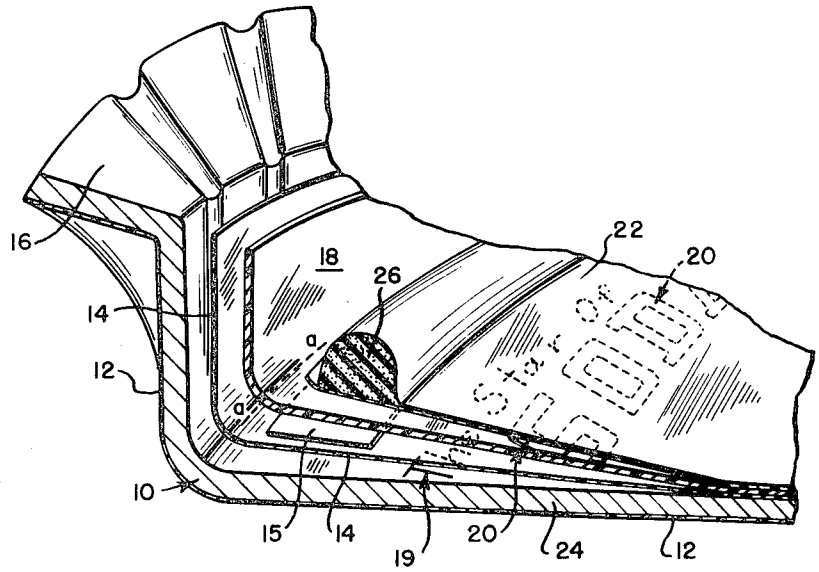


FIG. 1

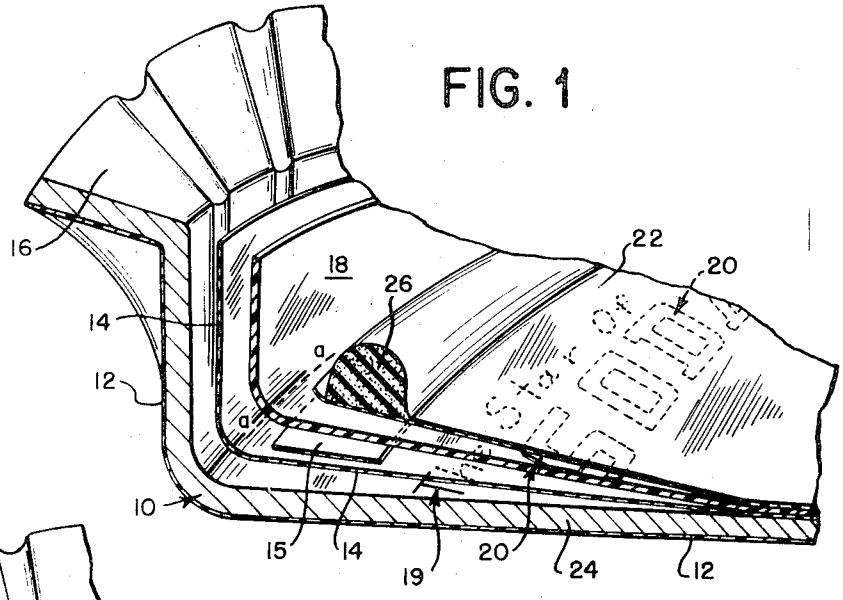


FIG. 2

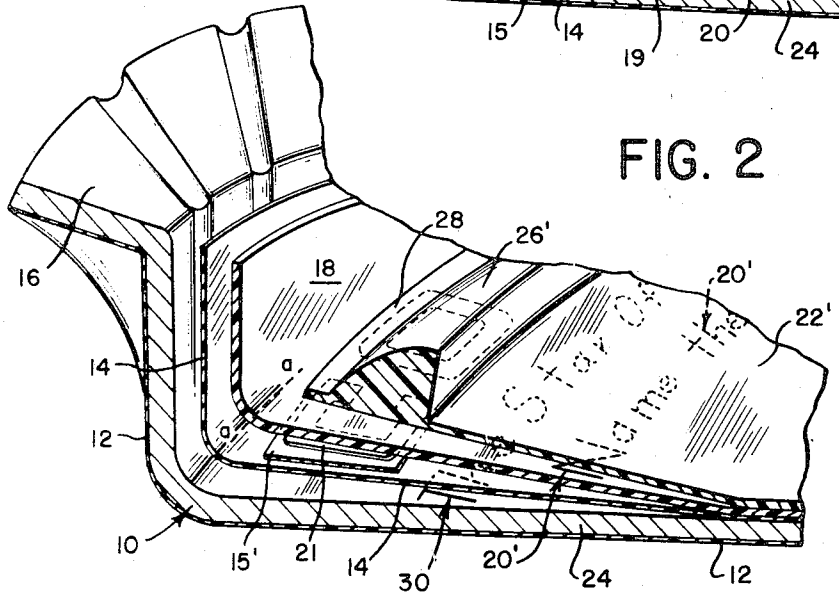
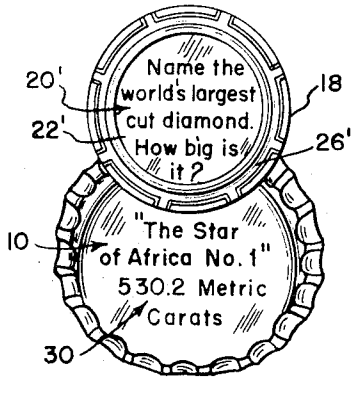


FIG. 3



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CROWN-TYPE CLOSURE WITH DOUBLE REMOVABLE LINER UNIT ENCLOSING TRAPPED INDICIA

CROSS-REFERENCE TO RELATED APPLICATION

This application is a division of the pending application, Ser. No. 785,443, filed Dec. 16, 1968, now U.S. Pat. No. 3,581,690, as a continuation-in-part of the applicant's U.S. application, Ser. No. 731,852, filed May 24, 1968 (now abandoned).

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to improvements in bottle cap closures, particularly crown-type closures provided with a removable liner unit of plastic material carrying selected printed indicia and seated over an interior size coating of the closure.

2. Description of Prior Art

Prior disclosures relating to the above subject comprise U.S. Pat. Nos. 3,233,770, 3,361,281 and 3,257,021. These patents were granted recently, and the first discloses a crown-type closure provided with a removable liner which is arranged to carry printed indicia which may be mailed out by a customer to the distributor or manufacturer. In this instance the liner is a clear plastisol material. The crown closure is provided with a coating of lacquer and indicia are printed on this lacquer in the interior part of the closure. Subsequently, the liner is applied over the printed indicia material. In this construction the relationships are such that the lacquer coating is nonadherent to the liner, and the printing is selectively adherent to the liner, so that it is removed from the closure with the removable liner. The patent describes specific vinyl chloride polymer plastisols and plasticizers and other materials which may be used in forming the films and coatings of the present invention.

The third patent referred to above has a disclosure very similar to the first. In this instance the printed indicia are printed on the lacquer of the closure and covered over with a transparent elastic cushion liner, so that the printing is visible therethrough when looking into the closure. The liner may be peeled from the closure and carry the printed indicia adhering thereto because of its preferential adherence to the liner rather than the lacquer on the closure. To begin with, the indicia is adherent to both the lacquer and the liner but the adhesion between the indicia and the liner is said to be greater than that between the indicia and the lacquer.

In these prior disclosures the printing material used to form the indicia are said to reduce the adhesion between the liner and the lacquer over a considerable portion of the area of the closure. Overbaking of the lacquer is also disclosed.

The attempt to remove the printed indicia in the prior art disclosures, along with the removable liner, is in many instances only partially successful. Sometimes there is only a partial transfer of the indicia to the liner when it is removed from the closure and in a number of instances a poor or illegible image or printing results. According to the present invention, the removable liner unit provides the indicia or image in the perfect condition in which it is printed. This is achieved by providing a first plastic coating over the lacquer or sizing, and any printing thereon, on the interior of the shell under conditions so that it is readily removable. Next, this first coating or film is printed by the various procedures described in the above patents to provide the desired indicia. After printing the first film, a second film is applied to the first film over the printing, so that the latter is trapped between the two films and kept in perfect condition until, during and after the liner unit is removed from the closure.

One of the objects of the present invention is to achieve good promotional features without sacrificing the functional properties of a plastic-lined crown. An "easy-removal" liner manufactured by sacrificing the normal adhesion between the liner and crown shell frequently results in blister formation in the central panel caused by gas diffusion from the bottle. Such blisters are objectionable in appearance and can lead to a distortion of the gasket ring and subsequent loss of pressure retention.

In prior attempts to achieve easy removal by using the thumbnail to remove the plastic liner from the sheet, the above functional features were sacrificed by either providing a low order of adhesion of the liner to the shell (U.S. Pat. No. 3,257,021) or only adhering the liner in selected areas (U.S. Pat. No. 3,233,770). In each case, the reduction in adhesion between liner and shell to accomplish "easy removal" results in an occasional loose liner in the shell, blister formation, gas leakage, or difficulty in removal by thumbnail because the reduction in adhesion is difficult to control.

SUMMARY OF THE INVENTION

The present invention comprises a container closure provided with a size coating which may be printed, and a removable liner unit as described above, which includes first and second films or coatings between which indicia are trapped. This liner is prepared and formed in such a way along with an annular seal that it provides protection for the goods sealed in the container and at the same time provides a readily removable liner unit after the closure is removed from the container.

In accordance with the invention, large tinned steel sheets of the type used in this art, shown and described in U.S. Pat. No. 3,257,021, are printed then coated with a low-solids size coat. This is the initial lacquer coating of the large tinned sheets, after which that coating is baked on at a temperature to give good adhesion to the tinned sheet and printing. This size coating, at the positions within the sealing rings, is now advantageously printed with some message, such as a question or answer, for example with printing ink material.

As an additional novelty to aid in easy removal of the liner unit without sacrificing functional properties, a ring of clear ink can be printed on the interior size coating around the gasket areas to reduce adhesion of the liner unit to the sizing, thus facilitating easy removal with an average fingernail. This ring of clear ink may be used or not depending on the ease of removal required.

The second coating referred to as the first film of the removable liner unit is applied over the large sheets on the size coating and or the ring of clear ink. This coating is preferably a polyvinyl chloride organisol applied to produce a heavier film weight than the size coat. It may be transparent but in some instances it is made of opaque material. The next step is the printing of an image or indicia on the large sheet in the positions of the respective closures to be stamped from the sheet. This goes on the second coating and the printing is preferably effected by a printing ink of known type applied in various ways, such as by screen or lithographic press, and may be trail coated with the third coating, or a third, transparent coating, may be applied over the second coating and adhered to it. Each coating is heated or baked before the application of the next coating, and the third coating is also baked.

The conditions are such as to control the adhesion, particularly between the size coating and the second coating. If the third coating is applied, the large sheets are subjected to the usual punching operation to cutout and form the crowns, each of which would carry the three coatings with the various indicia and or the clear ink ring. In this case the crowns are finally provided with an annular sealing gasket of a foamed or solid polyvinyl chloride plastisol material of known type, and the annular seals are baked and cured in an oven. Instead of applying the third coating as above, an advantageous structure is provided by simultaneously applying a third coating and annular sealing ring. This third coating and sealing ring are applied to the punched out crowns by a cold punch die operation on hot plastic material. No curing is thereafter necessary. The plastic material used is such that the area inside the sealing ring is transparent.

In carrying out the main features of the invention some modifications may be made, for example, the crowns may be

punched out following the printing of the indicia on the second coating after which a transparent film is provided, for example, by spinning in a center panel section to cover a limited area short of the edge of the panel. An annular seal may then be applied in each closure, so that it covers the peripheral edge of the second film and is adhered to the first film of the removable liner.

BRIEF DESCRIPTION OF THE DRAWINGS

The drawing provided herewith as a part of this application illustrates the invention in connection with two embodiments.

In the drawing:

FIG. 1 comprises an enlarged broken sectional view through a crown-type closure comprising one embodiment having a removable liner with trapped indicia over a ring of release material, although it may be without the ring of release material, and an annular seal constructed and arranged in accordance with the invention;

FIG. 2 is a view similar to that of FIG. 1 showing a second embodiment provided with a removable liner, located over indicia under the size coating, and containing trapped indicia in which the transparent third film and annular seal are integral; and

FIG. 3 is a plan view showing a removed liner message unit and crown according to FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In both FIGS. 1 and 2 the crown closure or bottle cap comprises a rigid tinned steel plate member **10**. The outside of the crown closure is provided with a size lacquer coating **12** called a modified vinyl size coating of known type on which the usual exterior printing is applied. Inside the crown there is also a modified vinyl or primer size coating **14** covering the entire interior surface of the shell including the corrugated skirt **16**.

In FIGS. 1 and 2 the various coatings are cut back to expose a part of the coating beneath. The removable liner unit is applied over the size coating **14** and consists of a coating **18**, a somewhat heavier coating than that of the coating **14**. These coatings may be applied over the entire interior area of the crown, including the corrugated skirt portion **16**. The coatings **14** and **18** are applied uniformly over the large sheets before the crowns are punched therefrom. However, the coating **18**, of similar material to the coating **14**, is applied in such a manner as to apply limited adhesion to the size coating **14**.

The limited adhesion of the coating **18** to the size coating **14** can be greatly reduced by applying a ring of clear ink **15** to the size coating **14** at the position below the sealing ring gasket of the crown. This reduces the adhesion under the gasket area and thus facilitates easy removal with the average fingernail. The clear ink used may comprise a property which is designed to cause the ink to adhere selectively to the size coating **14** only. Easy removal may also be effected by providing a ring of printed indicia at the position of the ring layer **15**, using the same type of ink but preferably one which is not clear but which is made visible such as an answer to a question when the removable liner unit is finally removed from the crown.

Additional printing **19** is applied to the tinned steel plate **10**, before applying the size coating **14**, in the area inside that of the ring **15**. This printing may be an answer to a question and as illustrated comprises the answer shown in FIG. 3, FIG. 1 showing the lettering "THE ST." The lettering may be in a desirable color and since the printing is trapped under the size coating it will not adhere to the coating **18**. In this case the coating **18** would be made of opaque material, so that the printing under the interior area of the transparent size coating will only be made visible when the liner unit is removed. This is described more in detail in connection with FIG. **2**.

Following the application of the printing **19**, coating **14**, the ring **15** and the coating **18**, the large sheets are printed at the locations of the crown panels to provide the desired indicia or message on the panel section of the coating **18**. Such indicia is indicated at **20** which for purposes of illustration may be a question as in FIG. **3**, or comprise the letters "SODA" which may be only a part of the message.

In the embodiment shown in FIG. **1** the crowns may be punched from the large sheet after applying the printing **20** and thereafter each crown is provided with a transparent liner film **22** by spinning the crowns and applying a blob of polyvinyl chloride plastisol or organisol material to the center of the panel portion so that it spreads out thinly to the periphery of the panel portion **24** of the crown. This film coating **22** completely covers the printed indicia **20** and its periphery is adhered firmly to the coating **18**. Finally, the crowns are slowly rotated while a sealing ring **26** is applied over the peripheral portion of the film **22** above the element **15**. The various coatings and the sealing ring **26** are subjected to baking operations described more in detail hereinafter. The transparent coating **22** may extend completely to the skirt of the crown or only to a position so that its edge is well covered by the sealing ring **26** or as shown in FIG. **1**. The film or coating **22** may be spun in, or applied as spots by screen printing, or spot coating on the large sheet before punching.

The embodiment illustrated in FIG. **2** may include elements corresponding to the elements shown in FIG. **1** up to and including the printed indicia material **20'** on the coating **18**. In this view, the sealing ring and the center panel coating are applied as a single integral element which comprises a central transparent film panel **22'** molded integrally with a ring gasket **26'**. The material used in making these two elements comprises a dry blend gasket molding liner material of known type supplied to the crowns hot and molded with a cold die. The integral element includes a peripheral portion **28** immediately outside the gasket **26'** and this portion together with the area beneath the gasket is firmly adhered to the coating **18**.

In the construction shown in FIG. **2** an adhesion reducing layer **15'** similar to the layer **15** of FIG. **1** can be provided on the size coating **14** beneath the area covered by the sealing ring **26'** and the peripheral portion **28**. Printed indicia **21**, illustrated by the letters C and O are also provided on the layer **15'** to form an entire ring of indicia which is also of adhesion reducing material. This indicia is made visible when the removable liner is taken from the crown.

The crown and removable liner shown in FIG. **2** are provided with the indicia set out in FIG. **3**. For example, the indicia **20'** is printed on the coating **18** within the panel area inside the ring **26'**. Since the layer **22'** is transparent the question of the indicia **20'** is plainly visible before the removable liner is taken from the crown. In this instance the coating **18** is preferably opaque so that the answer of the indicia **30** located under the size coating **14** is not disclosed until the removable liner is pulled out of the crown.

The removable liner shown in FIG. **3** may have the structure illustrated in either FIG. **1** or FIG. **2**, but FIG. **3**, for purpose of simplification, does not include a showing of the element **15** of FIG. **1** or the elements **15'** or **21** of FIG. **2**.

In producing the combination illustrated in FIGS. **2** and **3**, the indicia or answer **30** is printed on the tinned sheets **10** and cured before applying the size coat **14**. Following this, the coating **18** is applied over the size coating **14** and the elements **15'** and **21** thereon. This coating is cured, after which the indicia of the question **20'** is applied, following which the large sheets are passed through a curing oven at from 300° to 335° F. for a period of about 10 minutes. The coating **18** is preferably opaque, so that the answer indicia **30** on the tin is not visible or learned until the removable liner is taken from the crown.

The layer **22'** and the ring seal **26'** are applied over the question indicia **20'** in the manner described above. It is to be understood, of course, that instead of the integral layer **22'** and ring **26'**, one may use the coating **22** and sealing ring **26**.

EXAMPLE

The large tinned steel sheets, from each of which a considerable number of crowns are finally punched (as in U.S.

Pat. No. 3,257,021) are printed with indicia **19** or **30**, later coated with a commercial polyvinyl chloride liquid sizing material following which the large sheets are baked in an oven at a temperature of from approximately 395° to 405° F. for a period of approximately 10 minutes. The coating **14** may amount to approximately 4 to 8 mg. per 4 square inches of the sheet and the baking cures and hardens the size coating **14**, so that it is adhered firmly to the tin coat of the steel sheets and yet gives an outer surface which has limited adhesion characteristics with respect to subsequent coating **18**, when coating **18** is baked at temperatures below the fusion point of the two coatings.

Prior to applying the coating **18**, the sizing coat **14** can receive the ring of low-adhesion material **15** or **15'**, and the printing **21** is applied to the ring or band **15'**. The lacquered or sized sheets are thereafter coated with the plastic film **18**, which has a high solids content commercial coating material sometimes referred to as polyvinyl chloride organisol, examples of which are given in the above patents. This coating amounts to 25 to 70 mg. per 4 square inches and is baked on in an oven at a temperature of from 325° to 345° F., preferably 335° F. In the oven the sheets are passed along at a rate such that a baking time of about 10 minutes is obtained and the temperature and time of baking are adjusted to provide some adhesion to the sizing coat **14**, but an adhesion which is limited. A good film **18** is obtained with 20 to 25 mg. per 4 square inches.

The next step of the process is that of printing an indicia message or question on the exposed surface of the cured coating **18**. The indicia **20** and **20'** are applied in a known manner by the use of a suitable printing ink material, such as disclosed in said patents, preferably by an offset litho method. The printing of an entire sheet at a time with the multiplicity of locations is accomplished in a very accurate manner by this method. However, the printing may be accomplished by ordinary offset procedure, lithographic gravure, silk screen or flexographic methods. The printed sheets are baked at a temperature of from 295° to 305° F. for a period of about 10 minutes to fix and cure the printing material. Printing **19** and **30** may be cured by the same procedure before applying the size coating **14**.

In accordance with the embodiment shown in FIG. **1**, the fourth step is the provision of a solid coating film **22** over the indicia **20** and the remainder of the coating **18** to the extent shown. This film is applied either to the sheets or to the individual crowns after they are punched from the sheets as described above.

The transparent film coating **22** may be applied to the individual crowns over the indicia **20** and the coating **18** to the extent shown by depositing a blob of polyvinyl chloride organisol into each crown and rotating it until the coating **22** spreads out. The coating **22** either on the sheets or the crowns is baked at a temperature of from 305° to 325° F., preferably 315° F. for a period of about 10 minutes and adhered to the coating **18**. The plastisol used to form the film **22** produces a clear film through which the question or other indicia **20** are visible.

Finally, the foamed plastisol gasket **26** is applied in each crown on top of and adhered to the peripheral portion of the film **22**. The material used for this gasket is a commercial product and is applied in the ring shape, in a known manner, while slowly rotating the crown. The gasket is baked in the crown at a rather high temperature, that is, 390° to 400° F. for a period of 1 minute. Known types of baking ovens may be used in effecting the various baking steps.

The procedure followed with respect to the embodiment shown in FIGS. **2** and **3**, after the indicia are printed on the film **18** comprises the use of a cold molded liner comprising the transparent film layer **22'** and the raised ring gasket **26'** which are molded in one piece. The liner may be cold die molded from a hot molten pellet of commercial polyvinyl chloride liner material. The heat in the molten pellet being molded, causes fusion between the formed liner material and the film **18**, instantaneously, that is, during only a fraction of a second.

It is to be understood that the film **22'** and the integral ring gasket **26'** are one piece, and may be applied in a known manner by the use of a cold molding plunger pressed downwardly on a suitable quantity of hot molten commercial polyvinyl chloride liner material, which may originally be a dry blend.

In accordance with the invention the separation of the film **18** from the size or lacquer coating **14**, and the elements **15**, **15'** and **21** when the removable liner unit is removed from the closure, is achieved because of the control of adhesion. The coating **14** is a vinyl size coating as used in the industry, which adheres well to the tin plate and elements **19** and **30** under the conditions described in the above example, while the coating or film **18** is of the modified polyvinyl organisol type, a dispersion of polyvinyl chloride in a plastisol with other modifying resins. This material has the property to develop only a physical adhesion to the vinyl size coating and little if any adhesion to the elements **15**, **15'** and **21**, under the baking conditions described in the above example. It is baked at a temperature below 350° F. at which it does not develop maximum chemical adhesion with the size coating or the mentioned elements. The size coating **14** is baked at a normal baking temperature which gives good adhesion to the tin plate and provides low-adhesion surface for the coating **18**.

When a bottle cap, for example, is removed from a beverage bottle by a customer, the liner unit is readily removable from the size coating **14** by breaking the tin film **18** partly around the outside of the gasket **26** along the dotted line *a—a*. This may be accomplished readily by a fingernail or pen knife. When the liner is lifted at one point, a separation occurs between the film coating **18**, the size coat **14** and elements **15**, **15'** and **21**. Since the printed question or message indicia **20** or **20'** is located on the film **18** and trapped by the film **22**, the indicia is removed with the liner message unit, which has been sealed away from the contents of the container, the lacquer coating **14** and the printing **19** and **30**.

In FIG. **2** the message liner unit is readily removable by running a fingernail or a pen knife along the dotted line *a—a* and edge of film portion **28**. This severs the film **18**, so that the sealed message or question unit is readily removable from the size coating **14** and the elements **15'** and **21**.

The closures or crowns of the present invention may be of the press-on or screw-on type for use on soft drink or other bottles, jars and other containers.

An excellent product can be made without making use of the size coating **14**. Therefore, the coating **18** may be applied directly over the indicia **19** or **30** as well as the elements **15**, **15'** and **21**, which would be applied directly to the tinned surface of the steel plate **10**. In this construction the printing **19**, **21** and **30** may be omitted so that a single message unit is provided which is sealed between the films **18** and **22** or **22'**.

I claim:

1. In a container closure cap of the type including a rigid shell provided with an adherent size coating on its inner surface, and a removable plastic sealing liner unit releasably secured to the size coating, wherein the improvement comprises a removable liner unit including a first solid plastic film, portions of which are adherent to the size coating but readily releasable therefrom, printed indicia on the surface of said first film opposite the size coating, a second solid transparent plastic film covering said printed indicia and trapping and sealing-in the printed indicia between said films, a ring gasket on the second film, and a low-adhesion material on the portion of the size coating underlying the ring gasket.

2. A container closure cap as claimed in claim **1**, wherein the printed indicia is in the form of a message adhered to the first solid plastic film, and wherein the second solid transparent film is adhered to the indicia message and first plastic film.

3. A container closure cap as claimed in claim **1**, wherein the low-adhesion material on the size coating comprises a ring of transparent ink.

4. A container closure cap as claimed in claim 3, wherein the surface of the ring of ink carries printed indicia of low-adhesion material made visible only when the liner unit is removed from the shell.

5. A container closure cap as claimed in claim 1, wherein the ring gasket and the second solid plastic film comprise an integral unit.

6. A container closure cap as claimed in claim 1, wherein the first solid plastic film is opaque, and wherein said inner surface under the size coating carries printed indicia exposed to view only when the liner unit is removed from the shell.

7. A container closure cap as claimed in claim 6, wherein the indicia on the first solid plastic film comprises a question or request, and wherein the indicia on the surface under the size coating comprises a statement or answer.

8. A container closure cap as claimed in claim 1, including a ring or printed low-adhesion indicia carried by the size coating and located under the ring gasket and made visible only when the liner unit is removed from the shell.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,633,781 Dated January 11, 1972

Inventor(s) Claudio Zapata G.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the first column of the title page, item (72), correct the applicant's name to --Claudio Zapata G.--, and item (73), change "Lapata" to --Zapata--.

Signed and sealed this 22nd day of May 1973.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents