CONTAINER AND CONTAINER CLOSURE WITH SECURE MOLDED THREE DIMENSIONAL IMAGE

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ABSTRACT

A container closure having a closed position and an open position and including a molded portion, such as a threaded flat cap, having a molded three dimensional image, in particular a lithophane image, on at least one surface thereof, wherein the image is configured to be viewed with the container in the open position and the image is configured to be viewable with the container in the closed position. The flat cap may include a sealing member such as a clear liner engaging a support shoulder surrounding the image. The flat cap may further include tamper evident features for the cap.
A wide variety of images appeared on lithophanes. The subject matter included quaint and delightful replicas of rural scenes and children at play, reproductions of famous portraits and popular paintings, dramatic religious scenes, hunting images, and scenic panoramas. It was the efforts of the Baron de Bourguignon that led to the great popularity of lithophanes during the mid-19th century. His concept was simply this: a sheet of porcelain carved in varying degrees of thickness, when held to a light, would result in a highly detailed picture with the soft image quality of a mezzotint. This simple concept however, was not easy to execute. Sheer artistry of high order was required to make a master carving from which the lithophanes could be molded.

The very first lithophanes were individually carved entirely by hand. Soon after their introduction, the artists reasoned that molds could be made, from which numerous pieces could be cast. In the production of these molds a sheet of wax was placed on a piece of plate glass. This provided sufficient transparency for the artist’s guidance. The full thickness of the wax on the glass stopped all light, and any scratch or gouge produced varying degrees of gray. Therefore, the entire range of shading from dark to bright was available for the skilled artisan to bring to life a subject image. The artist first drew his general design on the surface of the white wax. Then, with modeling knives, burnishers, and other tools, he sculpted the minute details of the subject chosen for reproduction. From the wax carving, when finally approved by the master model maker, a plaster cast was made. This was the original die, which was used in molding the porcelain bisque. A moist porcelain paste was then carefully pressed into this cast, picking up all the details in the carving. Close examination of this mold would reveal intricate surface detail.

During the porcelain casting process, the friction of the clay would swiftly wear these fine details out. To address this problem, the artists developed master molds. Master molds were made out of a harder plaster than the production molds, and the image was reversed; like a negative. Production molds were then cast from the master mold, allowing many more lithophanes to be successfully cast. The seemingly simple process of removing the thin moist panels from the molds required the highest degree of skill to avoid damaging the intricate details in the image. Since the panels were very thin and delicate, and the kilns extremely hot, many fired pieces were warped, twisted, and cracked. In addition, any slight impurity in the porcelain clay body showed up when the fired pieces were lit from behind. Therefore, the number of acceptable finished pieces to come out of the kilns has always been far less than the number that went in. Sometimes, only about 40 percent of the panels survived this process. Since the earliest days of their production, these issues have challenged the makers of lithophanes. Only the most determined craftsmen could overcome these difficulties, and go on to produce these brilliant art pieces.

During their heyday, lithophanes were produced by many potteries throughout the world. Some of the finest examples, as well as some of largest quantities of lithophanes were produced in Germany by the companies Prenzlauer Porzellan Manufaktur in Plaue (P.P.M.), Berlin Porzellan Manufaktur (B.P.M.), and Königlichen Preussische Manufaktur (K.P.M.). About 25 factories in Belgium, France, Denmark, Portugal, England, Italy, and Czechoslo-
vakin produced lithophanes during the last century, with their popularity peaking in the middle of the century. Some of the well-known companies involved in lithophone production were the Wedgewood and Worcester Pottery in England, Phoenix Pottery in Pennsylvania, Bieleck in Ireland, and Limoge in France. Surprisingly, no individual lithophone artists have been identified, however, many pieces are marked with the manufacturer's name.

Porcelain Lithophanes were hung in front of windows, where the sunlight streaming through the panel revealed the designs in the porcelain. Since lithophanes need to be lit from behind, they were made incorporating these porcelain artworks. Because of the era from which they originated, most lithophone lamps were quite fanciful and ornate. Candle screens incorporating lithophanes were also quite popular. Typically, they consisted of a decorative frame holding a lithophone, with a built-in candleholder to illuminate it from the rear. Multi-paneled lamps were also quite popular. These came in many forms. Some were ornate shades that would hold from four to six flat panels, mounted on a matching lamp base. These panels could be shaped as rectangles or trapezoids. Sometimes, a similarly constructed shade was made to hang from the ceiling instead. Other lamps, instead of utilizing multiple panels, used one-piece hollow castings; cylindrical, conical, or sometimes round, with several images around their circumference. This type of shade is quite rare and highly prized. Lithophanes were made to fit in "hurricane" type lamps, desk lamps, table lamps, ceiling lamps, wall sconces; virtually any type of lighting fixture. A unique but popular vehicle for displaying lithophanes was the tea warmer. These ornate fixtures had lithophanes surrounding an enclosure, in which a candle was lit. Topping the enclosure was a metal plate on which a teapot could be set, and kept warm from the candle below.

Another popular application for lithophanes was to cast them into the bottom of drinking vessels. As one would finish his drink, a delicate image would appear in the bottom of the cup or mug. In Germany, many beer steins were made with lithophanes in the base; sometimes with images that were quite risqué. From Denmark, and France came beautiful tea and demitasse sets with lovely images in the bottom of the cup. In the early 20th century, Japanese potteries began to produce lavishly decorated tea sets (called Dragonware) with images of geishas in the bottom. This practice became quite popular in the post-WWII and Occupied Japan era for the GI trade in Japan. Production of these teacups tapered off in the 1950's, and a few are still being made today. By the late 1800s, the bloom was off the rose, and the great popularity enjoyed by lithophanes began to fade. The potteries moved on to other items, and the highly evolved skills and techniques that the master craftsmen had developed disappeared with the original artists as they passed away. Since then, knowledgeable collectors, wise to the hidden beauty of this truly remarkable art form, have avidly sought antique lithophanes.

[0015] The machining of lithophone images is not a cost effective method of forming lithophone images economically on a large scale. Further, the traditional porcelain substrate is not appropriate for consumable products.

[0016] There have been recent attempts to expand the application of lithophone images and to revive this art form. For example, U.S. Pat. No. 6,306,470 discloses a lithophone-type pictorial work formed within a thin, generally closed container. The illustrated container has a pair of generally parallel closely spaced-apart walls, one front wall and one rear wall. The front wall is transparent and has a contoured forming surface on its inward face. This forming surface is the reverse or mirror-image of a desired contoured recessed picture-providing front surface of a desired lithophone-type pictorial work. When the container is generally filled with a translucent material, the desired lithophone-type work is thereby created within the container. This work is thin and has the desired contoured recessed picture-providing front face where the material meets and interfaces with the forming surface. The opposite or rear container wall is transparent or translucent so that light can pass through the work. The picture provided by the work is then visible through the transparent front wall.

[0017] Further, Design Pat. No. D504,819 discloses a specific ornamental cover, which has an inner side thereof provided with a lithophone-type image. This disclosure is incorporated herein by reference and this design patent disclosure was filed after the filing dates of parent U.S. patent application Nos. 10/375,233 and 10/584,678.

[0018] U.S. Pat. No. 6,287,492 discloses an apparatus that includes a stamp having a three-dimensional contoured stamping, compressing or forming surface that is a reverse image of the contour of the recessed front surface of the desired finished lithophone-type pictorial object or work. The stamp may be used to compress a plan translucent material that is positioned on a base or support that has generally flat ancillary surface, to form the material into the work without further activity or delay. The stamp may be held on end or may be mounted on a press or the like. The surfaces may be reversed, with the stamp having the flat ancillary surface and the base may have the forming surface.

[0019] Further, U.S. Pat. No. 6,520,409 and U.S. Publication 2004/0170807 disclose certain methods of forming a lithophone-type image from a pictorial work that can greatly facilitate the lithophone creation process. These references are incorporated herein by reference. Other die manufacturing techniques are believed to be within the skill of those in the art.

[0020] There remains a need to expand the utility of lithophone images, and three dimensional images more generically, such that the use thereof will be more fully exploited. The present invention is intended to effectively expand the utilitarian application of lithophone type works to consumable products, namely containers and container closures or caps.

SUMMARY OF THE INVENTION

[0021] It is noted that, as used in this specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless expressly and unequivocally limited to one referent.
[0022] For the purposes of this specification, unless otherwise indicated, all numbers expressing quantities of ingredients, reaction conditions, and other parameters used in the specification and claims are to be understood as being modified in all instances by the term “about.” Accordingly, unless indicated to the contrary, the numerical parameters set forth in the following specification and attached claims are approximations that may vary depending upon the desired properties to be obtained by the present invention. At the very least, and not as an attempt to limit the application of the doctrine of equivalents to the scope of the claims, each numerical parameter should at least be construed in light of the number of reported significant digits and by applying ordinary rounding techniques.

[0023] All numerical ranges herein include all numerical values and ranges of all numerical values within the recited numerical ranges. Notwithstanding that the numerical ranges and parameters setting forth the broad scope of the invention are approximations, the numerical values set forth in the specific examples are reported as precisely as possible. Any numerical value, however, inherently contain certain errors necessarily resulting from the standard deviation found in their respective testing measurements.

[0024] The various embodiments and examples of the present invention as presented herein are each understood to be non-limiting with respect to the scope of the invention. In accordance with one embodiment of the invention a container closure is provided having a closed position and an open position and including a molded portion having a molded three dimensional image on at least one surface thereof, wherein the image is configured to be viewed with the container in the open position and the image is configured to be un-viewable with the container in the closed position.

[0025] In one non-limiting embodiment of the invention the three dimensional image is a lifephase image that is formed by one of compression molding and injection molding. The term lifephase is described above within the context of this application. The molded material may be a thermosetting plastic. The container may further include a tamper evident structure, such as a tamper evident band, configured to seal the container in the closed position at least prior to the initial opening of the container.

[0026] In one non-limiting embodiment of the invention the container closure is a cap for a soda or wine bottles, having a generally cylindrical cross-section with one of the opposite ends open and the opposite end carrying a 3-D lifephase work.

[0027] In one non-limiting embodiment of the invention the molded portion of the container is a container closure having a top, a skirt depending from the top, internal threads on the skirt for securing the closure to the remainder of the container, and wherein the tamper evident structure is a tamper evident band coupled to the depending skirt at least prior to the initial opening of the container. The lifephase image is on an inner side of the top. Further the top may include an annular shoulder and further including a transparent liner adjacent the shoulder.

[0028] In one non-limiting embodiment of the invention the liner is molded to conform to the lifephase image. Further the lifephase image may have a depth of between about 0.0004 and 0.002 of an inch.

[0029] These and other advantages of the present invention will be described in the following description taken together with the attached figures in which like reference numerals represent like elements throughout.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] FIG. 1 is a schematic perspective view of a container closure for a container in accordance with one embodiment of the present invention illustrating the image placement;

[0031] FIG. 2 is a schematic top view of the container closure of FIG. 1;

[0032] FIG. 3 is a schematic side section view of the container closure of FIG. 1;

[0033] FIG. 4 is a schematic side section view of a container closure for a container in accordance with one embodiment of the present invention;

[0034] FIG. 5 is a schematic side section view of a container closure for a container in accordance with one embodiment of the present invention;

[0035] FIG. 6 is a schematic side section view of a container closure for a container in accordance with one embodiment of the present invention;

[0036] FIG. 7 is a schematic side section view of a container closure for a container in accordance with one embodiment of the present invention;

[0037] FIG. 8 is a schematic side section view of a container closure for a container in accordance with one embodiment of the present invention;

[0038] FIG. 9 is a schematic side section view of a container closure for a container in accordance with one embodiment of the present invention;

[0039] FIG. 10 is a schematic side section view of a container closure for a container in accordance with one embodiment of the present invention;

[0040] FIG. 11 is a schematic side section view of a container closure for a container in accordance with one embodiment of the present invention;

[0041] FIG. 12 is a schematic side section view of a container in accordance with one embodiment of the present invention; and

[0042] FIG. 13 is a perspective view of a container of the type schematically illustrated in FIG. 12.

DETAILED DESCRIPTION OF THE INVENTION

[0043] FIGS. 1-11 schematically illustrate molded container closures 10 configured to be attached to a container (not shown) such as by selectively threaded onto and off of a container body (not shown) having a threaded neck finish. The threaded container closure 10 is generally called a flat cap (or even a cap) in the art and is extremely well known as a closure for beverage containing bottles, such as water bottles. FIGS. 1-3 generally illustrate the position of the lifephase image 16 within the top surface 12 of the closure 10, whereas FIGS. 4-11 further illustrate the additional
aspects of the closure 10 and relation of these cap components to the image 16, also called the lithophone work 16.

[0044] The lithophone work 16 and the actual size of the final product, e.g. closure 10, can be adjusted relative to one another so that the lithophone-type work 16 completely occupies the top surface 12 of the cap or closure 10 between an annular shoulder 14 that is used for sealing to the container.

[0045] The closure 10 includes an injection molded circular top 12 having an annular shoulder 14 and a molded lithophone image 16 on an inner facing surface thereof, wherein the lithophone image 16 is radial inward of the annular shoulder 14. The image 16 may be molded with the top 12, such as injection molding, or through compression molding provided the ancillary cup structures permit compression molding, from a thermosetting plastic, as schematically represented in FIG. 4. Alternatively the image 16 may be molded separately into the injection (or compression) molded top 12 as described in alternative embodiments below. Any conventional plastic may be used provided that the end color of the top 12 is translucent for viewing the image 16. In order to effectively operate as a container closure 10 and utilize conventional thermosetting plastics, the lithophone image 16 has a depth of between about 1/5,000 and 9/100 of an inch, more preferably between about 1/5,000 and 3/100 of an inch. Further as shown the shoulder 14 will, preferably, have a depth equal to or greater than the greatest depth of the lithophone image 14 as shown.

[0046] The structure or shape of the lithophone image 16 can be formed in any known fashion for forming lithophone type images such as those described in the above cited references or described in U.S. Patent Publication Number 2004-0170807 or international patent application publication number WO/2004/079451 which are incorporated herein by reference. Once the structure of the image 16 is known a mold can be made in a conventional fashion. As described below, the present invention provides some advantageous cost effective methods for incorporating an image forming die component into a mold.

[0047] The closure 10 or cap includes an integral skirt 20 depending from the top 12 with threads 22 molded on the interior of the skirt 20 for securing the closure 10 to the container body with associated threaded neck finish. The closure 10 further includes a tamper evident band 24 coupled to the depending skirt 20 at least prior to the initial opening of the container 10. The tamper evident band 24 is constructed to engage an interference bead on the conventional container neck finish whereby the band will be dislodged from the skirt 20 upon first opening of the container, thereby providing tamper evident features to the user. The construction and operation of the skirt 20, threads 22, and tamper evident band 24 are known generally in the art. Further, these components are integral to and molded with the top 12. A wide variety of tamper evident bands 24 are known in the art, also called TE bands, and the band 24 can take on other know configurations.

[0048] The tamper evident feature provided by the band 24 together with the image 16 on an inner surface of the top 12 within the shoulder 14 combine to define a “secure” lithophone image 16. The phrase secure image within the meaning of this application means that the image 16 cannot be viewed until the container has been opened, namely until the closure 10 is removed from the container body. In consumable products this results in that the specific image 16 on an associated closure 10 will not be able to be viewed by the consumer until after purchasing. This allows for the image 16 to be used as a collectible or game piece in marketing campaigns or the like where the image 16 varies from closure 10 to closure 10 of a series.

[0049] Alternatively to molding the image 16 with the top 12 such as in a one step injection molding process or a one step compression molding step, the image 16 may be formed as a separate component 26 that could be compression molded into a translucent plastic closure “blank” set into a recess 28 formed within the annular shoulder 14, effectively as shown in FIG. 5. This would be a three step process where the closure 10 “blank” with top 12 having recess 28 is initially molded (e.g. via injection molding), then the image 16 is compression molded in place into component 26 and a transparent liner 18 is placed on the shoulder 14 to complete the closure 10 construction. The completed closure 10 would be attached to a container body having a threaded neck finish as known in the art. Although FIG. 5 shows the component 26 as a separate member, after the compression molding it will be coupled to and essentially integral with the closure 10, particularly where the same material is used for forming the component 26 and the remainder of the closure 10 (other than the liner 18). The liner 18 is often a more pliable, less rigid material. The use of a separate component 26 also allows for a differing material to be used for the image 16, if desired. Consequently, one material can form the top 12 that is selected primarily for the cap forming features, e.g. high strength and rigidity, with enough translucency to allow for the image 16. The component 26 can be selected from a material that primarily optimizes the image 16 quality, although the material must be compatible with the closure 10. Finally the liner 18 is selected from a material that primarily accomplishes the desired seal, while being sufficiently translucent to viewing of the image 16.

[0050] The transparent liner 18 may be performed as shown in FIGS. 4 and 5 or molded to conform to the image 16 as shown in FIG. 6. This conforming of the liner 18 to the image 16 can most easily be accomplished with compression molding, where the material of the liner 18 is much softer than that forming the remainder of the closure 10. The compression molding of the liner 18 shown in FIG. 6 may be through the application of pressure from a liner die to a blank of liner material for forming the liner 18. The compression molding of the inner 18 in FIG. 6 may also be used in the embodiment of FIG. 4 where the image 16 is formed “integral” with the top 12. The compression molding of the liner 18 to the image 16 may have beneficial effects in viewing the image 16 through the elimination of air gaps between the image and the liner that may otherwise effect the viewed image.

[0051] FIG. 7 illustrates another alternative method for forming the closure 10 where the liner 18 and the image 16 are formed from the same material, namely component 26. The component 26 is forming the image 16 within the recess 28 and also forming a sealing ring or annular liner 18. Here the liner 18 is not over the image 16. The formation of the image 16 and the liner 18 can be through an appropriate compression molding die.

[0052] FIG. 8 illustrates another alternative method for forming the closure 10 where the liner 18 is formed as an
annular seal that does not overlap the image 16. This annular liner 18 may be inserted or may be formed with the closure through co-injection molding, or even through a compression molding of an annular liner blank. The annular liner 18 is shown with the component 26 forming the image 16, but the annular liner 18 configuration could also be used with the integrally molded image of FIG. 4.

[0053] FIG. 9 illustrates another alternative method for forming the closure 10 where the liner 18 is replaced with an annular plug seal 32. The plug seal is a known container closing feature. Other known closure seals may be formed on the shoulder 14. The plug seal 32 is shown with the component 26 forming the image 26, but the plug seal 32 configuration could also be used with the integrally molded image 16 of FIG. 4.

[0054] FIGS. 10 and 11 illustrate embodiments in which the image 16 is formed on the outside of the top 12. This configuration can be formed in the image integrally with the top 12 as shown in FIG. 11 or with a separate component 26 as shown in FIG. 10. A transparent dust covering layer 34 is added to prevent material from entering the image 16 and obscuring the viewing thereof. The image 16 is not viewable until after the closure 10 is removed from the container as no light can be transmitted through the cap or closure 10 with the closure 10 on the container. This configuration adds a covering layer 34, although such a covering layer may be optional where the closure 10 has a separate cover such as a protective TE over-wrap or larger dust cover. Further, this embodiment does not limit the size of the image 16 by the sealing features on the shoulder 14. Here the image 16 can overlap the shoulder 14, and associated sealing feature such as liner 18 or plug 32 to some extent. These embodiments are shown with the plug 32, but can be used with the liner 18 configurations.

[0055] It is possible only a single image 16 will be desired for a given line of closures 10. In such a single image environment the image 16 will become a logo or trademark of sorts for the associated user. However, it is expected that the image 16 will often vary from closure 10 to closure 10 for a given set of containers, e.g. the images are a collection of athletes from a particular sport, or characters from a particular story. The commercial acceptance of the variable image 16 on a series of consumable containers will depend largely with the ease in which the image 16 can be changed from lot to lot. In the compression molding of the image 16 discussed above the image 16 is formed from a separate die and changing the image 16 will not require re-working of the remaining mold components. It is preferred that even in the compression design the image die include an image containing disc inserted into the die such that the entire tooling need not be replaced.

[0056] In the injection molding of the image 16, a similar replacement disc containing the image 16 (actually the reverse there of as known in the molding art) should be used. In the injection molding environment it is desirable if this disc is formed from a highly thermally conductive material, with “highly thermally conductive” meaning at least 2-3 times the thermal conductivity of stainless steel. Barriilium Copper is one example, see Ampcoloy® brand alloy. The high thermal conductivity is helpful as the presence of the disc within an injection mold will require that the cooling water channels be spaced further from the operating surface of the disc than if the image portions of the mold were an integral component of the mold.

[0057] The above described closure 10 design and the associated molding techniques will allow the efficient economic use of distinct images 16 in a line of consumable containers using the closures 10. The containers using the closures 10 are identified as consumable in that they are effectively destroyed after use by the consumer, as even recycling of the container will destroy the specific container.

[0058] There are numerous modifications to the invention as described. For example the tamper evident band may be replaced with a TE shrink wrap or sleeve around the container and the closure 10. This is a known alternative tamper evident structure. Further the present invention is not limited to applications on a flat cap as shown in closures 10.

[0059] FIGS. 12 and 13 illustrate a container 130 having an injection molded container body 132 coupled to a closure or lid 134 through a hinge 136. The lid 134 includes an image 116 molded on an inner surface there of. A latch 138 and receiver 140 closes the container 130. Shoulder 142 is positioned to receive/support a separate liner 144. In this embodiment the liner 144 is opaque which further assures that the image cannot be viewed without opening of the container 130. The container 130 may have a tamper evident feature, such as a shrink wrap, or the like. In the medical or drug dispensing fields, the image 116 may be used to minimize counterfeiting. The image 116 may be changed from lot to lot as desired by the manufacturer and counterfeiters will not have access to the specific packaging until it hits the store shelves for consumers adding delay for those attempting to knock the products off. Further, the present invention allows for the economic, rapid change of the image to keep the counterfeiters constantly behind.

[0060] Whereas particular embodiments of this invention have been described above for purposes of illustration, it will be evident to those skilled in the art that numerous variations of the details of the present invention may be made without departing from the invention as defined in the appended claims.

What is claimed is:

1. A container closure having a closed position and an open position including a molded portion having a molded three dimensional image on at least one surface thereof, wherein the image is configured to be viewed with the container in the open position and the image is configured to be un-viewable with the container in the closed position.

2. The container of claim 1 wherein the three dimensional image is a lithophane image that is formed by one of compression molding and injection molding.

3. The container of claim 2 further including a tamper evident structure configured to seal the container in the closed position at least prior to an initial opening of the container.

4. The container of claim 3 wherein the molded portion of the container is a container closure having a top, a skirt depending from the top, internal threads on the skirt for securing the closure to the remainder of the container, and wherein the tamper evident structure is a tamper evident band coupled to the depending skirt at least prior to the initial opening of the container.
5. The container of claim 4 wherein the lithophane image is on an inner side of the top.

6. The container of claim 5 wherein the top includes an annular shoulder and further including a transparent liner adjacent the shoulder.

7. The container of claim 6 wherein the liner is molded to conform to the lithophane image.

8. The container of claim 7 wherein the lithophane image has a depth of between about 1/5,000 and 9/5,000 of an inch.

9. A molded container closure configured to be selectively attached to and removed from a container body, the container closure comprising:

   a top having a molded three dimensional image on one surface thereof, wherein the image is configured to be viewed with the container closure removed from the container body and the image is configured to be unviewable with the container closure attached to the container body; and

   a skirt depending from the top, a container body securement mechanism on the skirt for securing the closure to the container body.

10. The container closure of claim 9 wherein the liner is molded to conform to the lithophane image.

11. The container closure of claim 9 wherein the three dimensional image is a lithophane image that is formed by one of compression molding and injection molding.

12. The container closure of claim 11 further including a tamper evident band coupled to the depending skirt at least prior to the initial opening of the container.

13. The container closure of claim 11 further including a liner, wherein the liner is molded to conform to the lithophane image.

14. The container closure of claim 13 wherein the lithophane image has a depth of between about 1/5,000 and 9/5,000 of an inch.

15. The container closure of claim 9 wherein the top includes an annular shoulder receiving the liner, wherein the image is positioned radially inward of the shoulder.

16. The container closure of claim 15 wherein the shoulder has a depth equal to or greater than the greatest depth of the lithophane image.

17. A container closure configured to be selectively threaded onto and off of a container body having a threaded neck finish, the container closure comprising:

   an injection molded top having an annular shoulder and a molded lithophane image on an inner facing surface thereof, wherein the lithophane image is radial inward of the annular shoulder;

   an integral skirt depending from the top, threads molded on the skirt for securing the closure to the container body;

   a sealing mechanism in the form of one of a transparent liner and a sealing plug adjacent the top on the annular shoulder surrounding the image.

18. The container closure of claim 17 wherein the shoulder has a depth equal to or greater than the greatest depth of the lithophane image.

19. The container closure of claim 18 wherein the lithophane image has a depth of between about 1/5,000 and 9/5,000 of an inch.

20. The container closure of claim 11 wherein the sealing mechanism is a sealing plug in the form of a liner that is molded to conform to the lithophane image.

21. A article of manufacture comprising:

   a surface; and

   a lithophane-type work visible through the surface and having a thickness adjusted as a function of opacity of material from which the surface is made and a color of the material.

22. The article of claim 17, wherein the lithophane-type work is sculpted within the surface.

23. The article of claim 17, wherein the lithophane-type work is erected on a top of the surface.

24. The article of claim 17, wherein the article is selected from the group consisting of cans, caps, key chains, eatable items and caps each having a polygonal or annular cross-section.

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