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(54) **SEALED BEVERAGE CONTAINER**

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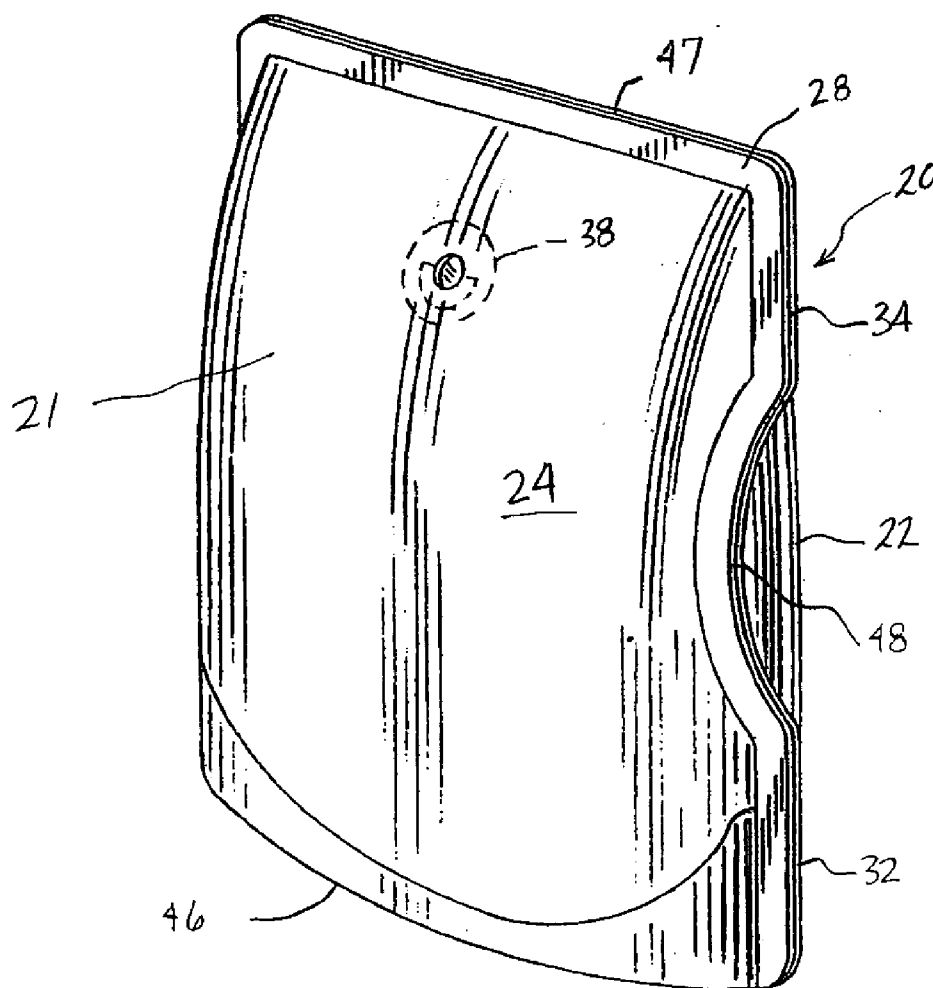
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ABSTRACT

A sealed beverage container having a container body with a front wall joined to a rear wall defining a substance receiving compartment with an interior surface and an exterior surface with one of the walls including an aperture having a first axis for accessing the compartment and a seal covering the aperture with an unsealed region and a sealed region with said sealed region forming an asymmetrical sealing pattern about the first axis.

(21) Appl. No.: **10/938,196**

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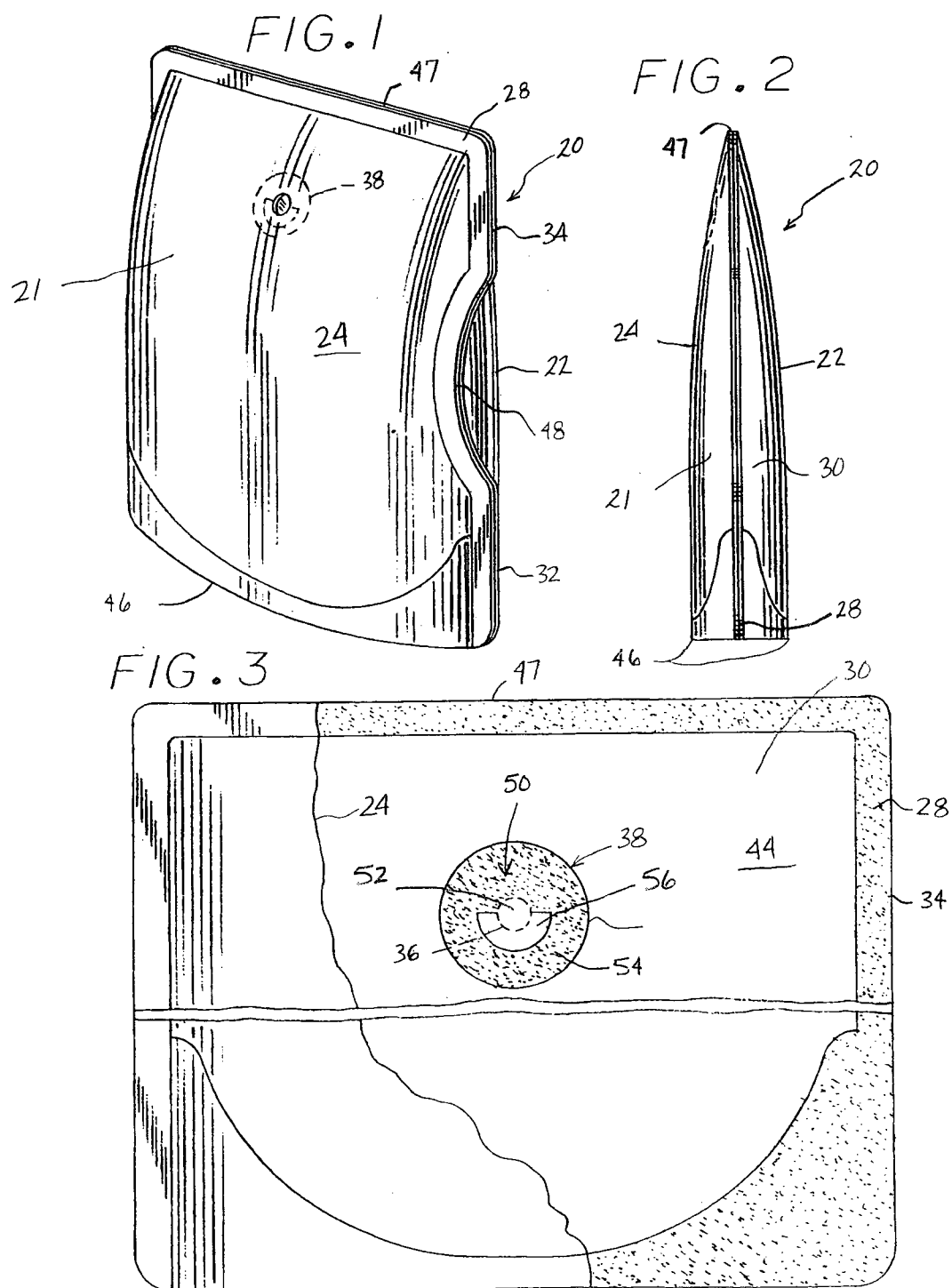


FIG. 4
PRIOR ART

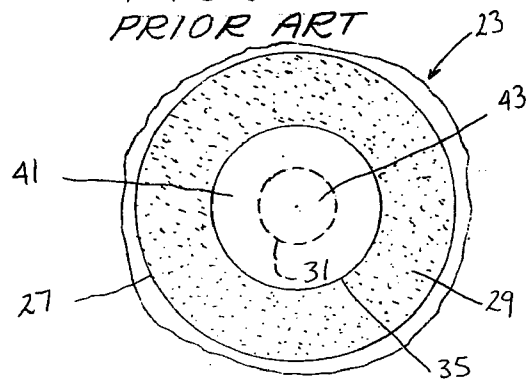


FIG. 5
PRIOR ART

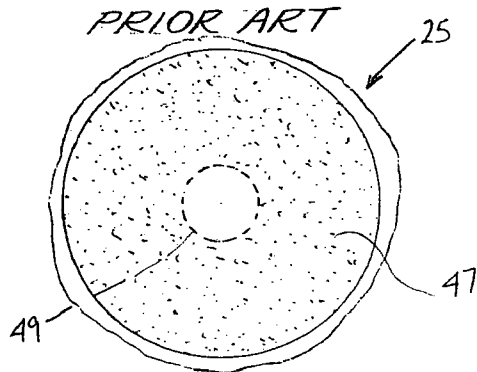


FIG. 6A

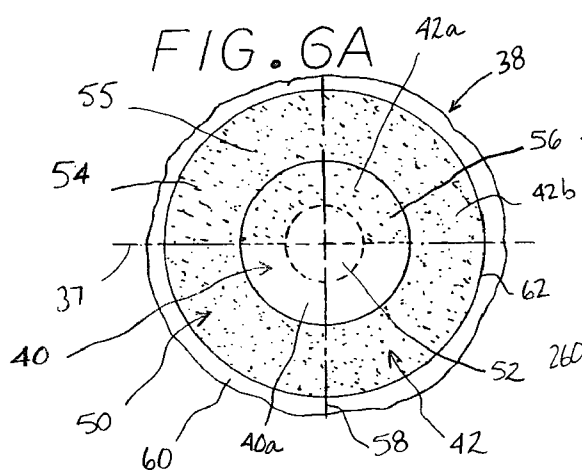


FIG. 6B

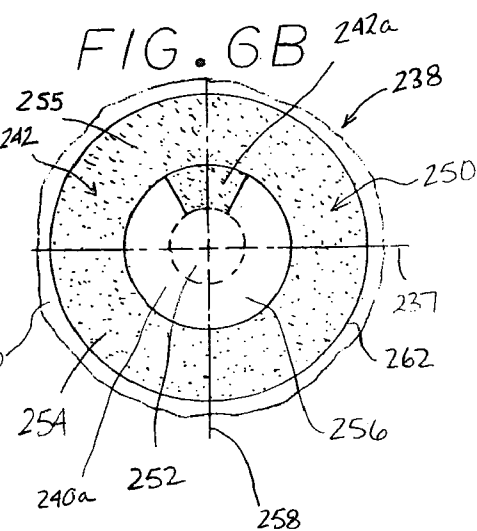


FIG. 6C

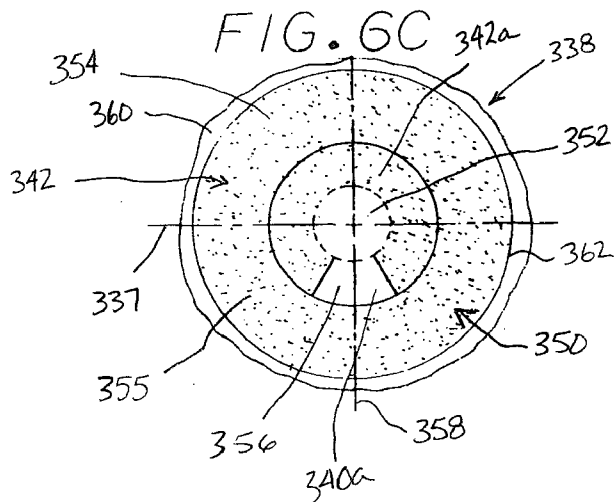


FIG. 7

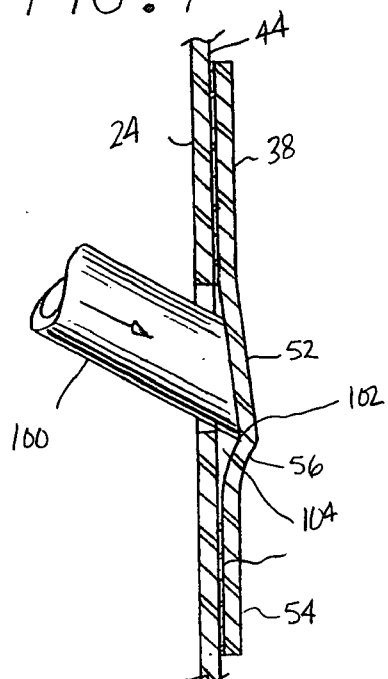


FIG. 8

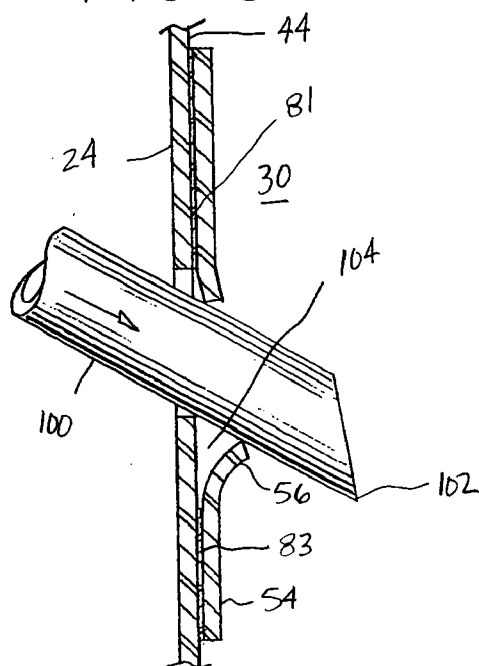
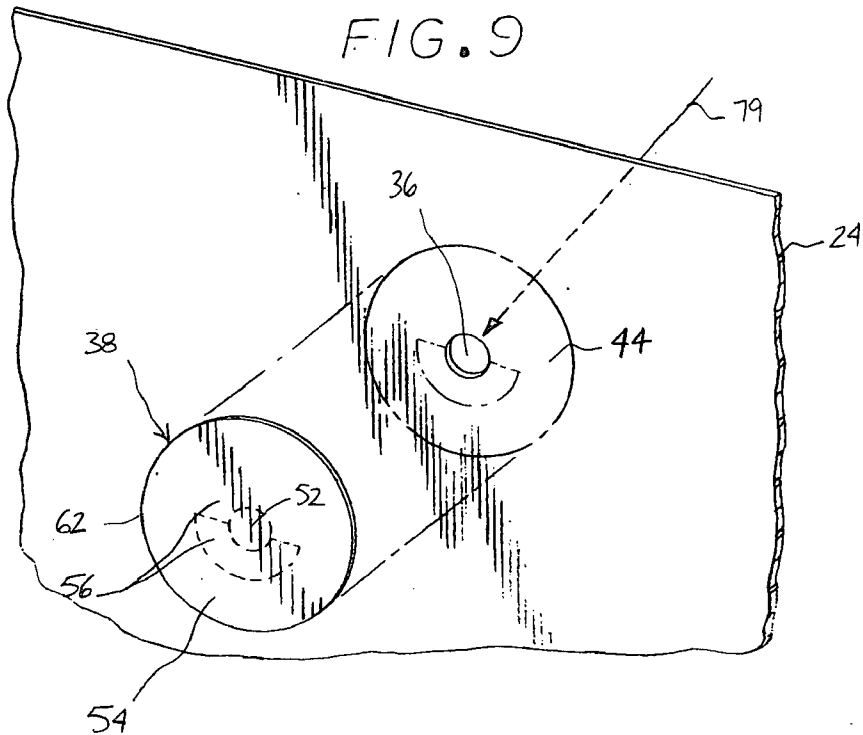
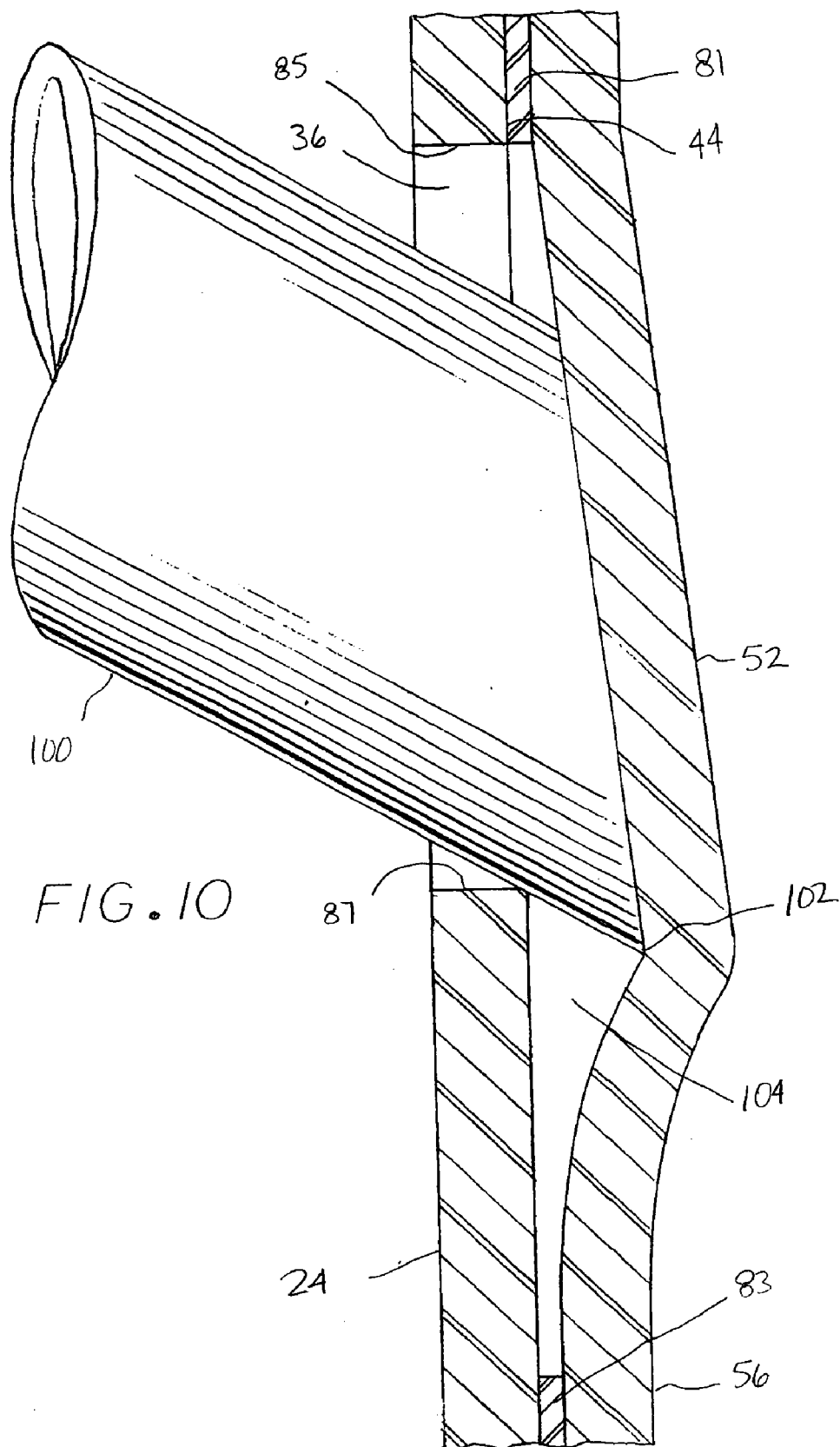
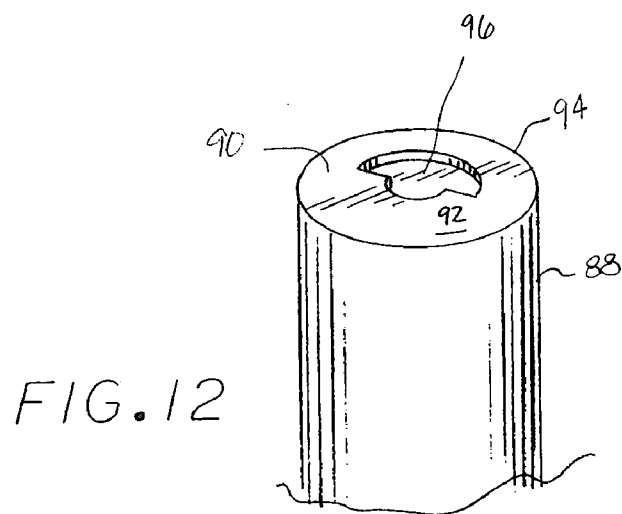
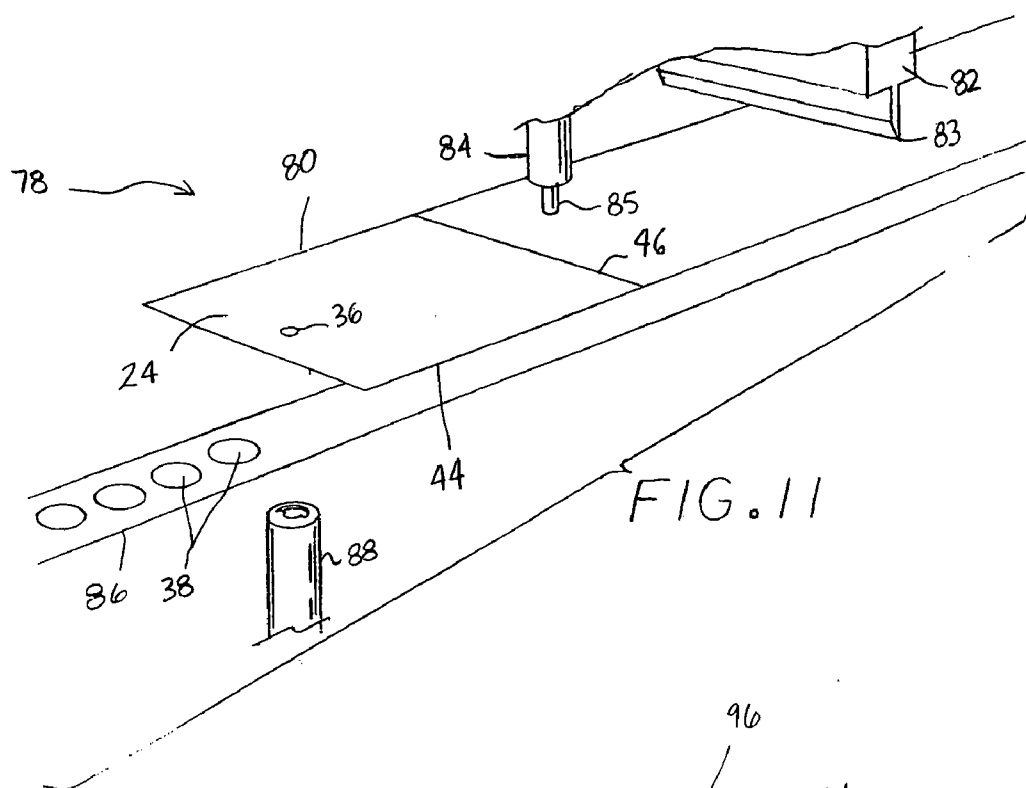


FIG. 9







SEALED BEVERAGE CONTAINER

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to packaging and more specifically to beverage containers constructed for piercing with a straw-like component to withdraw its contents.

[0003] 2. General Background and State of the Art

[0004] Flexible stand-up pouches are becoming increasingly common throughout the beverage industry. A typical stand-up pouch includes a pair of sheets welded together using heat welding or other bonding techniques to form a peripheral seam line and a central distensible pouch for receiving the desired contents. The bottom wall of the pouch is typically gusseted facilitating placement of the pouch in a self-standing configuration when filled.

[0005] One example of manufacturing such a pouch can be found in U.S. Pat. No. 5,868,658 to Wild. According to that patent, the beverage containers are produced by transporting a front side sheeting web using a conveyor transportation system through a piercing means to produce a piercing hole (straw hole) completely through the front side sheeting at periodically spaced intervals. A closure sheeting web is also conveyed at a point downstream from the piercing hole means and is brought into contact with the piercing hole and welded around the piercing hole using a sealing means to the inside of the front sheeting web. A rear side sheeting web is fed in a conveying direction such that the inside of the front sheeting web welded to the closure sheeting web moving along therewith faces the inside of the rear side sheeting web and that the bottom sheeting web is conveyed between front side and rear side sheeting webs. After all the sheetings have been fed together, they pass a sealing means which welds the bottom sheeting web in part to the front and rear side sheeting webs in the bottom region of the bag such that a standing bag can be produced. Downstream of this bottom sealing means, a lateral edge sealing means is provided to weld the lateral edges of the front and rear side sheeting webs together of the beverage container to be produced with the closure web included therein. This is followed by a shape punching means to, for example, round the beverage container edges. A longitudinal cutter is used for cutting the welded together sheeting webs into strips of bags which are joined together at the lateral edges. A transverse cutter separates the lateral edges of the individual bags from one another. The individual bags may be packaged in stackable containers or transferred to a fill and closure conveyor system. Similar closure strips may be found in U.S. Pat. No. 5,997,177 to Kaufman and U.S. Pat. No. 5,425,583 to Wild.

[0006] As each of those three patents reveal, the closure means to close off the piercing hole (straw hole) is a strip that spans the entire lateral width of each beverage container and thus wastes a considerable amount of material as only the piercing hole and immediate surrounding area needs to be covered. Thus, the transverse ends of the strip are welded to the inner surfaces of the transverse edges of the front and rear sides sheet and aligned that a portion of the strip covers the piercing hole. Then, the strip is typically sealed using a circular sealing element to seal the area circumscribing the

piercing hole forming a circular sealing pattern extending up to the edge of the piercing hole. Illustrations of this circular sealing pattern are found in FIGS. 3 and 5 of U.S. Pat. No. 5,425,583 to Wild. By inserting a straw or other piercing implement through the piercing hole, the seal on the interior side may be punctured providing access to the contents of the container. This circular seal pattern, however, typically creates a difficulty in opening the pouch as the abutting end of the straw often slips across the straw hole and inner seal membrane and misses the opening.

[0007] With this drawback in mind, a different sealing pattern was developed. For example, in U.S. Pat. No. 5,997,177 to Kaufman, the seal strip spanning the entire transverse width of the beverage container is still used and thus wastes a significant amount of material to cover just the piercing hole as in the Wild patent. However, in this Kaufman patent, the puncturing difficulty is sought to be alleviated somewhat by providing a sealing pattern that does not extend entirely to the edge of the piercing hole as in the Wild patent but leaves a small gap spaced away from the edge of the piercing hole. While the focus of the Kaufman patent is to provide a tamper-evident seal, the inner seal forms a pocket when pushed inwardly by a piercing implement and creates a more satisfactory seal that prevents slippage of the piercing straw. More specifically, the end of the straw pushes the seal membrane inwardly away from the edge of the piercing hole and is directed inwardly and is guided by the piercing hole to puncture the seal membrane. In Kaufman, an additional perforated exterior puncturable section is used over the piercing hole to provide a visible indication of tampering with the inner seal. That is, if the outer perforated section is broken, then it is possible that the inner seal membrane was compromised. Again, as with the Wild patent, an excessive waste of material is created using the strip closure means placement. Also, as with Wild, the sealing pattern again completely circumscribes the piercing hole and is symmetrical about the piercing hole.

[0008] Another example appears in U.S. Pat. No. 5,873,656 to Arkins et al. takes another approach at the pocket forming seal. This seal is also strip mounted and includes a sealing pattern with an outer portion attached by heat seal to the inside surface of the front barrier wall with the inner portion not attached to the inside surface. As illustrated in **FIG. 2**, the heat seal pattern forms a series of small fingers in the outer portion which extend toward the center of the straw hole. The fingers are laid out so that the inner portion and outer portion form a sinusoidal intersection centered around and symmetrical about the inner portion. The fingers terminate at a distance D from the straw hole. With this construction, the inner portion forms a small pouch between the straw hole and the surrounding part of the front barrier wall and completely circumscribing the straw hole. According to the patent, precise centering of inner portion and outer portion about a straw hole are dependent upon the precision with which the action a heat sealing tool is registered with the pre-punched straw hole. According to the patent, it is often difficult to precisely center inner portion on the straw hole of the front barrier wall when sealing jaws are used to seal the outer portion to the inside surface.

[0009] As the Arkins et al. patent further explains, to open the sealed pouch, the straw is inserted into the straw hole. Since the outer portion of the membrane seal does not extend to the edges of the straw hole, the inner portion forms a small

pouch which readily moves away from the straw hole and elongates or distends when contacted by the straw. The straw readily enters the straw hole and is guided by the straw hole during further entry. As the straw is further extended into the inner portion, the seal strip eventually ruptures.

[0010] As a user typically grasps the beverage container with one hand and forces the straw downward, there is no real benefit to a pouch beneath the upper edge of the straw hole as in the Arkins seal configuration. Rather such an upper pouch configuration increases the likelihood of improperly directing the piercing implement at an angle wherein the likelihood of undesirably piercing the opposing wall of the pouch increases.

[0011] Improvements have been made in the procedures for applying a straw hole patch or seal involving use of a relatively small generally circular patch to cover the straw hole. The technology for placing a circular patch or seal about the straw hole and weld it into place with a circular sealing pattern is well known. This circular patch reduces the overall amount of material required by providing just a sufficient amount of material to cover the straw hole with only enough left over to connect to the inner surface of the pouch and provide an adequate seal. Prior patches involving this latter structure may be seen in **FIGS. 4-5** herein. As illustrated in **FIG. 4**, this patch **23**, known as a washer type patch, has a circular perimeter **27** and includes a sealing pattern **29** that includes an innermost circular edge **35** that does not extend entirely to the edge of the straw hole **31**, shown in phantom lines, thus leaving a symmetrical unsealed region **41** concentrically disposed about the straw hole with a central unsealed region **43** covering the straw hole along the lines of the sealing pattern in U.S. Pat. No. 5,997,177 to Kaufman. However, while this circular patch is often satisfactory, it also has a tendency to fold during rapid application thus providing an inadequate seal creating undesirable leaks and costing the manufacturer money. Also, there is typically no need for the unsealed portion near the top of the patch above the straw hole and such unsealed portion may lead to inadvertently forcing the straw in the wrong direction and piercing the opposing wall of the pouch creating a leak.

[0012] Another circular patch **25** as illustrated in **FIG. 5** includes a sealing pattern wherein a symmetrical ring shaped sealed area **47** includes an innermost edge that extends right up to the edge of the straw hole **49**, designated in phantom lines, as with the sealing pattern described in U.S. Pat. No. 5,425,823 to Wild. However, when this sealing pattern is used in conjunction with a circular patch on a high speed sealing machine, this style of patch must be aligned precisely to avoid creating an improper seal and drives the cost of the machinery upwards to achieve such accuracy. If the patch is not aligned and seals off the straw hole or effectively reduces the straw hole to an unusable dimension, the pouch is rendered unusable. In addition, as with the seal in the '823 patent to Wild, this patch version adds difficulty in piercing the seal as the piercing straw may slip outside the punch hole region of the pouch as there is no appreciable lip to catch the straw from sliding outside the punched region.

[0013] A common theme occurring with all of these patches and corresponding sealing patterns is that they are all symmetrical about the piercing hole and fail to take into account that there is no design criteria that dictates all regions around the piercing hole should be treated equally.

[0014] Thus, there exists a need for a patch assembly which will reduce waste, will allow for placement of the patch at high speeds without undue risk of leaking and which will accommodate piercing of the pouch without mishaps.

INVENTION SUMMARY

[0015] In accordance with a preferred embodiment of the present invention, a container body is provided with a substance receiving compartment between a front wall and a rear wall includes an aperture in one of the walls that defines an axis passing through a plane of the wall in which the aperture is disposed and further includes a seal or patch covering the aperture with the seal including an unsealed region and a sealed region attached to the interior surface of the wall about the aperture with at least one of the regions being asymmetrically oriented about the axis.

[0016] In another aspect of the present invention, the seal is a substantially circular patch with a majority of the unsealed region disposed underneath a horizontal axis in relation to the bottom edge of the container body.

[0017] Yet another aspect of the present invention involves a seal with an outer ring attached to the interior surface of a wall of the container body, an unsealed center registered with the aperture, and an inner ring including portions of both the unsealed region and the sealed region.

[0018] Still yet another feature of the present invention is that the seal may be heat welded, adhered, or sonically welded to the container body over the aperture.

[0019] In another embodiment of the present invention, the container body includes flexible walls to form a flexible stand-up beverage pouch.

[0020] It is also contemplated that the present invention may include a second axis with the sealed and unsealed regions asymmetrically oriented about the first axis and symmetrically oriented about the second axis.

[0021] As another feature of the present invention, a piercing tool receiving pouch is formed by the configuration of the unsealed and sealed regions of the seal to assist in guiding the tool into the compartment.

[0022] Other aspects of the present invention will become apparent with further reference to the following drawings and specification.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] **FIG. 1** is a perspective rear view of a flexible beverage pouch incorporating the straw patch according to the present invention;

[0024] **FIG. 2** is a side view, in reduced scale, of the flexible beverage pouch shown in **FIG. 1**;

[0025] **FIG. 3** is a broken and cutaway view from the rear side of the pouch in **FIG. 1** with the inner surface of the rear wall of the pouch visible with a patch according to the present invention;

[0026] **FIG. 4** is a plan view of a prior art patch;

[0027] **FIG. 5** is a plan view of another prior art patch;

[0028] **FIGS. 6A, 6B, and 6C** are plan views of alternative patches, in enlarged scale, according to the present invention;

[0029] FIG. 7 is a cross sectional, exploded view illustrating the rear wall of the flexible pouch and a straw beginning to penetrate the patch seal;

[0030] FIG. 8 is a similar view as FIG. 7 with the piercing end of the straw piercing through the patch seal;

[0031] FIG. 9 is sectional, exploded view from the interior of the pouch illustrating the patch apart from the straw hole on the inner surface of the rear wall of the pouch;

[0032] FIG. 10 is a close up view of the area surrounding the straw hole and patch with the straw initially piercing the straw patch taken from FIG. 7;

[0033] FIG. 11 is a perspective view of a portion of an exemplary flexible beverage pouch assembly machine; and

[0034] FIG. 12 is a close up perspective view of the welding element shown in FIG. 11.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0035] Referring now to FIGS. 1-2, a sealed beverage container, generally designated 20, includes a container body 21 with a front panel 22 and a rear panel 24 joined together to form a distensible compartment 30 for receiving a fluid such as a fruit juice, water, or other desired substance with one of the panels including in its upper portion an aperture 36 for accessing the contents of the compartment. The circular aperture includes a diametrical axis 37 disposed in a plane passing through the wall in which the aperture resides and may be sealed off with a seal 38 including an unsealed region 40 at least partially covering the aperture and a sealed region 42 attached to the interior surface 44 of the panel that may be applied during the manufacturing process with at least one of the regions oriented about the axis asymmetrically.

[0036] With reference to FIGS. 1-3 and 6A, in this particular exemplary container embodiment 20, the front panel 22 (or wall) and rear panel 24 (rear wall) are joined together at their outer edges using conventional material welding or adhering techniques to form a marginal seam 28 divided generally into a lower section 32 and an upper section 34 with a narrow waist section 48 formed in the middle of the pouch. The underside (not shown) of the pouch between opposing bottom edges 46 of the pouch is gusseted using conventional methods to assist in supporting the flexible pouch in an upright position. The top edge 47 of the pouch is generally straight across where the front and rear panels meet.

[0037] The body of the pouch is preferably constructed of a multi-layered film about 4 mil thick such as those containing layers of Low Density Polyethylene (LDPE), Ethyl Vinyl Alcohol (EVOH) and Linear Low Density Polyethylene (LLDPE) or Polyethylene Terephthalate (PET) with Ethylene acrylic acid (EAA)-LDPE. It will be appreciated that these are exemplary materials and other suitable materials would occur to one of ordinary skill in the art and that the general construction of a flexible stand-up pouch is well known in the art.

[0038] In this exemplar, the rear wall 24 includes the aperture 36 that may be punched by a punch tool during the manufacturing process as described below. The aperture or straw hole is preferably circular and connects the interior

surface 44 of the rear wall 24 with the exterior surface 45 of the rear wall so that the contents of the compartment 30 are accessible. The aperture lies in a plane passing through the rear wall that is generally locally flattened around the aperture. In the preferred embodiment, this first axis 37 is a horizontal axis with respect to the bottom edge 46 of the container body and also a centerline with respect to the circular aperture 36. The aperture typically measures about 5 mm in diameter but other suitable dimensions and shapes will occur to one of ordinary skill. It will be appreciated that more than one aperture may be provided and punched into either or both walls 22 or 24, or other regions of the container body 21 to access the contents of the compartment 30.

[0039] The aperture 36 of the container 20 may be sealed with an exemplary patch 38 such as that illustrated in FIGS. 3, 6A, and 9. The patch is preferably circular, about 19 mm in diameter, and has a constant thickness of about 2.0 mil, although a thickness in the range of 1.0 to 4.0 mil would be satisfactory. A suitable patch may be manufactured of co-extruded EVOH material although other suitable materials may be used. While the patch is preferably circular, a certain amount of fringe material 60 may be present on the applied patch. This fringe material may have jagged or non-circular edges and is typically not adhered or welded to the interior surface 44 of the rear panel 24.

[0040] With particular reference to FIG. 6A, the exemplary circular patch 38 includes an application surface 50 that may be melted and adhered or welded to the interior surface 44 of the rear panel 24. The application surface of exemplary circular patch 38 has three distinct regions including a central alignment region 52, an adjacent intermediate ring region 56 concentrically arranged about the central region 52 and an outer ring region 54 concentrically arranged about and adjacent to the intermediate ring region 56. As will be discussed in further detail, only certain portions of the application surface are adhered, heat welded, sonically welded, or otherwise suitably attached to the interior surface 44 of the rear panel 26 of the pouch 20. When welded or adhered to the interior surface 44 of the rear panel 26, the application surface forms an asymmetrical seal footprint 55, indicated by stippling in FIG. 6A, as may be imprinted by a sealing element. It will also be appreciated that the circles, including the phantom lines, separating the regions 52, 54, and 56 as in FIG. 6A have been added to the drawings to facilitate description and are not a necessary part of the invention.

[0041] With continued reference to FIGS. 3 and 6A, the central alignment region 52 of the patch 38 is preferably circular and approximately the size of the straw hole 36 (typically about 5 mm in diameter). During the application process, the central alignment region is preferably aligned to register with the straw hole thus centering the patch about the straw hole and is not adhered or welded to the interior surface 44 of the rear panel 24. This region 52 as surrounded by the straw hole 36 provides a puncture target from the outside of the container body 21 for the user to aim the piercing end of a straw. The entire central alignment region forms part of the unsealed region 40.

[0042] Due to the speed at which the web presses operate in applying the patch, exact registration of the central alignment region 52 and straw hole 38 is not always possible

with moderately priced equipment. Thus, to provide some tolerance in the alignment procedure, a portion of the intermediate ring 56 may also be left unsealed while another portion of the intermediate ring 56 falls within the sealed region 42 of the patch 38 as discussed in more detail below.

[0043] As viewed in FIG. 6A, the first axis 37 corresponds with what might be considered the horizontal centerline of the patch 38. When the central alignment region 52 is registered with the straw hole 36, their respective horizontal centerlines are also aligned. A second diametrical axis 58, what might be considered a vertical centerline in this exemplar, projects radially outwardly from the center of the central alignment region 52 in a vertical direction. Both axes project through each of the three regions 52, 54, and 56 and intersect at the center of the circular patch excluding any fringe material 60. The intermediate ring 56 includes an unsealed region 40 and a sealed region 42. In the exemplary patch 38 of FIG. 6A, the arch shaped sealed region 42a and the upside down arch shaped unsealed region 40a of the intermediate ring 56 meet at the transverse axis 37 with the entire portion of the intermediate ring above the transverse axis forming a sealing region and the entire portion below the transverse axis forming an unsealed region of the intermediate ring thereby forming an asymmetrical sealing pattern 50 about the transverse axis 37. These two regions 40a, 42a completely encircle the central alignment region 52 that also remains unsealed. Thus, the unsealed region 40 is shaped like an upside down semi-circle with a smaller diameter right side up semi-circle centered between the arch extremities.

[0044] The outer ring region 54 is preferably circular and concentrically circumscribes the intermediate ring region 56. The outer ring includes a sealed region 42b that complements the sealed portion 42a of the intermediate ring 56 to form the asymmetrical welding footprint 55. As illustrated in FIG. 6A, this outer sealed region 42b fills the entire outer ring region 54. While illustrated as having a circular perimeter 62, the outer ring 54 may include a differently shaped, irregular or other geometric shape including for example, having a four-sided perimeter.

[0045] With continued reference then to FIG. 6A, the asymmetrical welding pattern 55 of the circular patch 38 is formed by the combination of the intermediate sealed region 42a and the outer sealed region 42b forming the sealed region 42 which complements the unsealed region 40 comprised of the central alignment region 52 and intermediate unsealed region 40a. Together the unsealed region 40 and sealed region 42 form a complete seal or patch 38. As explained further below the unsealed portion 40a of the intermediate ring 56 forms an alignment pouch to assist in guiding a straw end into the compartment. The horizontal centerline 37 divides the unsealed region 40a of the intermediate ring 56 from the sealed region 42a.

[0046] Alternative patches are illustrated in FIGS. 6B and 6C wherein like components are like numbered. In the first alternative patch 238 of FIG. 6B, the application surface 250 includes an outer ring 254 and central alignment region 252 that are constructed identically to their counterparts 54 and 52, respectively, of the patch 38 in FIG. 6A. The intermediate ring 256 includes an unsealed region 240a and a sealed region 242a forming an asymmetrical sealing pattern about the horizontal center line 237 and symmetrical

about the vertical centerline 258. More specifically, the welded area 242a of the intermediate ring 256 covers approximately a 30 degree arc centered about the vertical center line with the majority of the unsealed region beneath the horizontal centerline 237. The asymmetrical sealing pattern 255 is formed by the outer ring 254 and sealed region 242a of the intermediate ring 256 which complements the unsealed region 240 comprised of the central alignment region 252 and unsealed region 240a of the intermediate ring 256. Thus, the sealed region 42a of the patch 38 has been reduced from a 180 degree arc in patch 38 to a 30 degree arc in patch 238. It will be appreciated that any arc variants within this range of 30 degrees to 180 degrees for the sealed region 242a would also be acceptable. While a sealed region 242a may cover a smaller arc than 30 degrees, at least 30 degrees is preferred and a portion of the sealed region located in the intermediate ring 56. The unsealed region of the intermediate ring 256 extends above the horizontal centerline 237.

[0047] In addition, a sealed region of more than 180 degrees may also be used as shown in the second alternative patch 338 illustrated FIG. 6C. This patch 338 includes an application surface 350 wherein the asymmetrical sealing pattern 355 includes an outer ring 354 and central alignment region 352 identical to their counterparts 54 and 52, respectively of the patch 38. The intermediate ring 356 includes a sealed portion 342a covering about a 330 degree arc leaving an unsealed region 340a covering about a 30 degree arc. In this configuration, the entire unsealed portion of the intermediate ring is beneath the horizontal centerline 337 and does not abut that line. The sealing pattern 355 is symmetrical about the vertical centerline 358. Of course, it will be appreciated that any degree of arc creating an asymmetrical inner pattern about the horizontal center line 337 is suitable with a welded area that does not project directly below the center such that the straw end when pressing through the patch and rear surface of the beverage pouch forms a lip for engaging the straw end as shown in FIG. 10 and described below. In addition, while the first axis 37, 237, 337 and second axis 58, 258, 358 have been described in terms of horizontal and vertical centerlines, these axes do not have to be centered but merely provide a point of reference as to the asymmetrical sealing pattern.

[0048] Referring now to FIGS. 11 and 12, an exemplary patch application system, generally designated 78, for applying such patches 38, 238, 338 is illustrated. While the general technology for constructing flexible pouches and applying patches such as those shown in FIGS. 4 and 5 is known to those of ordinary skill in the art, such machinery may be modified with a certain sealing element to provide the particular application of the asymmetrical welding pattern discussed now in more detail. As shown in FIG. 11, the patch application machinery 78 includes a sheet of flexible pouch material 80 to be used for the rear panel 24 of the flexible pouch 20 that may be conveyed underneath a cutter 82 having a blade 83 for separating rear panels using rollers (not shown) or other suitable delivery device. The moving pouch material 80 also passes beneath a straw hole punch 84 with a piercing element 85 that is lowered onto the pouch material with sufficient force to punch a circular straw hole 36 through the material. On the reverse side of the pouch material 80, representing the interior surface 44 of the rear panel 24 once the pouch is assembled, a strip or webbing 86 including a plurality of circular straw hole patches 38 is

passed beneath the sheet material **80** in the opposite direction. Beneath the straw hole patch strip **86** is a heat sealing/cutter unit **88** that may be in the form of a welding shoe, for example. The face **92** of the heat sealing/cutter unit (straw patch applicator) has a marginal circular cutting edge **94** for cutting the straw hole patch from the strip **86**. In addition while the patch **38** is pressed up against the interior surface **44** over the straw hole **36** the end of the heat sealing/cutter unit **88** beneath the face **92** is heated using conventional methods to a sufficient degree to melt the application surface **50** of the straw hole patch material where it meets the strip material thus applying the patch to the inside surface **44** of the pouch material **80** over the straw hole **36**.

[0049] Inside the circular cutting edge, the face of the straw patch applicator **88** includes a marginal outer perimeter **94** flush with the outer end application surface **92** of the straw patch applicator **88**. Within this outer surface, an asymmetrical recess **96** devoid of a heat source provides the absence of sealing on the straw patch to establish the unsealed portion **40** of the patch **38**. Thus the unsealed portion **40** of the application surface **50** of the patch **38** opposite the recess **96** does not melt or adhere to the interior surface **44**.

[0050] The heat sealing/cutter unit **88** is operable to move upwardly to cut a circular patch **38** from the strip **86** and press the patch against the inner surface **44** of the rear wall **24** over the straw hole **36**. As shown in FIG. 9, the circular patch **38** is aligned with the central axis **79** of the straw hole **36**. As the heat sealing/cutter unit presses the patch against the inner surface of the rear wall, the asymmetrical end surface **92** on the end **90** of the unit **88** is heated sufficiently to melt a corresponding portion of the patch application surface **50** as determined by the melting characteristics of the patch material used and imprint an asymmetrical sealing pattern **55** on the patch **38**. The asymmetrical pattern illustrated in FIG. 12 would seal the patch with the asymmetrical sealing pattern **55** of the patch as shown in FIG. 6A. Thus, by varying the end surface **92** of the heating element, the sealing pattern or asymmetrical welding footprint of the patch **38**, **238**, **338**, for example, or variation thereof, may be varied as described herein. The face of the heating element imprints the sealing pattern on the patch. Once the patch **38** is applied over the straw hole **36**, the remainder of the flexible stand-up pouch is constructed as is known in the art.

[0051] It will be appreciated that this assembly arrangement is exemplary and not meant to be restrictive. Any suitable assembly machine or process for assembling flexible beverage pouches and applying patches may be used with the specialized heating unit **88** to form the desired sealing pattern. For example, typically a plurality of heat sealing/cutter units are used to apply a plurality of patches on a corresponding plurality of rear walls simultaneously to increase the production rate of the pouches. The asymmetrical sealing pattern also locates the welding pattern efficiently while allowing its use in high speed patch application machinery. Conventional machines typically apply about 4 patches at a time but with the asymmetrical welding pattern, anywhere from 1 to 100 patches may be applied at a time. Control over the placement of the patch is also enhanced.

[0052] With reference to FIGS. 1-3, 7-8 and 10, in use, after the beverage pouch **20** is formed, filled, and sealed, a user may conveniently grasp the container body **21** around

the narrow waist section **48**, and grasp a straw **100** or other suitable piercing tool and drive the piercing end **102** through the straw hole **36** between the upper ledge **85** and lower ledge **87** into contact with the central region **52** of the patch **38**. As the lower portion of the patch inner ring **56** is unsealed and the upper portion of the patch inner ring is sealed to the interior surface **44** of the rear wall **24**, the straw is generally directed downwardly to displace the unsealed material to form an alignment pouch **104** within the inner ring **56** generally beneath the straw hole **36**.

[0053] With reference to FIGS. 7, 8 and 10, continued inward force of the straw will eventually rupture the seal **38** allowing the piercing end **102** of the straw into the compartment **30**. The upper section of the seal is retained on the interior surface **44** of the rear wall **24** by the upper weld **81**. The lower section of the seal is retained on the interior surface **44** of the rear wall **24** by the lower weld **83** so that no portion of the seal breaks off and falls into the compartment. Once the seal is ruptured, the user may draw the contents of the container body **21** out through the straw in a conventional manner. It will be appreciated that this asymmetrical welding pattern assists in directing the straw downwardly and into the container to avoid inadvertently piercing through the front wall **22** of the container **20**. The patch **338** is the most restrictive in guiding the straw end **102** downwardly into the compartment while the patch **238** due to the narrow channel formed by the unsealed area **340a** and the patch **238** is the most forgiving during the placement process. Thus, the sealing patterns may be varied to accommodate a wide variety of patch application machinery to increase the accuracy, efficiency and speed at which the patches are applied to reduce the likelihood of leaks while maximizing production rates and resulting in a user friendly puncturable pouch. The patch strength is sufficient normal shipping environments but also easily rupturable by a small child.

[0054] While the present invention has been described herein in terms of a number of preferred embodiments, it will be appreciated that various changes and improvements may also be made to the invention without departing from the scope and spirit thereof. For example, while the preferred embodiment is in terms of a flexible stand-up beverage pouch, the patch application process may be used on other containers such as cartons.

What is claimed is:

1. A sealed container comprising:

- a container body including a front wall joined to a rear wall defining a substance receiving compartment with an interior surface and an exterior surface, at least one of said walls including an aperture for accessing said compartment and defining a first axis disposed in a plane passing through said at least one of said walls; and
- a seal including an unsealed region at least partially covering said aperture and a sealed region attached to said interior surface of said container body with at least one of said regions being asymmetrical about said first axis.

2. The sealed container as set forth in claim 1 wherein: said rear wall includes said aperture and said seal is attached to said interior surface of said rear wall over said aperture.
3. The sealed container as set forth in claim 1 wherein: said first axis is a horizontal centerline relative to a bottom edge of said container body.
4. The sealed container as set forth in claim 1 wherein: said seal includes a second axis as a vertical centerline relative to said first axis and said unsealed region and said sealed region are symmetrical oriented relative to said second axis.
5. The sealed container as set forth in claim 1 wherein: said seal is circular and includes an outer ring, an inner ring, and a center region, said outer ring being completely sealed to said interior surface of said container body, said center region disposed within said unsealed region and covering said aperture, and said inner ring including a portion of said unsealed region and a portion said sealed region.
6. The sealed container as set forth in claim 5 wherein: said seal includes a unsealed fringe region circumferentially disposed about said outer ring.
7. The sealed container as set forth in claim 5 wherein: said first axis is a horizontal centerline and said inner ring includes said unsealed region disposed beneath and abutting said horizontal centerline.
8. The sealed container as set forth in claim 5 wherein: said axis is a horizontal centerline and said inner ring includes said unsealed region with a first portion disposed partially above said horizontal centerline and a second portion disposed completely below said horizontal centerline.
9. The sealed container as set forth in claim 5 wherein: said axis is a horizontal centerline and said inner ring includes said unsealed region that extends beneath said centerline.
10. The sealed container as set forth in claim 1 wherein: said walls are flexible.
11. The sealed container as set forth in claim 1 wherein: said aperture is circular.
12. The sealed container as set forth in claim 1 wherein: said seal is heat welded to said interior surface of said container body.
13. The sealed container as set forth in claim 1 wherein: said seal is sonically welded to said interior surface of said container body.
14. The sealed container as set forth in claim 1 wherein: said seal is adhered to said interior surface of said container body.

15. The sealed container as set forth in claim 1 wherein: said unsealed region defines a piercing tool receiving pouch below said first axis.
16. The sealed container as set forth in claim 1 wherein: said walls are welded together at their respective margins to form said compartment.
17. The sealed container as set forth in claim 1 wherein: said seal includes an arch-shaped sealing pattern above said first axis.
18. The sealed container as set forth in claim 1 wherein: said seal includes an inner ring concentrically disposed about said aperture and including an unsealed region extending a distance greater than 180 degrees about a center point of said aperture.
19. The sealed container as set forth in claim 1 wherein: said seal includes an inner ring concentrically disposed about said aperture and including an unsealed region extending a distance less 180 degrees about a center point of said aperture and below said first axis.
20. A sealed container comprising:
 - a container body including a front wall joined to a rear wall defining a substance receiving compartment with an interior surface and an exterior surface, one of said walls including an aperture for accessing said compartment, said aperture having a first axis; and
 means for asymmetrical sealing said aperture about said first axis.
21. A sealed container comprising:
 - a flexible standup pouch body including an upright front wall joined to an upright rear wall;
 - a bottom wall joined to a lower edge of said front and rear walls, said walls cooperating to define a fluid receiving compartment with said rear wall including a straw hole disposed near the top of said pouch body for accessing said compartment, said hole having a horizontal centerline passing therethrough; and
 - a substantially circular patch overlying said hole on said interior surface of said rear wall and including a sealed region attaching said patch to said interior surface and an unsealed region, said sealed region including an outer ring sealed to said interior surface and concentrically disposed about said hole, said unsealed region including a center registered with said hole, said patch including an inner ring also concentrically disposed about said hole and interior to said outer ring, said inner ring defining an asymmetrical sealing pattern about said centerline with a portion of said ring including a portion of said sealed region and a portion of said unsealed region.

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