FLEXIBLE POUCH FOR AN ALCOHOLIC BEVERAGE AND METHOD OF FORMING

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ABSTRACT

A flexible pouch for packaging an alcoholic beverage and a method of forming is provided. The flexible pouch includes a panel having an inner surface and an outer surface, and an upper edge, an opposed lower edge and a first side edge and a second side edge. The upper edge is sealed by a first seal and a second seal spaced a predetermined distance from the first seal, so that some of the beverage is trapped between the first seal and second seal. The pouch also includes an opening means disposed in the panel for accessing the beverage. The method includes the steps of forming a body of the pouch from a roll of laminate material, and sealing the lower edge, first side edge and second side edge, applying an opening means to the panel and finishing the pouch.
FIG - 6
1. Empty Pouches into Machine
2. Place Pouch in Transport Means
3. Open Pouch
4. Fill Pouch
5. Remove O₂ From Pouch
6. First Seal Applied
7. Second Seal Applied
8. Finish Pouch and Discharge

FIG - 14
FLEXIBLE Pouch FOR AN ALCOHOLIC BEVERAGE AND METHOD OF FORMING

CROSS-REFERENCE TO RELATED APPLICATIONS


FIELD OF THE INVENTION

[0002] The present invention relates generally to a flexible pouch for packaging a product and, more specifically, to a flexible pouch for packaging a beverage containing alcohol and a method of manufacturing the same.

DESCRIPTION OF THE RELATED ART

[0003] Various types of disposable, portable containers are known in the art for storing a fluid or dry product, such as a liquid, granular material, powder or the like. Examples of containers include a cup, a metal can, a plastic bottle, a glass bottle or a flexible pouch. Consumers prefer the convenience of flexible pouches over other types of containers due to their shape, size, shelf life and storage adaptability. Manufacturers recognize the packaging benefits of a flexible pouch, since the pouch can be formed and filled on the same manufacturing line.

[0004] The flexible pouch is made from a flexible material, preferably a laminate composed of sheats of plastic or aluminum or the like. An outer layer of the material may include preprinted information, such as a logo or the like, to provide the consumer with information regarding the contents of the pouch. The pouch includes a front and a back wall. Edges of the panel, such as a side edge, upper edge or lower edge, are joined together using a sealing technique such as bonding or welding. The pouch may be formed and/or filled using conventionally known manufacturing techniques, such as a horizontal form-fill-seal machine with a single or multiple lanes, a flat bed pre-made pouch machine, a vertical form-fill machine, or the like. An example of a method and apparatus for filling a flexible pouch with a product is disclosed in commonly assigned U.S. Pat. No. 6,199,601, which is incorporated herein by reference.

[0005] Flexible pouches have been used for some time to distribute non-carbonated beverages, such as fruit juice and the like. However, their use with other types of beverages, including carbonated beverages or the like, has been limited. Materials previously used in the manufacture a flexible pouch for a non-carbonated product were somewhat permeable, thereby allowing loss of the internal carbon dioxide gas from the pouch and its replacement with oxygen. The presence of oxygen in the filled pouch is detrimental, since oxygen increases the chance of bacteria forming, or may affect the taste.

[0006] While the above-described pouch functions well for some products, it doesn’t function satisfactorily for a beverage having an alcoholic content, such as wine, beer or liquor or the like. Thus, there is a need in the art for a flexible pouch for a beverage having an alcoholic content, and an improved method of making such a flexible pouch.

SUMMARY OF THE INVENTION

[0007] Accordingly the present invention is an improved flexible pouch for a beverage having an alcoholic content and a method for manufacturing the pouch. The flexible pouch includes a panel having an inner surface and an outer surface, and an upper edge, an opposed lower edge and a first side edge and a second side edge extending therebetween the upper edge and the lower edge. The upper edge is sealed by a first seal that is an ultrasonic seal and a second seal spaced a predetermined distance from the first seal so that some of the beverage having an alcoholic content is trapped between the first seal and second seal. The pouch also includes an opening means disposed in the panel for accessing the beverage having an alcoholic content contained within the pouch.

[0008] The method of making the pouch includes the steps of forming a body of the pouch from a roll of laminate material, and sealing the lower edge, first side edge and second side edge. The method further includes the steps of applying a first ultrasonic seal and a second seal spaced a predetermined distance from the first seal, while capturing some of the product between the first and second seal. The method further includes the steps of applying an opening means to the panel and finishing the pouch.

[0009] One advantage of the present invention is that a flexible pouch for an alcoholic beverage and an improved method of making the flexible pouch is provided. Another advantage of the present invention is that a flexible pouch and method of making a flexible pouch is provided that utilizes a laminate material that includes layers of PET, foil, nylon and cast polypropylene. Still another advantage of the present invention is that a flexible pouch and the method of making a flexible pouch is provided that includes an angled top seal to facilitate pouring the product from the pouch. A further advantage of the present invention is that a flexible pouch and method of making a flexible pouch is provided that is cost effective to manufacture. Yet a further advantage of the present invention is that the flexible pouch retains its shape as the product is removed. Still yet a further advantage of the present invention is that a flexible pouch and method of making the flexible pouch is provided that retains its flavor over the shelf life of the product. Another advantage is that a flexible pouch and method of making a flexible pouch is provided that includes a hanging hole in an upper portion of the pouch.

[0010] Other features and advantages of the present invention will be readily appreciated, as the same becomes better understood after reading the subsequent description taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 is an elevational view of a flexible pouch for an alcoholic beverage with an angled side edge and angled top seal, according to the present invention.

[0012] FIG. 2 is another elevational view of a flexible pouch for an alcoholic beverage with an angled side edge and angled top seal, according to the present invention.

[0013] FIG. 3 is still another elevational view of a flexible pouch for an alcoholic beverage with an angled side edge and angled top seal, according to the present invention.

[0014] FIG. 4 is an elevational view of a flexible pouch for an alcoholic beverage with a centrally located fitment and an angled top seal, according to the present invention.
FIG. 5 is another elevational view of a shaped flexible pouch for an alcoholic beverage with a centrally located fitment, according to the present invention.

FIG. 6 is another elevational view of a shaped flexible pouch for an alcoholic beverage with an angled side edge and an opposed angled top seal, according to the present invention.

FIG. 7 is still another elevational view of a shaped flexible pouch for an alcoholic beverage with an angled side edge and an opposed angled top seal, according to the present invention.

FIG. 8 is an elevational view of a flexible pouch for an alcoholic beverage with a tear strip opening means and an angled top seal, according to the present invention.

FIG. 9 is another elevational view of a shaped flexible pouch for an alcoholic beverage with a tear strip opening means, according to the present invention.

FIG. 10 is still another elevational view of a shaped flexible pouch for an alcoholic beverage with a tear strip opening means, according to the present invention.

FIG. 11a is an elevational view of a flexible pouch for an alcoholic beverage with a fitment opening means and a gusseted side seam, according to the present invention.

FIG. 11b is an enlarged view of the gusseted side seam for the flexible pouch of FIG. 11a.

FIG. 12a is an elevational view of a flexible pouch for an alcoholic beverage with a fitment opening means and a center seam, according to the present invention.

FIG. 12b is an enlarged bottom view of the flexible pouch of FIG. 12a, according to the present invention.

FIG. 13 is a flowchart of a method of forming a flexible pouch for an alcoholic beverage, according to the present invention.

FIG. 14 is a schematic view of a rotary fill machine for the flexible pouch of FIGS. 1-12, according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIGS. 1-12 a flexible pouch 10 is illustrated. The pouch 10 may be filled with a product 90 and sealed. Various shapes are contemplated for the pouch. The pouch 10 may have a generally cylindrical shape, a box-like shape, an hourglass shape, a barrel shape or another shape. It is contemplated that the pouch may contain a single portion or multiple portions of the product. In this example, the product is a beverage having an alcoholic content, such as wine, beer or liquor, or the like. The product may be carbonated, such as a sparkling wine. An example of a pouch for a carbonated beverage is disclosed in commonly assigned PCT Patent Application No. PCT/US03/034396, which is incorporated herein by reference.

The flexible pouch 10 is preferably formed from a roll of preprinted material of extruded or laminate layers. The material is typically a three, or four, or five or more gauge material, or two laminations of material or the like. The outer layer is usually preprinted. Alternatively, at least a portion of the material may be not printed, i.e. translucent, in order to view the product 90 contained therein, as shown in FIG. 1 at 40 as a window. The clear portion could also be in a gusset or insert. The outer layer of material may be a sleeve with preprinted information.

The choice of sheet layer material is non-limiting, and is influenced by factors such as the product contained in the pouch, the shape of the pouch, or the anticipated use of the pouch. One example of a laminate material structure includes at least one layer of virgin polyethylene terephthalate (PET), at least one layer of aluminum foil and another layer such as EVOH, PET, polyethylene or nylon or the like. Another type of laminate material structure may also include a metalized foil paper layer laminated to a cast polypropylene layer and another layer of PET, polyethylene or EVOH. There may be a fourth layer of nylon. Similarly, the laminate structure may include a cast polypropylene (CPP) layer, a polyethylene (PET) layer, a foil (AL) layer, a nylon (ONO) layer and another CPP layer. Another structure is the use of nylon, foil, nylon and cast polypropylene (ONO/AL/ONO/ CPP) or CPP/NY/AL/CPP. Another example of a material structure is ONO/AL/COEX-ONO-LDPE. Still another is PET/AL/NYLON/CPP. Material structures that include CPP are well suited for packaging a beverage having an alcoholic content, such as wine or beer or another liquor, to add strength to the walls of the pouch, and to preserve the product. CPP and nylon protect the AL layer from cracking. Carbonation is beneficial since it acts as a microbiocide and preserves the flavor and aroma of the products. The use of cast polypropylene laminate material also assists in retaining the filled shape of the container, even as the product is removed from the pouch 10. A further example of a laminate material structure is CPP/AL/ONO/PE. This structure works well when the product has a short shelf life, and the nylon eliminates stretching or cracking of the AL layer.

For white wine, an example of a material structure is PET/EVOH/PE or AL/PET/NY/PE. Similarly, a material structure for red wine includes PET/EVOH/PE, or AL/NY/ PET/PE. Still another example of a material structure is a 7-layer structure that includes a co-extruded laminate, such as PET/CO-PP/AL/NY/LLDPE, or the like. It should be appreciated that the CO-PP layer can include multiple layers, such as three in this example. Other film structures may also be utilized that offer similar protection from sunlight, as well as organoleptic protection from the development of undesirable flavors.

It should be appreciated that if the filled carbonated pouch is stored at ambient temperature, the laminate will start to creep after a period of time, such as ten days. The laminate material may include an extrusion layer to contain “creepage” or “stretch” of the film after filling due to carbonation expansion of the carbonated product. In addition, the selected material may be organoleptic compliant in order to avoid the transfer of odor contaminants to the product, or product contamination during the shelf life period of the product.

The pouch 10 is formed from at least one panel of material. The panel has an inner surface that is adjacent the product, and an outer surface. The pouch formed out of the panel has a front wall 12 and a back wall 14. Each wall 12, 14 is further defined by an upper edge 16, an opposed lower edge 18, and first and second side edges 20a, 20b extending therebetween the upper and lower edges 16, 18. The side
edges 20a, 20b of the panel form a sealed seam. In addition, the side edge, such as the second side edge, may include an angled portion, as shown at 50. The pouch may include two side seams if made from two panels or one single seam if made from one panel. In an example of a pouch formed using a single panel of material, the side edges 20a, 20b may be joined along a center seam, as shown in FIG. 12a at 22. The seam may be a flat seam. In an example of a pouch 10 formed using two panels of material, the edges are joined along two side seams. Again, the side seam may be a flat seam.

[0033] The pouch 10 may include an insert 24, sidewall or gusset 26. The gusset 26 may be integrally formed in the panel as shown in FIG. 11b, or a separate piece of material. The gusset 26 may be disposed between the front and back walls 12, 14, and positioned between the side edges of the walls, the lower edges, the upper edges, or any desired combination. It should be appreciated that the shape of the gusset 26 is non-limiting. For example, the gusset 26 may be generally wider at one end and taper upwards towards the opposite end. The gusset 26 may also be of a uniform width. The use of the gusset 26 may be functional, i.e. it may allow the pouch 10 to acquire another shape, such as cylindrical, or to stand upright. The gusset 26 also enhances the strength and rigidity of the pouch 10 during filling and processing. A side gusset is advantageous since it allows the walls of the pouch to expand as the internal pressure within the pouch increases. A gusset 26 positioned between the lower edges 18 of the pouch 10 may form a base, enabling the pouch 10 to stand upright unsupported.

[0034] Similarly, the pouch may include an insert, as shown in FIG. 12c. The insert 24 is a generally planar member that is inserted between the walls 12, 14 of the pouch 10. The shape of the insert 24 is non-limiting, i.e. square, round or oval or rectangular, and generally influences the shape of the flexible pouch. The insert 24 may be positioned internally within the pouch or externally. Various materials may be utilized for the insert, such as foil, cardboard, plastic, nylon, laminate or the like. Further, the insert 24 may be formed from a printed material, or it may be clear. In one example, the insert 24 is inserted between the lower edges of the panel and sealed to the walls of the panel. The seal may be an ultrasonic seal or a heat weld or a combination of both or the like.

[0035] The pouch may contain two inserts as shown in FIGS. 12a and 12b. In this example, there is a first insert positioned between the lower edges 18 of the panel, and a second insert positioned between the upper edges 16 of the panel. The first insert may include an integral opening means, such as a slit. The pouch of this example has a generally cylindrical shape.

[0036] The pouch 10 incorporates an opening means 28 for accessing the contents of the pouch. Various types of opening means 28 are known in the art for this purpose, and is non-limiting. The position of the opening means is determinable by many factors, such as type of opening means. The opening means may be positioned in an upper edge, a lower edge or side edge, or front wall or back wall, or on an insert or gusset. It should be appreciated that the opening means 28 may be incorporated into the pouch 10 prior to filling the pouch 10. One example of an opening means is a tear-off portion 30, as shown in FIGS. 8-10. The tear-off portion 30 usually has an integral tear notch 32. The tear notch 32 is typically formed near an outermost edge of a seam, for initiating the removal of the tear-off portion, such as a side edge. A further example of an opening means 28 is a pull tab covering an opening in the pouch. Yet another example of an opening means 28 is a resalable zipper, such as a hermetic seal. Another example of an opening means 28 is a weakened straw pierceable portion in the pouch for receiving a straw.

[0037] Still a further example of an opening means 28 is a fitment such as a removable and replaceable cap 34 secured to a spout 36, or a tap, or the like. Various types of caps and spouts are available. For example, the cap 34 can be the traditional round shape, or have an elongated oval shape. An oval shape may support the pouch that it can stand up on its own. The cap 34 and spout 36 can be made from a variety of materials. For example, the cap 34 may be made from plastic, such as regrind resins. The spout may be made of polypropylene (PP), depending on the product. The spout is sealed into the upper edges of the panel using a sealing means, such as an ultrasonic seal or a heat weld, or the like. The spout may include a removable seal 38 to prevent leakage of the product or evidence of tampering.

[0038] The pouch 10 also includes an angled top seal 42 extending between a first side edge 20a and a predetermined location on the upper edge 16 of the pouch. The size, orientation or position of the angled top seal 42 is dependent on factors such as the location of the opening means, type of opening means or product or the like. In one example, the angled top seal 42 extends a predetermined length between a first edge 20a and the upper edge 16. A portion of the pouch that is above the angled top seal 42 may be sealed, as shown at 48. The corner seal 48 may be a cosmetic seal. The opening means 28 is located to facilitate removal of the product. For example, the opening means may be located in the upper edge. Similarly, an upper portion of the second side edge may be angled as shown at 50. The shape and position of the angled top seal 42 facilitates the removal of product from the pouch 10 by directing the flow of the product towards the opening means. The angled top seal 42 may have a radius to keep the interior of the pouch rounded as shown at 52. The angled top seal 42 preferably reduces the headspace in the pouch. This is advantageous because it assists in pouring the product, reduces headspace (and oxygen), and influences the shape of the pouch.

[0039] The pouch 10 further includes a hanging aperture 44 located within a portion of the pouch, such as an upper edge or side edge. It may be located in the corner seal 48 portion of the pouch. Preferably, the hanging aperture is positioned between the angled top seal and the outermost edge. The aperture 44 may have various shapes, such as round or curved. The pouch may be supported by a support means such as a hook extending through the aperture, such as for display purposes. The positioning of the hanging aperture above the angle top seal 42 within the corner seal 48 or within a sealed edge, prevents the contents of the pouch from leaking out through the aperture 44.

[0040] It should be appreciated that the flexible pouch 10 may advantageously include other features that are known in the art. For example, the flexible pouch 10 may include a guide pocket formed in a wall 14, 16 of the pouch 10 prior to filling and sealing, to facilitate the separation of the front
and back walls 14, 16 prior to the filling of the pouch 10. An example of such a pouch is disclosed in commonly assigned U.S. patent application Ser. No. 10/310,221. The pouch may include an integrally formed rib 46 that adds rigidity to the pouch.

[0041] The pouch may include a feature such as an ergonomic shape, as shown in FIG. 5 or 11a. An example of an ergonomically shaped pouch for a carbonated beverage is disclosed in commonly assigned U.S. patent application Ser. No. 11/454,241 which is incorporated by reference. The ergonomic shape may be achieved through carbonation since as the pouch 10 is filled with a carbonated product, the carbonation causes the pressure within the pouch to increase. The increased pressure causes the front wall 12 and back wall 14 to assume a longitudinally oriented convex shape, and each side edge 20a, 20b assumes a longitudinally oriented concave shape. Thus, the width across the pouch is less in the middle, than at the upper edge or lower edge. The overall hourglass shape assumed by the pouch 10 due to the internal pressure within the pouch facilitates holding of the pouch in the hand of a user.

[0042] The flexible pouch 10 may include a feature such as an outer layer or sleeve 54 covering the outer surface of the pouch. The sleeve 54 may be a label containing information about the product such as a barcode or the like. The sleeve 54 may cover only a portion of the pouch outer surface. Preferably, the sleeve 54 is shrunk over the outer surface of the pouch 10 after the pouch 10 is formed and filled with the product. The sleeve 54 is advantageous because it covers the side seam. It also adds one or more layers of material to strengthen the pouch and improve its durability. Various types of material may be utilized for the sleeve, such as paper or plastic including PET or PVC and the choice is non-limiting.

[0043] The pouch 10 may include a feature as a result of a secondary process after it is filled with the product. For example, the filled pouch 10 may be frozen. Alternatively, the filled pouch 10 may be pasteurized in order to have an extending shelf stable life under ambient temperature.

[0044] It is contemplated that the flexible pouch 10 may incorporate any of the above-described features in any combination. For example, the pouch 10 may include an insert 24 in the bottom portion of the pouch and a tapered top portion, or an insert 24 in the bottom portion of the pouch and a spout 36 and cap 34 in the top portion of the pouch. In addition, the finished pouch may assume various shapes, such as cylindrical, cubical, and conical, hourglass or barrel shaped or the like, as influenced by the type of product and intended usage of the pouch.

[0045] Referring to FIG. 13, a method for forming and filling the flexible pouch 10 using a high-speed machine 80, such as that described with respect to FIG. 14 is illustrated. The method begins in block 100 at a first station with the step of forming the body of the pouch 10. For example, a roll of laminate material, as previously described, is unrolled along a horizontally oriented plane. The initial width of the roll of material is determined by the desired finished size of the pouch 10 and the number of pouches to be obtained from the width. For example, three or four or six pouches, representing six to twelve panels, can be obtained from a width of the roll of material on a three-lane machine or four-lane machine, respectively. Each panel has an inner surface and an outer surface. One layer of the material is preferably preprinted with information or locating indicia (not shown), such as a registration mark. The registration marks are located on the material to denote an edge of the panel. The registration marks are read by an optical reading device (not shown), such as a scanner or registration eye, to index the material in a predetermined position at the cutting station. The preprinted information may include labeling information that describes the product contained within the pouch. In this example, the layer of preprinted information is located on an outer layer of the material. An example of a high speed, multiple lane machine for forming a pouch is described in commonly assigned U.S. patent application Ser. No. 11/674,923, which is incorporated herein by reference.

[0046] The methodology advances to block 105 and a feature, such as a gusset 26 or insert 24, is optionally positioned between the aligned first and second unrolling sections of material. In addition, an opening means may be applied at this time. For example, an opening means, such as a press-to-close zipper may be positioned between the panels. Another opening means such as a straw hole, patch or tear notch or fitment may be applied.

[0047] The methodology advances to block 110 and the edges of the walls are sealed together, such as the side edges 20a, 20b, or the upper edge 16, or the lower edge 18. One edge may be left open for filling purposes. In this example, the open edge is designated the upper edge, as a reference. Alternatively, all of the edges are sealed and the pouch is filled through a fitment. The angled top seal may also be applied at this time. Various sealing techniques are contemplated. For example, an ultrasonic sealing process may be used. Another technique is a heat weld that includes the application of heat and compression. Advantageously, the seal may be shaped so as to avoid sharp radiuses at the interior corners of the pouch, as shown at 52. A rounded interior shape facilitates removal of the product.

[0048] In still another example, the edges are sealed using a seal bar or forming plate having a plasma coating. One advantage of the plasma coating is that the line speed may increase. Another advantage is that the coating makes the surface of the seal bar or forming plate more resilient. When the seal bar is heated, the coating expands due to this resiliency. The shear stress on the inner edge of the seal is reduced; resulting in reduced creepage of the material and greater durability of the seal. The plasma coating reduces the opportunity for potential damage to the material during the sealing step. In this example, the plasma coating is a smooth, hard plastic that mimics glass. Since the outer layer of material is not weakened, there is no creepage of the outer layer.

[0049] In still another example of a sealing technique, the side seal is a two-step seal. An example of a two-step seal is disclosed in commonly assigned U.S. patent application Ser. No. 11/551,071. The two-step seal advantageously avoids the generation of keytones due to application of heat to the material. The first or inner seal is a low temperature seal. The second or outer seal is a high temperature seal. The second seal is spaced apart from the first seal by a predetermined distance, to create an air gap. The first seal is a tack seal, such as 6 mm wide, and is of a sufficient temperature so as to melt the layers of material and tack the edges together. The predetermined distance between the first and
second seal is ½-1 mm. The second seal is applied at a higher temperature and pressure than the first seal. As a result, any gas, such as steam, ketones, aromatics or the like are pushed in an outwardly direction, out through the open edges of the panels, and not into the pouch. Thus, the first seal prevents entry of contaminants into the pouch to avoid organoleptic contamination.

The methodology advances to block 115, and a section of pouches formed in the roll width of material are separated from each other in a cutting operation. For example, each section of material may be first separated along its width, or the side seam of the pouches. The section is then separated into individual pouches. In addition, the material is cut and the pouch 10 using a known cutting apparatus, such as a laser or punch or the like. The cutting apparatus forms a single cut in the material to separate the pouches. The size of the pouch 10 is controlled by the distance between the cuts.

Alternatively, two consecutive pouches 10 separated using a double cutting process, whereby two cuts are made at the same time to separate the upper and lower edges of two pouches at the same time from the sheet of material. Advantageously, forming two pouches during the cutting operation effectively doubles the assembly line speed.

It should be appreciated that the upper edge or lower edge may be further trimmed. For example, the end of the pouch may be trimmed to accommodate a fitment. In another example, two legs are formed during the trimming operation, in order to recess the fitment.

The methodology advances to block 120 and a feature, such as an opening means 28 may also be applied to the pouch 10 at this time. For example, a fitment, as previously described, may be sealed within the walls of the pouch 10, such as between the upper edges 16. The fitment may be sealed using an ultrasonic seal, or a heat weld, or by a combination of ultrasonic seal and heat weld. An example of an ultrasonic seal for a fitment is disclosed in commonly assigned U.S. patent application Ser. No. 11/195,906, which is incorporated herein by reference. Accordingly, the base portion of the fitment is sealed between the walls of the pouch using an ultrasonic seal, a heat seal, and then a cool seal. The heat seal melts a layer of the pouch material, and the material flows around the sealing ribs on the base portion, and fills in any void between the base portion and the wall of the pouch. The cool seal sets the seal and provides an attractive finish to the overall seal. Advantageously, fewer stations are required to seal the fitment between the walls of the pouch, since a tack seal is eliminated.

In addition, an insert 24 may be likewise applied to the pouch 10 at this time. The insert 24 may be positioned at a lower edge of the pouch, an upper edge, or both an upper and lower edge. The methodology advances to block 125.

In block 125, the individual pouches are finished. For example, an edge of the pouch 10 may be trimmed to shape, i.e., the corners may be angled or edges trimmed fitment. It is sometimes advantageous for the pouch corners to have a radius, to eliminate right angles at the corners. The hanging aperture may be formed at this time. This operation may be performed using a cutter or a die cut or the like. In addition, a tear notch may be cut out of an edge of the pouch to facilitate opening of the pouch.

In another example of a finishing operation, a crease or guide pocket may be formed in a top portion of each wall 12, 14 in a creasing operation, in order to facilitate opening and filling of the pouch. An example of a method of forming a crease in a wall to facilitate opening the pouch is disclosed in commonly assigned U.S. patent application Ser. No. 10/310,221, which is incorporated herein by reference. It should be appreciated that the shape of the finished pouch is non-limiting, and may be round, square, oval, triangular or the like. In still another example of a finishing operation, the sleeve 54 is applied over the individual pouch and shrunk to fit using an application of heat to the pouch. A further example of a finishing operation is the formation of a rib 46, such as a thermoformed rib, to add rigidity to the pouch.

The methodology advances to block 130 and the pre-made pouch 10 is discharged from the form machine. The pouches may be loaded into a carrier and transferred to a filling machine. It should be appreciated that the filling machine may be integral with the pouch forming machine, or a separate machine. This portability increases the flexibility of the pouch and may result in a manufacturing cost savings.

The methodology advances to block 135, and the pouch is then transported to the filling machine, is unloaded from the carrier, and placed in a holder for moving the pouch between stations. An example of a holder is a cup-shaped member, as disclosed in commonly assigned U.S. patent application Ser. No. 10/336,601, which is incorporated herein by reference. Alternatively, the pouch 10 may be held using grippers (not shown) as is known in the art. The methodology advances to block 140.

In block 140, the pouch 10 is opened in an opening operation. Various techniques are conventionally known in the art for opening the pouch 10. For example, the guide pocket formed by the crease in the front wall 12 and back wall 14 facilitates opening of the pouch. A nozzle (not shown) may be mechanically lowered into the guide pocket to direct a stream of compressed gas into the guide pocket, to force the walls of the pouch 10 away from each other. An example of a gas is carbon dioxide or nitrogen. The blowing station may include a manifold, with a hood extending over the top of the edges of the pouch as known in the art. The manifold has rows of apertures (not shown) formed above the upper edges 16 of the pouch 10. The hood is placed over the pouch 10 to assist in maintaining the air pressure in the pouch 10. The supply of pressurized gas is directed through the aperture to form a plurality of jets of pressurized gas or air. The jets are directed downwardly at the diamond-shaped openings formed at the upper edges 16 to assist in overcoming the surface tension of the pouch and assist in separation of the walls 12, 14. A diving rod (not shown) may then be used to make sure the pouch 10 is fully opened. If the pouch has a fitment, the gas is injected through the spout fitment. After the pouch is opened, it may be injected with super-saturated steam to eliminate any pathogens or the like. The methodology advances to block 145.

In block 145, the pouch 10 is filled with the product in a filling operation. For example, a fill tube (not shown) is lowered into the opened pouch 10 and the product is dispensed into the open pouch 10. The pouch may be filled
through an open edge, or through the fitment, as previously described. If the pouch is large, the pouch may be filled at more than one station.

[0061] If the product is naturally carbonated, such as a sparkling wine or the like, the pouch is preferably filled while immersed in a nitrogen or carbon dioxide atmosphere. If the product is not naturally carbonated and carbonation is desirable, it is immersed in a carbonator to introduce carbon dioxide into the product. For example, carbon dioxide is introduced into cold water or juice to provide a carbonated beverage. The product may contain a mixture of up to four volumes of carbon dioxide. It should be appreciated that the carbon dioxide masks any undesirable taste from ketones and other solvents released during the sealing process. The carbon dioxide also increases the pressure within the product so that the walls of the pouch are rigid after the top is sealed. The product is preferably filled at a temperature ranging from 29°F to ambient temperature.

[0062] The filled pouch may have the oxygen removed from the pouch. For example, the pouch may be flushed with carbon dioxide. The methodology advances to block 150.

[0063] In block 150, the pouch is sealed. For example, if the pouch is filled through the open edges, the open edges of the pouch are closed by applying a first closing seal 56. The first closing seal 56 may be an ultrasonic seal or an ultrasonic seal and the like. The location of the second seal 58 is selected so that some of the product is trapped between the first and second seals 56, 58. This is advantageous since eliminates the potential for gas in the head space, i.e., the region between the product and the heat seal. In this example the second seal is spaced outboard of the first seal. Another advantage of the location of the second seal 58 is that the overall length of the pouch may be reduced, resulting in less pouch material. The first closing seal 56 may be a tack seal, and the second closing seal 58 is a high pressure, high temperature seal. A cosmetic seal may be applied with respect to the first and second closing seals, or the second seal 58 may be a cosmetic seal.

[0064] Alternatively, the pouch is filled through the spout fitment and the cap is applied to close the pouch. The cap contains the product in the filled pouch, to prevent leakage of the product from the pouch. The cap may be a tamper-evident cap for a carbonated product. For a carbonated product, the complementary arrangement of threads and grooves in the cap and spout provides for the controlled release of pressure from the pouch, as disclosed in commonly assigned U.S. patent applications Ser. No. 11/195,906, which is incorporated herein by reference.

[0065] The methodology advances to block 155 and the pouch 10 is filled in a finishing operation. For example, the edges of the pouch 10 are trimmed to achieve a predetermined shape. In addition, the pouch 10 may be cooled at a cooling station, where the pouch 10 is cooled using a conventionally known cooling technique. Optionally, the sleeve may be placed over the filled pouch and shrink fit over the pouch by applying heat. The sleeve layer forms an outer layer of the pouch. The methodology advances to block 160.

[0066] In block 160 the filled pouch 10 is discharged from the machine. A plurality of pouches may be placed in a package for sales or shipping purposes.

[0067] It should be appreciated that the pouch may undergo other processing steps, such as such as an upstream oxygen purging station, downstream oxygen purging station, sterilization or the like. For example, the filled pouch 10 may be pasteurized in integral retort chamber (not shown) that heats and then cools the pouch 10. The pouch 10 may be tested, such as burst testing or the like prior to packaging for shipping. These additional processing steps may take place at a station on the form/fill/seal apparatus, or on another apparatus.

[0069] It should be appreciated that the order of steps may vary depending on the pouch and its features. Also, a particular manufacturing station may perform one or a plurality of operations, to enhance the efficiency of the methodology and apparatus.

[0070] Referring to FIG. 14, an example of a fill-seal machine 80 for carrying out the method described with respect to FIG. 23 is illustrated. The fill machine illustrated by way of example, and other configurations may be utilized. It should be appreciated that a particular manufacturing station may perform one or more operations. It should also be appreciated that the order of operations may vary. The fill-seal machine may be configured as a flat bed, a conveyor, or a rotary turret or the like. An example of a flat bed form machine is manufactured by Nishibe, such as the model number SBM500, SBM600 or SBM700. It should be appreciated that the fill-seal machine may be integral with the form machine, or a separate machine.

[0071] In operation, the carrier with the pouch is loaded onto the machine 80 as shown at “1.” The pouches 10 are removed from the receptacle and placed in a transport means as shown at “2.” The transport means may be a carrier or a gripper or a combination of the two.

[0072] The pouch 10 is transported along the conveyor belt to operation “3,” and tile pouch 10 is opened in an opening operation. Various techniques are conventionally known in the art for further opening the pouch 10. The guide pocket formed by the crease in the front panel and back panel facilitates opening the upper edges of the pouch. For example, a nozzle may be mechanically lowered into the pouch to direct a stream of compressed gas downwardly into the pouch to force the walls of the pouch away from each other to further open an upper edge of the pouch. An example of a gas is carbon dioxide or nitrogen. The lever arms assist in maintaining the pouch in an open position.

[0073] The pouch 10 is then fully opened. For example, a blowing station may include a manifold, with a hood extending over the top of the edges of the pouch. The manifold has rows of apertures (not shown) formed above the upper edges of the walls of the pouch. The hood is placed over the pouch to assist in maintaining the air pressure in the pouch. The supply of pressurized gas is directed through the aperture to form a plurality of jets of pressurized gas or air. The jets are directed downwardly at the diamond-shaped openings
formed at the upper edges to assist in overcoming the surface tension of the walls and assist in separation of the walls. A diving rod may then be used to make sure the pouch is fully opened.

[0074] The opened pouch is transferred to a filling station as indicated at operation “4”, and the pouch is filled with the product. For example, a nozzle dispenses a predetermined amount of product into the opened pouch. The product may be dispensed into the opened edges of the pouch or through a fitment. In this example, the fill nozzle is lowered into the opened pouch, and the product is dispensed into the open pouch. Depending on the size of the pouch, there may be two fill stations.

[0075] If the product is naturally carbonated, such as with a sparkling wine or another alcoholic beverage, the pouch is preferably filled while immersed in a nitrogen atmosphere or carbon dioxide atmosphere. The pouch may be flushed with nitrogen or carbon dioxide or a mixture of both. If the product is not naturally carbonated, it may be immersed in a carbonator to introduce carbon dioxide into the product. For example, carbon dioxide is introduced into cold water or juice to provide a carbonated beverage. The product may contain a mixture of up to four volumes of carbon dioxide. It should be appreciated that the carbon dioxide masks any undesirable taste from ketones and other solvents released during the sealing process. The carbon dioxide also increases the pressure within the product so that the walls of the pouch 10 are rigid after the top is sealed. The product is preferably filled at a temperature ranging from 29° F. to ambient temperature. The carbonation is advantageous as a microbiocide which can enhance the flavor or prevent mold or contamination.

[0076] The pouch 10 is transferred to a station “5” for removing any oxygen from the pouch. The headspace of the pouch may be flushed with a gas.

[0077] The pouch is then transferred to a sealing station and if filled through the open edges of the pouch, the open edges of the pouch are first sealed, as indicated at operation “6”. For example, at the sealing station “6”, the lifting surface ends, causing the lever arms to return to their original position and the pouch to close. It should be noted that the filled pouch might return to a partially closed position due to the product contained therein. The first seal may be a thermal seal. For example, a heat-sealing member extends through the slots in the sides of the cup to seal the upper edge of the pouch. As previously described, the heat sealing member may have a plasma coating. For example, a heat-sealing member extends therethrough the slots in tile sides of the cup, to seal the upper edge of pouch. For example, at the sealing station “6”, the lifting surface ends, causing the lever arms to return to their original position, and the pouch to close. It should be noted that the filled pouch might return to a partially closed position due to the product contained therein.

[0078] Another example of a first seal 56 for a product utilizes an ultrasonic sealing process. Preferably the ultrasonic seal includes sound waves and is formed using a horn and anvil. A second seal is applied at a second sealing station “7”. The second seal 58 may be applied using a heat seal means to form a second heat seal spaced apart a predetermined distance from the first seal 56. It should be appreciated that the second seal 58 may be spaced slightly outboard of the first seal 56, in order to trap some of the product between the two seals. The second heat-sealing station is conventional and utilizes heat or a combination of heat and pressure to form the seal. The second seal 58 may also be a cosmetic seal or another type of seal, such as ultrasonic, ultrapulse or the like. The first and second seals are applied for a carbonated product as disclosed in commonly assigned Patent Application No. PCT/US03/34396, which is incorporated herein by reference.

[0079] If the pouch is filled through the fitment, the pouch is closed by securing a cap to the fitment. The cap may have a temper-evident feature. The cap and fitment preferably have leak-proof features as previously described for a carbonated product.

[0080] The pouch is transferred to a finishing station as shown at “8” for finishing and removal from the filling machine. For example, the pasteurized pouch 10 may be cooled. A hanging aperture may be formed at this time. Similarly, a tear notch may be formed in the pocket portion of the pouch to facilitate opening the pouch to access the product in the pouch. In another finishing operation, the edges of the pouch are trimmed to achieve a desired shape. The finished pouches may be discharged into a container. For example, grippers may be utilized to place the pouch in a box for shipment.

[0081] If desired, the pouch may be transferred to a pasteurization station. Pasteurization enhances the shelf life of the product. The pouch is inserted into an enclosed retort chamber. Air is extracted from the chamber such as using a vacuum source. The product inside the pouch is pasteurized. For example, a combination of steam and water is used to heat the pouch to a predetermined temperature for a predetermined period of time to pasteurize the product contained within the pouch. The package is then cooled. In this example, recirculated water surrounds the pouch to cool the pouch. In certain instances, it may be desirable to apply steam to sterilize the pouch 10 and to wet the inner surface of the walls to facilitate handling.

[0082] The present invention has been described in an illustrative manner. It is to be understood that the terminology which has been used is intended to be in the nature of words of description rather than of limitation.

[0083] Many modifications and variations of the present invention are possible in light of the above teachings. Therefore, the present invention may be practiced other than as specifically described.

1. A flexible pouch for packaging a beverage having an alcoholic content, said pouch comprising:

   a panel having an inner surface and an outer surface, and
   an upper edge, an opposed lower edge and a first side edge and a second side edge extending therebetween
   the upper edge and the lower edge, wherein the upper edge is sealed by a first seal that is an ultrasonic seal
   and a second seal spaced a predetermined distance from the first seal so that some of the beverage having an
   alcoholic content is trapped between the first seal and second seal; and

   an opening means disposed in said panel for accessing the beverage having an alcoholic content contained within
   the pouch.
2. The pouch as set forth in claim 1 further comprising an angled top seal extending between the first side edge and the upper edge, wherein the opening means is positioned relative to the angled top seal to facilitate removal of the alcoholic beverage through the opening means;
3. The pouch as set forth in claim 1 wherein said opening means is disposed between the upper edge of the pouch;
4. The pouch as set forth in claim 1 wherein said opening means is positioned along an angled side edge between the second side edge and the upper edge of the pouch;
5. The pouch as set forth in claim 2 wherein said opening means is a tear strip integrally formed in said panel;
6. The pouch as set forth in claim 2 wherein said opening means is a fitment having a spout and a cap removably connected to the spout;
7. The pouch as set forth in claim 1 wherein said panel is made from a laminate material having at least a layer of cast polypropylene (CPP);
8. The pouch as set forth in claim 1 wherein said panel is made from a laminate material having a layer that is extended;
9. The pouch as set forth in claim 1 wherein said beverage is wine, or beer or a liquor;
10. A flexible pouch for packaging a beverage having an alcoholic content, said pouch comprising:
a panel having an inner surface and an outer surface, and an upper edge, an opposed lower edge and a first side edge and a second side edge extending therebetween the upper edge and the lower edge, wherein the upper edge is sealed by a first seal that is an ultrasonic seal and a second seal spaced a predetermined distance from the first seal so that some of the beverage is trapped between the first seal and second seal;
an opening means disposed in said panel for accessing the beverage contained within the pouch; and
an angled top seal extending between the first side edge and the upper edge, wherein the opening means is positioned relative to the angled top seal to facilitate accessing the beverage through the opening means;
11. The pouch as set forth in claim 10 wherein said opening means is disposed between the upper edges of the pouch;
12. The pouch as set forth in claim 10 wherein said opening means is positioned along an angled side edge between the second side edge and the upper edge of the pouch;
13. The pouch as set forth in claim 11 wherein said opening means is a tear strip integrally formed in said panel;
14. The pouch as set forth of claim 11 wherein said opening means is a fitment having a spout and a cap removably connected to the spout;
15. The pouch as set forth in claim 10 wherein said panel is made from a laminate material having at least a layer of cast polypropylene (CPP);
16. The pouch as set forth in claim 10 wherein said beverage is wine, or beer or a liquor;
17. The pouch as set forth in claim 10 wherein said beverage is wine, or beer or a liquor;
18. The pouch as set forth in claim 10 wherein said panel includes an aperture formed in a corner seal portion of the panel located between the angled top seal and an outermost edge of the panel;
19. A method of forming, filling and sealing a flexible pouch with a beverage having an alcoholic content using an automated machine, said method comprising the steps of:
forming a body of the pouch from a roll of laminate material, wherein the body of the pouch includes a panel having an inner surface and an outer surface, and an upper edge, an opposed lower edge and a first side edge and an opposed second side edge extending therebetween;
sealing the lower edge, first side edge and second side edge;
applying an angled top seal between the first side edge and upper edge;
applying an opening means to the panel; and
finishing the pouch;
20. The method as set forth in claim 19, further including the steps of:
opening the pouch;
filling the pouch with the product, wherein the product is beer or wine or a liquor;
sealing the upper edge of the pouch with a first closing seal, wherein the first closing seal is an ultrasonic seal;
applying a second closing seal spaced a predetermined distance apart from the first closing seal, wherein some of the product is trapped between the first closing seal and the second closing seal, and
removing the filled pouch from the machine.