A flexible container comprises a front panel, a back panel and a first and second opposing side panel. Each side panel including a gusset to, in turn, divide each side panel into a first region and a second region. The front panel is attached to the first region of the first side panel by a first side seam, a first side panel seam region of a top seam and a first side panel seam region of a bottom seam and to the first region of the second side panel proximate a second side seam, a second side panel seam region of the top seam and a second side panel seam region of the bottom seam. The back panel is attached to the second region of the first side panel proximate a third side seam, a third side panel seam region of the top seam and a third side panel seam region of the bottom seam and to the second region of the second side panel proximate the fourth side seam, a fourth side panel seam region of the top seam and a fourth side panel seam region the bottom seam. The back panel is attached to the front panel about a central panel region of the top seam and about a central panel region of the bottom seam. A pair of opposing corner seams are associated with each side seam. Each of the opposing corner seams extending from a side seam to a top seam, each corner region comprising an outwardly concave configuration.
SELF STANDING FLEXIBLE CONTAINER

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates in general to flexible containers, and more particularly, a self standing flexible container which is capable of being filled with various flowable solid and liquid products, whereupon filling, the container can be maintained in a self standing orientation, and wherein the container is structurally configured to minimize stresses caused by the flowable products positioned therewithin.

[0003] 2. Background Art

[0004] The use of flexible packaging has become increasingly widespread. In particular, among other industries, the carbonated beverage industry relies heavily on the use of flexible inner containers surrounded by rigid outer containers for the packaging and transporting of syrup.

[0005] Other Food

[0006] Certain flexible packaging containers have been utilized which can be constructed from two attached panels of material. Certain such containers are referred to as pillow containers. While such containers have been commercially successful, they suffer from certain drawbacks. For example, they generally lie flat when filled with a material, and are not capable of being placed in a stand-up configuration. Moreover, such containers, when inserted into outer boxes, do not properly retain a desired shape.

[0007] Consequently, other flexible containers have been developed which utilize a combination of substantially flat panels together with gusseted panels such that they are flat when empty, but assume a somewhat cubic configuration when filled. Such containers generally appear to be an improvement. However, such containers include certain drawbacks as well. In particular, such containers generally comprise a plurality of layers or reinforcing regions to reinforce portions of the container which exhibit increased stresses due to the fluid placed into the container. Moreover, while such containers are considered to be self standing when filled, they are nevertheless substantially unstable in certain self standing orientations.

[0008] Accordingly, it is an object of the invention to provide a construction of a flexible container which facilitates a stable self standing configuration upon filling thereof.

[0009] It is another object of the invention to provide a standup flexible container with an improved configuration for enhanced strength.

[0010] These objects as well as other objects of the present invention will become apparent in light of the present specification, claims, and drawings.

SUMMARY OF THE INVENTION

[0011] The invention comprises a flexible container. The flexible container includes a front panel, a back panel and first and second opposing side panels. Each side panel includes a gusset to, in turn, divide each side panel into a first region and a second region. The front panel is attached to the first region of the first side panel by a first side seam, a first side panel seam region of a top seam and a first side panel seam region of a bottom seam and to the first region of the second side panel proximate a second side seam, a second side panel seam region of the top seam and a second side panel seam region of the bottom seam. The back panel is attached to the second region of the first side panel proximate a third side seam, a third side panel seam region of the top seam and a third side panel seam region of the bottom seam and to the second region of the second side panel proximate the fourth side seam, a fourth side panel seam region of the top seam and a fourth side panel seam region of the bottom seam. The back panel is attached to the front panel about a central panel region of the top seam and about a central panel region of the bottom seam. A pair of opposing corner seams are associated with each side seam. Each of the opposing corner seams extending from a side seam to a top seam, and each corner seam comprises an outwardly concave configuration.

[0012] In a preferred embodiment, at least one of the opposing corner seams intersects a respective top seam or bottom seam at least partially within a respective side panel seam region thereof. In one such embodiment, each of the opposing corner seams intersect a respective top seam or bottom seam at least partially within a respective side panel seam region thereof.

[0013] In another preferred embodiment, each respective side panel seam of the top seam is joined to the central panel region of the top seam. Similarly, each respective side panel seam of the bottom seam is joined to the central panel region of the bottom seam.

[0014] In one embodiment, each respective side panel seam of the top seam is joined to the central panel region of the top seam at an interface, and each respective side panel seam of the bottom seam is joined to the central panel region of the bottom seam at an interface. Preferably, each of the opposing corner seams intersect one of the top seam and the bottom seam at the respective interface.

[0015] In another preferred embodiment, at least one of the opposing corner seams comprises a first region and a second region. The first region extends from a respective side panel seam. The second region extends from one of the respective top seam and the respective bottom seam. In such an embodiment, a longitudinal axis extending along the first region and a longitudinal axis extending along the second region intersect obliquely.

[0016] In one embodiment, an angle defined by the intersecting longitudinal axis of the first and second regions comprise an angle greater than about 150° and less than about 180°. In another such preferred embodiment, the first and second regions are joined together. In yet another embodiment, the first region is substantially longer than the second region. Preferably, each of the opposing corner seams include a first region and a second region.

[0017] In a preferred embodiment, each of the opposing corner seams includes a substantially identically configured first region and second region.

[0018] In a preferred embodiment, the flexible container includes a film facilitating the passage of fluid into and out of the cavity. In one such embodiment, the film is positioned between the two corner regions associated with the top seam of the front panel.
[0019] In yet another preferred embodiment, the container comprises a plurality of panels, each of which comprises a single integrated sheet of material. Preferably, the single sheet of material includes a plurality of fully laminated plies of material.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The invention will now be described with reference to the drawings wherein:

[0021] FIG. 1 of the drawings is a perspective view of a flexible container of the present invention;

[0022] FIG. 2 of the drawings is a front elevational view of a flexible container of the present invention;

[0023] FIG. 3 of the drawings is a back elevational view of a flexible container of the present invention;

[0024] FIG. 4 of the drawings is a side elevational view of a flexible container of the present invention; and

[0025] FIG. 5 of the drawings is a front elevational view of a flexible container of the present invention showing an alternate location of a fitment.

DETAILED DESCRIPTION OF THE INVENTION

[0026] While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and described herein in detail a specific embodiment with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated.

[0027] It will be understood that like or analogous elements and/or components, referred to herein, may be identified throughout the drawings by like reference characters. In addition, it will be understood that the drawings are merely schematic representations of the invention, and some of the components may have been distorted from actual scale for purposes of pictorial clarity.

[0028] Referring now to the drawings and in particular to FIG. 1, flexible container 10 is shown as comprising a plurality of panels 12 which are joined by seams 14 so as to define cavity 64 for retaining, for example, a fluid material. A fitment, such as fitment 16, may be provided to provide for the passage of material into and out of the cavity. It will be understood that in certain embodiments, a fitment may be omitted from the container design, and the cavity may be fully sealed after filling. The fitment may be positioned in any number of different locations. For example, as shown in FIG. 1, the fitment is positioned on the front panel between two corner seams proximate the top edge thereof. As shown in FIG. 5, the fitment may be mounted between and secured to the central panel regions of each of the front and back panels, to, in turn, provide a central passage therethrough.

[0029] Generally, the flexible container comprises a plastic film material having a single integrated sheet of material which may be formed by the lamination of any number of different plies of material. In certain embodiments, it is contemplated that multiple disconnected and unrelated plies may be contemplated for use. However, it will be understood that due to the construction of the container (and the corner regions thereof), additional plies and additional reinforcing materials are not required to maintain the integrity of the container during use.

[0030] As is shown in FIG. 1, the plurality of panels 12 include front panel 20, back panel 22, first side panel 24 and second side panel 26. As is shown in greater detail in FIG. 2, each of the panels includes top edge 30 and bottom edge 32 and side edges, such as side edges 34, 36. As will be explained, certain edges are common among a plurality of the panels. Side panels 24, 26 further include gussets 38, 39, respectively, which substantially bisect each panel into multiple regions, such as, for example, two regions. Indeed, the regions may substantially identical in size and shape, or the regions may be of different size and shape. The gussets may, for example, scored or indexed into the side panels, or, the gussets may be formed by folding.

[0031] In certain embodiments, the front and back panels are substantially identical in size and shape. Similarly, the each of the side panels are substantially identical in size and shape. Of course, it is likewise contemplated that the panels may have different sizes or shapes relative to each other.

[0032] Referring again to FIG. 2, the individual seams will be explained with respect to front panel 20. It will be understood that back panel 22 (FIG. 3) may comprise a plurality of identical or similarly situated and configured seams. As such, with the describing of the front panel, it will be understood that the back panel will include similar and analogous components. In turn, similar components will be identified with like reference numerals as the corresponding structures of front panel 20, augmented with a prime (').

[0033] It will be understood that the seams may comprise a number of different structures which join or attach adjoining panels. For example, the seam may comprises a fold or a score wherein adjoining and joined panels are formed from a single integrated web of material. In other embodiments, the seam may comprise a heat seal, or other method of joining panels made from, for example, varying polymer material films. Moreover, while the seam regions are shown as being substantially linear and substantially uniform, various configurations are contemplated. For example, the seams may be arced in configuration, to facilitate the retention of a particular desired shape and may vary in width.

[0034] As is shown in FIG. 2, the seams of the front panel comprise top seam 40, bottom seam 42, first side seam 44, second side seam 45 and corner seams 46a, 46b, 46c and 46d. Top seam 40 extends across at least a portion of top edge 30, and includes first side panel seam region 50, second side panel seam region 51, central panel region 52, first interface 53 and second interface 54. First side panel region 50 joins the second region of first side panel 24 (FIG. 1) to a portion of front panel 20 proximate the top edge thereof. Second side panel seam region 51 joins the first region of second side panel 26 (FIG. 1) to a portion of front panel 20 proximate the top edge thereof. Central panel region 52 extends between the first and second side seam regions 50, 51, joining the side seam regions proximate interface 53 on the one side and proximate interface 54 on the other side.

[0035] Similarly, bottom seam 42 extends across at least a portion of bottom edge 32, and includes first side panel seam
region 55, second side panel seam region 56, central panel region 57, first interface 58 and second interface 59. First side panel seam region 55 joins the second region of the first side panel 24 (FIG. 1) to a portion of front panel 20 proximate the bottom edge thereof. Second side panel seam region 56 joins the first region of second side panel 26 (FIG. 1) to a portion of front panel 20 proximate the bottom edge thereof. Central panel region 57 extends between the first and second seam regions 55, 56, joining the side seam regions proximate interface 58 on the one side and proximate interface 59 on the other side.

[0036] Side seam 44 is shown in FIG. 2 as comprising central seam region 60 and wing seam regions 61, 65. Central seam region 60 extends between corner seams 46a and 46c proximate first side edge 34. Wing seam region 61 extends proximate side edge 34 on the opposing side of corner seam 46a from central seam region 60. Wing seam region 65 extends proximate side edge 34 on the opposing side of corner seam 46c from central seam region 60.

[0037] Preferably, wing seam region 61 is substantially contiguous with central seam region 60, joining corner seam 46a to first panel seam region 50. Of course, in various embodiments, different configurations of side seam 44 are contemplated. In certain embodiments, the central seam region and the wing seam regions may comprise a single integrated seam, or a plurality of discrete seams.

[0038] Similarly, side seam 45 is shown in FIG. 2 as comprising central seam region 67 and wing seam regions 68, 69. Central seam region 67 extends between corner seams 46b and 46d proximate second side edge 36. Wing seam region 68 extends proximate side edge 36 on the opposing side of corner seam 46b from central seam region 67. Wing seam region 69 extends proximate side edge 36 on the opposing side of corner seam 46d from central seam region 60.

[0039] Side seam 45 is shown as being substantially a mirror image of side seam 44 about a longitudinal axis extending from the top edge to the bottom edge of the front panel positioned therebetween. Of course, side seam 44 may be configured in a manner different from side seam 45 (i.e., different structures, shapes, etc.).

[0040] Corner seams 46a, 46b, 46c and 46d are shown in FIG. 2 as being positioned on the corners of front panel 20. Specifically, each of the opposing side seams include opposing upper corner seams (i.e., 46a and 46b) and lower corner seams (i.e., 46c and 46d). The corner seams comprise at least a partially outwardly concave structure, such as, for example, a partially concave structure formed by a plurality of joined segments which intersect obliquely.

[0041] One particularly useful embodiment is shown in the Figures, wherein corner seams, such as corner seam 46a, includes first region 62a and second region 63a. Such a configuration has been found to be particularly useful with respect to the dispersing of destructive forces exerted by the fluid retained within the cavity. First region 62a extends from first side edge 34 obliquely toward top edge 30. Second region 62a extends from top edge 30 obliquely toward first side edge 34. The second region 63a initiates proximate interface 53 on side of side panel seam region 50. First region 62a intersects second region 63a obliquely at interface 82a. It will be understood that that the intersection is such that the outward intersection angle α of a longitudinal axis defined by each of first region 62a and 63a is less than 180°, preferably, between about 150° and about 175°. Furthermore, it is contemplated that first region 63a is substantially greater than the length of second region 62a. In turn, the angle at which the second region and the top edge intersect, denoted by βa, is greater than would have been had first region 62a continued to the top edge.

[0042] Most preferably, second region 63b initiates at interface 53, or proximate interface 53 on the side panel seam region side of interface 53. Greater strength and performance has been realized by maintaining second region 63b substantially outside of central panel region 52 of top seam 40.

[0043] The remaining corner seams 46b, 46c and 46d are configured in a manner substantially similar to corner seam 46a. In particular, corner seam 46b includes first region 62b and second region 63b which are at an angle of. Corner seam region 46c includes first region 62c and second region 63c which are disposed at an angle thereof. Corner seam region 46d includes first region 62d and second region 63d which are disposed at an angle thereof. Of course, it is contemplated that the various corresponding regions 62a-63a, and corresponding regions 63a-63d may be disposed at varying angles αa-αd relative to each other. Moreover, the respective regions may be initiated at varying positions along the top edges and the side edges, respectively. In the embodiment shown, the seams are substantially identical in configuration, but such a configuration is not required. As can be seen, the corner seams which terminate near each other along top or bottom edges, remain spaced apart from each other a predetermined distance (i.e., in one embodiment, the predetermined distance may be substantially similar to the distance between interface 53, 54 and interface 58, 59).

[0044] It will be understood that in other embodiments, the corner seams may comprise more than two obliquely intersecting segments (i.e., three, four or more). Additionally, in certain embodiments, the corner seam may comprise a single or compound outwardly concave arcuate configuration, or a combination of arcuate configurations and linear configurations.

[0045] As explained above, the back panel includes substantially similar configurations as the front panel. Corresponding structures of the back panel are shown in FIGS. 3 and 4 wherein the same reference numbers are used augmented by a prime (’).

[0046] With reference to FIG. 1, the various seams cooperate to define cavity 64 which is substantially, if not fully, fluid-tight. Moreover, the varying corner seams, in cooperation with respective top seams, bottom seams and side seams cooperate to define corner cavities 66a-66d.

[0047] Fitment 16 is shown in FIG. 2 as comprising rim 70 and attachment region 72. Rim 70 is configured for operable retention to a filling device, a fill valve, or a dispensing mechanism. Furthermore, rim 70 is configured to receive caps of varying configurations. The attachment region 72 is configured so as to be heat sealed to front panel 20 by way of heat seal 74. It will be understood that attachment region 72 is preferably positioned within cavity 64 so as to extend the rim through the opening. Of course, the invention is not limited to any particular fitment, or to a container which includes a fitment.
While the manufacture of flexible container may be accomplished manually and, likewise, in an automated fashion. It will likewise be understood that the preferable manufacture of the flexible container can be achieved continuously as a web of containers. The individual containers are formed by way of heat seals and attached top edge to bottom edge (i.e., end to end). Such a web of containers may be placed into a larger box for shipment. In other embodiments, after manufacture, the containers can be sequentially be separated upon formation.

In operation, the container is first associated with a filling apparatus. Once positioned, fitment 16 is associated, and placed in fluid communication, with the filling apparatus. As flexible container 10 is filled, cavity 64 expands. As is shown in FIG. 1, the container begins to take a rectangular cubic configuration. Inasmuch as the corner seams include a particular outwardly concave configuration, as the container is filled, the area between the corner regions proximate central regions 52, 57 will tend to buck outwardly. In particular, the relatively larger angle θ, facilitates the dispersing of the force substantially across the central panel region of the top seam, and reduces the pressure proximate the seal region formed by the top seam and the respective corner seams, or the bottom seam and the respective corner seams. As such, additional reinforcing material or additional plies of material are not required to reinforce this region of the container. Moreover, the container can be exposed to greater movement and disturbances without compromising the integrity of cavity 64.

The foregoing description merely explains and illustrates the invention and the invention is not limited thereto except insofar as the appended claims are so limited, as those skilled in the art who have the disclosure before them will be able to make modifications without departing from the scope of the invention.

What is claimed is:

1. A flexible container comprising:
   a front panel, a back panel and a first and second opposing side panel, each side panel including a gusset to, in turn, divide each side panel into a first region and a second region;
   the front panel attached to the first region of the first side panel by a first side seam, a first side panel seam region of a top seam and a first side panel seam region of a bottom seam and to the first region of the second side panel proximate a second side seam, a second side panel seam region of the top seam and a second side panel seam region of the bottom seam;
   the back panel attached to the second region of the first side panel proximate a third side seam, a third side panel seam region of the top seam and a third side panel seam region of the bottom seam and to the second region of the second side panel proximate the fourth side seam, a fourth side panel seam region of the top seam and a fourth side panel seam region of the bottom seam;
   the back panel attached to the front panel about a central panel region of the top seam and about a central panel region of the bottom seam; and
   a pair of opposing corner seams associated with each side seam, each of the opposing corner seams extending from a respective side seam away from each other toward one of a respective top seam and bottom seam, wherein each corner seam comprises an outwardly concave configuration.
2. The flexible container of claim 1 wherein at least one of the opposing corner seams intersect one of a respective top seam and a respective bottom seam at least partially within a respective side panel seam region thereof.
3. The flexible container of claim 2 wherein each of the opposing corner seams intersect one of a respective top seam and a respective bottom seam at least partially within a respective side panel seam region thereof.
4. The flexible container of claim 1 wherein each respective side panel seam of the top seam is joined to the central panel region of the top seam at an interface, and wherein each respective side panel seam of the bottom seam is joined to the central panel region of the bottom seam at an interface.
5. The flexible container of claim 4 wherein each of the opposing corner seams intersect one of the top seam and the bottom seam at the respective interface.
6. The flexible container of claim 4 wherein each respective side panel seam of the bottom seam is joined to the central panel region of the bottom seam.
7. The flexible container of claim 1 wherein at least one of the opposing corner seams comprises:
   a first region extending from a respective side panel seam; and
   a second region extending from one of the respective top seam and the respective bottom seam;
   wherein a longitudinal axis extending along the first region and a longitudinal axis extending along the second region intersect obliquely.
8. The flexible container of claim 7 wherein an angle defined by the intersecting longitudinal axis of the first and second regions comprise an angle greater than about 150° and less than about 180°.
9. The flexible container of claim 7 wherein the first and second regions are joined together.
10. The flexible container of claim 7 wherein the first region is substantially longer than the second region.
11. The flexible container of claim 7 wherein each of the opposing corner seams include a first region and a second region.
12. The flexible container of claim 11 wherein each of the opposing corner seams includes a substantially identical configured first region and second region.
13. The flexible container of claim 1 further comprising a fitment facilitating the passage of fluid into and out of the cavity.
14. The flexible container of claim 13 wherein the fitment is positioned between the two corner regions associated with the top seam of the front panel.
15. The flexible container of claim 13 wherein the fitment is mounted so as to extend through a top seam thereof.
16. The flexible container of claim 1 wherein the container comprises a plurality of panels which comprise a single integrated sheet of material.
17. The flexible container of claim 16 wherein the single sheet of material includes a plurality of fully laminated plies of material.
18. A method of manufacturing a flexible container, the method comprising:

- providing a plurality of panels, including, a front panel, a back panel and a first and second opposing side panel, each side panel including a gusset to, in turn, divide each side panel into a first region and a second region;
- attaching a front panel to the first region of the first side panel by a first side seam, a first side panel seam region of a top seam and a first side panel seam region of a bottom seam and to the first region of the second side panel proximate a second side seam, a second side panel seam region of the top seam and a second side panel seam region of the bottom seam;
- attaching the back panel the second region of the first side panel proximate a third side seam, a third side panel seam region of the top seam and a third side panel seam region of the bottom seam and to the second region of the second side panel proximate the fourth side seam, a fourth side panel seam region of the top seam and a fourth side panel seam region the bottom seam;

- attaching the back panel to the front panel about a central panel region of the top seam and about a central panel region of the bottom seam; and

- providing a pair of opposing corner seams to each side seam, each of the opposing corner seams extending from a respective side seam away from each other toward one of a respective top seam and bottom seam, wherein each corner seam comprises an outwardly concave configuration.

19. The method of claim 18 wherein each of the opposing corner seams intersect one of a respective top seam and a respective bottom seam at least partially within a respective side panel seam region thereof.

20. The method of claim 18 wherein each respective side panel seam of the top seam is joined to the central panel region of the top seam at an interface, and wherein each respective side panel seam of the bottom seam is joined to the central panel region of the bottom seam at an interface.