US 20080054060A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2008/0054060 A1

Greenfield (43) Pub. Date: Mar. 6, 2008

(54) METHODS FOR CREATING MULTI-WALLED CONTAINERS AND ARTICLES PRODUCED THERE FROM

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(21) Appl. No.: **11/514,430**

(22) Filed: **Aug. 31, 2006**

Publication Classification

(51) **Int. Cl.**
B65D 5/02 (2006.01)

(52) **U.S. Cl.** **229/185.1**; 229/939

(57) **ABSTRACT**

Methods for making multi-walled containers from a single blank, preferably using a continuous process approach, and the resulting containers are disclosed. Various embodiments of the invention include, alone or in combination, intermediate panels formed from flap precursors that are in- or out-folded such that their distal ends are in proximate relationship to each other; outer flaps sized to overlap exposed edges of a container formed from the blank; stress relief features a joint corners to reduce stresses thereat. Methods for making select containers of the invention include folding and adhering the flap precursors to an inner panel, up-folding the inner panel/intermediate panel combination about a mandrel, and continuing to up-fold the outer panel until a container having a "use" position as a resting position is formed.

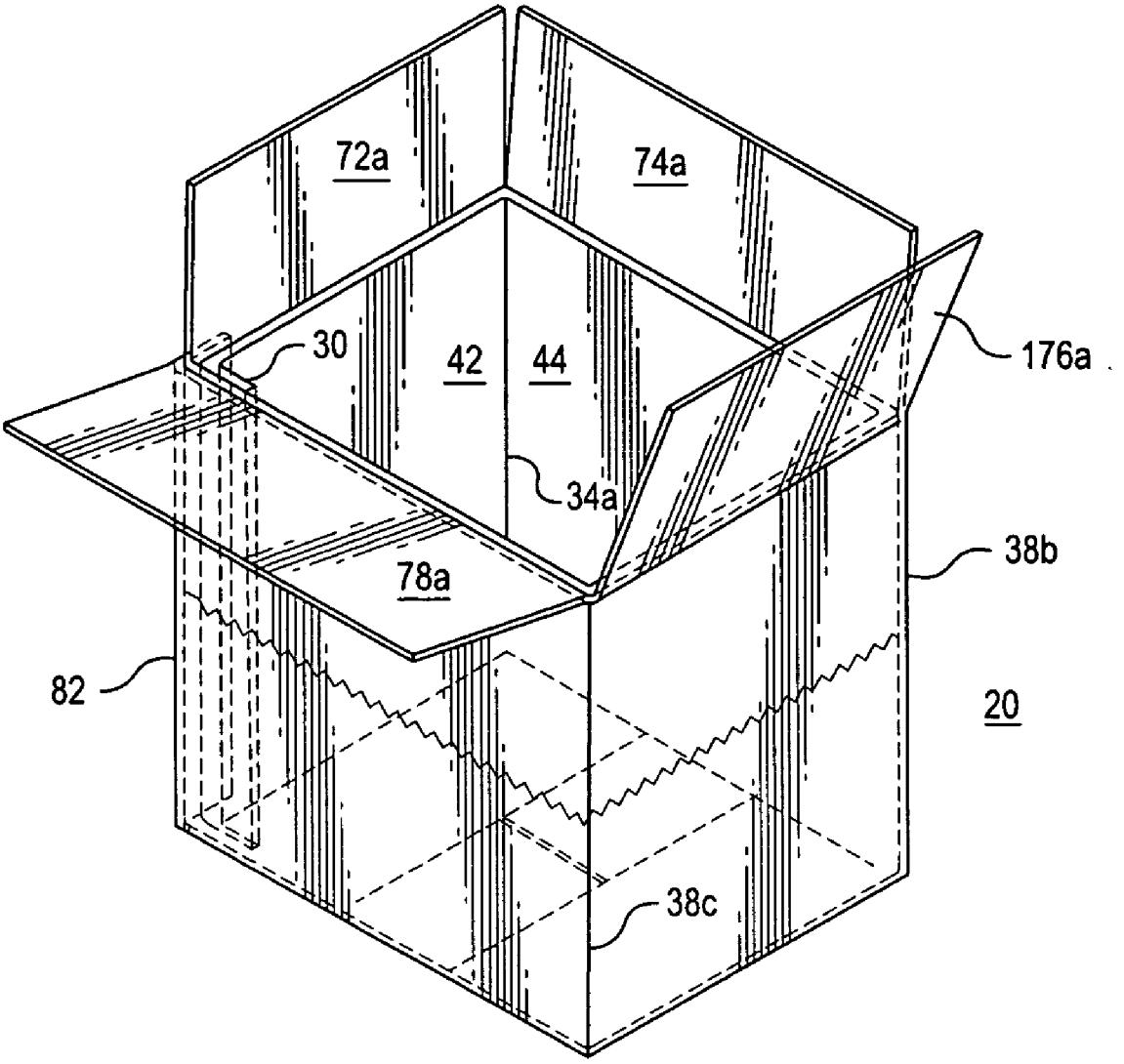


FIG. 1

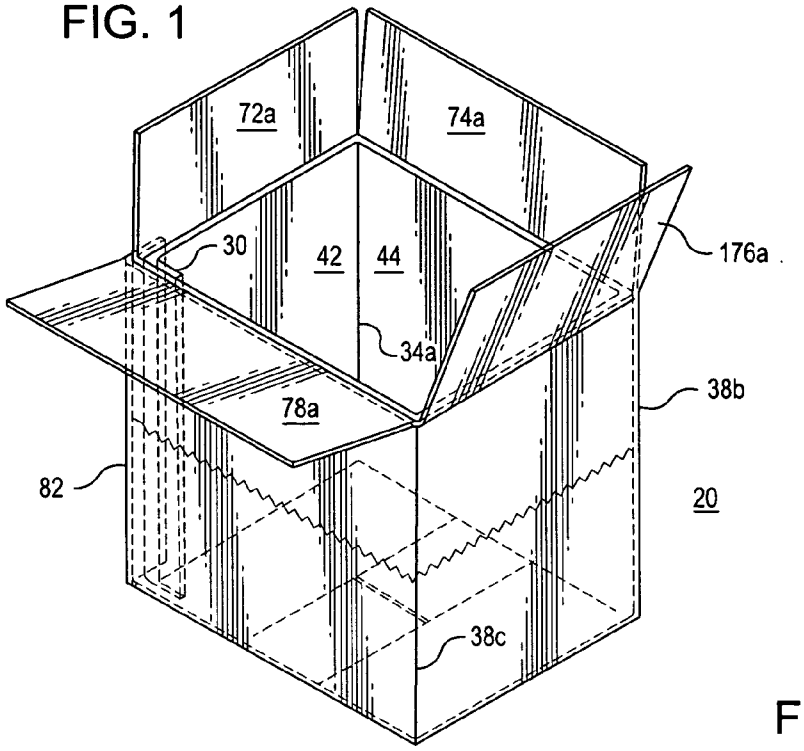


FIG. 2

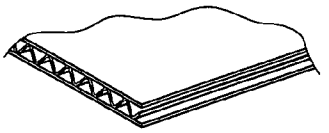


FIG. 3

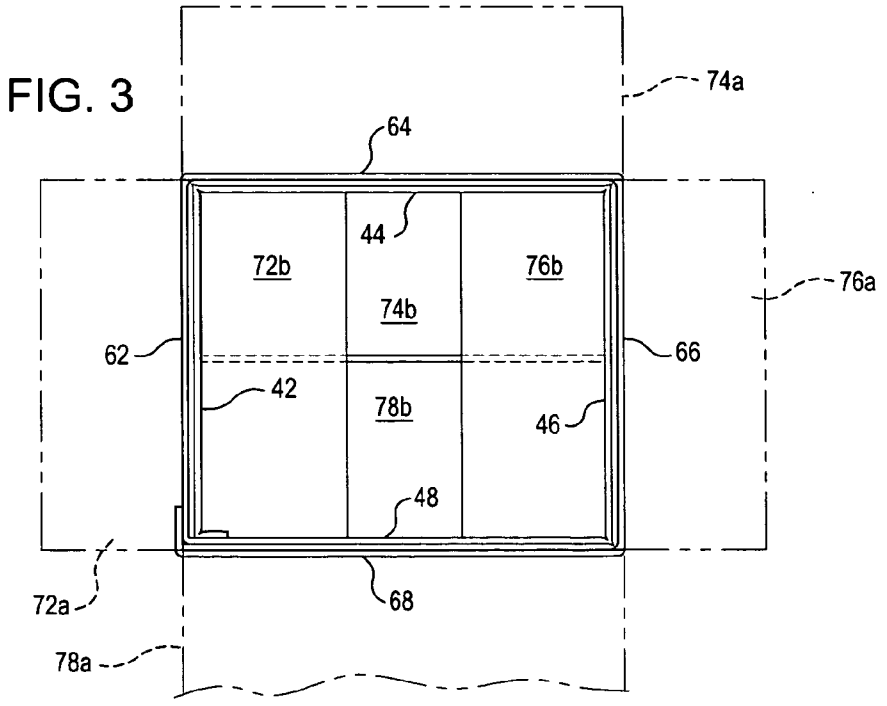


FIG. 3a

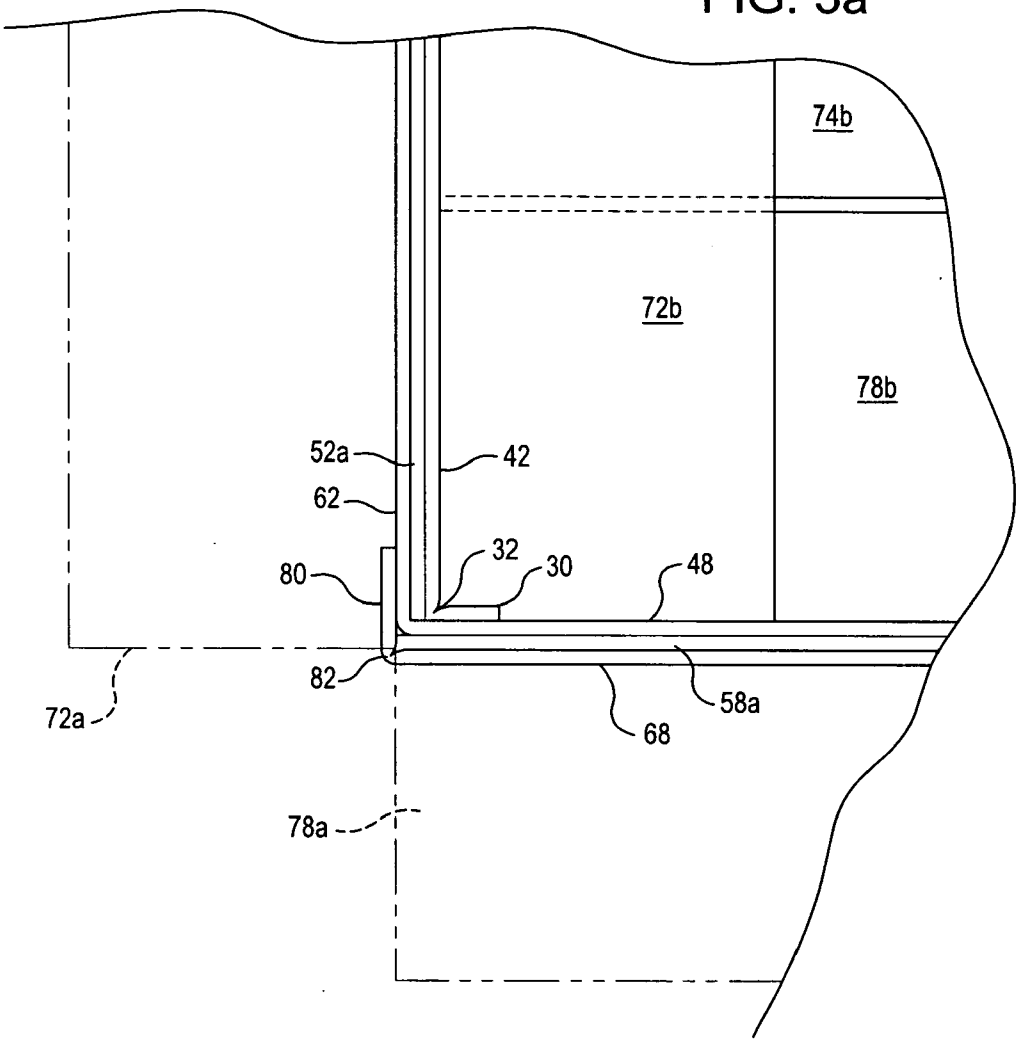


FIG. 4

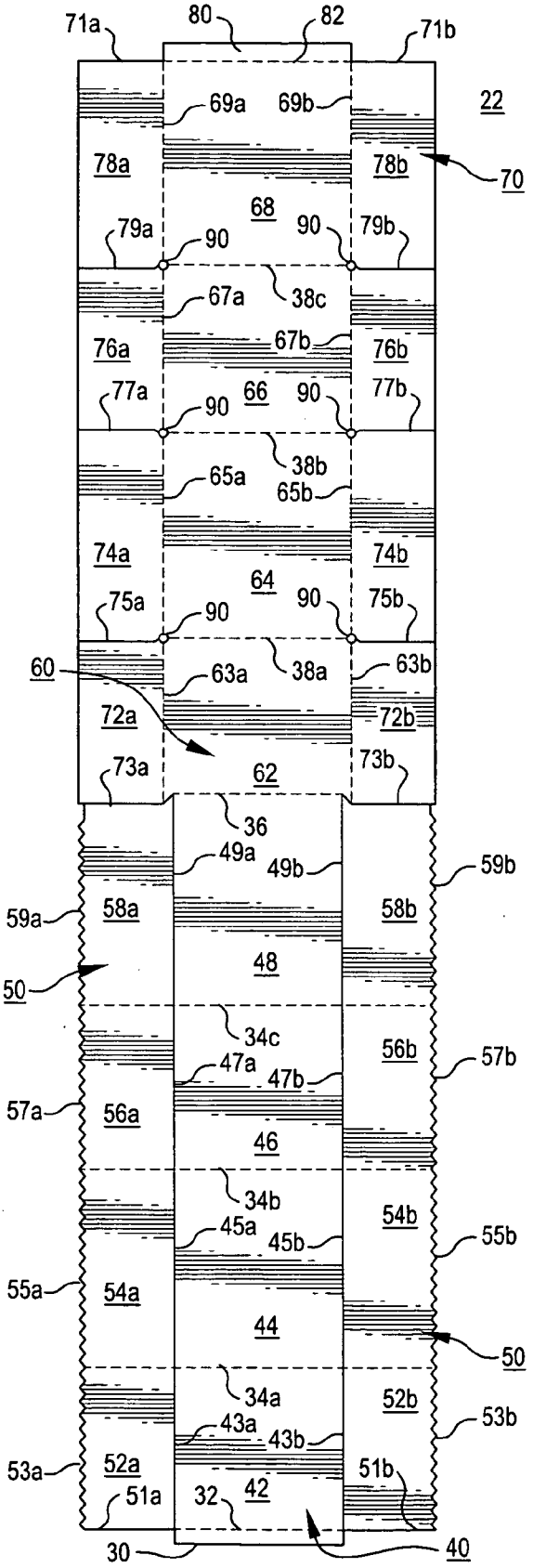

71a
80
82
71b
69a
69b
22
78a
78b
70
68
79a
90
90
79b
67a
38c
76a
67b
76b
77a
90
66
90
77b
38b
65a
65b
74a
74b
64
75a
90
90
75b
60
63a
38a
63b
72a
72b
73a
62
73b
36
49a
49b
59b
59a
58a
58b
48
50
34c
56b
57b
47a
47b
57a
56a
46
34b
54b
45a
45b
55b
55a
54a
44
50
34a
52b
43a
43b
53b
53a
52a
51b
51a
32
42
30
40

FIG. 5

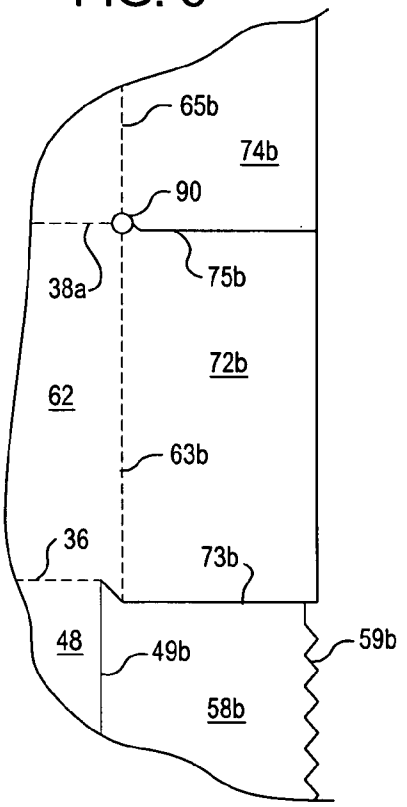

65b
74b
90
38a
75b
72b
62
63b
36
73b
48
49b
59b
58b

FIG. 6

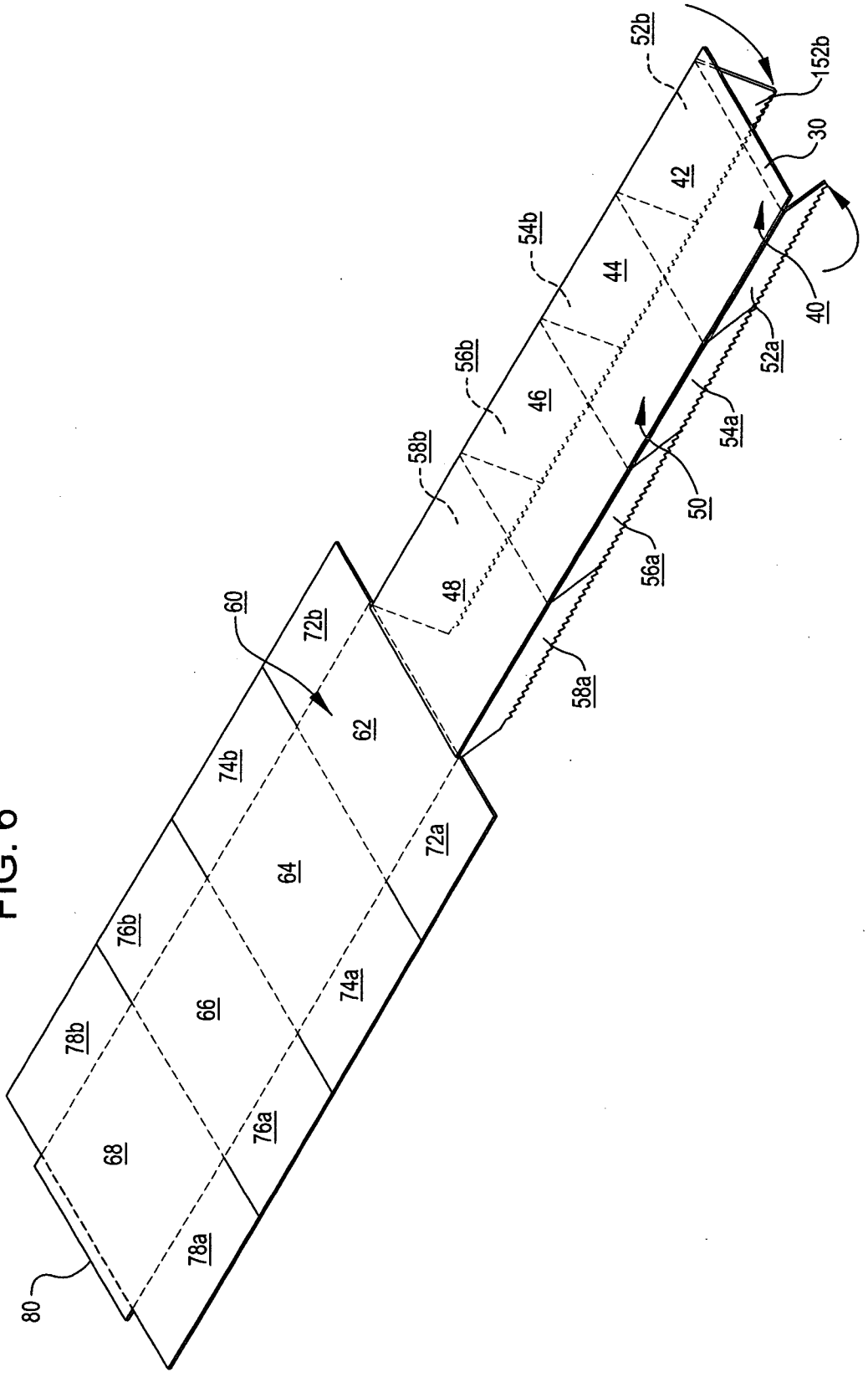

52b
152b
30
42
54b
44
40
56b
46
52a
58b
54a
50
48
56a
60
72b
58a
62
74b
72a
64
76b
74a
66
78b
76a
68
78a
80

FIG. 7

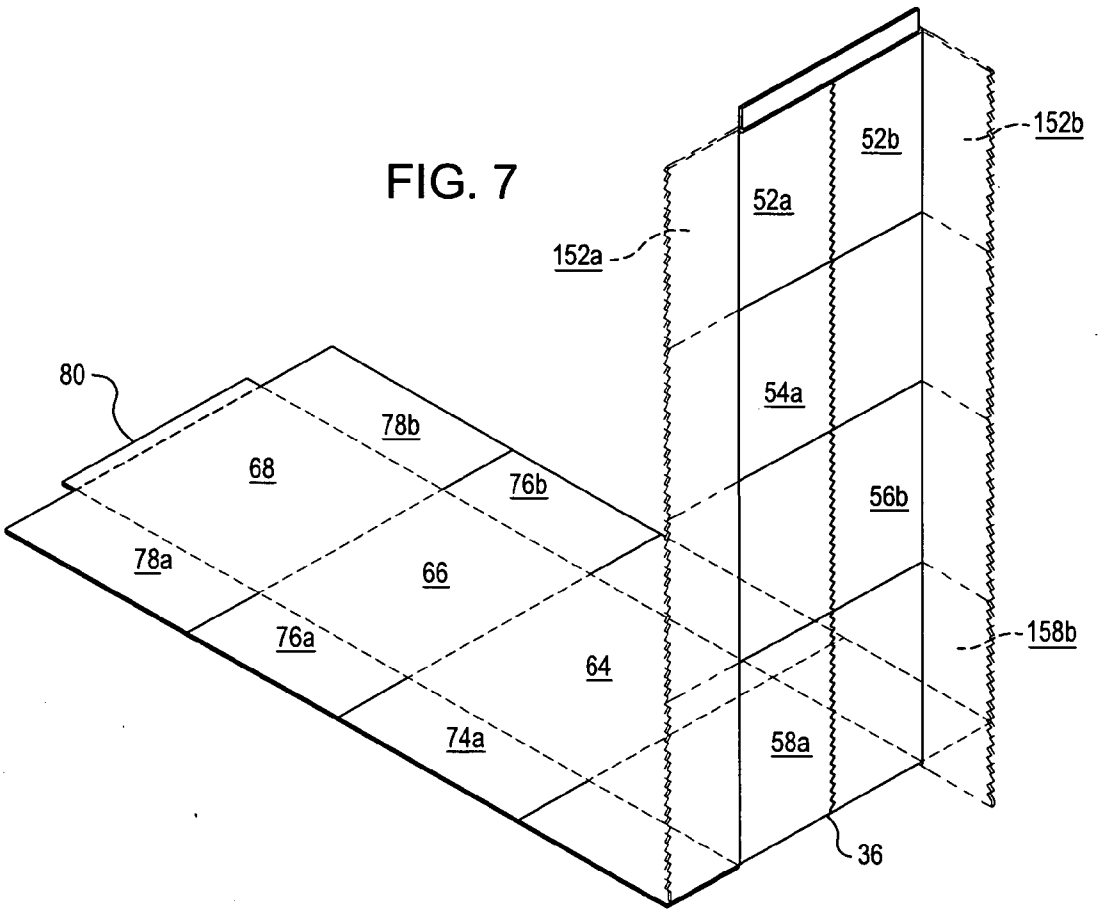

80
78b
68
76b
78a
66
76a
64
74a
152a
52a
52b
152b
54a
56b
158b
58a
36

FIG. 8

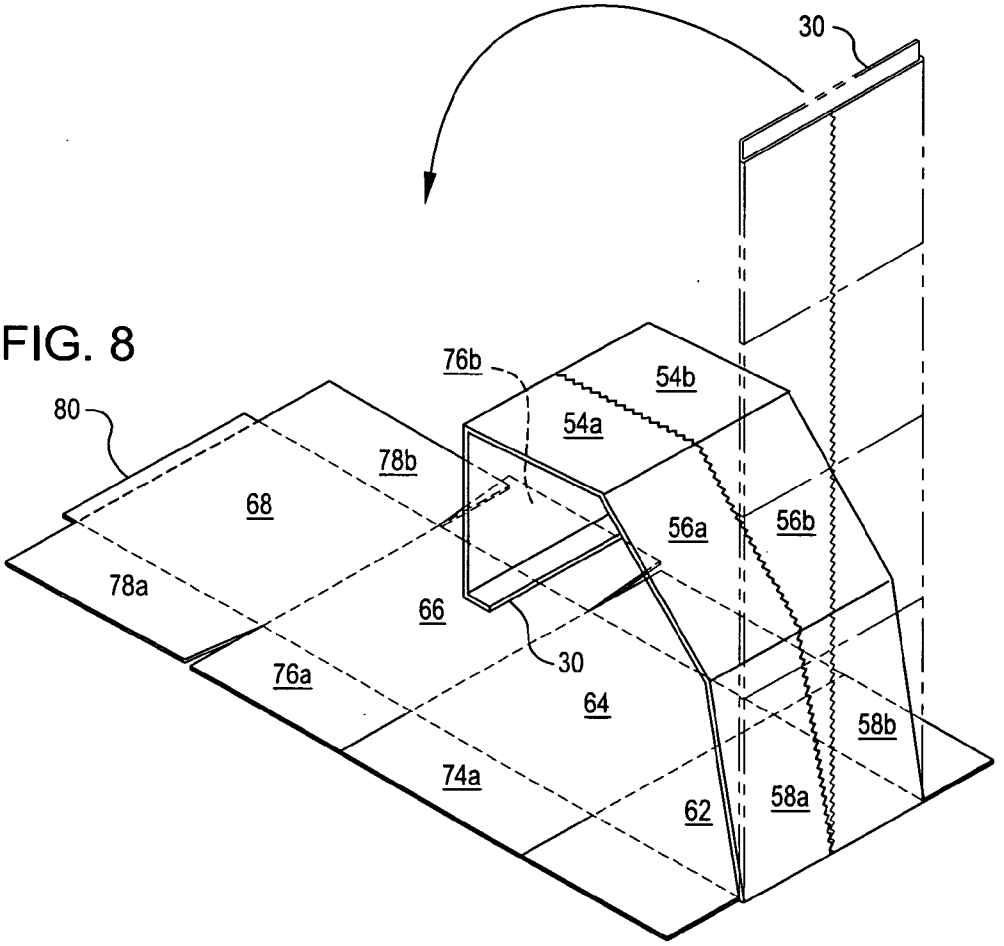


FIG. 9

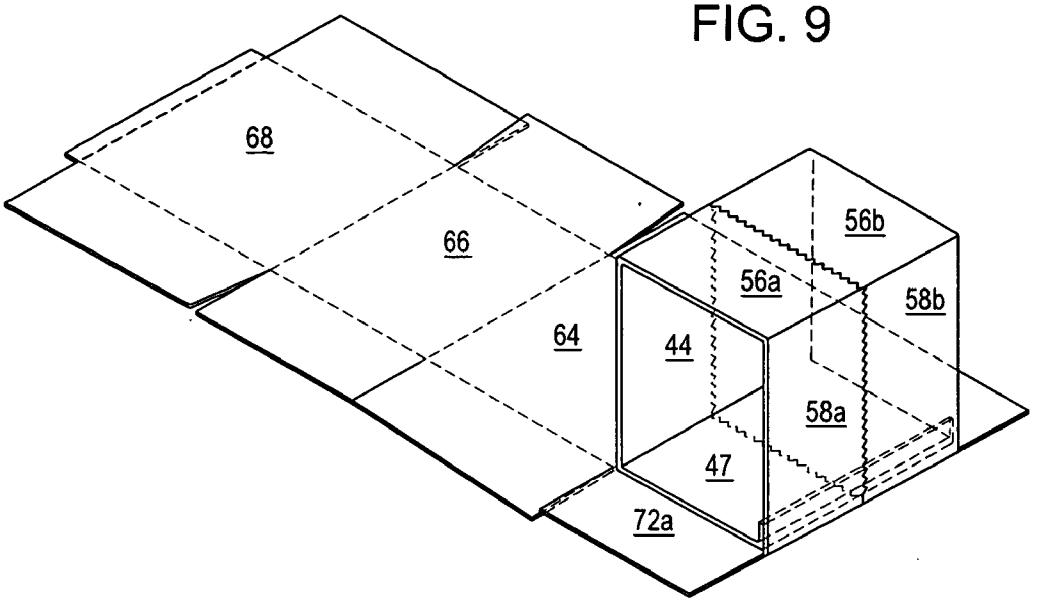

68
66
64
44
56b
56a
58b
58a
47
72a

FIG. 10

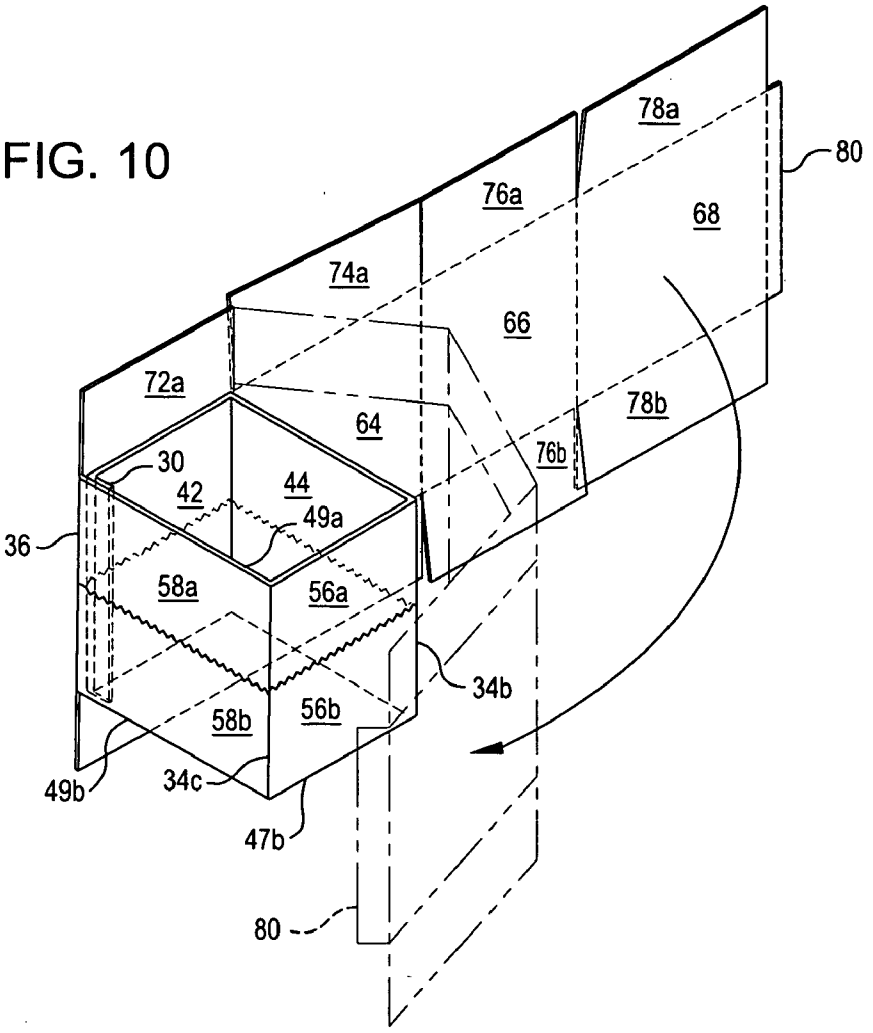

78a
80
76a
68
74a
66
72a
64
78b
76b
30
42
44
49a
36
58a
56a
34b
58b
56b
49b
34c
47b
80

FIG. 11

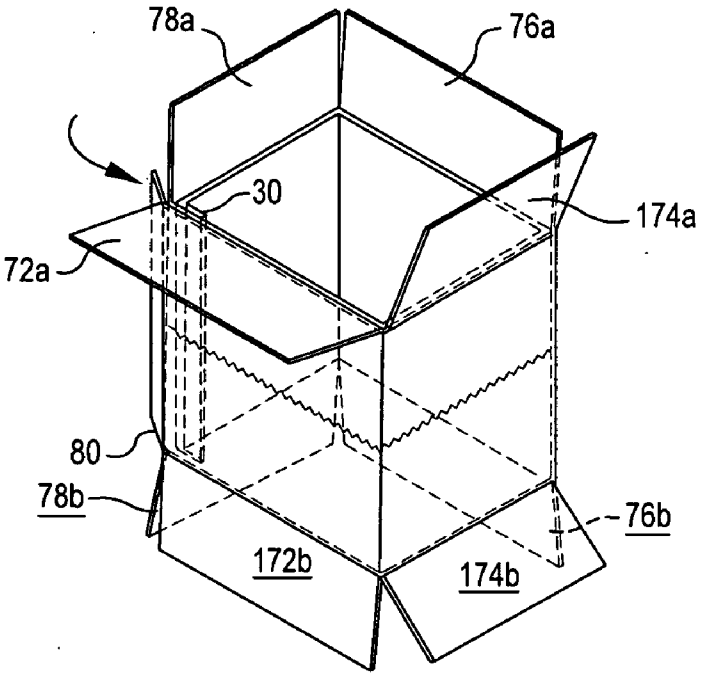
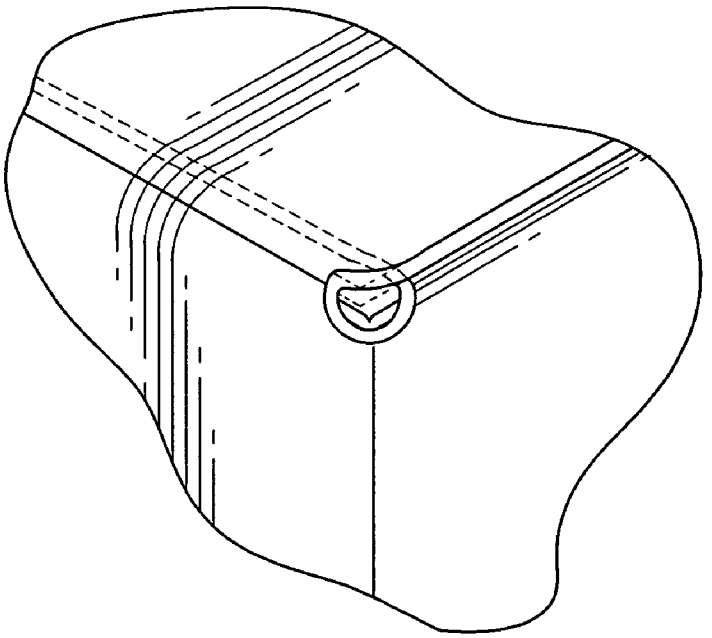


FIG. 12



METHODS FOR CREATING MULTI-WALLED CONTAINERS AND ARTICLES PRODUCED THERE FROM

BACKGROUND OF THE INVENTION

[0001] Large format containers, generally referred to as "bins", are used to hold a variety of materials, usually for transport but also for retail display. Because more than 95% of all products in the US are shipped in corrugated boxes, and because of the cost advantages associated with this form of packaging, most bins are constructed from corrugated paperboard. But while about 90% of all corrugated paperboard is single wall, the relatively large dimensions of bins in conjunction with the nature of the goods being placed in the bins require the additional strength provided by multiple wall construction.

[0002] The prior art is replete with various methods for establishing a desired level of sidewall burst strength, bottom crush resistance and vertical load capacity for bins. Some solutions employ the use of double or triple wall corrugated paperboard as the starting material, while others rely upon layering walls or nesting boxes. Each of these approaches, however, includes advantages as well as disadvantages. Exemplary disadvantages include high manufacturing costs due to material handling, use of adhesives, or fabrication equipment, etc.; handling difficulties (both prior to box converting such as when handling large area blanks as well as afterwards such as when attempting to prepare the bins for shipping), and generation of waste material, all of which are well known to the skilled practitioner.

[0003] In view of these disadvantages, an improved bin would be constructed from easy-to-create single wall corrugated material, would use limited amounts of adhesive during the converting process, would require little human effort during the converting process, would generate little waste, and would require minimal handling, among other advantages. While such a need exists, heretofore, such need has not been met.

SUMMARY OF THE INVENTION

[0004] Embodiments of the invention in one respect are directed to methods for creating a multi-walled container (and resulting articles) from a corrugated material with minimal intentional waste, wherein the container is formed from a single sheet or preferably a continuous web of corrugated material, such as single wall corrugated board, or double wall corrugated board. Because embodiments of the invention create a multi-walled container from a single sheet or web of material (as opposed to using inserts or a box-within-a-box design), it is possible, as well as desirable, to create the container in a single operation, which advantageously lends itself to a continuous process. Moreover, a continuous process will usually dispense with the need to manage container blanks. Additionally, multi-walled containers are usually large, e.g., from approximately 40" in width/side. At this scale, conventional container blanks would be very large, approaching 30 feet in length. If embodiments of the invention were formed using traditional construction methodologies, e.g., one apparatus manufactures the blanks, the blanks are then moved to storage, and then moved to a box making machine, storage, transport and handling of such large format blanks would present a formidable challenge. By using a continuous process wherein a web or constant source of material is fed into a box making machine, all material handling requirements that would otherwise be associated with conventional blank-based box making procedures can be eliminated.

[0005] While the foregoing description of preferred methods emphasizes the benefits of using a continuous process approach to making containers according to the invention, the invention is not limited to such approaches. Moreover, even in a continuous process, container blanks will be formed prior to makeup of the container. Thus, the term "blank" as used herein includes both conventional container blanks not derived from a continuous process as well as those that are so derived. In the event that a distinction is to be made, and it is otherwise not clear from the context of usage, the term "conventional blanks" or similar wording will refer to blanks not derived from a continuous process.

[0006] Embodiments of the invention pertaining to articles resulting from the practice of methods according to the invention utilize in- or out-folded intermediate panels to establish a wall in between an outer wall and an inner wall of a produced container. In certain preferred embodiments of the invention, flap precursors of a blank used to create the container are dimensioned to either individually, or in combination, create an intermediate wall. Thus, in one series of embodiments, opposing flap precursor are folded toward each other, and attached, such as by adhesives, to the panel from which they extended. Once folded and adhered, these flap precursors collectively form an additional sidewall of the container. By employing this method for producing the general equivalent of triple wall containers where the flap precursors constitute middle flaps, it is possible to construct such a container with virtually no planned waste.

[0007] Embodiments of the invention in yet another respect are directed to methods for creating a multi-walled container (and resulting articles) that has a generally unstressed vertical fold at all corner edges. By forming the container about a mandrel having the desired shape of the container (at least side walls thereof, the resultant container's relaxed state is that of its in-use form. As a result, each vertical corner of a four-sided container is less susceptible to tearing and breakage during use, as is common in the prior art. The same applies to both 6 and 8 corner styles. Moreover, handling and storage of the resulting containers is enhanced since no vertical corner in the four sided configuration, for example, undergoes substantially greater than a 90° bend from its "use" geometry to its "knocked down" geometry.

[0008] Within the context of the invention, articles resulting from the practice of the various method embodiments comprise a single blank for forming a multiple sidewall container, as well as the resulting container. The blank defines a longitudinal direction from a first end to a second end, and comprises an inner panel forming inner sidewalls of the container when assembled, wherein the inner panel has a plurality of inner panel portions, each inner panel portion being contiguous with any adjacent inner panel portion and each inner panel portion making up one inner sidewall of the container when assembled.

[0009] The blank further comprises at least one pair of flap precursors, alternatively referred to as opposing middle flaps, extending from the inner panel to a distal edge, wherein the sum of the average lateral lengths of the pair of middle flaps from their intersection with the inner panel to the distal edge is equal to or less than the lateral length of the

inner panel from the intersection of a first opposing middle flap to the intersection of a second opposing middle flap. Furthermore, each middle flap has a plurality of flap portions, each flap portion being contiguous with any adjacent flap portion and each opposing pair of flap portions making up one middle sidewall of the container when assembled.

[0010] In addition, the blank comprises, in three sidewall embodiments, an outer panel extending from the inner panel forming outer sidewalls of the container when assembled, wherein the outer panel has a plurality of outer panel portions, each outer panel portion being contiguous with any adjacent outer panel portion and each outer panel portion making up an outer sidewall of the container when assembled. If additional intermediate sidewalls are desired, then the outer panel will extend from the last intermediate panel. In the described three sidewall embodiment, such (an) intermediate panel(s) is/are located longitudinally between the inner panel and the outer panel.

[0011] As noted above, the combined average lateral widths of the middle flaps is equal to or less than the lateral width of the inner panel. This relationship permits the at least one pair of opposing middle flaps to be involuted, thereby bringing their respective distal edges into proximity with each other and with the inner panel. The resulting structure can then function as intermediate sidewalls when the blank is assembled into the container. The skilled practitioner will of course realize that as the geometries of the distal edges vary, so may the lateral length determinations. Thus, while the combined lengths are described in terms of "average", it is within the scope of the invention to include any geometry that will not result in an overlapping condition when the opposing flaps are involuted and brought into relative proximity with one another.

[0012] In certain embodiments, an interlocking or intermeshing pair of middle flap edges is established. In these embodiments, stresses at what would otherwise be localized at a butt joint after involution and formation of the container are dispersed over a larger area of the container when in use. This is especially important when maximizing burst and vertical compression strength values.

[0013] Still other embodiments of the invention employ a corner stress relief feature at the intersection of a flap joint and a panel joint, preferably on the outermost panels and flaps. Because this intersection would otherwise undergo bidirectional manipulation, select removal of material from this intersection permits a greater degree of articulation and delocalizes stresses that would otherwise occur at a single, small location.

[0014] And yet other embodiments of the invention provide for the slit separating two flaps to be off set from a score to facilitate bending of two adjacent panels. The offset, which preferably occurs with respect to the outer panels and flaps, is preferably approximately equal to the thickness dimension of the material used to construct the container. When implemented, each flap will have a width dimension that is different (longer or shorter) than the width dimension of the panel width from which it extends. When the container is assembled into its final configuration, the wider outer flaps will extend to the outer edge of the container, and the inner flaps will fully extend over the intermediate and inner layer, thereby providing additional stacking strength and making full use of, and contact with, the outer panel(s) of the container. Those persons skilled in the art will appreciate that this configuration is more easily achieved when used in conjunction with the previously described stress relief feature.

[0015] While practice of the invention can be made in a continuous process environment, benefits of the invention can also be realized in a batch process, whereby conventional container blanks are used. Because the continuous process methods do create discrete containers, at some point during practice of the method a "blank" will be established and the resultant container formed there from. Therefore, the term "blank" is used broadly herein to include both conventional container blanks as well as the discrete sections of material created in the continuous process environments. Unless otherwise specified, the term "blank" or its plural comprises both forms.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] FIG. **1** is a perspective view of a first embodiment of the invention shown in a generally assembled state;

[0017] FIG. **2** is a detailed perspective view of a portion of the double liner corrugated material used in the construction of the first embodiment;

[0018] FIG. **3** is a plan view of the first embodiment with the upper flaps shown in phantom to better illustrate the layering of the corrugated material;

[0019] FIG. **3***a* is a detailed plan view of a corner of the embodiment shown in FIG. **3**;

[0020] FIG. **4** is a plan view of a "blank" used to form the first embodiment of the invention;

[0021] FIG. **5** is a detailed plan view of a stress relief feature and vertical crush resistance geometry feature of the first embodiment of the invention;

[0022] FIG. **6** is a perspective view of a first step in forming a multi-walled container using the "blank" of FIG. **4** where the middle flaps are folded into close proximity to form a middle sidewall of corrugated material;

[0023] FIG. **7** is a perspective view of a second step in forming a multi-walled container using the "blank" of FIG. **4**;

[0024] FIG. **8** is a perspective view of a third step in forming a multi-walled container using the "blank" of FIG. **4** where the combined inner panel and middle flaps are involuted;

[0025] FIG. **9** is a perspective view of a fourth step in forming a multi-walled container using the "blank" of FIG. **4** where an inner glue tab is attached to an inner panel, thereby forming a basic container shape;

[0026] FIG. **10** is a perspective view of a fifth step in forming a multi-walled container using the "blank" of FIG. **4** where the outer panels are wrapped around the basic container of FIG. **9**;

[0027] FIG. **11** is a perspective view of a sixth step in forming a multi-walled container using the "blank" of FIG. **4** where an outer glue tab is attached to an outer panel, completing formation of the first embodiment; and

[0028] FIG. **12** is a detailed perspective view of a stress relief feature shown in FIG. **5** when the "blank" of FIG. **4** is

converted into the container of FIG. **11**, and the upper and lower flaps are folded inward.

DESCRIPTION OF THE INVENTION EMBODIMENTS

[0029] The following discussion is presented to enable a person skilled in the art to make and use the invention. Various modifications to the embodiments shown herein will be readily apparent to those skilled in the art, and the generic principles herein may be applied to other embodiments and applications without departing from the spirit and scope of the present invention, as defined by the appended claims. Thus, the present invention is not intended to be limited to the embodiments shown, but is to be accorded the widest scope consistent with the principles and features disclosed herein.

[0030] Turning then to the several Figures, where like numerals indicate like parts, and more particularly to FIGS. **1-4**, an embodiment of the invention employing many of the features and elements of the invention will now be described. Container **20** comprises "blank" **22**, which is preferably constructed from a double lined, single wall corrugated material such as 5/16" L flute corrugated board shown in FIG. **2**. In the illustrated embodiment, container **20** has dimensions of about 42" H×48" W×40" D, while blank **22** has maximum dimensions of about 355" L×83" W. In the illustrated embodiment, container **20** has triple sidewalls and single overlapping bottom and top flaps.

[0031] In order to form container **20**, it is necessary to create container blank **22** either prior to assembly or in line with the assembly process. As is best shown in FIG. **4**, container blank **22** is a unitary piece of corrugated material, such as of the type shown in FIG. **2**, with the direction of corrugation running laterally. From a single sheet, selected scores, cuts and perforations are carried out, such as by rotary die cutter(s) or other means appreciated by the skilled practitioner. Each container blank **22** then comprises inner panel **40**, opposing middle flaps **50**, outer panel **60**, and a plurality of end flaps **70**. Container blank **22** preferably further comprises inner glue tab **30** and outer glue tab **80**. For convention purposes, the observed sides of all panels and flaps are as indicated, with the reverse side being numbered similarly, but within the one hundred series. Thus, the reverse side of inner panel **40**, for example, is labeled as inner panel **140**.

[0032] Inner panel **40** comprises inner panel portions **42**, **44**, **46** and **48**, separated by scores **34***a*, **34***b*, and **34***c*. Inner glue tab **30** extends longitudinally from inner panel portion **42**, and is separated there from by score **32**. Extending laterally outwardly from inner panel portions **42**, **44**, **46** and **48**, and defined in part by slit-scores **43***a/b*, **45***a/b*, **47***a/b* and **49***a/b*, and by scores **34***a*, **34***b*, and **34***c* (as well as edges **51***a/b*, and slits **73***a* and **73***b*), are respective middle flaps **50**, identified in this embodiment as middle flap portions **52***a/b*, **54***a/b*, **56***a/b* and **58***a/b*. While those persons skilled in the art will appreciate that other forms of scoring (e.g., point-to-flat) as well as slitting or even slotting can be used instead of those portions of scores **34***a*, **34***b*, and **34***c* that partially define each middle flap portion pair **52***a/b*, **54***a/b*, **56***a/b* and **58***a/b*, additional strength and handling advantages can be realized by retaining robust physical linkage between adjacent middle flap portions, as will be described below. Moreover, each "flap" **50** may comprise physically discrete flap portions (as are end flaps **70**, discussed below), visually discrete flap portions as illustrated herein, or may be wholly contiguous (no scoring). Because it is only necessary to form a wall or layer within container **20**, there is no intrinsic need to form physically discrete flap portions as long as those portions of blank **22** that fold to meet the opposing portions of blank **22** can result in the creation of such wall or layer.

[0033] The distal ends of each middle flap portion are characterized by chevron edges **53***a/b*, **55***a/b*, **57***a/b* and **59***a/b*, again as shown best in FIG. **4**. The inclusion of these chevron edges, or any non-linear edge, will beneficially delocalize burst and column compression stresses that may occur after assembly and use of container **20**, as will be described in later detail below. Thus, curvilinear edges or rectilinear edges such as repeating square or saw-tooth geometries are considered desirable. However, it is not necessary to the operation or constitution of the embodiments of the invention to incorporate such non-linear edges, and a linear edge will provide benefits as herein described.

[0034] While inner panel **40** and middle flaps **50** both form sidewalls of the container, only outer panel **60** forms sidewalls; end flaps **70** constitute single bottom and top sides of container **20** as shown in FIG. **11**. Outer panel **60** comprises outer panel portions **62**, **64**, **66** and **68**, separated by scores **38***a*, **38***b*, and **38***c*; outer panel portion **62** is separated from inner panel portion **48** by score **36**. Outer glue tab **80** extends longitudinally from inner panel portion **42**, and is separated there from by score **82**. Extending laterally outwardly from outer panel portions **62**, **64**, **66** and **68**, and defined in part by point-to-point scores **63***a/b*, **65***a/b*, **67***a/b* and **69***a/b*, and by slits **73***a/b*, **75***a/b*, **77***a/b* and **79***a/b* (as well as edges **71***a*/b), are respective end flaps **72***a/b*, **74***a/b*, **76***a/b* and **78***a/b*, as shown. Those persons skilled in the art will appreciate that slots can be used instead of slits **73***a/b*, **75***a/b*, **77***a/b* and **79***a/b*, although as will be described in detail below, advantages can be achieved through the use of slits with respect to stress relief feature **90**.

[0035] It should be noted that the lateral width (or as assembled, the height) of outer panel **60** is greater than that of inner panel **40**. This increased dimension addresses the consequence of the increased external dimensions as container **20** is formed (discussed and shown below). Similarly, the longitudinal length (or as assembled, the width and depth) of outer panel **60** is greater than that of inner panel **40**. Those persons skilled in the art will appreciate that the increases are related to the number of walls used to form the container, as well as the thickness of the material comprising the walls.

[0036] FIG. **5** illustrates two features of the subject embodiment, namely, stress relief feature **90**, which is characterized as a hole of approximately 0.375" diameter, and flap offsets. It is well known in the art that flaps on containers frequently tear at the exposed edge interface between the flap and a sidewall panel. This is due in part to the effect of the three edge corner present on the underside of the flap: the three edge corner causes a crushing of the flap at its edge, thereby compromising the structural integrity of the flap and related structure. This consequence, in conjunction with the inherent weakness of the material at this position, often invites mechanical failure during repeated use or operation of the flap. By establishing a hole, and preferably, but not necessarily, a round or circular hole, the three edge corner will not directly impinge upon the underside of the flap. Depending upon the number of walls for any

particular container, additional stress relief features may be employed with respect to interior or middle walls, as the case may be.

[0037] Also shown in FIG. **5** is an offset with respect to the slits separating adjacent flaps **70** and the point-to-point scores separating adjacent outer panel **60**. Unlike the continuous scores **34***a*, **34***b*, and **34***c* of inner panel **40** (which create inner panel portions **42**, **44** and **46**) and middle flaps **50** (which partially define each middle flap portion pair **52***a/b*, **54***a/b*, **56***a/b* and **58***a/b*), and which result in equally dimensioned walls, flaps **70** have differing dimensions when compared to their companion panels. Because flaps **70** form end walls as opposed to sidewalls, there is no need for such symmetry. Moreover, and as best shown in FIG. **3**, because flaps **70** will be positioned orthogonal to the sidewalls comprising inner panel **40**, middle flaps **50** and outer panel **60**, the dimensionally larger flaps will extend over the entire exposed edges of outer panels **60** when container **20** is in the assembled configuration. The consequence of this arrangement is that all exposed vertical sidewall edges can be "covered" by the end flaps, and that vertical compression loads can be evenly distributed to the end flaps. See also FIG. **11**.

[0038] Turning then to FIGS. **6-12**, the assemblage of container **20** is shown in detail. Completed blank **20**, as described in FIG. **4**, emerges from a converting machine and enters a folding and gluing section of the process. Using folding rails or paddles, co-joined middle flap portions **52***a*, **54***a*, **56***a* and **58***a*, and **52***b*, **54***b*, **56***b* and **58***b* are down folded 180°, along slit-scores **43***a*, **45***a*, **47***a* and **49***a*, and **43***b*, **45***b*, **47***b* and **49***b* to join in surface-to-surface area contact with respective inner panel portions **42**, **44**, **46** and **48** as shown in FIG. **6**. Prior to initiation or completion of the 180° folding process, adhesive is applied to the contact area surfaces using an extrusion or roller coating system. On completion of the 180° folding and gluing process, chevron edges **53***a/b*, **55***a/b*, **57***a/b* and **59***a/b* meet about mid way of inner panel portions **42**, **44**, **46** and **48**. The 'serrated' and intermeshing nature of chevron edges **53***a/b*, **55***a/b*, **57***a/b* and **59***a/b* distribute the joined line over a greater area than a pure straight cut and now appear on the underside of the flat box blank.

[0039] Using a gripper mechanism, inner glue tab **30** is up-folded 90° at score **32**, inner panel portion **42** (with middle flap pair **52***a/b*) is up-folded 90° at score **34***a*, inner panel portion **44** (with middle flap pair **54***a/b*) is up-folded 90° at score **34***b*, inner panel portion **46** (with middle flap pair **56***a/b*) is up-folded 90° at score **34***c*, and inner panel portion **48** (with middle flap pair **58***a/b*) is up-folded 90° at score **36**, as is shown in FIG. **8**. All 90° folds are 'up' and therefore away from the surface joint of chevron edges **53***a/b*, **55***a/b*, **57***a/b* and **59***a/b*. The resulting structure is best shown in FIG. **9**.

[0040] Adhesive is applied to the intended mating surfaces of outer panel portions **62**, **64**, **66** and **68**, and the up-folding process continues with outer panel portion **62** folding 90° at score **38***a*, outer panel portion **64** folding 90° at score **38***b*, outer panel portion **66** folding 90° at score **38***c*, and outer panel portion **68** folding 90° at score **82**, with outer glue tab **80** completing the folding and gluing process. This process is best shown in FIG. **10**. As those persons skilled in the art will appreciate, the up-folding process may be accomplished by use of a forming mandrel or other aid.

[0041] The collective effect of the multiple-90 degree folding and gluing process takes the original flat, rigid corrugated board blank, comprising inner glue tab **30**, inner panel **40**, middle flaps **50**, which form an intermediate panel, and outer panel **60**, as well as outer glue tab **80**, all as shown in FIG. **4**, and forms a multi-walled, four sided, finished container/bin, with single wall flaps top and bottom, that has no 'manufacturers-joint', as best shown in FIG. **11**. Because the relaxed state (manufacturer's resting position) is the use state of the container, there is a natural tendency of the container to return to its resting position if collapsed. In single wall construction containers, this advantage is of little consequence; however, in multi-walled containers the force necessary to form the desired container shape can be significant. Therefore, there is a significant labor advantage to constructing a container to have a resting position the same as its use position regarding multi-walled containers. Furthermore, by incorporating panel scores at each edge, knock-down of the container is made easier (the score lines further localize any resulting crushing, thereby preserving the structural integrity of the container at locations adjacent to the edges).

What is claimed:

1. A single blank for forming a multiple sidewall container, the blank defining a longitudinal direction from a first end to a second end, with the blank comprising:

an inner panel forming inner sidewalls of the container when assembled, wherein the inner panel comprises a plurality of inner panel portions, each inner panel portion being contiguous with any adjacent inner panel portion and each inner panel portion comprising one inner sidewall of the container when assembled;

at least one pair of opposing middle flaps extending from the inner panel to a distal edge, wherein the sum of the lateral length of the pair of middle flaps from their intersection with the inner panel to the distal edge is equal to or less than the lateral length of the inner panel from the intersection of a first opposing middle flap to the intersection of a second opposing middle flap, and wherein each middle flap comprises a plurality of flap portions, each flap portion being contiguous with any adjacent flap portion and each opposing pair of flap portions comprising one middle sidewall of the container when assembled; and

an outer panel extending from the inner panel forming outer sidewalls of the container when assembled, wherein the outer panel comprises a plurality of outer panel portions, each outer panel portion being contiguous with any adjacent outer panel portion and each outer panel portion comprising an outer sidewall of the container when assembled,

wherein the at least one pair of opposing middle flaps are involuted to bring their respective distal edges into proximity with each other and with the inner panel, thereby forming intermediate sidewalls when the blank is assembled into the container.

2. The blank of claim **1** further comprising a glue tab at the first end of the blank and a glue tab at the second end of the blank wherein the first glue tab is adherable to the inner panel when the container is assembled and the second glue tab is adherable to the outer panel when the container is assembled.

3. The blank of claim **1** wherein the distal edges of the middle flaps are not linear.

4. The blank of claim **3** wherein the distal edges of the middle flaps are one of a repeating rectilinear, curvilinear, or a combination rectilinear and curvilinear design.

5. The blank of claim **1** wherein the distal edges of the middle flaps are complementary such that upon involution, the distal edge of one middle flap will substantially abut the distal edge of the opposing middle flap.

6. The blank of claim **1** wherein each middle flap portion is separated from an adjacent middle flap portion by a score.

7. The blank of claim **1** wherein each middle flap portion is separated from an adjacent middle flap portion by a slit, a slot or a gap.

8. The blank of claim **1** wherein each inner panel portion is separated from an adjacent inner panel portion by a score.

9. The blank of claim **1** constructed from a double liner corrugated material.

10. The blank of claim **1** wherein the lateral dimension of any inner panel portion is less than the lateral dimension of any outer panel portion.

11. The blank of claim **1** further comprising at least one pair of opposing end flaps extending from at least some outer panel portions wherein each end flap is separated from any adjacent end flap by one of a slot, a slit or a gap.

12. The blank of claim **11** wherein pairs of opposing end flaps extend laterally from each outer panel portion.

13. The blank of claim **11** further comprising a stress relief feature at an interface between an end flap and an outer panel portion.

14. The blank of claim **12** further comprising a stress relief feature at an interface between each end flap and each outer panel portion.

15. The blank of claim **11** wherein the longitudinal length of each end flap is one of greater or less than the longitudinal length of a corresponding outer panel portion from which it extends.

16. The blank of claim **1** wherein the resting position of a container formed from the blank is the same as the use position of a container formed from the blank.

17. The blank of claim **1** wherein the blank is derived from a web of double liner corrugated material.

18. The blank of claim **1** wherein the blank is derived from a continuous process beginning with a corrugator.

19. The blank of claim **13** wherein the stress relief feature comprises a hole defined at least in part by two adjacent end flaps and the outer panel.

20. The blank of claim **1** wherein one inner panel portion has a longitudinal length longer than any other inner panel portion.

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