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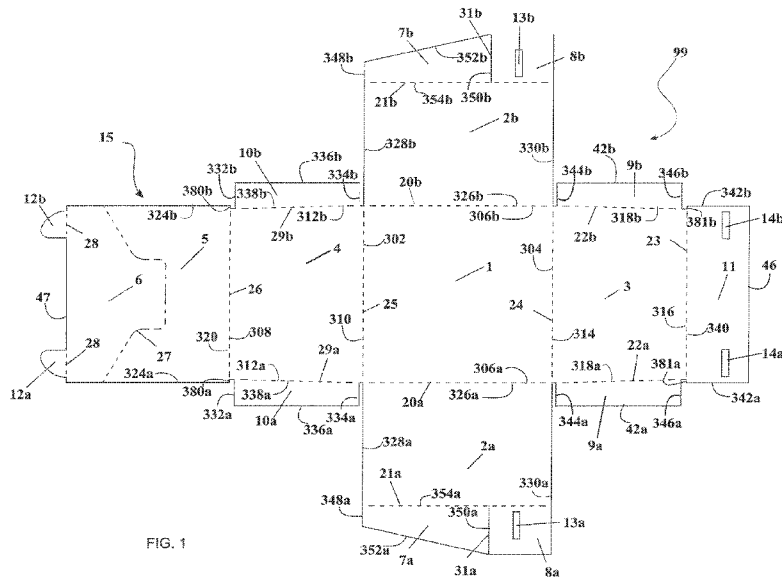


FIG. 1

(57) Abstract: Paperboard containers having panels and flaps with dimensions and aspect ratios that result in a reduction in the quantity of paperboard used to construct the paperboard container. Disclosed configurations provide for efficient and easy mechanisms for closing the paperboard container from a flat form into a closed box using a rapid folding jig, and include panels and flaps having trapezoidal shapes to enable folding into a partially closed configuration with enhanced ease and reliability. Disclosed configurations also provide a structure that opens by collapsing into a substantially flat sheet, making it easy for a user to view and retrieve products stored inside, and a reversible structure, which promotes reuse of the paperboard container.

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RAPID PACKING CONTAINER

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of priority under 35 U.S.C. §119(e) to U.S. Provisional Patent Application Ser. No. 61/865,669, filed August 14, 2013, the disclosure of which is hereby incorporated by reference in its entirety.

BACKGROUND

[0002] Individuals often need to store products, transport products, or ship products from one location to another. A common approach for storing, transporting, or shipping products is to package the products in a paperboard container. However, existing paperboard containers present several drawbacks that make them more expensive to fabricate, more wasteful, more laborious and cumbersome to close, and more laborious and cumbersome to open.

[0003] Accordingly, it would be desirable to develop improved configurations, systems, and methods for making and using paperboard containers. It would be desirable for the paperboard containers to be fabricated from a relatively limited quantity of paperboard as to reduce expense and waste. It would be desirable for the paperboard containers to be easy to convert from flat form into a closed box form in a short amount of time that requires less focus and effort than alternative paperboard containers. It would also be desirable for the paperboard containers to be easy to open in order to view and retrieve the products stored inside.

[0004] This background information is provided to provide some information believed by the applicant to be of possible relevance to the present disclosure. No admission is intended, nor should such admission be inferred or construed, that any of the preceding information constitutes prior art against the present disclosure. Other aims, objects, advantages and features of the disclosure will become more apparent upon reading of the following non-restrictive description of specific embodiments thereof, given by way of example only with reference to the accompanying drawings.

SUMMARY OF THE DISCLOSURE

[0005] The present disclosure describes configurations, systems, and methods for making and using paperboard containers. Disclosed embodiments show paperboard containers

having six panels along with flaps and other features that are shaped, sized, and arranged according to particular configurations, dimensions, and aspect ratios. By way of overview, the panels and flaps are in foldable relationship with one another such that the paperboard container can be folded into a closed box form. To facilitate folding, the present disclosure sets forth various embodiments of a folding jig that allows a user to quickly and efficiently fold the panels and flaps in a desired manner. The paperboard container contains features that securely close and seal the box, including protrusions that engage with slots, and adhesive strips. The paperboard container also includes features to facilitate easy and efficient opening of the paperboard container and retrieval of products stored inside, including tear joints.

[0006] Disclosed configurations for paperboard containers address the above-described technical problems by providing dimensions and aspect ratios that may result in a reduction in the quantity of paperboard used to construct the paperboard container. For example, certain disclosed configurations may result in a 15% reduction in paperboard usage as compared to a regular slotted container. Disclosed embodiments further reduce the quantity of required paperboard and prevent waste by allowing a recipient of a paperboard container to open the container and then re-fold the container “inside-out” such that any external markings are on the inside of the re-folded container, and then reuse the paperboard container.

[0007] Disclosed embodiments further address the above-described technical problems by providing for efficient and easy mechanisms for closing the paperboard container from a flat form into a closed box. For example, a rapid folding jig is disclosed. Using the rapid folding jig, a paperboard cutout can be quickly and easily folded from a flat sheet to a box by pressing the cutout into the rapid folding jig. Disclosed embodiments also provide for tooth-shaped protrusions that fit into slots, as well as the use of adhesive strips, both of which facilitate efficient and easy, yet secure, closing of the box. Certain disclosed embodiments do not require tape for secure closing, which enhances the recyclability of the box, as shipping tape may not be recyclable while adhesive can be recyclable. This feature also promotes efficient and easy, yet secure, closing of the box, because the use of tape can be cumbersome and inefficient.

[0008] Disclosed embodiments further address the above-described technical problems by providing for efficient and easy mechanisms for opening the paperboard container from a closed box into a flat form. Disclosed embodiments include a tear joint that a recipient of the paperboard container can easily tear in order to neatly, efficiently, and easily open the

paperboard container. Moreover, the disclosed dimensions and aspect ratios are such that the paperboard container opens by collapsing into a substantially flat sheet, making it easy for a user to view and retrieve products stored inside the paperboard container without being impeded by panels or flaps of the paperboard container.

[0009] Additional features of the present disclosure will become apparent to those skilled in the art upon consideration of illustrative embodiments exemplifying the best mode of carrying out the disclosure as presently perceived.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1 is a plan view of a paperboard cutout in accordance with the present disclosure;

[0011] FIG. 2 is an isometric view of a completely folded box in accordance with the present disclosure;

[0012] FIG. 3 is an isometric view of a rectangular rapid folding jig in accordance with the present disclosure;

[0013] FIG. 4 is an isometric view of a square rapid folding jig in accordance with the present disclosure;

[0014] FIG. 5 is an isometric view of a partially folded box in accordance with the present disclosure;

[0015] FIG. 6 is an isometric view of a partially folded box after certain additional folding steps have been taken in comparison to the partially folded box of FIG. 6, in accordance with the present disclosure;

[0016] FIG. 7 is a plan view of a box in an open configuration after the box was opened by tearing a tear joint in accordance with the present disclosure;

[0017] FIG. 8 is plan view of a paperboard cutout for an alternative embodiment of a box in accordance with the present disclosure;

[0018] FIG. 9 is an isometric view of a partially folded box in accordance with the alternative embodiment of the present disclosure; and

[0019] FIGS. 10A-10B show two respective orientations for cardboard corrugation based on two respective methodologies for cutting a paperboard cutout from a paperboard sheet, with FIG. 10A showing corrugation perpendicular to an edge of a panel of a paperboard cutout and FIG. 10B showing corrugation oriented at a forty-five degree angle with respect to an edge of a panel of a paperboard cutout.

[0020] The exemplification set out herein illustrates embodiments of the disclosure that are not to be construed as limiting the scope of the disclosure in any manner. Additional features of the present disclosure will become apparent to those skilled in the art upon consideration of the following detailed description of illustrative embodiments exemplifying the best mode of carrying out the disclosure as presently perceived.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0021] While the present disclosure may be susceptible to embodiment in different forms, there is shown in the drawings, and herein will be described in detail, embodiments with the understanding that the present description is to be considered an exemplification of the principles of the disclosure. The disclosure is not limited in its application to the details of structure, function, construction, or the arrangement of components (*e.g.*, flaps, panels, slots, protrusions, *etc.*) set forth in the following description or illustrated in the drawings. The disclosure is capable of other embodiments and of being practiced or of being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of various phrases and terms is meant to encompass the items or functions identified and equivalents thereof as well as additional items or functions. Unless limited otherwise, various phrases, terms, and variations thereof herein are used broadly and encompass all variations of such phrases and terms. Furthermore, and as described in subsequent paragraphs, the specific configurations illustrated in the drawings are intended to exemplify embodiments of the disclosure. However, other alternative structures, functions, and configurations are possible which are considered to be within the teachings of the present disclosure. Furthermore, unless otherwise indicated, the term "or" is to be considered inclusive.

[0022] Description will now be given with reference to the attached FIGS. 1-7. It should be understood that these figures are exemplary in nature and in no way serve to limit the scope of the invention.

[0023] FIG. 1 is a plan view of a paperboard cutout 99 in accordance with the present disclosure. In this illustrative embodiment, cutout 99 is one continuous sheet of paperboard in flat form that is subdivided into several panels, flaps, and other features, as will be described in more detail below. However, the cutout 99 could, in alternative embodiments, be made from multiple sheets of paperboard that are affixed together through adhesives, staples, or other binding mechanisms that are known in the art. Moreover, the cutout 99 need

not be fabricated from paperboard. The cutout 99 could be formed from any material suitable for box packaging, including composite materials. The materials forming the cutout 99 could be a variety of thicknesses, which may be determined by an application at hand — *e.g.*, larger boxes designed to carry heavier loads may require thicker paperboard materials.

[0024] The cutout 99 includes a bottom panel 1, a left side panel 2a, a right side panel 2b, a front panel 3, a back panel 4, and a top panel 15. The bottom panel 1 is adjacent to and in foldable relationship with the left side panel 2a, the right side panel 2b, the back panel 4, and the front panel 3. Moreover, the back panel 4 is adjacent to and in foldable relationship with the top panel 15. The bottom panel 1, the left side panel 2a, the right side panel 2b, the front panel 3, the back panel 4, and the top panel 15 may be folded using the foldable relationships among these panels to form the six faces of a constructed box. More particularly, when the cutout 99 is folded into a closed box form, the bottom panel 1 will serve as the bottom face of the box, the left side panel 2a will serve as the left face of the box, the right side panel 2b will serve as the right face of the box, the back panel 4 will serve as the back face of the box, and the top panel 15 will serve as the top face of the box. It should be understood that the above-recited directions simply establish a convention for narrative reference. For example, a user could signify that the back panel 4 should serve as a front of a box (*e.g.*, through markings on the box) should the user so desire.

[0025] The bottom panel 1 is generally rectangular and defined by edges that will be discussed below, and may be square in certain embodiments. The generally rectangular shape of the bottom panel 1 may, in varying embodiments, take on varying aspect ratios depending on the dimensional requirements for a desired box. The bottom panel 1 includes a back edge 302, a front edge 304, a left side edge 306a, and a right side edge 306b. For purposes of this disclosure, the directional terms used to describe edges relate to the relative location of the edge once the paperboard cutout 99 is formed into a closed box. Thus for example, the back edge 302 will be located towards the back of the closed box form, the left side edge 306a will be located on the left side of the closed box form, *etc.* However, as explained, these directional orientations are simply conventions used for ease of exposition.

[0026] The back panel 4 may be generally trapezoidal, for reasons that will be discussed below. The back panel 4 includes a top edge 308, a bottom edge 310, a left side edge 312a, and a right side edge 312b. The front panel 3 may similarly be generally trapezoidal, and includes a bottom edge 314, a top edge 316, a left side edge 318a, and a right side edge 318b. The generally trapezoidal shape of the back panel 4 and/or the front panel 3 may take on

varying aspect ratios and dimensions, depending on the dimensional requirements for a desired box.

[0027] The top panel 15 includes a back edge 320, a front edge 47, a left side edge 324a, and a right side edge 324b. The front edge 47 is parallel to and the same length as the back edge 320, such that the top panel 15 is generally rectangular.

[0028] The left side panel 2a includes a bottom edge 326a, a back edge 328a, a front edge 330a, and a top edge 354a. Similarly, the right side panel 2b includes a bottom edge 326b, a back edge 328b, a front edge 330b and a top edge 354b. The left side panel 2a and the right side panel 2b are both generally rectangular, and their respective generally rectangular shapes can take on varying aspect ratios depending on the dimensional requirements for a desired box.

[0029] As explained, foldable relationships exist between the panels of the cutout 99. These foldable relationships may be provided by foldable creases, which may be disposed in the cutout 99 using methods generally known in the art. Thus, a back bottom crease 25 is disposed between the bottom panel 1 and the back panel 4, and establishes a foldable relationship between the bottom panel 1 and the back panel 4. More particularly, the back bottom crease 25 is disposed at the intersection of the back edge 302 of the bottom panel 1 and the bottom edge 310 of the back panel 4. In this embodiment, the back edge 302 of the bottom panel 1 and the bottom edge 310 of the back panel 4 have a common (*i.e.*, approximately equal) length, and the back bottom crease 25 spans their common length.

[0030] A front bottom crease 24 is disposed between the bottom panel 1 and the front panel 3, and establishes a foldable relationship between the bottom panel 1 and the front panel 3. More particularly, the front bottom crease 24 is disposed at the intersection of the front edge 304 of the bottom panel 1 and the bottom edge 314 of the front panel 3. In this embodiment, the front edge 304 of the bottom panel 1 and the bottom edge 314 of the front panel 3 have a common length, and the front bottom crease 24 spans their common length.

[0031] A left bottom side crease 20a is disposed between the bottom panel 1 and the left side panel 2a, and establishes a foldable relationship between the bottom panel 1 and the left side panel 2a. More particularly, the left bottom side crease 20a is disposed at the intersection of the left side edge 306a of the bottom panel 1 and the bottom edge 326a of the left side panel 2a. Similarly, a right bottom side crease 20b is disposed between the bottom panel 1 and the right side panel 2b, and establishes a foldable relationship between the bottom panel 1 and the right side panel 2b. More particularly, the right bottom side crease 20b is

disposed at the intersection of the right side edge 306b of the bottom panel 1 and the bottom edge 326b of the right side panel 2b. In this embodiment, the left side edge 306a of the bottom panel 1, the right side edge 306b of the bottom panel 1, the bottom edge 326a of the left side panel 2a, and the bottom edge 326b of the right side panel 2b share a common length and the left and right bottom side creases 20a and 20b span their common length.

[0032] A back top crease 26 is disposed between the back panel 4 and the top panel 15. More particularly, the back top crease 26 is disposed at the intersection of the top edge 308 of the back panel 4 and the back edge 320 of the top panel 15. In this embodiment, the top edge 308 of the back panel 4 has a length approximately equal to the length of the bottom edge 310 of the back panel 4 minus twice the thickness of the paperboard material of which the cutout 99 is formed. The back edge 320 of top panel 15 has a length approximately equal to the length of the bottom edge 310 of the back panel 4. Thus, back panel 4 is trapezoidal in shape, with top edge 308 shorter than bottom edge 310 and forming generally parallel sides of the trapezoidal shape, and left and right side edges 312a and 312b adjoining the top edge 308 and the bottom edge 310 and forming legs of the trapezoidal shape. This configuration exposes nubs 380a and 380b, with each of the nubs 380a and 380b having a length approximately equal to a thickness of the paperboard material of which the cutout 99 is formed.

[0033] As explained, the dimensions of the trapezoidal shape can vary. The benefit of the trapezoidal shape of the back panel 4 will be discussed below.

[0034] The creases described above provide for folding relationships among the bottom panel 1, the back panel 4, the front panel 3, and the top panel 15, which as explained, will form six faces of a closed box. In addition to panels, the cutout 99 includes flaps and other features, some of which are in foldable relationship with the above-described panels, as will now be described.

[0035] A left back panel flap 10a and a right back panel flap 10b are joined to the back panel 4 by back side creases 29a and 29b, respectively. The left back panel flap 10a has a top edge 332a, a bottom edge 334a, a front edge 336a, and a back edge 338a. Similarly, the right back panel flap 10b has a top edge 332b, a bottom edge 334b, a front edge 336b, and a back edge 338b.

[0036] The left back side crease 29a is disposed between the back panel 4 and the left back panel flap 10a, and establishes a foldable relationship between the back panel 4 and the left back panel flap 10a. Similarly, the right back side crease 29b is disposed between the

back panel 4 and the right back panel flap 10b, and establishes a foldable relationship between the back panel 4 and the right back panel flap 10b.

[0037] The left back panel flap 10a and the right back panel flap 10b are generally trapezoidal in shape. In certain embodiments, the top edges 332a and 332b of the left and right back panel flaps 10a and 10b may be longer, respectively, than the bottom edges 334a and 334b of the left and right back panel flaps 10a and 10b. In certain embodiments, the back edges 338a and 338b may be longer than the front edges 336a and 336b. Varying dimensions for the trapezoidal shapes of the left back panel flap 10a and the right back panel flap 10b can be used in order to vary the structural properties of the box resulting from the cutout 99, such as structural strength, amount of material used, *etc.*

[0038] The left back panel flap 10a and the right back panel flap 10b, in certain embodiments, are elongate, in that the front edges 336a and 336b and the back edges 338a and 338b are substantially longer (*e.g.*, about three times longer, about four times longer, or about five times longer) than the bottom edges 334a and 334b.

[0039] A front panel slot flap 11 is joined to front panel 3 by a front top crease 23. The front panel slot flap 11 has a front edge 340, a left edge 342a, a right edge 342b, and a front panel slot flap edge 46. The front panel slot flap 11 is generally rectangular in shape, and the front panel slot flap edge 46 has the same length as the front edge 340 of the front panel slot flap 11. The aspect ratio for the generally rectangular shape of the front panel slot flap 11 can vary depending on the dimensional requirements for a desired box.

[0040] Front panel slot flap 11 has two front slots in the form of left front slot 14a and right front slot 14b. Front panel slot flap 11 may also have an adhesive strip 60 applied thereto, not shown in this figure but as will be later shown and explained.

[0041] The top crease 23 is disposed between the front panel 3 and the front panel slot flap 11, and establishes a foldable relationship between the front panel 3 and the front panel slot flap 11. More particularly, the top crease 23 is disposed at the intersection of the top edge 316 of the front panel 3 and the front edge 340 of the front panel slot flap 11. In certain embodiments, the top edge 316 of the front panel 3 has a length approximately equal to the length of the bottom edge 314 of the front panel 3 minus twice the thickness of the paperboard material of which the cutout 99 is formed. The front edge 340 of the front panel slot flap 11 has a length approximately equal to the length of the bottom edge 314 of the front panel 3. Thus, and as previously noted, the front panel 3 is generally trapezoidal in shape, with the top edge 316 of the front panel 3 shorter than the bottom edge 314 of the front panel

3. This configuration exposes nubs 381a and 381b, with each of the nubs 381a and 381b having a length approximately equal to a thickness of the paperboard material of which the cutout 99 is formed.

[0042] A left front panel flap 9a and a right front panel flap 9b are joined to the front panel 3 by front side crease 22a and front side crease 22b, respectively. The left front panel flap 9a has a bottom edge 344a, a top edge 346a, and an inner edge 42a. Similarly, the right front panel flap 9b has a bottom edge 344b, a top edge 346b, and an inner edge 42b. The left front panel flap 9a may be shaped and sized similarly to the left back panel flap 10a, and the right front panel flap 9b may be shaped and sized similarly to the right back panel flap 10b. Thus, the left front panel flap 9a and the right front panel flap 9b may be generally trapezoidal in shape. However, in the depicted embodiment, the left front panel flap 9a is a mirror image of the left back panel flap 10a and the right front panel flap 9b is a mirror image of the right back panel flap 10b. Accordingly, for the left front panel flap 9a, the top edge 346a may be longer than the bottom edge 344a. Similarly, for the right front panel flap 9b, the top edge 346b may be longer than the bottom edge 344b.

[0043] Front side crease 22a is disposed between the front panel 3 and the left front panel flap 9a, and establishes a foldable relationship between the front panel 3 and the left front panel flap 9a. Front side crease 22b is disposed between the front panel 3 and the right front panel flap 9b, and establishes a foldable relationship between the front panel 3 and the right front panel flap 9b.

[0044] Left side panel flap 7a and side panel slot flap 8a are adjoined to left side panel 2a. Left top side crease 21a is disposed between the left side panel 2a and the combination of the left side panel flap 7a and the side panel slot flap 8a. The left top side crease 21a establishes a foldable relationship between the left side panel 2a and the left side panel flap 7a, and also between the left side panel 2a and the side panel slot flap 8a. The left top side crease 21a is the same length as the bottom edge 326a of the left side panel 2a.

[0045] The left side panel flap 7a and the left side panel slot flap 8a are separated by a left side flap cut 31a. The left side flap cut 31a is formed between the left side panel flap 7a and the left side panel slot flap 8a such that the left side panel flap 7a and the left side panel slot flap 8a are independently foldable about the left top side crease 21a.

[0046] The left side panel flap 7a is generally trapezoidal in shape, and in the illustrated embodiment is a right trapezoid. A back edge 348a of the left side panel flap 7a is shorter than a front edge 350a of the left side panel flap 7a, and the back edge 348a and the front

edge 350a form parallel sides of the trapezoidal shape. An inner edge 354a of the left side panel flap 7a is generally orthogonal to the back edge 348a and the front edge 350a, and an outer edge 352a is formed at an angle relative to the back edge 348a and the front edge 350a, such that the inner edge 354a and the outer edge 352a form legs of the trapezoidal shape.

[0047] The left side panel slot flap 8a is generally rectangular in shape, and contains within its boundary a left side slot 13a. The right side panel flap 7b and the right side panel slot flap 8b are generally mirror images of the left side panel flap 7a and the left side panel slot flap 8a.

[0048] As previously explained, the cutout 99 includes protrusions that engage with slots to facilitate closing the cutout 99 into closed box form, and a tear joint to facilitate opening of the box. Certain of these features are provided on the top panel 15. More particularly, the top panel 15 includes a posterior top panel portion 5 and an anterior top panel portion 6. The posterior top panel portion 5 and the anterior top panel portion 6 are adjoined by severable, union tear joint 27. The tear joint 27 can be fabricated within the top panel 15 using methods generally known in the art, including known methods for applying perforation.

[0049] The tear joint 27 initiates at the left side edge 324a and terminates at the right side edge 324b. At locations closer to the left side edge 324a and the right side edge 324b, the tear joint 27 is located in a position that will be further towards the front of the cutout 99 when in closed box form. Further away from the left side edge 324a and the right side edge 324b, the tear joint is located in a position closer towards the center of the top panel 15.

[0050] The front edge 47 contains, within its length, a left tooth-shaped protrusion 12a and a right tooth-shaped protrusion 12b. The left tooth-shaped protrusion 12a is shaped and sized as to be able to fit through and engage with the left side slot 13a and the left front slot 14a. Similarly, the right tooth-shaped protrusion 12b is shaped and sized as to be able to fit through and engage with the right side slot 13b and the right front slot 14b.

[0051] FIG. 2 is an isometric view of a folded box 98 in accordance with the present disclosure. In operation, a user folds the cutout 99 shown above in connection with FIG. 1 along the creases that establish foldable relationships between panels and flaps, as discussed above, in order to form the folded box 98. Thus, the folded box 98 represents the cutout 99 in a closed position. Methodologies for performing such folding will be discussed in detail below. FIG. 2 shows that when the cutout 99 is folded into a closed position, the left tooth-shaped protrusion 12a fits through as to engage with the left front slot 14a, while the right tooth-shaped protrusion 12b is shaped and sized as to be able to fit through and engage with

the right front slot 14b. The tooth-shaped protrusion 12a also fits through as to engage with the left side slot 13a (obstructed from view in FIG. 2) and the right side slot 13b (obstructed from view in FIG. 2), as will be made more apparent in connection with FIG. 5.

[0052] The dimensions of the folded box 98 can vary depending on an application at hand. The present disclosure is suitable for use with a wide variety of dimensions of boxes.

[0053] FIG. 3 shows an isometric view of a rectangular rapid folding jig 299 in accordance with the present disclosure. The rapid folding jig 299 allows a user to efficiently and easily convert the cutout 99 into the folded box 98. The rapid folding job 299 can be made of any material having sufficient structural integrity, such as plastics or wood.

[0054] The rapid folding jig 299 has a generally rectangular base 207. The rectangular base 207 is terminated by four faces: two front and back folding faces 204 and two side folding faces 205. One front and back folding face 204 is shown in FIG. 3, while the other front and back folding face 204 is obscured from view but is located opposite from the depicted folding face 204 with respect to the rectangular base 207. Similarly, one side folding face 205 is shown in FIG. 3, while the other side folding face 205 is obscured from view but is located opposite the depicted folding face 205 with respect to the rectangular base 207. Each front and back folding face 204 meets adjoining side folding faces 205 at interior edges 206, of which one is shown and the other three are obscured from view.

[0055] The two front and back folding faces 204 and the two side folding faces 205 form a negative space rectangular prism. However, the particular dimensions of the rapid folding jig 299 may vary based on, for example, the dimensions of the cutout 99 and the folded box 98 that is being used.

[0056] The front and back folding faces 204 extend vertically upwards from the rectangular base 207. As the front and back folding faces 204 extend vertically upwards, they meet with curved front and back folding ramps 200a and 200b, respectively. The curved front and back folding ramps 200a and 200b gradually curve outwardly away from the rectangular base 207 as they extend vertically upwards, until they terminate at respective edges 210a and 210b.

[0057] The two side folding faces 205 also extend vertically upwards from the rectangular base 207. As the two side folding faces 205 extend vertically upwards, they meet with curved side folding ramps 201a and 201b. The curved side folding ramps 201a and 201b gradually curve outwardly away from the rectangular base 207 as they extend vertically upwards, until they terminate at respective edges 212a and 212b.

[0058] Each of the side folding ramps 201a and 201b meets adjacent front and back folding ramps 200a and 200b at corners from which column-like extrusions 214a, 214b, 214c, and 214d emanate. The column-like extrusions 214a, 214b, 214c, and 214d each include a flap folding face 203a, 203b, 203c, and 203d that extends vertically upwards away from an adjoining front and back folding ramp 200a or 200b. As each flap folding face 203a, 203b, 203c, and 203d extend vertically upwards, the flap folding faces 203a, 203b, 203c, and 203d meet respective flap folding ramps 202a, 202b, 202c, and 202d. The flap folding ramps 202a, 202b, 202c, and 202d continue to extend vertically upwards, gradually curving away from the rectangular base 207.

[0059] In one exemplary usage of the rapid folding jig 299 to assemble a folded box 98 as shown in FIG. 2, the user aligns the cutout 99 vertically above the rapid folding jig 299 such that bottom panel 1 is roughly parallel to the rectangular base 207 and contained within the vertical footprint of the rectangular base 207. The user aligns the left front panel flap 9a over the folding ramp 202c, the right front panel flap 9b over the folding ramp 202d, the left back panel flap 10a over the folding ramp 202a, and the right back panel flap 10b over the folding ramp 202b. Next the user, either directly or using a machine, applies a force normal to the plane of cutout 99 (*e.g.*, normal to the bottom panel 1 and the rectangular base 207).

[0060] Upon application of the above-described normal force, several sequential actions lead to the partial folding of the cutout 99, though not necessarily in the order described. First, the flap folding ramps 202c and 202d fold left and right front panel flaps 9a and 9b, respectively, such that they are co-planar to flap folding faces 203c and 203d, respectively. Second, the flap folding ramps 202a and 202b fold left and right back panel flaps 10a and 10b, respectively, such that they are co-planar to flap folding faces 203a and 203b, respectively.

[0061] Third, front and back folding ramps 200a and 200b fold back panel 4 and front panel 3, respectively, such that they are co-planar with respective front and back folding faces 204. Fourth, side folding ramps 201a and 201b fold left and right side panels 2a and 2b, respectively, such that they are co-planar with the side folding faces 205.

[0062] The cutout 99 continues traveling in the direction of the applied force (*e.g.*, towards the rectangular base 207) until bottom panel 1 lies on and is co-planar with the rectangular base 207. In such a configuration, the front side crease 22a and front edge 330a of the left side panel 2a will be collinear with one of the interior edges 206, the front side crease 22b and the front edge 330b of the right side panel 2b will be collinear with another

interior edge 206, the left back side crease 29a and the back edge 328a of the left side panel 2a will be collinear with another interior edge 206, and the right back side crease 29b and the back edge 238b of the right side panel 2b will be collinear with another interior edge 206.

[0063] After the steps described above in connection with FIG. 3, the cutout 99 will take the form of the partially folded box 97 as shown in FIG. 5. FIG. 5 is an isometric view of a partially folded box in accordance with the present disclosure. In such a configuration, the user may insert goods to be shipped into the partially folded box 97.

[0064] The generally trapezoidal shapes of the back panel 4, the front panel 3, left back panel flap 10a, the right back panel flap 10b, the left front panel flap 9a, and the right front panel flap 9b are beneficial when using the cutout 99 with the rapid folding jig 299. It has been found that these generally trapezoidal shapes allow the cutout 99 to partially fold into the configuration shown in FIG. 5 with enhanced ease and reliability than if the generally trapezoidal shapes were not used.

[0065] Before continuing with the description of FIG. 5, an alternative implementation of a folding jig will be discussed in connection with FIG. 4. FIG. 4 shows an isometric view of an alternative square rapid folding jig 199 in accordance with the present disclosure. The square rapid folding jig 199 is an alternative to the rapid folding jig 299 discussed above in connection with FIG. 3. The square rapid folding jig 199 is generally similar to the rapid folding jig 299, but has additional symmetry. More particularly, the front and back folding faces 204 and the side folding faces 205 are similar to what was depicted in connection with FIG. 3, except that all have substantially similar dimensions in the embodiment of FIG. 4. The front and back folding ramps 200a and 200b and the side folding ramps 201a and 201b are similar to what was depicted in connection with FIG. 3, except in the embodiment of FIG. 4, they all have substantially similar dimensions.

[0066] In addition, the embodiment of FIG. 4 has additional flap folding faces which are similar to but disposed orthogonal to respective flap folding faces 203a, 203b, 203c, and 203d that were previously discussed in connection with FIG. 3. In FIG. 4, one such flap folding face 208b is shown, with other flap folding faces disposed orthogonal to flap folding faces 203a, 203c, and 203d being obstructed from view.

[0067] The embodiment of FIG. 4 also includes modified flap folding ramps 215a, 215b, 215c, 215d, 215e, 215f, 215g, and 215h. Thus, whereas the embodiment of FIG. 3 included a single flap folding ramp 202a, the embodiment of FIG. 4 now has two flap folding ramps 215c and 215d that are disposed orthogonal to one another and curve upwards as to meet at a

point. Similarly, the embodiment of FIG. 4 replaces the flap folding ramp 202b with the flap folding ramps 215a and 215b, replaces the flap folding ramp 202d with the flap folding ramps 215h and 215g, and replaces the flap folding ramp 202c with the flap folding ramps 215e and 215f.

[0068] The additional symmetry is beneficial at least in part because it allows one to place the cutout 99 over the square rapid folding jig 199 in the orientation that was described in connection with FIG. 3, above, as well as in an orientation 90 degrees clockwise from the orientation that was described in connection with FIG. 3, or in an orientation 90 degrees counterclockwise from the orientation that was described in connection with FIG. 3. In all such orientations, the square rapid folding jig 199 can still be used.

[0069] Returning to FIG. 5, as explained the cutout 99 is shown in the form of a partially folded box 97 after a user applied a force to the cutout 99 while using the rapid folding jig 299. Next the user may fold the left side panel flap 7a and the left side panel slot flap 8a such that they are orthogonal to the left side panel 2a and contained within the vertical footprint of bottom panel 1, and fold the right side panel flap 7b and the right side panel slot flap 8b such that they are orthogonal to the right side panel 2b and contained within the footprint of bottom panel 1. The user may then fold the front panel slot flap 11 such that the left front slot 14a aligns with the left side slot 13a, and such that the right front slot 14b aligns with the right side slot 13b. The user then folds the top panel 15 such that the left tooth-shaped protrusion 12a approaches the left front slot 14a and the right tooth-shaped protrusion 12b approaches the right front slot 14b. A depiction of the partially folded box 97 after having performed these additional steps will be shown in connection with FIG. 6.

[0070] FIG. 5 also shows an adhesive strip 60. In certain embodiments, adhesive strip 60 is a pressure sensitive adhesive with a wax-paper backing. Thus, the partially folded box 97 may have a protective strip in the form of a wax-paper backing (not shown) protecting the adhesive strip 60. In use, the user removes the wax-paper backing from the adhesive strip 60, thus exposing the adhesive strip 60 in preparation for sealing.

[0071] FIG. 6 is an isometric view of the partially folded box 97 in accordance with the present disclosure. After the above-described actions have been taken, the cutout 99 will appear as the partially folded box 97 in FIG. 6. The user may continue folding the top panel 15 such that the left tooth-shaped protrusion 12a approaches, extends through, and engages with the left front slot 14a and the left side slot 13a aligned below the left front slot 14a. Similarly, the user may continue folding the top panel 15 such that the right tooth-shaped

protrusion 12b approaches, extends through, and engages with the right front slot 14b and the right side slot 13b aligned below the right front slot 14b.

[0072] The depicted embodiment as described above includes two sets of slots — a left side set of slots including left front slot 14a and left side slot 13a, and a right side set of slots including right front slot 14b and right side slot 13b. Other embodiments may include only one or the other of these sets of slots, or may include still other sets of slots.

[0073] In the depicted embodiments, slots are disposed through both a side panel slot flap (e.g., left side slot 13a disposed in side panel slot flap 8a) and the front panel slot flap 11 (e.g., left front slot 14a). In other embodiments, slots are disposed only through one or the other of these flaps, rather than both.

[0074] The top panel 15 engages the adhesive strip 60, for example by the natural weight of the top panel 15 applying pressure on the adhesive strip 60 or by the application by a person or machine of force onto the top panel 15 such that the top panel 15 is co-planar with front panel slot flap 11.

[0075] After these actions are taken, the partially folded box 97 will take the form of the completely folded box 98 discussed earlier in connection with FIG. 2.

[0076] FIG. 7 is a plan view of a box in an open configuration after the box was opened by tearing a tear joint in accordance with the present disclosure. When the recipient is ready to open the container, the recipient may apply a force to the anterior top panel portion 6 such that the tear joint 27 is severed, decoupling top panel 15 into two portions: the posterior top panel portion 5 and anterior top panel portion 6. The recipient's fingers may penetrate the exterior of the folded box 98. However, the user's fingers may not be met by an impediment within the box (e.g., the product being shipped) if, for example, appropriate standards for packaging and padding of the shipped goods were followed.

[0077] The decoupling causes the box to fall back to a flat orientation exposing the shipped goods. In this example, the shipped goods are depicted as a trapezoidal prism 93. In certain usage scenarios, as depicted in FIG. 7, the anterior top panel portion 6 may remain engaged with the front panel slot flap 11 due to continued engagement of the left tooth-shaped protrusion 12a with the left front slot 14a, and of the right tooth-shaped protrusion 12b with the right front slot 14b.

[0078] That the box collapses into a flat orientation is useful to a user because the user can reach laterally towards the goods 93. With alternative, conventional paperboard containers, a user may open a top panel of the box, but the sides of the box would not

collapse. The user would then have to reach over the sides and into the box in order to reach desired goods, and then pull the desired goods vertically out of the box. This is laborious, time consuming, and can cause physical pain. In the embodiment depicted in FIG. 7, a user can reach laterally towards the goods 93 without being impeded by the top panel 15, the back panel 4, the front panel 3, the left side panel 2a, or the right side panel 2b.

[0079] The left back panel flap 10a, the right back panel flap 10b, the left front panel flap 9a, the right front panel flap 9b, the posterior top panel portion 5, the anterior top panel portion 6, and the front panel slot flap 11 may also lie substantially flat, but need not lie substantially flat, as a user will generally be able to view and reach the shipped goods 93 unimpeded even if these portions of the cutout 99 are raised rather than flat.

[0080] Once in a flat position as shown in FIG. 7, the box is reversible. Specifically, the cutout 99 as depicted in FIG. 7 can be flipped upside down. The front panel 3 can then be folded up about the front bottom crease 24, and the back panel can be folded up about the back bottom crease 25. In doing so, the user can fold left back panel flap 10a inwards about crease 29a, can fold right back panel flap 10b inwards about crease 29b, can fold right front panel flap 9a inwards about crease 22a, and can fold right back panel flap 9b inwards about crease 22b.

[0081] The left side panel panel 2a will now serve as the right side of a box, and can be folded up about the left bottom side crease 20a. The right side panel 2a will now serve as the left side of a box, and can be folded up about the right bottom side crease 20b. The left side panel flap 7a and the left side panel slot flap 8a can be folded over the crease 21a, and the right side panel flap 7b and the right side panel slot flap 8b can be folded over the crease 21b. The posterior top panel portion 5 can be folded over about the back top crease 26, and the front panel flap 11 (with the anterior top panel portion 6 still engaged thereto) can be folded over about the front top crease 23. The anterior top panel portion 6 will then join the posterior top panel portion 5, and the two can be adjoined together, e.g., by taping.

[0082] FIG. 8 is a plan view of a paperboard cutout 499 for an alternative embodiment for a box in accordance with the present disclosure. In this illustrative embodiment, cutout 499 is one continuous sheet of paperboard in flat form that is subdivided into several panels, flaps, and other features, as will be described in more detail below. However, the cutout 499 could, in alternative embodiments, be made from multiple sheets of paperboard that are affixed together through adhesives, staples, or other binding mechanisms that are known in the art. Moreover, the cutout 499 need not be fabricated from paperboard. The cutout 499

could be formed from any material suitable for box packaging, including composite materials. The materials forming the cutout 99 could be a variety of thicknesses, which may be determined by an application at hand — *e.g.*, larger boxes designed to carry heavier loads may require thicker paperboard materials.

[0083] The cutout 499 includes a bottom panel 401, a left side panel 402a, a right side panel 402b, a front panel 403, a back panel 404, a rear top flap 415, and a front top flap 417. The bottom panel 401 is adjacent to and in foldable relationship with the left side panel 402a, the right side panel 402b, the back panel 404, and the front panel 403. Moreover, the back panel 404 is adjacent to and in foldable relationship with the rear top flap 415, while the front panel 403 is adjacent to and in foldable relationship with front top flap 417. The bottom panel 401, the left side panel 402a, the right side panel 402b, the front panel 403, the back panel 404, the rear top flap 415, and the front top flap 417 may be folded using the foldable relationships among these panels and flaps to form the six faces of a constructed box. More particularly, when the cutout 499 is folded into a closed box form, the bottom panel 401 will serve as the bottom face of the box, the left side panel 402a will serve as the left face of the box, the right side panel 402b will serve as the right face of the box, the back panel 404 will serve as the back face of the box, and the rear top flap 415 and front top flap 417 will together serve as the top face of the box. It should be understood that the above-recited directions simply establish a convention for narrative reference. For example, a user could signify that the back panel 404 should serve as a front of a box (*e.g.*, through markings on the box) should the user so desire.

[0084] Also shown as part of the paperboard cutout 499 are a left back panel flap 410a, a right back panel flap 410b, a left front panel flap 409a, a right front panel flap 409b, a left side panel 407a, and a right side panel 407b.

[0085] Certain panels of the paperboard cutout 499 are similar to corresponding panels of the paperboard cutout 99 shown in FIG. 1, above. In particular, the bottom panel 401 may be similarly shaped and sized as the bottom panel 1 of the paperboard cutout 99; the back panel 404 may be similarly shaped and sized as the back panel 4 of the paperboard cutout 99; the front panel 403 may be similarly shaped and sized as the front panel 3 of the paperboard cutout 99; the left side panel 402a may be similarly shaped and sized as the left side panel 2a of the paperboard cutout 99; and the right side panel 402b may be similarly shaped and sized as the right side panel 2b of the paperboard cutout 99. FIG. 8 shows certain creases that establish foldable relationships among these panels, and these creases may be similar to

corresponding creases depicted and described in connection with FIG. 1. Particularly, FIG. 8 shows a back bottom crease 425 similar to the back bottom crease 25 of the paperboard cutout 99; a front bottom crease 424 similar to the front bottom crease 24 of the paperboard cutout 99; a left bottom side crease 420a similar to the left bottom side crease 20a of the paperboard cutout 99; and a right bottom side crease 420b similar to the right bottom side crease 20b of the paperboard cutout 99.

[0086] Accordingly, these aspects of the paperboard cutout 499 will not be repeated, as it should be understood that corresponding disclosure presented above in connection with the paperboard cutout 99 may apply to the paperboard cutout 499. For example, it should be understood that the back panel 404 may be generally trapezoidal, the front panel 403 may similarly be generally trapezoidal, and there may exist nubs 480a, 480b, 481a, and 481b each having a length approximately equal to a thickness of the paperboard material of which the cutout 499 is formed.

[0087] Likewise, certain flaps of the paperboard cutout 499 are similar to corresponding flaps of the paperboard cutout 99 shown in FIG. 1, above. In particular, the left back panel flap 410a may be similarly shaped and sized as the left back panel flap 10a of the paperboard cutout 99; the right back panel flap 410b may be similarly shaped and sized as the right back panel flap 10b of the paperboard cutout 99; the left front panel flap 409a may be similarly shaped and sized as the left front panel flap 9a of the paperboard cutout 99; and the right front panel flap 409b may be similarly shaped and sized as the right front panel flap 9b of the paperboard cutout 99. Thus, for example, it should be understood that the left back panel flap 410a, the right back panel flap 10b, the left front panel flap 9a, and the right front panel flap 9b may be generally trapezoidal in shape. The generally trapezoidal shapes of the back panel 404, the front panel 403, the left back panel flap 410a, the right back panel flap 410b, the left front panel flap 409a, and the right front panel flap 409b are beneficial when using the cutout 499 with the rapid folding jig 299, as will be explained below. It has been found that these generally trapezoidal shapes allow the cutout 499 to partially fold with enhanced ease and reliability than if the generally trapezoidal shapes were not used.

[0088] Creases associated with these flaps are also similar to corresponding creases of the paperboard cutout 99. Thus, the paperboard cutout 499 includes a left back side crease 429a similar to the left back side crease 29a of the paperboard cutout 99; a right back side crease 429b similar to the right back side crease 29b of the paperboard cutout 99; a left front side crease 422a similar to the left front side crease 22a of the paperboard cutout 99; and a right

front side crease 422b similar to the right front side crease 22b of the paperboard cutout 99. Accordingly, these aspects of the paperboard cutout 499 will not be repeated, as it should be understood that corresponding disclosure presented above in connection with the paperboard cutout 99 may apply to the paperboard cutout 499.

[0089] The paperboard cutout 499 differs in certain respects from the paperboard cutout 99. In particular, and as mentioned above, the paperboard cutout 499 includes a rear top flap 415 that is adjacent to and in foldable relationship with the back panel 404 about a crease 426. The rear top flap 415 is generally rectangular and may, in varying embodiments, take on varying aspect ratios depending on the dimensional requirements for a desired box.

[0090] As also mentioned above, the paperboard cutout 499 includes a front top flap 417 that is adjacent to and in foldable relationship with the front panel 403 about a crease 423. The front top flap 417 is generally rectangular and may, in varying embodiments, take on varying aspect ratios depending on the dimensional requirements for a desired box.

[0091] Finally, the paperboard cutout includes a left side panel flap 407a and a right side panel flap 407b. The left side panel flap 407a and the right side panel flap 407b may each be rectangular in shape and each may, in varying embodiments, take on varying aspect ratios depending on the dimensional requirements for a desired box. A left top side crease 421a establishes a foldable relationship between the left side panel flap 407a and the left side panel 402a, while a right top side crease 421b establishes a foldable relationship between the right side panel flap 407b and the right side panel 402b.

[0092] The paperboard cutout 499 can be formed into a folded box using the rapid folding jig 299 or the square rapid folding jig 199. The process is similar to that described above in connection with the paperboard cutout 99. In particular, in one exemplary usage, the user aligns the paperboard cutout 499 vertically above the rapid folding jig 299 such that the bottom panel 401 is roughly parallel to the rectangular base 207 and contained within the vertical footprint of the rectangular base 207. The user aligns the left front panel flap 409a over the folding ramp 202c, the right front panel flap 409b over the folding ramp 202d, the left back panel flap 410a over the folding ramp 202a, and the right back panel flap 410b over the folding ramp 202b. Next the user, either directly or using a machine, applies a force normal to the plane of cutout 499 (e.g., normal to the bottom panel 401 and the rectangular base 207).

[0093] Upon application of the above-described normal force, several sequential actions lead to the partial folding of the cutout 499, though not necessarily in the order described.

First, the flap folding ramps 202c and 202d fold left and right front panel flaps 409a and 409b, respectively, such that they are co-planar to flap folding faces 203c and 203d, respectively. Second, the flap folding ramps 202a and 202b fold left and right back panel flaps 410a and 410b, respectively, such that they are co-planar to flap folding faces 203a and 203b, respectively.

[0094] Third, front and back folding ramps 200a and 200b fold back panel 404 and front panel 403, respectively, such that they are co-planar with respective front and back folding faces 204. Fourth, side folding ramps 201a and 201b fold left and right side panels 402a and 402b, respectively, such that they are co-planar with the side folding faces 205.

[0095] The cutout 499 continues traveling in the direction of the applied force (e.g., towards the rectangular base 207) until bottom panel 401 lies on and is co-planar with the rectangular base 207. In such a configuration, the front side crease 422a will be collinear with one of the interior edges 206, the front side crease 422b will be collinear with another interior edge 206, the left back side crease 429a will be collinear with another interior edge 206, and the right back side crease 429b will be collinear with another interior edge 206.

[0096] After the above-described steps are complete, the paperboard cutout 499 will take on a partially folded configuration as shown in FIG. 9. A user may perform certain additional steps to complete closing the paperboard cutout 499 into a closed box. In particular, the user may fold down the left side panel 407a about the left top side crease 421a such that the left side panel 407a is orthogonal to the left side panel 402a. The user may also fold down the right side panel 407b about the right top side crease 421b such that the right side panel 407b is orthogonal to the right side panel 402b. Next, the user may fold over the rear top flap 415 about the crease 426 such that that rear top flap 415 is orthogonal to the back panel 404. Finally, the user may fold over the front top flap 417 about the crease 423 such that the front top flap 417 is orthogonal to the front panel 403.

[0097] The rear top flap 415 and the front top flap 417 each have respective inner edges 415a and 417a. Subsequent to the folding steps described above, the inner edge 415a of the rear top flap 415 and the inner edge 417a of the front top flap 417 may abut one another, overlap with one another, or reach close towards one another while leaving a narrow gap between one another, depending on the particular dimensions of the panels and flaps of the paperboard cutout 499. Regardless, the inner edge 415a of the rear top flap 415 and the inner edge 417a of the front top flap 417 can be taped together to affixedly close the box.

[0098] The box thus formed from the paperboard cutout 499 can then be opened, such as by cutting the tape that was used to affix the inner edge 415a of the rear top flap 415 with the inner edge 417a of the front top flap 417. Upon such opening, the paperboard cutout 499 opens by collapsing into a substantially flat sheet, making it easy for a user to view and retrieve products stored inside the paperboard cutout 499 without being impeded by panels or flaps of the paperboard container. In particular, the front panel 403, the back panel 404, the left side panel 402a, and the right side panel 402b may fall to a flat orientation, exposing and making accessible the shipped goods. In this respect, the paperboard cutout 499 is similar to the paperboard cutout 99 described above.

[0099] It should be noted that the left back panel flap 410a, the right back panel flap 410b, the left front panel flap 409a, the right front panel flap 409b, the rear top flap 415, and the front top flap 417 may also lie substantially flat, but need not lie substantially flat, as a user will generally be able to view and reach the shipped goods unimpeded even if these portions of the cutout 499 are raised rather than flat.

[00100] As with the paperboard cutout 99, the paperboard cutout 499 may be reversible. Thus, after being opened, the paperboard cutout 499 can be flipped upside down and re-folded for subsequent use.

[00101] FIGS. 10A-10B show two respective orientations for cardboard corrugation based on two respective methodologies for cutting a paperboard cutout from a paperboard sheet. As is known in the art, paperboard cutouts are often formed as cutouts from paperboard sheets, where the paperboard sheets include a corrugated layer sandwiched between an upper surface and a lower surface. FIG. 10A shows one such configuration. Specifically, FIG. 10A shows a panel 900 formed from a paperboard material having an upper surface 903 and a lower surface 901. Between the upper surface 903 and the lower surface 901 is a corrugated surface consisting of a repeated sequence of fluted folds 902. Each of the fluted folds 902 forms respective peaks having profiles 904 that run a longitudinal length of the panel 900. The peak profiles 904 form a right angle 906 with a front edge 907 of the panel 900.

[00102] FIG. 10B shows an alternative orientation for corrugation. In particular, FIG. 10B shows a panel 950 formed from a paperboard material having an upper surface 953 and a lower surface 951. Between the upper surface 903 and the lower surface 901 is a corrugated surface consisting of a repeated sequence of fluted folds 902. Each of the fluted folds 902 forms respective peaks having profiles 904. In the embodiment of FIG. 10B, however, the peak profiles 904 are oriented at an angle 956 with respect to a front edge 957 of the panel

900. In certain exemplary implementations, the angle 956 is forty-five degrees. It has been found that angling the profile peaks 904, such as at the forty-five degree angle 956 depicted in FIG. 10B, provides additional mechanical strength for boxes formed from, e.g., the paperboard cutout 99 and/or the paperboard cutout 499 described above. Thus, the corrugation configuration shown in either FIG. 10A or FIG. 10B can be used for any of the cutouts, panels, and/or flaps described above.

[00103] Thus, as explained, the present disclosure describes configurations, systems, and methods that address technical problems associated with making and using paperboard containers. It will be appreciated that still further embodiments of the present invention will be apparent to those skilled in the art in view of the present disclosure. It is to be understood that the present invention is by no means limited to the particular constructions herein disclosed and/or shown in the drawings, but also comprises any modifications or equivalents within the scope of the invention. Examples in particular include but are not limited to, changing the final aspect ratio of the folded box, utilizing different grades of paperboard, flute size, or otherwise different foldable materials. Furthermore it shall be appreciated that different types or classes of adhesives could be used; pressure sensitive adhesive, hot-melt, or any other type of glue/adhesive would suffice. Even a strip of tape could be used to join the surfaces appropriately.

[00104] While the present disclosure describes various exemplary embodiments, the disclosure is not so limited. To the contrary, the disclosure is intended to cover various modifications, uses, adaptations, and equivalent arrangements based on the principles disclosed. Further, this application is intended to cover such departures from the present disclosure as come within at least the known or customary practice within the art to which it pertains. It is envisioned that those skilled in the art may devise various modifications and equivalent structures and functions without departing from the spirit and scope of the disclosure as recited in the following claims. The scope of the following claims is to be accorded the broadest interpretation so as to encompass all such modifications and equivalent structures and functions.

CLAIMS:

1. A paperboard container, comprising:
 - a bottom panel;
 - a left side panel adjacent to and in foldable relationship with a left edge of the bottom panel;
 - a left side flap adjacent to and in foldable relationship with a top edge of the left side panel;
 - a right side panel adjacent to and in foldable relationship with a right edge of the bottom panel;
 - a right side flap adjacent to and in foldable relationship with a top edge of the right side panel;
 - a back panel adjacent to and in foldable relationship with a back edge of the bottom panel;
 - a top panel adjacent to and in foldable relationship with a top edge of the back panel;
 - a front panel adjacent to and in foldable relationship with a front edge of the bottom panel; and
 - a front flap adjacent to and in foldable relationship with a top edge of the front panel;wherein
 - the front flap includes at least one front slot;
 - at least one of the left side panel and the right side panel includes at least one side slot alignable with the front slot; and
 - the top panel includes at least one protrusion shaped and sized to extend through both the at least one front slot and the at least one side slot in order to facilitate securance of the paperboard container in a closed position.

2. The paperboard container of claim 1, wherein
 - the front panel flap includes a left front slot and a right front slot;
 - the left side panel includes a left side slot alignable with the left front slot;
 - the right side panel includes a right side slot alignable with the right front slot;
 - the top panel includes a left protrusion shaped and sized to extend through both the left front slot and the left side slot; and
 - the top panel includes a right protrusion shaped and sized to extend through both the right front slot and the right side slot.

3. The paperboard container of claim 1, wherein the paperboard container is in the form of an open and unfolded cutout.
4. The paperboard container of claim 1, wherein the paperboard container is in the form of a closed box.
5. The paperboard container of claim 4, further comprising
 - a tear joint spanning between a left edge and a right edge of the top panel, wherein
 - the tear joint is configured to tear upon application of a normal force to the top panel such that an anterior portion of the top panel decouples from a posterior portion of the top panel and, upon the decoupling, the paperboard container collapses from the closed box form to a substantially flat and open form.
6. The paperboard container of claim 1, wherein the front panel and the back panel are trapezoidal in shape.
7. The paperboard container of claim 1, wherein an adhesive strip is disposed on the front flap.
8. The paperboard container of claim 1, wherein the bottom panel, the left side panel, the right side panel, the back panel, the top panel, and the front panel each have respective interior-facing surfaces and respective exterior-facing surfaces when the paperboard container assumes a first closed configuration, and
 - the paperboard container can assume a second, reversed closed configuration in which the interior-facing surfaces of the first closed configuration become exterior-facing surfaces when the paperboard container assumes the second, reversed closed configuration.
9. A paperboard container, comprising:
 - a bottom panel;
 - a left side panel adjacent to and in foldable relationship with a left edge of the bottom panel;

a right side panel adjacent to and in foldable relationship with a right edge of the bottom panel;

a back panel adjacent to and in foldable relationship with a back edge of the bottom panel; and

a top panel adjacent to and in foldable relationship with a top edge of the back panel having a tear joint spanning between a left edge and a right edge of the top panel; wherein

the tear joint is configured to tear upon application of a normal force to the top panel such that an anterior portion of the top panel decouples from a posterior portion of the top panel and, upon the decoupling, the paperboard container collapses from the closed box form to a substantially flat and open form.

10. The paperboard container of claim 9, wherein in the substantially flat and open form the bottom panel, the left side panel, the right side panel, the front panel, and the back panel do not obstruct an opener of the paperboard container from laterally retrieving contents stored in the paperboard container.

11. A paperboard container, comprising:

a bottom panel;

a left side panel adjacent to and in foldable relationship with a left edge of the bottom panel;

a left side flap adjacent to and in foldable relationship with a top edge of the left side panel;

a right side panel adjacent to and in foldable relationship with a right edge of the bottom panel;

a right side flap adjacent to and in foldable relationship with a top edge of the right side panel;

a back panel adjacent to and in foldable relationship with a back edge of the bottom panel;

a rear top flap adjacent to and in foldable relationship with a top edge of the back panel;

a front panel adjacent to and in foldable relationship with a front edge of the bottom panel; and

a front top flap adjacent to and in foldable relationship with a top edge of the front panel; wherein

the front panel and the back panel are trapezoidal in shape.

12. The paperboard container of claim 11, wherein
the front panel has a top edge and a bottom edge, and
the top edge has a length shorter than a length of the bottom edge by an amount approximately equal to twice the thickness of a paperboard material of which the paperboard container is constructed.

13. The paperboard container of claim 11, further comprising
back side flaps adjacent to and in foldable relationship with respective edges of the back panel; and
front side flaps adjacent to and in foldable relationship with respective edges of the front panel; wherein
the back side flaps and the front side flaps are trapezoidal.

14. The paperboard container of claim 11, further comprising corrugation oriented at about a forty-five degree angle with respect to an edge at which a paperboard material was cut to form the paperboard container.

15. A method for folding a continuous sheet of paperboard into a paperboard container, comprising:

folding a left side panel in a perpendicular orientation with respect to a bottom panel;

folding a right side panel in a perpendicular orientation with respect to the bottom panel;

folding a front panel in a perpendicular orientation with respect to the bottom panel;

folding a back panel in a perpendicular orientation with respect to the bottom panel;

folding a top panel in a perpendicular orientation with respect to the back panel;

folding a front flap in a perpendicular orientation with respect to the front panel;

folding a left side flap in perpendicular orientation with respect to the left side panel;

folding a right side flap in perpendicular orientation with respect to the right side panel; and

inserting a protrusion extending from the top panel sequentially through a slot disposed in the front flap and through a slot disposed in either the left side flap or the right side flap.

16. The method of claim 15, comprising folding the continuous sheet of paperboard into a paperboard container by using a jig.

17. The method of claim 15, wherein folding a left side panel, folding a right side panel, folding a front panel, and folding a back panel are accomplished by aligning the bottom panel over and within a vertical footprint defined by a base of the jig and applying a normal force to the bottom panel.

18. The method of claim 17, comprising aligning first and second folding ramps of the jig with first and second flaps extending from and in foldable relationship with the front panel; and

aligning third and fourth folding ramps of the jig with first and second flaps extending from and in foldable relationship with the back panel.

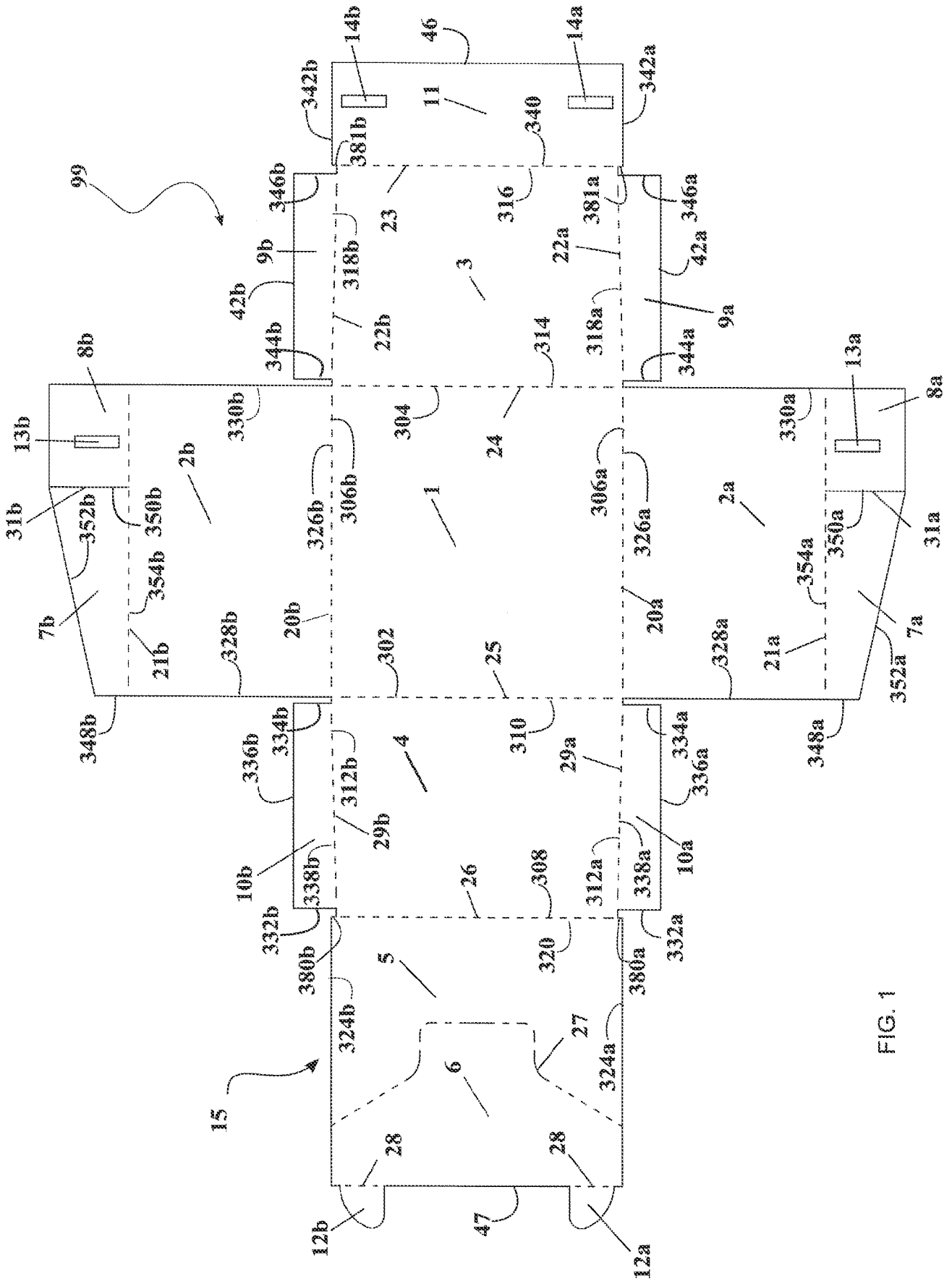


FIG. 1

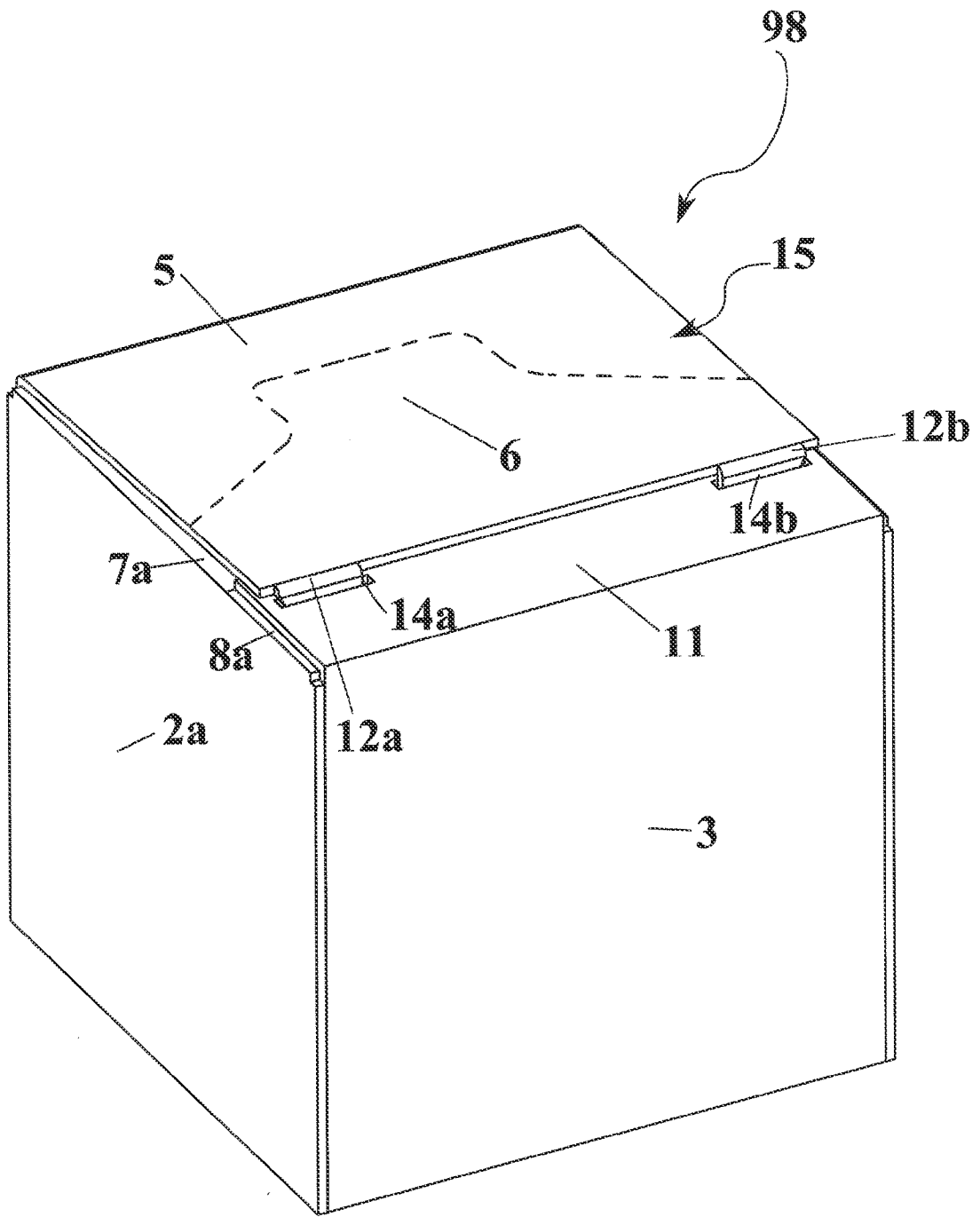


FIG. 2

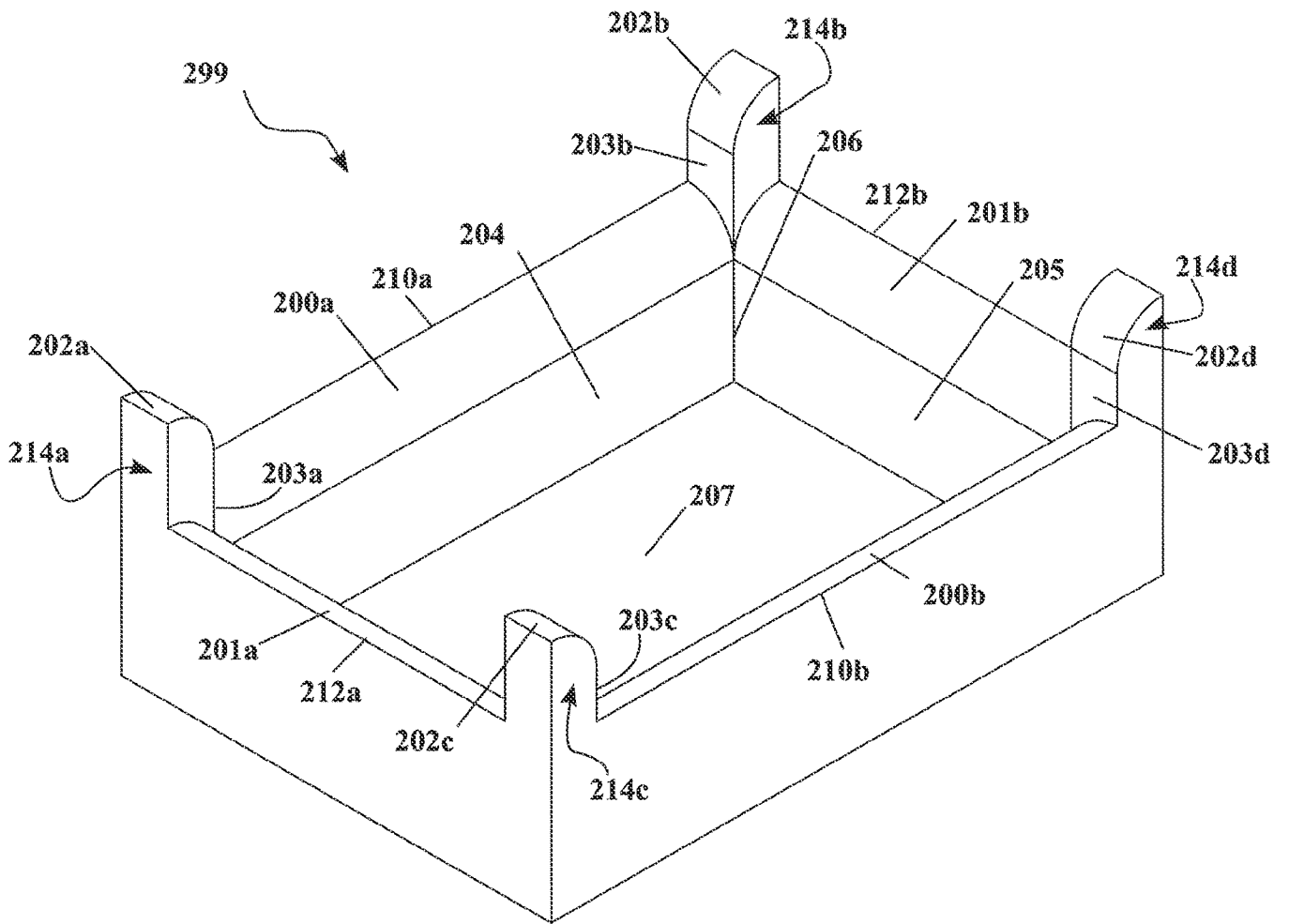


FIG. 3

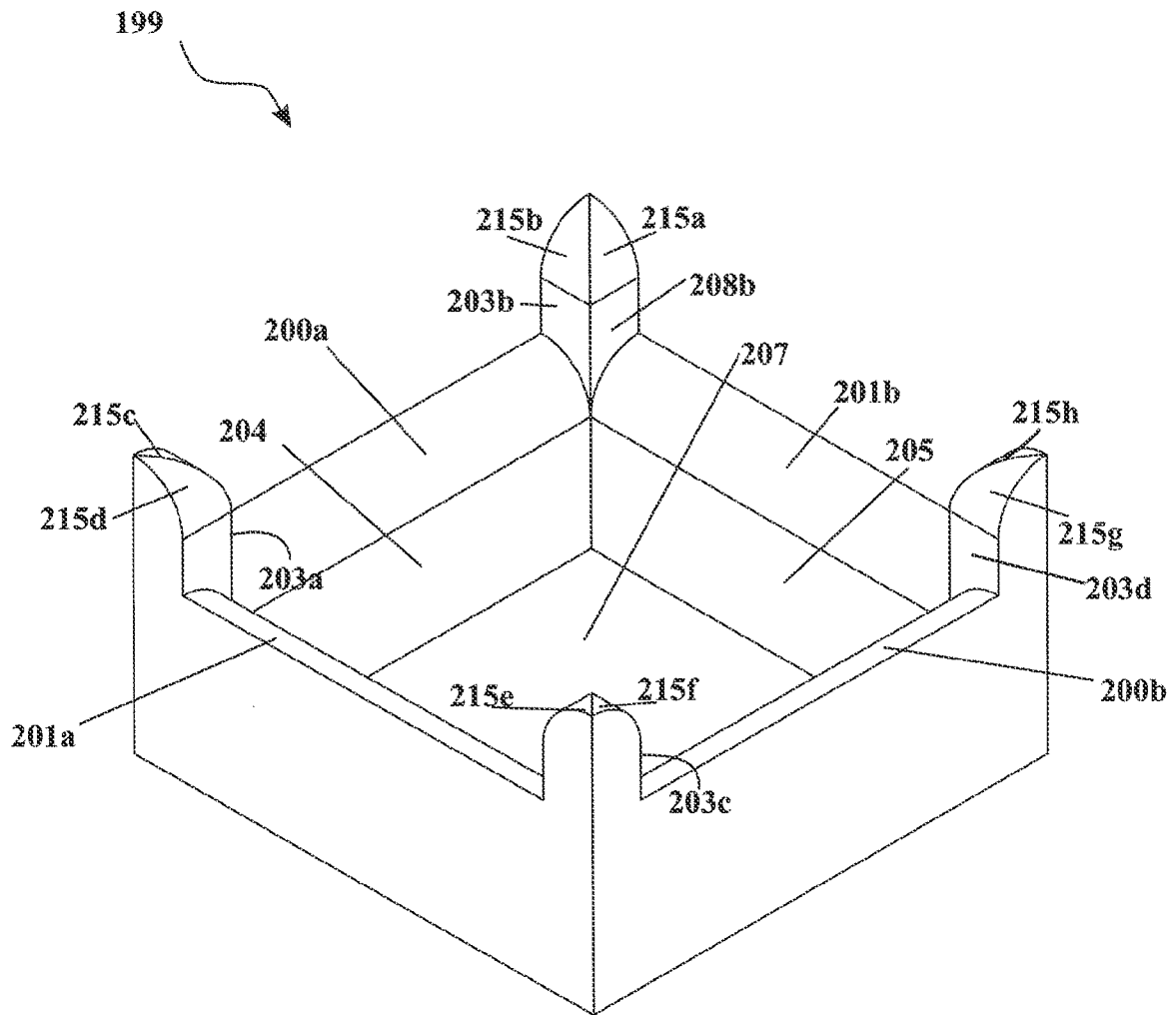


FIG. 4

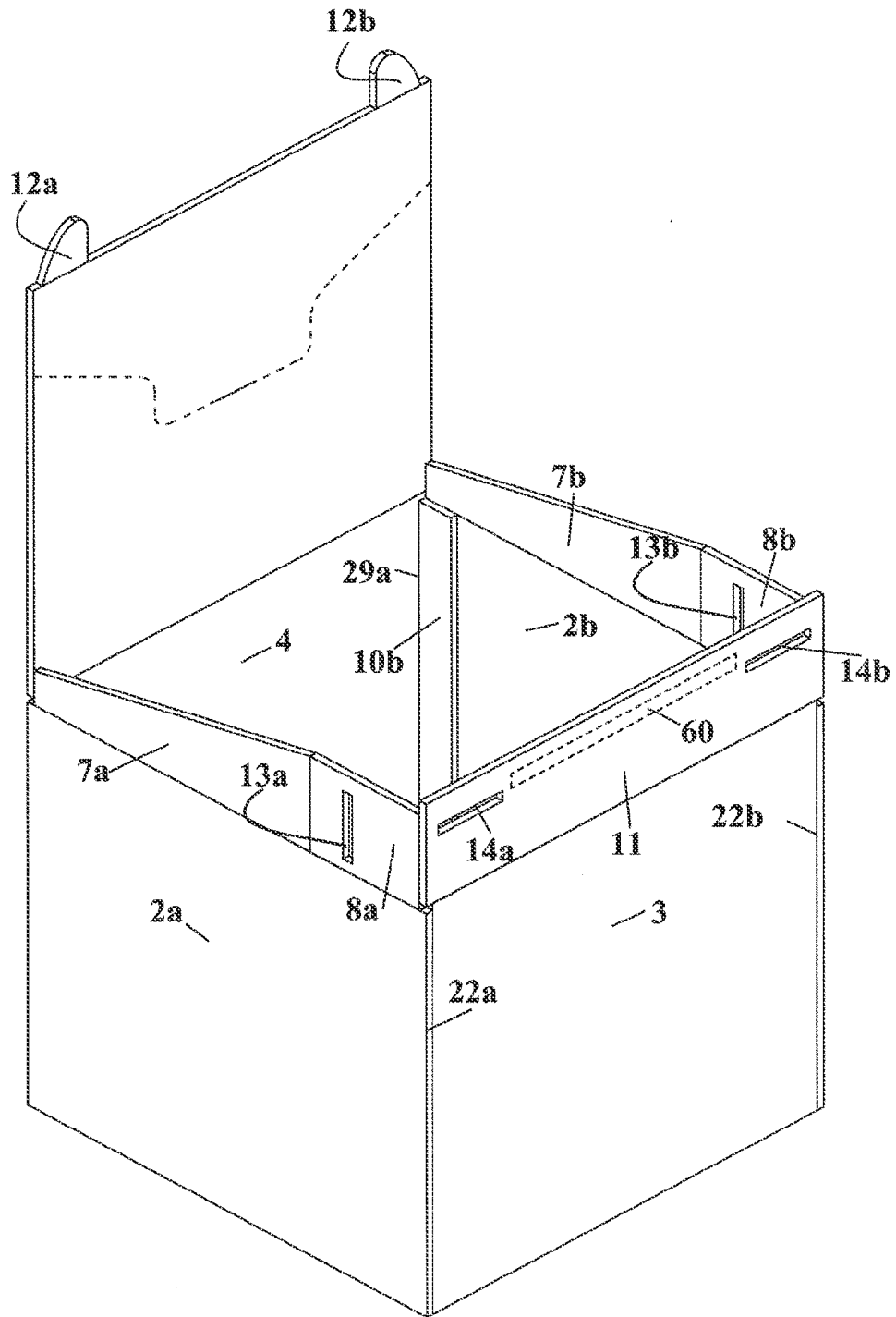


FIG. 5

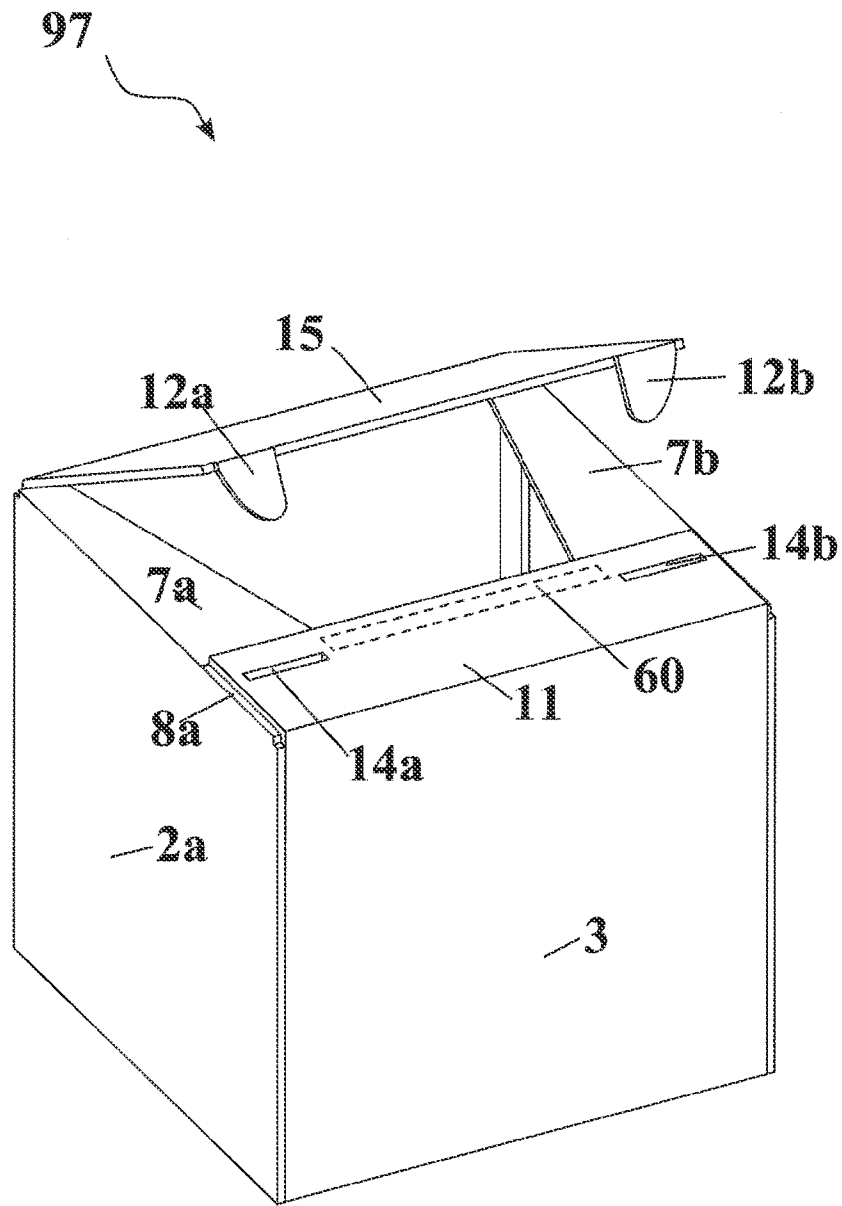


FIG. 6

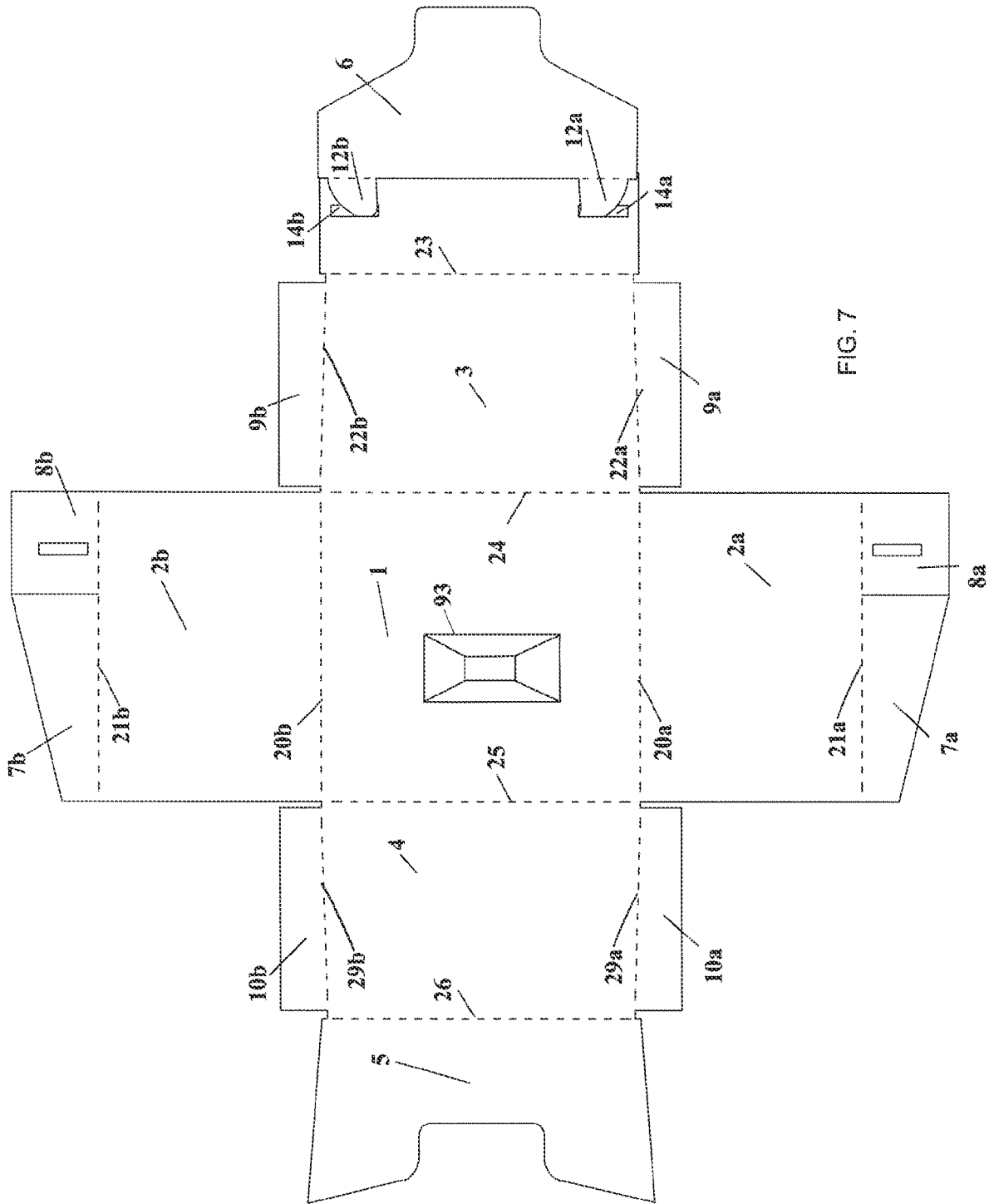


FIG. 7

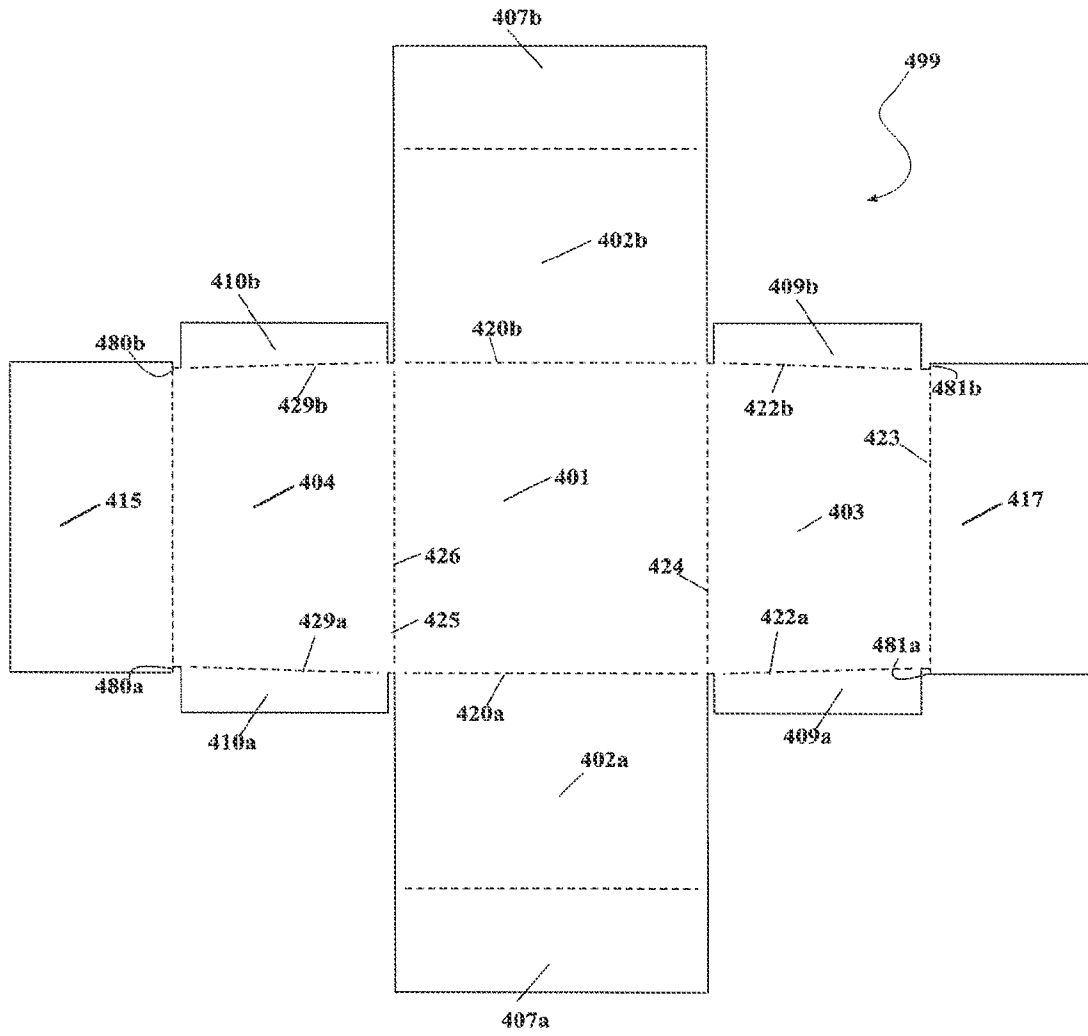


FIG. 8

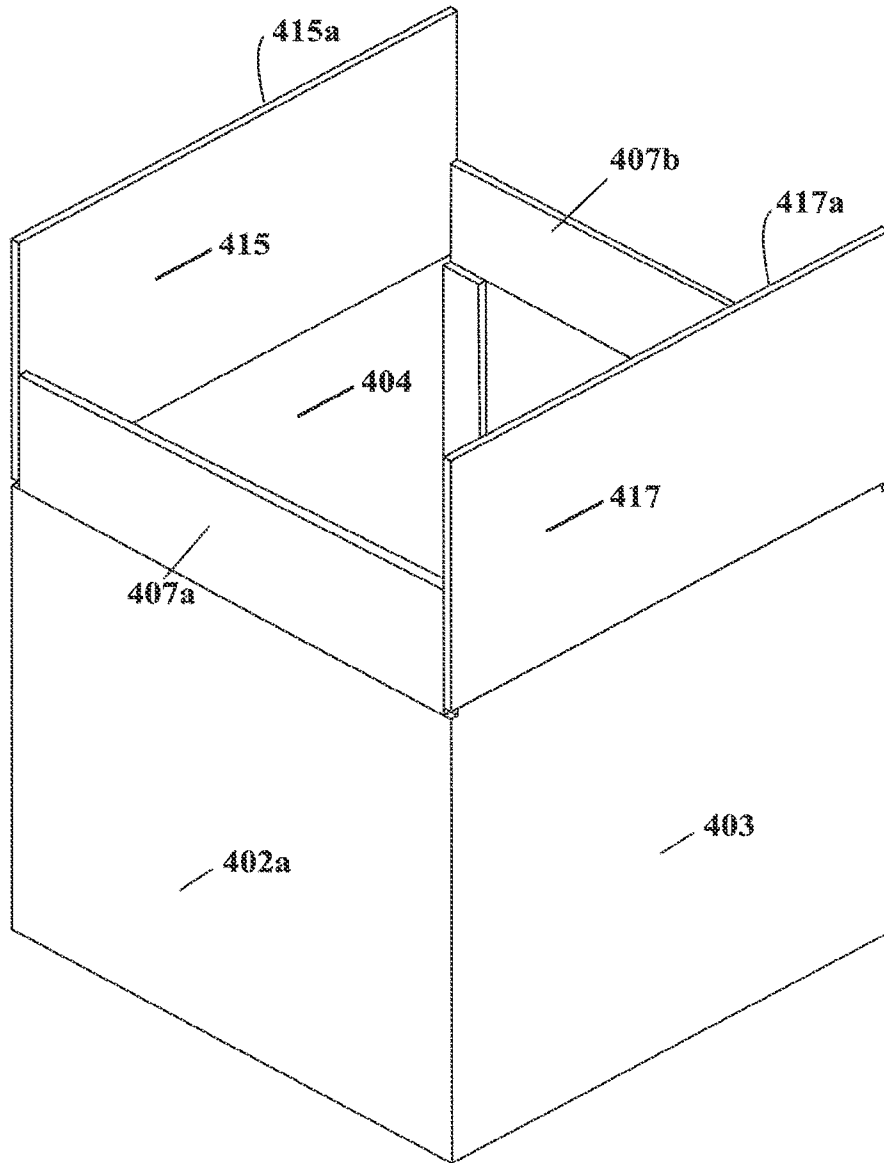


FIG. 9

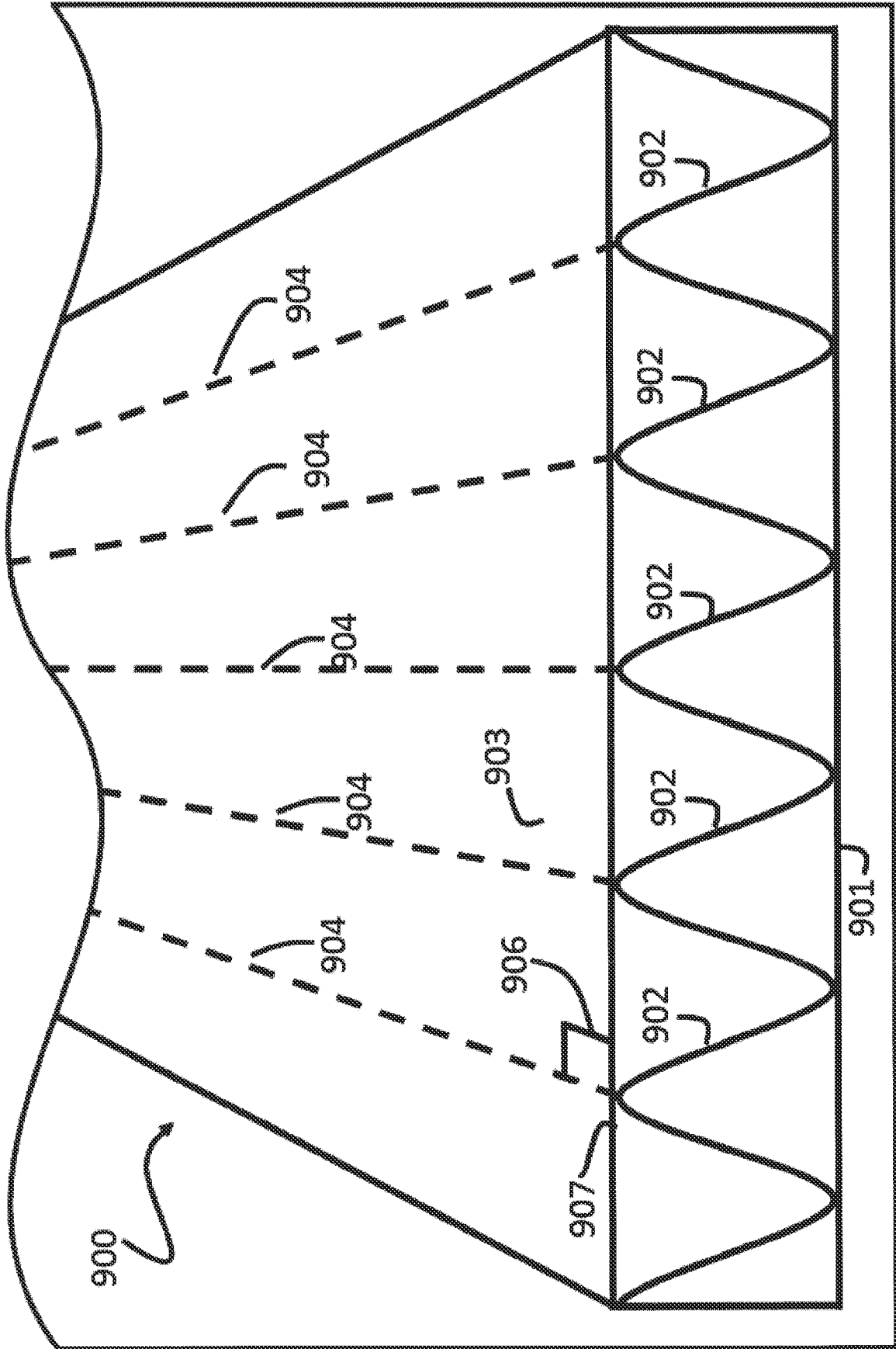


FIG. 10A

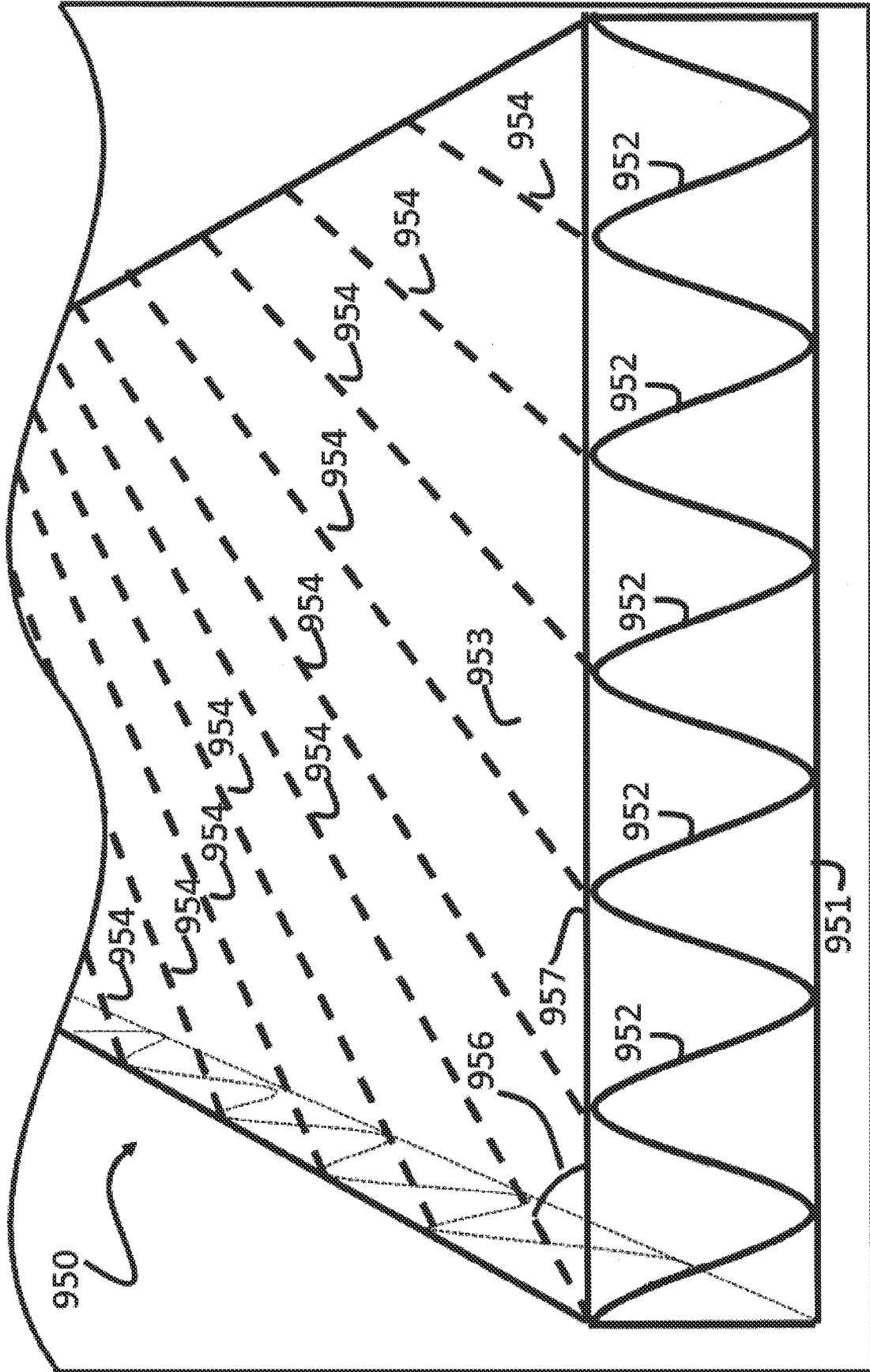


FIG. 10B

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2014/050782

<p>A. CLASSIFICATION OF SUBJECT MATTER IPC(8) - B65D 5/66 (2014.01) CPC - B65D 5/6658 (2014.10) According to International Patent Classification (IPC) or to both national classification and IPC</p>																							
<p>B. FIELDS SEARCHED</p> <p>Minimum documentation searched (classification system followed by classification symbols) IPC(8) - B32B 3/10; B65D 5/00,5/02,5/10,5/20,5/24,5/30,5/54,5/64,5/66 (2014.01) CPC - B65D 5/065,5/241,5/247,5/4266,5/548,5/6658,5/6664 (2014.10)</p> <p>Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched USPC - 229/125.28,125.31,147,149,150,151,154,155,157,186,208,223; 428/43,136 (keyword delimited)</p> <p>Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) PatBase, Thomson Innovation Derwent, Orbit, Engineering Village, Google Scholar Search terms used: container, carton, box, boxes, paper, card, corrugat, craftpaper, tongue, slot, overlap, reinforce, interlock, tear, collapse, trapezoid, nonparallel, front, back, jig</p>																							
<p>C. DOCUMENTS CONSIDERED TO BE RELEVANT</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>Y</td> <td>DE 8,529,244 U1 (CAMMAROTO) 19 December 1985 (19.12.1985) see machine translation</td> <td>1-17</td> </tr> <tr> <td>Y</td> <td>EP 1 348 633 B1 (NOULET et al) 27 March 2003 (27.03.2003) see machine translation</td> <td>1-8, 15-17</td> </tr> <tr> <td>Y</td> <td>EP 0 997 380 A1 (LEGOFF) 03 May 2000 (03.05.2000) see machine translation</td> <td>5, 7, 9, 10</td> </tr> <tr> <td>Y</td> <td>CN 201176319 Y (HUI et al) 07 January 2009 (07.01.2009) see machine translation</td> <td>6, 11-14</td> </tr> <tr> <td>Y</td> <td>US 6,948,616 B2 (GILLANI) 27 September 2005 (27.09.2005) entire document</td> <td>8</td> </tr> <tr> <td>Y</td> <td>US 5,033,668 A (COHEN et al) 23 July 1991 (23.07.1991) entire document</td> <td>16, 17</td> </tr> </tbody> </table>			Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	Y	DE 8,529,244 U1 (CAMMAROTO) 19 December 1985 (19.12.1985) see machine translation	1-17	Y	EP 1 348 633 B1 (NOULET et al) 27 March 2003 (27.03.2003) see machine translation	1-8, 15-17	Y	EP 0 997 380 A1 (LEGOFF) 03 May 2000 (03.05.2000) see machine translation	5, 7, 9, 10	Y	CN 201176319 Y (HUI et al) 07 January 2009 (07.01.2009) see machine translation	6, 11-14	Y	US 6,948,616 B2 (GILLANI) 27 September 2005 (27.09.2005) entire document	8	Y	US 5,033,668 A (COHEN et al) 23 July 1991 (23.07.1991) entire document	16, 17
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<p><input type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/></p>																							
<p>* Special categories of cited documents:</p> <table style="width:100%;"> <tr> <td style="width:50%;"> <p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width:50%;"> <p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p> </td> </tr> </table>			<p>“A” document defining the general state of the art which is not considered to be of particular relevance</p> <p>“E” earlier application or patent but published on or after the international filing date</p> <p>“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>“O” document referring to an oral disclosure, use, exhibition or other means</p> <p>“P” document published prior to the international filing date but later than the priority date claimed</p>	<p>“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>“&” document member of the same patent family</p>																			
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<p>Date of the actual completion of the international search</p> <p>03 November 2014</p>		<p>Date of mailing of the international search report</p> <p align="center">18 DEC 2014</p>																					
<p>Name and mailing address of the ISA/US</p> <p>Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201</p>		<p>Authorized officer:</p> <p align="center">Blaine R. Copenheaver</p> <p>PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774</p>																					