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(71) Applicant: **Wilkie East Corporation**
Oakville ON L6J 6K6 (CA)

(72) Inventor: **Cameron, Hugh T.**
Oakville L6J 6K6 (CA)

(74) Representative: **Hartig, Michael**
Forrester & Boehmert
Pettenkoferstraße 20-22
80336 München (DE)

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(54) **Box with removable top**

(57) A box blank comprises serially attached top, bottom, first side, and second side panels, each having two side edges, with a side flap attached to each side edge. A first tear line extends across the top panel and side flaps attached thereto. A second tear line extends across the top or first side panel, and side flaps attached thereto. The panels and flaps are foldable to form a box with bottom formed from the bottom panel, top formed from the top panel, first side formed from the first side panel, second side formed from the second side panel, third and fourth sides formed from the side flaps. The side flaps are sized so that the third and fourth sides are partially open. The tear lines are positioned so that a top portion of the box is removable by separating it along the tear lines.

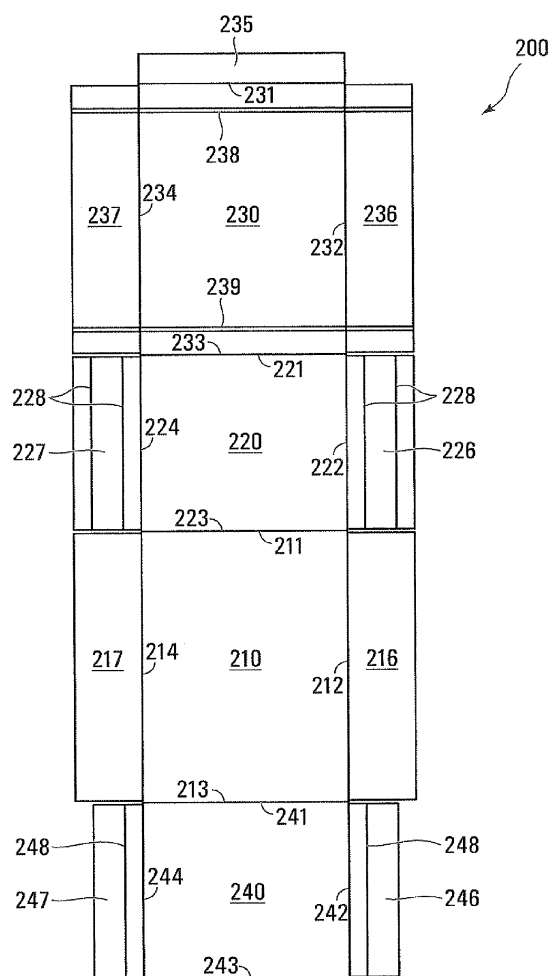


FIG. 2A

Description

FIELD OF THE INVENTION

[0001] The present invention relates to boxes and blanks for boxes.

BACKGROUND OF THE INVENTION

[0002] Many goods and products are shipped and stored in shipping containers, such as cardboard or paperboard boxes. In many cases, such as in a retail store, it is desirable to store or display certain goods and products on shelves so that the goods and products are conveniently visible and accessible by a user. Thus, some shipping containers have been designed to be convertible from a shipping configuration to a display configuration. For example, US 7,451,878 to Rochefort et al., issued November 18, 2008, discloses shipping containers that are convertible to display containers. A container disclosed in US 7,451,878 is formed of an outer wrap portion and an internal divider/structural support portion. Openings are provided in the face panel of the container. Zipper pull tabs are also provided in the side face panels so that the face panel and the top half of the outer wrap portion may be removed to convert the container into a dispensing container or a tray. The blank for forming the outer wrap portion has an irregular shape, with a width varying substantially along its length. Another shipping/display container is disclosed in US 5,657,872 to Leftwich et al., issued August 19, 1997. The disclosed container has a tray portion and a cover portion. The front side panel of the tray portion has a severable portion, which may be removed to allow products be extracted from the resulting opening. US 6,168,027 to Esser, issued January 2, 2001, discloses a shipping/display box having a tear-out segment spaced from all eight corners of the box. The tear-out segment can be removed at a store for display.

[0003] However, improvements to existing shipping/display containers are desirable.

SUMMARY OF THE INVENTION

[0004] In accordance with an aspect of the present invention, there is provided a box blank that comprises a top panel, a bottom panel, a first side panel, and a second side panel. The panels are serially attached to one another and each of the panels has two side edges. A side flap is attached to each side edge of each panel. A first tear line extends across the top panel and side flaps attached to the top panel. A second tear line extends across the top or first side panel and across side flaps attached to the top or first side panel. The panels and flaps are foldable to form a box that comprises a bottom formed from the bottom panel, a top formed from the top panel, a first side formed from the first side panel, a second side formed from the second side panel, third and fourth sides

each formed from side flaps each extending from one of the panels. The side flaps are sized so that the third and fourth sides of the box are partially open. The first and second tear lines are positioned so that the top and the first, third and fourth sides of the box are each at least partially removable by separating them along the first and second tear lines. The first and second tear lines may be substantially parallel. Two of the panels may be end panels each having an end edge. The blank may further comprise an end flap attached to the end edge of at least one of the end panels, where the end flap may be foldable along the end edge. An end flap may be attached to each end panel. The first tear line may be substantially perpendicular to the side edges of the top panel and may be positioned so that a portion of the first tear line is adjacent a terminal edge of the side flaps attached to the second side panel in the box. A fold line may be provided between each pair of the panels and flaps that are attached to each other. The first and second tear lines may be substantially parallel to a fold line between the top panel and a side panel adjacent to the top panel. A fold line may be provided on each one of the side flaps attached to one of the side panels, such that the side flap is foldable along the fold line on the side flap to form a reinforced edge in the box. Two fold lines may be provided on each side flap, such that each side flap is foldable to form a triangular prism shaped reinforced edge in the box. At least one of the first and second tear lines may be substantially straight. The blank may comprise a material selected from cardboard, paper, and plastic. At least one of the first and second tear lines may be provided by a line of perforation or a tear strip. The blank may have a substantially rectangular shape.

[0005] In another aspect of the present invention, there is provided a box. The box comprises a bottom; a top; first and second sides opposite one another; third and fourth sides opposite one another, each being partially open and comprising a top flap and a bottom flap separated from the top flap, the top flap attached to the top of the box; a first tear line extending across the top and the top flaps; and a second tear line extending across the top and the top flaps, or extending across one of the first and second sides. The first and second tear lines are positioned so that the top, the one of the first and second sides, and the top flaps are each at least partially removable by separating them along the first and second tear lines. The first and second tear lines may be substantially parallel. The first and second tear lines may be substantially parallel to an edge between the top and one of the first and second sides. At least one edge between two adjacent sides may be reinforced. The reinforced edge may comprise a folded flap. A folded flap may be folded along one fold line to form a double-layered support. A folded flap may be folded along two parallel fold lines to form a substantially triangular prism support. At least one of the first and second tear lines may be provided by a line of perforation. At least one of the first and second tear lines may be provided by a tear strip.

[0006] In accordance with a further aspect of the present invention, there is provided a display box, which comprises a box described in the preceding paragraph, where the top, one of the first and second sides, and the top flaps have each been at least partially removed along the first and second tear lines.

[0007] Other aspects and features of the present invention will become apparent to those of ordinary skill in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] In the figures, which illustrate, by way of example only, embodiments of the present invention,

[0009] **FIG. 1A** is a plan view of a blank for a box, exemplary of an embodiment of the present invention;

[0010] **FIGS. 1B, 1C, 1D, 1E, and 1F** are perspective views of the blank of **FIG. 1**, at different stages of being folded into a box, exemplary of an embodiment of the present invention;

[0011] **FIG. 1G** is a perspective view of a display box formed from the box of **FIG. 1F** by removing a portion thereof, exemplary of an embodiment of the present invention;

[0012] **FIG. 2A** is a plan view of another blank for a box, exemplary of an embodiment of the present invention;

[0013] **FIGS. 2B, 2C, 2D, and 2E** are perspective views of the blank of **FIG. 2A**, being folded into a box, exemplary of an embodiment of the present invention;

[0014] **FIG. 2F** is a perspective view of a display box formed from the box of **FIG. 2E** by removing a portion thereof;

[0015] **FIG. 3A** is a plan view of a further blank for a box, exemplary of an embodiment of the present invention;

[0016] **FIGS. 3B, 3C, 3D and 3E** are perspective views of the blank of **FIG. 3A**, being folded into a box, exemplary of an embodiment of the present invention;

[0017] **FIG. 3F** is a perspective view of a display box formed from the box of **FIG. 3E** by removing a portion thereof;

[0018] **FIG. 4A** is a plan view of another blank for a box, exemplary of an embodiment of the present invention;

[0019] **FIGS. 4B, 4C, 4D, and 4E** are perspective views of the blank of **FIG. 4A**, being folded into a box, exemplary of an embodiment of the present invention;

[0020] **FIG. 4F** is a perspective view of a display box formed from the box of **FIG. 4E** by removing a portion thereof;

[0021] **FIGS. 4G, 4H, and 4I** are perspective views of the blank of **FIG. 4A**, being folded differently as shown in **FIG. 4C**;

[0022] **FIG. 5A** is a plan view of another blank for a box, exemplary of an embodiment of the present inven-

tion;

[0023] **FIGS. 5B, 5C and 5D** are perspective views of the blank of **FIG. 5A**, being folded into a box, exemplary of an embodiment of the present invention; and

[0024] **FIG. 5E** is a perspective of a display box formed from the box of **FIG. 5D** by removing a portion thereof.

DETAILED DESCRIPTION

[0025] **FIG. 1A** depicts a box blank **100**, exemplary of an embodiment of the present invention.

[0026] Blank **100** includes serially attached bottom panel **110**, back side panel **120**, top panel **130**, and front side panel **140**.

[0027] Bottom panel **110** has end edge **111**, side edge **112**, end edge **113** and side edge **114**. An end flap **115** is attached to end edge **111**. A fold line is provided at the joint of bottom panel **110** and end flap **115** along end edge **111**. A side flap **116** is attached to bottom panel **110** along side edge **112**, and a side flap **117** is attached to bottom panel **110** along side edge **114**.

[0028] Side panel **120** has end edge **121**, side edge **122**, end edge **123** and side edge **124**. A side flap **126** is attached to side panel **120** along side edge **122**, and a side flap **127** is attached to side panel **120** along side edge **124**.

[0029] Bottom panel **110** and side panel **120** are attached to each other along end edges **113** and **121**.

[0030] Top panel **130** has end edge **131**, side edge **132**, end edge **133** and side edge **134**. A side flap **136** is attached to top panel **130** along side edge **132**, and a side flap **137** is attached to top panel **130** along side edge **134**. A tear line is provided by way of a tear strip **138** across top panel **130** and side flaps **136** and **137**. As depicted, tear strip **138** may be substantially parallel to end edges **131** and **133**, and substantially perpendicular to side edges **132** and **134**. Tear strip **138** may be located in proximity to end edge **131** so that a portion **139** of top panel **130** is between end edge **131** and tear strip **138**, as depicted. However, the distance between end edge **131** and tear strip **138** may vary in different embodiments.

[0031] Side panel **120** and top panel **130** are attached to each other along end edges **123** and **131**.

[0032] Side panel **140** has end edge **141**, side edge **142**, end edge **143** and side edge **144**. An end flap **145** is attached to end edge **143**. A side flap **146** is attached to side panel **140** along side edge **142**, and a side flap **147** is attached to side panel **140** along side edge **144**. A tear line is provided by way of a tear strip **148** across side panel **140** and, optionally, across side flaps **146** and **147**. As depicted, tear strip **148** may be substantially parallel to end edges **143**, and substantially perpendicular to side edges **142** and **144**. Tear strip **148** may be located near or at end edge **143**, as depicted, but the distance between end edge **143** and tear strip **148** may vary in different embodiments.

[0033] In a different embodiment, one or both of tear strips **138**, **148** may be partially or entirely replaced with

a line of perforation or score line to provide the desired tear line(s). Tear lines may also be provided with another form of weakened line or portion. For example, any suitable tear line construction known to those skilled in the art may be used.

[0034] Top panel **130** and side panel **140** are attached to each other along end edges **133** and **141**.

[0035] A fold line is provided at the joint between each pair of attached panels **110, 120, 130, 140** and flaps **115, 116, 117, 118, 119, 126, 127, 136, 137, 145, 146, 147**, so that the panels and flaps are foldable along the fold lines to form a box.

[0036] Blank **100** may be formed of any suitable material for box blanks and packaging boxes. For example, cardboard, paper board, fibreboard, or plastics may be used. Suitable material may include double faced corrugated cardboard. Other materials typically used for forming shipping or packaging boxes may be used.

[0037] Glues or other adhesive materials or suitable configurations for attaching or fixing different parts of blank **100** may be additionally provided at the appropriate locations on blank **100**, if desired.

[0038] Blank **100** may have any suitable thickness and size. Blank **100** may have a substantially uniform thickness. In some embodiments, blank **100** may have a thickness from about 1 mm to about 5 mm. In a particular embodiment, blank **100** may have a thickness of about 3 or about 4 mm.

[0039] Blank **100** may be folded into a box **150**, as illustrated in **FIGS. 1B, 1C, 1D, 1E, and 1F**, according to an exemplary embodiment.

[0040] First, as shown in **FIG. 1B**, panels **110, 120, 130, 140** and end flaps **115, 145** are folded along the fold lines at the edges between them to form a tube shape as shown in **FIG. 1C**. End flaps **115** and **145** overlap and may be glued together, or otherwise attached to each other.

[0041] For example, a hot melt adhesive may be used and may be applied using, for example, a hot glue gun.

[0042] Next, side flaps **115, 116, 117, 118, 119, 126, 127, 136, 137, 145, 146, 147** are folded inwardly, as shown in **FIGS. 1D and 1E**, to form a partially open box **150**, as shown in **FIG. 1F**. As depicted, side flaps **116, 136** may be folded first and then side flaps **126 and 146** are folded over side flaps **116, 136**. However, the order in which the flaps are folded may be varied in different embodiments and does not have to be the same as shown in **FIGS. 1D and 1E**. For example, in a different embodiment, flaps **126, 146** may be folded before flaps **116, 136** are folded.

[0043] Box **150** has a bottom formed from bottom panel **110**; a top formed from top panel **130**; a back formed from back side panel **120**; a front formed from front panel **140**; a partially open left side formed from side flaps **116, 126, 135, 146**; a partially open right side formed from side flaps **117, 127, 137, 147**.

[0044] Side flaps **118, 125, 136, 146, 117, 127, 137, 147** are sized so that the right and left sides of box **150**

are partially open. For example, as depicted, each side flap **116, 126, 136, 146, 117, 127, 137, 147** may have a width that is less than half of the width of the panel to which the side flap is attached. In a different embodiment, a different arrangement or configuration of side flaps may be used to form the partially open sides, as can be appreciated by those skilled in the art.

[0045] Side flaps **116, 126, 136, 146, 117, 127, 137, 147** may be shaped and sized so that each side flap partially overlaps with each adjacent side flap. The overlapped portions of the side flaps may be glued, stapled, taped, or otherwise attached or affixed together, to seal box **150**.

[0046] The goods (not shown) to be packaged may be placed inside box **150** before both left and right sides of box **150** are sealed.

[0047] The partial openings on the left and right sides of box **150** may allow partial viewing of the goods, and may reduce the materials needed to form box **150**. However, the openings should be shaped and sized to prevent the goods from falling out of box **150**.

[0048] Box **150** with the contained goods may then be transported or stored. For example, box **150** with the contained goods may be conveniently placed on a storage or display shelf.

[0049] Box **150** may be opened by tearing off tear strips **138** and **148**, thus separating a portion of each of top panel **130**, side panel **140**, and side flaps **136, 137, 146, 147** from the remainder of box **150** along the tear lines provided by tear strips **138** and **148**. As can be understood, box **150** may be opened by tearing off tear strips **138** and **148** within a limited space, such as on a storage or display shelf. As tear strips **138** and **148** are located on the top or in the front of box **150**, it is not necessary to remove any portion of box **150** at the back of box **150**, which may be inconvenient to do when box **150** is placed on a shelf.

[0050] The remainder of box **150** forms a display box **160** with partially opened top and front, as shown in **FIG. 1G**. Therefore, the goods placed in box **150** become accessible and visible in box **160**. It is not necessary to remove the goods from box **150** or **160** to place them on the shelf, to view them, or to access them. A user can conveniently remove the goods from the partially open box **160**, either from the open front side or the open top.

[0051] As a relatively large portion of the top and front of box **150** can be conveniently removed, relatively large items may be stored in box **150** on a shelf and may be conveniently displayed and removed from display box **160**.

[0052] The back panel **120** and top panel portion **139** and other remaining portions of side flaps can conveniently provide structural support for confining the goods on display. For example, back panel **120** can prevent the goods from falling off the shelf from the back side.

[0053] As now can be appreciated, to remove the desired portions of the panels and side flaps, tear lines need to be properly positioned in blank **100**. For example, to

avoid tearing off a portion of side flaps **126** and **127**, tear strip **138** should be positioned away from end edge **131** by a distance that is substantially equal or greater than the width of side flaps **128** and **127**, as depicted. In some embodiments, tear strip **138** may be distanced from edge **131** such that in box **150** the tear line provided by tear strip **138** is aligned with the free edge of each of side flaps **126** and **127**. In some embodiments, when a smaller portion **139** is desired, tear strip **138** may be moved closer to edge **131**, and the width of side flaps **126** and **127** may be correspondingly reduced. In any event, the tear strips are positioned so that when the tear strips are torn off, the desired portions of top panel **130**, front side panel **140**, and selected side flaps are each at least partially removed.

[0054] Further, as depicted, tear lines provided by tear strips **138** and **148** in blank **100** are substantially straight lines. Blanks with straight tear lines may be easier to design and produce. Further, the openings formed by removal of the removable portions along the tear lines may be conveniently adjusted when the tear lines are straight and are substantially parallel to the edges of top panel **130**.

[0055] As tear strip **138** extends across top panel **130** between its side edges **132** and **134**, and across side flaps **136** and **137**, the top of box **150** may be conveniently opened by removing tear strip **138**, without using any opening or cutting tools. A portion of each side flap **136**, **137**, **146**, **147** is also conveniently removed when tear strips **138** and **148** are torn off.

[0056] As depicted, two openings may be formed in the sides of box **150** by the gaps between side flaps **116**, **126**, **136**, **146**, **117**, **127**, **137**, **147**. These openings may be conveniently utilized to handle the box, and to provide a viewing window for viewing the content in box **150** without opening it. Further, less material is needed as compared to a box with fully covered sides. Conveniently, the design of blank **100** allows the openings to be formed during assembly, without having to form openings in blank **100** during fabrication of the blank. The size and position of the openings may be conveniently adjusted by adjusting the sizes of one or more of side flaps **116**, **126**, **136**, **146**, **117**, **127**, **137**, **147**.

[0057] In different embodiments, side flaps **116**, **126**, **136**, **146**, **117**, **127**, **137**, **147** may also be sized so that they cover the entire side of the box formed by these side flaps and no opening is left.

[0058] Further, as depicted, blank **100** as a whole is substantially rectangular. As such, it is easier to produce and waste of material is limited during production, as compared to production of blanks that have irregular shapes and varying widths along their lengths.

[0059] In an exemplary embodiment, blank **100** or other blanks described herein may be formed using various different types of known methods and systems for forming such blanks, appropriately adapted to form the features disclosed herein.

[0060] For example, the making of a blank **100** from a

corrugated fibreboard material can start with making with first forming a sheet of corrugated material using a corrugator machine, such as one provided by BHS Corrugated Maschinen- und Anlagenbau GmbH™. The corrugator machine may produce a length of corrugated material of a given width that can be used immediately or stored in a roll until it is ready to be utilized.

[0061] The next step may involve utilizing a roll or sheet of such corrugated material that may have an approximate width that may be the same as the width of the desired blank that may be used to form the case. The roll or sheet can be also cut transversely such as to create sections of cardboard that are generally rectangular in shape. The corrugated material may then be fed through what is known as a flexo-folder gluer machine. In passing through such a machine, the corrugated sheet may pass through a printer, which prints words or pictures on one or both sides of the sheet. Next, the material may be creased both across and along the sheet material such that when the blank is folded/erected it may easily bend along the crease (fold) lines to form the desired shape.

[0062] The creased sheet may then be "slotted" with a slotting device which cuts thin transversely oriented "slots" in the board in intervals along a desired direction.

These slots create the panels that may be folded. Finally, the sheet material may go through a rotary die cutter to remove excess corrugated material along one end of the board and crush down a portion along a fold line, to create a thin "hinge". The purpose of the hinge is to later allow the board to be doubled back on itself (i.e. glue one end of the board to the other to create a tube) and glued.

[0063] At some stage of this process, tear strips **138** and **148** may be formed in the blank such as by applying a device to create perforations in the blank. For example, a steel die may be pre-applied to a part of the blank to form the perforations.

[0064] The result up to this point can be a flat blank. Thereafter a flexo-folder gluer may apply glue to the hinge portion of the blank. The panels of the blank are then folded over by a folding mechanism such that one end of the blank is now glued to the other in a flattened tube-shaped orientation to create a flat tubular shaped blank such as is shown in **FIG. 1C**.

[0065] After the tubular shaped blank has been created, it may be grouped with other blanks and shipped to another location where the boxes are to be erected and packed.

[0066] When it is desired to fill a box with one or more products, a two step operation may be required. First, the box can be erected from its knock-down configuration, either by hand or using a "case erector" machine. Examples of commercially available case erectors include case packers made by iPak Machinery Ltd.™

[0067] The second step may be the placing of the products into the formed case, either by hand or using a "case packer" machine. Examples of commercial case packers include case packers made by iPak Machinery Ltd.™ of Canada. The box can then be sealed with the product

inside.

[0068] It may also be possible to utilize blanks that have not been formed into tubular forms such as in FIG. 1C in a first step, but rather using flat blanks and a wrap around machine. An example of a commercial wrap around machine is available from CERMAX™ of France. The wrap around machine, utilizing a flat blank, may place one or more products on one panel such as panel 110 and then cause the remaining panels to be folded around and glued in the sequence identified in FIGS. 1A to 1F.

[0069] As can be understood, blank 100 may be modified without losing all of its benefits.

[0070] For example, in place of a tear strip, a tear line may be provided in another suitable form. A tear line may refer to any line or elongated portion in the blank that is configured or adapted to facilitate the removal of a portion of the blank. Tear lines may be provided in the form of tear-away or tear-out strips, pull strips, tear- or pull-away tabs, perforation lines such as punch-out perforation lines, score lines, thinned or weakened strips or sections, or the like.

[0071] FIG. 2A depicts a modified box blank 200, exemplary of another embodiment of the present invention.

[0072] Blank 200 includes serially attached bottom panel 210, side panel 220, top panel 230, and side panel 240.

[0073] Bottom panel 210 has end edge 211, side edge 212, end edge 213 and side edge 214. A fold line is provided at the joint of bottom panel 110 and end flap 115 along end edge 111. A side flap 216 is attached to bottom panel 110 along side edge 212, and a side flap 217 is attached to bottom panel 110 along side edge 214.

[0074] Side panel 220 has end edge 221, side edge 222, end edge 223 and side edge 224. A side flap 226 is attached to side panel 220 along side edge 222, and a side flap 227 is attached to side panel 220 along side edge 224.

[0075] Bottom panel 210 and side panel 220 are attached to each other along end edges 211 and 223.

[0076] Top panel 230 has end edge 231, side edge 232, end edge 233 and side edge 234. An end flap 235 is attached to end edge 231. A side flap 236 is attached to top panel 130 along side edge 232, and a side flap 237 is attached to top panel 230 along side edge 234. Two tear lines are provided by way of tear strips 238, 239 across top panel 230 and side flaps 236 and 237.

[0077] Side panel 240 has end edge 241, side edge 242, end edge 243 and side edge 244. A side flap 246 is attached to side panel 240 along side edge 242, and a side flap 247 is attached to side panel 240 along side edge 244.

[0078] Bottom panel 210 and side panel 240 are attached to each other along end edges 213 and 241.

[0079] A fold line is provided at the joint between each pair of attached panels 210, 220, 230, 240 and flaps 235, 216, 217, 218, 219, 226, 227, 236, 237, 246, 247, so that the panels and flaps are foldable along the fold lines

to form a box.

[0080] Further, two substantially parallel fold lines 228 are provided on each of side flaps 226, 227, 246 and 247 attached to side panels 220 and 240 respectively. Fold lines 228 are also substantially parallel to side edges 222, 224 or 242, 244.

[0081] Blank 200 may be folded into a box 250, as illustrated in FIGS. 2B, 2C, 2D and 2E.

[0082] As shown in FIGS. 2B and 2C, side flaps 226, 227, 246 and 247 are each folded along fold lines 228 and side edge 222, 224, 242, or 244 to form a triangular prism shaped reinforced edge.

[0083] As shown in FIGS. 2C, 2D and 2E, panels 210, 220, 230, 240, end flap 235, and side flaps 216, 217, 236, 237 are next folded along the respective fold lines at the edges between them to form a box 250 with two partially open sides. The reinforced edges formed from side flaps 226, 227, 246 and 247 can provide a strengthened support frame for box 250. The overlapping portions may be glued or stapled together.

[0084] Box 250 has a bottom formed from bottom panel 210, a top formed from top panel 230, closed sides formed from side panels 220, 240, and partially open sides respectively formed from side flaps 216, 226, 236, and 246, or 217, 227, 237, and 247.

[0085] In this embodiment, tear strips 238, 239 may be distanced from edges 231, 233 so that tear strips 238, 239 are aligned or clear of the free edges of side flaps 226, 227 and 246, 247, respectively. Such alignment or clearance allows convenient removal of tear strips 238, 239 with the removable portions of top panel 230 and side flaps 236, 237.

[0086] The top 230 and the top parts of the partially opened sides of box 250 may be removed by tearing off tear strips 238 and 239, to form a display box 260, as shown in FIG. 2F. Display box 260 has a closed bottom (formed from panel 210), two closed sides (formed from panels 220 and 240), an open top, and two partially open sides (formed mainly by flaps 216 and 217). The four vertical edges of box 260 are reinforced with the folded flaps 226, 227, 246, 247.

[0087] The reinforced edges may have a substantially triangular prim shape as depicted in FIGS. 2B, 2C, 2D, and 2F. The triangular support edges may be vertically oriented during use to provide improved support, such as when boxes are stacked one on top of another. When the removable top portion is removed, the remaining reinforced edges may also provide improved support for the remaining side panels 220, 240.

[0088] In different embodiments, further tear-strip(s) (not shown) may be provided on blank 200, such as on panel 240 parallel to edge 241, or on flaps 216 and 217, so that front panel 240 may be conveniently removed, either partially or completely, during use.

[0089] In a different embodiment, the reinforced edges may be formed of double-folded flaps, as shown in FIGS. 3A, 3B, 3C, 3D, 3E, and 3F.

[0090] Blank 300 shown in FIG. 3A is similar to blank

200, except that flaps 326, 327, 346, 347 each has only one fold line 328 or 348. Blank 300 may be folded to form a box 350, and then transformed to display box 360, in a similar manner as for forming box 250 and display box 260 from blank 200, as illustrated in FIGS. 3B, 3C, 3D, 3E, and 3F. A difference is that flaps 326, 327, 346, 347 only need to be folded once to form double layer.

[0091] On the one hand, the edges reinforced by folded flaps 226, 227, 246, 247 may be stronger. On the other hand, the edges reinforced by folded flaps 326, 327, 346, 347 may provide sufficient strength in some applications, and blank 300 and box 350 may be easier to form as compared to blank 200 and box 250.

[0092] FIG. 4A shows another blank 400, exemplary of an embodiment of the present invention. Blank 400 is similar to blank 100, but with the differences discussed below.

[0093] Specifically, blank 400 includes serially attached bottom panel 410, side panel 420, top panel 430, and side panel 440. An end flap 415 and two side flaps 416, 417 are attached to bottom panel 410. End flap 415 is also attached to two side flaps 418, 419. Two side flaps 426, 427 are attached to side panel 420. Two side flaps 436, 437 are attached to top panel 430. An end flap 445 and two side flaps 446, 447 are attached to side panel 440. Tear lines are provided by way of tear strip 438 on panel 430 and tear strip 448 on panel 440.

[0094] Blank 400 may be folded as shown in FIGS. 4B, 4C, 4D, and 4E, to form box 450.

[0095] As can be seen, a fold line is provided on each of side flaps 418, 419, 426, 427, 446, 447 so that each of these side flaps may be folded to form a double layer to provide a reinforced edge in box 450, as illustrated.

[0096] Portions of the top and front of box 450 may be removed by tearing off tear strips 438 and 448, to form a display box 460 as shown in FIG. 4F. As depicted, in blank 400, the length of side flaps 418 and 419 are approximately equal to the width of side flaps 416 and 417; and tear strip 448 is aligned with the edges of side flaps 416, 417, 418 and 419 in box 450. As a result, after removal of tear strip 448, the top edges of the remaining sides formed by end flap 415 and side flaps 416, 417, 418 and 419 are substantially flush with each other.

[0097] As discussed above, a blank, such as blank 400, may be fully assembled on a case erector, following the procedure shown in FIGS. 4B to 4E.

[0098] Alternatively, blank 400 may be partially pre-assembled such as shown in FIGS. 4B, 4G and 4H, before being assembled on a case erector such as shown in FIGS. 4I, 4D, and 4E, in that order. In particular, after folding side flaps 418, 419, 426, 427, 446, 447 as shown in FIG. 4B, panels 430 and 440 may be folded together along the edge between panels 420 and 430, towards panels 410 and 420, as shown in FIG. 4G. The partially assembled blank is flattened as depicted in FIG. 4H and is thus convenient to store and transport before being completely assembled. End flap 445 may be glued to end flap 415 during preassembly or at a later time.

[0099] FIGS. 5A, 5B, 5C, 5D, and 5E show a blank 500 for forming a box 550 and display box 560, which are similar to blank 400, box 450 and display box 460, except that the corner edges are reinforced with triangular prism shaped supports that are formed by side flaps 518, 519, 526, 527, 546, 547, folded along two fold lines, similar to the corner supports in box 250 formed from blank 200.

[0100] Conveniently, as illustrated above, a shipping and display container may be formed from a single blank according to exemplary embodiments of the present invention disclosed herein. Thus, the manufacture and assembly process may be simplified as compared to boxes or containers that are formed from multiple pieces of blanks. However, in different embodiments, additional components or attachments may be added to the blanks or assembled boxes, if desired.

[0101] As can be understood, the panels in the blank are typically substantially rectangular, as depicted in the drawings. The side and end flaps may also be substantially rectangular, as depicted in the drawings. However, in different embodiments, one or more of the flaps and panels may have a different shape. For example, some of the flaps may have a substantially trapezoidal shape or triangular shape. It is also possible that one of the flaps has a curved terminal edge.

[0102] One or more permanent openings may also be provided in one or more of the panels and flaps of the blanks for various purposes depending on the application.

[0103] Of course, the above described embodiments are intended to be illustrative only and in no way limiting. The described embodiments are susceptible to many modifications of form, arrangement of parts, details and order of operation. The invention, rather, is intended to encompass all such modification within its scope, as defined by the claims.

Claims

1. A box blank comprising:

a top panel, a bottom panel, a first side panel, and a second side panel, said panels serially attached to one another and each of said panels having two side edges;
a side flap attached to each side edge of each panel;
a first tear line extending across said top panel and side flaps attached to said first panel; and
a second tear line extending across said top or first side panel and side flaps attached to said top or first side panel,
wherein said panels and flaps are foldable to form a box comprising
a bottom formed from said bottom panel,
a top formed from said top panel,

- a first side formed from said first side panel,
a second side formed from said second side panel,
third and fourth sides each formed from side flaps each extending from one of said panels, 5
wherein said side flaps are sized so that said third and fourth sides of said box are partially open, and wherein said first and second tear lines are positioned so that said top and said first, third and fourth sides of said box are each at least partially removable by separating them along said first and second tear lines. 10
2. The blank of claim 1, wherein said first and second tear lines are substantially parallel. 15
3. The blank of claim 1 or claim 2, wherein two of said panels are end panels each having an end edge, said blank further comprising an end flap attached to said end edge of at least one of said end panels, said end flap foldable along said end edge. 20
4. The blank of any one of claims 1 to 3, wherein said first tear line is substantially perpendicular to said side edges of said top panel and is positioned so that a portion of said first tear line is adjacent a terminal edge of side flaps attached to said second side panel in said box. 25
5. The blank of any one of claims 1 to 4, wherein a fold line is provided between each pair of panel and flap attached to each other, and wherein said first and second tear lines are optionally substantially parallel to a fold line between said top panel and a side panel adjacent to said top panel. 30
6. The blank of any one of claims 1 to 5, wherein a fold line is provided on each one of said side flaps attached to one of said side panels, such that said each side flap is foldable along said fold line on said each side flap to form a reinforced edge in said box, and wherein two fold lines are optionally provided on said each side flap, such that said each side flap is foldable to form a triangular prism shaped reinforced edge in said box. 35
7. The blank of any one of claims 1 to 6, wherein at least one of said first and second tear line is substantially straight, and wherein at least one of said first and second tear lines is provided by a line of perforation or a tear strip. 40
8. The blank of any one of claims 1 to 7, wherein said blank has a substantially rectangular shape. 45
9. A box comprising:
a bottom;
- a top;
first and second sides opposite one another;
third and fourth sides opposite one another, each being partially open and comprising a top flap and a bottom flap separated from said top flap, said top flap attached to said top of said box;
a first tear line extending across said top and said top flaps; and
a second tear line extending across said top and said top flaps, or extending across one of said first and second sides;
wherein said first and second tear lines are positioned so that said top, said one of said first and second sides, and said top flaps are each at least partially removable by separating them along said first and second tear lines.
10. The box of claims 9, wherein said first and second tear lines are substantially parallel, and may be substantially parallel to an edge between said top and one of said first and second sides.
11. The box of claim 9 or claim 10, wherein at least one edge between two adjacent ones of said sides is reinforced, wherein said at least one edge may comprise a folded flap, said folded flap being optionally folded along one fold line to form a double-layered support, or along two parallel fold lines to form a substantially triangular prism support.
12. The box of any one of claims 9 to 11, wherein at least one of said first and second tear lines is provided by a line of perforation or a tear strip.
13. The box of any one of claims 9 to 12, wherein said first and second sides are closed sides.
14. The box of any one of claims 9 to 13, formed from the blank of any one of claims 1 to 8.
15. A display box comprising the box of any one of claims 9 to 14, wherein the top, one of the first and second sides, and the top flaps have each been at least partially removed along the first and second tear lines.

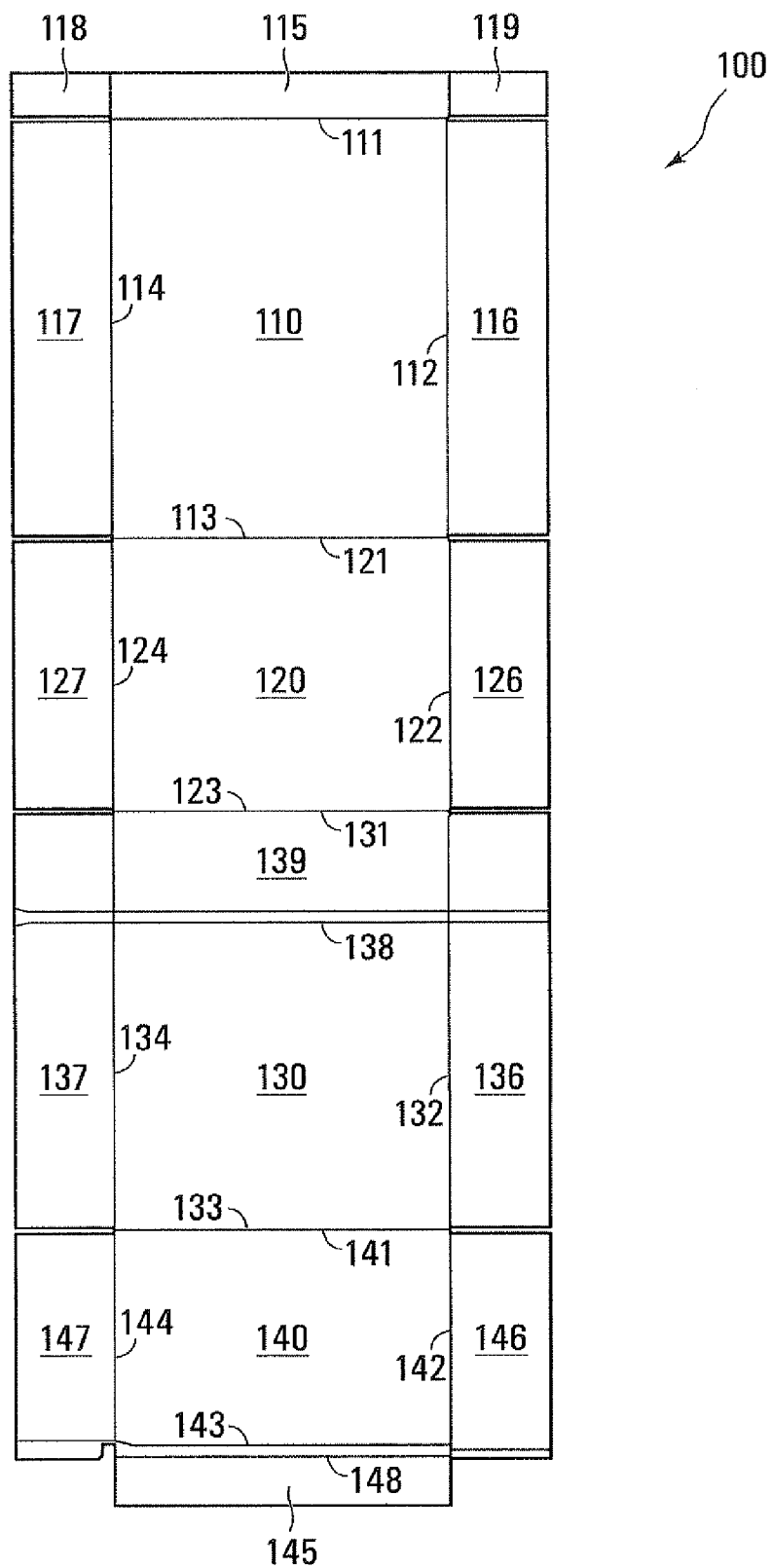
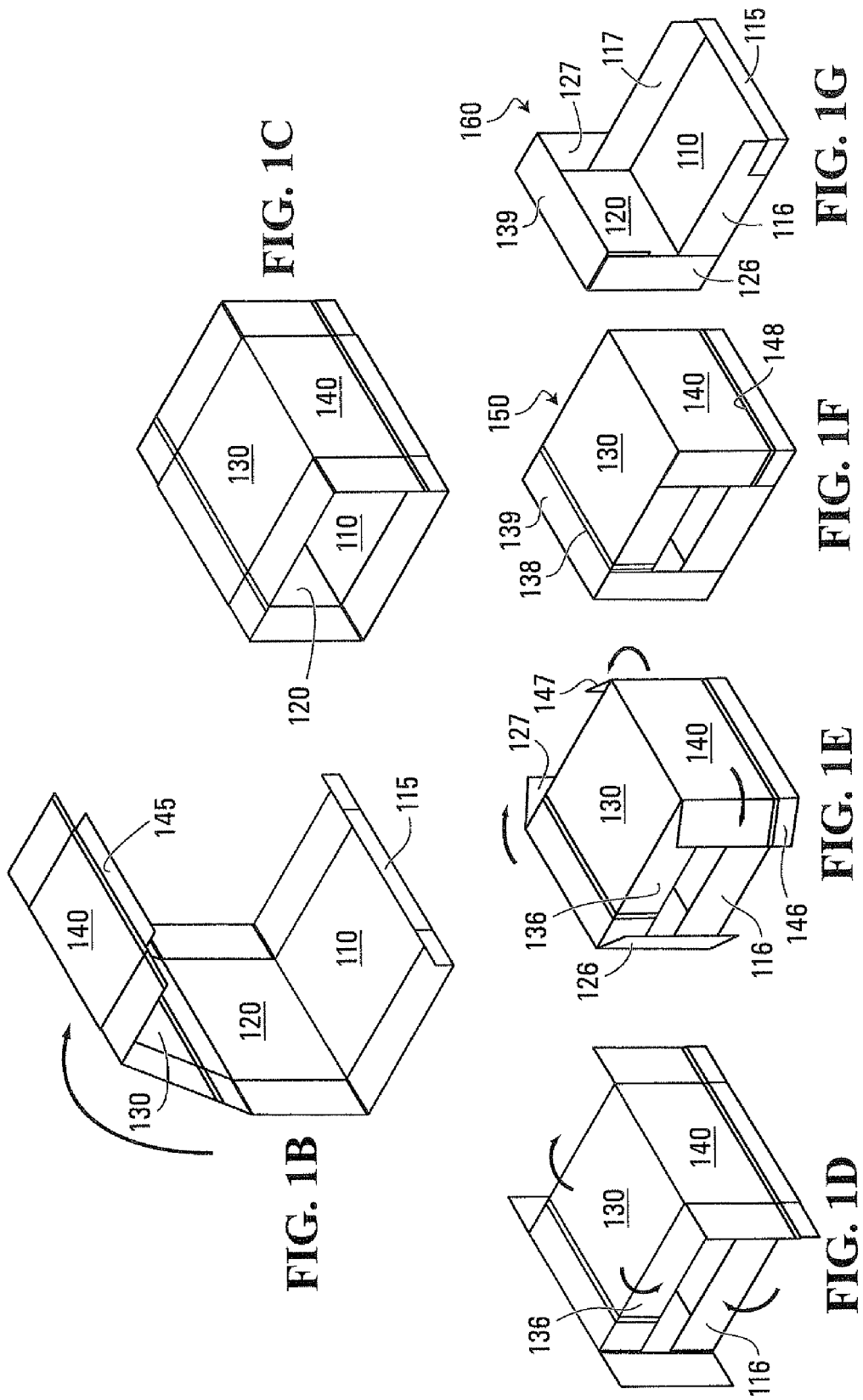


FIG. 1A



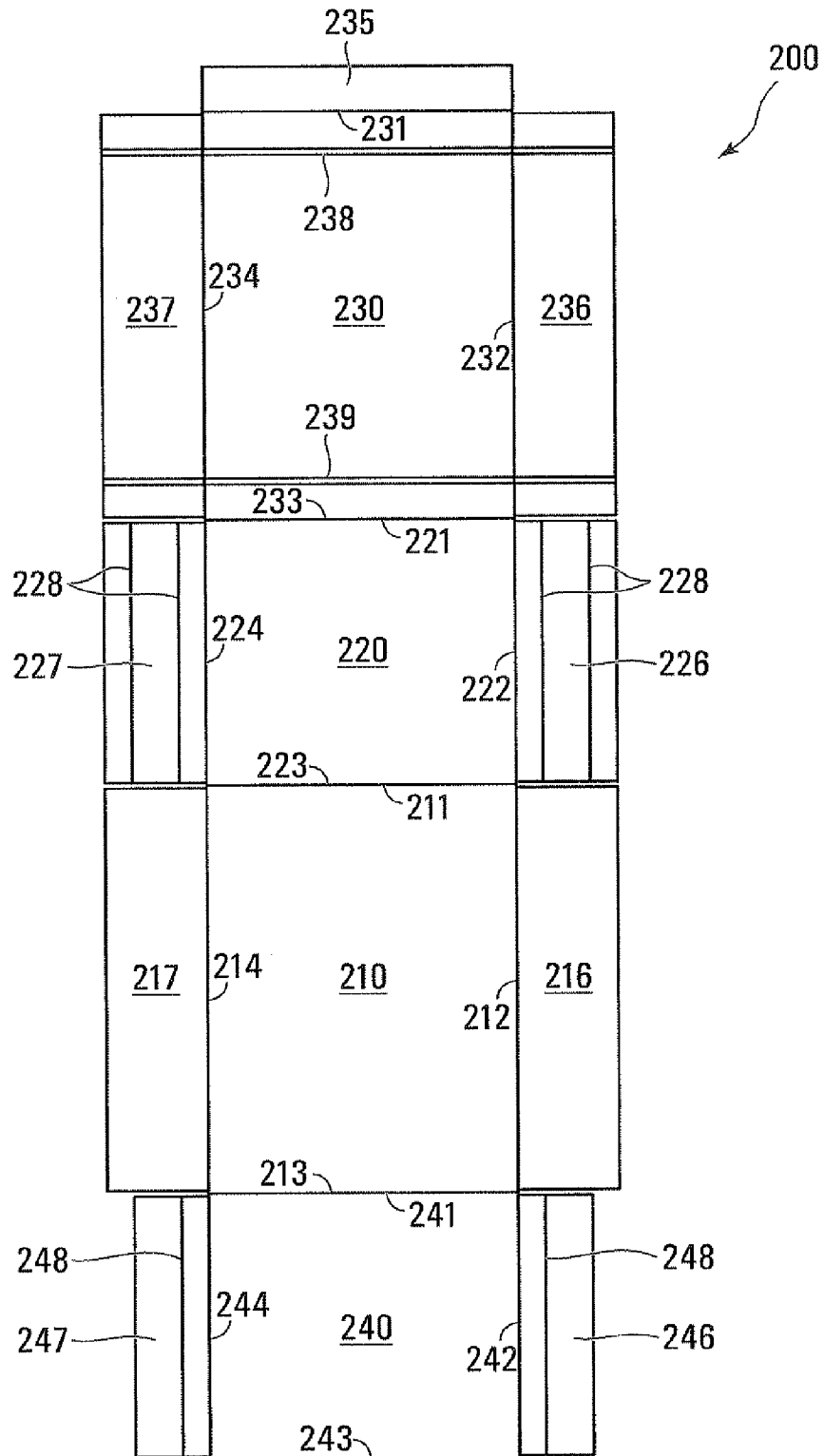
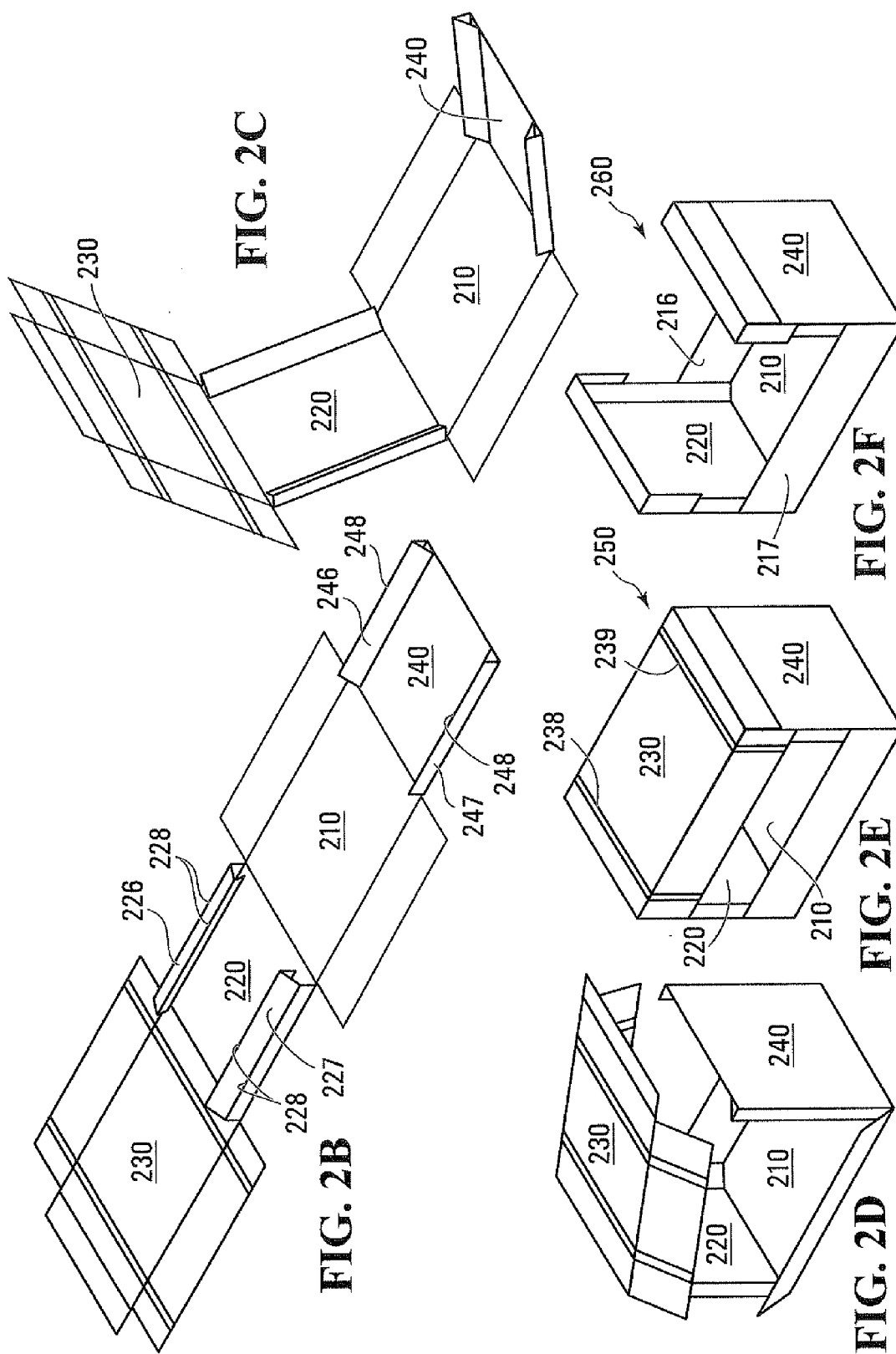


FIG. 2A



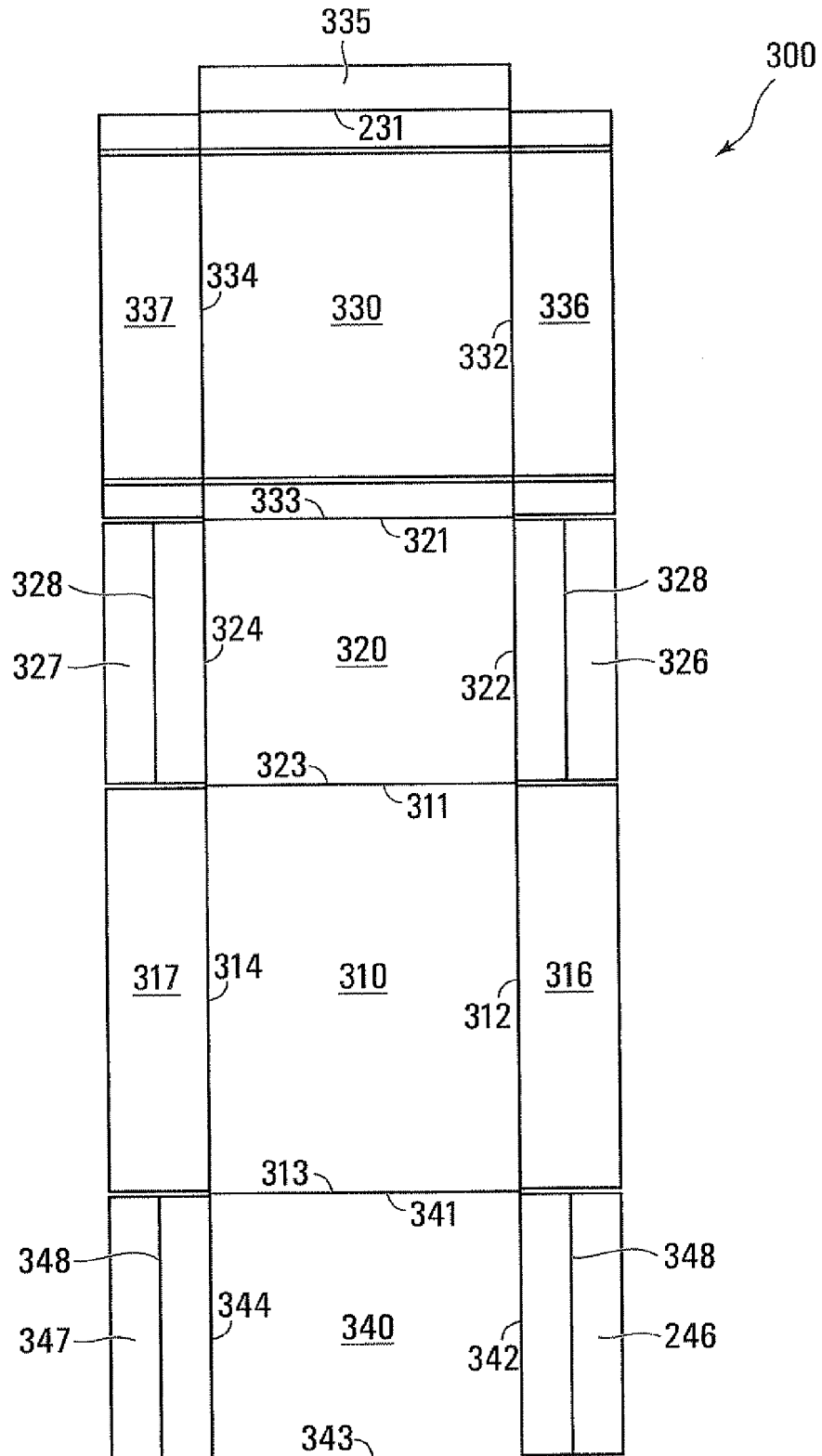
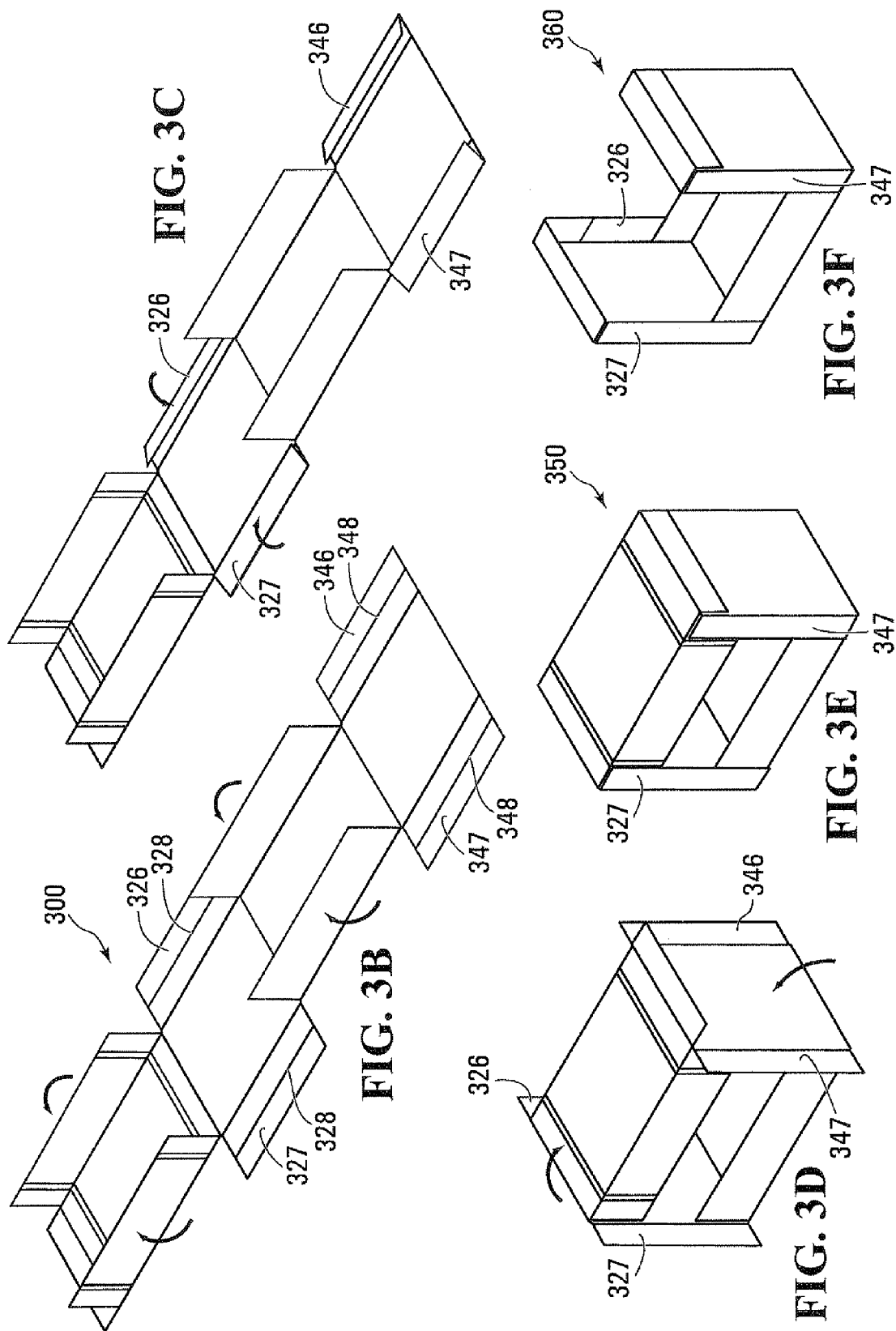
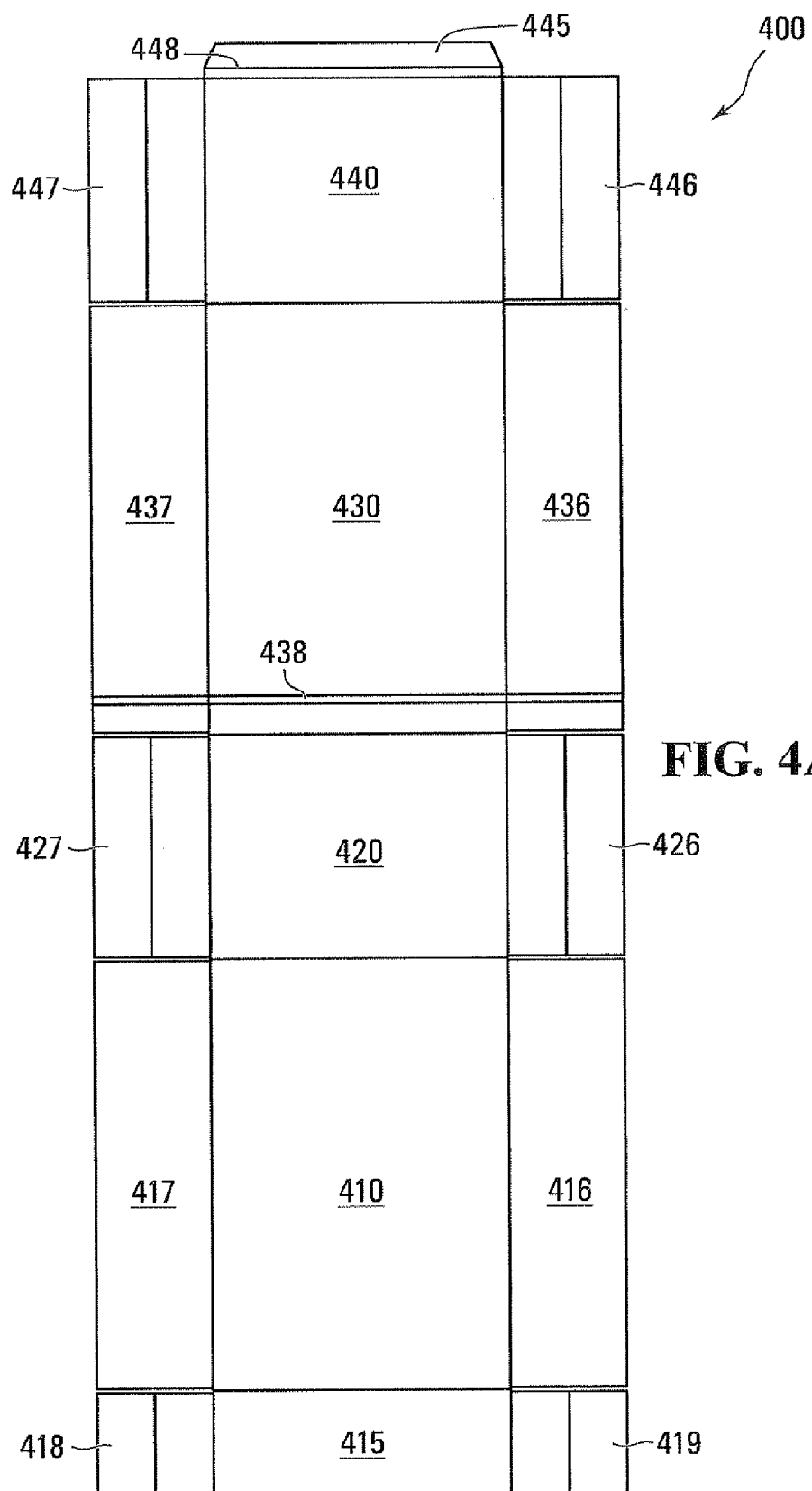
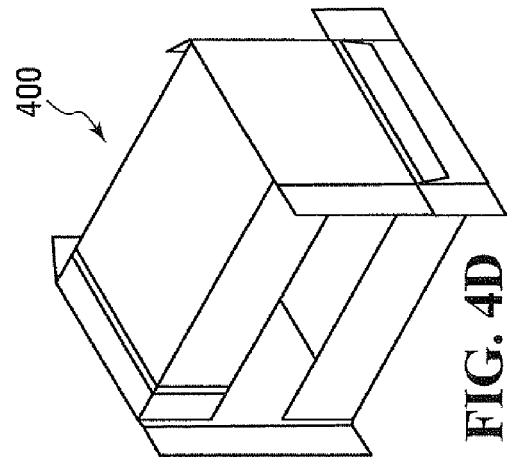
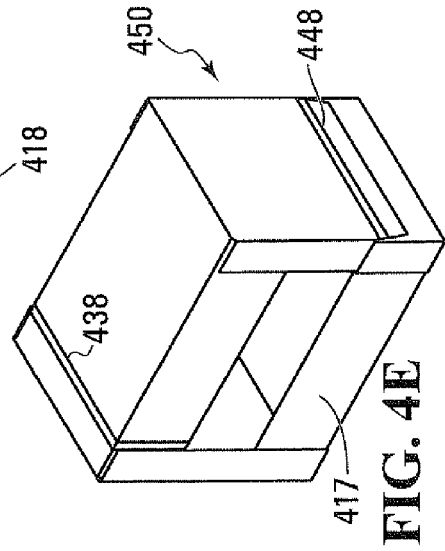
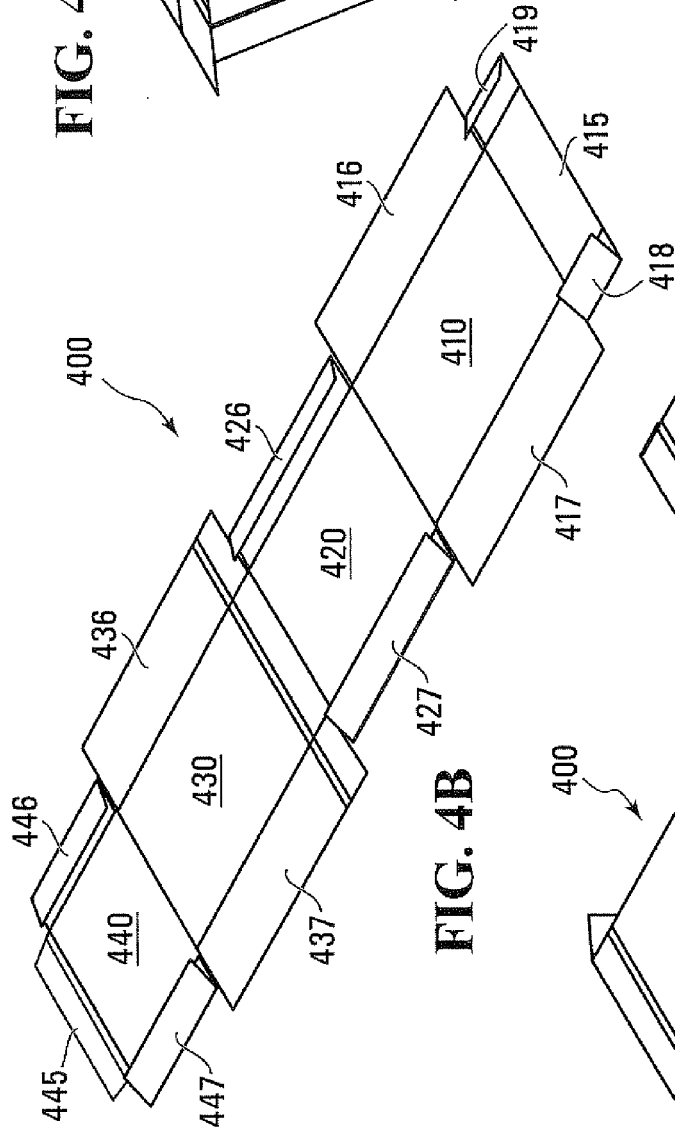
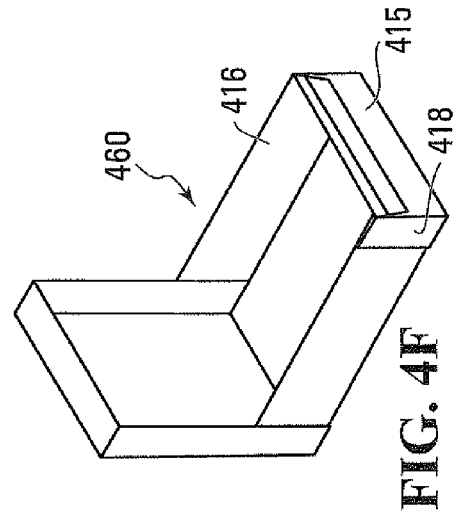
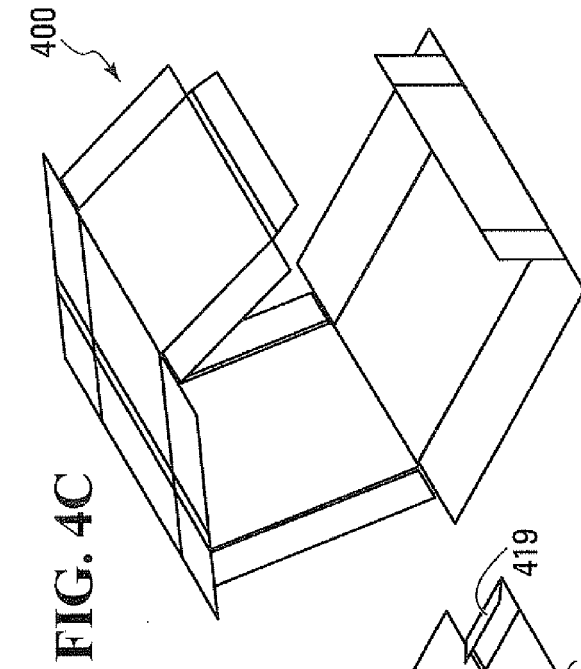


FIG. 3A







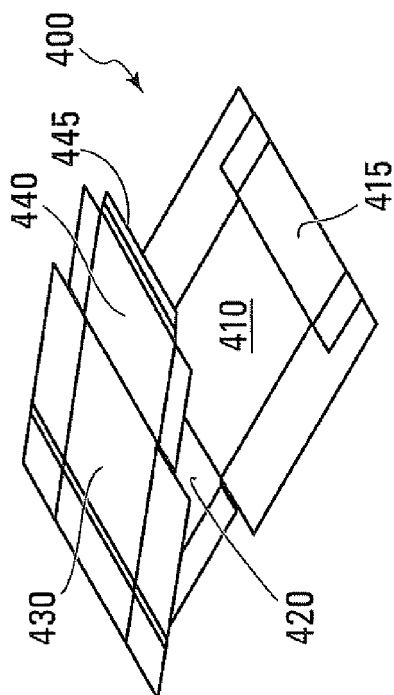


FIG. 4G

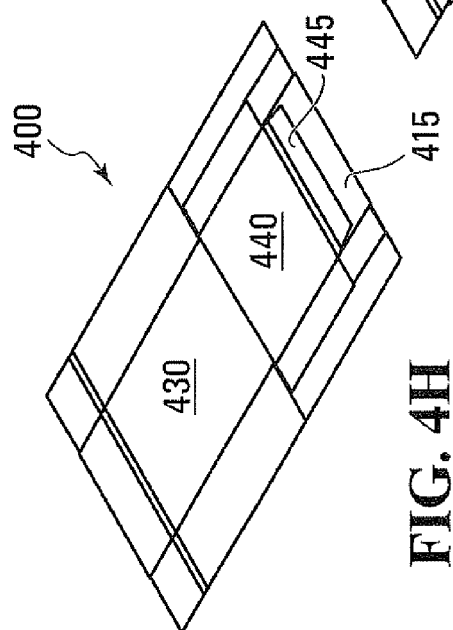


FIG. 4H

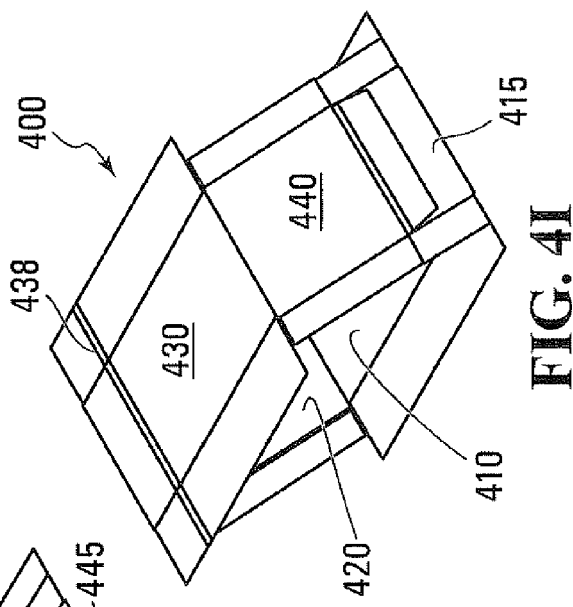


FIG. 4I

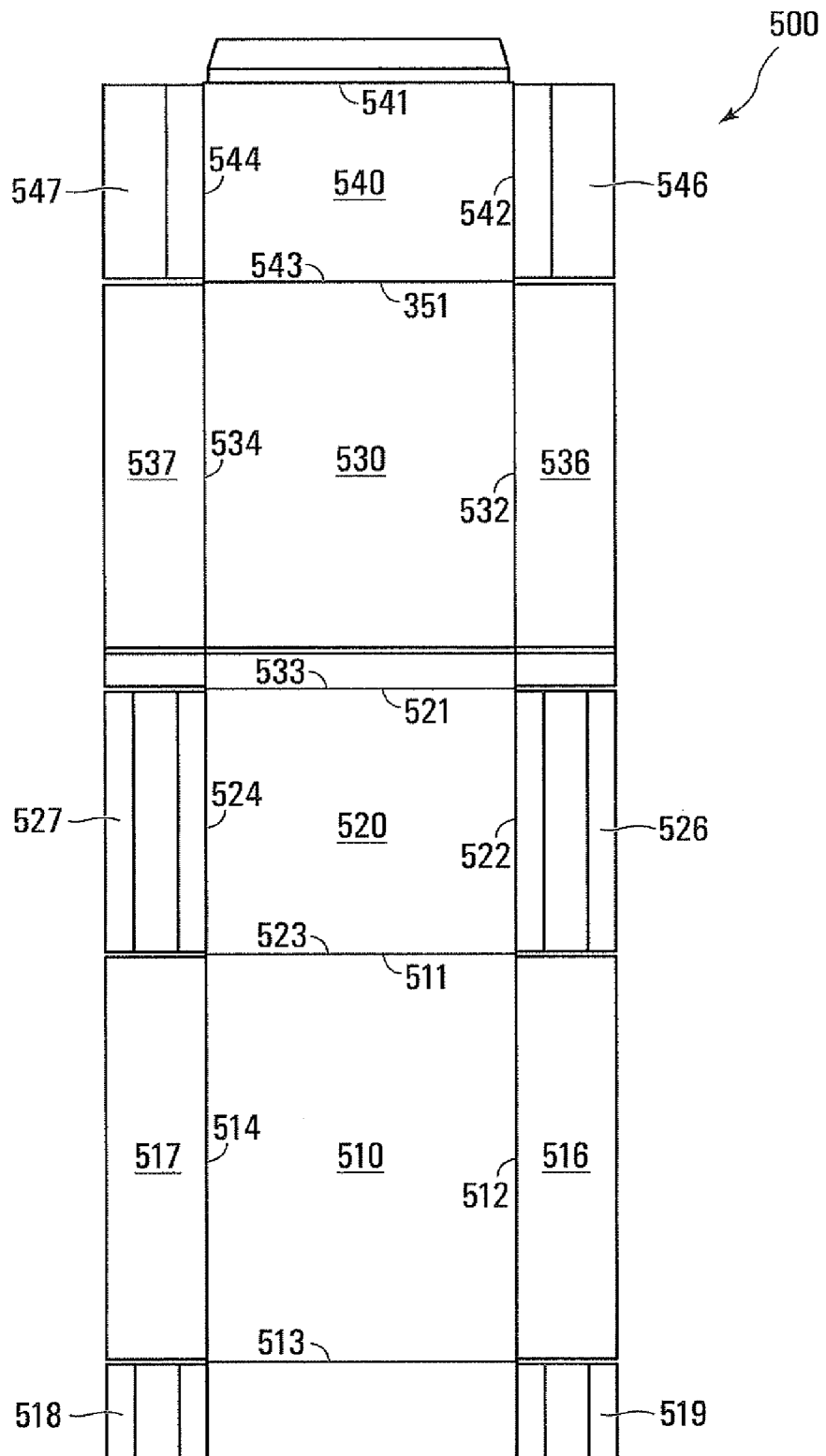
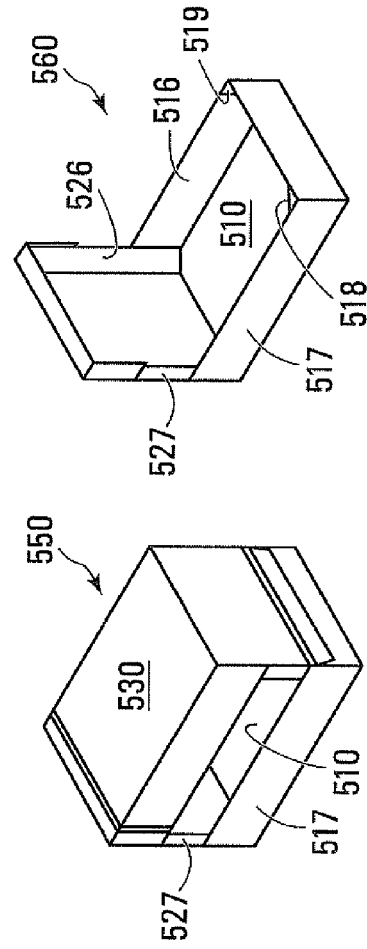
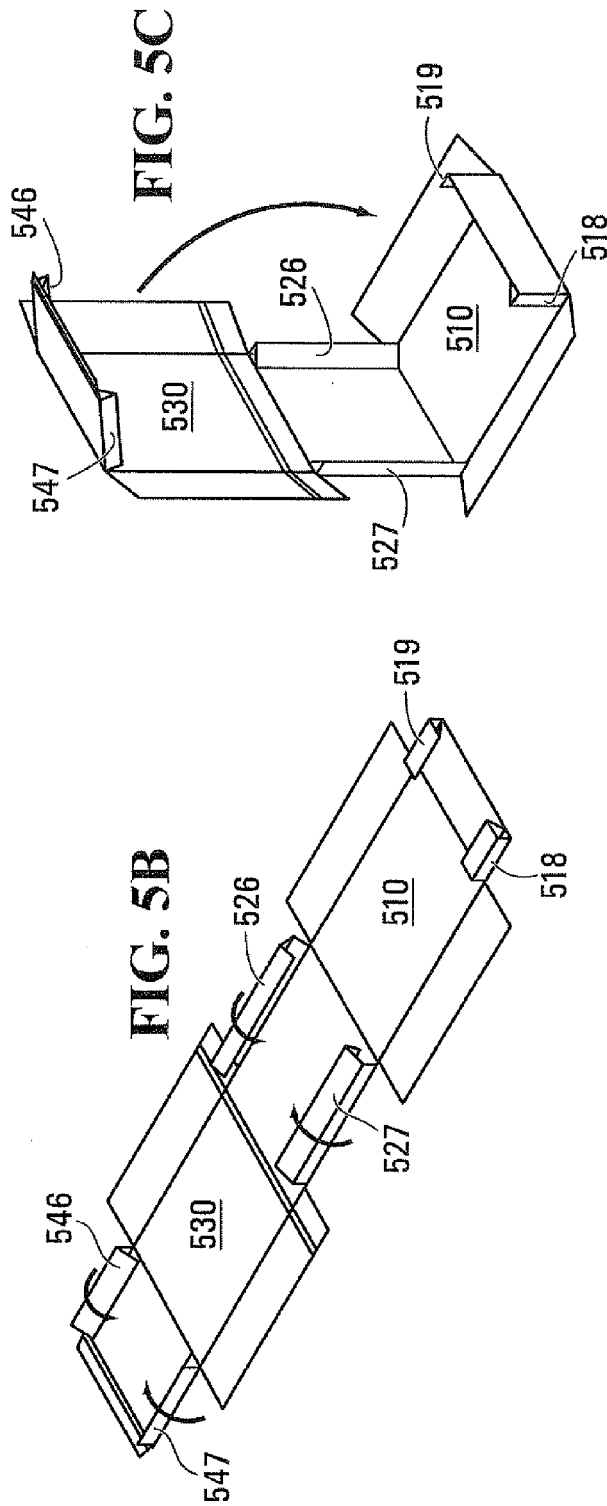


FIG. 5A





EUROPEAN SEARCH REPORT

Application Number
EP 11 16 0205

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 27 June 2011	Examiner Jervelund, Niels
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