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(54) **BOX LID AND BLANK THEREFOR**

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(57) **ABSTRACT**

Some embodiments relate to a box lid blank comprising side panels and end panels adapted to be connected to form a rectangular structure, side flaps and end flaps extending from the respective side panels and end panels and connected thereto along fold lines or score lines, folding portions of said end flaps being adapted to be secured to opposed facing portions of the side flaps and to extend outwardly from the side and end panels when the rectangular structure is folded flat, said end flaps and the secured folding portions being shaped such that the secured folding portions draw the end and side flaps inwardly towards a closed position with respect to the side and end panels when the rectangular structure is formed from its folded flat condition to thereby form a lid.

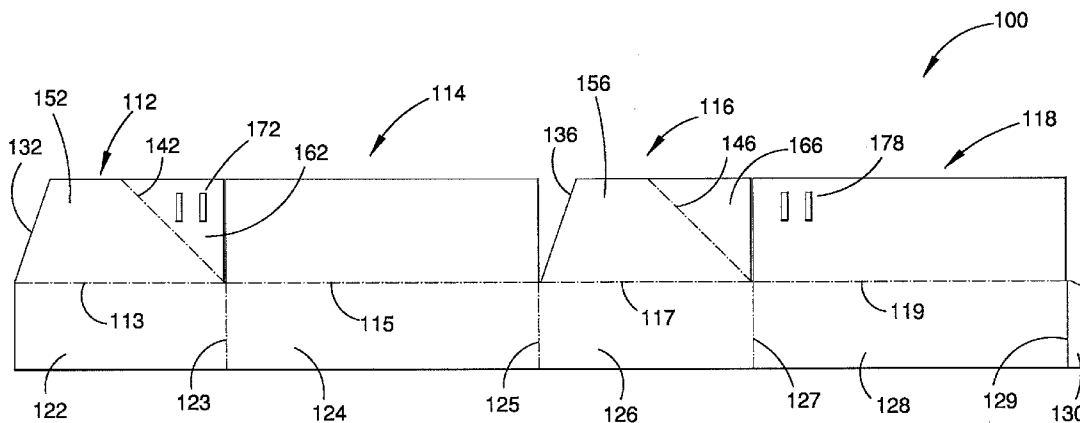
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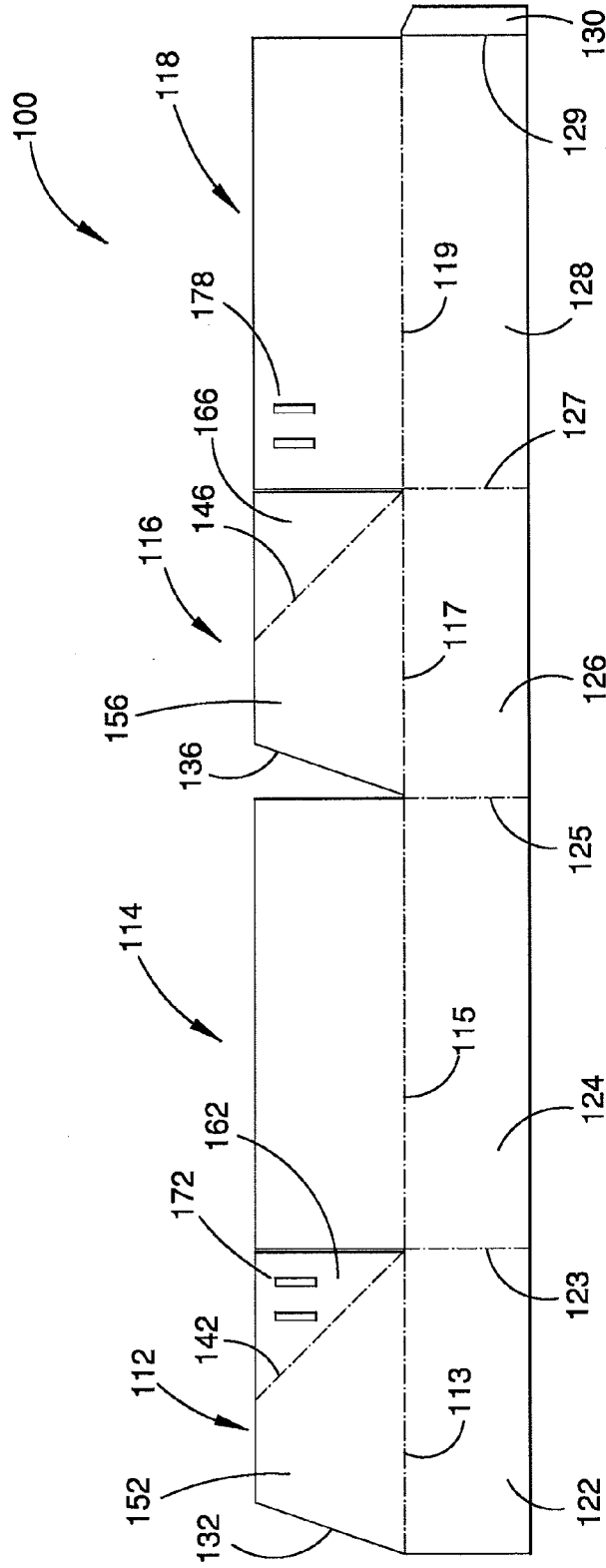


FIG. 1

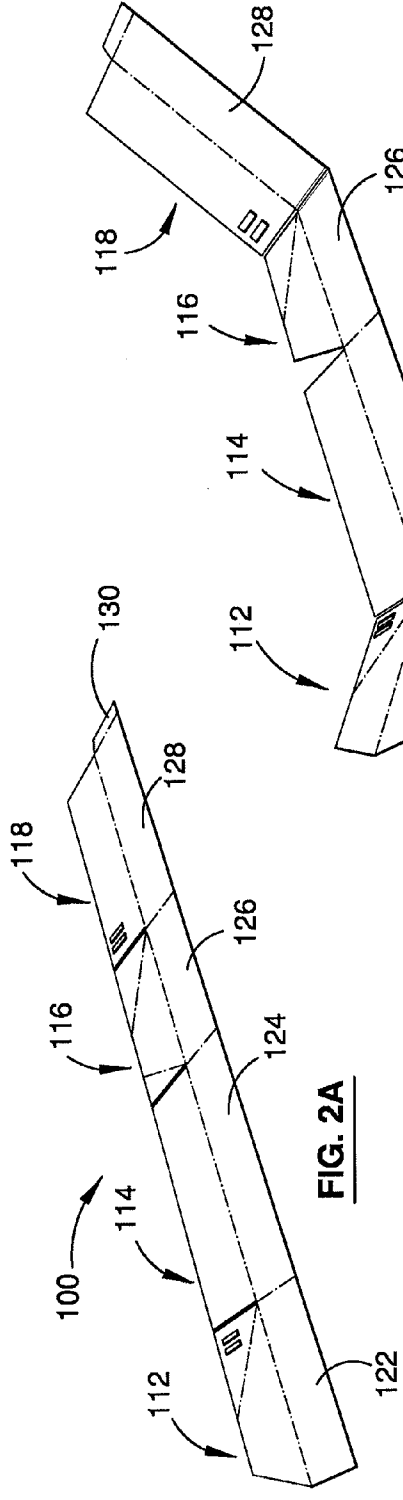


FIG. 2A

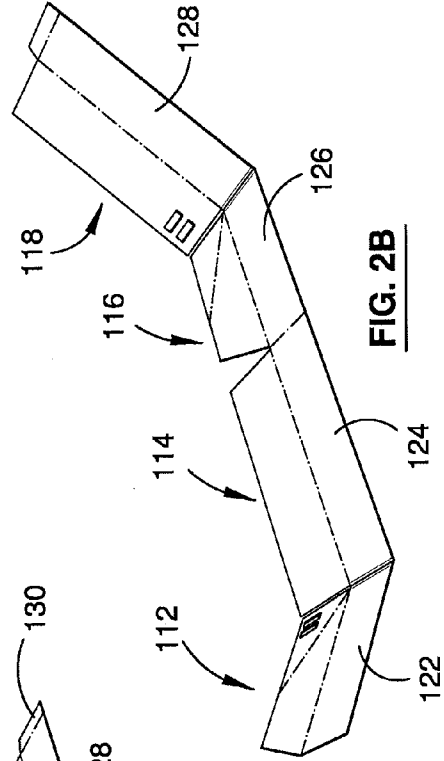


FIG. 2B

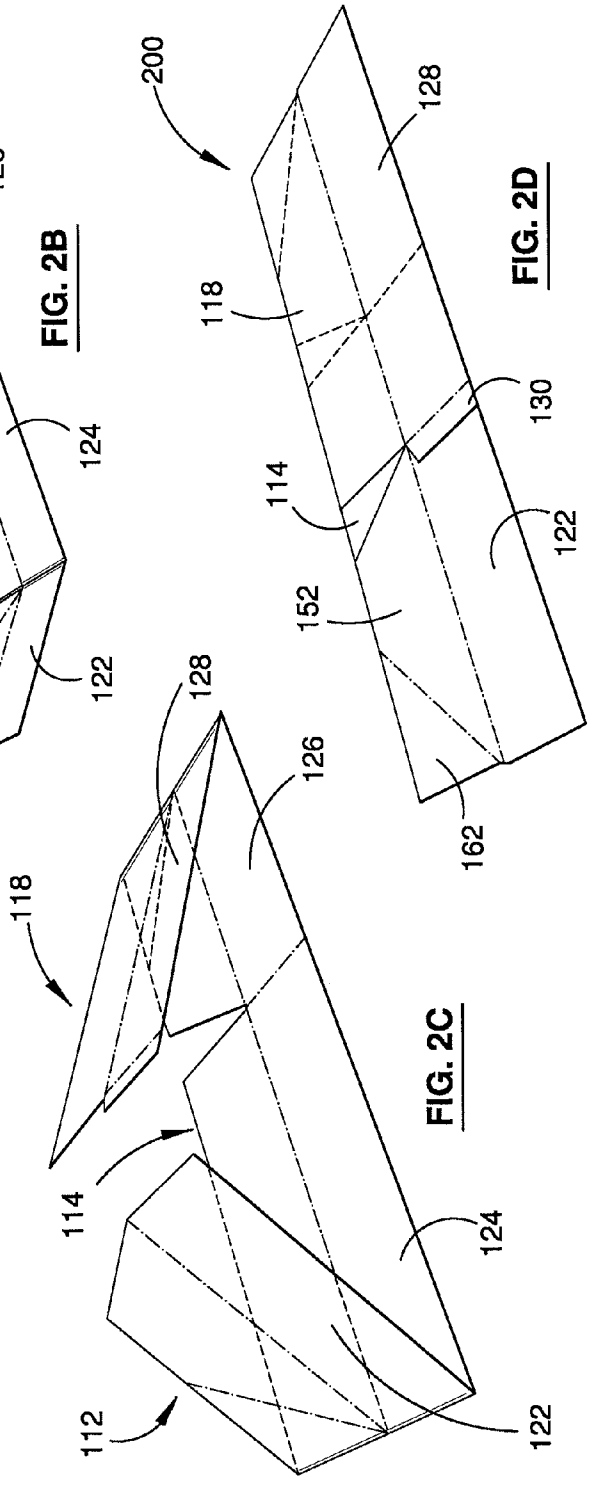


FIG. 2C

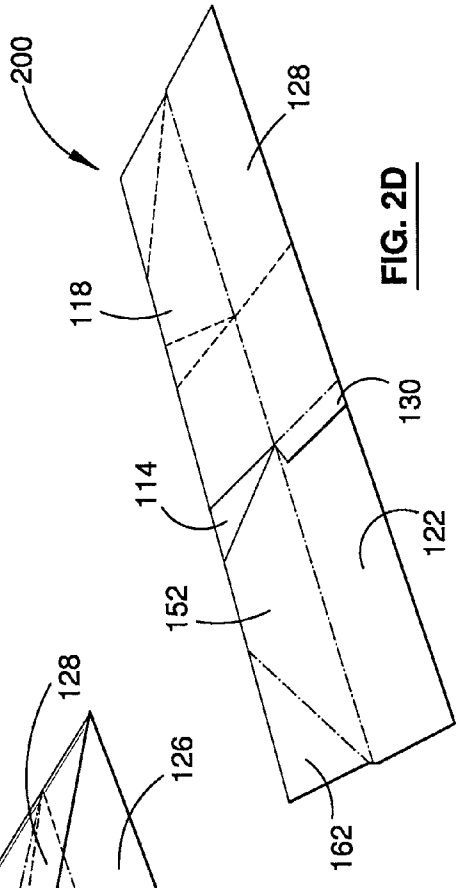


FIG. 2D

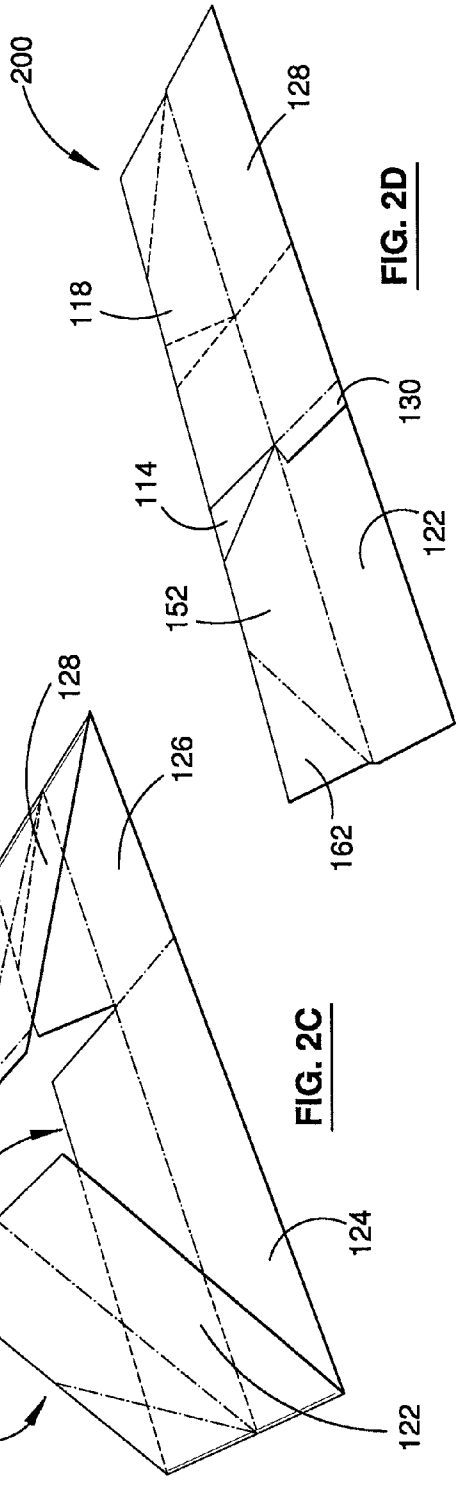


FIG. 2E

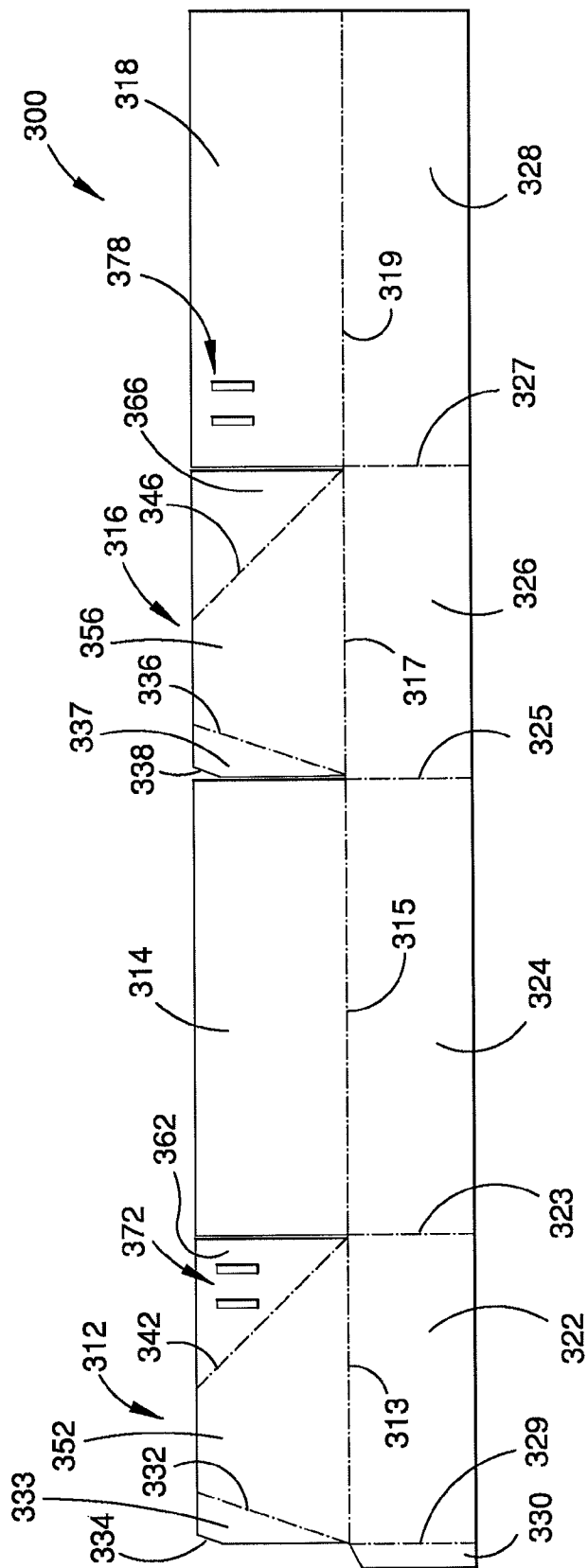


FIG. 3

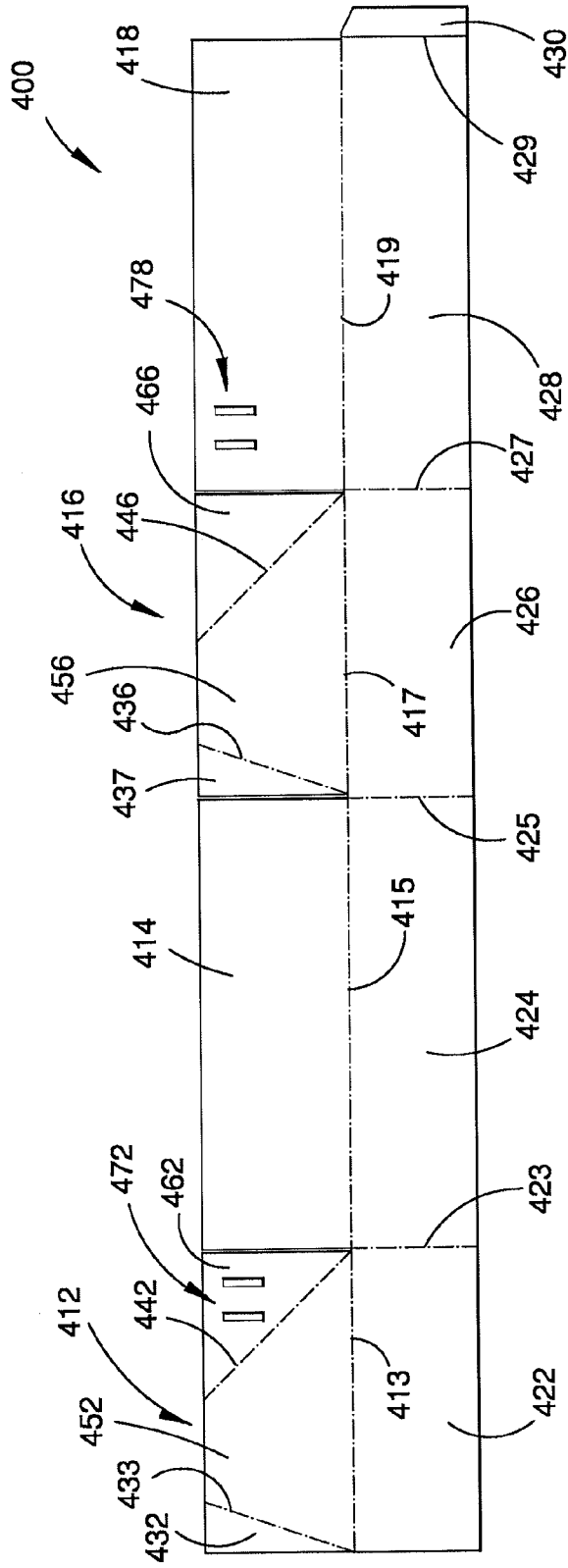


FIG. 4

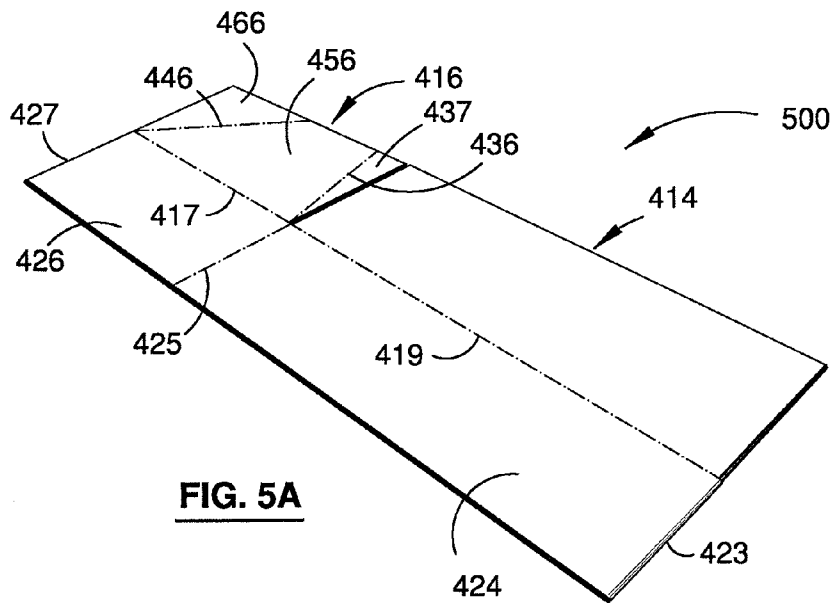


FIG. 5A

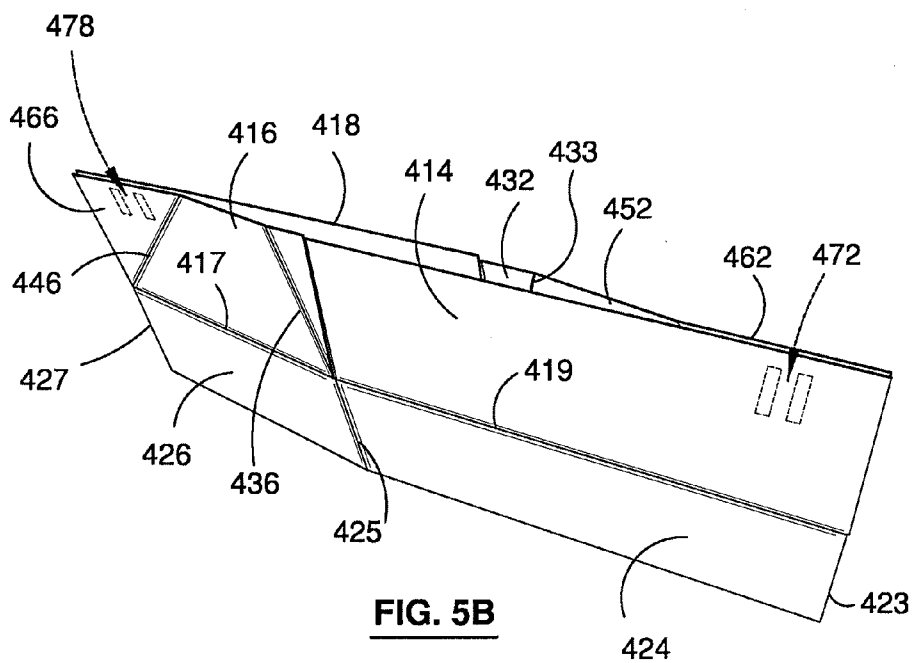
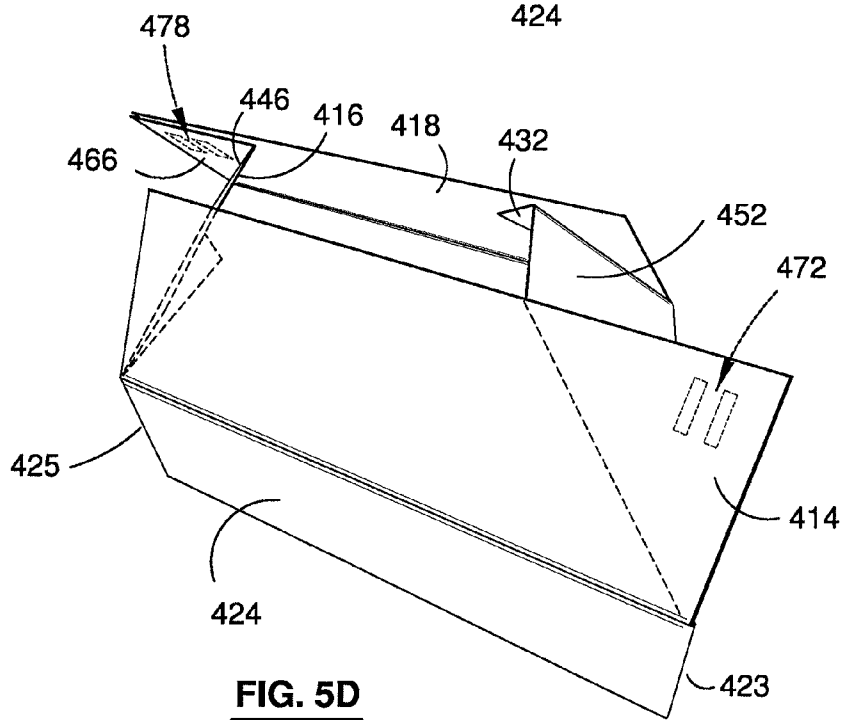
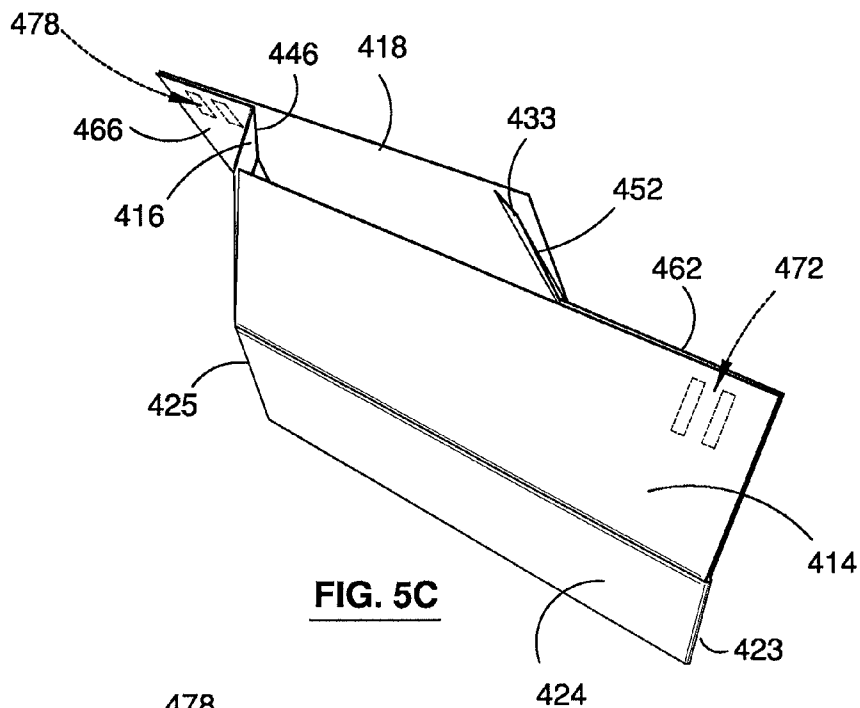
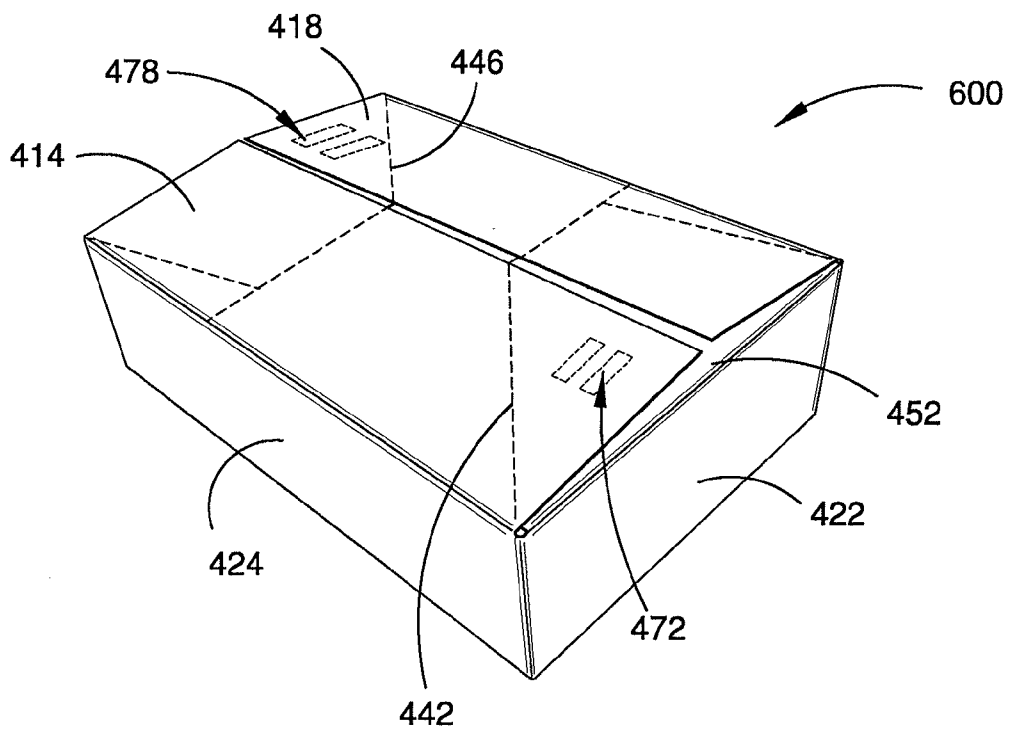
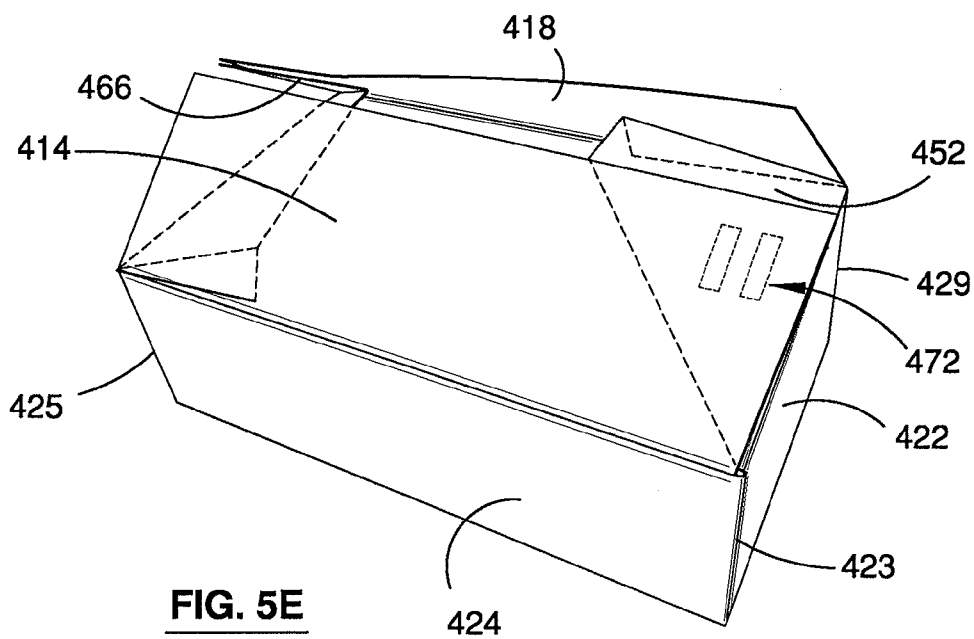


FIG. 5B





BOX LID AND BLANK THEREFOR

[0001] This application is claims benefit of Serial No. 2008903869, filed 29 Jul. 2008 in Australia and which application is incorporated herein by reference. To the extent appropriate, a claim of priority is made to the above disclosed applications.

TECHNICAL FIELD

[0002] The described embodiments relate to blanks for forming box lids and box lids formed thereby.

BACKGROUND

[0003] Some boxes may be formed from a single blank that has been preassembled. Such a preassembled box blank has all of the necessary side walls and flaps so that, when the box is erected, the flaps are folded to overlap to form top and bottom walls of the box and the box defines an enclosed space. On the other hand, some boxes are formed by two parts, such as an open bottom part and a lid fitting over the open bottom.

[0004] Of importance in manufacturing boxes and their blanks is ease of manufacture and ease of erection of the box from the preassembled blank. Boxes that require a greater number of steps in the manufacturing processes are generally more expensive to manufacture and therefore more expensive for customers to buy. Ease of manufacture of boxes can often lower costs and can result in greater product sales to customers.

[0005] Additionally, ease of erection of a box by a customer improves customer satisfaction with the box product and can lead to increased sales.

[0006] It is desired to address or ameliorate one or more shortcomings or disadvantages associated with existing box lids or blanks, or to at least provide a useful alternative thereto.

SUMMARY

[0007] Some embodiments relate to a box lid blank comprising: a first panel having a first flap extending in a first direction away from the first panel, the first flap having a first face, an opposed second face, an outer edge, a first side edge and an opposed second side edge;

[0008] a second panel coupled to the first panel and having a second flap extending in the first direction, the second flap having a first face, an opposed second face, an outer edge, a first side edge and an opposed second side edge;

[0009] a third panel coupled to the second panel and having a third flap extending in the first direction, the third flap having a first face, an opposed second face, an outer edge, a first side edge and an opposed second side edge;

[0010] a fourth panel coupled to the third panel and having a fourth flap extending in the first direction, the fourth flap having a first face, an opposed second face, an outer edge, a first side edge and an opposed second side edge; and

[0011] a coupling portion for coupling the first panel to the fourth panel;

[0012] wherein the first flap has a first score extending at a first angle of about 45° from adjacent a base of the first flap first side edge to the first flap outer edge, a first folding portion being defined by the first score, the first flap first side edge and the first flap outer edge;

[0013] wherein the third flap has a second score extending at a second angle of about 45° from adjacent a base of the third flap first side edge to the third flap outer edge, a second folding portion being defined by the second score, the third flap first side edge and the third flap outer edge;

[0014] wherein the blank comprises securing portions positioned on at least one of the first and second flaps and on at least one of the third and fourth flaps so that, when the first panel and the second panel are folded so that the first flap first face faces the second flap first face and the unfolded first folding portion overlies part of the second flap and the third panel and the fourth panel are folded so that the third flap first face faces the fourth flap first face and the unfolded second folding portion overlies part of the fourth flap, the first folding portion is securable to the second flap and the second folding portion is securable to the fourth flap; and

[0015] wherein when the first and fourth panels are coupled, the first folding portion is secured to the second flap and the second folding portion is secured to the fourth flap, the blank is erectable into a box lid in which the first, second, third and fourth panels form side walls of the box lid, the second faces of the second and fourth panels face generally outwardly, the first folding portion is folded toward the first panel second face and the second folding portion is folded toward the third panel second face.

[0016] The first flap second side edge and the third flap second side edge may be obtusely angled relative to the first flap outer edge and the third flap outer edge, respectively. The obtuse angle may be between 105° and 125°. In some embodiments, the obtuse angle is about 110°.

[0017] The first, second, third, and fourth panels may be free of flaps extending in a second direction opposite to the first direction. The securing portions may comprise adhesive.

[0018] The first flap may have a third score extending at a third angle from adjacent a base of the first flap second side edge to the first flap outer edge, a third folding portion being defined by the third score, the first flap outer edge and the first flap second side edge. The third flap may have a fourth score extending at a fourth angle from adjacent a base of the third flap second side edge to the third flap outer edge, a fourth folding portion being defined by the fourth score, the third flap outer edge and the third flap second side edge.

[0019] The third and fourth angles may be between 55° and 75° relative to a line generally parallel to the first flap outer edge and the third flap outer edge, respectively.

[0020] In some embodiments, when the first and fourth panels are coupled, the first folding portion is secured to the second flap and the second folding portion is secured to the fourth flap, the blank is erectable into the box lid by bringing a first junction of the first and second panels and a second junction of the third and fourth panels toward each other. The blank may be erectable into the box lid in a single action. In some embodiments, by bringing the first junction and the second junction toward each other, at least part of the first flap second side edge frictionally engages and slides against the fourth flap second face and at least part of the third flap second side edge frictionally engages and slides against the second flap second face.

[0021] Some embodiments relate to a box lid blank comprising side panels and end panels adapted to be connected to form a rectangular structure, side flaps and end flaps extending from the respective side panels and end panels and connected thereto by fold lines or score lines, folding portions of the end flaps being adapted to be secured to opposed facing

portions of the side flaps and to extend outwardly from the side and end panels when the rectangular structure is folded flat, the end flaps and the secured folding portions being shaped such that the secured folding portions draw the end and side flaps inwardly towards a closed position with respect to the side and end panels when the rectangular structure is formed from its folded flat condition to thereby form a lid.

[0022] Other embodiments relate to a pre-formed boxed lid comprising box lid blank embodiments described above, wherein the first and fourth panels are coupled to each other by the coupling portion, the first folding portion is secured to the second flap and the second folding portion is secured to the fourth flap. Other embodiments relate to a box lid formed from the pre-formed box lid or the box lid blank.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] Embodiments are described in further detail, by way of example, with reference to the accompanying drawings, in which:

[0024] FIG. 1 is a plan view of a box lid blank;

[0025] FIGS. 2A-2D are perspective views of the box lid blank of FIG. 1, showing a manner in which the box lid blank is used to form a pre-formed box lid;

[0026] FIG. 3 is a plan view of an alternative box lid blank;

[0027] FIG. 4 is a plan view of a further alternative box lid blank;

[0028] FIG. 5A is a perspective view of pre-formed box lid formed from the blank of FIG. 4;

[0029] FIGS. 5B to 5E are perspective views of the pre-formed box lid during erection into the box lid, illustrating relative movement of the panels and flaps during the erection process;

[0030] FIG. 5F is a perspective view of an erected box lid formed by the pre-formed box lid of FIG. 5A.

DETAILED DESCRIPTION

[0031] The described embodiments generally relate to box lid blanks, preformed box lids formed using such blanks and box lids formed from such preformed box lids. Some embodiments relate to a box lid blank comprising side panels and end panels adapted to be connected to form a rectangular structure. The side flaps and end flaps extend from the respective side panels and end panels and are connected thereto by fold lines or score lines. The end flaps have folding portions that are secured to opposed facing portions of the side flaps and extend outwardly from the side and end panels when the rectangular structure is folded flat. The end flaps and the secured folding portions are shaped such that the secured folding portions draw the end and side flaps inwardly towards a closed position with respect to the side and end panels when the rectangular structure is formed from its folded flat condition to thereby form a box lid.

[0032] Referring firstly to FIG. 1, there is shown a plan view of a box lid blank 100 which can be used to form an erected box lid. Blank 100 comprises a first flap 112, a second flap 114, a third flap 116 and a fourth flap 118, respectively coupled to or integrally formed with, first panel 122, second panel 124, third panel 126 and fourth panel 128. Blank 100 also comprises a connector flap 130 for coupling the first panel 122 to the fourth panel 128. Connector flap 130 may be located on an end of fourth panel 128, as shown in FIG. 1, or alternatively on an end of the first panel 122.

[0033] The order of the side and/or end panels and flaps shown in the figures can, in embodiments not shown, be shifted, for example so that the first and second panels and flaps have their positions swapped and the third and fourth panels and flaps have their positions swapped. The lengths and widths of the first, second, third and fourth panels can be varied to provide for box lids of different dimensions. The lengths and widths of the first, second, third and fourth flaps can be varied to suit variations in dimensions of the first, second, third and fourth panels.

[0034] Blank 100 (and blanks 300 and 400 shown in FIGS. 3 and 4) may be formed by a die cutting process from a larger piece of generally flat material. The die-cutting process includes formation of the creases and/or score lines as structural weaknesses in the material. The scoring may comprise partial cutting, while the creasing may comprise partial crushing of the material. The material of the blank 100 (and blanks 300 and 400 shown in FIGS. 3 and 4) may be a cardboard material or other material having similar structural properties.

[0035] As shown in FIG. 1, first panel 122 is coupled to first flap 112 at a crease or score line 113, second panel 124 is coupled to second flap 114 at a crease or score line 115, third panel 126 is coupled to third flap 116 at a crease or score line 117 and fourth panel 128 is coupled to fourth flap 118 at a crease or score line 119. First panel 122 is coupled to second panel 124 at a crease or score line 123. Second panel 124 is coupled to third panel 126 at a crease or score line 125. Third panel 126 is coupled to fourth panel 128 at a crease or score line 127.

[0036] Second and fourth panels 114, 118 are generally (but need not be exactly) rectangular and are sized so that, when the box lid is erected, those flaps will generally form a top, outer surface of the box lid.

[0037] An adhesive 172 and 178, such as a polyvinyl acetate (PVA) glue or thermoplastic adhesive like ethylene-vinyl acetate (EVA), is positioned at selected locations on two of the first, second, third and fourth flaps for adhering the first flap to the second flap and the third flap to the fourth flap. First flap 112 has a score line 142 extending from adjacent a base of a right side edge of flap 112 (close to where the right side edge meets crease line 113) at about a 45° angle relative to the right side edge or the crease line 113 toward the outer edge of flap 112. Score line 142 defines a triangular flap portion 162 bounded by the right side edge and outer edge of flap 112. In the embodiments shown in FIG. 1, adhesive 172 is positioned on flap portion 162 for adhering flap portion 162 to a facing portion of flap 114. Third flap 116 has a score line 146 extending from adjacent a base of a right side edge of flap 116 (close to where the right side meets crease line 117) at about a 45° angle toward an outer edge of flap 116. Score line 146 defines a triangular flap portion 166 bounded by the right side edge and outer edge of flap 116. Flap portion 166 is intended to be adhered to a facing part of flap 118 by adhesive 178 when blank 100 is in a preassembled form, such as is shown in FIG. 2D.

[0038] First flap 112 has an angled left side edge 132 that is obtusely angled relative to the outer edge of flap 112 and acutely angled relative to fold line 113. Third flap 116 also has an angled left side edge 136, angled at an obtuse angle relative to the outer edge and at an acute angle relative to crease line 117. Left side edges 132 and 136 are angled in the manner shown in FIG. 1 in order to facilitate reduced frictional engagement of left side edges 132 and 136 with fourth and

second flaps **118** and **114**, respectively, during erection of the preassembled box lid into the box lid, as illustrated in exemplary form in FIGS. **5A** to **5F**.

[0039] The obtuse angle of left side edges **132**, **136** relative to the outer edges of flaps **112**, **116**, respectively, may be between about 105° and about 125° . In the example illustrated in FIG. **1**, the obtuse angles are about 110° . Alternatively, if the angle of left side edges **132**, **136** is measured relative to crease line **113**, **117**, respectively, such acute angles are between about 55° and about 75° . In the example illustrated in FIG. **1**, the acute angles are about 70° .

[0040] In the example shown in FIG. **1**, the outer edges of first flap **112**, second flap **114**, third flap **116** and fourth flap **118** are aligned in a straight line when blank **100** is lying flat. Such outer edges need not be perfectly aligned or straight in some embodiments. Also as illustrated in FIG. **1**, because blank **100** is for erecting a box lid rather than a complete box, panels **122**, **124**, **126** and **128** have flaps extending only in one direction, namely in the direction in which first flap **112** and second flap **114**, third flap **116** and fourth flap **118** extend.

[0041] As shown in FIG. **1**, first flaps **112**, **116** have main flap portions, **152**, **156** that, when the box lid is erected, fold relative to crease lines **113**, **117** respectively, so as to lie under second and fourth flaps **114**, **118**. During this erection process, flap portions **162**, **166** fold about score lines **142**, **146** respectively so as to overlie part of main flap portions **152**, **156** respectively.

[0042] Referring now to FIGS. **2A** to **2B**, formation of box lid blank **100** into a preformed box lid **200** is described in further detail. FIG. **2A** is a perspective view of the box lid blank **100** in a flat form, following die cutting and application of adhesive. FIG. **2B** is a perspective view of blank **100** showing first panel **122** and first flap **112** being folded about crease **123** toward second panel **124** and second flap **114**, while fourth panel **128** and fourth flap **118** are folded about crease **127** toward third panel **126** and third flap **116**. FIG. **2C** is a perspective view of blank **100** with fourth panel **128** and fourth flap **118** mostly folded over towards the third panel **126** and third flap **116**. First panel **122** and first flap **112** are mostly folded over towards second panel **124** and second flap **114**. As shown in FIG. **2D**, once the first flap **122** and fourth flap **128** are folded over to lie flat against the second and third flaps **124**, **126**, and coupling portion **130** couples the first and fourth flaps together, for example by use of a suitable adhesive (not shown), a preformed box lid **200** is formed. Although not evident in FIG. **2D**, preformed box lid **200** has flap portion **162** adhered to flap **114** by adhesive **172** and flap portion **166** is adhered to flap **118** by adhesive **178**. The remaining areas of the flaps remain free from adhesive.

[0043] A suitable folding machine may be employed to fold blank **100** into preformed box lid **200** in the manner illustrated in FIGS. **2A** to **2D**.

[0044] Referring now to FIG. **3**, there is shown a plan view of a box lid blank **300** which can be used to form an erected box lid. Blank **300** comprises a first flap **312**, a second flap **314**, a third flap **316** and a fourth flap **318**, respectively coupled to or integrally formed with, first panel **322**, second panel **324**, third panel **326** and fourth panel **328**. Blank **300** also comprises a connector flap **330** for coupling the first panel **322** to the fourth panel **328**. Connector flap **330** may be located on an end of first panel **322**, as shown in FIG. **3**, or alternatively on an end of the fourth panel **328**.

[0045] As shown in FIG. **3**, first panel **322** is coupled to first flap **312** at a crease or score line **313**, second panel **324** is

coupled to second flap **314** at a crease or score line **315**, third panel **326** is coupled to third flap **316** at a crease or score line **317** and fourth panel **328** is coupled to fourth flap **318** at a crease or score line **319**. First panel **322** is coupled to second panel **324** at a crease or score line **323**. Second panel **324** is coupled to third panel **326** at a crease or score line **325**. Third panel **326** is coupled to fourth panel **328** at a crease or score line **327**.

[0046] Second and fourth panels **314**, **318** are generally (but need not be exactly) rectangular and are sized so that, when the box lid is erected, those flaps will generally form a top, outer surface of the box lid.

[0047] An adhesive **372** and **378**, such as a polyvinyl acetate (PVA) glue or thermoplastic adhesive like ethylene-vinyl acetate (EVA), is positioned at selected locations on two of the first, second, third and fourth flaps for adhering the first flap to the second flap and the third flap to the fourth flap. First flap **312** has a score line **342** extending from adjacent a base of a right side edge of flap **312** (close to where the right side edge meets crease line **313**) at about a 45° angle relative to the right side edge or the crease line **313** toward the outer edge of flap **312**. Score line **342** defines a triangular flap portion **362** bounded by the right side edge and outer edge of flap **312**. In the embodiments shown in FIG. **3**, adhesive **372** is positioned on flap portion **362** for adhering flap portion **362** to a facing portion of flap **314**. Third flap **316** has a score line **346** extending from adjacent a base of a right side edge of flap **316** (close to where the right side edge meets crease line **317**) at about a 45° angle toward an outer edge of flap **316**. Score line **346** defines a triangular flap portion **366** bounded by the right side edge and outer edge of flap **316**. Flap portion **366** is intended to be adhered to a facing part of flap **318** by adhesive **378** when blank **300** is in a preassembled form, such as is shown in FIG. **2D** or FIG. **5A**.

[0048] In the example shown in FIG. **3**, the outer edges of first flap **312**, second flap **314**, third flap **316** and fourth flap **318** are aligned in a straight line when blank **300** is lying flat. Such outer edges need not be perfectly aligned or straight in some embodiments. Also as illustrated in FIG. **3**, because blank **300** is for erecting a box lid rather than a complete box, panels **322**, **324**, **326** and **328** have flaps extending only in one direction, namely in the direction in which first flap **312** and second flap **314**, third flap **316** and fourth flap **318** extend.

[0049] In embodiments of blank **300**, for example as illustrated in FIG. **3**, the first and third flaps **312**, **316** have second score lines **332**, **336** extending from adjacent a base of a left side edge of the first and third flaps, **312**, **316**, respectively (close to where the left side edges meet crease lines **313**, **317**, respectively). Second score lines **332**, **336** are angled relative to crease lines **313**, **317** at an acute angle of about 70° , but possibly between about 55° and about 75° . Alternatively, or in addition, second score lines **332**, **336** are angled relative to the outer edge of first and third flaps **312**, **316**, respectively, at an obtuse angle of about 110° , but possibly between about 105° and about 125° .

[0050] Second score lines **332**, **336** define second flap portions **333**, **337**, respectively, that are approximately triangular (or possibly trapezoidal or trapezium-shaped), but for a chamfer of the outer left corner of first and third flaps, **312**, **316**.

[0051] Second flap portions **333**, **337** are intended to fold relative to main flap portions **352**, **356** of first and third flaps **312**, **316**, respectively, when blank **300** is used to form a preformed box lid similar to preformed box lid **200** or pre-

formed box lid **500** (shown in FIG. 5A) and is erected into a box lid. During the erection process, second flap portions **333**, **337** slide behind and underneath fourth and second flaps **318**, **314**, respectively, and engage therewith in a sliding frictional manner.

[0052] Chamfered edges **334**, **338** of the outer left corner areas of second flap portions **333**, **337** facilitate the second flap portions **333**, **337** sliding behind the adjacent right side edges of fourth and second flaps **318**, **314**, respectively, during an initial stage of erection of the preformed box lid into the erected box lid.

[0053] Referring now to FIG. 4, there is shown a plan view of a box lid blank **400** which can be used to form an erected box lid. Blank **400** comprises a first flap **412**, a second flap **414**, a third flap **416** and a fourth flap **418**, respectively coupled to or integrally formed with, first panel **422**, second panel **424**, third panel **426** and fourth panel **428**. Blank **400** also comprises a connector flap **430** for coupling the first panel **422** to the fourth panel **428**. Connector flap **430** may be located on an end of fourth panel **428**, as shown in FIG. 4, or alternatively on an end of the first panel **422**.

[0054] As shown in FIG. 4, first panel **422** is coupled to first flap **412** at a crease or score line **413**, second panel **424** is coupled to second flap **414** at a crease or score line **415**, third panel **426** is coupled to third flap **416** at a crease or score line **417** and fourth panel **428** is coupled to fourth flap **418** at a crease or score line **419**. First panel **422** is coupled to second panel **424** at a crease or score line **423**. Second panel **424** is coupled to third panel **426** at a crease or score line **425**. Third panel **426** is coupled to fourth panel **428** at a crease or score line **427**.

[0055] Second and fourth panels **414**, **418** are generally (but need not be exactly) rectangular and are sized so that, when the box lid is erected, those flaps will generally form a top, outer surface of the box lid.

[0056] An adhesive **472** and **478**, such as a polyvinyl acetate (PVA) glue or a thermoplastic adhesive like ethylene-vinyl acetate (EVA), is positioned at selected locations on two of the first, second, third and fourth flaps for adhering the first flap to the second flap and the third flap to the fourth flap. First flap **412** has a score line **442** extending from adjacent a base of a right side edge of flap **412** (close to where the right side edge meets crease line **413**) at about a 45° angle relative to the right side edge or the crease line **413** toward the outer edge of flap **412**. Score line **442** defines a triangular flap portion **462** bounded by the right side edge and outer edge of flap **412**. In the embodiments shown in FIG. 4, adhesive **472** is positioned on flap portion **462** for adhering flap portion **462** to a facing portion of flap **414**. Third flap **416** has a score line **446** extending from adjacent a base of a right side edge of flap **416** (close to where the right side edge meets crease line **417**) at about a 45° angle toward an outer edge of flap **416**. Score line **446** defines a triangular flap portion **466** bounded by the right side edge and outer edge of flap **416**. Flap portion **466** is intended to be adhered to a facing part of flap **418** by adhesive **478** when blank **400** is in a preassembled form, such as is shown in FIG. 5A.

[0057] In the example shown in FIG. 4, the outer edges of first flap **412**, second flap **414**, third flap **416** and fourth flap **418** are aligned in a straight line when blank **400** is lying flat. Such outer edges need not be perfectly aligned or straight in some embodiments. Also as illustrated in FIG. 4, because blank **400** is for erecting a box lid rather than a complete box, panels **422**, **424**, **426** and **428** have flaps extending only in one

direction, namely in the direction in which first flap **412** and second flap **414**, third flap **416** and fourth flap **418** extend.

[0058] In embodiments of blank **400**, for example as illustrated in FIG. 4, the first and third flaps **412**, **416** have second score lines **433**, **436** extending from adjacent a base of a left side edge of the first and third flaps, **412**, **416**, respectively (close to where the left side edges meet crease lines **413**, **417**, respectively). Second score lines **433**, **436** are angled relative to crease lines **413**, **417** at an acute angle of about 70°, but possibly between about 55° and about 75°. Alternatively, or in addition, second score lines **433**, **436** are angled relative to the outer edge of first and third flaps **412**, **416**, respectively, at an obtuse angle of about 110°, but possibly between about 105° and about 125°. Second score lines **433**, **436** define second flap portions **432**, **437**, respectively, that are approximately triangular.

[0059] Second flap portions **432**, **437** are intended to fold relative to main flap portions **452**, **456** of first and third flaps **412**, **416**, respectively, when blank **400** is used to form a preformed box lid similar to preformed box lid **200** or preformed box lid **500** (shown in FIG. 5A) and is erected into a box lid. During the erection process, second flap portions **432**, **437** slide behind and underneath fourth and second flaps **418**, **414**, respectively, and engage therewith in a sliding frictional manner.

[0060] The second flap portions of the first and third flaps may be present, as illustrated in FIGS. 3 and 4, or absent, as illustrated in FIG. 1. If present, the second flap portions may be chamfered at the outer left corner of the flap, as illustrated in FIG. 3, or may have no chamfer, as illustrated in FIG. 4. The chamfer, if formed, may be formed during the die-cutting and may be cut at an angle approximately parallel to second score lines **332**, **336**. A greater or lesser amount of material than is shown in FIG. 3 may be cut from the blank **300** to form the chamfer on the outer left corner of the first and third flaps, **312**, **316**, with the possible result that such embodiments of blank **300** may more closely resemble blank **100** or blank **400** in its configuration of the left side edge of each of the first and third flaps.

[0061] Referring now to FIGS. 5A to 5F, erection of a preformed box lid **500** into an erected box lid **600** is described. For illustration purposes only, preformed box lid **500** is formed by box lid blank **400**. It should be understood that box lid blanks **100** and **300** behave in substantially the same way during erection when used to form a preformed box lid, with the only difference between these embodiments being the way in which the left side edge of the first and third flaps engage with the fourth and second flaps, respectively, during erection of the preformed box lid into the erected box lid.

[0062] FIG. 5A is a perspective view of preformed box lid **500** formed from box lid blank **400** in a similar manner to that shown in FIGS. 2A to 2D. FIG. 5B is a perspective view of the preformed box lid **500** as crease line **427** (being the junction between third panel **426** and fourth panel **428**) is brought toward crease line **423** (being the junction between first panel **422** and second panel **424**), during an initial stage of erection. As shown in FIG. 5B, as crease **427** is brought toward crease **423**, flap portion **466** begins to fold relative to main flap portion **456** along score line **446** because flap portion **466** is adhered to fourth flap **418** via adhesive **478**. Simultaneously, flap portion **462** begins to fold relative to main flap portion **452** along score line **442** because flap portion **462** is adhered to second flap **414** via adhesive **472**.

[0063] During the bringing together of creases 427 and 423, first panel 422, second panel 424, third panel 426 and fourth panel 428 fold relative to each other along the crease lines that join them as they tend to adopt a parallelogram shape that gets progressively more rectangular until erected box lid 600 is formed, as shown in FIG. 5F. Thus, box lids according to the described embodiments can be erected by performing a single action of forcing creases 127/327/427 and 123/323/423 together. No additional manipulation of panels or flaps is required.

[0064] FIG. 5C illustrates another partial stage of formation of the box lid, showing greater folding of first flap portions 466 and 462 relative to main flap 456 and 452. Additionally, as is illustrated in FIG. 5C, the left side edge of each of the first and third flaps 412 and 416 slides inside and under fourth and second flaps 418, 414, respectively and begin a sliding frictional engagement therewith as creases 423 and 427 are brought toward each other.

[0065] This sliding frictional engagement of the left side edges of the first and third flaps 412, 416 with fourth and second flaps 418, 414 is further evident in FIG. 5D and FIG. 5E, which show further progression of the preformed box lid 500 into the erected box lid 600. The amount of frictional resistance from this sliding engagement is initially small and increases to a maximum somewhere between the states shown in FIGS. 5B to 5E before sharply decreasing prior to formation of erected box lid 600.

[0066] As is evident from FIG. 5D, second flap portions 432, 437 fold relative to main flap portions 452, 456, respectively, about second score lines 433, 436 as the force used to bring creases 427 and 423 towards each other forces first and third flaps 412 and 416 downward under the second and fourth flaps 414 and 418. Because first flap portion 466 is adhered to fourth flap 418 and first flap portion 462 is adhered to second flap 414, as the first and third flaps 412 and 416 are forced downward, second and fourth flaps 414 and 418 are also forced downward through their connection with first flap portions 462 and 466. This is particularly facilitated by the approximately 45° angle of score lines 442 and 446. Some variation of the angle of the score line may be permitted, so long as the behaviour of the first, second, third and fourth flaps relative to each other as illustrated in FIGS. 5B to 5F is retained.

[0067] FIG. 5E shows a perspective view of the preformed box lid being almost erected into box lid 600. As is illustrated in FIG. 5E, at this stage, first and third flaps 412, 416 lie mostly underneath second and fourth flaps 414, 418 and the first, second, third and fourth panels 422, 424, 426 and 428 form side walls of the box lid in a nearly rectangular configuration.

[0068] FIG. 5F is a perspective view of the erected box lid 600 showing first and third flaps 412, 416 substantially underlying second and fourth flaps 414, 418, while first flap portions 462, 466 are folded over onto main flap portions 452, 456 along score lines 442, 446.

[0069] Erected box lid 600 is ready for placement over a bottom part for formation into a box. Because of the structure and material of box lid 600, box lid 600 tends to retain its erected shape without the aid of further mechanical assistance, such as adhesive tape to bind the second and fourth flaps 414, 418 together in the erected position. However, for ease of handling and safety of transport, straps may be put around the box lid and bottom portion to securely close the contents of the box.

[0070] The ease of erection of preformed box lid 500 into erected box lid 600 also translates into easy collapsing of the erected box lid 600, if desired. If it is desired to collapse box lid 600 back into the flattened state of the preformed box lid 500, it is only necessary for a person to push the corner edges of box lid 600 (at creases 425 and 429) together to reverse the process illustrated in the sequence of FIGS. 5B to 5F.

[0071] The box lid blanks 100, 300 and 400 are easy to manufacture as they only require one die-cutting step, one glue step and one folding step performed in succession in one operation in order to produce a preformed box lid. The preformed box lid is easily erected into a useable box lid (and easily collapsed, if desired) in the manner described.

[0072] The cutting, gluing and folding can be performed by one machine, such as a “flexo-folder-gluer” made by EMBA Machinery AB of Sweden, supplemented with a secondary glue system located at the beginning of the folding rails (immediately prior to folding of the blank in the manner illustrated in FIGS. 2B and 2C) for applying adhesive 172, 178, 372, 378, 472, 478. The secondary glue system may comprise a digitally adjustable two-head glue applicator, such as is available from Copar Corporation of Burbank, Ill., USA, for example.

[0073] The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

[0074] Throughout this specification and the claims which follow, unless the context requires otherwise, the word “comprise”, and variations such as “comprises” and “comprising”, will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

1. A box lid blank comprising:

- a first panel having a first flap extending in a first direction away from the first panel, the first flap having a first face, an opposed second face, an outer edge, a first side edge and an opposed second side edge;
 - a second panel coupled to the first panel and having a second flap extending in the first direction, the second flap having a first face, an opposed second face, an outer edge, a first side edge and an opposed second side edge;
 - a third panel coupled to the second panel and having a third flap extending in the first direction, the third flap having a first face, an opposed second face, an outer edge, a first side edge and an opposed second side edge;
 - a fourth panel coupled to the third panel and having a fourth flap extending in the first direction, the fourth flap having a first face, an opposed second face, an outer edge, a first side edge and an opposed second side edge; and
 - a coupling portion for coupling the first panel to the fourth panel;
- wherein the first flap has a first score extending at a first angle of about 45° from adjacent a base of the first flap first side edge to the first flap outer edge, a first folding portion being defined by the first score, the first flap first side edge and the first flap outer edge;
- wherein the third flap has a second score extending at a second angle of about 45° from adjacent a base of the third flap first side edge to the third flap outer edge, a

second folding portion being defined by the second score, the third flap first side edge and the third flap outer edge;

wherein the blank comprises securing portions positioned on at least one of the first and second flaps and on at least one of the third and fourth flaps so that, when the first panel and the second panel are folded so that the first flap first face faces the second flap first face and the unfolded first folding portion overlies part of the second flap and the third panel and the fourth panel are folded so that the third flap first face faces the fourth flap first face and the unfolded second folding portion overlies part of the fourth flap, the first folding portion is securable to the second flap and the second folding portion is securable to the fourth flap; and

wherein when the first and fourth panels are coupled, the first folding portion is secured to the second flap and the second folding portion is secured to the fourth flap, the first folding portion is secured to the second flap and the second folding portion is secured to the fourth flap, the blank is erectable into a box lid in which the first, second, third and fourth panels form side walls of the box lid, the second faces of the second and fourth panels face generally outwardly, the first folding portion is folded toward the first panel second face and the second folding portion is folded toward the third panel second face.

2. The blank of claim 1, wherein the first flap second side edge and the third flap second side edge are angled at an obtuse angle relative to the first flap outer edge and third flap outer edge, respectively.

3. The blank of claim 2, wherein the obtuse angle is between 105° and 125°.

4. The blank of claim 1, wherein the first flap has a third score extending at a third angle from adjacent a base of the first flap second side edge to the first flap outer edge, a third folding portion being defined by the third score, the first flap outer edge and the first flap second side edge.

5. The blank of claim 4, wherein the third angle is between 55° and 75° relative to a line generally parallel to the first flap outer edge.

6. The blank of claim 1, wherein the third flap has a fourth score extending at a fourth angle from adjacent a base of the third flap second side edge to the third flap outer edge, a fourth folding portion being defined by the fourth score, the third flap outer edge and the third flap second side edge.

7. The blank of claim 6, wherein the fourth angle is between 55° and 75° relative to a line generally parallel to the third flap outer edge.

8. The blank of claim 1, wherein when the first and fourth panels are coupled, the first folding portion is secured to the second flap and the second folding portion is secured to the fourth flap, the blank is erectable into the box lid by bringing a first junction of the first and second panels and a second junction of the third and fourth panels toward each other.

9. The blank of claim 8, wherein the blank is erectable into the box lid in a single action.

10. The blank of claim 8, wherein by bringing the first junction and the second junction toward each other at least part of the first flap second side edge frictionally engages and slides against the fourth flap second face and at least part of the third flap second side edge frictionally engages and slides against the second flap second face.

11. The blank of claim 1, wherein the first, second, third and fourth panels are free of flaps extending in a second direction opposite to the first direction.

12. The blank of claim 1, wherein a corner of each of the first and third flaps is chamfered opposite respective first side edges of the first and third flaps.

13. The blank of claim 1, wherein the securing portions comprise adhesive.

14. A pre-formed box lid comprising the box lid blank of claim 1, wherein the first and fourth panels are coupled to each other by the coupling portion, the first folding portion is secured to the second flap and the second folding portion is secured to the fourth flap.

15. A box lid formed from the pre-formed box lid of claim 14.

16. A box lid formed from the box lid blank of claim 1.

17. A box lid blank comprising side panels and end panels adapted to be connected to form a rectangular structure, side flaps and end flaps extending from the respective side panels and end panels and connected thereto along fold lines or score lines, folding portions of said end flaps being adapted to be secured to opposed facing portions of the side flaps and to extend outwardly from the side and end panels when the rectangular structure is folded flat, said end flaps and the secured folding portions being shaped such that the secured folding portions draw the end and side flaps inwardly towards a closed position with respect to the side and end panels when the rectangular structure is formed from its folded flat condition to thereby form a lid.

18. A pre-formed box lid formed from the box lid blank of claim 17, wherein the pre-formed box lid is erectable into the lid.

19. A box lid formed from the pre-formed box lid of claim 18.

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