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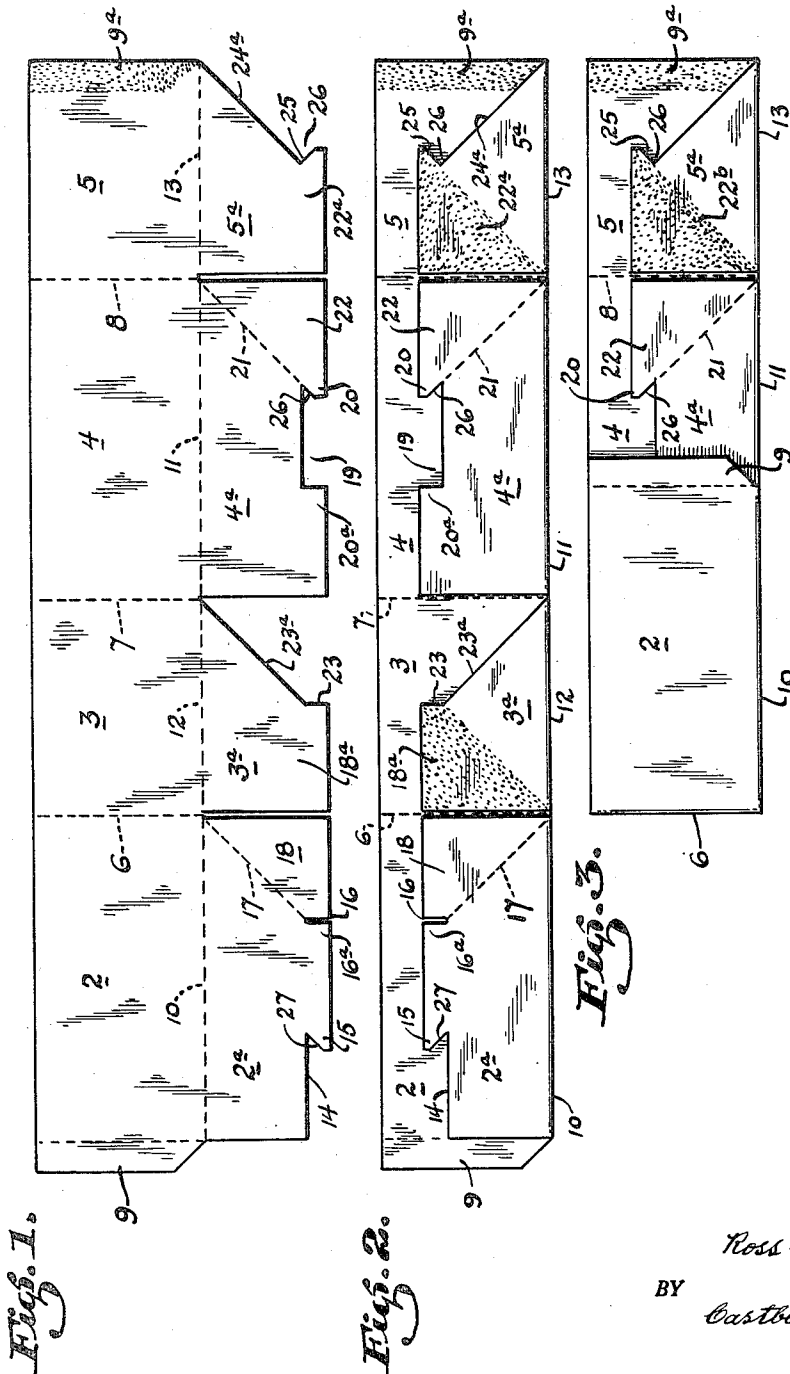
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2,327,709

BOTTOM STRUCTURE FOR FOLDING PAPER BOXES

Filed Feb. 24, 1941

3 Sheets-Sheet 1



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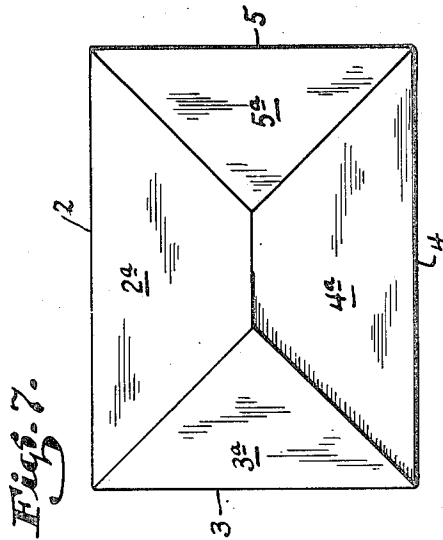
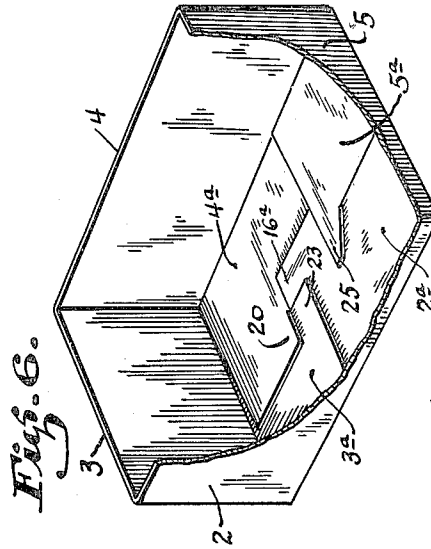
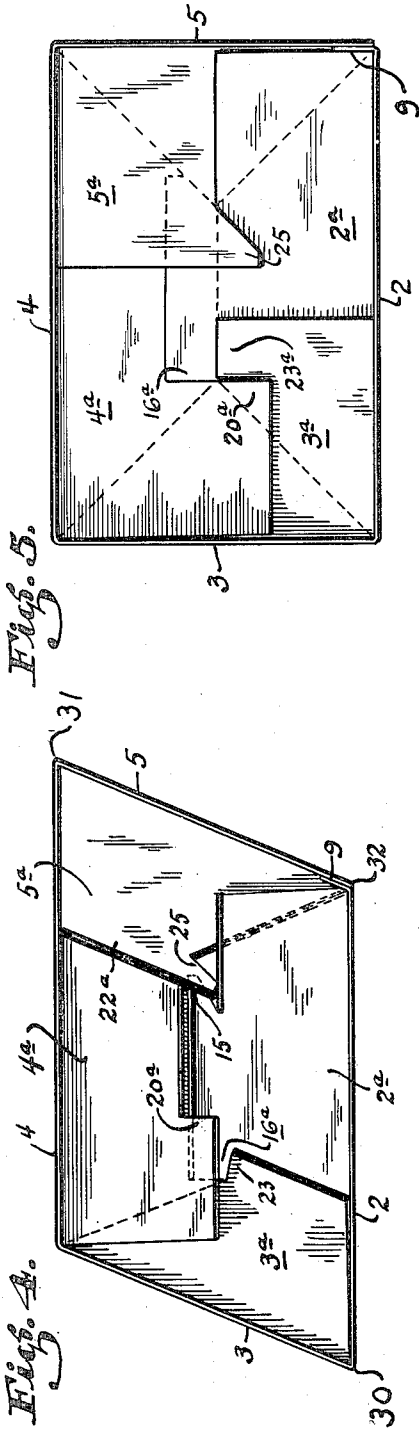
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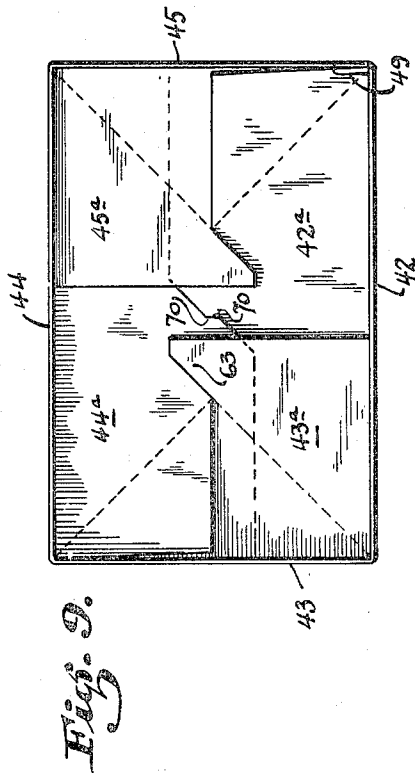
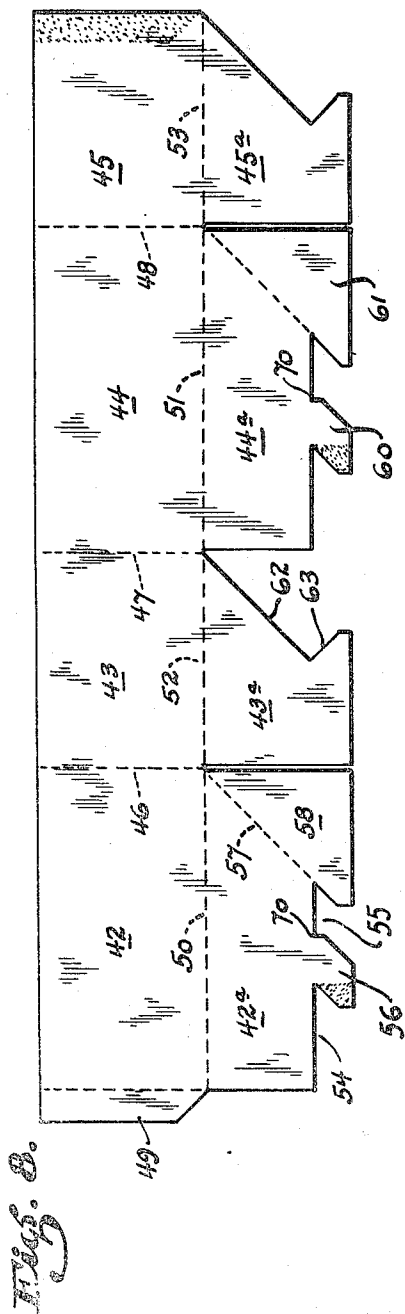
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UNITED STATES PATENT OFFICE

2,327,709

BOTTOM STRUCTURE FOR FOLDING PAPER BOXES

Ross A. Himes, Oakland, Calif.

Application February 24, 1941, Serial No. 380,250

6 Claims. (Cl. 229—39)

This invention relates to a bottom structure for folding paper boxes.

Folding paper or cardboard boxes which are made in flat or folded form and which are adapted to be readily extended or opened for use are commonly employed. Two general forms of bottom structure are used in boxes of this type. First, there is a multiple section bottom which is placed in position by a separate manual operation after the sides and ends are extended; and secondly there is a multiple section bottom in which glued tabs connect the several sections in such a manner that the bottom unfolds and positions itself automatically and simultaneously with the extension or opening of the sides and ends of the box.

This latter type is the most popular, as it is readily and quickly opened in one operation, and at the same time provides a stronger or more rigid bottom structure. This type, however, presents one weakness, to wit, that of depending upon the glued tabs to secure the bottom sections with relation to each other. That is, the glue will often soften and let go when a box of this character is subjected to water or moisture either from the exterior or from the contents placed in the box, and when this happens the bottom gives way and the contents are likely to fall out.

The object of the present invention is to provide a multiple section bottom for folding boxes which will automatically unfold and become extended in unison with the unfolding or opening of the sides and ends, but which distinguishes from boxes of a similar type by constructing or arranging the multiple sections of the bottom in such a manner that as they are opened and extended they will be arranged to support each other, and in addition thereto, one or more interlocks will be formed between two or more of the bottom sections to further increase strength and to prevent separation of the bottom sections if the glued corner of the box should let go.

In the present structure, a pair of glued tabs are employed but they are in no way depended upon to tie or support the bottom sections with relation to each other. Their only use or purpose is that of connecting or aiding in directing the bottom sections into their proper positions during unfolding or opening of the box. Thereafter the glue may let go without affecting the strength or supporting action of the bottom sections with relation to each other.

A folding box employing a bottom structure forming the subject matter of this application is shown by way of illustration in the accompanying drawings, in which

Fig. 1 is a plan view of the box blank;

Fig. 2 is a similar view showing the bottom sections of the box blank folded over the side and end wall sections;

Fig. 3 is a similar view showing the manner in which the blank is folded after glue has been applied to the bottom sections, assuming the position shown in Fig. 2;

Fig. 4 is a perspective view of the bottom of the box, looking from the upper side thereof, just before it is fully extended;

Fig. 5 is a plan view of the bottom of the box, looking from the upper side thereof after it has been fully extended, said view also showing the side and end walls of the box removed; and

Fig. 6 is a perspective view of the box in open or extended position, with one side and end wall partially broken away; and

Fig. 7 is a bottom view of the box;

Fig. 8 is a plan view showing a modified form of box blank; and

Fig. 9 is a plan view of a box formed from the blank shown in Fig. 8.

The box shown in Figs. 1 to 7 is formed from a die-cut blank such as shown in Fig. 1. This blank is cut and creased to form a pair of side wall sections 2 and 4 and a pair of end wall sections 3 and 5. These sections are foldably connected by crease lines formed at the points indicated at 6, 7, and 8, and the side wall section 2 is provided with a creased flap 9 which serves to connect the free corners of the box when assembling the same.

The bottom of the box is formed from a pair of side bottom sections 2a and 4a foldably joined to the respective side wall sections 2 and 4 by creased lines 10 and 11, and a pair of end bottom sections 3a and 5a are foldably joined to the respective end wall sections 3 and 5 by crease lines 12 and 13.

The side bottom section 2a is cut away as at 14 to form an interlocking lug 15 and it is cut at 16 and creased as at 17 to form a flap 18 which will hereinafter be referred to as a glue flap. The side bottom section 4a is cut away at 19 to form an interlocking lug 20 and it is creased as at 21 to form a flap 22 which will also be referred to as a glue flap. The end bottom section 3a is cut away as at 23 to form a complementary surface 18a for the glue flap 18. The end bottom section 5a is also cut away as at 24 to form a complementary surface 22a for reception of the flap 22. The creases 17 and 21 are arranged on an angle of substantially 45° and so are the cut lines indicated at 23a and 24a, and the same may be said of lines 25, 26 and 27.

A box blank cut and creased in the manner shown in Fig. 1 may be folded and assembled by machine operation or by hand operation, but as no machine is illustrated, let it be assumed that the box is to be folded, glued and assembled by hand. If that is the case, the first operation in assembling the box will be that of folding the side and end bottom sections along the crease

lines 10, 11, 12 and 13 to overlie the wall sections 2, 3, 4 and 5, as shown in Fig. 2. When this has been accomplished, glue is applied to the dotted areas indicated at 18a, 22a and 9a. Thereafter the sections 2 and 2a are folded to overlie the sections 3 and 3a and partially to overlie the sections 4 and 4a. In this position the glue flap 18 will contact the glued area 18a and will permanently adhere thereto. The next and final operation is that of folding the sections 5 and 5a over the sections 4 and 4a and the flap 9. The glued area 22a will thus overlie and engage the flap 22 and will adhere thereto, while the glued area 9a will overlie the flap 9 and adhere thereto. In this position the box blank is completely folded and assembled, and in that condition may be delivered to the trade, and it may be retained in the flat condition until ready for use.

When the box is to be used, or in other words opened or extended, it is merely necessary to push inwardly on the corners 30 and 31 of the box. In doing so, the side and end wall sections of the box will finally reach a position at right angles to each other and the glue tabs will direct the bottom sections into their proper positions. When they reach their proper positions, all bottom sections will be flat and all of them will have portions both over- and underlying each other. The lug 15 will extend in under the glue flap 22 and interlock therewith. That is, the 45° angle surface 27 of the lug 15 will engage the 45° crease line 21 of the flap 22, and the side section 2a thus becomes interlocked with relation to the side section 4a and they are thereby secured against lateral movement with relation to each other. This is important, as the glue flap 9 is disposed in the adjacent corner, as shown at 32. This glue flap might let go under conditions of water or moisture, but even if it does so, the bottom sections will not separate, due to the interlock between the lug 15 and the flap 22.

The lugs 16a and 20a will also interlock. They are formed on the respective side bottom sections, and they lock these against longitudinal movement with relation to each other. Thus the bottom sections are locked both laterally and longitudinally.

By referring to Fig. 5 it will be noted that the side bottom section 2a rests on top of the end bottom section 5a, and also that a portion of the side bottom section 2a underlies said end bottom section. Similarly, a portion of the end bottom section 5a underlies the side bottom section 2a and another portion overlies the side bottom section 2a. This is true of every section. The bottom sections thus not only support one another to form a rigid, strong bottom, but they are also interlocked with relation to each other, both longitudinally and laterally, thereby strengthening the structure of the bottom and the box as a whole.

By the method of arranging and interlocking the several bottom sections the glue flaps may, due to moisture conditions, let go, but this will not be detrimental or reduce the strength of the box bottom, as the main function of the glue tabs is that of directing the bottom sections into their respective positions during unfolding of the box. Their other function is that of forming interlocking members, and this function is retained even if the glue lets go.

In Figs. 8 and 9 a modified form of the bottom structure is disclosed. In this instance the blank (see Fig. 8) is cut and creased to form a pair of side wall sections 42 and 44, and a pair

of end wall sections 43 and 45. These sections are foldably connected by crease lines formed at the points indicated at 46, 47 and 48, and the side wall section 42 is provided with a creased foldable glue flap 49 which serves to connect the free corners of the box when assembling the same.

The bottom of the box is formed from a pair of side bottom sections 42a and 44a foldably joined to the respective side wall sections 42 and 44 by crease lines 50 and 51, and a pair of end bottom sections 43a and 45a are foldably joined to the respective end wall sections 43 and 45 by crease lines 52 and 53. The side bottom section 42a is cut away as at 54 and 55 to form an interlocking lug 56 and a diagonal crease line is formed at 57 to provide a foldable flap 58, which is similar to and serves the same purpose as the glue flap 18 of the blank shown in Fig. 1. The side bottom section 44a is cut away in the identical manner as the side bottom section 42a to form an interlocking lug 60, and it is creased in the same manner to form a glue flap 61. The end bottom section 43a is cut away on one side on an angle of substantially 45°, as indicated at 62, and then at right angles thereto, as at 63, to form a surface complementary to the glue flap 58. The end bottom section 45a is cut away in a manner identical to the end bottom section 43a, and thus provides a surface complementary to, and for the purpose of receiving, the glue flap 61.

From the foregoing it will be seen that each side bottom section is identical in shape, and that each carries an interlocking lug and a glue flap; similarly it will be noted that each end bottom section is identical in shape, and that each is cut or shaped to form a surface complementary to the glue flap which is to be secured thereto.

Another feature which should be noted is that each of the interlocking lugs 56 and 60 has a rear right-angular shoulder 70 formed thereon. This is important as these shoulders meet and interlock at a point substantially central of the bottom sections when fully extended, and secures the several sections against longitudinal movement, while the lugs 56 and 60 secure the several bottom sections against lateral movement.

The blank of Fig. 8 is folded and glued in the same manner as that shown in Fig. 1; i. e., the side and end bottom sections are first folded over the side and end wall sections of the box, in the same manner as shown in Fig. 2. Glue is then applied to the areas on the end bottom sections which are complementary to the adjacent glue flaps, and the sections are then folded in the manner shown in Fig. 3; finally the end wall section 45 and attached bottom section 45a is folded over to engage the glue flap 49, when the operation is completed.

The box is now complete, and assumes a flat folded form, and when it is to be extended or opened for use, inward pressure is applied to the opposite corners, as previously described in connection with the structure shown in Figs. 1 to 7. During the opening of the box, the interlocking lug 60 will pass in under the glue flap 58, which is overlaid and glued to the end bottom section 43a, and will interlock with said glue flap. Similarly, interlocking lug 56 will pass in under the glue flap 61 which is overlaid by the end bottom section 45a and glued thereto. A lateral interlock is thus formed at each end of the box, and

as the shoulders 70 also interlock, a longitudinal interlock is formed.

Having thus described and illustrated my invention, what I claim and desire to secure by Letters Patent is:

1. A folding paper box having foldably connected side and end walls, side bottom sections and end bottom sections foldably connected to the lower edges of the respective side and end walls and adapted to lie flat between the side and end walls when they are folded flat, a glue flap foldably connecting one side and one end bottom section, a second glue flap foldably connecting the other side and end bottom section, said foldable glue flaps being disposed between the side and end bottom sections which they connect, and assuming a folded position only in the open position of the box, said glue flaps automatically extending the bottom sections when the side and end walls are extended and directing the bottom sections to assume predetermined positions with relation to each other, and a lateral interlock between the bottom sections formed by a lug on one of the side bottom sections positioned to extend in under an interlock with a glue flap on the other side bottom section when the blank assumes box form.

2. A folding paper box having foldably connected side and end walls, side bottom sections and end bottom sections foldably connected to the lower edges of the respective side and end walls and adapted to lie flat between the side and end walls when they are folded flat, a glue flap foldably connecting one side and one end bottom section, a second glue flap foldably connecting the other side and end bottom section, said foldable glue flaps being disposed between the side and end bottom sections which they connect, and assuming a folded position only in the open position of the box, said glue flaps automatically extending the bottom sections when the side and end walls are extended and directing the bottom sections to assume predetermined positions with relation to each other, and a pair of lateral interlocks formed between the two side bottom sections, said interlock being formed by a lug on each side bottom section, said lugs being positioned to extend in under an interlock with the glue flap of an opposite side bottom section when the blank assumes box form.

3. A folding paper box having foldably connected side and end walls, side bottom sections and end bottom sections foldably connected to the lower edges of the respective side and end walls and adapted to lie flat between the side and end walls when they are folded flat, a glue flap foldably connecting one side and one end bottom section, a second glue flap foldably connecting the other side and end bottom section, said foldable glue flaps being disposed between the side and end bottom sections which they connect, and assuming a folded position only in the open position of the box, the folding connections of the glue flaps being disposed on angles to the corners of the box, to form lug-receiving pockets, one at each end of the box, said glue flaps automatically extending the bottom sections when the side and end walls are extended to box form and directing the bottom sections to assume predetermined positions with relation to each other, a pair of lateral interlocks between the side bottom sections formed by a lug on each side bottom section, said lugs being positioned to extend into the respective lug-receiving pockets and inter-

lock therewith when the blank assumes box form, and means for interlocking the bottom sections against longitudinal separation.

4. A folding paper box having foldably connected side and end walls, side bottom sections and end bottom sections foldably connected to the lower edges of the respective side and end walls and adapted to lie flat between the side and end walls when they are folded flat, a glue flap foldably connecting one end and one side bottom section, a second glue flap connecting the other end and side bottom section, said flaps being disposed between the side and end bottom sections which they connect, said glue flaps automatically extending the bottom sections when the side and end walls are extended and directing the bottom sections to assume predetermined positions with relation to each other, a lateral interlock between the two side bottom sections formed by a lug on one of the side bottom sections positioned to extend in under an interlock with a glue flap on the other side bottom section when the blank assumes a box form, and a lug on the other side bottom section, said lugs engaging each other when the blank assumes box form and forming a longitudinal interlock between the side bottom sections.

5. A box blank cut and creased to form a pair of side walls and a pair of end wall sections foldably connected and disposed in end to end series, a side bottom section foldably connected to each side wall, an end bottom section foldably connected to each end wall, a flap connected by a diagonal crease line to each side bottom section, said crease lines extending toward an inner corner of each section and being disposed on an angle of substantially 45 degrees and both crease lines extending in the same direction, a lug formed on the free side of one of the side bottom sections, said lug being pointed at one end and extending in under and forming a lateral interlock with the folded glue flap on the other side bottom section when the blank assumes box form and said lug having a shoulder formed on its opposite end, and a lug formed on the other side bottom section and having a shoulder on one end which engages the shoulder on the first-named lug to form a longitudinal interlock between the side bottom sections when the blank assumes box form.

6. A box blank cut and creased to form a pair of side walls and a pair of end wall sections foldably connected and disposed in end to end series, a side bottom section foldably connected to each side wall, an end bottom section foldably connected to each end wall, a flap connected by a diagonal crease line to each side bottom section, said crease lines extending toward an inner corner of each section and being disposed on an angle of substantially 45 degrees and both crease lines extending in the same direction, an interlocking lug on the free side of each side bottom section, said lugs each having a pointed portion at one end extending in under and interlocking with the respective glue flaps to form a lateral interlock between the side and end bottom sections when the blank assumes box form, and a shoulder formed on the other end of each lug, said shoulders interlocking with each other and forming a longitudinal interlock between the side bottom sections when the blank assumes box form.

ROSS A. HIMES.