Oct. 2, 1956 M. I. WILLIAMSON 2,765,113

HOLLOW-WALLED BOXES

Filed April 13, 1953 6 Sheets-Sheet 1

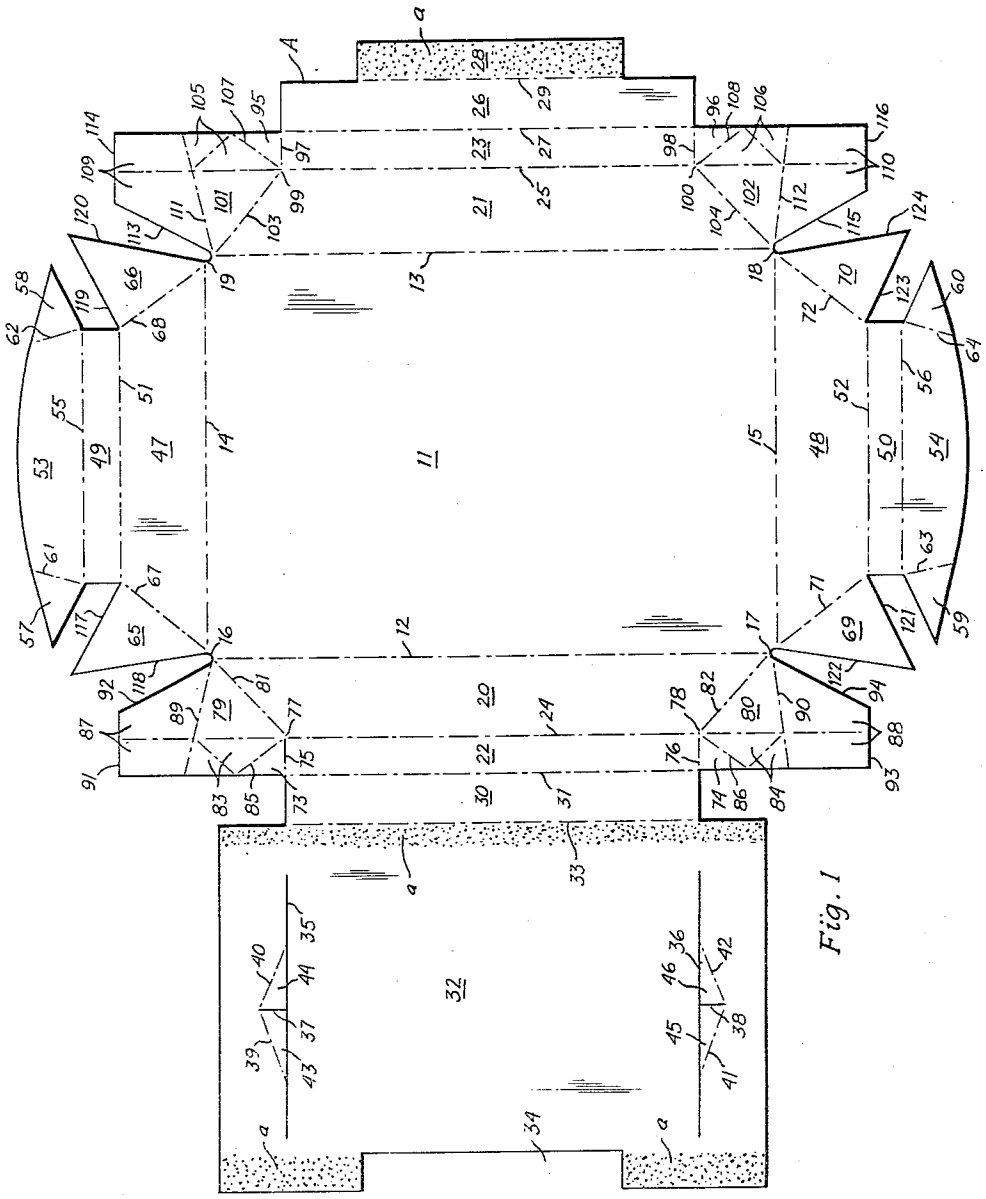

Fig. 1

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HOLLOW-WALLED BOXES

Filed April 13, 1953 6 Sheets-Sheet 2

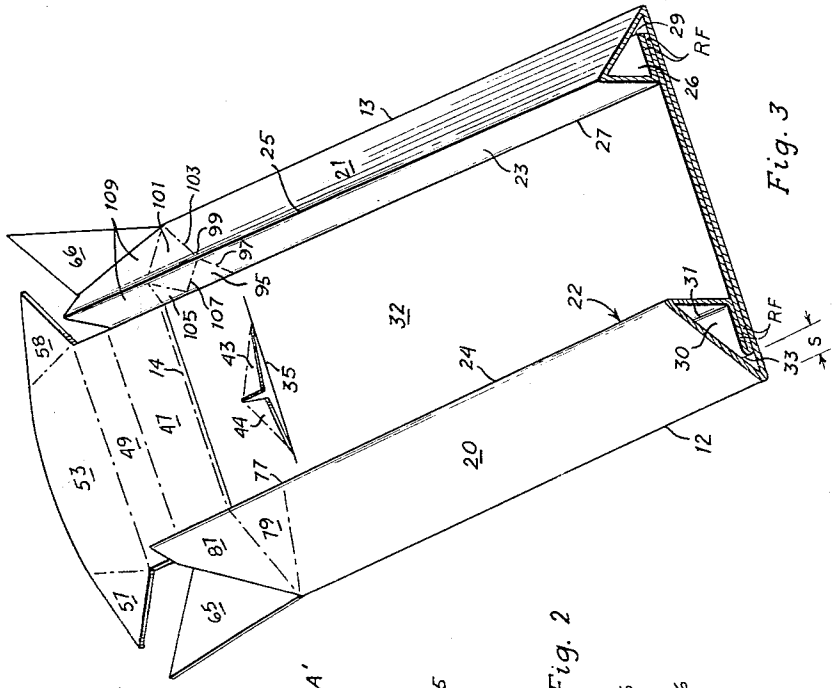

Fig. 3

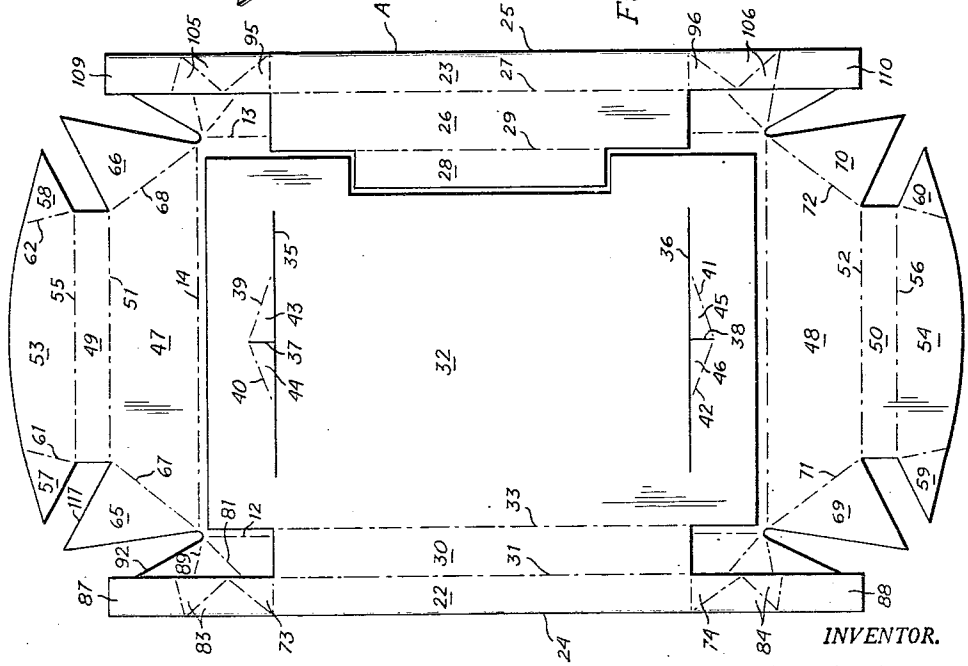

Fig. 2

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HOLLOW-WALLED BOXES

Filed April 13, 1953 6 Sheets-Sheet 3

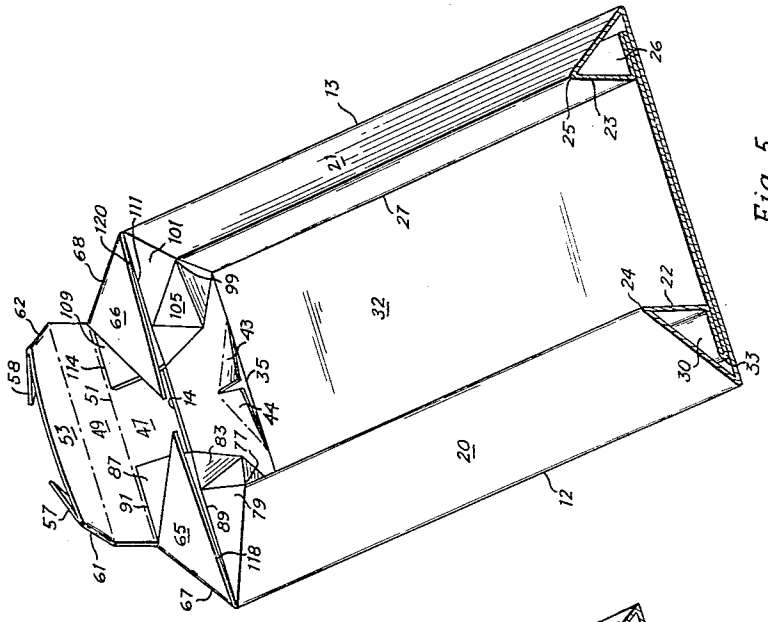

Fig. 5

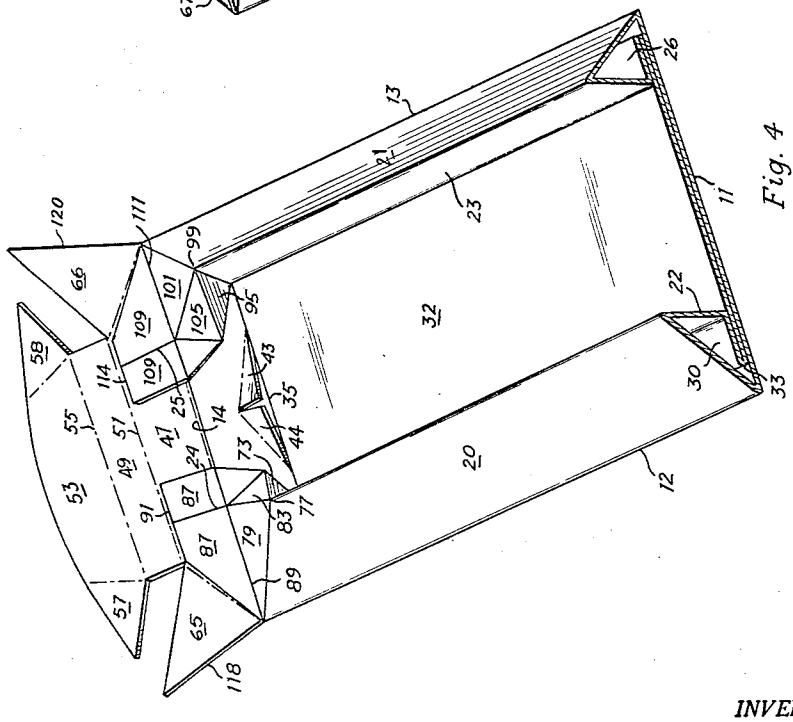

Fig. 4

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HOLLOW-WALLED BOXES

Filed April 13, 1953 6 Sheets-Sheet 4

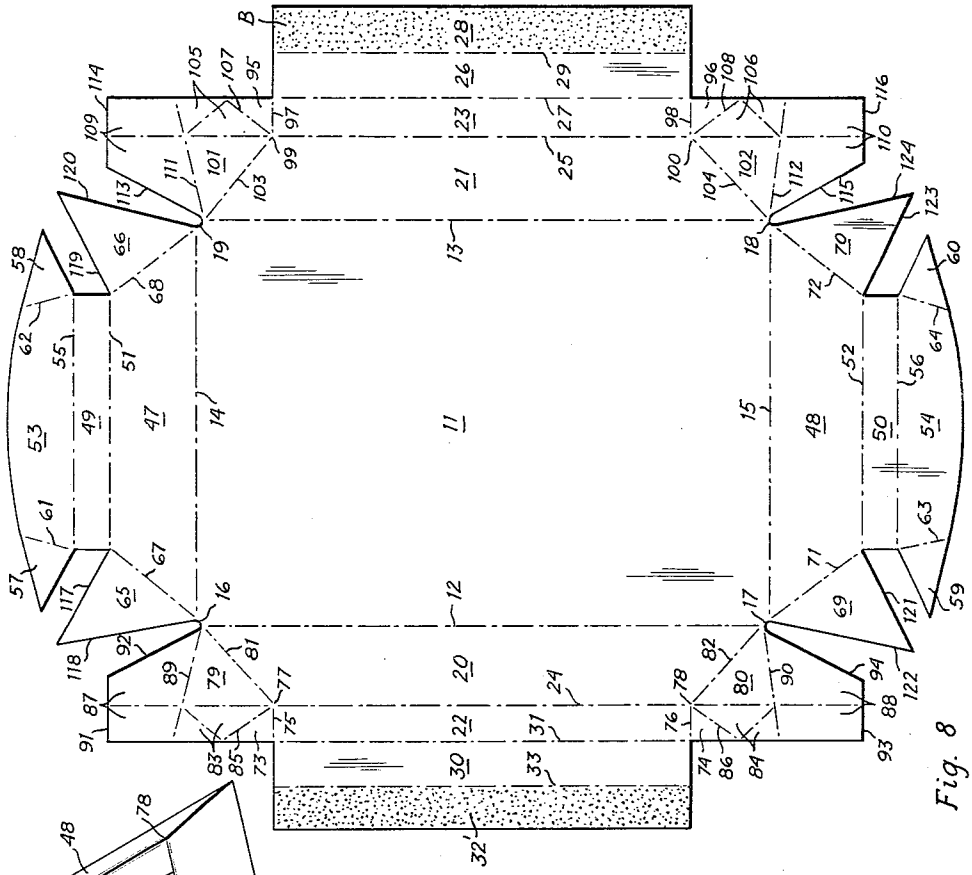

Fig. 8

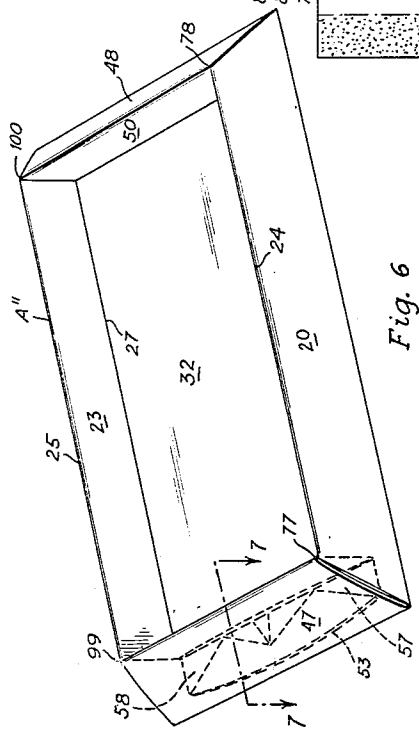

Fig. 6

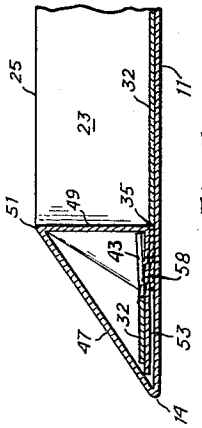

Fig. 7

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HOLLOW-WALLED BOXES

Filed April 13, 1953 6 Sheets-Sheet 5

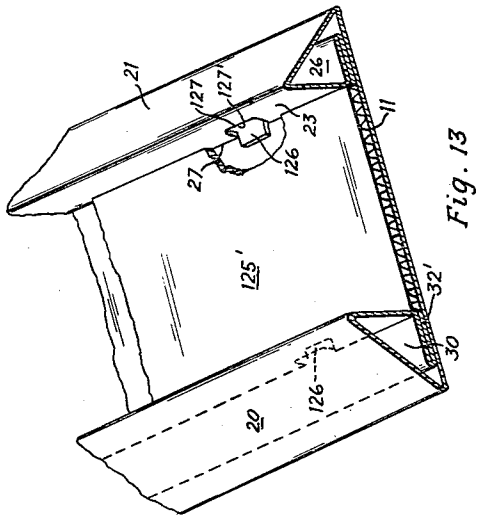

Fig. 13

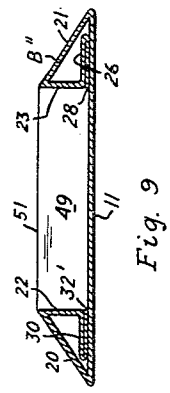

Fig. 9

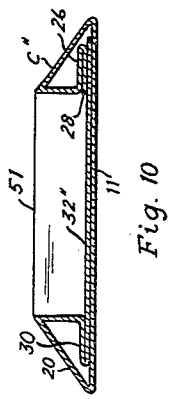

Fig. 10

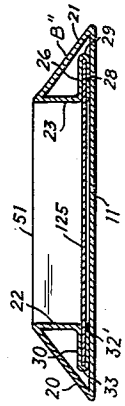

Fig. 11

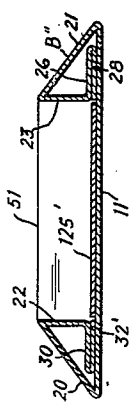

Fig. 12

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HOLLOW-WALLED BOXES

Filed April 13, 1953 6 Sheets-Sheet 6

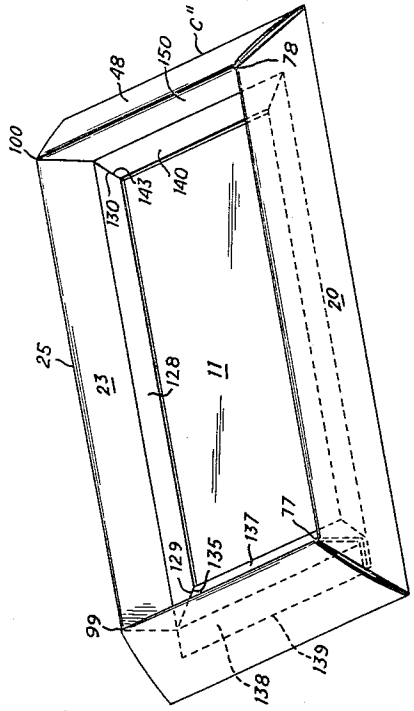

Fig. 15

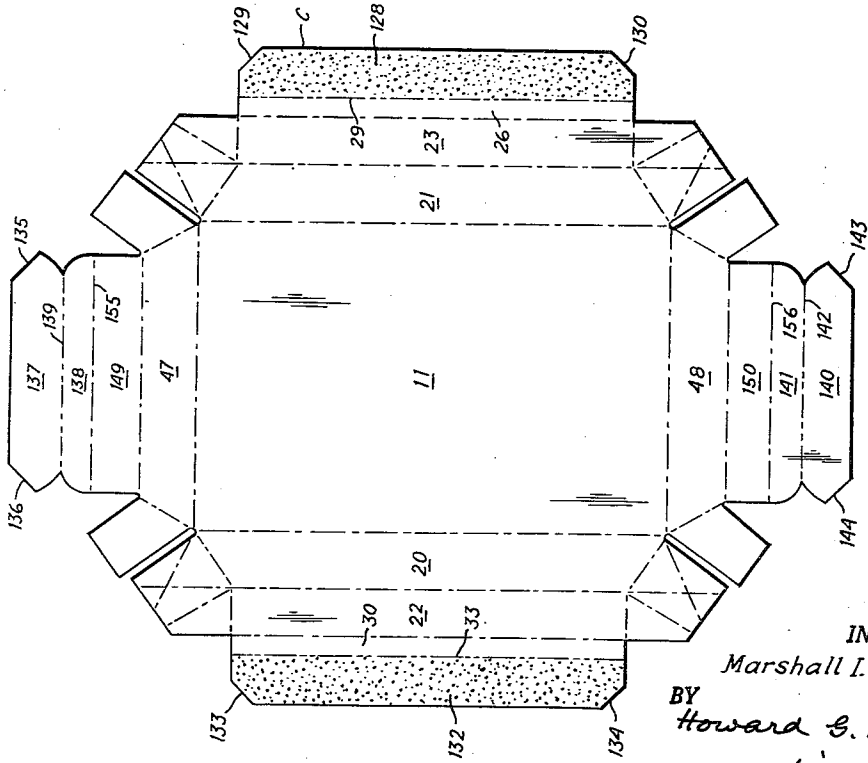

Fig. 14

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United States Patent Office

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HOLLOW-WALLED BOXES

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Application April 13, 1953, Serial No. 348,359

6 Claims. (Cl. 229—34)

This invention provides a novel and improved construction of boxes, cartons, trays, or other receptacles made from paperboard, corrugated board or other foldable sheet material, hereinafter collectively referred to, for convenience, as "boxes" or "folding boxes."

This invention has particular reference to folding boxes having hollow walls of substantially triangular cross-section. Such boxes are sometimes referred to as bevel-edge boxes or bevel-edge trays.

Hollow walled boxes of the aforementioned type are particularly well suited for the purpose of visually displaying merchandise in an attractive and eye-catching manner in addition to the more mechanical function of protecting the merchandise during shipment.

The dimensions of bevel edge boxes vary within rather wide limits, depending on the particular use of the box. Relatively small boxes are used for perfume, jewelry and candy, large boxes are used for the packaging of tools, silverware or even blankets. Not only do box sizes vary, but there is also considerable variation in the slope of the beveled walls and the height of the walls. This leads to problems in the manufacture and assembly of the boxes.

Since bevel edge boxes take up a relatively large amount of space, when set-up, it is desirable to construct the boxes in such a way that they may be stored in flat collapsed condition, from which they are later set up into hollow box form. It is essential, in this connection, to construct the boxes in such a manner that the setting-up operation is simple and quick, and further in such a way that the set up box has great rigidity.

To this end it has been proposed to perform all securing operations, such as gluing or stapling, at the box manufacturer's plant on the flat or collapsed blank, so that the setting up operations at the customer's plant are limited to the folding of walls or tucking of flaps.

All previous box constructions of the pre-glued type, as far as I am aware, were limited to walls of a certain predetermined slope, which could not be altered at will, since at other angles the pre-glued box blanks were not collapsible into flat condition.

The present invention provides a box construction which permits selection of any angle for the sloping walls, yet permits collapsing of the completely pre-glued blank into flat space-saving form. The invention further provides numerous constructional features resulting in great strength and rigidity of the set up box, simplified assembly, and other advantages.

These and various other objects, features and advantages of the invention will appear more fully from the detailed description which follows, accompanied by drawings showing, for the purpose of illustration, a representative embodiment of the invention. The invention also consists in certain new and original features of construction and combination of elements hereinafter set forth and claimed.

Although the characteristic features of this invention which are believed to be novel will be particularly pointed

out in the claims appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out, may be better understood by referring to the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a plan view of a representative flat cut and scored box blank incorporating the present invention;

Fig. 2 shows the blank of Fig. 1 after a first folding and gluing operation resulting in the formation of a tubular blank;

Fig. 3 is a perspective view of a portion of the blank of Fig. 2 in the process of expansion into hollow box form;

Figs. 4 and 5 are perspective views, illustrating further advanced stages of the assembly;

Fig. 6 is a perspective view of the completed box;

Fig. 7 is a sectional view of a portion of the box of Fig. 6, the section being taken in plane 7—7 of Fig. 6;

Fig. 8 is a plan view of a modified flat cut and scored box blank embodying the invention;

Fig. 9 is a sectional view illustrating the construction of the side walls of a box made from the blank of Fig. 8;

Fig. 10 is a sectional view, similar to Fig. 9, of a modification of the box shown in Fig. 9, the modification involving the addition of an integral inner main panel;

Fig. 11 is a sectional view, similar to Figs. 9 and 10, of a box comprising a large separate inner main panel;

Fig. 12 is a sectional view, similar to Fig. 11, of a differently constructed box comprising a small separate inner main panel;

Fig. 13 is a perspective view, partly in section, of details of the construction of the box of Fig. 12;

Fig. 14 is a plan view of a modified flat cut and scored box blank embodying the invention; and

Fig. 15 is a perspective view of a box formed from the blank of Fig. 14.

In the following description and in the claims, various details will be identified by specific names for convenience. These names, however, are intended to be as generic in their application as the art will permit. Corresponding reference characters refer to corresponding parts in the several figures of the drawings.

In the drawings accompanying, and forming part of, this specification, a certain specific disclosure of the invention is made for the purpose of explanation of broader aspects of the invention, but it is understood that details may be modified in various respects without departure from the principles of the invention and that the invention may be applied to other structures than the one shown.

Referring to the drawings, the blank A in Fig. 1 may be cut and scored in multiple from rolls or sheets of paperboard, cardboard, or other flexible sheet material. Only one side of the board need be imprinted or otherwise decoratively finished, since only one side of the blank is exposed to view in the finished box. In Fig. 1 the blank is shown in the position in which the unfinished surface faces the observer.

The blank is subdivided into panels and flaps by a plurality of score lines. A main bottom panel **11** is bordered by outer side fold lines **12** and **13** and outer end fold lines **14** and **15**. These fold lines intersect at the corners **16**, **17**, **18** and **19** of the main panel which, as will later be seen, become the outer corners of the box.

Outer side wall panels **20** and **21** are articulated to the main bottom panel **11** along the outer side fold lines **12** and **13**, respectively. Inner side wall panels **22** and **23** are articulated to the outer side wall panels along side ridge fold lines **24** and **25**. A panel **26** is articulated to the inner side wall panel **23** along inner side fold line **27**, and a glue lap **28** is articulated to the upper bottom panel **26** along a return fold line **29**. This glue lap **28** may

also be considered an intermediate bottom panel, as will later appear from Fig. 10.

An upper bottom panel 30 is articulated to the inner side wall panel 22 along an inner side fold line 31, and an intermediate bottom panel or liner 32 is articulated to the upper bottom panel 30 along a return fold line 33.

The liner 32 may be cut out at 34 to accommodate the glue lap 28 in the glued blank as will later be seen.

The liner panel 32 has slits 35 and 36 therethrough. These slits are preferably in line with the inner end wall panels of the finished box as will later become apparent. The slits 35 and 36 permit flaps on the end wall structure to be inserted as will later be explained in greater detail. To facilitate such insertion of flaps, the liner panel is further provided with cuts 37 and 38 and fold lines 39, 40, 41 and 42. Triangular panel portions 43, 44, 45 and 46 are thus formed.

Outer end wall panels 47 and 48 are articulated to the main panel 11 along the outer end fold lines 14 and 15, respectively. Inner end wall panels 49 and 50 are articulated to the outer end wall panels along end ridge fold lines 51 and 52, respectively. Bottom flaps 53 and 54 are articulated to the inner end wall panels 49 and 50 along inner end fold lines 55 and 56, respectively.

Lock tabs 57, 58, 59 and 60 are articulated to the bottom flaps 53 and 54 along fold lines 61, 62, 63 and 64 about which the lock tabs are foldable back upon the respective bottom flaps.

Side flaps 65 and 66 are articulated to the outer end wall panel 47 along oblique flap fold lines 67 and 68 extending at an angle with respect to the outer end fold line 14. A further pair of side flaps 69 and 70 is articulated to the outer end wall panel 48 along oblique fold lines 71 and 72, respectively.

The provision of the side flaps 65, 66, 69 and 70 is optional. However, as will later become apparent, the side flaps, besides performing a structural function, result in neater appearance, since no cut edges are exposed at the corners of the box, if the aforementioned side flaps are employed.

The corner structure of the blank includes three panel portions bordered by four corner fold lines aimed at a common point of intersection on the side ridge fold lines. In the illustrated form of blank substantially triangular panel portions 73 and 74 are articulated to the inner side wall panel 22 along corner fold lines 75 and 76, respectively. These fold lines intersect the side ridge fold line 24 at 77 and 78. A further pair of substantially triangular panel portions 79 and 80 is articulated to the outer side wall panel 20 along corner fold lines 81 and 82, respectively. It will be noted that these corner fold lines 81 and 82 are also aimed at the points of intersection 77 and 78, respectively. The panel portions 79 and 80 are further bordered by the extended ridge fold line 24. Further panel portions 83 and 84 are articulated to the panel portions 79 and 80 along the fold line 24 and are bordered by corner fold lines 85 and 86 towards the panel portions 73 and 74, respectively. The corner fold lines 85 and 86 are also aimed at the points 77 and 78, respectively.

Securing flaps 87 and 88 are articulated to the panel portions 79, 83 and 80, 84 along flap fold lines 89 and 90, respectively. These securing flaps perform their function in a variety of ways, as will later be seen. They may be caused to abut one or more fold lines of the blank with their outer edges, such abutment edges being 91 and 92 on the securing flap 87, and edges 93 and 94 on the securing flap 88.

In a similar manner substantially triangular panel portions 95 and 96 are articulated to the inner side wall panel 23 along corner fold lines 97 and 98, respectively. These fold lines intersect the side ridge fold line 25 at 99 and 100, respectively. A further pair of substantially triangular panel portions 101 and 102 is articulated to the outer side wall panel 21 along corner fold lines 103 and 104, respectively. It will be noted that these corner fold lines 103 and 104 are also aimed at the points of intersection 99 and 100, respectively. The panel portions 101 and 102 are further bordered by the extended ridge fold line 25. Further panel portions 105 and 106 are articulated to the panel portions 101 and 102 along the fold lines 25 and are bordered by corner fold lines 107 and 108 towards the panel portions 95 and 96, respectively. The corner fold lines 107 and 108 are also aimed at the points 99 and 100, respectively.

Securing flaps 109 and 110 are articulated to the panel portions 101 and 102 along flap fold lines 111 and 112, respectively. These securing flaps 109 and 110 have abutment edges 113, 114, and 115, 116, respectively.

The side flaps 65, 66, 69 and 70 have cut bordering edges 117, 118, 119, 120, 121, 122, 123 and 124, respectively, which are so disposed that the cut edges abut certain fold lines of other panels in the assembled box as will later be seen.

The assembly of the blank A shown in Fig. 1 into box form may proceed as follows:

Adhesive *a* is first applied to the glue lap 28 and to the marginal surfaces of the liner panel 32. The blank is then folded along the side ridge fold lines 24 and 25 to bring the liner panel 32 over the main panel 11 and to bring the glue lap 28 over the main panel 11 into the recess 34. The result is a flat collapsed tubular blank A' in which the liner panel 32 and the glue lap 28 are adhesively secured to the main panel 11. The tubular blank 11 is shown in Fig. 2.

The blank A' may be shipped and stored in flat collapsed condition and requires a minimum of space for shipping and storing. It may easily be set up into hollow box form by a simple expanding and folding operation which will now be described.

The flat collapsed blank A' is expanded by pressure exerted against the edges 24 and 25. This causes the side wall structures to expand and move towards each other until the upper bottom panels 26 and 30 lie in surface-to-surface contact with the liner main panel 32 thus forming a return fold RF. The resulting structure is shown in Fig. 3. The inner and the outer side wall panels assume the slope they have in the finished box.

It is quite apparent that the depth of the return fold, measured between the fold lines 33 and 31 or between 27 and 29 may vary considerably. This variation permits various slope angles to be selected for the outer side wall panels and for the inner side wall panels with regard to the main panel. In the illustrated example the inner side wall panels are vertical, but evidently they may also slope towards or away from each other. Geometrically speaking, the collapsibility of the blank demands that the width of the upper bottom panel plus the width of the inner side wall panel equals the width of the outer side wall panel plus the spacing between the return fold line and the outer side fold line in the tubular blank.

It is also evident that the width of the outer side wall panel, the width of the inner side wall panel and the slope of the latter (most commonly, although not necessarily, 90 degrees) fixes the slope of the outer side wall panel with regard to the main panel. According to the previously stated relationship of widths and spacing, it is therefore possible to determine the required spacing S of the return fold line from the outer side fold line, to make the blank expandable and collapsible. In other words for a box in which the outer and the inner side walls have a desired slope and height, the proper spacing S can be determined so that the blank can be preglued, set-up and re-collapsed.

The panel portions of the corner structures are aligned with the respective outer and inner side wall panels. For example, the panel portion 79 and a portion of the flap 87 lie in the same plane as the outer side wall panel 20. The panel portions 95, 105, and a portion of the

flap 109 lie in the same plane as the inner side wall panel 23. The panel portion 101 and the remainder of the flap 109 lie in the same plane as the outer side wall panel 21. The condition of the structure may also be characterized by the fact that the ridge fold lines 24 and 25 extend unbroken beyond the points 77 and 99, respectively.

Pressure is then exerted against the panel portions 87 and 109, causing the corner structures to assume a new and angular position as illustrated in Fig. 4. In the new position the panel portions 87 and 109 move into the same plane, and similarly the panel portions 101 and 105 flatten out. The panel portions 73 and 95 extend at an angle with respect to the inner side walls 22 and 23. The portions of the flaps 87 and 109 move into the same plane which, however, lies at an angle with respect to the plane of the panel portions 79, 83 and 101, 105, the crease lines being 89 and 111.

As a next step, the side flaps 65 and 66 are folded over the securing flaps 87 and 109, as shown in Fig. 5. The blank structure is now in condition for the completion of the end walls. For this purpose the end wall structure is folded upwardly about the outer end fold line 14. Simultaneously, the edges 91 and 114 line up with the crease 51, and the edges 118 and 120 line up with the creases 89 and 111.

As the panel 47 is folded upon the end surfaces 79, 183 and 101, 105, the flaps 87 and 109 are folded back upon the panels from which they extend, clamping the side flaps 65 and 66 securely therebetween. Great rigidity is achieved by the engagements and abutments.

The assembly of the box end wall is completed by folding the lock flaps 57 and 58 back upon the bottom flap 53 and inserting the bottom flap with its lock flaps into the slit 35 underneath the panel portions 43 and 44. In inserted position the flaps 57 and 58 abut the edge of the cut 35 and prevent accidental withdrawal of the bottom flap 53 from the tucked-in position.

The assembly of the opposite end wall takes place in the same manner.

The completed box A'' is shown in Fig. 6. It possesses extraordinary strength and is greatly resistant to forces exerted on it from the inside, from the outside and from above.

A modified form of blank is shown in Fig. 8. This blank corresponds to the blank A of Fig. 1, except for the absence of the internal bottom or liner panel 32. In its place, a glue lap 32' is provided. Since the blank B corresponds to the blank A in all other respects, the same reference numerals are applied and it is unnecessary to describe the folding, gluing and setting up operations of the blank B in detail.

Fig. 9 is a vertical cross-section through the side walls of a box B'' set up from the blank B. It is apparent that the bottom of the box is of single ply thickness. Return folds are formed by the panel 30 and the lap 32' on one side, and the panel 26 and the lap 28 on the other side. As in the previous embodiment, the provision of return folds permits the selection of any desired slope angle for the outer side wall panel while yet retaining the feature of collapsibility of the pre-glued blank.

Fig. 10 illustrates a further modification C'' of the box A''. In this modification the liner panel 32'' underlies the glue lap 28 with its marginal end portion.

Fig. 11 illustrates a box structure consisting of the box B'' as shown in Fig. 9, to which a separate liner panel 125 is added. The liner panel 125 is wider than the interior space of the box measured between the inner side walls 23 and 22. Because of its width, the liner panel 125 extends into the return fold between the upper bottom panel 30 and the glue lap 32' on one side, and between the upper bottom panel 26 and the glue lap 28 on the other side.

Besides providing double ply thickness for the bottom, concealing the upper surface of the bottom panel 11 which is generally unfinished, the liner panel 125 adds rigidity to the box because of the engagement of the edges of the liner panel 125 with the return fold lines 29 and 33. A box reinforced by a separate liner panel 125 has exceptionally great resistance to twisting.

Fig. 12 illustrates a modification of the structure of Fig. 11. In the box shown in Fig. 12 the separate liner panel 125' is smaller and its width is equal to the distance between the edges of the glue laps 32' and 28. The advantages of the liner 125' are the same as the advantages of the liner 125.

Additional means may be provided in the box structure for preventing the liner panel 125' from slipping into the return fold. As illustrated in Fig. 13, such means may assume the form of tabs 126 formed by U-shaped cuts 127 in the inner side walls. In the set up box the tabs 126 form extensions of the respective upper bottom panel 26 and 30, and the liner panel 125' rests on these tabs.

The cut 127 results in the formation of an aperture 127' in the respective inner side wall panel. This aperture may be concealed by the use of a liner panel 125' of appropriate thickness. For example, a liner panel of double face corrugated board may be used.

The blank C shown in Fig. 14 corresponds, in general, to the blank B shown in Fig. 8, except for certain modifications of the glue laps 128 and 132, and of the end wall structure.

The glue laps 128 and 132 have beveled lateral edges 129, 130 and 133, 134, respectively. Preferably, the lateral edges extend at an angle of 45° with respect to the return fold lines 29 and 33, respectively.

In the finished box the edges 129 and 133 abut similar lateral edges 135 and 136 on an end flap 137 forming part of the end wall structure. The end flap 137 is articulated to an upper end bottom panel 138 along a return fold line 139. The upper end bottom panel 138 is articulated to the inner end wall panel 149 along a fold line 155.

Similarly, the end flap 140 at the opposite end wall structure is articulated to an upper end bottom panel 141 along a return fold line 142. The upper end bottom panel 141, in turn, is articulated to the inner end panel 150 along fold line 156.

The blank C is pre-glued in a similar manner as the blank B of Fig. 8. The glue laps 128 and 132 are adhered to the main bottom panel 11 and the side wall structures are erected as hereinbefore described.

In the finished box C'' the side wall structures are of similar construction as the side wall structures of the box A'' shown in Fig. 6, with the exception that the glue laps 128 and 132 overlie a portion of the main bottom panel 11 which is exposed to view. Similarly, the end portions of the flaps 137 and 140 overlie a visible portion of the bottom panel.

The beveled edges 143, 130 abut in the assembled box and maintain the end flap 140 in its proper position. Similarly, the edges 129 and 135 abut and maintain the opposite end flap 137 in inserted position. The flaps 137 and 140 form return folds with the respective upper end bottom panels 138 and 141.

The protruding portions of the glue laps 128 and 132, and the protruding portions of the end flaps 137 and 140 produce a mitered frame effect, enhancing the appearance of the box. In addition, the engagement of the beveled edges of the glue laps 128, 132 and the end flaps 137 and 140 renders the box more rigid to twisting.

The assembly of the end structures of the box C'' is extremely simple since it amounts to a mere tucking in of the return-folded-end flaps 137, 140 underneath the hollow end wall structures.

The stiffness of the board, that is the resistance of the stock to folding along the return fold lines 139 and 142 tends to urge the abutting beveled edges into secure engagement. In this connection it is of advantage to

cut-score the return fold lines 139 and 142, since the board is folded back upon itself at these fold lines. The cut scores are indicated by dash-double-dot lines, and sufficiently weaken the stock to prevent formation of a gap above the end flaps 137 and 140.

Obviously, the present invention is not restricted to the particular form of box herein described, but may be incorporated in other forms of boxes with equal benefits. Thus, various additions, omissions, modifications, substitutions, and other changes may be made without departing from the spirit of the invention.

What is claimed is:

1. A hollow walled folding box comprising, in combination, a main bottom panel; a pair of side wall structures on opposite sides of the main bottom panel, at least one end wall structure at one end of the main bottom panel; and corner structure between each side wall structure and said end wall structure; each of said side wall structures comprising, an outer side wall panel integral with, and articulated to, said main bottom panel along an outer side fold line; an inner side wall panel articulated to said outer side wall panel along a side ridge fold line; an upper bottom panel articulated to said inner side wall panel along an inner side fold line; an intermediate bottom panel articulated to said upper bottom panel along a fold line spaced from, and parallel to, said inner side fold line and said outer side fold line, said intermediate bottom panel being folded back with respect to said upper bottom panel and forming with the upper bottom panel a return fold underneath the side ridge fold line, said intermediate bottom panel lying in direct contact with said main bottom panel, said intermediate bottom panel having a surface portion outside the inside-facing surfaces of the return fold at which surface portion the intermediate bottom panel is adhesively secured to one of the bottom panels of the box, thereby leaving the return fold proper unglued, said end wall structure comprising, an outer end wall panel articulated to, and integral with, said main bottom panel along an outer end fold line; an inner end wall panel articulated to said outer end wall panel along an end ridge fold line; and a bottom flap articulated to said inner end panel along an inner end fold line; said corner structure comprising, an outer corner panel articulated to the outer side wall panel, an inner corner panel articulated to the inner side wall panel, both lines of articulation being directed to intersect at the side ridge fold line, and a connecting corner panel articulated to the outer corner panel along a lineal extension of the side ridge fold line and articulated to the inner corner panel along a fold line which is also directed to the intersection of the said lines of articulation at, and with, the side ridge fold line, said corner structure lying, in the set up box, between said outer end wall panel and said inner end wall panel.

2. A hollow walled folding box comprising, in combination, a main bottom panel; a pair of side wall structures on opposite sides of the main bottom panel, at least one end wall structure at one end of the main bottom panel; and a corner structure between each side wall structure and said end wall structure; each of said side wall structures comprising, an outer side wall panel integral with, and articulated to, said main bottom panel along an outer side fold line; an inner side wall panel articulated to said outer side wall panel along a side ridge fold line; an upper bottom panel articulated to said inner side wall panel along an inner side fold line; an intermediate bottom panel articulated to said upper bottom panel along a fold line spaced from, and parallel to, said inner side fold line and said outer side fold line, said intermediate bottom panel being folded back with respect to said upper bottom panel and forming with the upper bottom panel a return fold underneath the side ridge fold line, the intermediate bottom panel of one side wall structure extending over, and in direct contact with, said main bottom panel and adhesively secured to the intermediate bottom panel of the opposite side wall structure, whereby the blank of the box becomes a flat collapsible tubular blank in which the return folds proper are open and adapted to be flattened out; said end wall structure comprising, an outer end wall panel integral with, and articulated to, said main bottom panel along an outer end fold line; an inner end wall panel articulated to said outer end wall panel along an end ridge fold line; and a bottom flap articulated to said inner end panel along an inner end fold line; said corner structure comprising an outer corner panel articulated to the outer side wall panel, an inner corner panel articulated to the inner side wall panel, both lines of articulation being directed to intersect at the side ridge fold line, and a connecting corner panel articulated to the outer corner panel along a lineal extension of the side ridge fold line and articulated to the inner corner panel along a fold line which is also directed to the intersection of the said lines of articulation at, and with, the side ridge fold line, said corner structure lying, in the set up box, between said outer end wall panel and said inner end wall panel.

3. A hollow walled folding box comprising, in combination, a main bottom panel; a pair of side wall structures on opposite sides of the main bottom panel, at least one end wall structure at one end of the main bottom panel; and a corner structure between each side wall structure and said end wall structure; each of said side wall structures comprising, an outer side wall panel integral with, and articulated to, said main bottom panel along an outer side fold line; an inner side wall panel articulated to said outer side wall panel along a side ridge fold line; an upper bottom panel articulated to said inner side wall panel along an inner side fold line; an intermediate bottom panel articulated to said upper bottom panel along a fold line spaced from, and parallel to, said inner side fold line and said outer side fold line, said intermediate bottom panel being folded back with respect to said upper bottom panel and forming with the upper bottom panel a return fold underneath the side ridge fold line, the intermediate bottom panel lying in immediate contact with, and being adhesively secured to, said main bottom panel at a surface area of the intermediate bottom panel lying on the reverse side of the stock with respect to the inside-facing surfaces of the return fold, whereby the return folds proper are open and adapted to be flattened out for collapsing; said end wall structure comprising, an outer end wall panel integral with, and articulated to, said main bottom panel along an outer end fold line; an inner end wall panel articulated to said outer end wall panel along an end ridge fold line; and a bottom flap articulated to said inner end panel along an inner end fold line; said corner structure comprising, an outer corner panel articulated to the outer side wall panel, an inner corner panel articulated to the inner side wall panel, both lines of articulation being directed to intersect at the side ridge fold line, and a connecting corner panel articulated to the outer corner panel along a lineal extension of the side ridge fold line and articulated to the inner corner panel along a fold line which is also directed to the intersection of the said lines of articulation at, and with, the side ridge fold line, said corner structure lying, in the set up box, between said outer end wall panel and said inner end wall panel.

4. A hollow walled folding box comprising, in combination, a main bottom panel; a pair of side wall structures on opposite sides of the main bottom panel, at least one end wall structure at one end of the main bottom panel; and a corner structure between each side wall structure and said end wall structure; each of said side wall structures comprising, an outer side wall panel integral with, and articulated to, said main bottom panel along an outer side fold line; an inner side wall panel articulated to said outer side wall panel along a side ridge fold line; an upper bottom panel articulated to said inner side wall panel along an inner side fold line; an inter-

mediate bottom panel articulated to said upper bottom panel along a fold line spaced from, and parallel to, said inner side fold line and said outer side fold line, said intermediate bottom panel being folded back upon with respect to said upper bottom panel and forming with the upper bottom panel a return fold underneath the side ridge fold line, the intermediate bottom panel lying in immediate contact with, and being adhesively secured to, said main bottom panel at a surface area lying on the opposite surface of the stock with respect to the inside-facing surfaces of the return fold, whereby the return folds proper are open and adapted to be flattened out for collapsing, the intermediate bottom panels of the opposite side wall structures covering said main bottom panel and forming a full liner-ply for said main bottom panel, said end wall structure comprising, an outer end wall panel articulated to said main bottom panel along an outer end fold line; an inner end wall panel articulated to said outer end wall panel along an end ridge fold line; and a bottom flap articulated to said inner end panel along an inner end fold line; said corner structure comprising, an outer corner panel articulated to the outer side wall panel, an inner corner panel articulated to the inner side wall panel, both lines of articulation being directed to intersect at the side ridge fold line, and a connecting corner panel articulated to the outer corner panel along a lineal extension of the side ridge fold line and an articulated to the inner corner panel along a fold line which is also directed to the intersection of the said lines of articulation at, and with, the side ridge fold line, said corner structure lying, in the set up box, between said outer end wall panel and said inner end wall panel.

5. A hollow walled folding box comprising, in combination, a main bottom panel; a pair of side wall structures on opposite sides of the main bottom panel, at least one end wall structure at one end of the main bottom panel; and a corner structure between each side wall structure and said end wall structure; each of said side wall structures comprising, an outer side wall panel articulated to said main bottom panel along an outer side fold line; an inner side wall panel articulated to said outer side wall panel along a side ridge fold line; an upper bottom panel articulated to said inner side wall panel along an inner side fold line; an intermediate bottom panel articulated to said upper bottom panel along a fold line spaced from, and parallel to, said inner side fold line and said outer side fold line, said intermediate bottom panel being folded back upon said upper bottom panel and forming with the upper bottom panel a return fold underneath the side ridge fold line, the intermediate bottom panel lying in immediate contact with, and being adhesively secured to, one of said bottom panels of the box in such a way as to leave the return fold proper unglued, the intermediate bottom panels of the opposite side wall structures overlying said main bottom panel and at least one of said intermediate bottom panels forming a liner-ply for said main bottom panel, said end wall structure comprising, an outer end wall panel articulated to said main bottom panel along an outer end fold line; an inner end wall panel articulated to said outer end wall panel along an end ridge fold line; and a bottom flap articulated to said inner end panel along an inner end fold line; said liner ply having a slit therethrough substantially in line with the bottom edge of said inner end wall panel, said bottom flap extending through said slit

into the space between said main bottom panel and said liner ply; said corner structure comprising at least one corner panel articulated to one of the side wall panels along a fold line aimed at said side ridge fold line, said corner panel lying, in the set-up box, between said outer end wall panel and said inner end wall panel.

6. A hollow walled folding box comprising, in combination, a main bottom panel; a pair of side wall structures on opposite sides of the main bottom panel, at least one end wall structure at one end of the main bottom panel; and a corner structure between each side wall structure and said end wall structure; each of said side wall structures comprising, an outer side wall panel integral with, and articulated to, said main bottom panel along an outer side fold line; an inner side wall panel articulated to said outer side wall panel along a side ridge fold line; an upper bottom panel articulated to said inner side wall panel along an inner side fold line; an intermediate bottom panel articulated to said upper bottom panel along a fold line spaced from, and parallel to, said inner side fold line and said outer side fold line, said intermediate bottom panel being folded back with respect to said upper bottom panel and forming with the upper bottom panel a return fold underneath the side ridge fold line, said intermediate bottom panel lying in immediate contact with, and being adhesively secured to, said main bottom panel at a surface area of the intermediate bottom panel lying on the reverse side of the stock with respect to the inside-facing surfaces of the return fold, whereby the return fold proper remains open and adapted to be flattened out for collapsing; said end wall structure comprising, an outer end wall panel integral with, and articulated to, said main bottom panel along an outer end fold line; an inner end wall panel articulated to said outer end wall panel along an end ridge fold line; and a bottom flap articulated to said inner end panel along an inner end fold line; said corner structure comprising, an outer corner panel articulated to the outer side wall panel, an inner corner panel articulated to the inner side wall panel, both lines of articulation being directed to intersect at the side ridge fold line, and a connecting corner panel articulated to the outer corner panel along a lineal extension of the side ridge fold line and articulated to the inner corner panel along a fold line which is also directed to the intersection of the said lines of articulation at, and with, the side ridge fold line, said corner structure lying, in the set up box, between said outer end wall panel and said inner end wall panel; and a separate bottom liner panel having side edges, said liner panel extending with its side edges between the upper bottom panel and the intermediate bottom panel of each of said opposite side wall structures, said inner end wall panel extending, in set-up condition, transverse with respect to the side edges of the liner panel.

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