# United States Patent [19]

**Stapp**

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[45] **Jan. 9, 1973**


## [54] SHIPPING CARTON AND END PANEL CONSTRUCTION THEREFOR


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[73] Assignee: **American Forest Products Corporation,** San Francisco, Calif.



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[52] **U.S. Cl.** .....**229/23 C,** 229/49

[51] **Int. Cl.** .....**B65d 13/00**

[58] **Field of Search**.....229/23 A, 23 C, 23 R, 49; 220/DIG. 25, 4 E



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*Primary Examiner*—Davis T. Moorhead

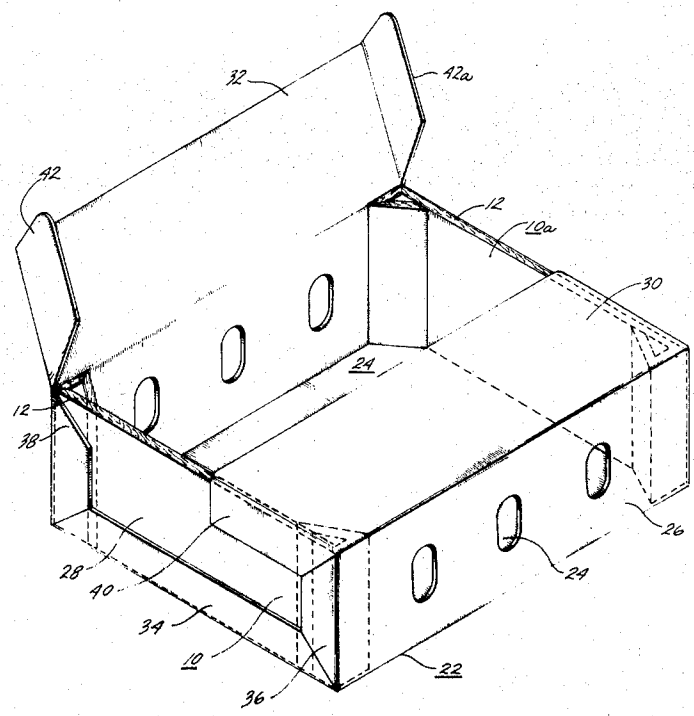
*Attorney*—Robert C. Smith et al.



[57] **ABSTRACT**

A shipping carton and end panels therefor and the method of manufacturing same have been disclosed in which extra resistance to crushing is provided by forming the end panels of paper-faced wood veneer which are routed to permit two segments at each end to be folded over and fastened together to form corner posts of triangular cross-section. The bottom, sides and top may be of corrugated paper and are formed with flaps which are glued to the outside faces of the end panels. Alternatively, the bottom, sides and top may be formed of the same material as the end panels. A modification uses a similar technique to form end panels having both vertical and horizontal posts or rails for stiffening in both planes.


**10 Claims, 8 Drawing Figures**



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SHEET 1 OF 3

FIG. 1

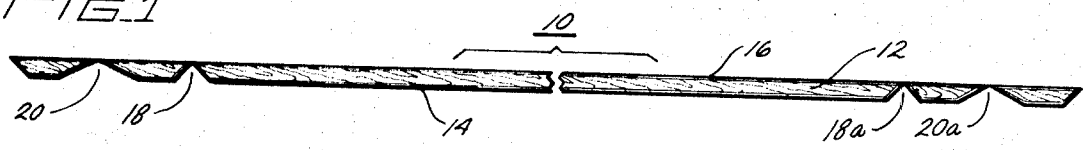



FIG. 2

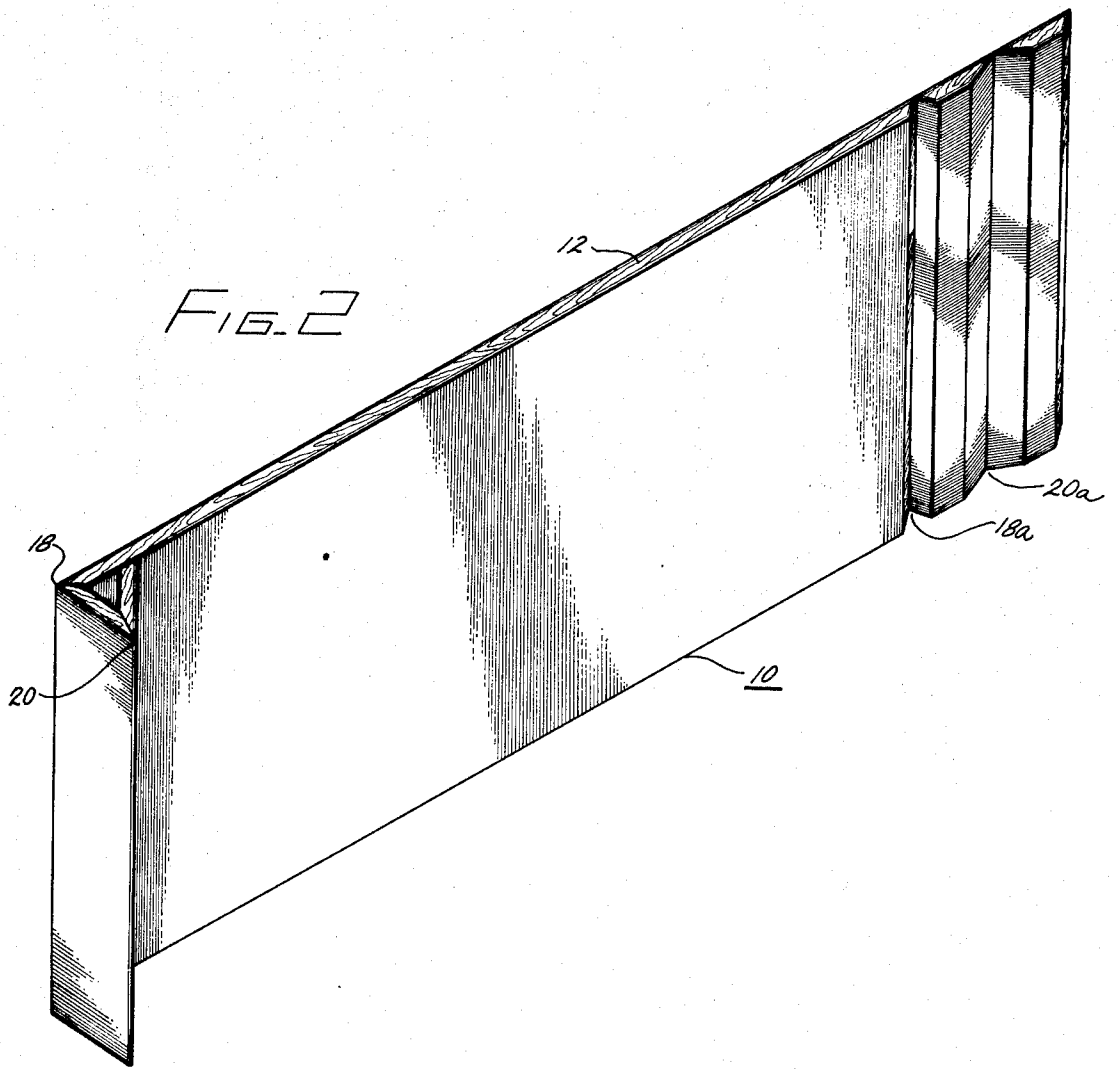
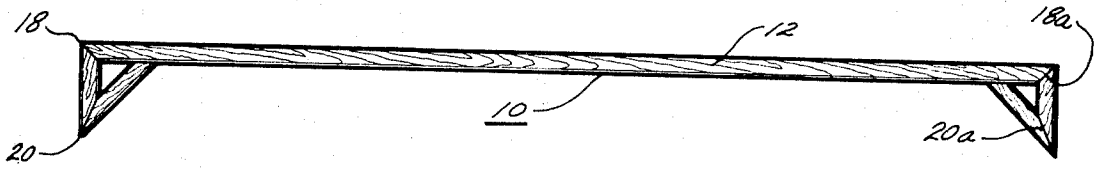



FIG. 3




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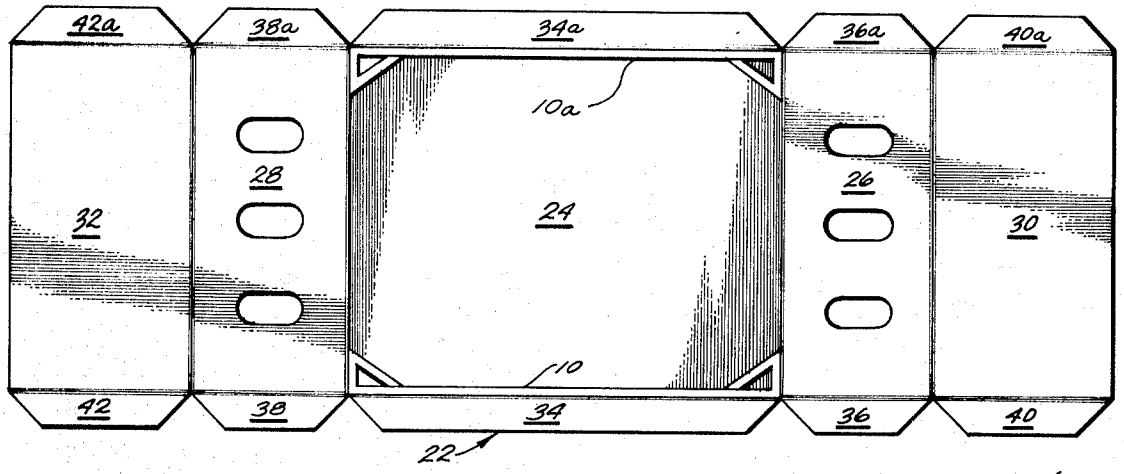

42a
38a
34a
36a
40a
10a
28
26
32
24
30
10
42
38
34
36
40
22

FIG_4

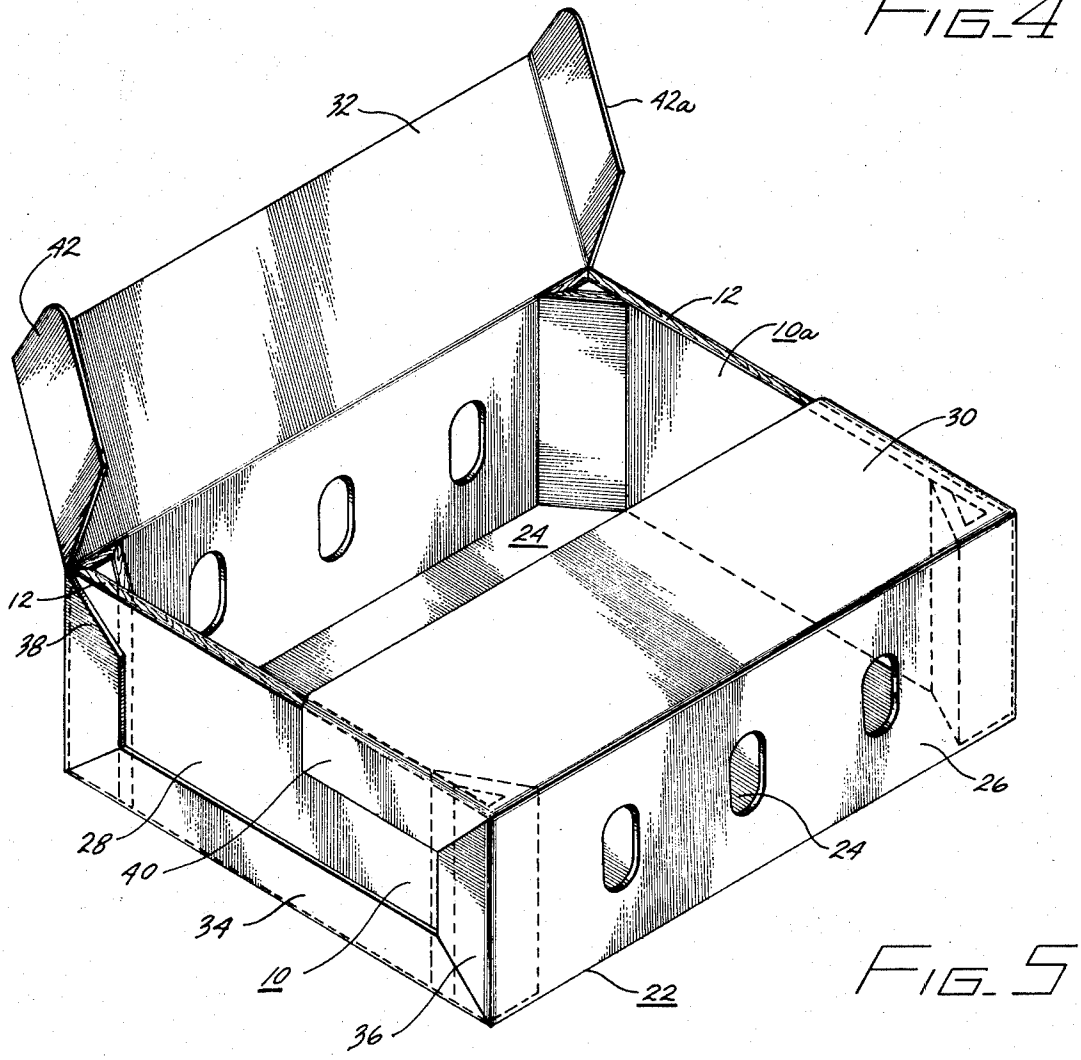

32
42a
42
12
10a
30
24
12
38
26
28
24
40
34
10
22
36

FIG_5

FIG. 6

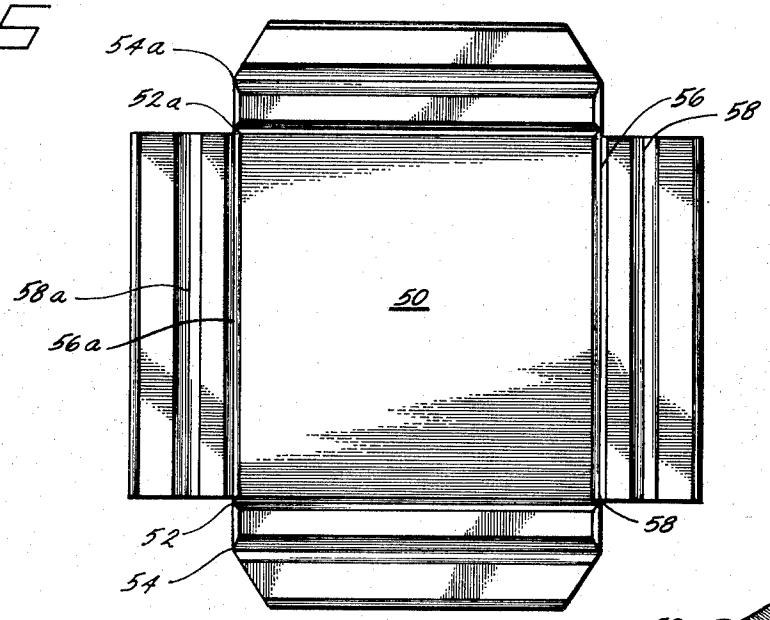



FIG. 7

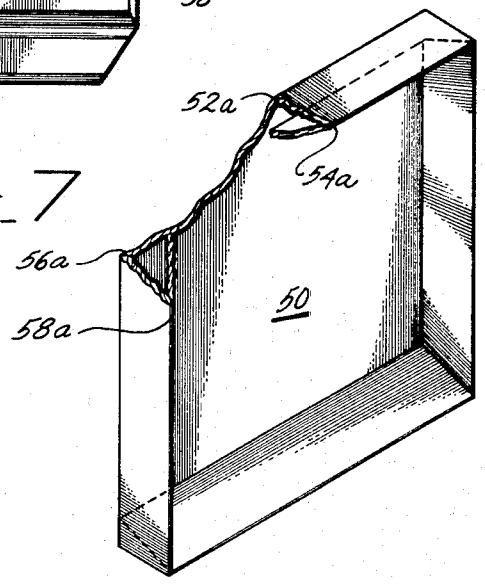
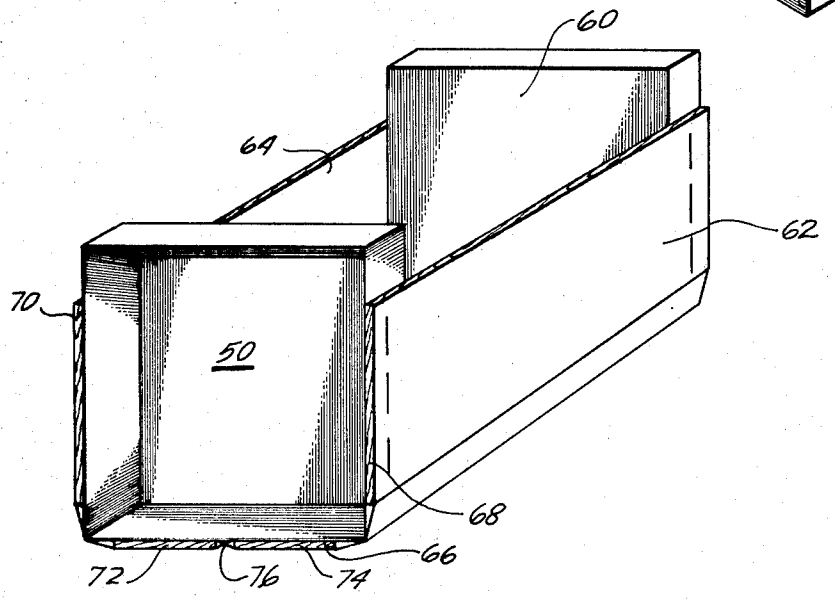



FIG. 8



# SHIPPING CARTON AND END PANEL CONSTRUCTION THEREFOR

## BACKGROUND OF THE INVENTION

There have been many applications for shipping cartons having special provisions for resisting crushing forces resulting from stacking. A common application for such cartons is in the packaging of fruit and, especially, grapes which are sometimes stored for several months in a high humidity environment. A common type of carton for storing grapes is a paperboard carton having its ends formed with a plurality of layers of corrugated paper such that although top, bottom and sides are a single layer thick, the end panels may be three or four layers thick. As is well known by those skilled in the art, such an end panel does have considerable resistance to crushing. Another design which has been used in corrugated paperboard boxes to resist crushing includes folded columns of paperboard in the corners. Despite various measures to impregnate the paperboard with waxes or other materials, neither of these types of cartons have proved entirely satisfactory for storing grapes, etc., since such measures are expensive and even multiple-layered paperboard boxes deform under compressive loads when subjected to very high humidity.

## SUMMARY OF THE INVENTION

A type of carton which has been used extensively in connection with packing and storing fruit is a paperboard carton with side panels formed with flaps which are folded over and glued to the end panels, commonly known as a "Bliss" type carton. This design is well adapted to mass production and permits some flexibility in the choice of end panels. Applicant has devised a carton and an end panel for this type of carton which is uniquely suited to resisting heavy compressive loads in a high humidity environment. The end panel is formed of a moisture-resistant, paper-covered veneer of a type well known in the art. This material is cut into a desired rectangular form, beveled at its ends, and then routed along two lines parallel to each end to provide V-shaped grooves. These grooves are cut through one paper layer and the wood layer, but not the opposite paper layer. The angles of the cuts are important since the material is folded and glued at the inside groove to make an angle of 90°, and the second cut is preferably at 135° to permit the material to be folded back on itself and glued to inside the end panel, thus forming a very strong corner post of triangular cross-section at each end. The resulting panel is highly resistant to crushing, largely because of the wood core, so a box formed with this type of end panel substantially retains its structural integrity even after several months in a high humidity environment and even if the remainder of the carton is a single layer of corrugated paperboard. Economics is very important in this application, of course, but where extra strength is required the end panel may be incorporated into a carton formed almost entirely of paper-covered wood core veneer. In such case, the wood core may be present only at the flat surfaces of top, bottom and sides, and the edges may consist of the two layers of moisture-resistant paper veneer which are glued together to facilitate folding. Alternatively, the material may be grooved and folded at the edges, as in the case of the end panels.



By forming the end panel with grooves both top and bottom and at the ends, and with a proper taper provided with one pair of end segments, reinforcing posts or rails may be formed around all edges, thus forming a very strong end panel having substantial resistance to crushing in either plane. This technique may be particularly useful where the box is approximately as tall as it is wide, so that it may happen to be stacked either way.

## DESCRIPTION OF THE DRAWINGS

FIG. **1** is an edge view of my end panel with the grooves cut prior to forming the corner posts.

FIG. **2** is a perspective view of the panel of FIG. **1** with one corner post formed by folding over the end sections.

FIG. **3** is an edge view of the panel of FIG. **1** with corner posts formed at both ends.

FIG. **4** is a plan view of a typical carton cut to the desired shape with the end panels in place prior to forming the carton.

FIG. **5** is a perspective view of an assembled carton using the end panels shown in FIGS. **1**, **2** and **3**.

FIG. **6** is a plan view of an alternate form of end panel showing the manner in which the material is formed with grooves prior to forming the reinforcing posts.

FIG. **7** is a perspective view of the panel of FIG. **6** after assembly, with a portion broken away to show the manner in which the end sections are folded over.

FIG. **8** is a perspective view of a typical carton formed with the end panels of FIGS. **6** and **7**.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. **1**, an edge view is shown of a panel of paper-faced wood material **10** including a centrally disposed wood core **12** having exterior layers of paper **14** and **16** tightly bonded thereto. This board is routed at each end to form V-shaped grooves parallel to its shorter end, as well as being formed with a 45° bevel at each end. The grooves are preferably cut through paper layer **14** and wooden layer **12**, but not layer **16**, so that the material may be folded over using the paper layer **16** as a hinge to form a square edge. Thus grooves **18**, **18***a* should be cut at 90°. Grooves **20**, **20***a* are preferably cut to the same depth but at a greater angle, such as 135°, to facilitate folding the material over sufficiently that the section of material outside of groove **20** can come into contact with the main portion of panel **10**. The bevel on the end of the panel **10** will preferably be at 45° such that it will be flat against the surface of the panel.

FIG. **2** shows a perspective view of the panel of FIG. **1** with the grooves **18***a* and **20***a* visible, since that end of panel **10** is shown not folded over. The opposite end is folded at grooves **18** and **20** to form a triangular corner post with the outside beveled and secured against the panel **10** as shown.

FIG. **3** shows a view similar to FIG. **1** with both corner posts formed. All of the V-shaped grooves **18**, **18***a*, **20** and **20***a* and the beveled ends are normally coated with a desired type of moisture-resistant adhesive or glue and are then fastened together to form an end panel having corner posts as shown in FIG. **3**.

FIG. 4 is a plan view of the typical carton cut to the desired shape with the end panels **10**, **10a** positioned in place prior to forming the carton. In this instance the end panels **10** and **10a** are positioned on top of a properly formed corrugated paper carton structure **22** having bottom **24**, side panels **26** and **28**, and top panels **30** and **32**. Each of the panels **24**, **26**, **28**, **30** and **32** includes fold-over gluing flaps **34**, **34***a*, **36**, **36***a*, **38**, **38***a*, **34**, **34***a*, **36**, **36***a*, **38**, **38***a*, **40**, **40***a*, and **42**, **42***a*, respectively.

FIG. **5** shows the carton of FIG. **4** in essentially completed form. In this view it will be recognized that the paperboard member **22** has been folded around the end panels **10**, **10***a* with the bottom **24**, side panels **26** and **28**, and top panel **30** in place. Top panel **32***a* has been shown open to provide an additional showing of the interior structure of the assembled carton. Flaps **34**, **36**, **38** and **40** are shown folded over and fastened to end panel **10**. Flaps **34***a*, **36***a*, **38***a* and **40***a*(not shown) are similarly fastened to panel **10***a*. Typically, the sides of the corner posts forming a portion of the end panels will be fastened to the side panels **26** and **28** by means of adhesive.

FIG. **6** is a plan view of an alternate form of end panel which is formed in such a way as to provide reinforcing posts or rails around all edges of the end panel, thus providing a very strong end panel which will resist crushing in both vertical and horizontal planes. In this embodiment, a flat panel of paper-covered veneer **50**, such as that described above, is formed with horizontal grooves **52**, **52***a* and **54**, **54***a*, and vertical grooves **56**, **56***a* and **58**, **58***a* providing both vertically and horizontally disposed foldable segments. The outside edges of these segments are beveled, preferably at 45° as described above. With the arrangement shown, the end segments will fold over in exactly the same manner as described above with respect to the embodiment of FIGS. **1**, **2** and **3**, and then the top and bottom segments may be folded over to form posts in the horizontal plane. It will be observed that the outside ones of the top and bottom segments are tapered to accommodate the corners produced by inwardly folding the end segments.

FIG. **7** shows the end panel of FIG. **6** with the segments folded over to form a completed end panel and with a portion broken away to show the manner in which the various segments are folded over to form the side posts or rails. In this view, it will be seen that the top panels are folded 90° from the main portion of panel **50** to form the edge at fold **52***a* and that a second fold is formed at numeral **54***a* which brings the segments back at approximately a 45° angle into contact with the main end panel section. Similarly, side panels are folded at **56***a* and at **58***a* to form the vertical posts as previously described. The segments outside of folds **54** and **54***a* are tapered to accommodate the space taken up by the segment folded over at fold **58** or its counterpart, fold **58***a*.

FIG. **8** shows a carton utilizing end panels of the kind described with respect to FIGS. **6** and **7**. In this carton (which has the top removed for clarity), two end panels **50** and **60** are formed with reinforcing posts facing outwardly from the interior of the box structure and with sides **62** and **64** and bottom **66** stapled or otherwise secured to the edges of the end panels. This particular box is shown with sides, bottom and end panels formed of paper-covered veneer with the wood core sections **68**, **70**, **72** and **74** shown attached to the flat areas of the end panels while the paper portions are used alone at the edge folds and for areas of small span such as that shown at numeral **76**. The sides **62** and **64**, bottom **66**, and the corresponding top could also be of corrugated paper. It will be appreciated that a carton of the type shown in FIG. **8** will be very resistant to crushing forces and should not appreciably deform in normal service, even though stacked many cartons high. Where the cross-section of the box approaches square, as in the case of that carton shown in FIG. **8**, the carton will retain its resistance to crushing, irrespective of which side happens to be placed on the top during stacking.

While only a limited number of embodiments have been shown and described herein, other modifications will occur to those skilled in the art. Thus, with reference to FIGS. **4** and **5**, while the member **24** will typically be of corrugated paper, it may also be formed of other materials such as the paper-covered veneer used in the end panels **10**, **10***a*. While the grooves cut at **20**, **20***a* and the bevels at the edge of the end panels **10** are described as being cut at a 135° and 45° angle, respectively, this could be subject to some variation, but the sum of these two angles should equal 180° so that the corner post will fold properly back against the inside of panel **10**. To the extent that groove **20** is cut at less than 135°, more material will be required for the segment extending between groove **20** and the bevel. Exactly the same factors apply with respect to the grooves formed in end panel **50**. And, obviously, staples may be used either in addition to adhesives or in place of adhesives.

I claim:

**1**. A shipping container having a bottom panel, side panels integrally connected to said bottom panel and extending at right angles thereto, top panels integrally connected to the side panels and extending at right angles thereto, attachment flaps attached to each of said bottom, side and top panels, and separate end panels fastened to at least said bottom and side panels, each of said end panels comprising a sheet of paper-covered wood core veneer material with corner posts of paper-covered wood veneer at each end thereof.

**2**. A shipping container as set forth in claim **1** wherein said end panels are formed of a unitary sheet of paper-covered wood veneer material having the ends thereof beveled,

a first pair of grooves are cut parallel with the beveled edges to provide a first segment and a hinge which will fold said segment at right angles to the main portion of the end panel,

a second pair of grooves are cut between said first pair of grooves and said edge to provide a second segment and a second hinge which will fold said second segment back against said main portion,

and adhesive means securing said material at said hinges and said beveled edge to form said corner posts.

**3**. A shipping container as set forth in claim **2** wherein said corner posts are integrally formed with said end panels from a single sheet of paper-covered wood core veneer.

4. A shipping container as set forth in claim 3 wherein said bottom panel, side panels, top panels and attachment flaps are formed of corrugated paperboard.

5. In a container having end panels and a separate member cooperating with said panels to form aid container, said separate member having portions providing the top, sides and bottom panels of aid container and end flaps forming part of said portions, said end flaps being secured to said panels to form said container;

the improvement wherein each of said end panels comprises a sheet of paper-covered wood core veneer material formed with parallel grooves near the ends thereof and with the end segments formed thereby folded over and adhesively secured to form corner posts at each end.

6. A container as set forth in claim 5 wherein said end panels are formed with beveled edges at said ends, the said grooves are cut through one paper layer and the wood layer to form folded hinges, the inside pair of which fold to a right angle, and the outside pair of which fold past a right angle such that said beveled edges contact the main portion of said end panel.

7. A container as set forth in claim 5 wherein said separate member is formed of corrugated paperboard.

8. A container as set forth in claim 5 wherein said separate member is formed essentially of paper-covered wood core veneer material.

9. A container as set forth in claim 5 wherein said end panels are formed with parallel grooves near the top and bottom thereof to form top and bottom segments which are foldable to form posts at right angles to said corner posts.

10. A container as set forth in claim 9 wherein the outside segments of one of said pairs of end segments and said top and bottom segments are tapered to provide clearance for the opposite pair of segments as folded.

* * * * *