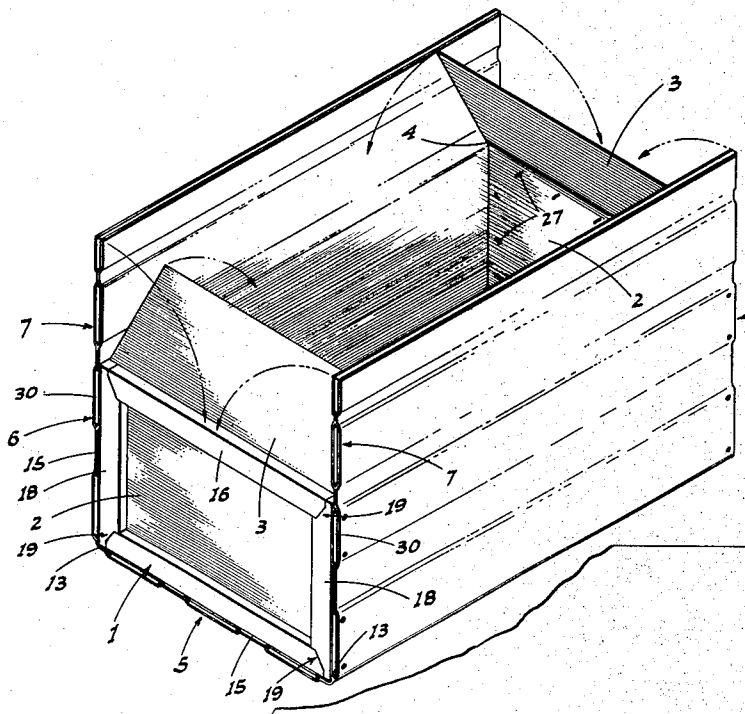
Aug. 14, 1956 C. A. BURKHOLDER 2,758,739

BOX

Filed Aug. 2, 1954 2 Sheets-Sheet 1

FIG. 1



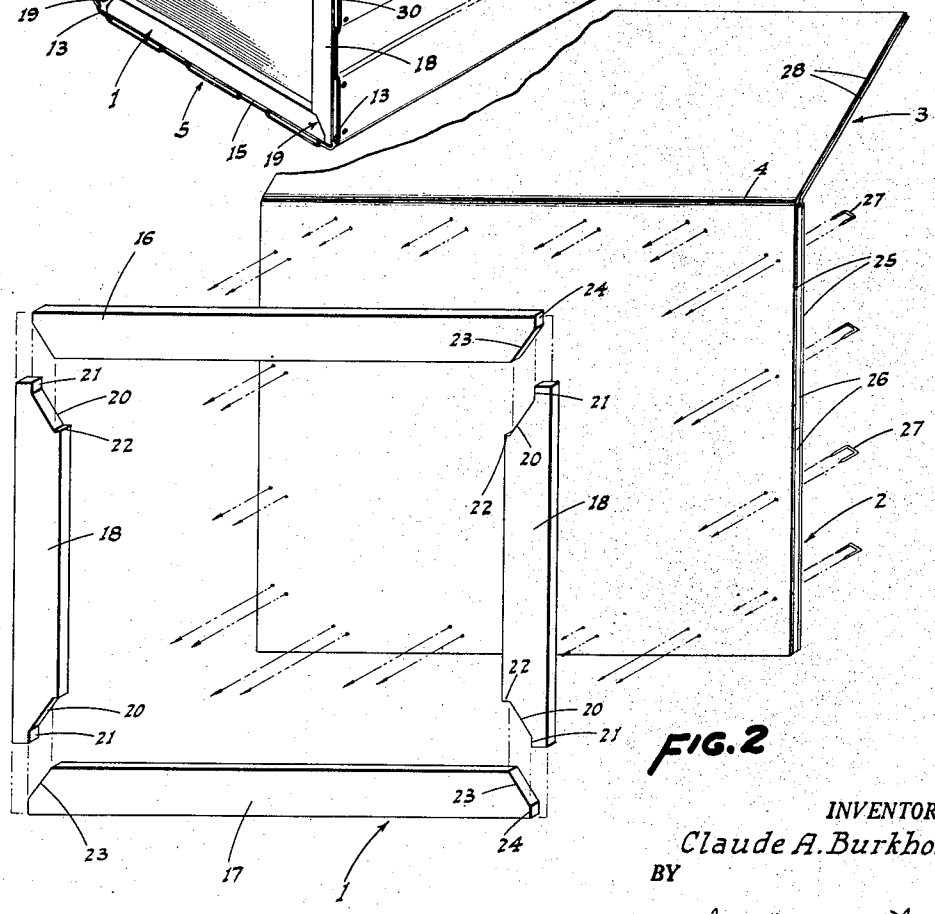


FIG. 2

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BOX

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FIG. 3

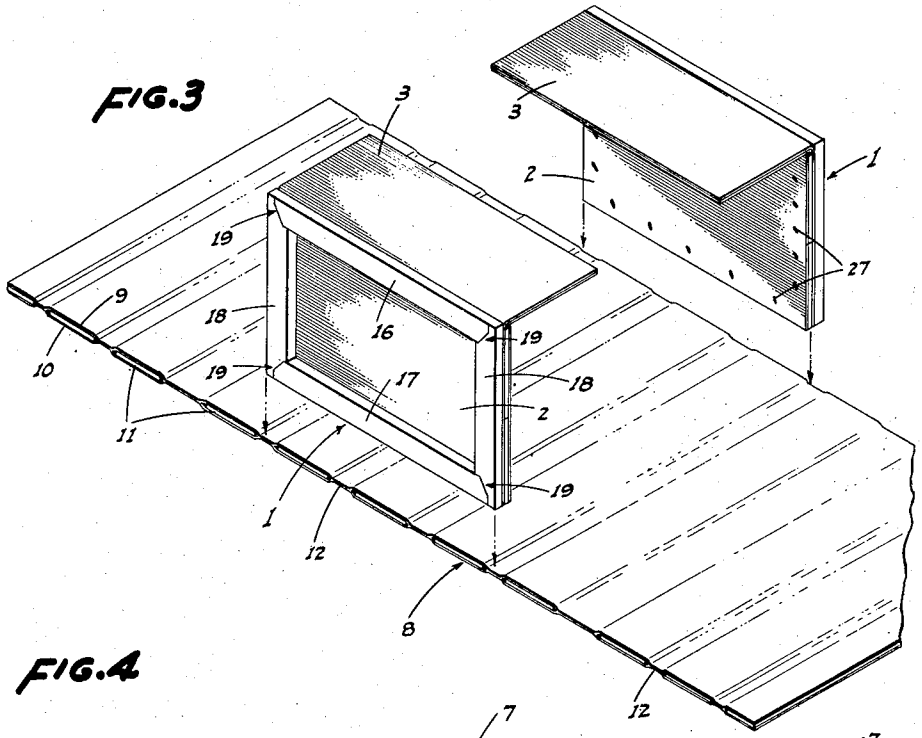


FIG. 4

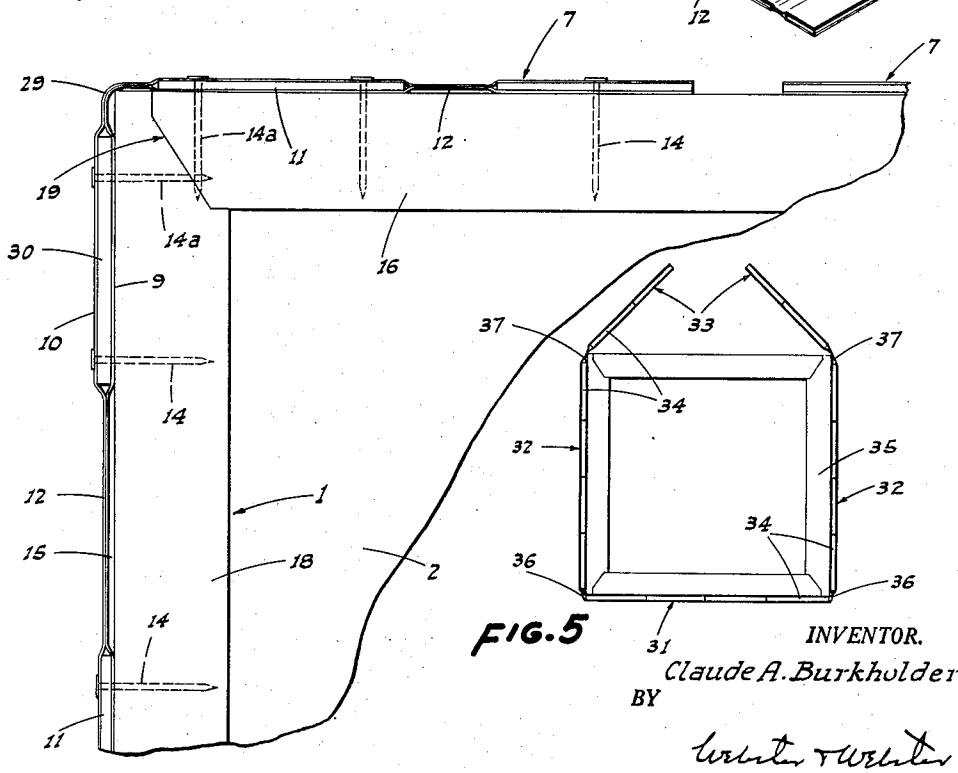


FIG. 5

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BOX

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Application August 2, 1954, Serial No. 447,225

2 Claims. (Cl. 217—17)

This invention relates in general to shipping boxes especially adapted—but not limited—for use to contain fresh produce for transit to market.

The principal object of the instant invention is to provide a novel box structure comprised of composite paper and wood veneer sheet material, and open rectangular end frames of wood to which said material is secured.

Another object of the invention is to provide a shipping box of the type described, which is light weight and economical to manufacture, yet strong, durable, and having no tendency to rack when subjected to the weight of the load or external pressures.

An additional object of the invention is to provide a shipping box, as above, wherein the end frames are of novel structural design, being effective to withstand substantial compression, both horizontally and vertically, particularly by reason of a unique joint used at the point of engagement of the end frame members; i. e. at the corners of the end frame where the top and bottom rails abut the end posts.

Still another object of the invention is to provide a shipping box which—in one embodiment—permits of the pulling of a vacuum on the contents during precooling, ventilation of such contents during transit, and water-drain from the box when the produce is ice packed.

A further object of the invention is to provide a shipping box which is arranged so that the parts can be readily assembled in secured-together relation by power driven stapling and nailing mechanisms.

It is also an object of the invention to provide a shipping box wherein the bottom, sides, and top side flaps are a continuous length of composite paper and wood veneer sheet material, which material may be produced by means of the method illustrated in copending application, Serial No. 559,730, filed January 17, 1956, on Method of Manufacturing Composite Paper and Veneer Sheet Material.

Still another object of the invention is to provide a practical and reliable box, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a perspective view of the shipping box as assembled; the view showing the top end flaps and the top side flaps in upstanding or open position.

Fig. 2 is an enlarged exploded view showing one of the end frames and the corresponding end panel and top end flap.

Fig. 3 is an enlarged perspective view showing, in its initial flat form, the length of composite paper and wood veneer sheet material from which the bottom, side panels, and top side flaps are formed; the view including the end frames and corresponding end panels and top end flaps disposed above said length of sheet material preparatory to being secured in connection therewith.

Fig. 4 is an enlarged fragmentary end view of the box as closed for shipment.

Fig. 5 is a somewhat diagrammatic end elevation on reduced scale illustrating a modification.

Referring now more particularly to the drawings and to the characters of reference marked thereon, and at present to the embodiment of Figs. 1–4 inclusive, the box comprises open rectangular end frames, indicated generally at **1**, and which are constructed of wood; such end frames being covered, from the inner face, by an end panel **2** having a top end flap **3** integral therewith at the upper edge. The numeral **4** indicates the horizontal line of bend between each end panel **2** and the corresponding top end flap **3**.

Secured to and spanning between the end frames **1** are a bottom **5**, side panels **6**, and top side flaps **7**. The bottom **5**, side panels **6**, and top side flaps **7** are formed from an elongated, rectangular length of composite paper and wood veneer sheet material, which length is shown in its initial flat position in Fig. 3, and which is indicated in such figure at **8**.

Such length **8** of sheet material comprises outer runs or laminations **9** and **10** of paper, and an intermediate lamination which is made up of a plurality of transversely extending, full width, wood veneer sections or slats **11** which are relatively thin, with substantial spacing therebetween in a direction longitudinally of the sheet.

The outer runs or laminations **9** and **10** of paper are adhesively bonded to the wood veneer sections **11** on both sides, and in the space between said sections the paper is bonded together, as at **12**, in the form of a reduced-thickness, two-ply, central web.

The transversely extending wood veneer sections **11**, which comprise the intermediate lamination, are predetermined in number and spacing in each length **8** of the sheet material, whereby when said length of sheet material is disposed in a given relation to and wrapped about the end frames **1**, a certain number of said wood veneer sections **11** lie in the bottom **5**, in the side panels **6**, and in the top side flaps **7**. Also, the arrangement is such that one of the webs **12** is disposed at each lower corner of the end frames **1**, and as such webs are flexible they readily bend about said corners, as at **13**.

When the box is initially assembled, with the length **8** of sheet material wrapped about the end frames **1**, the bottom **5** and side panels **6** are secured to said end frames by nails **14** driven through the material in the zone of the wood veneer sections **11**. The top side flaps **7** are similarly nailed closed after the box is packed with produce.

With the length **8** of sheet material thus secured to the end frames **1** the bonded paper webs **12** between adjacent wood veneer sections **11**, both in the bottom **5** and in the side panels **6**, lie in spaced relation to the adjacent outer edge portion of the related end frame; the spaces being indicated at **15**. This is a very important feature, as such spaces **15** permit of the ready pulling of a vacuum on the contents of the box during precooling by the vacuum process; permit of ready ventilation of such contents during transit; and in those instances where the produce pack is iced, water can readily drain through the spaces **15** at the bottom of the box.

The end frames **1** are of special construction, and each comprises a horizontal top rail **16**, a horizontal bottom rail **17**, and vertical end posts **18**; such rails and posts being provided at the abutting ends—i. e. at the corners of the end frame—with a novel joint, indicated generally at **19**.

Each such joint comprises, on the related post **18**, a miter-cut **20** which terminates short of the adjacent end and inner edge of said post; there being a vertical shoulder **21** between the miter-cut **20** and said adjacent end of the post, and a horizontal shoulder **22** between the inner edge of the post and said miter-cut.

The corresponding end of the rail **16** or **17** is formed with a matching miter-cut **23** which extends from the inner edge of said rail a distance less than the full width thereof, whereby to leave—adjacent the outer edge—a vertical shoulder **24**.

When each rail and end post are brought together at adjacent ends the miter-cuts **20** and **23** match; the inner edge of the rail seats on the horizontal shoulder **22**; and the vertical shoulders **21** and **24** abut.

With each such joint in engagement there is, in addition to the engaging miter-cuts, abutting vertical and horizontal surfaces, all of which assures against undesirable racking of each end frame **1**, and which frame is able to withstand substantial compression either vertically or horizontally.

The joints **19** may, if desired, be glued, and additionally the pair of nails, indicated at **14***a*, adjacent each such joint **19**, and the nails of which pair are slightly laterally offset relative to each other, are driven—as shown in Fig. 4—so that they pass through the miter, effectively joining the posts and rails.

Each end panel **2** comprises a rectangular section of composite paper and wood veneer sheet material made up of outer laminations **25** of paper, and an intermediate lamination of wood veneer sections **26** in abutting edge to edge relation so that each end panel **2** is quite rigid or stiff; each such panel being secured to the inner face of the corresponding end frame **1** by staples **27** driven through said panel from the inside into the rails **16** and **17**, and posts **18**. Glue also may be used.

Each top end flap **3** is an integral continuation of the corresponding end panel **2**, but comprises only laminations **28** of paper adhesively bonded together. In other words, the wood veneer sections **26** of each end panel **2** are omitted from the top end flap **3**.

After each box is loaded with produce, the top end flaps **3** are first infolded on the line of bend **4**, followed by infolding of the top side flaps **7** on a line of bend which occurs at certain of the webs **12**, as indicated at **29**; the final step being the nailing of the flaps **7** to the top rails **16**.

The paper, and the glue, used in the manufacture of the lengths **8** of composite sheet material, and the composite end panels **2**, including the top end flaps **3**, is water resistant so that no appreciable injury to the box, as by lamination separation, occurs when said box is used with ice-packed produce, such as lettuce. Certain ones **30** of the wood veneer sections or slats are of materially greater thickness than the remainder of the slats, and such slats **30** are disposed in the sheet **8** during the assembling or making of the same in such relation that said slats **30** will occupy positions on opposite sides of the end frames **1** at the top thereof when the side and bottom panels of sheet **8** are placed and secured about said frames in their proper relation thereto.

The purpose of such extra-thickness slats **30** is two-fold. For one thing, these thicker slats strengthen the box at the top against possible buckling or horizontal deformation or wracking before the top flaps are fastened down, while enabling the longitudinal sheathing of the box to be as light as is practicable.

For another thing, when boxes are placed in side-by-side engagement with each other, as during shipment, only the thick slats **30** contact each other, thus leaving longitudinal and vertical ventilation spaces between the adjacent sides of adjacent boxes below such slats **30**, which spaces are of course needed for cooling and preservation of fresh produce being shipped.

In those instances where the produce is ice packed, in the box, or in those instances where vacuum cooling and subsequent ventilation is desired, the box is constructed as in Figs. 1–4 inclusive, for the purpose of providing the spaces **15** between the webs **12** and the adjacent bottom rail **17** and end posts **18**, and which spaces serve the purpose hereinbefore described.

However, for certain types of dry packed produce, such as lemons or oranges, the spaces **15** are unnecessary, and for this kind of produce the box is formed as in Fig. 5, wherein the bottom **31**, side panels **32**, and top side flaps **33** are defined by a length of composite paper and wood veneer sheet material generally the same as indicated at **8** in Fig. 3, except that the sections **34** of wood veneer here lie in abutting edge to edge relation in said bottom **31**, side panels **32**, and top side flaps **33**. In this embodiment spacing between adjacent sections **34** of the wood veneer exists only at the point of bend about the corners of each end frame **35**, as shown. The lower corners of bend are indicated at **36**, while the upper corners of bend are indicated at **37**. At these corners **36** and **37** the sheet material thus embodies webs corresponding to those indicated at **12** in Fig. 3.

This invention provides, in either of its embodiments, a box having highly desirable characteristics for the shipment of fresh produce; such characteristics including lightness, strength, convenience and economy of manufacture, ability to permit of vacuum cooling and subsequent ventilation, and the drainage of water from an iced pack.

From the foregoing description it will be readily seen that there has been produced such a box as will substantially fulfill the objects of the invention, as set forth herein.

While this specification sets forth the present and preferred construction of the box, still in practice such deviations therefrom may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. A shipping box, including paneled end frames, and a bottom and side panels spanning between and secured to said end frames; in which said paneled end frames each include an initially open, rectangular, frame of wood, and an end panel of composite paper and wood veneer sheet material secured to the inner face of the frame; said wood veneer being in sections between and adhesively bonded to outer laminations of paper, and said outer laminations of paper extending from the upper edge of the panel and being adhesively bonded together to form a top end flap.

2. A shipping box, including paneled end frames, and a bottom and side panels spanning between and secured to said end frames; in which said bottom and side panels comprise a continuous length of composite paper and slat material, the slats extending transversely of the sheet material between and adhesively bonded to outer laminations of paper; the uppermost slats in the side panels being of greater thickness than the remainder.

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