Oct. 8, 1940. L. A. BIGELOW ET AL 2,217,210

FOLDABLE CONTAINER

Filed Dec. 18, 1937 5 Sheets-Sheet 1

Fig. 1

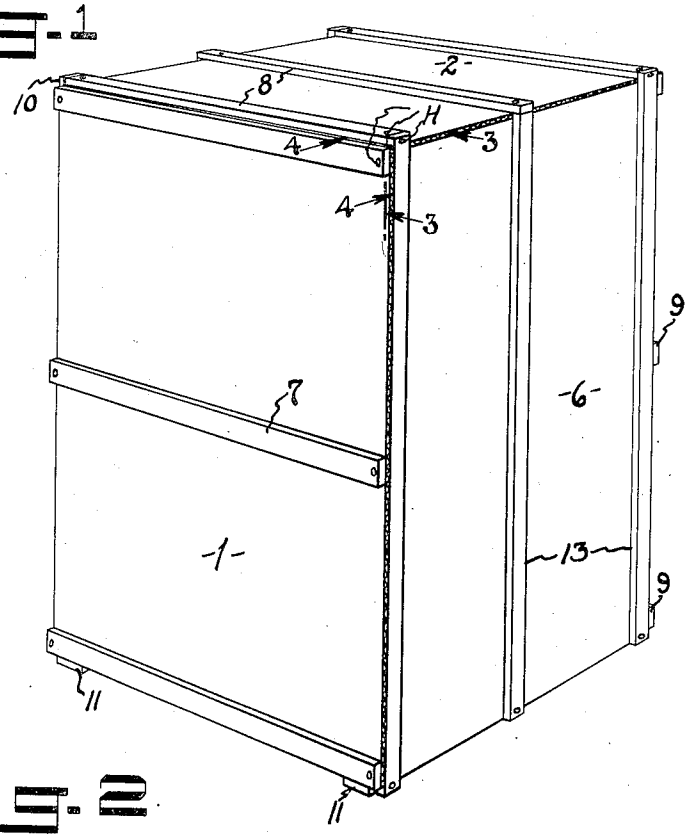
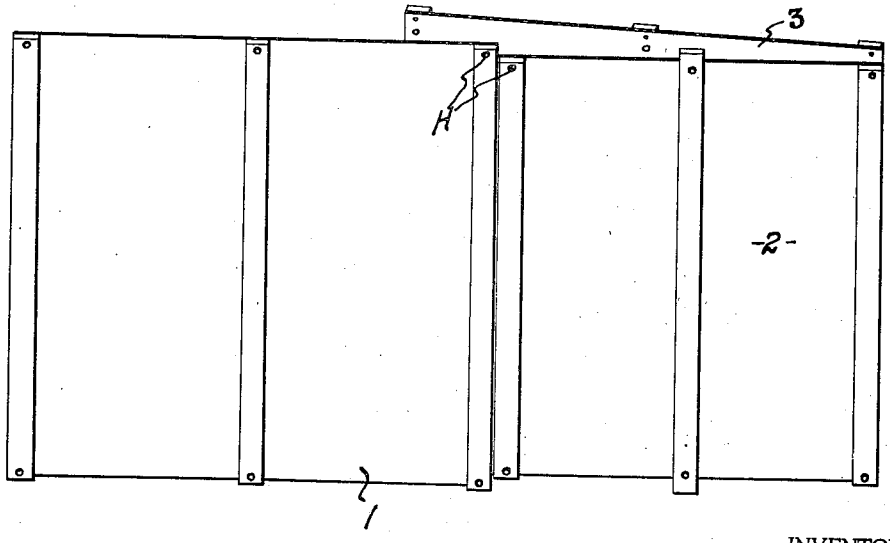


Fig. 2



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Filed Dec. 18, 1937 5 Sheets-Sheet 2

Fig. 3

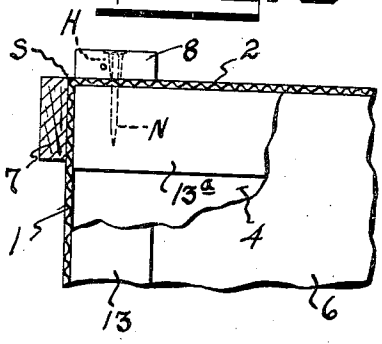


Fig. 4

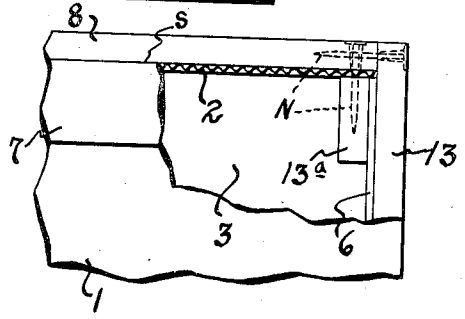
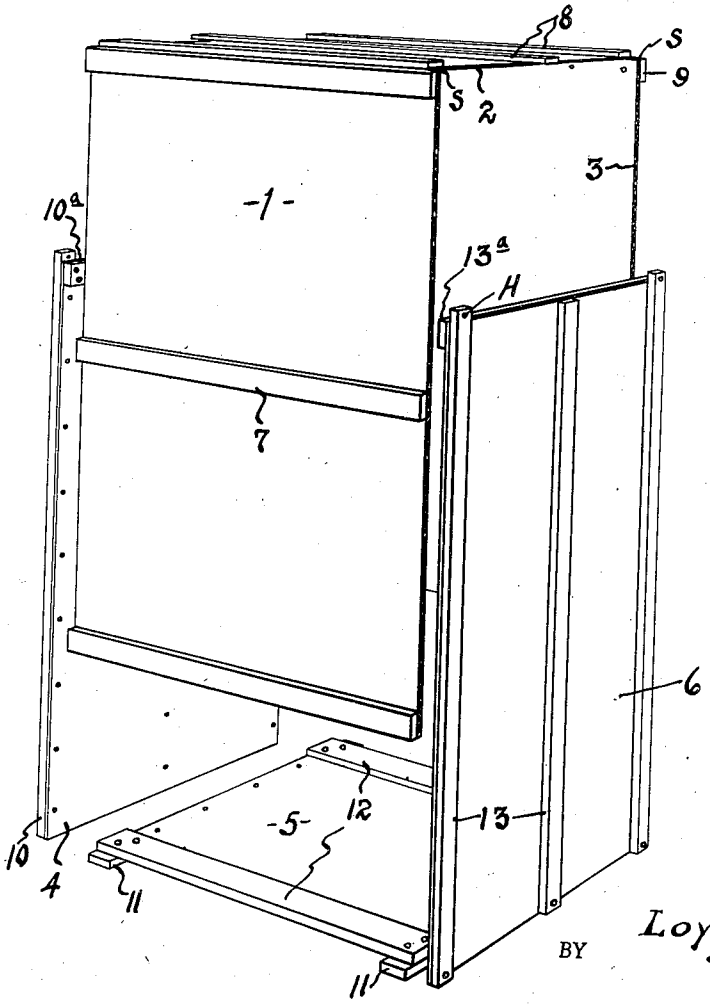


Fig. 5



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Filed Dec. 18, 1937 5 Sheets-Sheet 3

Fig. 6

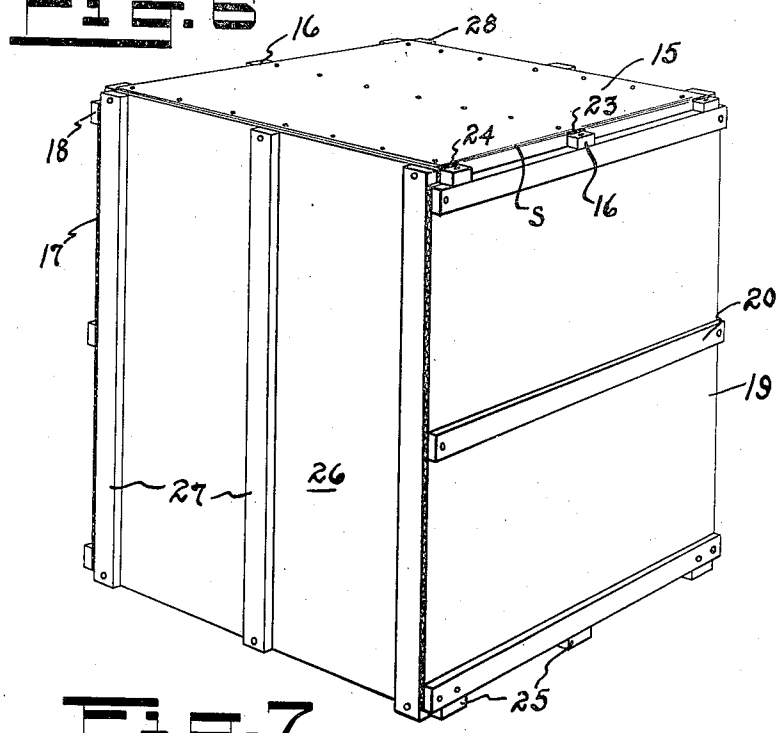


Fig. 7

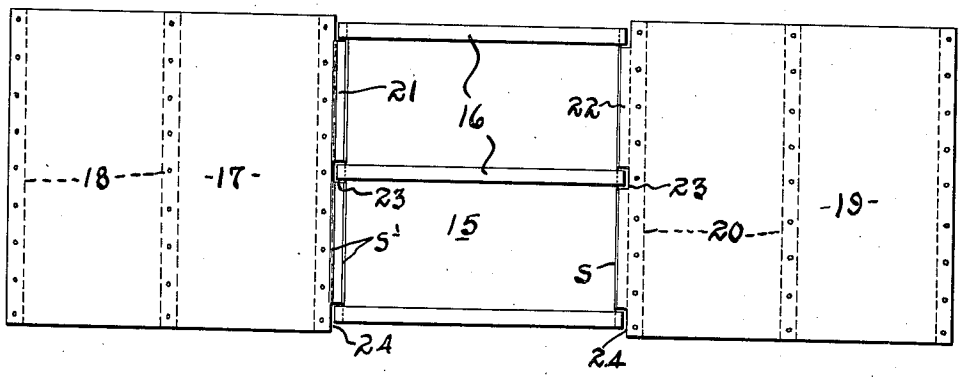
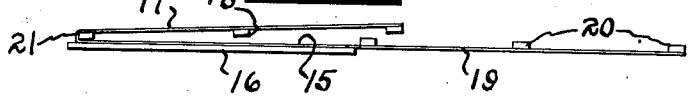


Fig. 8



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FOLDABLE CONTAINER

Filed Dec. 18, 1937 5 Sheets-Sheet 4

Fig. 9

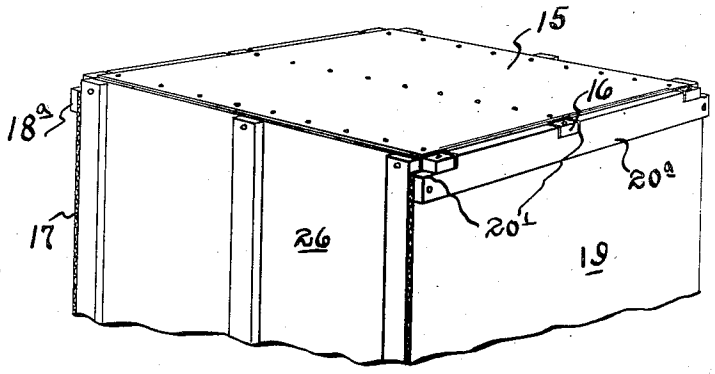
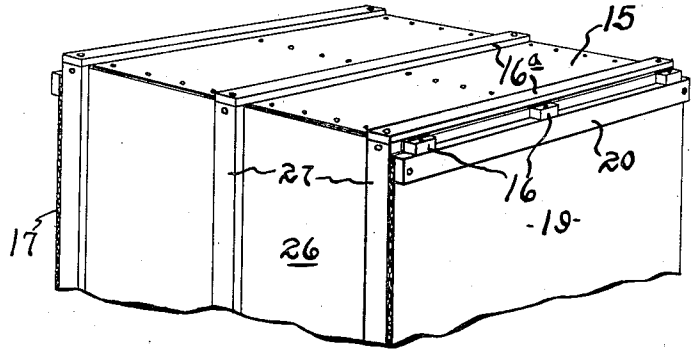


Fig. 10



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Filed Dec. 18, 1937 5 Sheets-Sheet 5

Fig. 11

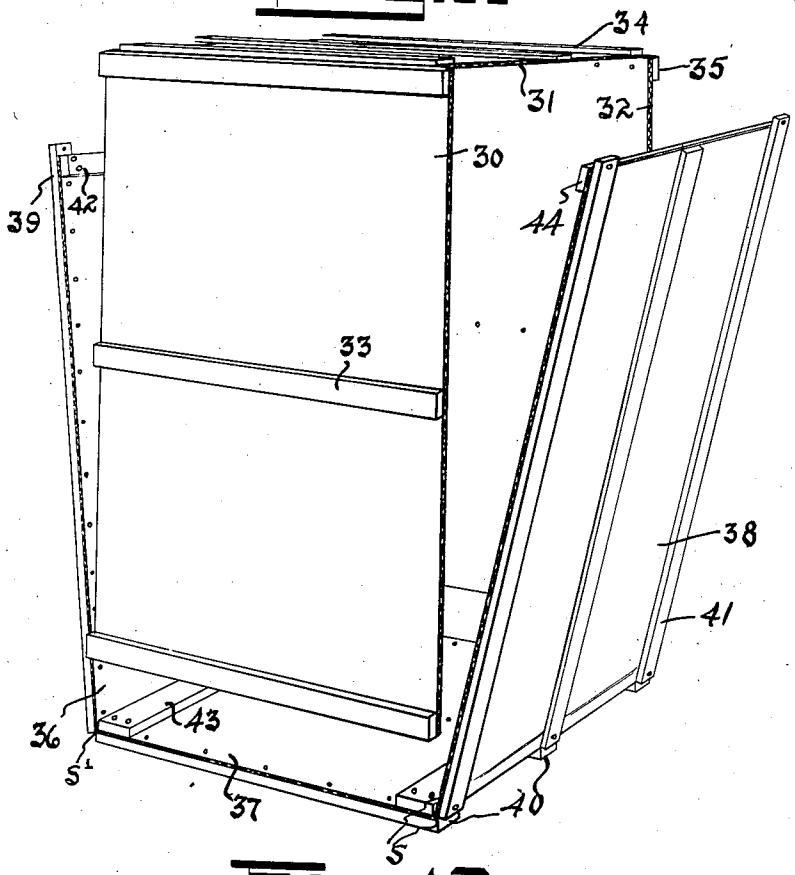
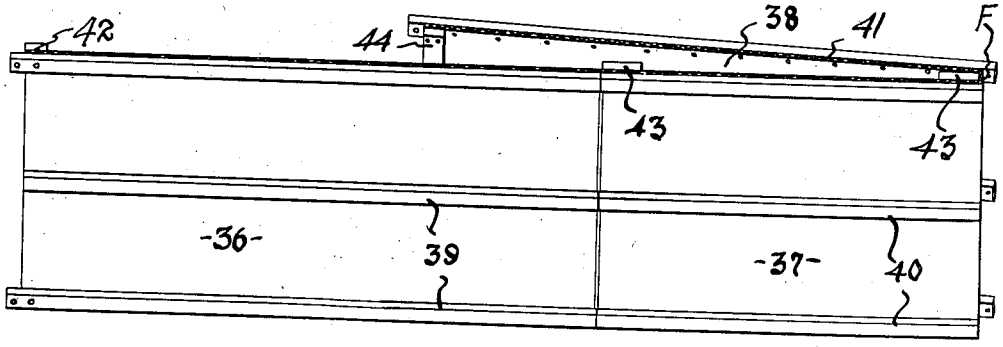


Fig. 12



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Patented Oct. 8, 1940 2,217,210

UNITED STATES PATENT OFFICE

2,217,210

FOLDABLE CONTAINER

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Application December 18, 1937, Serial No. 180,479

6 Claims. (Cl. 217—12)

This invention relates to improvements in the combination of fibre panel and wood cleat box construction of the type which is easily collapsible for storage and transportation, and which may be set up with ease.

The broad object of the invention is to provide, by reason of structural features and combination of elements, exceedingly strong, light, collapsible shipping containers composed of thin panels of fibrous material such as corrugated board, cardboard, chestnut board, fibre board, and the like, which are exceedingly strong and resistant to destructive forces in all directions.

A further object of this invention is to provide a container of this type composed of four parts, one of which comprises three connecting panels foldable to form a flat, easily stacked structure.

Another object of the invention is to provide a container of this type composed of two parts each comprising three hingedly connected panels which may be readily folded for flat storage, and easily unfolded for assembly into a complete container.

Other and more detailed objects of the invention will be apparent from the following description when taken in connection with the attached drawings.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all in accordance with this disclosure.

In the accompanying drawings, in which several forms of the invention have been illustrated,

Figure 1 is a perspective view of the four-piece type of container;

Fig. 2 is a view showing the three panel unit of this container folded for storage;

Fig. 3 is a view taken on the plane 3—3 of Figure 1;

Fig. 4 is a view taken on the plane 4—4 of Figure 1;

Fig. 5 is a perspective view of the structure of Figure 1 with the parts displaced to show the manner in which they are assembled;

Fig. 6 is a perspective view of a modified form of container;

Fig. 7 is a plan view of the three panel portion thereof;

Fig. 8 is an edge elevational view of the three panel portion folded for storage;

Fig. 9 is a perspective view of the upper end of a still further modified form of structure;

Fig. 10 is a similar view of another modification;

Fig. 11 is a perspective partially assembled view of a still further modification employing two parts each comprising three hingedly connected panel sections; and

Fig. 12 is a view of one of these sections folded for storage.

In the container illustrated in Figs. 1 to 5 inclusive, four elements are associated in a complete container. One element comprises three hingedly connected panels formed by the sheets 1, 2 and 3 of suitable fibrous material, which are formed from a single piece of this material by transverse score lines S. Extending transversely of the panel 1 are the reinforcing battens or cleats 7 of any suitable material such as wood secured to the outer face thereof in any suitable manner, such as by nails, staples and/or glue. In a similar way the cleats 8 are attached to the outer face of the section 2 and the cleats 9 to the outer face of the sheet 3. As is clear from Fig. 5, pairs of these cleats are arranged along the score lines S, and others of these cleats are at the lower terminal edges of the sections 1 and 3. It will be noted that in width the section 2 is less than the width of the sections 1 and 3. All of the cleats of these sections terminate at the side edges thereof, with the exception of the middle cleat of section 2 which extends beyond the edges thereof, as is clear from Figs. 1 and 2.

The other two side wall panels of the container comprise the fibrous sheets 4 and 6 having the cleats 10 and 13 respectively secured to the outer faces thereof in the manner explained above. These cleats all extend from the bottom edge of the sheets and project above the top edge with the exception of the central cleats. Secured to the inner faces of these sheets, transversely thereof, along the top edge are the cleats 10^a and 13^a respectively. The bottom panel comprises a fibrous sheet 5 secured to the longitudinal battens 11 along the side edges and having the transverse battens 12 secured on top thereof along the end edges. It will be noted that the battens 11 project beyond the end edges of the panel, as is clear from Fig. 5. The ends of the battens, as is shown in Figure 1, are each provided with nail receiving holes H which are preferably tapered with the larger end at the outer faces of the battens. The outer ends of these holes are larger than the diameter of the nails they receive, making them readily visible, and making it possible to easily insert a nail therein. The smaller ends of these holes are equal to or slightly less in diameter than the

nail, thereby insuring an upright position for the nail, and frictional engagement therewith. The use of these holes facilitates the application of the fastening nails to the assembled container.

The container is assembled by placing the bottom panel 5 on the floor and setting thereon the package or article to be crated, which if desired may be secured thereto in accordance with common practice. The side panels 4 and 6 are then placed at the side edges of the bottom panel as indicated in the figures and temporarily supported in position by driving nails through the holes H at the bottom of the cleats 10 and 13 into the cleats 11. The three panel unit is then folded to U formation as indicated in Fig. 5 and placed down into position so that the lowermost battens 7 and 9 rest on the projecting ends of the battens 11. The side edges of the panel 2 rest on the battens 10^a and 13^a, and the projecting ends of the middle battens 8 rest on the end of the middle battens 13 and 10. This is all clear from Figure 1. The various battens are then interconnected by means of nails extending from one to the other in a manner indicated in the figures, providing a strong, rigid structure.

As is clear from Figure 1, the side panels 4 and 6 extend all the way to the floor, providing load bearing columns which make the container strong under vertical loads. The same result occurs if the container is laid on either side. It will also be noted that by reason of the manner of scoring an association of cleats it is possible to fold the three unit panel to reduce its size, as indicated in Fig. 2. The other three units may then be nested or stacked thereon to form a compact, flat pile.

The container of Figs. 6 to 8 inclusive is similar to the previous one in that it has four elements, one of which comprises three panels hingedly connected together. The three panel unit consists of three fibrous sections 15, 17 and 19 formed from a single sheet of fibrous material transversely scored at S and S'. At S a single score line is provided while at S' a double score line is provided forming a narrow strip 21, as is clear from Fig. 7. Secured to the outer faces of the sections 17 and 19 are the cleats or battens 18 and 20 by means of nails, staples, glue or the like. These battens run from side to side. Secured to the inner face of the section 15 are the battens 16 which run at right angles to the others, and which have ends extending beyond the score line S and the inner score line S'. The section 15 is of less width than the other sections as shown, and the corners of the other sections adjacent the outer battens 16 are notched, as shown at 24. At the ends of the battens 16 openings 23 are cut so that the sections 17 and 19 can be folded upwardly at right angles to the section 15, Fig. 7. The notches and openings 24 and 23 permit the ends of the battens 16 to project therethrough and beyond the corners of the section 15, as is clear from Fig. 6. The double score lines S' permit the folding over of the section 15 as shown in Fig. 8, when the device is to be stored. The strip 21 defined by the double score lines S' is of sufficient width to permit of the nesting of the adjacent batten 18 therewith, as is clear from Fig. 8. The bottom panel is similar to the bottom panel of the previous construction and is provided with the battens 25 on its lower face projecting so that the sections 17 and 19 may rest thereon, as is clear from Fig. 6. The section 26 is provided with the vertical battens 27, while the corresponding section on the other side which does not appear in the figure, is provided with the vertical battens 28. It will be seen that these side sections extend all the way from the floor to the top surface of section 15. The projecting ends of the battens 16 rest on the uppermost battens 18 and 20 and the outermost battens 16 lie against the upper ends of the battens 27 and 29. Thus all of the structural members are inter-related and can be secured together by nails to form a strong, rigid structure. This crate is assembled in a manner quite similar to the previous one.

The construction in Fig. 9 is the same as that disclosed in Figs. 6 to 8 inclusive, with the exception that the battens 20^a and 18^a, which are made wider so that the top edges lie in the plane of the top faces of the battens 16. The battens 20^a and 18^a are notched at the ends and in the middle to receive the ends of the battens 16. This somewhat strengthens the upper end of the container at the side edges and makes a stronger interlocking connection between the battens 18^a and 20^a and 16.

The arrangement of Fig. 10 is likewise quite similar to that of Figs. 6 to 8 inclusive. Indeed, this construction varies therefrom only in that on the outer surface of the section 15 there are applied a plurality of battens 16^a, which are secured thereto as before, and which extend at right angles to the battens 16 on the end face. It will be noted that the battens 16^a extend over the ends of the battens 27 and 28 (not shown) so that they may be secured thereto. As will be apparent, this greatly protects and strengthens this end of the container.

The modification of Figs. 11 and 12 is one comprising but two elements each of which is made up of three sections hingedly connected together and when in set up condition form U-shaped structures which telescope over each other, as is clear from Fig. 11. One element comprises the fibrous sections 30, 31 and 32 which are formed from a single sheet of fibrous material transversely scored intermediate the ends to define these panels and form hinge connections therebetween. Extending transversely of the section 30 are the battens 33, transversely of the section 31 the battens 34 and transversely of the section 32, the battens 35, all of which are secured thereto as explained before. The other elements comprise the sections 36, 37 and 38 which are also formed by transversely scoring a single sheet of fibrous material intermediate the ends to define these sections and hingedly connect them together. The sections 36 and 38 have applied to the outer faces thereof the vertical battens 39 and 41 respectively, and to the inner faces thereof along the top edge the battens 42 and 44. It will be noted that the upper edge of these sections and the battens 42 and 44 are inside of the ends of the battens 39 and 41. To the lowerface of the section 37 are secured the battens 40 and on the inner faces are the battens 43 adjacent the score lines.

It should here be noted that because of the presence of the battens 43 the fibrous material is provided with a single score line S' adjacent one and double score line S adjacent the other to form a strip F wide enough to fit around the adjacent batten 43 when the structure is folded into the position shown in Fig. 12. The other element of the box is folded up in a manner ex-

actly the same, as is the third section element of Fig. 2. The construction of Figs. 11 and 12 is an exceedingly simple one in that the various sections are of uniform width and do not require any particularly special details of construction and assembly.

To employ this container the element containing the sections 36, 37 and 38 is laid flat on the floor and the article to be packed is set on the upper face of section 37 by the battens 43. The sections 36 and 38 are then folded up at right angles and the other element formed into U shape is set down thereover as indicated in Fig. 11, so that the side edges of the section 31 rest on the battens 42 and 44. The free ends of this element then lie down alongside of the outer battens 40. It will be noted from Fig. 1 that the ends of the middle batten 34 are longer than the two outer battens so as to lie over the ends of the middle batten of sections 36 and 38. The parts are then all secured together as before.

From the above description it will be apparent to those skilled in the art that the details and principles of this invention may be varied by those skilled in the art without departure from the novel scope thereof. We do not, therefore, desire to be strictly limited to the disclosure as given for purposes of illustration, but rather to the scope of the appended claims.

What we seek to secure by United States Letters Patent is:

1. A container of the type described consisting of four elements, comprising a bottom element and two side elements each including a fibrous sheet having a plurality of battens secured to the outer faces thereof, the bottom element having a pair of battens on its outer face along the end edges thereof, said side elements abutting against the end edges of the first element so that the ends of the side elements are in the plane of the outer face of the bottom element, and the fourth element comprising three sections formed from a continuous sheet of fibrous material transversely scored to define the sections and having a plurality of battens secured to the outer faces of the sections, said side sections having battens extending along the upper edges thereon on the inner faces, and lying under the middle section of said fourth element.

2. A container of the type described consisting of four elements, comprising a bottom element and two side elements each including a fibrous sheet having a plurality of longitudinal battens secured to the outer faces thereof, the bottom element having a pair of battens on its outer face along the end edges thereof, said side elements abutting against the end edges of the first element, and the fourth element comprising three sections formed from a continuous sheet of fibrous material transversely scored to define the sections and having a plurality of transverse battens secured to the outer faces of the sections, said side sections having battens extending transversely along the upper edges thereon on the inner faces, and lying under the middle section of said fourth element, the middle transverse batten of the middle section overlying the ends of the middle longitudinal batten of the side elements.

3. An element for a container of the type described comprising a single sheet of fibrous material transversely scored at two points intermediate its ends to divide it into three panels hingedly connected together, a plurality of battens secured to the outer faces of each of said panels, there being battens extending along the end edges of each panel so that a pair of battens lie close to and parallel to each of said score lines, the center panel being of less width than the end panels, the battens at the ends of the central panel being of the same width as the central panel and an intermediate batten of the central panel being of the same width as the end panels.

4. A container of the type described consisting of four elements comprising a bottom element and two side elements each element composed of a sheet of fibrous material having a plurality of battens secured to the outer faces thereof, the battens of the bottom element extending along a pair of opposite edges thereof and projecting at their ends beyond the remaining edges of the element, the battens of the side elements being co-extensive at one end with the edges thereof and two of said battens extending along the side edges of the side elements and projecting beyond the other end edge thereof, the remaining battens of the side elements being co-extensive at their other ends with the side elements, and a fourth element comprising a sheet of fibrous material scored to form three panels each having a plurality of battens secured to the outer faces thereof and extending transversely of the panel lengths, the battens of the central panel of the fourth element being aligned with the battens of the side elements when assembled and the middle batten of the central panel extending beyond the side edges thereof so as to overlie the aligned battens of the side elements when assembled.

5. A container of the type described consisting of four elements comprising a bottom element and two side elements each element composed of a sheet of fibrous material having a plurality of battens secured to the outer faces thereof, the battens of the bottom element extending along a pair of opposite edges thereof and projecting at their ends beyond the remaining edges of the element, a batten secured on the inner face of each side element along the top edge thereof, the outer battens of the side elements being co-extensive at one end with the edges thereof and two of said battens extending along the side edges of the side elements and projecting beyond the other end edge thereof, the remaining battens of the side elements being co-extensive at their other ends with the side elements, and a fourth element comprising a sheet of fibrous material scored to form three panels each having a plurality of battens secured to the outer faces thereof and extending transversely of the panel lengths, the battens of the central panel of the fourth element being aligned with the battens of the side elements when assembled and the middle batten of the central panel extending beyond the side edges thereof so as to overlie the aligned battens of the side elements when assembled.

6. A container of the type described consisting of four elements comprising a bottom element and two side elements each element composed of a sheet of fibrous material having a plurality of battens secured to the outer faces thereof, the battens of the bottom element extending along a pair of opposite edges thereof and projecting at their ends beyond the remaining edges of the element, a batten secured on the inner face of each side element along the top edge therof, the battens of the side elements be-

ing co-extensive at one end with the edges thereof and two of said battens extending along the side edges of the side elements and projecting beyond the other end edge thereof, the remaining battens of the side elements being co-extensive at their other ends with the side elements, and a pair of battens secured to the inner face of the bottom element extending at right angles to the battens on the outer face and along the edges of the bottom element, and a fourth element comprising a sheet of fibrous material scored to form three panels each having a plurality of battens secured to the outer faces thereof and extending transversely of the panel lengths, the battens of the central panel of the fourth element being aligned with the battens of the side elements when assembled and the middle batten of the central panel extending beyond the side edges thereof so as to overlie the aligned battens of the side elements when assembled.

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