

July 28, 1959

H. R. PAPY ET AL
BOX-LIKE STRUCTURE

2,896,808

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2 Sheets-Sheet 1

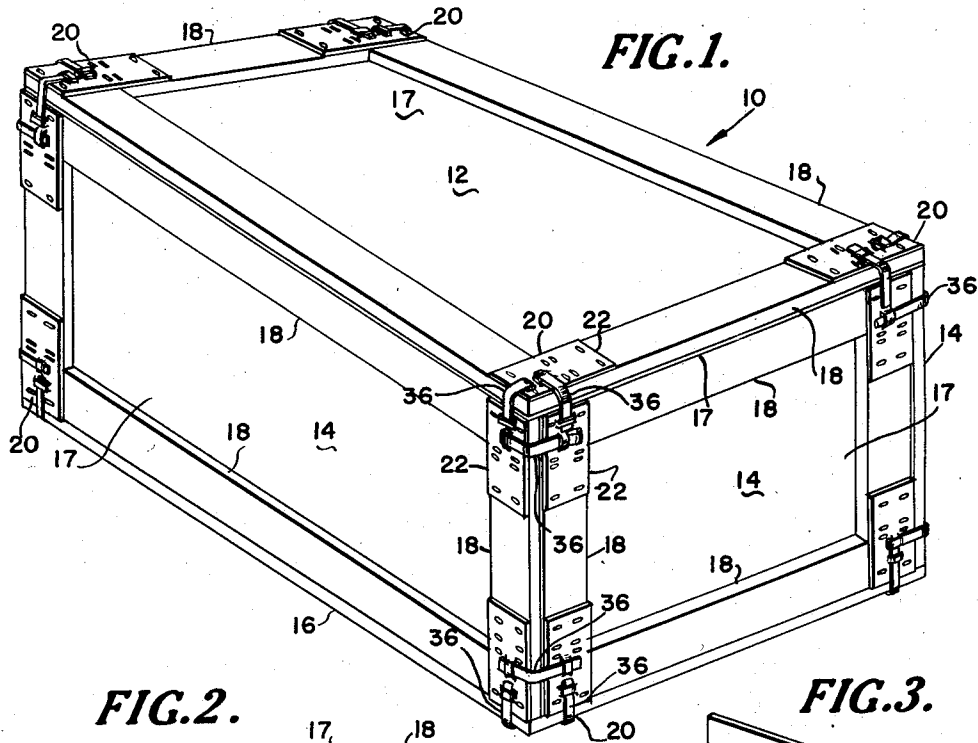


FIG. 2.

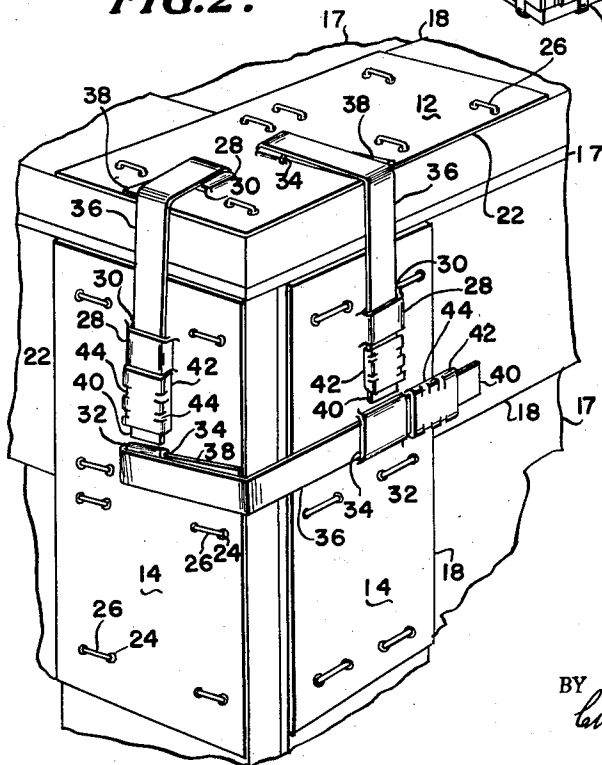
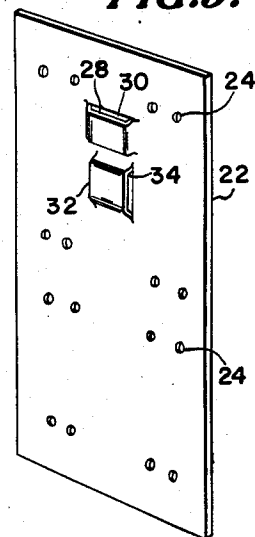


FIG. 3.



INVENTORS

HUGH R. PAPY
WALTER C. CARSON
EDWARD C. ROWLEY

BY *Cushman, Darby & Cushman*
ATTORNEYS

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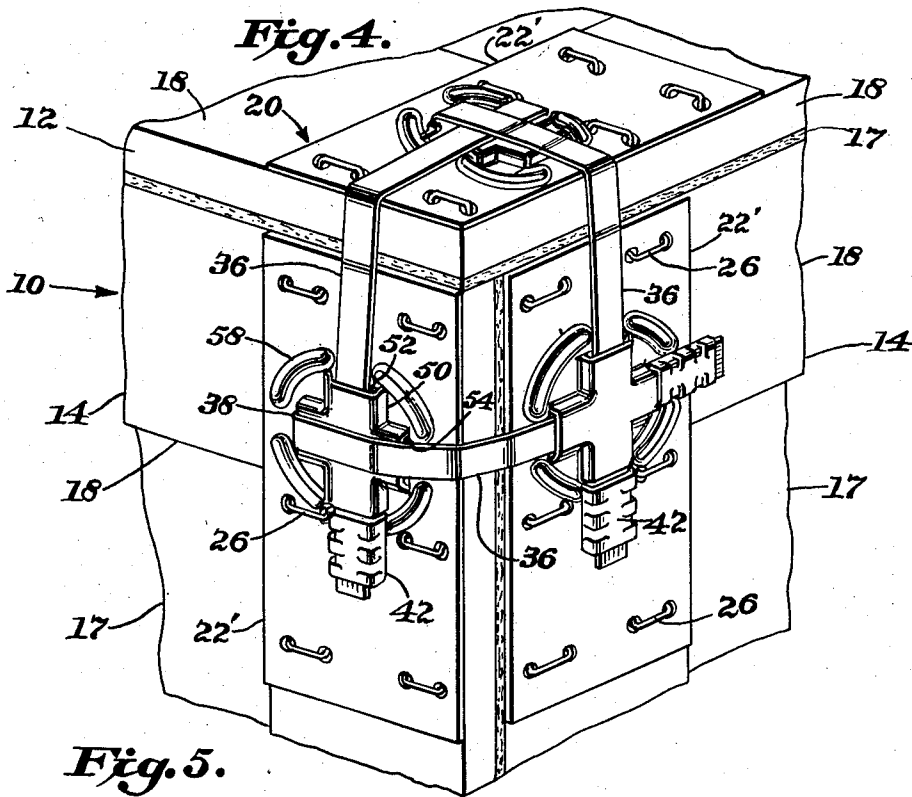


Fig. 5.

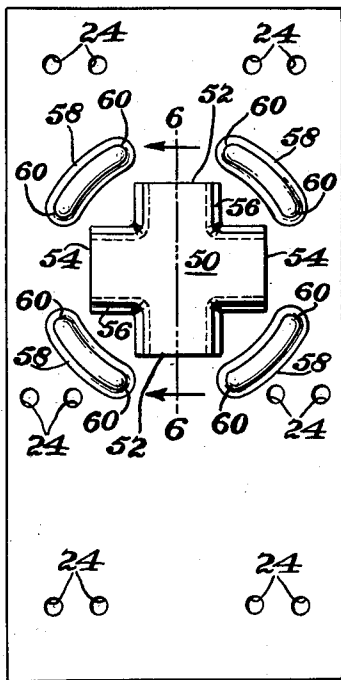
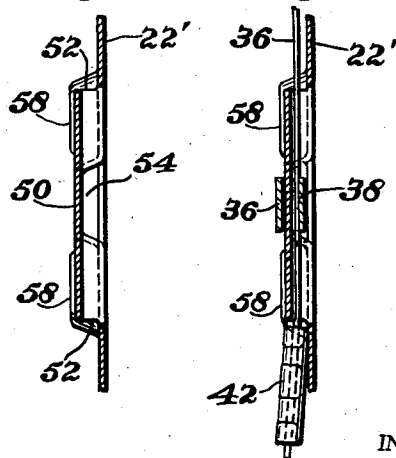


Fig. 6. **Fig. 7.**



INVENTORS:

*Hugh R. Papy,
Walter C. Carson,
Edward C. Rowley,*

BY

ATTORNEYS.

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BOX-LIKE STRUCTURE

Hugh R. Papy, Walter C. Carson, and Edward C. Rowley,
Savannah, Ga.

Application April 30, 1958, Serial No. 731,920

10 Claims. (Cl. 217—66)

The present invention relates to a box-like structure of the type made of a plurality of panels disposed at an angle to each other and fastened together as a unit by a novel fastening means.

The present application is a continuation-in-part of our copending United States application Serial No. 600,999, filed July 30, 1956 and now abandoned.

An object of the present invention is to provide an improved box-like structure which may be easily assembled or disassembled and, thus, reused many times.

Another object of the present invention is to provide improved fastening means for assembling boxes in which the sides, top and bottom are each made in panel form.

Still another object of the present invention is to provide a box-like structure of the type having panels abutting together in angular relationship, the fastening means connecting together the panels where they form the corners of the box construction. Ancillary to the preceding object, an object of the invention is to provide a box-like structure where the fastening means for each of the corners of the structure are separate from the fastening means at the other corners.

A still further object of the present invention is to provide a box wherein the panels making up the box are held together by bands, such as metal or wire straps or the like. In the prior construction of boxes with banding material used as a fastening means for holding the panels together, it was usually the practice to continuously girdle the box with the banding material. By utilizing short bands at each of the corners to connect the panels together, slippage of the bands due to shrinkage of the box is eliminated and, further, the bands do not cut into the box should there be expansion of the panels of the box.

Still another object of the present invention is to provide a novel fastening means for a box constructed of top, bottom and side panels, the fastening means making the box a strong integral unit.

A further object of the present invention is to provide a box construction utilizing short straps of banding material to fasten the panels of the box together at its corners, the straps of banding material being so arranged that straps along one side of the box serve as hinges for the top of the box when other straps have been removed or cut.

Still another object of the present invention is to provide fastening means for a box construction which is inexpensive and simple to apply to the box construction.

A still further object of the present invention is to provide a box-like structure made up of a plurality of panels, each of the panels being provided with plate means which is adapted to cooperate with similar plate means on an adjacent panel for anchoring the ends of a short band of flexible material.

Ancillary to the preceding object, it is a further object of the present invention to provide flat plates which are permanently secured to and lie in substantial planar re-

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lationship with the panels, the plates providing an anchor for the ends of flexible bands when the panels are positioned together to form a box-like structure.

Still another object of the present invention is to provide flat plates on panels used to form a box-like structure, the plates being anchors for the ends of flexible bands which retain the panels in a box-like structure and, further, the plates being provided with means to stiffen the same and to protect the flexible bands when the panels are assembled as a box-like structure.

Although the present invention is described in connection with a wooden box-like structure, it is to be understood that it is within the scope of the invention to utilize the same with any structure having abutting panels such as concrete forms, or the like. Further, the invention may be used with structures made from materials other than wood.

These and other objects of the present invention will appear more fully in the following specification, claims and drawings, in which:

Figure 1 discloses a perspective view of a box construction utilizing the novel fastening means of the present invention;

Figure 2 is an enlarged perspective view of a corner of a box showing the fastening means in position;

Figure 3 is a perspective view of one of the metal plates forming part of the fastening means of the box construction of the present invention;

Figure 4 discloses a perspective view of a fragmentary portion of a box construction according to the present invention and utilizing a modified form of fastening means;

Figure 5 is a side elevational view of the plate of the modified form of fastening means shown in Figure 4;

Figure 6 is a sectional view of the plate taken on the line 6—6 of Figure 5; and

Figure 7 is a sectional view similar to Figure 6 but showing the flexible bands in position.

Referring to the drawings wherein like character or reference numerals represent like or similar parts, the box construction of the present invention, as disclosed in Figure 1, is generally designated by the numeral 10. The box 10 includes a top panel 12, side panels 14 and a bottom panel 16, each of the panels being rectangular in shape. The panels 12, 14 and 16 may be of any desired unit construction and, as shown in the drawing, may include plywood sides 17 reinforced by wood braces 18 secured to each of the edges. Although the box disclosed in the drawing is made primarily of wood, it is, of course, within the scope of the present invention that the panels of the box could be made of metal, fiberboard or the like.

The rectangular panels 12, 14 and 16 when assembled in box form are disposed at an angle, the box having corners 20 each formed from three abutting panels. After panels 12, 14 and 16 have been positioned together in box form, each corner 20 of the box is then fastened together by the novel fastening means of the present invention, thus, resulting in a novel box construction. In more detail and referring to Figure 3, a flat substantially planar rigid plate 22 made of metal or the like is rigidly attached to each of the panels adjacent each of the corners. As shown in Figure 3, the metal plates 22 may be provided with a plurality of pairs of apertures 24 through which U-shaped staples 26 (Figure 2) are inserted into the wood reinforcing strips of the panels 12, 14 and 16 to rigidly retain them thereon. If the plates are to be utilized with metal panels, then the plates can be spot-welded or riveted to the metal panels so that they are rigidly attached thereto.

Each plate 22 is provided with a stamped-out portion or cross-piece 28, the cross-piece providing a strap-receiving slot 30 extending above the planar surface of the

plate. A second stamped-out portion or cross bar 32 is provided on each plate 22, the cross bar 32 being arranged at right angles to the cross bar 28 so as to provide a strap-receiving slot 34 which is at right angles to the slot 30. When the plates 22 are secured to the panels 12 and 14 which make up one of the corners of the box, as disclosed in Figure 2, the slot 30 in the plate 22 on the top panel 12 will be in alignment with the slot 30 of the plate 22 which is attached to one of the side panels 14. The slot 34 on the plate 22 attached to the top panel 12 will be in alignment with the slot 30 of the plate 22 attached to the other side panel 14. Also, it will be noted that the slot 34 of each of the plates 22 which are attached to the side panels 14 are in alignment with each other.

A plurality of short straps 36 made of flexible metal banding material are adapted to be anchored at their ends to each pair of aligned slots in adjacent plates 22 which make up the corners of box 10. As shown in Figure 2, one strap 36 ties the plate 22 on the top panel 12 to one of the plates 22 on the side panel 14, whereas a second strap 36 ties the plate 22 on the top panel 12 to the plate 22 on the other side panel 14. A third strap 36 then ties the two adjacent plates 22 on adjacent side panels 14 together. This arrangement of straps 36 between plates 22 provides tight corner construction and when this arrangement is provided to each corner 20 of the box, the panels are held together as a strong integral unit.

The ends of the straps 36 are anchored to adjacent plates 22 in identical manner and, therefore, the description with respect to one of the straps 36 will suffice for all of the straps 36. Referring to Figure 2 it will be noted that the end portion 38 of strap 36 is slipped under the cross bar 28 toward the edge of the top panel 12. The strap 36 is then turned back over the top of the cross bar 28 and bent over the edge of the top panel 12 and its end 40 is slipped down through the aligned slot 30 under the cross bar 28 in the plate 22 on the side panel 14. The free end 40 of the strap extends out from under the cross bar 28 and is tightly and firmly anchored in place by means of a clip 42 slipped onto the end 40 of the strap 36 and then clamped in place. Any conventional tool for tensioning and simultaneously applying clips to banding straps may be used to position and clamp the clip 42 in place on the end 40 for strap 36. The tension applied to the strap 36 when placing the clip 42 thereon draws the strap tight against the cross bar 28 so that the end 38 of the strap cannot slip out from under the cross bar 28. As shown in the drawing the clip 42 is of the type adapted to be crimped at 44 so as to positively retain it on the end 40 of the strap 36. However, it is within the scope of the present invention that other suitable clips secured to the end 40 may be utilized so long as the clips prevent the strap from slipping back through the slot 30.

When the box 10, shown in Figure 1, is provided with fastening means on each of its corners 20, the panels 12, 14 and 16 are rigidly secured together as a unit. When it is desired to open the top 12, all of the straps 36 connecting the top panel to the side panels 14 are cut or removed with the exception of two along one edge. The two which are not cut or removed serve as a hinge for the top panel 12 and it may then be pivoted upwardly. On the other hand, if it is desired to completely disassemble the box, all of the straps 36 at all of the corners 20 are cut or removed and the panels of the box will become completely disassembled. To reassemble it is merely necessary to insert the straps 36 as heretofore mentioned, at the corners 20, and the box again assumes the shape of a rigid integral unit. Such an arrangement of box construction provides for unlimited reuse of the panels with only the straps 36 being replaced.

Referring now to Figures 4 to 7 inclusive, the corner

20 of the box 10 is provided with a fastening means incorporating a modified form of plates 22'. The plates 22' are similar to the plates 22 described above, in that they are made of metal or the like and are substantially flat and rigid. Plates 22' are rigidly attached to the panels adjacent each of the corners by the U-shaped staples 26 which are inserted through the pairs of apertures 24 into the wood reinforcing strips 18 of the panels.

Plates 22' differ from plates 22 in that instead of providing separate cross-bars 28 and 32, a cruciformed struck-out portion 50 is provided in the plate 22'. The cruciformed portion 50 provides strap receiving slots 52 and 54 that are arranged at substantial right angles to each other. As best shown in Figure 4, the slots 52 and 54 are adapted to receive the ends of the straps 36 in similar manner to the slots 30 and 34 of cross bars 28 and 32 respectively.

The cruciformed struck-out portion 50 provides the plates 22' with certain advantages over the separate cross bars 28 and 32 of the plates 22. In more detail, the cruciformed struck-out portion provides more area for the straps 36 to bear on and considerably strengthens the plates as the area 56 of the cruciformed portion 50, which is contiguous and integral with the plate 22' is greater than the integral area of attachment of the individual cross bars to the plates 22. In addition, it has been found easier and cheaper to manufacture the plates 22' as it requires but a single stamping action to provide the strap-receiving slots 52 and 54.

Each of the plates 22' is provided with a plurality of circumferentially spaced arcuate beads 58, the beads being stamped into the plates simultaneously with the stamping out of the cruciformed portion 50. The beads 58 extend upwardly from the planar surface of the plate 22 a greater distance than the struck-out portion 50, the ends 60 of the beads terminating short of the slots 52 and 54. The beads or protuberances 58 further strengthen the plate 22' and provide a means of protecting the cruciformed struck-out portion 50 of an assembled box 10, as well as the straps 36. During handling or stacking of the box 10 the protuberances or beads 58 take the weight of the box or any object which is placed on the box so that no undue strain is placed on the cruciformed portion 50 or the straps 36. In addition, when one box is stacked on another box and then one of the boxes is moved relative to the other, the beads 58 of the plates cause the panels of the boxes, when sliding relative to one another, to lift up so that they will not become entangled with the flexible bands or straps 36. By providing a space between the ends 60 of the adjacent beads 58, the straps 36 which are anchored in the slots 52 and 54 of the cruciformed struck-out portion 50 lie flat against the surface of the plate.

The terminology used in this specification is for the purpose of description and not limitation, the scope of the invention being defined in the claims.

We claim:

1. In combination: a box-like structure comprising a plurality of abutting panels disposed at an angle to each other and forming the corners of the structure; and means fastening said panels together at the corners and making the structure a composite rigid unit, said means including a plurality of substantially planar metal plates and a plurality of flexible metal straps, each of said metal plates having at least a pair of strap-receiving cross bars offset from the planar surface of the plate, one of said cross bars of each plate extending transversely of the other of said cross bars, means securing one of said plates in substantially planar relationship to the surface of each panel in the proximity of the corners of the structure, said plates being positioned on the panels at the corners of the structure and having one of its cross bars aligned with the cross bar of another of said plates in the same corner while the other of its cross bars is aligned with one of

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the cross bars of still another of said plates in the same corner, each of said straps being secured at its ends between aligned cross bars of adjacent plates.

2. A combination of the character described in claim 1 wherein each of said cross bars is integral with said metal plate and is pressed out of said metal plate.

3. A combination of the character described in claim 1 wherein said means securing said plates to the panels of said structure includes a plurality of staples inserted through the plates into the panels of the structure.

4. In combination: a box-like structure comprising a plurality of abutting panels disposed at an angle to each other and forming the corners of the structure; and means fastening said panels together at the corners and making the structure a composite rigid unit, said means including a plurality of substantially planar metal plates and a plurality of flexible metal straps, each of said metal plates having a cruciform struck-out portion defining a pair of strap-receiving slots positioned at substantially right angles to each other, means securing one of said plates to and lying in a substantially planar relationship with the surface of each panel in the proximity of the corners of the structure, said plates being positioned on the panels at the corners of the structure and having one of said slots aligned with one of the slots of another of said plates in the same corner while the other of said slots is aligned with one of the slots of still another of said plates in the same corner, each of said straps being secured at its ends through aligned slots of adjacent plates to the cruciform struck-out portion of said plates.

5. A combination of the character described in claim 4 wherein means are provided on each of said plates for protecting straps secured to the cruciform struck-out portion of said plates.

6. A combination of the character described in claim 5 wherein said means includes a plurality of arcuate protuberances, each of said protuberances extending outwardly from the planar surfaces of said plates a distance greater than the height of the cruciform struck-out portion of said plates.

7. A combination of the character described in claim

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1 wherein said transversely extending cross bars of each of said plates are formed by a cruciform struck-out portion of the plate defining a pair of strap-receiving slots extending transversely of each other.

8. A combination of the character described in claim 1 wherein said transversely extending cross bars of each of said plates is formed by separate spaced struck-out portions in each plate, each struck-out portion defining a strap-receiving slot, one strap-receiving slot extending substantially transverse to the other strap-receiving slot.

9. A combination of the character described in claim 1 including means provided on each of said plates for protecting straps secured to the cross bars.

10. In combination: a box-like structure comprising a plurality of abutting panels disposed at an angle to each other and forming the corners of the structure; and means fastening said panels together at the corners and making the structure a composite rigid unit, said means including a plurality of substantially planar metal plates and a plurality of flexible metal straps, each of said metal plates having at least a pair of strap-receiving slots struck out from the plates, said strap-receiving slots being positioned substantially transverse to each other, means securing one of said plates in substantially planar relationship to the surface of each panel in the proximity of the corners of the structure, said plates being positioned on the panels at the corners of the structure and having one of said strap-receiving slots aligned with one of the slots of another of said plates in the same corner while the other of said slots is aligned with one of the slots of still another of said plates in the same corner, each of said straps being secured at its ends through the aligned slots of adjacent plates to the struck-out portion of said plates.

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