

[54] **WOODEN SHIPPING CONTAINERS**  
 [76] Inventor: **August G. Barkow**, 2230 South 43rd Street, Milwaukee, Wis. 53219  
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 [51] Int. Cl. ....B65d 9/34  
 [58] Field of Search.....217/65, 69, 12, 12 A; 287/20.92 D, 189.36 H; 52/580, 582, 584

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*Primary Examiner*—William T. Dixon, Jr.  
*Attorney*—Morsell & Morsell

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[57] **ABSTRACT**

A wooden shipping container has the edges of its walls adhesively secured in channels formed in metal corner pieces, each corner piece extending substantially the length of the edges received therein and presenting a pair of channels which face at an angle to one another, at least one of said channels having a reinforced base in certain embodiments.

**1 Claim, 9 Drawing Figures**

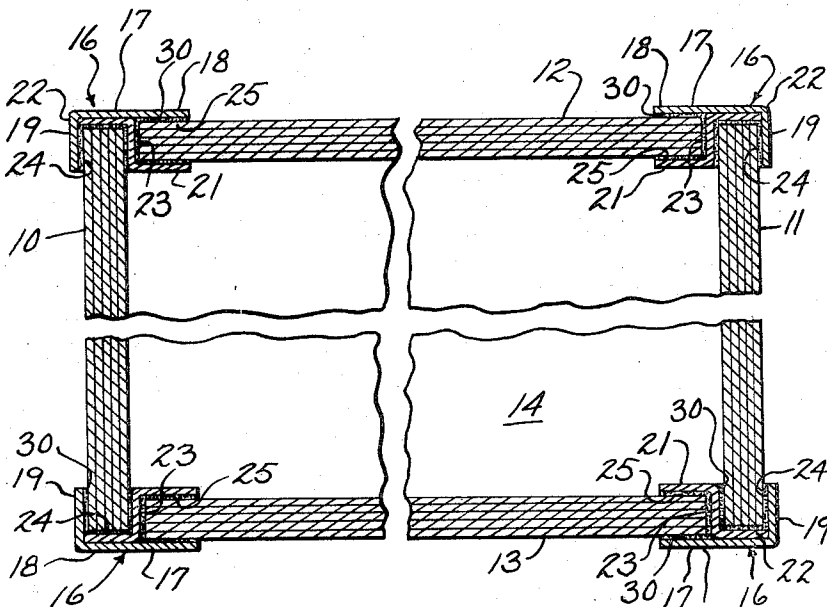


Fig. 1

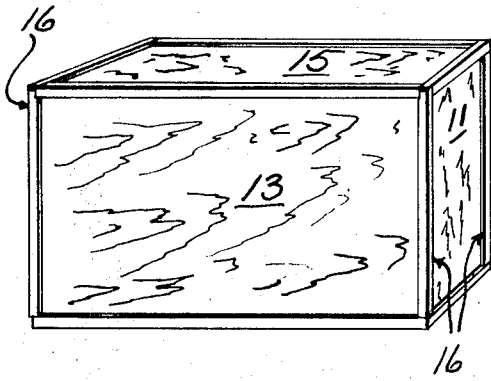


Fig. 2

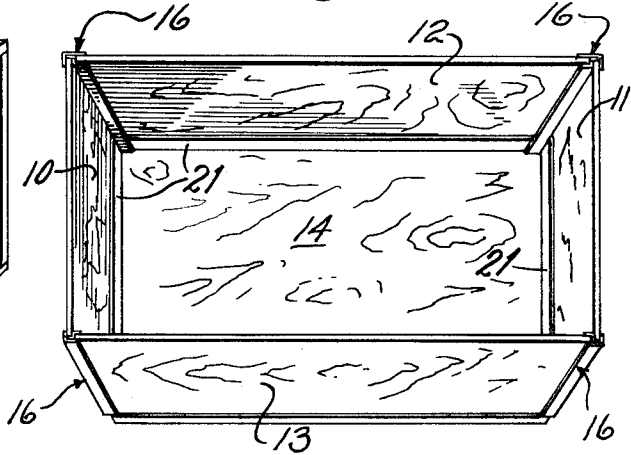


Fig. 3

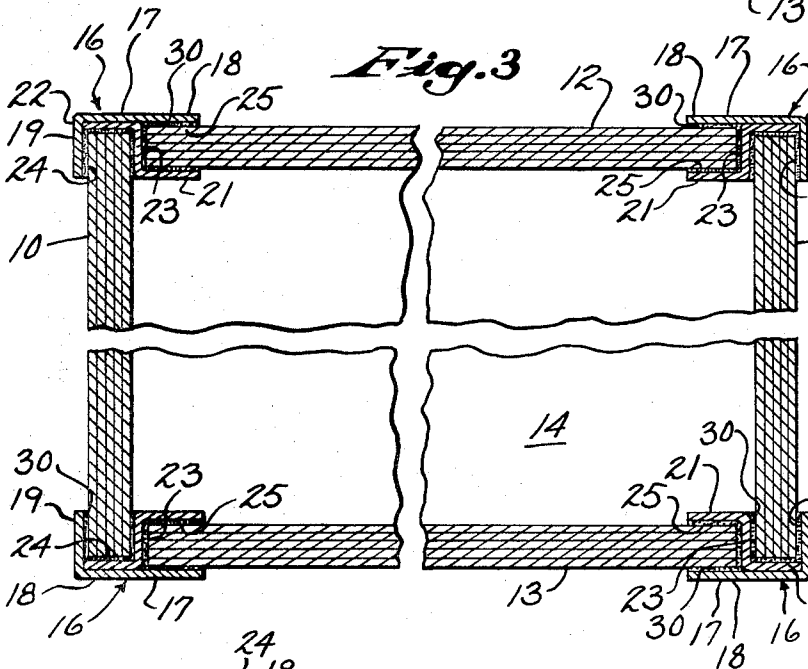


Fig. 5

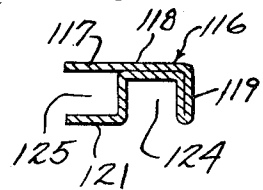


Fig. 6

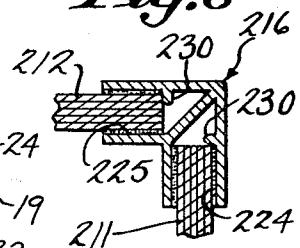


Fig. 4

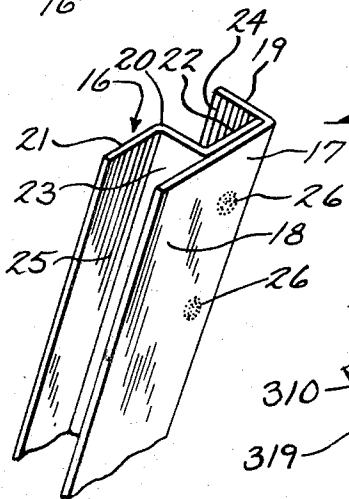


Fig. 9

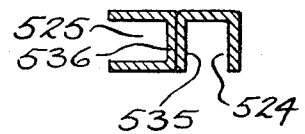


Fig. 7

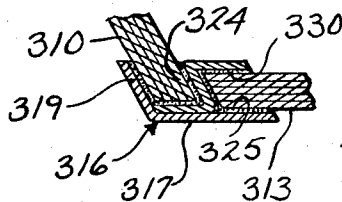
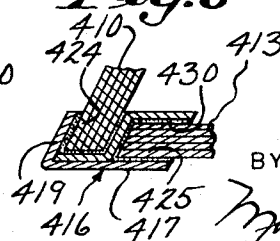


Fig. 8



INVENTOR  
AUGUST G. BARKOW

BY

*Myers & Myers*

ATTORNEYS

## WOODEN SHIPPING CONTAINERS

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention pertains to wooden shipping containers of a type which are particularly suitable for use in export shipments where container strength and protection for the contents are desired.

#### 2. Description of the Prior Art

In export shipments or in shipments having similar requirements it has been customary to crate the article in ordinary lumber, using nails and banding; or where plywood has been employed, it has been necessary to use wooden cleating to bridge over the edges of the plywood at the corners, and it has also been necessary to reinforce such containers by the use of wooden battens in order to give sufficient strength and facilitate assembly. In addition, in many instances it has been necessary to protect the contents with an inner wrapping of vinyl, polyethylene, or paper. All of this procedure is expensive, as the preparation of wooden cleats and battens requires additional time. Also a substantial amount of nailing is required, which adds to the expense of both labor and material. In addition, the external cleats and battens necessarily project beyond the walls of the container to increase the external dimensions thereof, which increases shipping expense.

### SUMMARY OF THE INVENTION

The present invention provides a wooden shipping container which can be formed of inexpensive plywood wherein, at the corners of the box, the plywood edges are adhesively secured in channels formed in metal corner pieces, each metal corner piece extending the length of its received edges and presenting a pair of channels which face at an angle with respect to one another, the wall edges being secured in said channels, preferably by adhesive, to produce an extremely strong container.

A further object of the invention is to provide a construction as above described in which the bottom of at least one of the channels is of double thickness to reinforce the corner piece and provide strength at the corners.

A further object of the invention is to provide a shipping container construction which eliminates the necessity of using nails, eliminates the necessity of separately preparing cleats and battens to save substantially in labor and materials, and which eliminates the increase in external dimensions which results from use of cleats and battens.

A further object of the invention is to provide a shipping container having novel corner pieces which eliminate the necessity of banding the container and which add sufficient strength and rigidity as to permit use of low grade sheeting or plywood.

A further object of the invention is to provide a shipping container construction having novel corner pieces presenting channels within which the edges of the plywood are adhesively secured, to thereby provide a relatively waterproof container construction.

A more specific object of the invention is to provide a shipping container having novel corner pieces which, in the preferred form of the invention, are each formed of two strips of metal which may be of rolled form, one strip being L-shaped in cross section and the other strip

being of Z-form and being spot welded within the L-shaped strip in a manner to lend strength and rigidity to the entire corner piece and present channels which are disposed at an angle such as a right angle with respect to one another.

With the above and other objects in view, the invention consists of the improved shipping container, and all of its parts and combinations, as set forth in the claims, and all equivalents thereof.

### BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawing, in which the same reference numerals designate the same parts in all of the views:

FIG. 1 is a perspective view of a shipping container constructed in accordance with the present invention;

FIG. 2 is a perspective view of an opened container looking into the interior thereof;

FIG. 3 is a fragmentary horizontal sectional view through the vertical corners of the container of FIG. 2 showing the corner construction, parts being broken away;

FIG. 4 is a perspective view of a portion of one of the corner pieces;

FIG. 5 is a cross-sectional view showing a corner piece of modified construction;

FIG. 6 is a cross sectional view of an extruded type of corner piece constituting another modification;

FIG. 7 is a fragmentary sectional view through the corner of a container showing a modified type of corner construction for maintaining walls at an obtuse angle with respect to one another;

FIG. 8 is a similar view showing a modified corner construction for holding container walls at an acute angle with respect to one another, and

FIG. 9 is a similar view showing another modification.

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring more particularly to the drawing, the shipping container comprises end walls 10 and 11 of plywood or other inexpensive wooden sheet material, side walls 12 and 13, a bottom wall 14, and a top wall 15. The walls are assembled and held together by the novel metal corner pieces 16 to be hereinafter described in detail.

In the preferred form of the invention the corner pieces are formed of rolled steel and, in the preferred form of the invention illustrated in FIGS. 3 and 4, each corner piece includes a strip of steel 17 rolled into L-form having a relatively long base 18 and an angularly-bent flange 19 which is usually bent at a right angle. The other strip of steel 20 is a Z-strip rolled into a so-called Z cross section. It includes parallel flanges 21 and 22 connected by webbing 23. The Z-strip has a width approximately equal to the width of the base 18 of the L-strip and is nested therein in the manner shown in FIG. 4 with the flange 22 positioned against said base and providing double thickness at the base of the formed channel 24, it being noted that the arrangement of strips also provides a channel 25 which faces at an angle with respect to the direction of the channel 24, usually at a right angle. In the preferred form of the invention, the flange 22 is spot welded to the base portion 18 of the other strip as at 26 (FIG. 4).

As a modification, the corner piece may be roll-formed from one piece of material as shown in FIG. 5. Here all of the common parts are designated by the same reference numerals used in FIG. 4 preceded by the digit 1. It will be noted that in this form of the invention double thickness is formed by the layer 122, and there is also a double thickness provided for the flange 119. In this form of the invention it is unnecessary to spot weld.

FIG. 6 shows a modified corner piece which may be formed of extruded material such as extruded aluminum. In such a construction the channels 224 and 225 correspond to the channels 24 and 25 of FIG. 4 but there is no end abutment arrangement. Here there are inner and outer L's 227 and 228 connected by diagonal webbing 229 at the corners. In addition there are stop ribs 230 forming abutments for the edges of the plywood.

While most shipping containers require walls disposed at right angles to one another, occasions sometimes arise where either an obtuse or an oblique angled relationship is desired. With the present invention the improved corner piece may be readily designed as shown in FIG. 7 so that the corner piece 316 presents a channel 324 which is at an obtuse angle with respect to the channel 325. Likewise, if an acute-angled relationship is desired, corner pieces may be made as shown in FIG. 8 wherein the corner piece 416 has a channel 424 which is disposed at an acute angle with respect to the channel 425.

In the modification of FIG. 9 the corner piece is formed by two channels 524 and 525, with the side flange 535 of one channel being spot welded to the bottom flange 536 of another channel. This form of the invention is used in the same way as the form of the invention of FIG. 3.

In assembling a shipping container, the end walls 10 and 11 are of a thickness to be snugly received in the channels 24 of the corner pieces, and the side walls 12 and 13 are of a thickness to be snugly received in the channels 25 of the corner piece. Before insertion, the edges of the walls or the interior of the channels, or both, are coated with a suitable adhesive 30 such as an epoxy adhesive which is capable of securing wood to metal. When the adhesive sets the walls will be firmly united at the corners. To assemble the bottom 14, its edges are inserted and adhesively connected in the channel portions 24 of the corner pieces on all four edges. Thereafter the lower edges of the side and rear walls may be inserted in the channels 25 of the corner pieces which have been previously attached to the bottom, suitable adhesive being employed. Where it is desired to have a sealed top, the top of the container may have its edges adhesively secured in the channels 24 of four of the corner pieces, and the upper edges of the side and end walls may be adhesively secured in the channels 25. This provides an extremely strong and substantially waterproof construction. Where a waterproof construction is not necessary and where ease of opening is desired, the cover may be nailed or otherwise secured in place instead of using the corner pieces to secure the cover.

From the above, and by reference to FIGS. 1 and 2, it is apparent that a shipping container has been provided which is extremely strong, and in the form of invention having a sealed top as in FIG. 1, substantially water-

proof. It is also apparent that there are no projecting cleats and battens and that, therefore, the external dimension of the shipping container is substantially reduced by the amount of projections of the usual cleats and battens. Thus transportation expense is reduced.

It is also clear that the container may be assembled without use of nails (unless a readily-removable nailed top is desired). This feature results in a saving of the cost of nails, and a saving in the very substantial amount of labor usually required to do the nailing. In addition, with the present invention there is no need for expenditure of time to pre-prepare cleats and battens as is now customary. The particular cross-sectional form shown in FIG. 4 with the Z-shaped strip nested within the L-shaped strip, gives remarkable strength at the corners which could not be obtained with an ordinary metal corner angle. This type of construction, therefore, adds rigidity to the plywood and makes it entirely practical to utilize inexpensive plywood or sheeting. By having a sealed top with corner pieces employed to secure the top in place, as in FIG. 1, a substantially waterproof construction is produced because of the novel corner pieces and the use of the adhesive in the channels. When the top is thus installed it is unnecessary to shroud and protect the contents with vinyl, polyethylene or paper.

Due to the unusual strength of the construction, banding is not needed.

When the container arrives at its destination and after the contents have been removed, the plywood material can be readily separated and reused for various purposes. This is to be distinguished from nailed shipping containers where there is a considerable problem in disposing of the entire container because disassembly into its flat components requires the expenditure of too much time.

It is to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

What I claim is:

1. In a wooden shipping container having a pair of wooden walls at an angle to one another, a metal corner piece having a first channel snugly receiving the edge of one wooden wall and extending therealong, and having a second channel facing at an angle with respect to said first channel and snugly receiving an edge of the other wooden wall, an adhesive coating between all contacting surfaces of said channels and wooden walls producing a substantially waterproof construction and forming the sole means for securing the edges of the walls within the channels, said metal corner piece comprising a first metal portion of L-shaped cross section having a relatively long base and a shorter, angularly-bent flange with a corner bend therebetween, and a second metal portion which is of Z cross section nested therein and comprising spaced, parallel flanges connected by webbing, one of said parallel flanges extending along part of the width of the base of the L-shaped portion and having an edge terminating at said corner bend of the L-shaped portion and forming a double thickness at the bottom of one of said channels, there being spot welding intermediate the width of said double thickness portion securing the two metal portions of the corner piece together.