April 24, 1945. R. GUYER 2,374,539

BOX

Filed Feb. 16, 1942

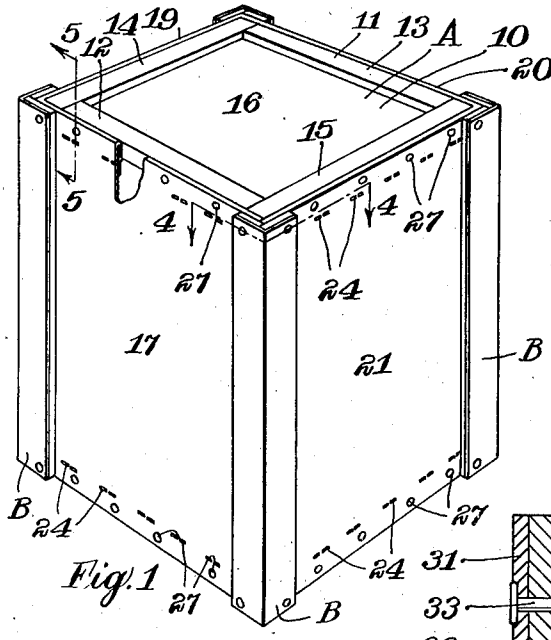


Fig. 1

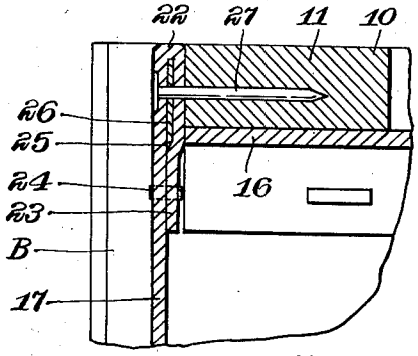


Fig. 5

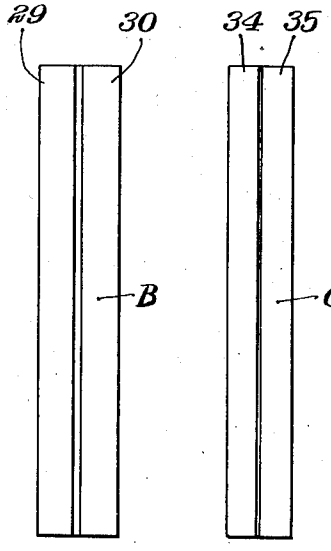


Fig. 2

Fig. 6

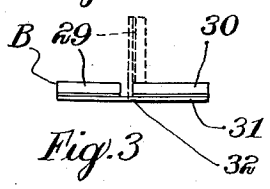


Fig. 3

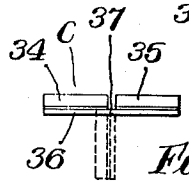


Fig. 7

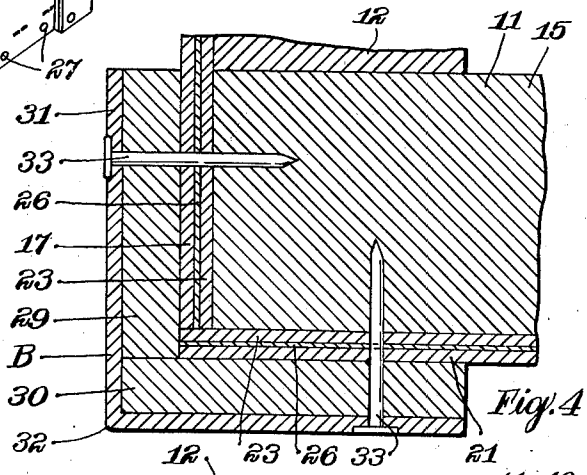


Fig. 4

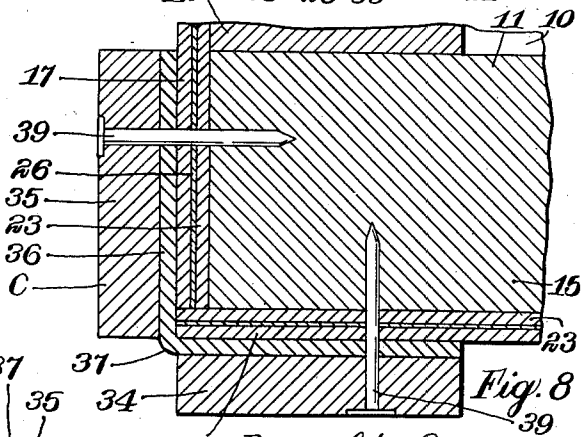


Fig. 8

Reynolds Guyer
INVENTOR

BY Robert M. Dunning
ATTORNEY

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UNITED STATES PATENT OFFICE

2,374,539

BOX

Reynolds Guyer, St. Paul, Minn., assignor to Waldorf Paper Products Company, St. Paul, Minn., a corporation of Minnesota

Application February 16, 1942, Serial No. 431,121

1 Claim. (Cl. 217—5)

My invention relates to an improvement in boxes, and has for its principal object the construction of a light weight box of extreme strength which may be shipped or transported in a flat shape and which may be assembled with a minimum of time and effort.

An object of the present invention lies in the provision of a box having end walls capable of receiving nails or other fastening means and in providing walls of paper or fibrous material secured thereto. Such a construction is lighter than a container made entirely of wood, and if certain principles of construction are followed can be made virtually as strong.

Another object of the present invention lies in the provision of a box having end walls of wood or other nail receiving material, side walls of paper or similar fibrous material, and reinforcing corner elements which are capable of withstanding the strain exerted upon the corners. These reinforcing strips not only assist in holding the box ends in proper spaced relationship, but also prevent the paper or fibrous walls from bursting at the corners.

A further object of this invention lies in the provision of a corner reinforcing element which is designed to overlie or underlie portions of two adjacent side walls of the container at the junction of these side walls and which comprises two reinforcing strips flexibly connected together. With such a construction the reinforcing members may be shipped or transported in a flat state and may be bent or folded into angular relation to reinforce the adjacent side walls at the junction thereof. In preferred form this reinforcing element comprises a pair of reinforcing strips secured to a flexible web, such as tough paper, or the like. These strips may lie flat upon the connecting web and shipped in a flat state. However, the connecting web will fold to permit the reinforcing strips to form a right angle when it is so desired.

It is a feature of the present invention that the reinforcing strips forming the corner element may be connected to either the inner or outer surface of the connecting web. When these strips are connected to the inner surface of the connecting web they may be formed with interfitting edges or mitered corners so that one strip contacts another in the formation of the corner.

With my construction a box may be quickly and easily formed in an extremely short period of time. The side walls may comprise a single elongated sheet which is scored to bend readily at the corners and to fold into a rectangular or multi-sided shell. This rectangular shell may be marginally secured by nails or other fastening means to the nail receiving end walls. The corner reinforcing elements may then be added to complete the container. All of the elements used in the formation of the box may be shipped in a flat state to conserve space in transporting and storage, and the completed container is extremely strong and well reinforced.

A further feature of the present invention lies in the fact that the paper side walls may have marginal folded edges along the line of attachment with the end walls, thus providing a double thickness of paper along these attaching edges. In order to further strengthen the connection between the paper side walls and the end walls, the flange may contain a thin flexible metal strip. The nails used to secure the side walls to the nail receiving end walls may pass through this metal strip. The metal strip will thus provide an enlarged bearing surface, which will prevent the side wall material from pulling out adjacent the nails.

When such a folded marginal edge structure is employed, the marginal folded flange may be secured to the side wall material by gluing, stapling, or stitching so as to form an elongated pocket for receiving the metal strip.

These and other objects and novel features of my invention will be more clearly and fully set forth in the following specification and claim:

In the drawing forming a part of my specification:

Figure 1 is a perspective view of a box embodying the principles of my invention.

Figure 2 is a view of one of the reinforcing corner elements when in flat condition before the same is bent into angular relationship.

Figure 3 is an end view of the corner reinforcing element illustrated in Figure 2, showing in dotted outline the relationship of the reinforcing strips when the corner reinforcing element is folded into angular relation.

Figure 4 is a cross-sectional view through the corner of the box, the position of the section being indicated by the line 4—4 of Figure 1.

Figure 5 is a sectional view through an edge of the box, showing the junction between the side wall and an end wall of the box.

Figure 6 is a plan view of a modified form of corner reinforcing element.

Figure 7 is an end view of the corner reinforcing element illustrated in Figure 6, showing in dotted outline the relation of the reinforcing strips when folded.

Figure 8 is a sectional view similar to Figure 4, showing the juncture between the reinforcing element and the box end.

The box A, made in accordance with the principles of my invention, is more desirable than the usual type of paper or fiber board container in that it is reinforced at the points where injury is most likely to occur. Not only do the corner members formed in accordance with the present invention reinforce the body of the container, but also these corner members prevent the corners from breaking down where they are weakened due to the lines of fold.

The box A includes upper and lower end walls 10, which may be identical in formation and which close the ends of the container. Only one of the end walls 10 is visible in the drawing, but it should be borne in mind that an end wall 10 is provided at each end of the container.

The end wall 10 includes a substantially rectangular frame 11 which includes substantially parallel frame members 12 and 13, which are connected by substantially parallel frame members 14 and 15. These frame members may be secured together in any desired manner, such as by gluing, mortising, rabbeting, or merely by nailing. A rectangular end wall 16 which may be of thinner material, if it is so desired, is secured to the frame 11, and is reinforced thereby.

The side walls of the container may, if desired, be in the form of separate panels, but in the form illustrated, the side walls are integrally connected together in a single elongated body of material. The side wall 17 is connected along a fold line to the side wall 19, which in turn is connected along a fold line to the side wall 20. The side wall 20 is connected along a fold line to the side wall 21, which extends to the edge of the side wall 17. This structure is extremely simple and inexpensive and provides a construction which can be readily assembled.

The marginal edges 22 of the side walls 17, 19, 20, and 21 are provided with inturned or inwardly folded flanged edges 23 which are secured to the body of the side walls by any suitable means, such as the staples 24. These staples 24 extend through the flanged edge 23 and the side wall 17, 19, 20, or 21 at a point spaced from the fold so as to provide a pocket 25 between the flanged edge 23 and the body of the side wall suitable for receiving a metal reinforcing strip 26. Obviously the strip 26 will extend entirely about the end walls 10 if the side walls are formed in a continuous piece and will extend only across a single side of the end wall 10 if the side walls are formed in separate panels.

The side walls 17, 19, 20, and 21 are secured to the end walls 10 by nails 27, or other suitable fastening means. The nails 27 extend through the side wall, through the reinforcing strip 26 and the flange 23, and into the frame 11. The nails 27 are thus anchored firmly into the frame 11, forming a part of the end walls 10, and by extending through the reinforcing strips 26 firmly clamp the side walls to the end walls.

The reinforcing corner elements are constructed as best illustrated in Figures 2 and 3 of the drawing. A pair of reinforcing strips 29 and 30 are glued or otherwise affixed to a connecting web 31. This connecting web is preferably formed of paper or the like, and is provided with a score line 32 which extends between the reinforcing strips 29 and 30. As a result, the strip 29 can be folded over so that an edge of this strip 29 abuts the inner surface of the strip 30. The manner in which this is accomplished is clear from an examination of Figure 3 of the drawing, which illustrates in full lines the strips 29 and 30 connected by the flat web 31 and showing in dotted outline the position of the strip 29 when folded into right angular relation with respect to the reinforcing strip 30.

It is obvious that if it is so desired the abutting ends of the strips 29 and 30 could be beveled so as to provide a mitered corner between these two strips. Similarly, another type of interlocking joint could be provided between these two reinforcing strips 29 and 30.

When the box has been assembled with the side walls secured between the end walls, the corner reinforcing elements, indicated in general by the letter B, may be added thereto to reinforce the corners and to prevent injury to the box at the corners. These reinforcing corners B also assist in holding the end walls 10 in proper spaced relationship and in otherwise reinforcing the box.

In Figure 4 of the drawing, I disclose a section through the corner of the box showing the relationship of the parts. This view illustrates nails 33 extending through the corner elements B and into the frame 11, so as to attach the corner reinforcing members in place and in order to clamp the side walls in place against the end walls. Because of the connection between the reinforcing strips 29 and 30, these strips do not necessarily have to be nailed into right angular relationship, but form a connected right angle which will not permit the side walls of the box to bulge outwardly at the corners, and to thus form an opening between adjacent side walls.

In Figure 8 of the drawing, I disclose a modified form of construction in which the web connecting the reinforcing strips is inwardly of the strips in attached relation of the corner reinforcing elements. The reinforcing elements C are formed, as best illustrated in Figures 6, 7, and 8 of the drawing, in which a pair of reinforcing strips 34 and 35 are shown glued or otherwise fastened to a connecting web 36. The connecting web 36 may be provided with a score line at 37 between the reinforcing strips 34 and 35 so that the two strips may be arranged at right angles to one another. Nails or other fastening means 39 extend through the strips 34 and 35 and into the frame 11 forming a part of the end wall 10 to hold the corner reinforcing members in place. While this type of construction is not quite as strong or as desirable as the corner element B, it is useful in some instances where it is desired to have the web 36 adjacent the side wall of the container.

The advantage of my construction can be readily understood. The containers may be constructed at a cost slightly greater than the cost of paper or fiber board containers of a similar size. The containers may be shipped flat with the side walls or panels forming the side walls lying flat, one upon another. The end walls 10 also rest flat, one upon another, as do the corner elements B or C. These corner elements are extremely strong and are connected by the foldable web which forms a tight joint at the juncture of each pair of walls. The crate may be partially assembled before the goods to be packed are placed therein, or the goods to be packed may be placed upon one of the walls of the container and the container may be built about the goods contained. The corner members hold the end walls in proper spaced relationship and prevent the outward bulging of the paper side walls. The containers have

proven to be exceptionally strong, light weight, and durable.

In the foregoing description, two reinforcing strips connected by a foldable strip have been described. The reinforcing members may be permanently secured in right angular relation, and furnished in this condition. Even such a corner reinforcing member is definitely advantageous, being bound in a web of fibrous material which protects the corner seam throughout its length.

While I have described and illustrated the end walls as being rectangular or square, it is obvious that these end walls may be multi-sided, and the box may have three or more sides. In such a case, the reinforcing strips would not necessarily assume a right angle, but may assume a relatively larger or smaller angle to properly overlie the adjacent side walls.

In accordance with the patent statutes, I have described the principles of construction and operation of my crate, and while I have endeavored to set forth the best embodiments thereof, I desire to have it understood that these are only illustrative of a means of carrying out my invention and that obvious changes may be made within the scope of the following claim, without departing from the spirit of my invention.

I claim:

A box comprising end walls having a plurality of free edges, a plurality of side walls connecting the free edges of said end walls, folded marginal flanges on said side walls, a side wall reinforcing strip enclosed between said marginal flanges and said side walls, corner reinforcing members extending from one end wall to the other, each reinforcing member including a pair of reinforcing strips secured to a foldable web, one reinforcing strip of said pair overlying a portion of one side wall adjacent the junction of said one wall with the next adjacent wall, and the other reinforcing strip of said pair overlying a portion of said next adjacent wall adjacent said junction, and fastening means extending through each reinforcing strip of the corner member, the side wall, said side wall reinforcing strip, and into said end wall.

REYNOLDS GUYER.