Dec. 24, 1935. G. H. OSGOOD 2,025,420

KNOCK-DOWN BOX

Filed Feb. 27, 1934

Fig. 1.

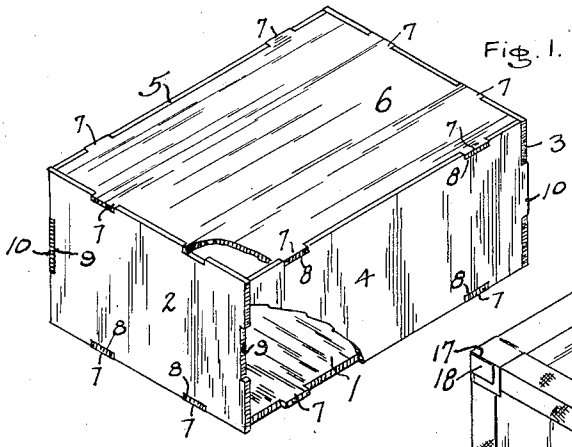


Fig. 2.

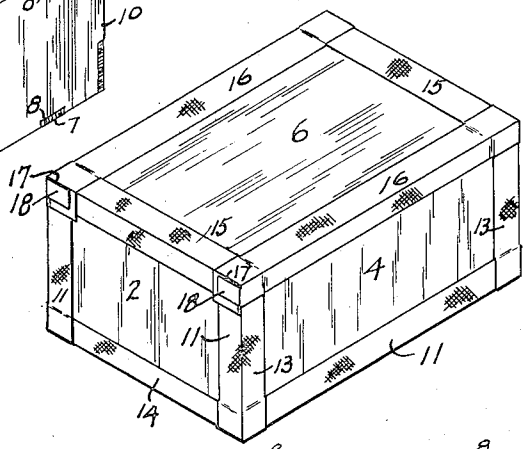
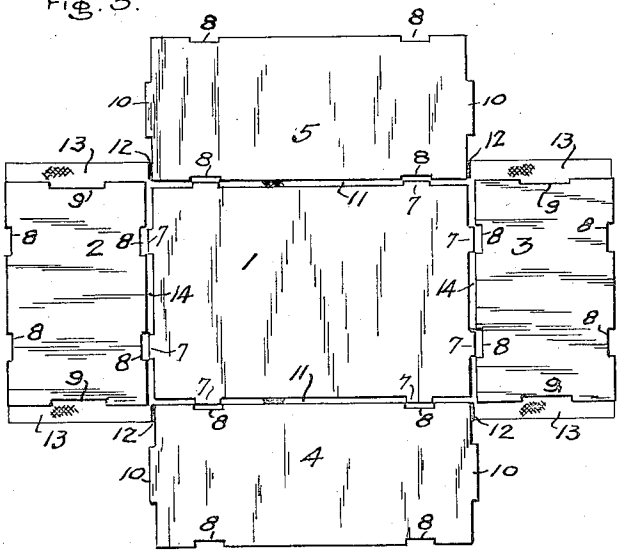


Fig. 3.



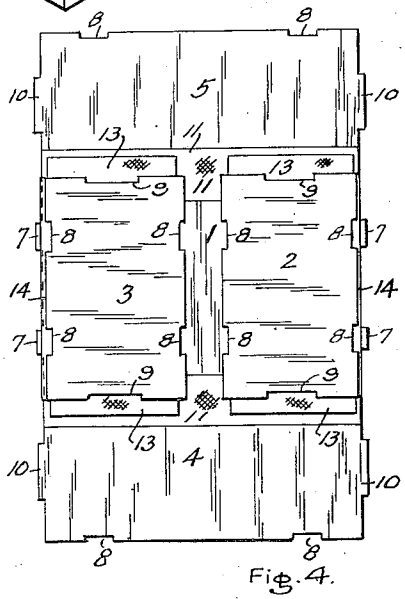


Fig. 4.

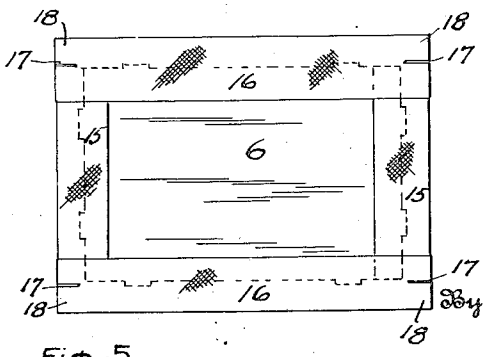


Fig. 5.

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KNOCK-DOWN BOX

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Application February 27, 1934, Serial No. 713,112

3 Claims. (Cl. 217—12)

This invention relates to packages or containers and especially to such containers as are made of wood and are purchased in knock-down condition and are adapted to be folded and assembled just prior to use.

The objects of my invention are to provide a box which, first, shall have all the advantages of a cardboard carton, such as is at present in general use, and yet which will have sufficiently stiff and strong sides as to prevent damage to the articles contained therein due to accidents in handling and shipping; second, which though made of wood, uses no nails or other fastening means piercing its sides; third, in which all sides are interlocked with their adjacent sides to prevent displacement thereof and distortion of the box under stress caused by falling on a corner or edge; fourth, which may be sold and shipped in knock-down or flat condition, thereby saving freight charges per unit; fifth, which, when received, may be quickly and easily folded and assembled with unskilled labor to form a practical shipping box; and sixth, which forms a cheap box of great strength, rigidity and stiffness.

I attain these and other objects by the devices and arangements illustrated in the accompanying drawing, in which—

Fig. 1 is a perspective view of the box, having its sides assembled but not attached together, and showing one corner broken away to reveal the box construction; Fig. 2 is a similar view of the completed box ready for shipment; Fig. 3 is a top plan view of the bottom and the four adjacent sides in knock-down or flat position; Fig. 4 is a bottom-plan view thereof, showing two sides folded under the bottom to reduce the size of the package in which the boxes are shipped from the box factory; and Fig. 5 is a plan view of the box top before it is applied to the box to close and seal it.

Similar numerals of reference refer to similar parts throughout the several views.

Cartons made of various kinds of paper-like materials, such as "corrugated board", have been largely adopted for the shipment of goods, and such cartons are fairly satisfactory where the goods cannot be damaged by rough handling of the carton, but such cartons signally fail when the goods contained therein are subject to damage, especially if the goods are heavy such, for instance, as canned food, in which case the cans are often received in dented condition and their sale value is thereby depreciated. In order to overcome this defect I have produced the following described box having the knock-down advantages of the said "corrugated board" while protecting the goods contained therein from damage.

My improved box comprises a bottom board 1, two ends 2 and 3, two sides 4 and 5, and a top or cover 6. All these six sides are made of wood, preferably three-ply veneer wood.

Each edge of the bottom 1 is provided with teeth or tenons 7, formed integral therewith. These tenons 7 are rectangular in form and are of substantial width, and extend out from the edge of the bottom 1 a distance equal to the thickness of the sides into which they fit, as hereinafter described. The top or cover 6 is also of the same size and form as the bottom 1 and is also provided with tenons 7 extending from each edge, in positions corresponding with those of the bottom 1.

Each end 2 and 3 of the box is provided with cuts or mortises 8 on its upper and lower horizontal edges, said mortises 8 corresponding in number, position and width with the tenons 7 extending from the edges of the bottom and cover 6, and each said mortise is of a depth equal to the thickness of the said bottom or cover, respectively. The mortises 8 are rectangular and are complementary to the said tenons 7 on the said edges of the parts 1 and 6. The vertical side edges of the ends 2 and 3 are provided with a broad mortise 9, of rectangular form and of a depth equal to the thickness of the sides 4 and 5, or a plurality of said mortises may be substituted for the said broad mortise 9.

The two sides 4 and 5 are provided with mortises 8 in their upper and lower horizontal edges, complementary to and corresponding in number, position and width with the tenons 7 on the adjacent edges of the bottom 1 and cover 6, respectively, and of a depth corresponding with the mortises 8 on the ends 2 and 3. The vertical edges of the sides 4 and 5 are each provided with a broad tenon 10 complementary to and corresponding in number, position and width with the mortises 9 on the vertical edges of the sides 2 and 3, and extending out from the sides 4 and 5 a distance equal to the thickness of the ends 2 and 3.

Thus it will be seen that each side is locked against sliding movement relatively to its adjacent sides by means of the interlocking of the several tenons with their corresponding mortises at the joints between the said sides, as is clearly shown in Fig. 1 of the drawing, and that the edges of the box, though formed of tenon edges from alternate sides of the box, form substantially straight lines because each tenon extends

from its side a distance equal to the thickness of the adjacent side into which it fits.

Of course, such a box would not, of itself, stay in assembled condition, since the only force resisting its falling apart would be the friction of the several tenons on the ends of the mortises into which it fits. I, therefore, tape the several edges together by means of paper or cloth tape suitably glued or cemented to the outside surfaces of the several respective sides, each such strip of tape being thus glued to the two pieces forming the edge of the box. This tape binding besides securing the box sides together when in assembled position also acts as a hinged binding when it is in knock-down condition and permits two sides to be folded under the bottom, if desired.

The edges of the bottom 1 and of the four adjacent sides 2, 3, 4 and 5 are taped together by means of two straight tape strips 11, each extending in one continuous line from the outer or upper corner of the end 2 to the opposite corner of the other end 3, and in so doing it attaches the end 2 to the bottom 1, the side 4 to the bottom 1, or the side 5 thereto, and the end 3 to the bottom 1 (Fig. 3). Each said strip of tape 11 is wide enough to be glued to both the bottom 1 and the side 4, or 5, and about one-half of its width is used in gluing contact with the vertical edges of the end 2, or 3, and is cut one-half way across at 12, adjacent the corners of the bottom 1, thus forming flaps 13 of the halves that overhang from the said end 2, or 3, and which are left unfastened to any side until the box is to be folded and finally assembled. Also two short strips 14 are fastened to the lower edges of the ends 2 and 3 and to the contiguous edges of the bottom 1.

This structure, as illustrated in Fig. 3, is adapted to permit the two sides 2 and 3, or the two sides 4 and 5, to be folded under the bottom 1 as shown in Fig. 4, to reduce the size of the package formed by a number of such unfolded boxes as shipped from the box factory.

The cover 6 is also provided with two cross strips of tape 15 and with two long strips 16, as shown in Fig. 5, each said strips overhanging the corresponding edges of the cover. The ends of the long strip 16 are cut at 17 to form tabs 18. All the above parts are preferably secured together at the factory, as above described. It will be observed that the five parts which fold together to form the open box are separated from each other on the tape by a distance equal to the thickness of the wood so that when they are folded to form the assembled box the said tapes are tight around the corners of the box (Fig. 2).

In order to assemble such a box it is only necessary to fold the four sides 2, 3, 4 and 5 into vertical positions around the edges of the bottom 1, thereby bringing each tenon into tight fitting engagement with its complementary mortise, and then to moisten the glue or cement on the four tape flaps 13 and to apply the said moistened flaps to the outside edges of the sides 4 and 5. Then, when the box has been filled, the cover 6 is placed thereon, the tenons 7 entering the mortises 8 of the upper edges of the sides 2 to 5, and then the overhanging positions of the tapes 15 and 16 and the tabs 18 are similarly moistened, said parts 15 and 16 being folded down into gluing contact with the upper edges of the said four sides, and the tabs 18 being bent around the corners of the box (Fig. 2).

As before stated, the tenons and mortises prevent any lateral movement of one edge sliding along the other edge. They do not, however, provide any substantial resistance to bursting strain or outward pressure from within the box. This pressure is effectively taken care of by the glued tape edges of all the joints between the respective sides.

It is, of course, understood that the number of tenons and their complementary mortises along the several edges of the box may be varied as desired in accordance with the size of the box and the weight and nature of its contents.

It is also to be understood that the glue applied to the tape may be of any desired composition but in practise it should be water soluble in order to cause it to soften and to unite the tape to the side of the box. Also, it will be understood that, though I prefer to use paper or cloth tape which has been coated with a suitable glue before it is applied to the box, the said tape may be dry and the glue applied thereto before making up the box and, if desired, the flaps 13 and the overhanging parts of the tapes 15 and 16 may similarly be left dry until it is desired to finally form the box, at which time the said parts may be coated with a suitable glue.

The box thus formed is remarkable for its strength and lightness as well as its efficient protection of its contents from damage in handling. The box may be made of plywood of sufficient thickness to provide the required strength for its size and for the weight and nature of its contents. It will be noted that on account of the interconnection of the tenons and mortises of the several sides, that if the box be dropped on its edge the bursting effect of the fall is carried by the two contiguous sides forming that edge, while if it is dropped on a corner the said stress is carried by the three sides forming that corner. In actual practical tests this box is equal in resistance to breakage from falling to a veneer box of nailed sides with solid wood ends, and far exceeds that of the usual corrugated board, but since it requires no nails it is cheaper than the said veneer box to assemble and is also somewhat lighter for the same strength.

Having described my invention, I claim:—

1. A box composed of a bottom and separate independent sides; separate means comprising a tape secured along the contiguous edges of the bottom and sides whereby said sides are flexibly held to said bottom to permit them to be swung into planes at right-angles to said bottom; and interlocking means between said bottom and each said side, whereby said sides are permanently held from movement parallel to the contiguous edges of said bottom.

2. A box as set forth in claim 1, wherein said means for securing the tape along the contiguous edges of the bottom and sides comprises gluing said tape to the bottom and sides along their contiguous edges.

3. A box as set forth in claim 1, wherein said interlocking means comprises complementary tenons and mortises formed in the contiguous edges of the bottom and the several sides.

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