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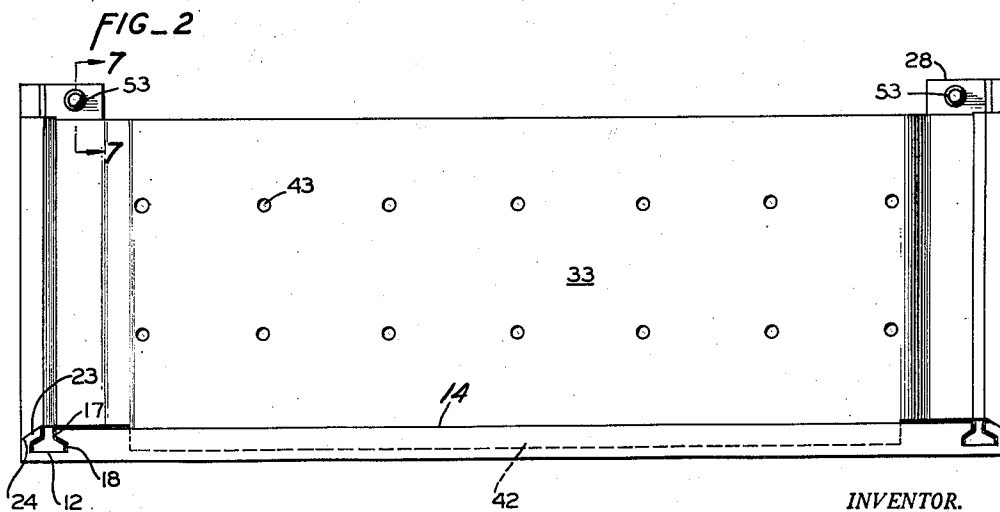
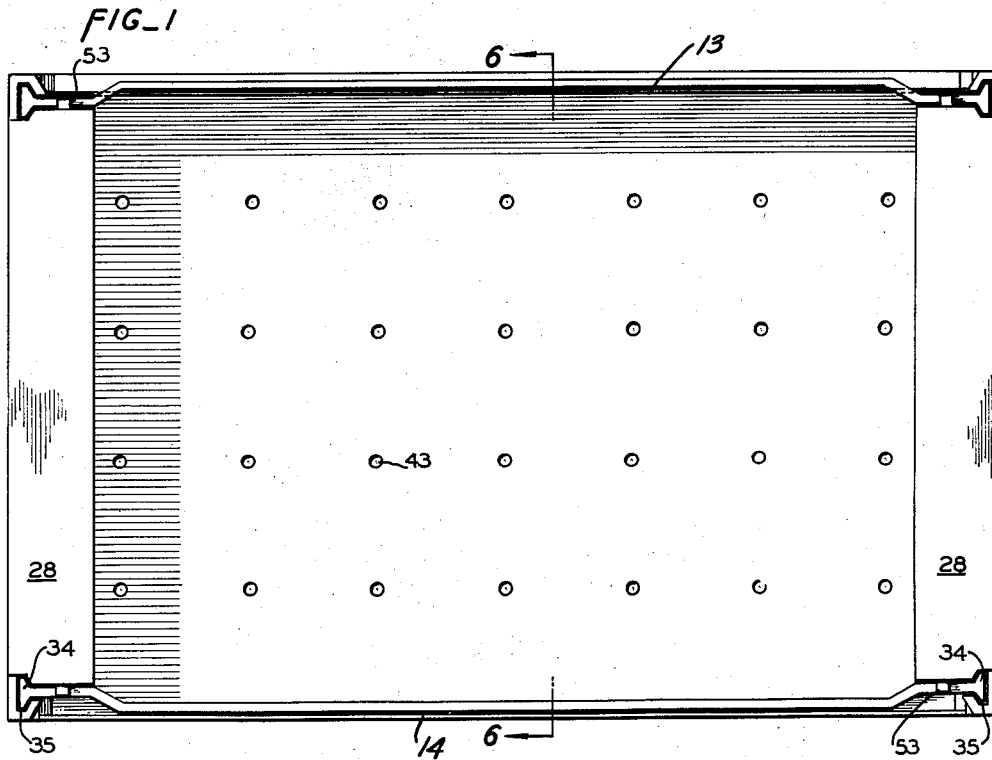
J. R. SOMAVIA

2,862,640

KNOCKDOWN BOX

Filed Jan. 26, 1956

3 Sheets-Sheet 1



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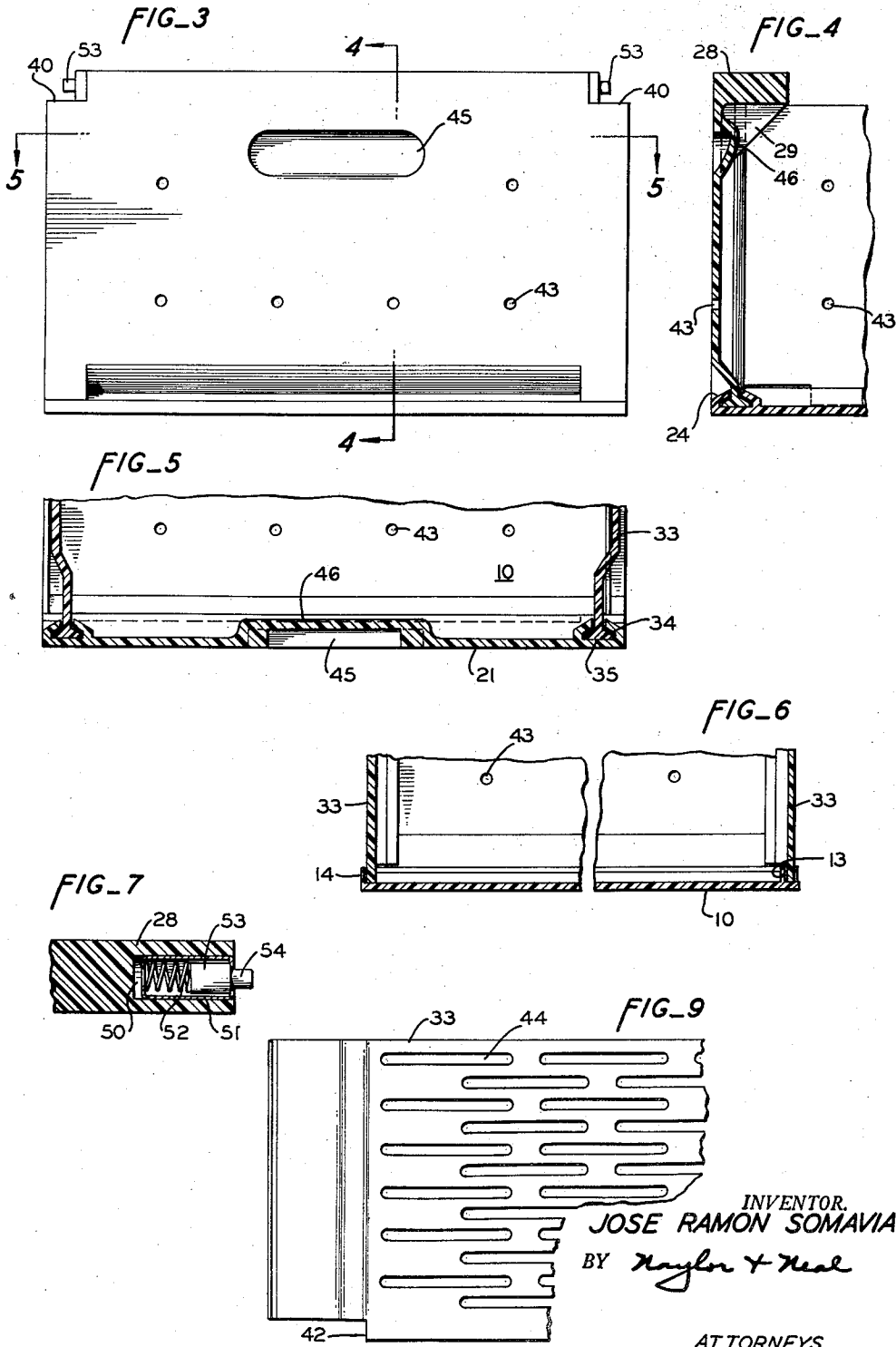
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3 Sheets-Sheet 2



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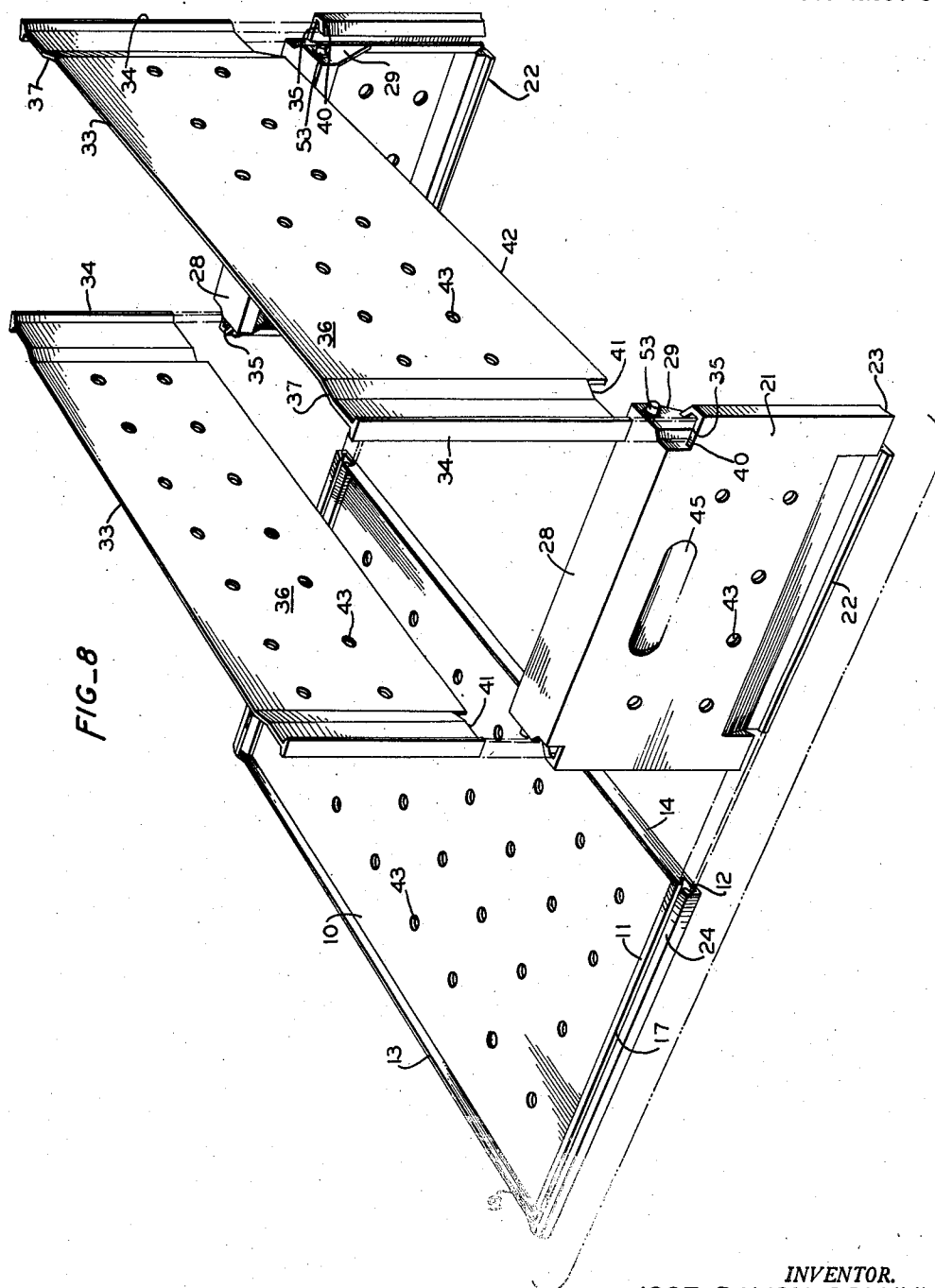
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KNOCKDOWN BOX

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3 Sheets-Sheet 3



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KNOCKDOWN BOX

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2 Claims. (Cl. 220—4)

This invention relates to knockdown boxes particularly adapted to serve as "lug" boxes of the type commonly used in agriculture in the handling of fruits and vegetables. While designed primarily to serve the stated purpose, the principles of the invention are well adapted to the construction of boxes for many other and varied uses.

"Lug" boxes, as they are well and familiarly known in agriculture, are open topped containers usually made of the softer woods, such as pine, and employed in the transportation and storage of fruits from the orchards and groves and vegetables from the fields to the packing sheds or canneries, as the case may be. Such boxes are generally of a size permitting convenient manual handling when loaded and susceptible to stacking for mass handling with conventional equipment. To withstand such usage the boxes are generally constructed in rather stout fashion, with especially heavy bottoms and ends but thinner sides, nailed together.

The wooden lug box, however, has many drawbacks. Included among these is excess weight, inability to stand up under the roughness of use, and the relatively high costs of initial construction and repair during the normal life of the box. Moreover, the acids of the fruits and vegetables handled therein attack the nails and cause loosening of the component wood panels of the box and render them unfit for normal use. Added to these there is the not inconsiderable cost of replacement of boxes misappropriated for uses other than their intended purpose, such as for firewood.

The present invention has for its objects the provision of a relatively lightweight lug box made of plastic materials, in which the parts are provided with integral connector means whereby assembly and repair is greatly facilitated. At the same time, it is an object of the invention to produce box parts susceptible of mass and hence low cost production, with complete interchangeability of parts, for ready assembly or repair at remote points, wholly without the aid of construction equipment or tools.

These and other objects of the invention will be made more apparent as this specification proceeds and the novelty thereof will be particularly pointed out in the appended claims.

In the drawings forming a part hereof, wherein a preferred embodiment of the invention is shown:

Figure 1 is a top plan view of the knockdown box;

Figure 2 is a side elevation of the assembled box;

Figure 3 is an end elevation of the same;

Figure 4 is a vertical sectional view taken along the line 4—4 of Figure 3;

Figure 5 is a horizontal sectional view taken along the line 5—5 of Figure 3;

Figure 6 is a vertical sectional view taken along the line 6—6 of Figure 1;

Figure 7 is a detailed sectional view taken along the line 7—7 of Figure 2;

Figure 8 is an exploded perspective view showing the relationship and interfit of the parts of the box, and

Figure 9 shows a fragmentary view of one of the side

panels of the box with particular reference to an alternative in the character of the ventilation apertures in the same.

In the make-up of a box embodying the present invention a bottom panel 10, having the characteristics shown to best advantage in Figure 8, is employed. This member is generally in the form of a shallow tray, with raised end portions 11, within which are fashioned the mortises 12, and having flanges 13 and 14 extending longitudinally thereof at its two sides. Flange 13 is spaced inwardly from an edge of bottom 10 whereas flange 14 is flush with the opposite edge thereof, for reasons that will become apparent in the description of the assembly of the box.

The mortises 12 have the cross-sectional characteristics shown to best advantage in Figure 2, in which a narrow slot 17 communicates with a relatively wider channel 18 formed inside the raised end portions 11 of the bottom panel 10. As will be seen in Figure 8, the mortises 12 extend substantially the width of the bottom panel 10, being open at one edge thereof and closed off, by obstructions as at 19, short of the opposite edge of panel 10. Thus the mortises 12 have one-way entrances and this for a purpose that will shortly be explained.

The end panels 21 are adapted for interchangeable connection with bottom panel 10 through the provision of the downwardly projecting tenons 22 formed intermediate the ends of panels 21 (see Figure 8) for sliding engagement with the mortises 12 in the ends of panel 10. By terminating the tenons 22 short of the ends of end panels 21 a distance corresponding to the closed off portion 19 of mortise 12, the end panels may be used interchangeably at the respective ends of the box and still be interfitted flush with the side edges of bottom panel 10.

In order to adequately brace the thus interfitted end and bottom panels, complementary bevels 23 and 24 are provided on the bottoms of the opposite end portions of panels 21 and the outer top edges of the raised ends of panel 10, respectively, as shown to best advantage in Figures 2 and 8. The end panels 21 are additionally characterized by the fact that a crown or relatively wide shoulder 28 is fashioned on their upper ends, and braced by suitable webs 29, to facilitate stacking of the boxes, one upon the other.

The side panels 33 are each adapted for interchangeable use in connection with the above described bottom and end panels 10 and 21, respectively. Thus at each of their respective ends tenons 34 are formed for sliding engagement with the vertically disposed mortises 35 fashioned in the ends of the end panels 21, in the make-up of the rigid dovetail joints illustrated in Figures 1 and 5.

In order to keep the overall dimensions of the assembled boxes within certain predetermined limits and thus meet accepted shipping specifications, as well as to dispose the joints well within the outer margins or surfaces of the box to withstand the rough uses to which the boxes are subjected, the side panels 33 have their tenons 34 disposed inside their main plane surfaces. Thus the ends of the principal area 36 of panels 33 are turned inwardly on the angle 37 and continue thence on a plane paralleling the surface 36 into the tenons 34.

For like considerations of dimensioning, the side walls or panels 33 are of considerably less height than the end panels 21, to the end that the crowns or shoulders 28 of the ends 21 will be the parts exposed to take the stress and strain of the stacking of the boxes. Also the upper corners of the end panels 21 are cut away, as at 40, to reduce the length of the mortises 35 equal to the length of the tenons 34 and the bottom ends of the side panels 33 and the tenons 34 are notched or cut away, as at 41, to fit over the raised ends 11 of bottom 10. Additionally, a skirt 42 is defined at the bottoms of the side panels

33 for engagement with the side flanges 13 and 14, as will presently be disclosed.

Good practice requires that the box be well ventilated and drained and to that end the several panels thereof are each provided with the apertures 43. Alternatively, the panels may be provided with a series of staggered slots 44 (see Figure 9), but for considerations of strength, spaced circular openings are deemed preferable.

Finger grips 45 are provided in the outer surfaces of the end panels 21, adjacent the crowns 28, through the expedient of forming a corresponding inwardly projecting bulge 46 in the panel wall (see Figures 4 and 5).

As will be appreciated from study of Figure 8 of the drawings, the box parts may be readily assembled or knocked down for use or storage or repair, respectively. In assembling the parts, the tenons 22 of the end panels 21 are inserted in the mortises 12 of bottom 10 and moved inwardly until they strike the closed ends 19, which will put the ends of the panels 21 flush with the side edges of the bottom 10. The side panels 33 are next fitted by inserting the tenons 34 thereof in the mortises 35 of the end panels 21. In this operation the outwardly projecting portion 36 of one of the side panels 33 is dropped outside the flange 13 of bottom 10 whereas the opposite side panel is disposed inside the flange 14 (see Figure 6), to thus serve as a locking device, preventing accidental lateral movement of the end panels 21 with respect to the bottom panel 10.

To prevent accidental disengagement of the side panels 33 from end panels 21 any conventional latching device may be employed. In the preferred embodiment the form of latch chosen is a detent, as shown in Figure 7. A bore 50, in the end of the crown 28 of end panels 21, accommodates a cylindrical member 51 within which there is disposed a spring 52 normally urging a plug 53 outwardly against a restricted opening in member 51, through which the reduced portion or pin 54 of plug 53 projects. It will thus be seen that pins 54 normally lie in the path of the top edges of side panels 33 when the latter are engaged with the end panels. (See Figures 1 and 2.) Such a device permits of easy intentional disengagement of members, since it is only necessary that the detent pins 54 be depressed sufficiently to raise an edge of the side panels past them and they will remain depressed until complete separation of the members has occurred. Once the side panels 33 have been disengaged, the end panels may be freely moved out of engagement with the bottom, to complete the knocking down of the box.

As will be appreciated from the foregoing and the device illustrated in the drawings, the disassembled parts of the box lend themselves to ready and relatively flat stacking, for economy in storage and shipment. This is also a decided advantage over the conventional lug boxes permanently assembled by nailing together the component wooden parts, since the latter are bulky and present costly storage problems between seasons of use, especially in protecting them against the weather.

This invention contemplates that the several parts of the box may be made of any of a multitude of known plastic material, with due consideration for durability and strength, as well as the most economical and proven methods of fabrication. An added utility of the devices is the fact that they may be made in various colors and include marks to readily indicate their ownership.

The knockdown box forming the subject matter hereof may take various other forms than the preferred form illustrated and described herein without departing from the spirit of the invention and hence protection is desired within the full scope of the appended claims.

What is claimed is:

1. A knockdown open topped plastic box comprising a bottom panel having upstanding reinforcing elements, a pair of alike end panels, and a pair of alike side panels, mortise and tenon connections between said bottom panel and said end panels comprising mortises formed in said upstanding reinforcement elements embodied in said bottom panel and tenon elements terminating short of the sides of said end panels, and mortise and tenon connections between said end panels and said side panels, and means for releasably securing all of said panels together in assembled relation against accidental relative movement with respect to each other, said means comprising: obstructions formed in one end of the mortises of the connections between said bottom and end panels preventing horizontal shifting in one direction of the end and side panel assembly with respect to said bottom panel; said end panels being further adapted to rest upon the top of said reinforcement elements and be supported thereby; at least one upwardly directed flange formed on said bottom panel adapted to be laterally engaged by one of said side panels to prevent horizontal shifting in the other direction of the end and side panel assembly with respect to said bottom panel; and means further interconnecting said end and side panels adapted to normally prevent vertical shifting of said side panels with respect to said end panels, said means being yieldingly releasable to permit the removal of said side panels from said box and thereby condition the remainder of said box for further and full knockdown.

2. A knockdown open topped box comprising a bottom panel having raised end portions and side flanges one of which is spaced inwardly from an edge and the other of which is flush with the opposite edge of the bottom panel, said end portions having longitudinally extending mortises formed therein, said mortises extending flush with a common side edge of said bottom panel to provide entrances thereto and being closed at their opposite ends at a point spaced from the edge of said bottom panel, a pair of end panels each having a tenon formed at the bottom edge thereof spaced equidistant from the ends of said panels, said end panel tenons being adapted to be inserted in the mortises in the bottom end portions, said end panels and said raised end portions of said bottom each having complementary beveled surfaces adapted to be brought into contact when the respective tenons and mortises of these members are engaged, said end panels each having vertically disposed mortises formed at their respective ends, a pair of side panels each having tenons formed at their respective ends adapted to be inserted in the mortises in the ends of the end panels, said side panels having dependent skirts engaging the flanges on the bottom on the side preventing accidental disengagement of the end panels and said bottom, and means for latching the side panels against accidental disengagement from said end panels.

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