

Dec. 5, 1950

A. TAYLOR  
COLLAPSIBLE BOX UNIT

2,532,863

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2 Sheets-Sheet 1

Fig. 1

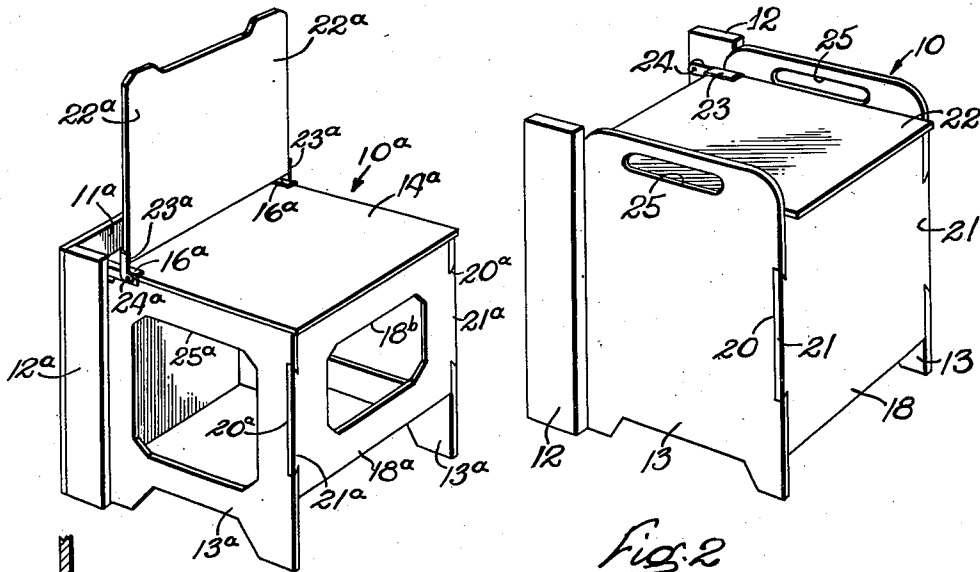


Fig. 3

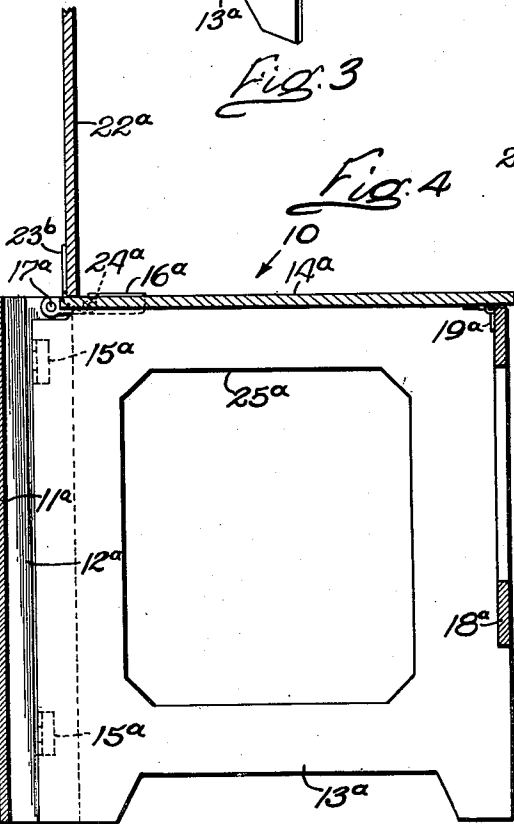
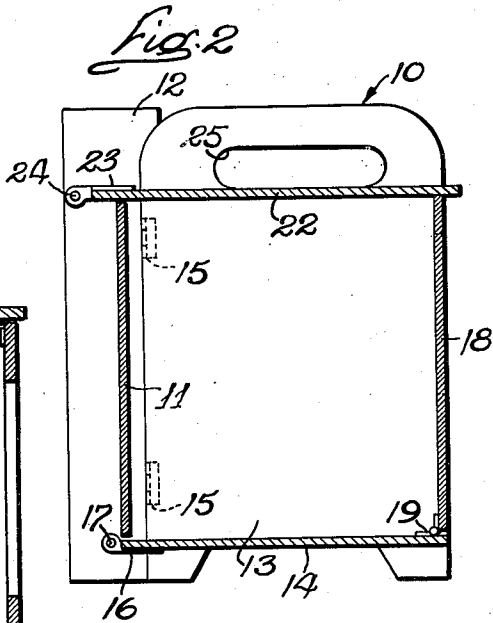


Fig. 4



INVENTOR  
Auburn Taylor  
By Carlson, Pitman, Hubbard & Woy  
ATTORNEYS

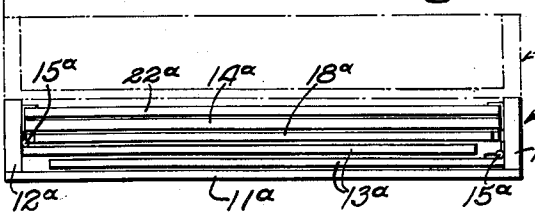
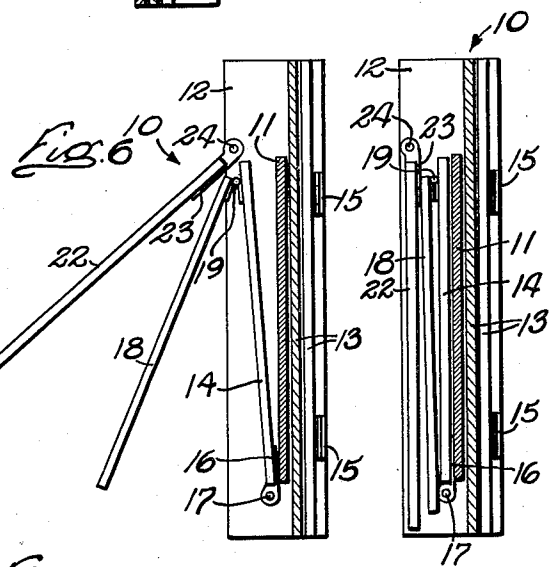
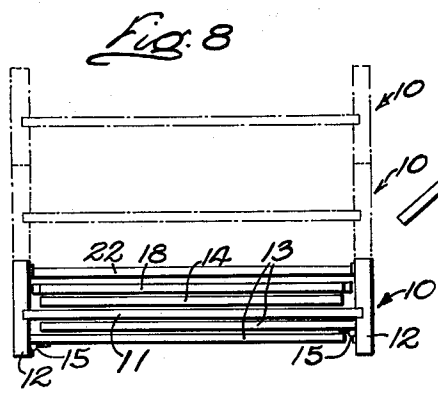
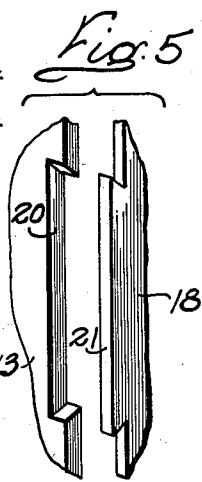
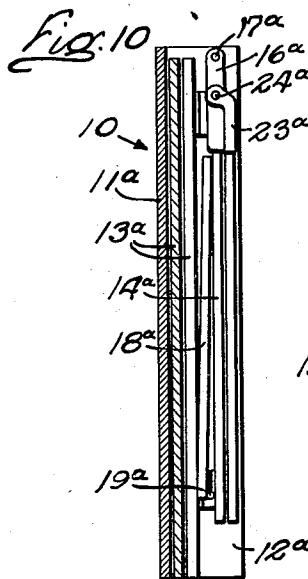
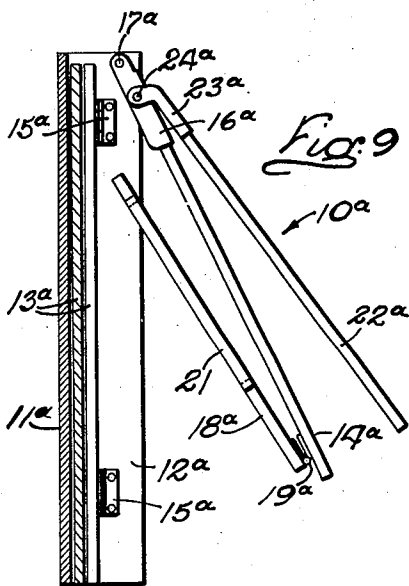
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INVENTOR  
Auburn Taylor  
By Carlson, Pitzman, Hubbard & Wolf  
ATTORNEYS

# UNITED STATES PATENT OFFICE

2,532,863

## COLLAPSIBLE BOX UNIT

Auburn Taylor, Charleston, W. Va.

Application January 8, 1945, Serial No. 571,899

1 Claim. (Cl. 217-14)

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The present invention pertains to collapsible box units. Such units may take a variety of specific forms to adapt them to different special uses. For example, box units embodying the present invention may be adapted for use as shipping containers, hampers, storage cabinets, waste baskets, stools, chairs, and many other specific items, as will hereinafter appear in greater detail.

One general object of the invention is to provide a unit of the type indicated which is extremely strong and rugged when set up or erected, but which may be readily collapsed into a generally flat package of small overall dimensions.

Another object is to provide such units which embody frame members or rails adapted not only to rigidify the units when erected, but also to facilitate stacking a whole series of such units when they are collapsed and without danger of injuring panels included in the units.

The invention also resides in various structural improvements and innovations in the disclosed units which adapt them for low-cost, large scale production and for utilization of plasticized plywood for a major portion of each unit.

Further objects and advantages of the invention will become apparent as the following description proceeds, taken in connection with the accompanying drawings in which:

Figure 1 is a perspective view of a collapsible box unit embodying the present invention, the same being shown in erected form.

Fig. 2 is a vertical sectional view of the unit of Fig. 1.

Fig. 3 is a perspective view of a modified form of box unit embodying the invention.

Fig. 4 is an enlarged vertical sectional view of the unit of Fig. 3.

Fig. 5 is a detail perspective view of one of the dovetail locking joints incorporated in the units of both Figs. 1 and 3.

Figs. 6 and 7 are vertical sectional views of the unit of Fig. 1 showing the same, respectively, in partially and completely collapsed form.

Fig. 8 is an end elevation of a unit like that of Fig. 1 collapsed and in horizontal position, additional units of like form stacked on top of the same being indicated in broken lines.

Figs. 9 and 10 are vertical sectional views of the modified unit of Fig. 3 showing the same, respectively, in partially and completely collapsed condition.

Fig. 11 is a view similar to Fig. 8 indicating the mode of stacking units like those of Fig. 3 when collapsed.

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While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring more particularly to the drawings, the invention has been illustrated in Figs. 1 and 2 as embodied in a collapsible box unit 10 particularly designed for use as a storage hamper or shipping basket. When suitably dimensioned the same is also adapted for use as a stool. Moreover, it may be used as a wastebasket or for many other purposes.

In the particular unit of Figs. 1 and 2 the parts are arranged, when erected, to constitute a closed six-sided box. This structure includes a generally rectangular rear wall assembly composed of a rectangular back panel 11 and two upright frame members 12, the side edges of the panel 11 being fixed in longitudinally extending grooves (see also Fig. 8) in the opposed faces of the two frame members 12. These frame members 12 rest directly on the floor when the unit is erected, serving as strong reinforcing corner posts. When collapsed the frame members 12 serve as side rails in stacking the units, as will appear hereinafter in connection with Fig. 8.

Pivoted to three respective edge portions of the rear wall structure 11, 12 are three panels, shown in Figs. 1 and 2 as a pair of side wing panels 13 and an end panel 14, the latter constituting the bottom end of the instant box unit. Each of the side wing panels 13 is pivoted by hinges 15 at its rear edge to the inner face of the uprights 12 so as to be free to swing through approximately ninety degrees from the erected position of Figs. 1 and 2 in which such side wing panels are in spaced parallel relation to the collapsed position of Fig. 7 in which the side wing panels overlap each other on the front face of the rear panel 11. The bottom panel 14, on the other hand, is pivoted by bracket arms 16 at its rear edge to pivot pins 17 in the inner faces of the uprights 12. Such bottom panel 14 is swingable downward from its horizontal erected position shown in Fig. 2 through substantially two hundred seventy degrees to the collapsed position of Fig. 7 in which it overlies the rear face of the back panel 11.

To the free or front edge portion of the bottom end panel 14 is pivoted a fourth panel 18 by hinges

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19 (Fig. 2). This fourth panel constitutes the front of the box unit when the latter is erected and is dimensioned to bridge the space between the wing panels 13.

As a means of securing the unit rigidly in erected position the front panel 18 is locked to the wing panels 13 by dovetail joints along their adjacent edges. Thus the front edges of the wing panels 13 may be mortised as indicated at 20 and mating tenons 21 formed on the side edges of the front panel 18 (see Fig. 5). The hinges 19 for the front panel 18 are so set that this front panel may be swung forwardly a few degrees to free the dovetail joints 20, 21 in collapsing the box. Thereafter the bottom panel is swung downward through the position of Fig. 6 to that of Fig. 7 and at the same time the front panel 18 swung about its hinges 19 until it overlies the face of the bottom panel 14 as shown in Fig. 7.

The unit of Figs. 1 and 2 is completed by a lid panel 22 pivoted at its rear edge to swing about a horizontal axis. It is provided with brackets 23 connecting it to pivot pins 24. When the box unit is erected the top panel 22 rests on the upper edges of the front and rear panels 11 and 16 (see Fig. 2), closing the box. It can of course be swung upward at any time to afford access to the interior of the box, and in collapsing the unit the top panel 22 is swung through substantially two hundred seventy degrees, passing through the position of Fig. 6 into the final position of Fig. 7.

Desirably the wing panels 13 are dimensioned to extend upward above the level of the top panel 22 (Figs. 1 and 2) and apertured as at 25. Convenient and strong handles for carrying the box unit are thus afforded.

With the box unit 10 erected as shown in Figs. 1 and 2 a strong and rigid structure is afforded. The dovetail joints 20, 21 constitute an especially rigid connection between the wing panels 13 and front panel 18, effectually preventing spreading of the wing panels under load applied to their inner surfaces. The lid or top panel 22 can of course be swung freely in opening and closing the unit and if desired a hasp or the like (not shown) may be provided for locking it to the front panel 18.

To collapse the box unit 10 is a very simple matter. To do so the user raises the lid 22 and grasps the upper edge of the front panel 13, pulling forward on the same. This frees the tenons 21 from the mortises 20 so that the bottom panel 14 and front panel 18 can be swung downward through the position of Fig. 6 to the final position of Fig. 7. Thereafter the top panel 22 is swung back to overlie these panels so that the panels 14, 18 and 22 are superimposed, in that order, on the rear face of the back panel 11. The side wings 13 are simply folded in, one over the other, to overlie the front face of the back panel 11. With the various panels of the box unit thus disposed, the resulting stack of panels is of slightly less height than the width of the posts 12. Consequently, when a series of such box units 10 is arranged horizontally and stacked one on another as shown in Fig. 8, the posts 12 constitute side rails bearing all of the weight of the stacked units. The only contact between successive units is, in such case, along the edges of the members 12, and consequently the panels of the units are without load and effectually protected from damage or injury even though a great many units be stacked.

The panels 11, 13, 14, 18 and 22 of the box unit 10 can be made of various rigid sheet materials.

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Preferably, however, they are fashioned from plasticized plywood of, for example, three-eighths inch thickness since their shapes particularly lend them to fabrication from such material. The posts 12, on the other hand, are preferably cut from a heavier material such, for example, as one inch lumber, to allow slots to be cut in their bottoms to insert rollers (not shown) so they can be wheeled around like a two-wheel truck when load is too heavy to carry.

A somewhat modified form of collapsible box unit is shown in Fig. 3. Basically, however, its structure is like that of the unit of Fig. 1 and to facilitate comparison the same reference numerals, with an added "a", have been used to identify corresponding parts in the unit of Fig. 3.

The modified unit 10a of Fig. 3 has been designed primarily for use as a folding chair. It includes a generally rectangular rear wall structure composed of a panel 11a and two upright frame members or posts 12a, the rear panel 11a being fixed to the edges of the posts 12a in this instance, rather than being inset into the grooves in the opposed faces of the latter. This is done for the reason that in the unit 10a all of the panels are, as will hereinafter appear, arranged to be collapsed into a stack on one face of the rear panel rather than in two stacks on opposite faces of the same, as was done in the unit 10.

Pivoted to three respective edge portions of the rear wall structure 11a, 12a are three panels, shown in Figs. 3 and 4 as a pair of side wing panels 13a and an upper end panel 14a, the latter constituting the seating surface of the unit when erected. The wing panels 13a are pivoted along their respective rear edges by hinges 15a to the opposed inner faces of the posts 12a so that the wing panels 13a may swing from their projected spaced parallel position of Figs. 1 and 2 into overlapped relation with each other when the unit is collapsed (Figs. 9 and 10). The top end panel 14a is, on the other hand, pivoted along its rear edge by brackets 16a on pivot pins 17a to the upper end portions of the posts 12a, this panel being adapted to swing from its horizontal position shown in Figs. 3 and 4 downward to the collapsed position of Fig. 10 where it overlies the infolded wing panels 13a.

To the free or front edge portion of the top end panel 14a is pivoted a fourth panel 18a by hinges 19a. This fourth panel constitutes the front of the box unit or chair base and is dimensioned to bridge the space between the wing panels 13a.

As a means of securing the unit 10a rigidly in erected position dovetail joints are provided between the adjacent edges of the wing panels 13a and front panel 18a. For that purpose the front edges of the wing panels are mortised as indicated at 20a and mating tenons 20a formed on the side edges of the front panel (Fig. 1).

The unit 10a is completed by a backrest panel 22a pivoted at its rear edge by brackets 23a on pivot pins 24a carried on the heretofore mentioned bracket arms 16a. This backrest panel 22a is swingable between an upright position with reference to the top panel 14a shown in Fig. 3 and a collapsed position shown in Fig. 10 in which the backrest panel lies flat against the outer face of the panel 14a. The bracket arms 23a have flanges 23b (Fig. 4) which overlie the back face of the panel 22a and when the latter panel is upright the lower ends of these flanges 23b bear against the upper edges of the bracket arms 16a, thus limiting the rearward swing of

the panel 22a. The dimensioning of the edges of such flanges 23b with reference to the top edges of the bracket arms 16a can be made such as to stop the panel 22a in a desired position of slight inclination calculated to give the most comfortable seating.

Desirably the wing panels 13a are apertured at 25a to lighten the structure and save material. Similarly, the front panel 18a may be apertured at 18b for the same purpose.

With the unit 10a erected as shown in Fig. 3 it constitutes a sturdy yet comfortable chair of light weight which can easily be moved about. To collapse this chair the user grasps the lower edge of the front panel 18a, pulling it forward to disengage the dovetail joints 20a, 21a. Then the user pushes upward on the front panel 18a to raise it and the top panel 14a slightly, whereupon the side wings 13a may be swung inward into the overlapped position of Fig. 9. Thereafter the front panel 18a is folded upward against the bottom face of the top panel 14a and the latter swung downward through the position of Fig. 9 to that of Fig. 10. Moreover, the backrest panel 22a is swung downward against the face of the top panel 14a. In this way the chair unit 10a may be quickly collapsed or folded for storage. When so collapsed all of the panels 13a, 18a, 14a and 22a are stacked, one on another, on the face of the back panel 11a. The posts 12a are of sufficient width that they protrude beyond this stack of panels so that they constitute stacking rails for units 10a piled one on another (see Fig. 11).

I claim as my invention:

A collapsible box unit comprising, in combination, a wall structure including a pair of upright corner posts having means bridging the space between them and rigidly joining the same, a plurality of panels pivotally connected along their edges to a corresponding plurality of right-angled related edge portions of said wall structure to swing from a collapsed position in which they

are all stacked in parallelism to said back structure to an erected position in which each is normal to another, means for locking said panels in erected position, and the width of said posts being greater than the thickness of the stack formed by said panels when in collapsed condition, and said posts being disposed along the sides of the stack with the front and rear surfaces thereof disposed beyond the outermost panels of the stack so that a plurality of such units may be piled up in horizontal position one on another with the longitudinal surface of the posts of each unit resting on the longitudinal surface of the posts of the next one beneath and without contact between their panels.

AUBURN TAYLOR.

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