

Nov. 29, 1966

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3,288,319

COLLAPSIBLE CONTAINER

Filed Aug. 20, 1964

2 Sheets-Sheet 1

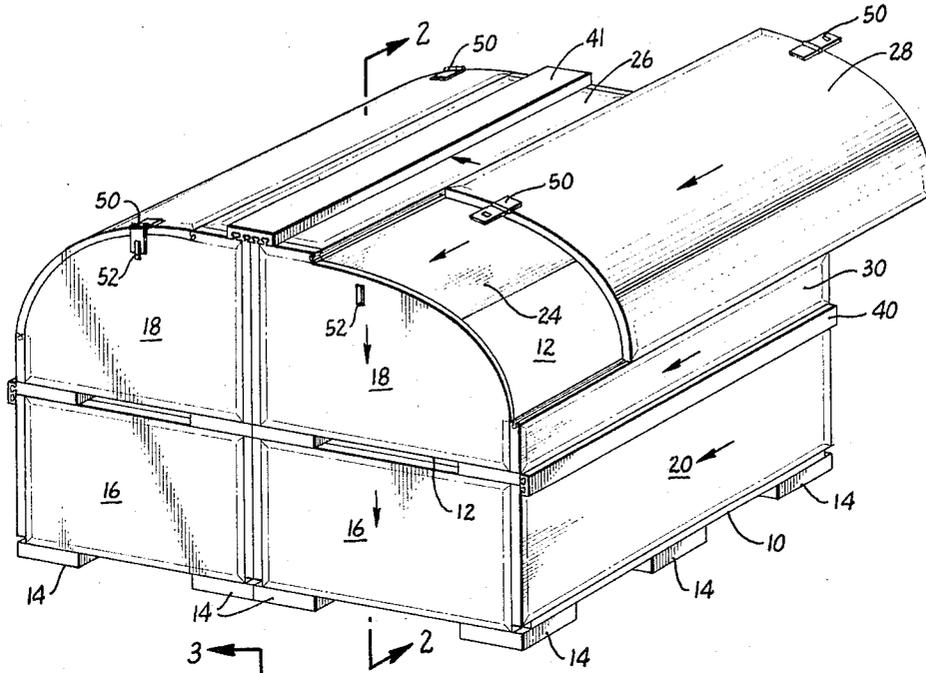


FIG. 1.

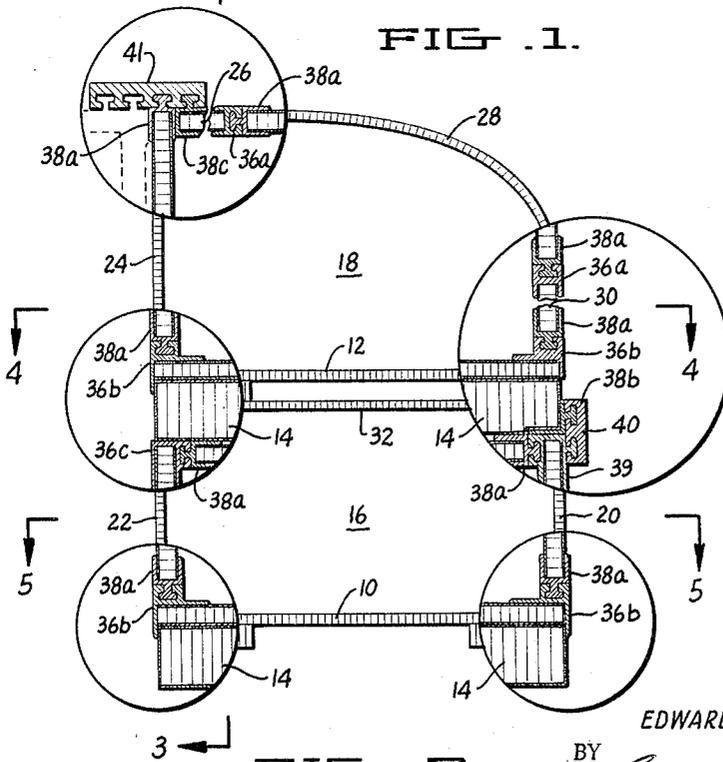


FIG. 2.

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2 Sheets-Sheet 2

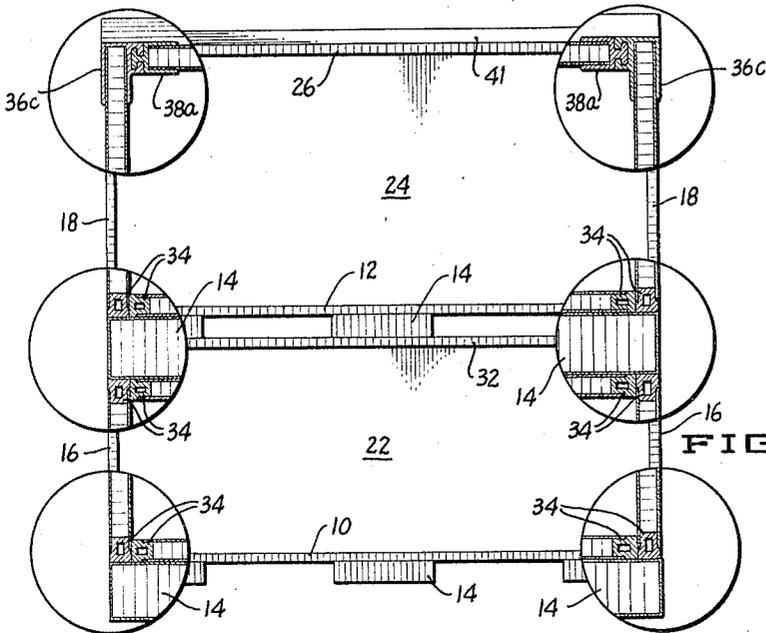


FIG. 3.

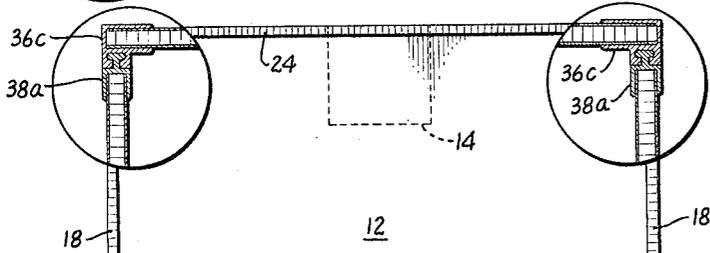


FIG. 4.

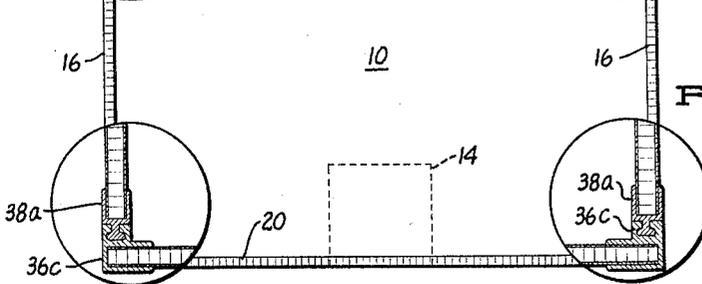
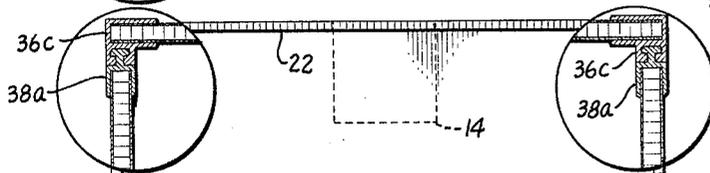
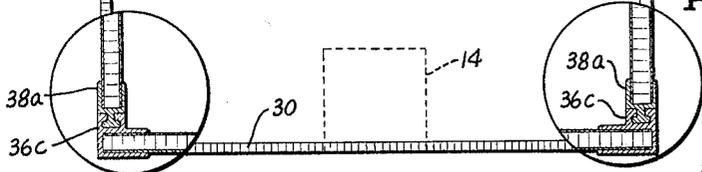


FIG. 5.

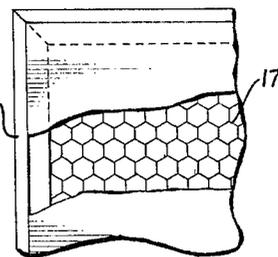


FIG. 6.

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COLLAPSIBLE CONTAINER

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3 Claims. (Cl. 217-12)

This invention relates in general to containers of the knockdown type and more particularly to such a collapsible box or bin structure which is especially adapted for use in the interior of airplanes.

A new type of knockdown box or bin is that described in the Herman Patent 3,079,025. A similarly constructed container having a curved top is needed for cargo shipped by air so that the box, when full, fits closely against the top of the fuselage. Otherwise, space is wasted near the top of the cabin. Current practice is to load air cargo pallets in such a manner so as to conform, more or less, to the curve of the roof and cargo nets or other covers are used to secure the cargo in place on the pallet.

It is an object of this invention to provide a rugged box, bin or container of a configuration capable of filling certain storage areas within an airplane which cannot be filled by presently available containers.

It is a further object of this invention to provide such an improved assembly which may be broken down or conveniently assembled and which, in the unassembled condition, is compact and easily shipped and stored.

Still another object of this invention is to provide a structure of the aforementioned type which, when in the disassembled condition, lacks extending parts which may be inadvertently struck and perhaps damaged.

Still another object of this invention is to provide means for holding together various container units so as to insure minimum space consumption and eliminate shifting of individual units constituting a single load in transit.

Other objects and advantages of this invention, if not specifically set forth, will become apparent during the course of the description which follows.

Generally, this invention is concerned with a plurality of units comprising a single assembly and especially with one portion thereof; however, this invention may also be of a single unit. The portion of the assembly to which primary attention will be directed is one having arcuate end walls designed to accommodate an arcuate top, the end walls representing a quadrant of a more or less circular figure. Means are provided for maintaining the two generally quadrant shaped end walls firmly in place and adequately bracing them even where the top is temporarily removed. All panels constituting the container are secured to other adjacent panels by means of interlocking channels and rails.

Another portion of the assembly is a rectangular box or bin which is a modification of that appearing in Patent 3,079,025. This rectangular portion may be used in conjunction with the aforementioned top portion and is constructed entirely of coupling members utilizing channels and rail members which can be slid into the channels and gripped thereby.

In the drawings:

FIGURE 1 is a perspective view of the assembly of this invention showing the several individual box or bin structures constituting the whole.

FIGURE 2 is a fragmentary sectional view through line 2-2 of FIGURE 1 showing the coupling members for the various walls, ends, etc. in enlarged form.

FIGURE 3 is a sectional view through the line 3-3 of FIGURE 2 also showing the coupling members in enlarged form.

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FIGURE 4 is a similar sectional view through line 4-4 of FIGURE 2.

FIGURE 5 is a similar sectional view through line 5-5 of FIGURE 2.

FIGURE 6 is a fragmentary enlarged view of one of the wall panels with a portion of the skin or facing material removed to show the interior structure.

Referring now to the drawings wherein like characters refer to like parts throughout, there is shown a horizontal base member 10 forming the bottom of one portion of the assembly. A somewhat similar horizontal base member 12 serves a similar function for the upper portion thereof having end walls which are quadrants of a more or less circular figure. As is especially shown in FIGURES 4 and 5, the base members 10 and 12 have relatively large square feet 14. Each of the feet 14 extends sufficiently beyond the adjacent lateral edge of bottom member 10 or 12 so as to provide a shoulder which is of a width equivalent to the thickness of a rectangular end panel 16 or a quadrant shaped end panel 18. These feet, as well as the wall and floor panels, are constructed of skins of aluminum or other strong, light metal or plastic between which a honeycomb structure 17 (see FIGURE 6) of expanded metal is sandwiched so as to provide rigidity with minimum weight.

The mirror image lower container portions are completed by side walls 20 and 22 while the mirror image upper portions each have a single additional upstanding back wall 24 together with several additional like members 26, 28 and 30 which are more or less segments of a circle, as described in greater detail below. The cover panels for the lower rectangular container units are sheets 32.

Facing for each edge of each panel which does not support a portion of the channel and rail interlock system is in the form of a hollow extruded metal member 34 which is generally rectangular in cross section and has recesses or land areas therein for the edges of the metal skins making up the exterior faces of each wall sandwich.

The interlocking means for the panels consists of mating coupling members generally designated 36 and 38. These may be extruded aluminum or aluminum alloy. Each female coupling member has a generally T-shaped channel and each male portion includes a rail which may be slid into locking engagement with the channel. Each of these extruded members has a pair of flanges which are used to secure the extruded members to the panels. The female extrusions illustrated in the drawings are designated 36a and 36c to differentiate the manner in which they are secured to the panels, and the male extrusions are designated 38a, 38b and 38c. A single extrusion 39 has both male and female portions.

It will also be noted in FIGURE 2 that means are provided for locking the container sections together so that four sub-assemblies can be treated as a single unit. Double channel elements 40 having two parallel longitudinal T-shaped slots therein may serve to hold the stacked container sections together by locking with the adjacent rails of extrusions 38b and 39 previously described and quadruple channel members 41 hold adjacent arcuate-topped units together by locking adjacent rails 38a. A double channel 40 may lock rails 38a and 38c of a single arcuate-topped container where adjacent containers are not to be secured together.

The sliding top members 28 may be secured in place by a suitable system of hasps 50 and hinged tongues 52. The tongue is preferred to a fixed upstanding staple since, when the box is knocked down and parts stacked, space is conserved.

Beginning with a completely disassembled top container, one proceeds as follows: Back panel 24 and the relatively

low, fixed front panel 30, attached to each of which is a male extrusion 38a, are slid into place over base 12. The side walls 18, which are fitted with male extrusions 38a, are dropped into place. Shoulders provided at either end by feet 14 support the end panels 18 along the lowermost edges thereof as seen at the middle of FIGURE 3. Each of sides 18 also carries a short length of right angle female extrusion 36c along the more or less horizontal edge thereof corresponding to the opposed short edges of the top panel 26. Along these short edges, top panel 26 has a pair of corresponding male extrusions 38a so that the top 26 may next be slid into place as noted by the arrow of FIGURE 1 and male extrusion 38c is mounted along the edge thereof nearest the panel 24. The front edge of panel 26, as seen in FIGURE 1, has secured thereto a female channel 36a, as seen in cross section in FIGURE 2, as has the uppermost edge of front panel 30. The arcuate door 28 has a pair of male coupling members 38a along the longitudinal edges thereof and therefore may be slid into place to cover the opening through which cargo may be loaded.

Referring now to the entirely rectangular container, it is seen that the base member 10 is provided with a pair of female channels 36b similar to those mounted on the base section 12 of the upper container element. The longitudinal walls 20 and 22, each fitted with male coupling member 38a along the lowermost edges thereof, are slid into place. Right angle female channel members 36c or, optionally, a unitary extrusion combining the female and male extrusions 36b and 38b, as seen in FIGURE 2, are also carried by the upper edges of walls 20. Right angle female members 36c are also mounted on the upper edges of walls 22. The upright edges of walls 20 and 22 also support female extrusions 36c. One end wall 16, which has mounted thereon a male coupling element 38a, is next slid down from the top. The lowermost edge of the end panels 16 rests upon the shoulders which are formed by extending the feet 14 somewhat beyond the ends of base panel 10. Top element 32 having male coupling elements 38a thereon is slid into place and, finally, the other end panel 16 is slid into place thereby to lock the top. There are no clips or other extensions in evidence when the container is in a knocked down condition because of the use of the channel and rail coupling members throughout.

An alternative structure to that shown in FIGURE 1 is a single, rather than a four-section, container having a pair of openings corresponding to those openings 28 shown in the drawing. This is a less preferred embodiment since a structure of this size is obviously not as readily handled as one consisting of the four units of FIGURE 1.

After the assembled containers have been stacked, as shown in FIGURE 1, the double channel members 40 and the quadruple channel members 41 are slid into place so as to prevent shifting of any one part of the entire assembly. Use of one and preferably both of panels 26 and 30 achieves rigidity even where the top 28 is not in place. Elimination of both of narrow panels 26 and 30 would lessen considerably the support given end panels 18 and would weaken the structure. These small panels with their coupling members provide a substitute for the third edge of support which is always available, given an entirely rectangular box construction. They permit the containers to withstand considerable abuse.

Obviously, many modifications and variations of this invention may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A knockdown container formed of a plurality of panels, said container including:

- (a) a horizontal rectangular bottom panel;
- (b) a pair of vertical end wall panels, said end wall panels each having a straight lowermost edge and two vertical edges perpendicular thereto, each of the

said end wall panels also having a non-linear top edge;

- (c) a vertical back wall panel perpendicular to the said end wall panels and to said bottom panel;
- (d) a vertical front wall panel perpendicular to said end wall panels and to said bottom panel;
- (e) a plurality of top panels bridging the space between said end wall panels and between said back wall panel and said front wall panel;
- (f) interlocking male and female coupling members attached to abutting edges of the said wall panels and top panels and along two opposite ends of said bottom panel, the two remaining opposite ends of said bottom panel being free of said interlocking members whereby to permit the said panels to be secured together; and
- (g) supporting means for the bottom panel, said supporting means comprising blocks spaced along the edges of said bottom panel to provide shoulders for supporting said wall panels, said last named wall panels resting directly upon the said blocks and obscuring edges of the said bottom panel, said last named wall panels being positioned adjacent the ends of said bottom panel which are free of said interlocking coupling members.

2. A knockdown container formed of a plurality of panels, said container including:

- (a) a horizontal rectangular bottom panel;
- (b) a pair of vertical end wall panels, said end wall panels each having a straight lowermost edge and two vertical edges perpendicular thereto, each of said end wall panels also having a non-linear top edge;
- (c) a vertical back wall panel perpendicular to said end wall panels and to said bottom panel;
- (d) a vertical front wall panel perpendicular to said end wall panels and to said bottom panel;
- (e) a plurality of top panels bridging the space between the said end wall panels and between the said back wall panel and said front panel;
- (f) interlocking male and female coupling members attached to abutting edges of the said wall panels and top panels and along two opposite sides of said bottom panel, the two remaining opposite sides of said bottom panel being free of said interlocking members whereby to permit the said panels to be secured together; and
- (g) supporting means for the bottom panel said supporting means extending beyond two of the ends of said bottom panel to provide shoulders for supporting two of said end wall panels, said last named wall panels resting directly upon the said supporting means and obscuring said two ends of the said bottom panel, said last named wall panels being positioned adjacent the ends of said bottom panel which are free of said interlocking coupling members.

3. An assembly consisting of at least two knockdown container units, each of the said units being formed of a plurality of panels, each of the said panels being connected together solely by means of interlocking male and female coupling members attached to abutting edges of the said panels whereby to permit the said panels to be secured together, said units being positioned in a side-by-side relationship, being mirror images of one another, and being arcuate in cross-section, said units in cross-section comprising approximately a quadrant of an approximately circular figure; and means for securing the two units together at the top thereof, said means comprising a rail along the adjacent top edges of the container units and extending substantially the entire length thereof attached to each of said units and an elongated bar having a pair of channels therein, each of said channels being fashioned to register with one of the said rails whereby to secure the two units together.

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