

[54] **COLLAPSIBLE CONTAINER**

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[58] Field of Search 217/14, 46; 220/6, 220/1.5, 7, 31 S, 24 H; 16/137

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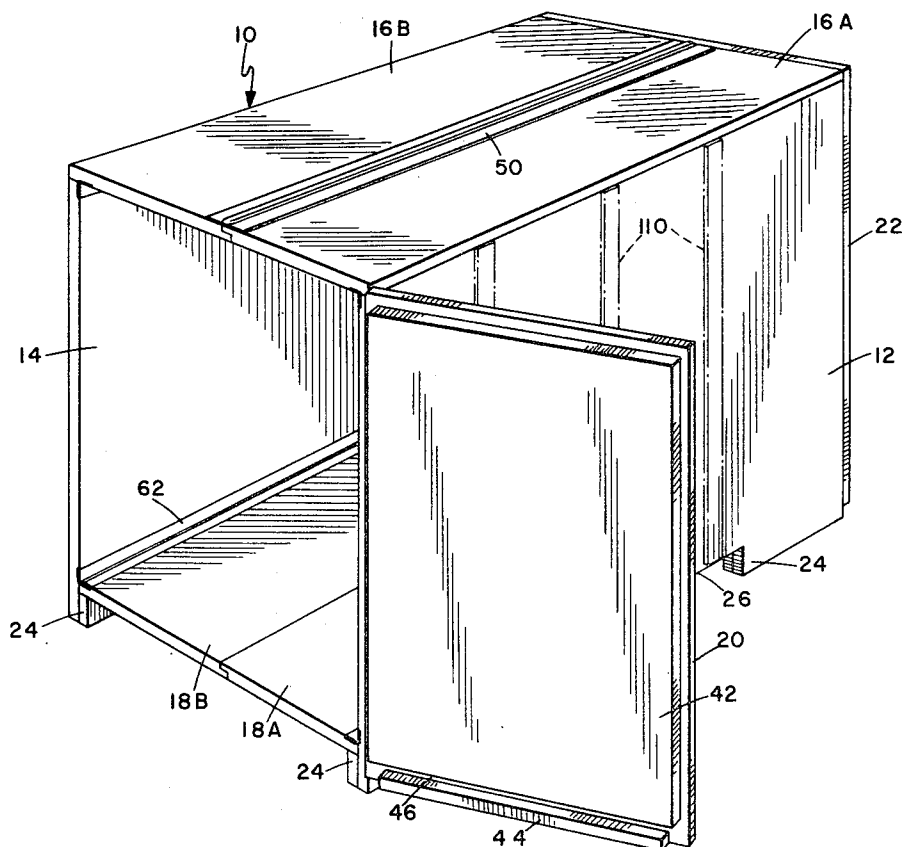
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[57] **ABSTRACT**

A collapsible container in which the doors at opposite ends provide rigidity for the structure. Opposed walls of the container are hinged to fold inwardly between the other walls, the doors folding back against the outside of the structure. In the erected position the doors have plug portions which fit closely into the ends of the box structure and maintain the alignment and rigidity of the walls. The hinges used in the structure are sealed on both sides to make the container weatherproof.

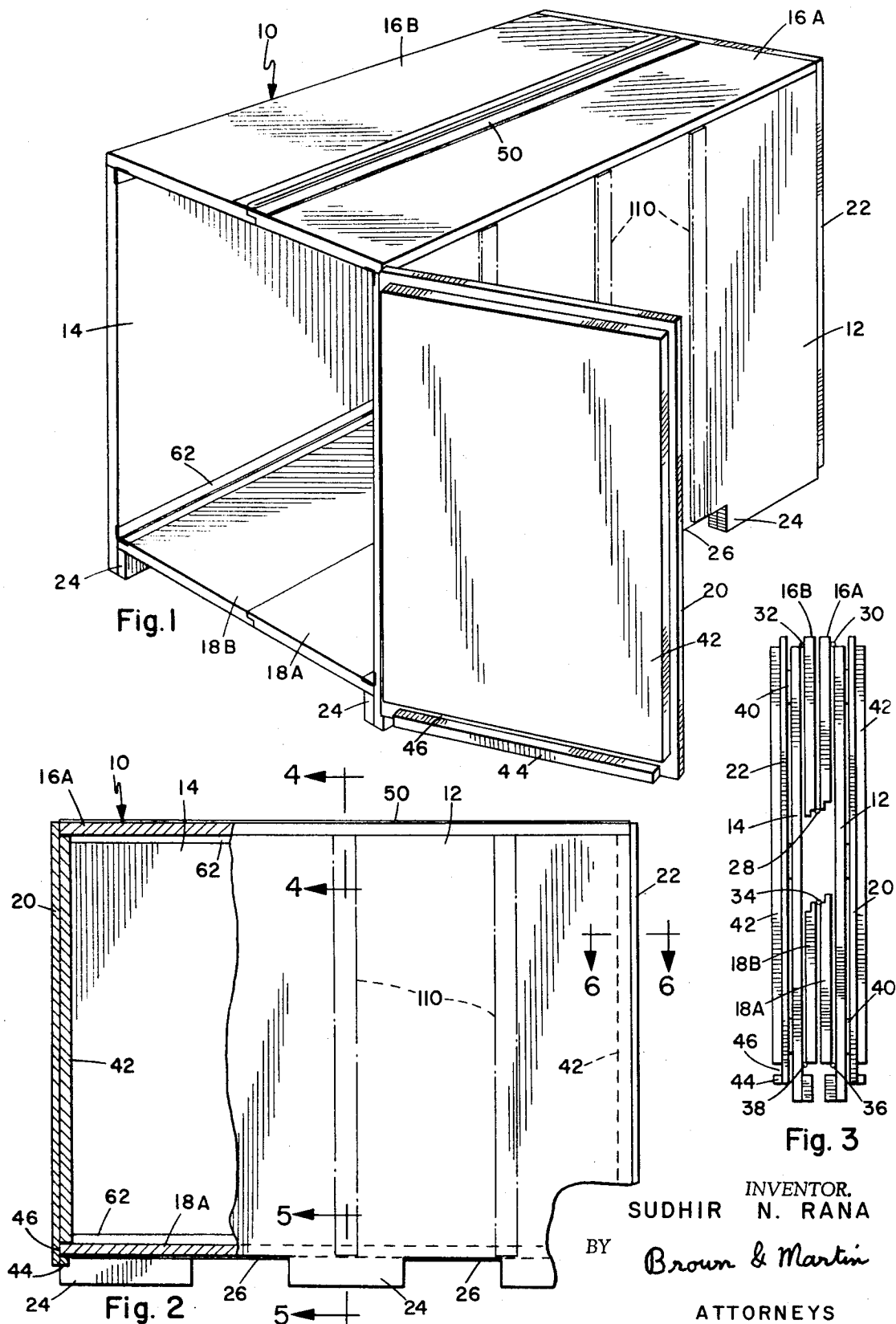
10 Claims, 9 Drawing Figures



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2 Sheets-Sheet 1



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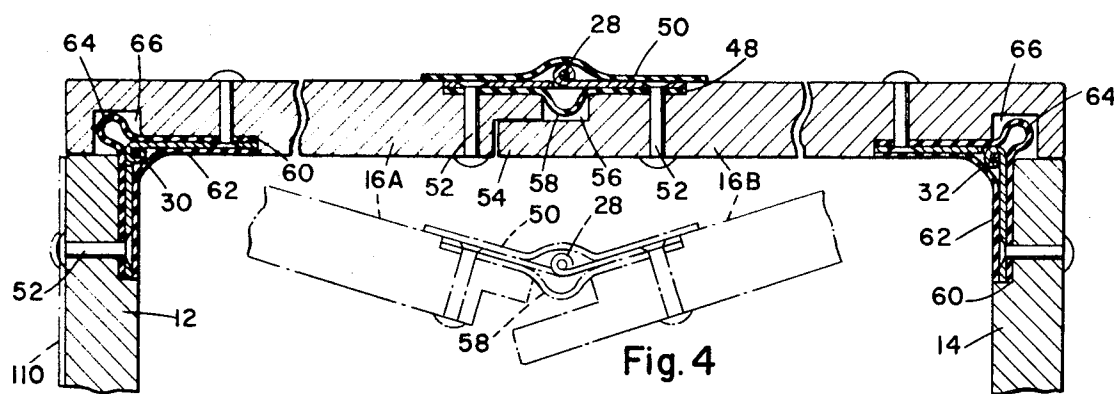


Fig. 4

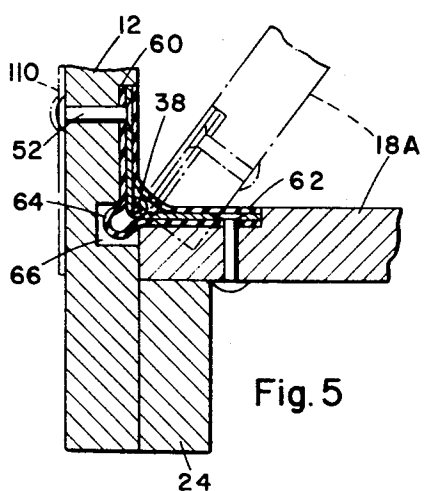


Fig. 5

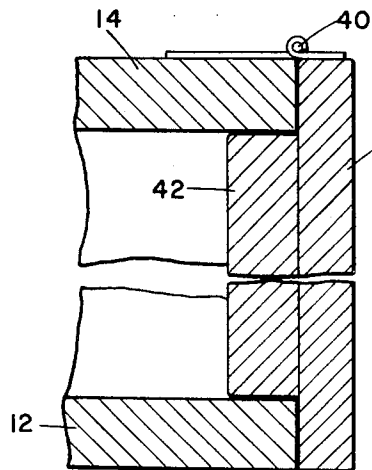


Fig. 6

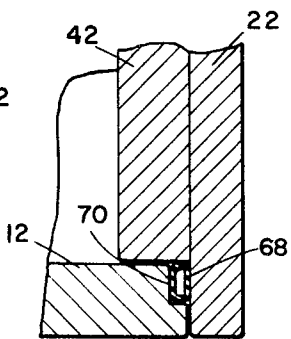


Fig. 7

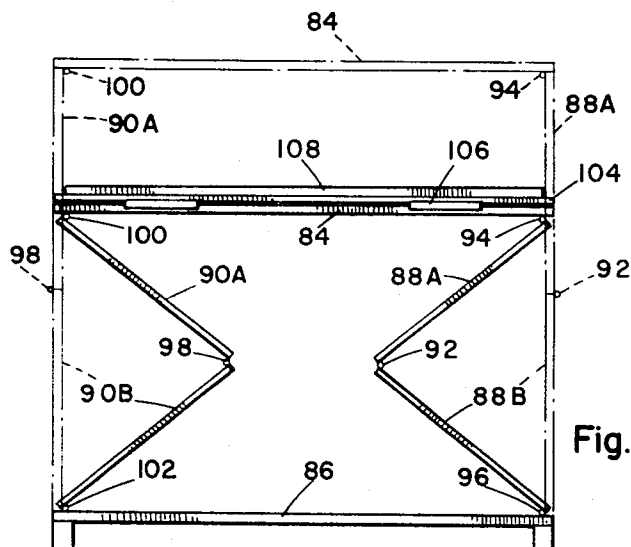


Fig. 9

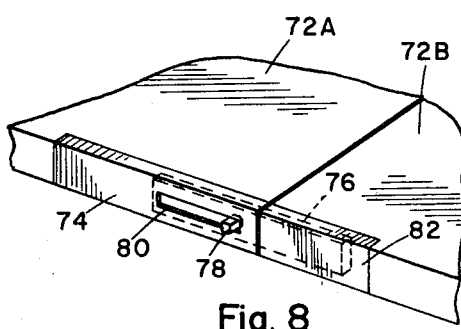


Fig. 8

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COLLAPSIBLE CONTAINER

BACKGROUND OF THE INVENTION

Shipping containers, especially large types, require a large amount of storage space when not in use. Many different structures have been devised to allow such containers to be collapsed or taken apart for storage. Most of the structures are heavy and use many fastening devices for holding the parts together, the procedure of dismantling or assembling a large container, being time consuming and usually requiring several people to handle the parts. In outdoor use, all joints must be sealed if the contents are to be protected, and the seals and fastening means often wear out rapidly due to repeated use.

SUMMARY OF THE INVENTION

The container described herein is an integral structure requiring no separate fastening or clamping means, or special seals, to make a rigid weatherproof enclosure. In its basic box form, two opposed sides or walls of the structure are hinged to fold double inwardly between the other sides or walls, the ends comprising doors which fold back against the outside of the collapsed structure. The doors have protruding plug portions which, in the erected position of the container, fit closely into the ends and support the walls in rigid alignment. Conventional locks or other fasteners may be used to hold the doors closed, no special supports, clamps, or the like being needed to maintain the structural integrity.

To make the container weatherproof, the hinges are sealed on both sides, the seals extending the full length of the hinged joints and making additional sealing means unnecessary. The container can be made in a wide range of sizes and configurations and, except for very large types, can be erected or collapsed by one person, without tools and in a minimum of time.

The primary object of this invention, therefore, is to provide a new and improved collapsible container.

It is another object of this invention to provide a new and improved collapsible container in which the doors are primary supporting elements, which hold the structure rigid.

It is another object of this invention to provide a new and improved collapsible container which can be erected and collapsed without tools or separate fastening means.

It is another object of this invention to provide a new and improved collapsible container in which the hinged joints have integral seals to make the joints weatherproof.

Other objects and many advantages of this invention will become more apparent upon a reading of the following detailed description and an examination of the drawings wherein like reference numerals designate like parts throughout and in which:

FIG. 1 is a perspective view of the basic container.

FIG. 2 is a side elevation view of the container, partially cut away.

FIG. 3 is an end view of the container in collapsed condition.

FIG. 4 is an enlarged sectional view taken on line 4—4 of FIG. 2.

FIG. 5 is an enlarged sectional view taken on line 5—5 of FIG. 2.

FIG. 6 is an enlarged sectional view taken on line 6—6 of FIG. 2.

FIG. 7 is similar to a portion of FIG. 6, but shows a seal at the door.

FIG. 8 is a perspective view of a folding joint, showing means for locking the joint in erect position before the doors are closed.

FIG. 9 is an end view of an alternative container, showing the folding action of the sides.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the basic form shown in FIGS. 1—3, the container 10 is a simple rectangular box with side walls 12 and 14, a top panel 16, bottom panel 18 and end doors 20 and 22. Side walls 12 extend below the bottom panel and have reinforced feet 24, with openings 26 between the feet to receive the prongs of a fork lift truck, or similar handling apparatus.

The top panel 16 is divided along its longitudinal center line into two panel portions 16A and 16B, which are joined by outside hinges 28 to fold downwardly. Panel 16A is joined to the top of side wall 12 by inside hinge 30, and panel 16B is joined to the top of side wall 14 by inside hinges 32, to swing downwardly inside the side walls. Bottom panel 18 is divided longitudinally into panel portions 18A and 18B, which are joined by outside hinges 34. Panel 18A is joined to the lower portion of side wall 12 by inside hinges 36 and panel 18B is joined to the lower portion of side wall 14 by inside hinges 38, so that the lower panel folds upwardly between the side walls. The hinges may be continuous piano hinges or suitably spaced individual hinges, depending on the size of the container and the expected loads.

Each of the doors 20 and 22 is attached to one side wall by hinges 40, to swing outwardly and back along the outside of the wall. The doors may be attached to opposite side walls, or to the same one if the length of the container is sufficient for both doors to fold flat against the one side. On the inner face of each door is a projecting plug 42, which fits closely into the end opening of the container box and provides a rigid structural connection between the side walls and top and bottom panels. It is this plug structure which gives the container its rigidity, without the need for special braces or fasteners. As shown, the plug 42 is a unitary panel member slightly smaller than the door, but could be a built up frame to minimize weight, particularly in large containers. Spaced below and parallel to the lower edge of plug 42 is a retaining bar 44, the channel 46 between the plug and retaining bar being a close fit for the end of bottom panel 18. Retaining bar 44 thus prevents the floor panel from sagging under load. Any suitable latches or locking means, not shown, may be used to hold the doors closed.

To make the container weatherproof for all purpose shipment of goods, the hinged joints are sealed as illustrated in FIGS. 4 and 5. Hinges 28 are covered by an inner membrane 48 and an outer membrane 50 of rubber, plastic, or the like. A suitable adhesive or sealant may be used to secure the inner membrane 48 to the hinges and to the panels 16A and 16B, the hinges being structurally secured by rivets 52 through the panels. Outer membrane 50 is adhered over the hinges 28 and extends beyond the hinges onto the panel surfaces. The membranes extend for the full length of the joint to

form a complete seal. Other fastening means may be used instead of the rivets shown, and may extend through the outer membrane if necessary. The junction of panels 16A and 16B is illustrated as a lap joint 54, and a recessed channel 56 is left below the center of hinges 28 to provide clearance for a slack loop portion 58 of inner membrane 48. The loop portion accommodates the motion of the hinge during folding, as indicated in the broken line position in FIG. 4. The sealing of hinges 34 is not shown in detail, but is similar in all respects to that of hinges 28.

Hinges 30 are sealed in a similar manner by an inner membrane 60 and an outer membrane 62, the inner membrane having a loop portion 64 which is contained in a channel 66 in panel 16A. The hinge structure is shown as being recessed in the panel members, but could be surface mounted if necessary. Hinges 32, 36 and 38 are similar in all respects to hinges 30, and the corresponding parts are similarly numbered in FIGS. 4 and 5.

The door hinges 40 may be sealed in a similar manner, or the entire periphery of the door may be sealed by a compressible seal 68, seating in a channel 70, as in FIG. 7.

To assist in erecting the container and to provide support for the foldable panels while loading and unloading with one or both doors open, simple locking means may be used as shown in FIG. 8. The structure is applicable to the top or bottom foldable panels, represented by typical panels 72A and 72B. A channel member 74 is inset in the edge of panel 72A and contains a sliding bolt 76, which is actuated by a pin 78 projecting through a slot 80. To lock the panels in planar alignment, the bolt 76 is extended into a channel member 82 inset in panel 72B. This arrangement will add support to the bottom panel and will prevent the top panel from sagging when the door is being closed.

As an alternative to the top and bottom folding, the container may be made with folding sides, as in FIG. 9, which may be more desirable for some purposes. In this structure, the top panel 84 and bottom panel 86 are rigid and side walls 88 and 90 are foldable. Side wall 88 is composed of two panel elements 88A and 88B joined by a hinge 92, panel element 88A being connected to top panel 84 by a hinge 94, and panel element 88B being connected to bottom panel 86 by a hinge 96. Side wall 90 is similarly composed of panel elements 90A and 90B joined by a hinge 98, the panel element 90A being connected to top panel 84 by a hinge 100, and panel element 90B being connected to bottom panel 86 by a hinge 102. In the erected position indicated in broken line, the locking means shown in FIG. 8 may be used to stabilize the side walls. The side walls fold inwardly, as in the full line position, so that the container collapses downwardly. In this form the doors 104 are attached to top panel 84 by hinges 106 to fold upwardly and back on the top of the collapsed structure. Each door has a plug 108 to fit into and support the erected structure, as in container 10.

In any form of the container, reinforcing may be applied as needed, such as metal straps 110 indicated in broken line in FIGS. 1, 2, 4, and 5. The straps may be inside or outside the container and, for maximum strength, are tied to the hinges by the rivets 52 or other fasteners.

It should be understood that the term container is used in its broadest sense and is not intended to be lim-

ited to storage and protection of goods in shipment. Other uses could include a portable shelter for people or pets, a shed or a garage. In some instances, particularly in the latter, the top panel could be inclined for water runoff, the hinged joints of the folding panels being suitably offset to fold correctly. With the fully sealed hinges, and proper sealing around the doors the container is capable of maintaining a reasonable interior to exterior pressure differential when necessary. The materials used in the construction will depend on the size and intended use.

Having described my invention, I now claim.

1. A collapsible container, comprising:

a box-like structure having opposed walls hinged to fold inwardly between the other walls;

doors hinged to the ends of said structure, said doors each having a plug fitting closely into the respective end of the structure and providing a rigid support between the walls,

said opposed walls each comprises a pair of panel elements with a connecting hinge therebetween, the outer edges of said panel elements having hinged connections to said other walls parallel to said connecting hinge,

all of said hinges have weatherproof sealing means therein,

said sealing means includes an inner membrane and an outer membrane enclosing each hinge for the full length of the hinged connection,

and each of said inner membranes has a loop portion extending the full length of the hinged connection, the adjacent structure having a channel to contain said loop portion.

2. A collapsible container according to claim 1, wherein said doors are hinged to said other walls to swing back against the outside thereof.

3. A collapsible container according to claim 1, wherein said box-like structure has side walls, a top wall panel and a bottom wall panel;

said side walls having feet extending below said bottom wall panel, with openings between the feet.

4. A collapsible container according to claim 1, wherein said box-like structure has side walls, a top wall panel and a bottom wall panel;

said top and bottom walls panels being hinged to fold downwardly and upwardly, respectively, between the side walls.

5. A collapsible container according to claim 4, wherein said side walls are rigid, and said doors are hinged to the side walls.

6. A collapsible container according to claim 5, wherein each of said doors has a retaining bar spaced below said plug and defining a channel therebetween to receive and support the end of said bottom panel.

7. A collapsible container according to claim 1, wherein said box-like structure has side walls, a top wall panel and a bottom wall panel;

said top and bottom wall panels being rigid and said side walls being hinged to fold inwardly therebetween.

8. A collapsible container according to claim 7, wherein said doors are hinged to said top wall panel to swing upwardly and back against the top wall panel.

9. A collapsible container according to claim 1, and including locking means on the ends of said panel elements at the hinged connection thereof for holding the panel elements in planar alignment.

10. A collapsible container according to claim 1, and including sealing means around the periphery of each of said doors.

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