

Jan. 31, 1961

M. MORTEROL
COLLAPSIBLE CONTAINER

2,969,889

Filed Jan. 28, 1958

2 Sheets-Sheet 1

Fig. 1.

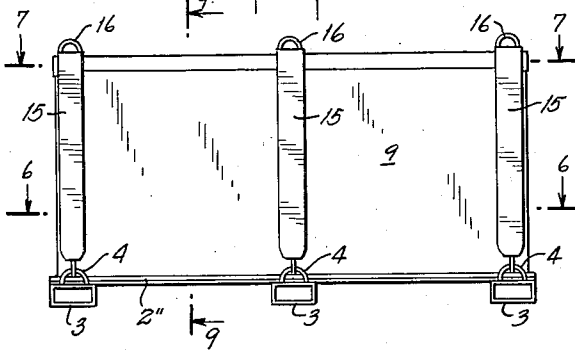


Fig. 2.

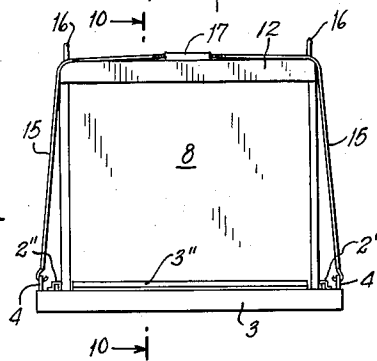


Fig. 3.

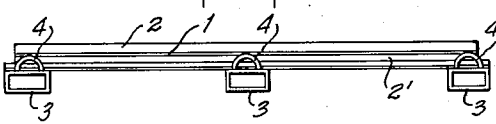


Fig. 4.

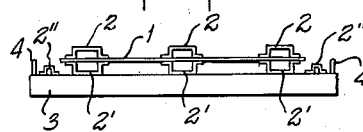


Fig. 5.

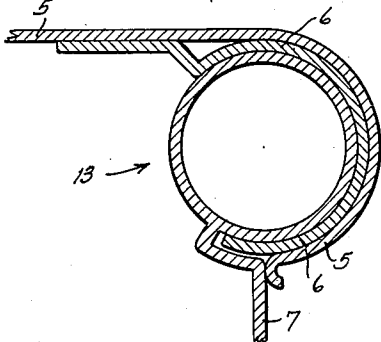


Fig. 6.

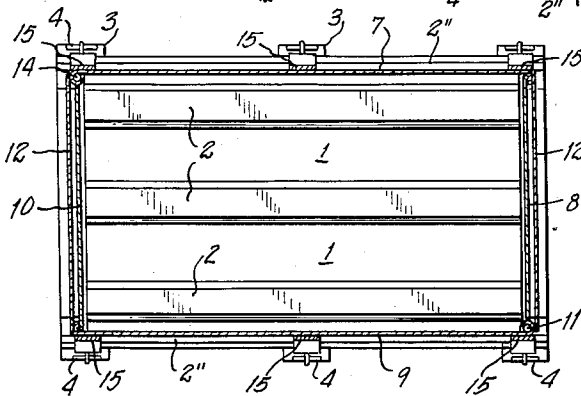
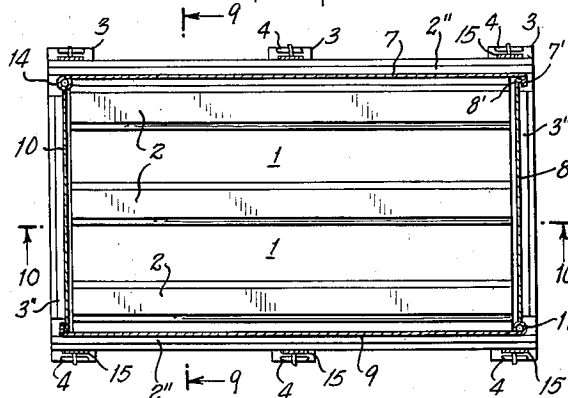


Fig. 7.

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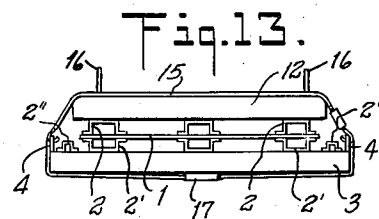
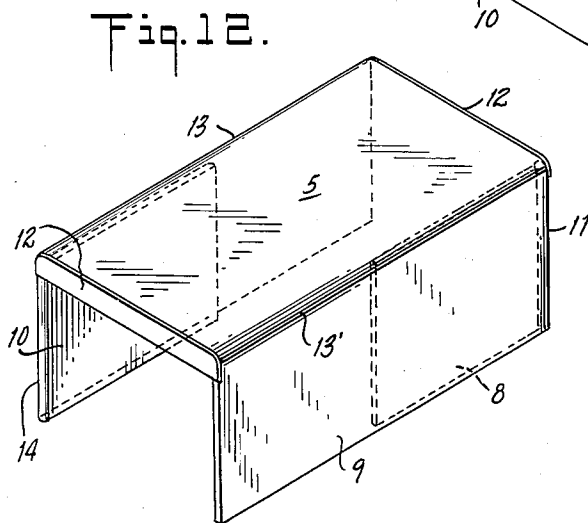
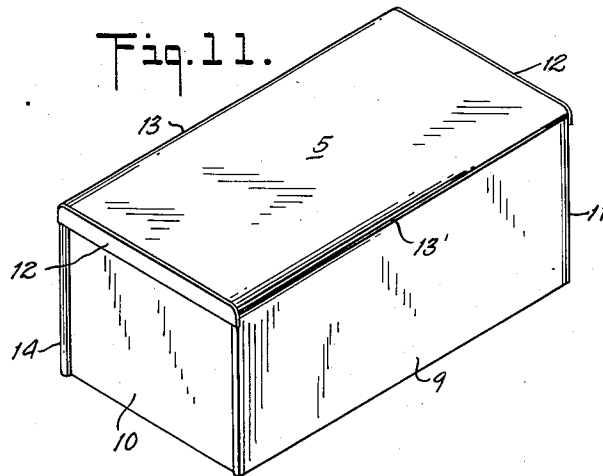
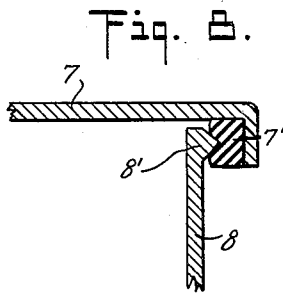
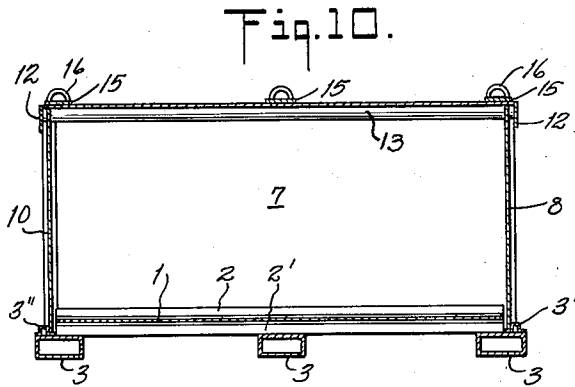
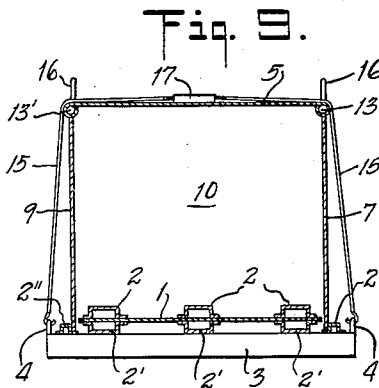
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COLLAPSIBLE CONTAINER

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15 Claims. (Cl. 220—6)

The present invention relates to an improved container for transporting solid, liquid or powdered materials.

The invention has for its object an improved container or case suitable for all merchandise, packaged, in casks or loose, this case being capable of being collapsed for return to the shipper or to storage after having been used.

The foldable packages of known type have a number of disadvantages. They are not absolutely tight. If they are sufficiently solid, their design makes it necessary for the manufacturer to use cutting tools which do not permit adaptation to variations of the dimensions required by different uses. They are often difficult to empty. The present invention avoids these and other disadvantages.

The container of the invention has the form of a parallelepiped, particularly a rectangular prism. It is capable of being easily collapsed. The elements when collapsed form a single package of which the volume may be at a maximum only 10 to 15% of the volume of the container when it is assembled for use. The joints between the panels which provide for folding them together are of such design that water cannot enter.

The invention now will be described in an illustrative embodiment which is intended to be without limitation of the scope thereof.

Fig. 1 shows a longitudinal elevation of the case of the invention.

Fig. 2 shows an end elevation.

Fig. 3 is a longitudinal elevation of the panel forming the base or platform of the case.

Fig. 4 is an end view of this platform.

Fig. 5 is a transverse section of the hinge joint.

Fig. 6 is a horizontal section of the case on line 6—6, Fig. 1.

Fig. 7 is a horizontal section of the case on line 7—7, Fig. 1.

Fig. 8 is a detail section showing the arrangement which insures tightness between two vertical panels.

Fig. 9 is a vertical section on line 9—9, Figs. 1 and 6.

Fig. 10 is a vertical section on line 10—10, Figs. 2 and 6.

Fig. 11 is a schematic view in perspective showing the assembly of panels before being folded together.

Fig. 12 shows the assembly as it is being folded together.

Fig. 13 is a view of the folded case, the different elements being brought together in a single package.

Referring to Figs. 1, 2, 3 and 4, a case is shown according to the invention which comprises essentially two parts, namely—

A base or platform supporting the load and resting either on the ground or on the floor of the means of transport utilized, this base having great rigidity by virtue of the sections 2 and 2' of omega profile welded on the sheet or plate 1, with the sections 3 of U-profile disposed transversely of sections 2, 2' and serving to raise the base slightly above the ground to provide for manipu-

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lating therebeneath a truck with a forked elevator platform.

A cover constituted by five panels 5, 7, 8, 9 and 10 connected together by four identical hinges, the horizontal hinges 13 and 13' articulating panels 7 and 9 with reference to panel 5 and the vertical hinges 11 and 14 articulating panel 8 with reference to panel 9 and panel 10 with reference to panel 7, as shown in Figs. 6 and 9.

Fig. 5 is a section of the hinge transversely of the axis thereof and shows that the hinge is constituted by a part 6 of cylindrical form maintaining in place a concentric tube connected to panel 7. The panel 5 is spot welded to part 6. This panel extends about the part 6 and about the hinge axis and is terminated by an edge slightly reverted and forming a drip edge for water which may run toward the edges of the case.

The assembly comprises an articulation of parts permitting a rotation of 90° to 100° and providing for movement of panel 7 from a position perpendicular to panel 5 to a position parallel to panel 5 and vice versa. The hinge construction is simple, strong and is tight against rain or against a stream from a hose.

Fig. 6 shows how the panels 7, 8, 9 and 10 are articulated together. In the position of the panels shown the edge portion 8' of the panel 8 carries a bead which presses upon a pad 7' of resilient material disposed along the reverted edge portion of the panel 7 so as to provide a tight joint between the two panels, as shown in Fig. 8. A tight joint is similarly provided between the panels 9 and 10.

Fig. 9 shows how the panels 7 and 9 are fitted between the edges of the plate 1 and the elements 2' of omega profile in section.

Fig. 10 shows how the panels 8 and 10 are fitted between the edges of plate 1 and the elements 3' at the ends of the platform.

In Fig. 7 the plates 12 are shown protecting the interior of the case against water which might be projected against the case and which might enter therein, this protection being secured by the plates 12 affording continuity between the panels 5 and 8 and the panels 5 and 10. To this end, for example, the plates 12 may be welded at their upper edges to the respective end edges of the top panel 5 and may be welded also to the respective ends of the horizontal hinges 13, 13'.

The cover is joined firmly to the platform by straps 15 secured as a sling to elements 3 by loops 4, Fig. 1. The tension is adjusted by the coupling 17, for example, a turnbuckle.

These straps 15 are provided with rings 16, Fig. 1, permitting raising the case by applying, and this is essential, the raising force directly to the platform.

Folding of the container is accomplished as follows:

The cover is raised after having released the sling from the loops 4. The panel 8 is then turned toward panel 9 by rotation on the hinge 11, Figs. 6 and 12. The panel 10 then is turned toward panel 7 by rotation on the hinge 14, Figs. 6 and 12. The assembly of panels 8 and 9 then is turned toward panel 5 by rotation on the hinge 13', Figs. 9, 12 and 13. The assembly of panels 7 and 10 then is turned toward panel 5 by rotation on the hinge 13, Figs. 9, 12 and 13.

The thus folded assembly then is placed on the base or platform and is connected to it by the straps 15 secured to the loops 4. The assembly folded to a single package may be raised by means of the rings 16.

The hinges 11, 13, 13' and 14, as will be understood from a consideration of Fig. 5 and having regard to the diameter of section of hollow form of these hinges with respect to their length, have a great resistance to bending in their lengths. The hinges 13, 13', therefore, serve

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to give the opposite sides of the top great rigidity and resistance to load or shock applied at the top of the case. Acting as struts they also have great resistance to end thrust and so reinforce the case against forces applied at the ends of the case. The hinges 11 and 14 of similar form also resist bending at the respective ends of the case and act as columns for support of the top as well as to resist forces applied to the top panel particularly adjacent their respective corners. Have regard to the reinforcement of the top panel 5 by the plates 12 along the end edges thereof and the reinforcement of the panels 7 and 9 at their ends removed from their hinges 14 and 11 by virtue of the reverted portions of panels 7 and 9, the corner portions of the case are strong and greatly resistant to forces of different kinds and directions which may become applied thereto. The load material, therefore, is well protected against damage by extraneous forces. This is accomplished, moreover, while insuring a tight case.

It will be understood that the embodiment described and shown in the drawing may be modified in different ways or by substituting equivalents for the several parts without changing the general concept and scope of the invention.

I claim:

1. A moisture-proof collapsible container comprising a rigid unitary platform having a raised supporting surface on which is mounted the load material to be contained, a unitary load enclosing cover seated on said platform and including a top panel and vertically disposed end and longitudinal panels, the lower edges of said end and longitudinal panels resting on edge portions of said platform located below said supporting surface, means on said platform for guiding said end and longitudinal panels into proper seating relation on such edge portions in position to enclose and shield said supporting surface, horizontally disposed hinge means connecting the upper edges of said longitudinal panels to opposite side edges of said top panel and including means protecting the lines of juncture of said panels against the passage of moisture therethrough while permitting pivotal movement of said longitudinal panels relative to said top panel, means on the opposite end edges of said top panel shielding the lines of juncture of such edges with the top edges of said end panels against passage of moisture therethrough, vertically disposed hinge means located at diagonally opposite corners of said cover and each hingedly connecting one side edge of an end panel to one side edge of a longitudinal panel, said vertically disposed hinge means each including means protecting the hinged joint defined thereby against the passage of moisture therethrough while permitting movement of the panels joined thereby, means provided on the other free side edges of one pair of said end and longitudinal panels associated with one vertical hinge means coacting with means provided on the other free side edges of the other pair of said longitudinal and end panels, respectively, associated with the other vertical hinge means to shield the lines of juncture formed thereby against passage of moisture therethrough, said horizontal and vertically disposed hinged means each being of substantial effective cross-section transversely of the axis of the hinge and continuously throughout its length to be resistant to substantial bending forces and end to end thrust along its axis, and means connected at its ends to opposite sides of said platform and extending over said cover and holding said cover in said load covering position with respect to said platform.

2. A collapsible container as defined in claim 1 in which the coacting means provided on the adjoining other free side edges of the end panel of one pair and the longitudinal panel of the other pair comprises an elongated pad of resilient material disposed along the reverted edge portion of one of such side edges and an elongated bead provided along the edge portion of the other of such

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side edges and pressing upon said elongated pad to form a tight joint.

3. A collapsible container as defined in claim 1 in which said means for holding said cover to said platform comprises a strap element extending from a point adjacent said platform at one side of and exterior to said cover up and over and bearing on the top portion of said cover and down to a point exterior to said cover and adjacent said platform at the opposite side of said cover, and means adjacent each of said points for connecting said strap to said platform to hold said cover thereto.

4. A collapsible container as defined in claim 3 in which said means connecting said strap to said platform at said two points comprises loops secured to said platform respectively at said points, and means secured to said strap at the respective adjacent ends thereof for engaging said loops to receive the stress of said strap when tension is developed therein.

5. A collapsible container as defined in claim 3 in which said strap element comprises means operable to adjust the tension in said strap.

6. A collapsible container as defined in claim 1 in which said platform comprises a plate extending horizontally generally over the surface extent of said platform and forming said supporting surface, and elongated reinforcing elements having a cross-section of omega profile and extending along a face of said plate with the flanges of the omegas secured to said plate.

7. A collapsible container as defined in claim 6 which comprises additional elongated reinforcing elements having a cross-section of omega profile and extending along the opposite face of said plate with the flanges of the omegas secured to said plate, said additional elements respectively being disposed with their lengths in registering relation to said first reinforcing elements.

8. A collapsible container as defined in claim 7 in which said platform is provided with elongated bearing elements disposed beneath said additional reinforcing elements and secured thereto in transversely spaced relation and extending along the surface extent of said platform to hold said plate and said reinforcing elements spaced substantially above the ground.

9. A moisture-proof collapsible container comprising a rigid unitary platform having a raised supporting surface on which is mounted the load material to be contained, a unitary load enclosing cover seated on said platform and including a top panel and vertically disposed end and longitudinal panels, the lower edges of said end and longitudinal panels resting on edge portions of said platform located below said supporting surface, means on said platform for guiding said end and longitudinal panels into proper seating relation on such edge portions in position to enclose and shield said supporting surface, horizontally disposed hinge means connecting the upper edges of said longitudinal panels to opposite side edges of said top panel and including means protecting the lines of juncture of said panels against the passage of moisture therethrough while permitting pivotal movement of said longitudinal panels relative to said top panel, means on the opposite end edges of said top panel shielding the lines of juncture of such edges with the top edges of said end panels against passage of moisture therethrough, vertically disposed hinge means located at diagonally opposite corners of said cover and each hingedly connecting one side edge of an end panel to one side edge of a longitudinal panel, said vertically disposed hinge means each including means protecting the hinged joint defined thereby against the passage of moisture therethrough while permitting pivotal movement of the panels joined thereby, means provided on the other free side edges of one pair of said end and longitudinal panels associated with one vertical hinge means coacting with means provided on the other free side edges of the other pair of said longitudinal and end panels, respectively, associated with the other vertical hinge means to

shield the lines of juncture formed thereby against passage of moisture therethrough, said horizontal and vertically disposed hinged means each being of substantial effective cross-section transversely of the axis of the hinge and continuously throughout its length to be resistant to substantial bending forces and end to end thrust along its axis.

10. A collapsible container structure as defined in claim 9 in which the moisture shielding means on the opposite edges of said top panel comprises protecting plates extending respectively along and lapping upon the upper edge portion of said end panels of said structure outwardly thereof, said protecting plates being secured to said top panel in water tight relation thereto.

11. A collapsible container structure as defined in claim 10 in which said protecting plates also cover and are secured to the adjacent ends of said hinge elements of said top and opposite panels.

12. A hinge construction for supporting two panels when attached thereto for angular movement thereof with respect to each other upon the axis of the hinge from a fully opened position of said panels to a position in which said panels lie in adjacent generally parallel relation to each other with the inner surfaces of said panels in opposed relation, said hinge construction comprising an elongated tubular element disposed with the axis of the tube adjacent and parallel to the plane of a given one of said panels, an elongated strip rigidly connecting said tubular element to said given panel, said strip extending inwardly from said given panel and being connected along its outer longitudinal edge to the adjacent edge of said given panel and along its inner longitudinal edge to said tubular element along a line of juncture located inwardly in offset relation to such plane of the given panel, and said strip being configured transversely to form a longitudinal recess extending from the outer surface of said given panel inwardly between said given panel and said tubular element so as to be disposed wholly inwardly of said given panel and an inner arcuate cylindrical member of less than full circumferential extent disposed coaxially with and embracing said tubular element to hold said tubular element and said member in hinging relation to each other, said cylindrical member being connected to the hinged edge portion of said other panel and extending outwardly from the plane of said other panel and around said tubular element, the outer longitudinal edge of said cylindrical member extending into said longitudinal recess in the fully opened position of said panels, the hinged edge portion of said other panel having an arcuately-shaped part disposed coaxially with and closely embracing said cylindrical member whereby said cylindrical member and said arcuate part form a composite multilayer hinge element coacting with said tubular element, the circumferential extent of said arcuate part being less than that of said cylindrical member and such that the outer longitudinal edge of such part engages the outer surface of said given panel to close said longitudinal recess in the fully opened positions of said panels.

13. A hinge construction as defined in claim 12 in which said edge portion of said other panel is provided at its outer longitudinal edge with an outwardly reverted por-

tion engageable with the outer surface of said given panel so as to provide a drip edge extending along and protecting the open end of said recess in the fully opened position of said panels.

14. A collapsible container as defined in claim 1 in collapsed condition, said respective vertical panels that are adjacent each other in hinged relation to each other at said opposite corners being folded upon each other, said panels thus folded being folded beneath said top panel, the assembly of said folded panels being disposed in flat relation upon said platform, said means for holding said cover to said platform securing said collapsed cover to said platform to provide a unitary assemblage of said parts as a compact package.

15. A hinge construction for pivotally connecting two panels to enable the pivotal movement of a panel from opened position to a position in which such panels lie adjacent to each other with the inner surfaces thereof in opposed relation, said hinge construction comprising elongated tubular means extending along the hinged edge of one of said panels, connecting means between said tubular means and the hinged edge of said one panel and connected to said hinged edge and to said tubular means along a line of juncture offset inwardly from the plane of said one panel, said connecting means being configured transversely to form a longitudinally extending recess extending from the outer surface of said one panel inwardly between said one panel and said tubular element, and arcuate means of less than full circumferential extent on the hinged edge of the other of said panels and extending outwardly and around said tubular means so as to be disposed coaxially with and embrace said tubular means to connect said other panel in hinging relation to said one panel, said arcuate means having an advanced longitudinally extending portion extending into said longitudinal recess in the fully opened position of said panels and having a longitudinally extending portion located in back of said advanced portion thereof and engageable with the outer surface of said one panel to close the longitudinal opening of said recess when said advanced portion is fully inserted into said recess.

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