United States Patent

Winsor

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[54] COLLAPSIBLE CONTAINER

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[52] **U.S. Cl.** **220/6**

[51] **Int. Cl.** **B65d 7/26**

[58] **Field of Search** 220/7, 6, 84, 1.5, 19; 217/15, 217/47

[56] **References Cited**

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Primary Examiner—Raphael H. Schwartz
Attorney—Alan Swabey

[57] **ABSTRACT**

A collapsible container having a bottom platform with end walls and at least one side frame pivotably connected thereto, a sidewall pivotably connected to the top edge of the side frame, and a top wall pivotably connected to the top of the container, the various walls of the container being pivotable about an end edge thereof so that said walls may be moved from a collapsed position to an erected position or vice versa, and locking means to ensure that all of the walls are locked in position when the container is closed in erected position.

16 Claims, 13 Drawing Figures

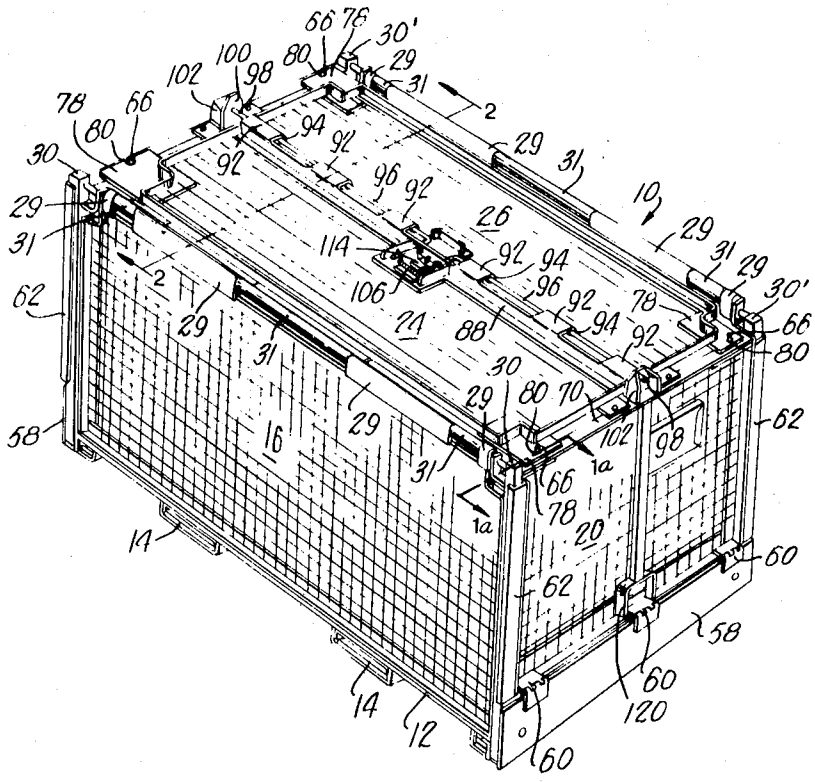


FIG. 1

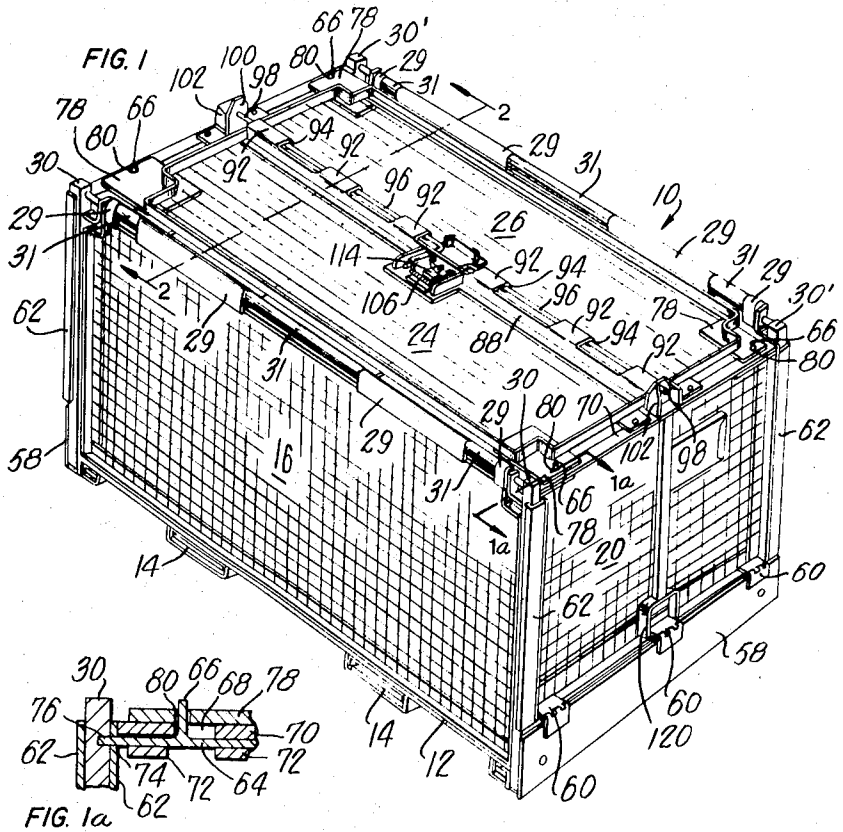


FIG. 1a

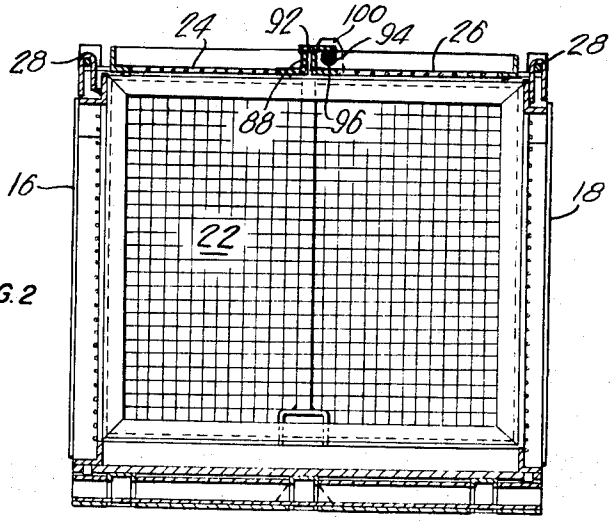


FIG. 2

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FIG. 4

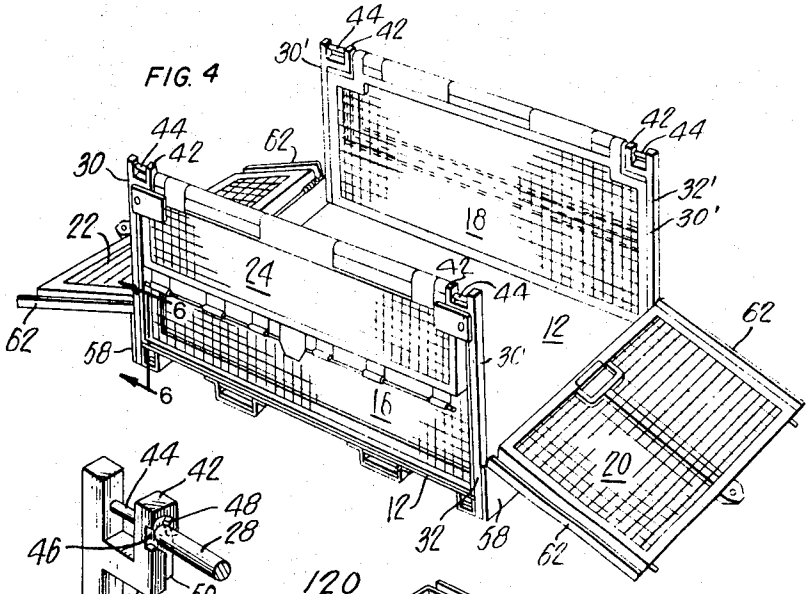
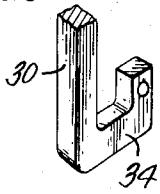


FIG. 3



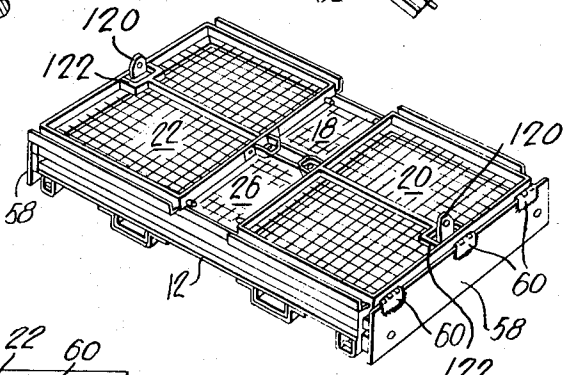


FIG. 5

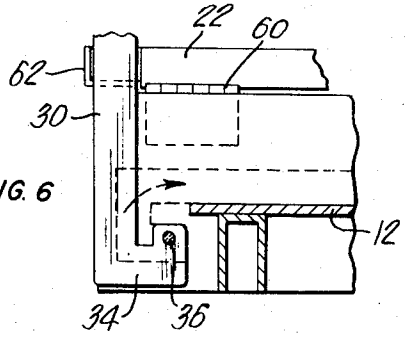


FIG. 6

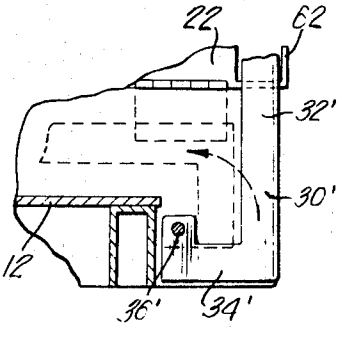


FIG. 7

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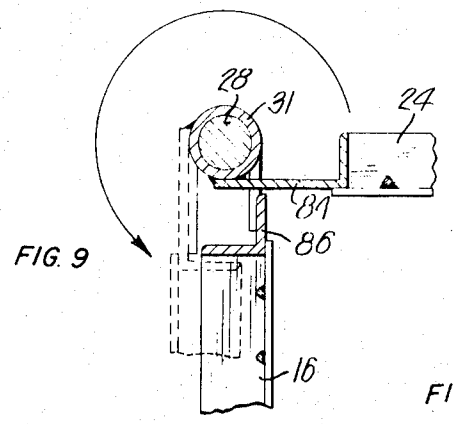


FIG. 9

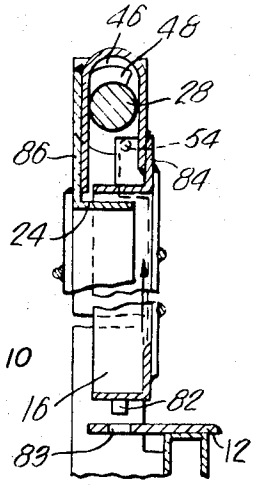


FIG. 10

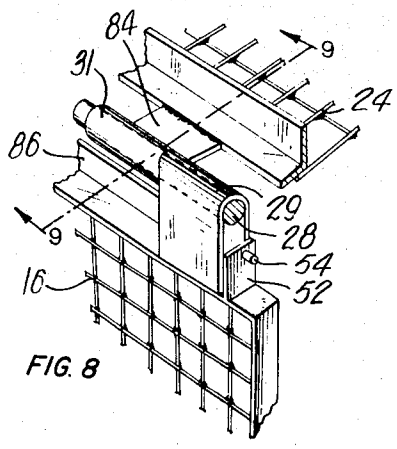


FIG. 8

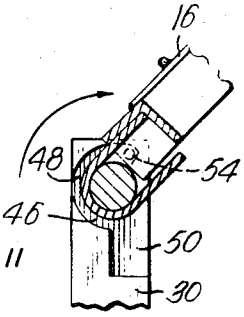


FIG. 11

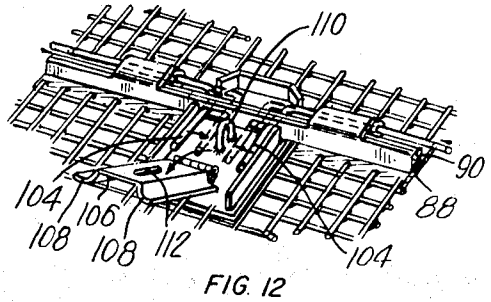


FIG. 12

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COLLAPSIBLE CONTAINER

BACKGROUND OF INVENTION

1. Field of Invention

The present invention relates to a collapsible container. More specifically, the present invention relates to a collapsible nondismantlable container to a collapsible both top or side loading.

2. Description of Prior Art

As is well known, containerization in sea and land transportation is gaining more and more acceptance. Normally, such containers are simply boxes which can be handled by specially designed equipment and transferred from a flatcar to a truck or to a ship or vice versa without requiring unloading of its contents. However, none of these six-sided containers are easily collapsible while still remaining in one piece. Furthermore, none of the present one-piece containers permit a selection of either top or side loading.

As is well known, it is sometimes desirable to load a container either from the top or the side. It is also important in some instances for the container to be collapsible for storage or during return shipment. It is also very important that when the container is collapsed or erected, there be no loose pieces that may be left behind and thereby lost or displaced.

Prior to the present invention, no one had been able to provide a device having the above characteristics.

SUMMARY OF INVENTION

It is thus the main object of the present invention to provide a collapsible side or top loading container.

Broadly, the present invention relates to a container having a bottom wall, a pair of side frames pivotably mounted relative to said bottom wall and having a supporting bar at the end thereof remote from said bottom wall, a sidewall and a top wall, means pivotably connecting said sidewall to said bar and means pivoting said top wall to said bar, end walls pivotably relative to said bottom wall, a second end wall pivotably relative to said bottom wall, and means for locking said walls in position when said container is erected.

BRIEF DESCRIPTION OF DRAWINGS

Further features, objects and advantages will be evident from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of the container;

FIG. 1A is a section along the line 1A—1A of FIG. 1;

FIG. 2 is a section along the line 2—2 of FIG. 1;

FIG. 3 is an isometric view of a side frame forming part of the present invention;

FIG. 4 is a perspective view of the container partly erected;

FIG. 5 is an isometric view of the collapsed container;

FIG. 6 is a section along the line 6—6 of FIG. 4;

FIG. 7 is a view similar to FIG. 6 but showing the opposite side of the container;

FIG. 8 is a partial isometric view showing the pivotable mounting of the top and sidewalls to the top bar of the frame together with the camming pin;

FIG. 9 is a section along the line 9—9 of FIG. 8;

FIG. 10 is a view similar to FIG. 9 but showing the top wall in open position and the sidewall in the disengaged position;

FIG. 11 is a section (with parts omitted) showing the pivotal movement of the sidewall relative to the post of the side frame; and

FIG. 12 is an isometric view of the hasp and locking mechanism for the container.

DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIGS. 1 and 2, the container 10 has a bottom wall or platform 12 provided with suitable means for two-way forklift truck handling such as indicated at 14, a pair of sidewalls 16, 18, a pair of end walls 20 and 22, and a pair of top walls 24 and 26. These walls are interconnected to the bottom platform by suitable pivotal connecting means to permit top or side loading as well as knocking down to collapsed position. Locking means are also provided to ensure proper erection and locking of the container in erected closed position, as will be described in more detail hereinbelow.

The sidewalls 16 and 18 and top walls 24 and 26 are each pivotably connected on a rod 28 (see FIGS. 2 and 3) by means of hinges 29 and 31 respectively. The hinge 29 permits sliding motion as well as pivoting motion of the walls 16 or 18 relative to the rod 28. The rod 28 extends between a pair of cornerposts 30 and forms with these two cornerposts a side frame designated at 32 (see FIG. 3). In the illustrated arrangement, there is a side frame 32 on each side of the container and these side frames are substantially identical with several minor exceptions as will be described hereinbelow and for this reason only one side frame has been described in detail. Corresponding parts of the other side frame have been indicated by the same number followed by a prime (′). The posts 30 have a projecting leg 34 at their lower end (see FIGS. 3, 6 and 7) which terminates in an upward projection 36 through which a pivot pin 38 pivotably connects each post 30 of the frame 32 to the platform 12. A comparison of FIGS. 3, 6 and 7 illustrates that the leg 34 is shorter than the leg 34′. This difference in length permits the frame 32′ and side and top walls 18 and 26 to be folded over and still lay parallel to the side frame 32 and side and top walls 16 and 24 when the container is collapsed.

Each of the corner posts 30 or 30′ has a fork at its upper end formed by an arm 40 projecting inward from the post 30 (30′) in the same plane as the post and having a section 42 substantially parallel to the post 30 (30′). A rod 44 interconnects the sections 42 with the posts 30 (30′) and forms a connection point for hoisting of the containers. Similar connection points may be provided on the bottom wall for housing the collapsed container.

A cam track 46 is cut into the inner surface of each of the arm sections 42 surrounding the rod 28. These cam tracks 46 have a substantially circular section 48 at least partially surrounding the rod 28 and opening into a vertical section 50 below the rod 28 (see FIGS. 3, 10 and 11).

Adjacent each end hinge 29 on the walls 16 and 18 are plates 52 each of which has a laterally projecting pin 54. These pins 54 are received within and guided by the cam track 46 to control the movement of the sidewalls 16 and 18 as will be described hereinbelow.

At each end of the bottom platform 12 is an upright projection 58 on which the end walls 20 and 22 are pivotably mounted by suitable hinges such as those indicated at 60. The height of the uprights 58 permits the walls 16, 18, 20, 22, 24 and 26 to be folded over with each wall laying substantially parallel to the platform 12.

Having now described the pivotable interconnections between the bottom platform and frames 32, 32′ and end walls 20 and 22 and between the sidewalls 16 and 18 and top walls 24 and 26 and the frames 32, 32′, the locking connections ensuring that the container is locked when in erected position will now be described.

The end walls 20 and 22 each have side rails 62 at opposite side edges thereof. These side rails 62 are open channels opening toward the container and are adapted to receive the posts 30 or 30′ of the frames 32, 32′ when the frames 32, 32′ and the walls 20 and 22 are in erected position substantially perpendicular to the bottom platform 12 (see FIGS. 1 and 4). In the top rails 70 at opposite sides of each of the end walls 20 and 22 is a locking bolt 64 (see FIGS. 1 and 1A) each having a manipulating handle 66 projecting through a slot 68 in the top rail 70 of the walls 20 and 22. Each bar 64 is slidably held on the rail 70 by bottom retainers 72 and is adapted to be slid through a hole 74 in a leg of the channel 62 and into a hole 76 in each of the posts 30 and 30′.

Each of the handles 66 is in the form of a round rod projecting substantially parallel to the plane of the wall 20 or 22 i.e., vertical. The top walls 24 and 26 are each provided with a pair

of plates 78 each having a hole 30 adapted to receive one of the handles 66 when the tops 24 and 26 are closed. The size of the holes 80 are just sufficiently large to receive the handles 66 and they are located to align with the handles 66 when the bolts are locked. Thus, the bolts 64 must be in locking position before the handles 66 will align with the holes 80 to permit closing of the top walls 24 or 26.

Each of the sidewalls 16 and 18 is provided along its bottom edge with a plurality of downwardly projecting pins 82 (see FIG. 10) which pins are adapted to cooperate with holes 83 formed in the platform 12. When the pins 82 are within the holes 83, the walls 16 and/or 18 are locked in position for reasons that will become more apparent as the description proceeds.

A further locking mechanism, preventing the pins 82 from being lifted from the holes 83 when the container is closed, is provided by the cam track 46, the section 50 of which requires that the walls 16 or 18 be lifted vertically and by cooperation of bars 84 connecting the hinges 31 with top walls 24 or 26 and flanges 86 on sidewalls 16 or 18 (see FIGS. 8 or 9). Only when the top walls 24 or 26 is not locked, can the sidewalls 16 or 18 be lifted vertically to permit opening since, otherwise, the flanges 86 engage with the bars 84 and prevent lifting of the walls 16 and 18 to clear the pins 82 from the holes 83. There is, however, sufficient give in the system to permit the sidewalls 16 and 18 to be swung and by its momentum displace the bars 84 sufficiently to permit the walls 16 and 18 to fall into position with the pins 82 received in the holes 83 in final closing of the container.

Referring now to FIGS. 1 and 12, the locking mechanism for the top walls 24 and 26 and thus for the container will be described. As in evident, the walls 2 and 26 terminate in flanges 88 and 90 respectively (see FIG. 12). The flange 88 has a plurality of spaced projecting lugs 92 which overlap the flange 90 and wall 26 and terminate in a locking rod receiving bearings 94 which slidably receive a pair of locking rods 96. The free ends 98 of the rods 96 projecting from the last bearing 94 are adapted to be received in suitable apertures 100 in alignment lugs 102 projecting up from the top of the end walls 20 and 22.

The opposite ends of the rods 92 are formed into handle members 104 by bending the ends of the rods about 90°. The rods 96 can be manipulated to insert or free the ends 98 from the apertures 100 to close or open the container. The handle members 104 also cooperate with a locking hasp 106 pivotably mounted on top wall 24 and which has a pair of laterally curved end flanges 108 which are adapted to receive the handles 104 when and only when the rods 96 are in closed position with their ends 98 in the aperture 100. Thus, only when the rods 96 are slid into closed position, may the hasp 106 be closed and the hook 110 passes through the slot 112 in the hasp 106 and a lock 114 (see FIG. 1) passes through the hook 110 to lock the container closed.

To erect the container 10, the end walls 20 and 22 are pivoted from collapsed position indicated in FIG. 5 through about 180° to the position indicated in FIG. 4 and the frame members 32, 32' together with the side and top walls 16, 24 and 18, 26 respectively are pivoted about pivot pins 36, 36' into a vertical erected position substantially perpendicular to the bottom platform 12 as shown in FIG. 4. Next, the end walls 20 and 22 are pivoted to a vertical erected position shown in FIG. 1 with the channels 62 on the sides of the end walls 20 and 22 engaging the posts 30, 30' of the frames 32, 32' and holding them in erected position. The bolts 64 are then slid into the apertures 76 in the posts 30, 30' to lock the frames 32, 32' and the walls 20, 22 in erected position. If the container is to be loaded from the top, the pins 82 at the bottom of the walls 16 and 18 are inserted in the holes 83 in the platform 12 to maintain the walls 16 and 18 in erected position and after filling, the top wall 26 and then 24 are pivoted from the open position of FIG. 4 to the closed position of FIG. 1. These walls 26 and 24 can only be closed if the handles 66 are in alignment with the apertures 80 in the plates 78. With the walls 24 and 26 closed, the locking bolts 64 are locked in position by cooperation of the handles 66 with the apertures 80. The sidewalls 16 and 18 are locked by the flanges 86 engaging the bars 84 and obstructing vertical movement of the sidewalls, the top panels 24 and 26 are locked by sliding the rods 96 into the holes 100 and closing the hasp 106 so that the flanges 108 overlap the handles 104 of the rods 96 preventing movement of the rods 96, and finally the container is locked by inserting the lock 114 through the hook 110 and closing the lock.

It is apparent from the above that the erecting and collapsing operations must be individually completed properly before the next operation can be completed and it is visually obvious to the operator that any operation is not properly complete.

If the container is to be side loaded, the sidewall 16 or 18 through which the container is to be loaded is lifted to open position, i.e., the pins 82 are not inserted in the holes 83 but the container otherwise is completely erected as described above. After the container has been erected, the top wall cooperating with the sidewall on the side through which the container is to be filled, say the top wall 24 for sidewall 16 will be pivoted to lie vertically beside wall 16. Then sidewall 16 will be lifted to disengage pins 82 and will be pivoted with its pin 54 in cam track 46 to the open position as illustrated in FIG. 11. The container then may be filled and the wall 16 swung and by its momentum moving the wall into vertical position so that the pin 54 may slide down the vertical section 50 of the cam track 46 and the pins 82 on the bottom of the sidewall slid into the apertures 83 in the bottom platform 12.

The container is collapsed by substantially the reverse procedure to that described above. First, the lock 114 and hasp 106 are opened and the rods 96 slid from the apertures 100. Next, the top walls 24 and 28 are pivoted through to 270° to a position substantially parallel with the walls 16 and 18 respectively (see FIGS. 4, 9 or 10) thereby freeing the handle 66 of the locking bolt 64 so that the bolt 64 can be slid from the aperture 76 in the posts 30, 30' and the walls 20, 22 lowered through 90° to the position shown in FIG. 4 wherein the posts 30, 30' are free from channels 62. The frames 32, 32' together with the walls 16 and 24 and 18 and 26 respectively are stable in the vertical position because the center of gravity of these frames and walls are laterally spaced outside of the pivot pins 36, 38' and the legs 34, 34' rest against the floor or other suitable supporting structure such as flanges (not shown) projecting from the bottom of uprights 58. Next, the frame 32 having the shorter legs 34 together with the walls 16 and 24 are pivoted about the pins 38 so that the wall 16 is in face-to-face relationship with the platform 12 (see the full and dotted-line positions in FIG. 6). Next, the frame 32' having the longer legs 34' together with the walls 18 and 26 are pivoted about pivot pins 38' to move the wall 18 into substantially face-to-face relationship with the wall 24 (see full and dotted-line positions in FIG. 6) and, finally, the walls 20 and 22' are folded over onto the walls 26 in substantially face-to-face relationship with the wall 26 to a collapsed position as shown in FIG. 5.

For stacking, when the containers are erected, the bosses 102 are received in suitable apertures (not shown) in the bottom platform 12. Similar bosses 122 shown in FIG. 5 are provided on the underside of the top 26 to cooperate with said apertures (not shown) for stacking the containers when collapsed or a combination of collapsed and erected containers. These bosses 122 project through apertures 120 in the end walls 20 and 22 when the container is in collapsed position (FIG. 5). When the container is erected, these bosses 122 project downward into the container immediately adjacent the rails 70 at the top of the end walls 20 and 22 thereby not interfering with the loading. Preferably, sleeves will be provided on the tops of the end walls 20 and 22 to receive the bosses 122 and cooperate with these bosses to rigidify the container when erected.

Modifications may be made to the described invention without departing from the spirit of same as defined in the ap-

pended claims. For example, in place of one of the frames 30 or 32', one of the sidewalls may be pivotably connected to the bottom wall. This, of course, would limit loading from only the other side of the container. Similarly, a unitary top wall connected to only one side frame or sidewall could replace the pair of sidewalls shown and still permit top loading. Even further modifications will be evident to those skilled in the art.

I claim:

1. A container comprising a bottom platform, end walls pivoted to said bottom platform, a side frame, means pivotably connecting said side frame to said bottom platform, a sidewall, means pivotably connecting said sidewall to said side frame along an edge of said side frame remote from said means pivotably connecting said side frame to said bottom platform, and means on said end walls cooperating with said frame to hold said side frame in erected position.

2. A container as defined in claim 1, further comprising a top wall pivotably connected to said side frame along said edge.

3. A container as defined in claim 2, wherein said means pivotably connecting said sidewall to said side frame also permits sliding motion between sidewall and said side frame, projections on said sidewall, apertures in said bottom platform adapted to receive said projections when said sidewall is in an erected position, and means on said sidewall and said top wall for preventing movement of said projections out of said apertures when said top wall is in a closed position.

4. A container as defined in claim 3, wherein said side frame includes a pair of spaced cornerposts and a rod interconnecting said cornerposts along said edge of said frame.

5. A container as defined in claim 4, wherein said means on said end walls cooperating with said side frame include open channels adapted to embrace said cornerposts.

6. A container as defined in claim 5, wherein said means on said end walls cooperating with said side frame further includes a locking bolt having a projecting handle, a hole in each of said posts, each said locking bolt engaging in said hole when said bolt is in locked position.

7. A container is defined in claim 6, further comprising an aperture in said top wall adapted to receive said handle of said locking bolt, said aperture in said top wall being located and being of a size to receive said handle only when said bolt is in said locked position.

8. A container as defined in claim 7, further comprising a locking rod on said top wall engaging an aperture in one of said end walls to lock said container in closed position.

9. A container comprising a bottom wall, a pair of end walls pivoted to said bottom platform, a pair of side frames, means pivotably connecting each of said side frames to said bottom platform, a pair of sidewalls, means pivotably connecting one of said sidewalls to each of said frames along an edge of a respective side frame remote from said means pivotably connecting said side frames to said bottom platform, and means on said end walls cooperating with said side frames to hold said side frames in erected position.

10. A container as defined in claim 9, further comprising a pair of top walls, means pivotably connecting one of said top walls to each of said side frames along said edge.

11. A container as defined in claim 10, wherein said means pivotably connecting said sidewalls to said side frames also permits sliding movement between each said sidewalls and its respective side frame, projections on each of said sidewalls, apertures in said bottom platform adapted to receive said projections when said sidewalls are in an erected position, and means on said sidewalls and said top walls preventing movement of said projections out of said apertures when said top walls are in closed position.

12. A container as defined in claim 11, wherein said side frames each include a pair of spaced cornerposts and a rod interconnecting said cornerposts along said edges of said frames.

13. A container as defined in claim 12, wherein said means on said end walls cooperating with said side frames includes an open-ended embracing each said cornerpost.

14. A container as defined in claim 13, wherein said means on said end walls cooperating with said side frames further include locking bolts each having a projecting handle, a hole in each said post adapted to receive a locking bolt, said locking bolts engaging in said holes when said bolts are in locked position.

15. A container as defined in claim 14, further comprising apertures in each said top wall adapted to receive one of said handles of said locking bolts, said apertures in said top wall being located and being of a size to receive said handles only when said bolts are in said locked position.

16. A container as defined in claim 15, further comprising a pair of locking rods slidably mounted on one of said top walls, and adapted to overlie the other of said top walls when said top walls are in closed position, and apertures in said end walls adapted to receive said locking rods when said locking rods are moved to locked position.

* * * * *