Oct. 31, 1967 C. C. AVERILL 3,349,939

PORTABLE AND COLLAPSIBLE STACKING BINS OR CRATES

Filed May 18, 1964 3 Sheets-Sheet 1

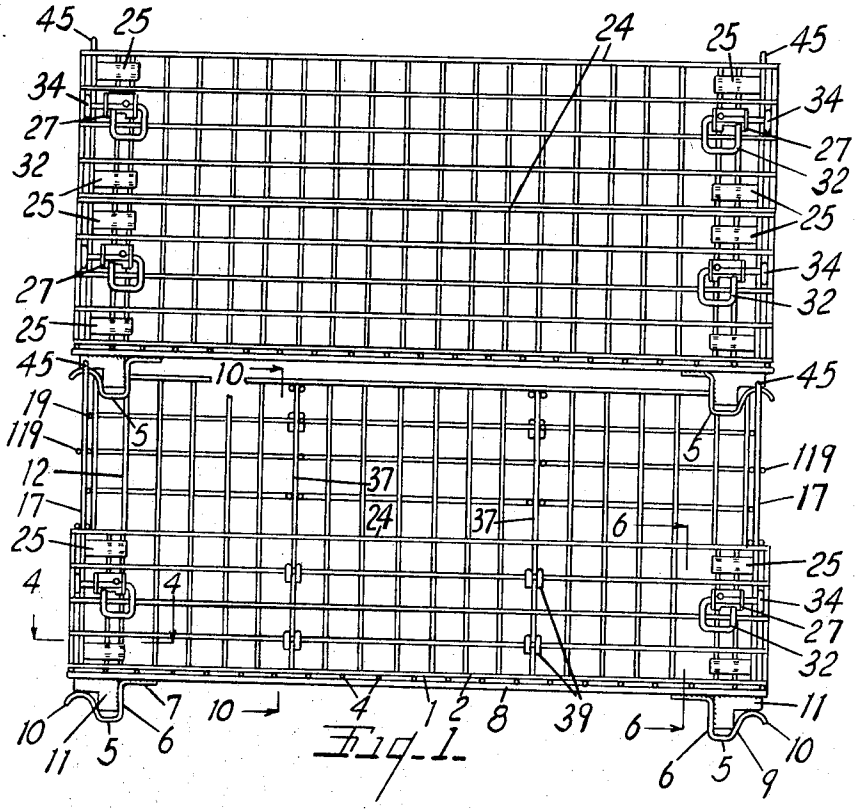


Fig. 1

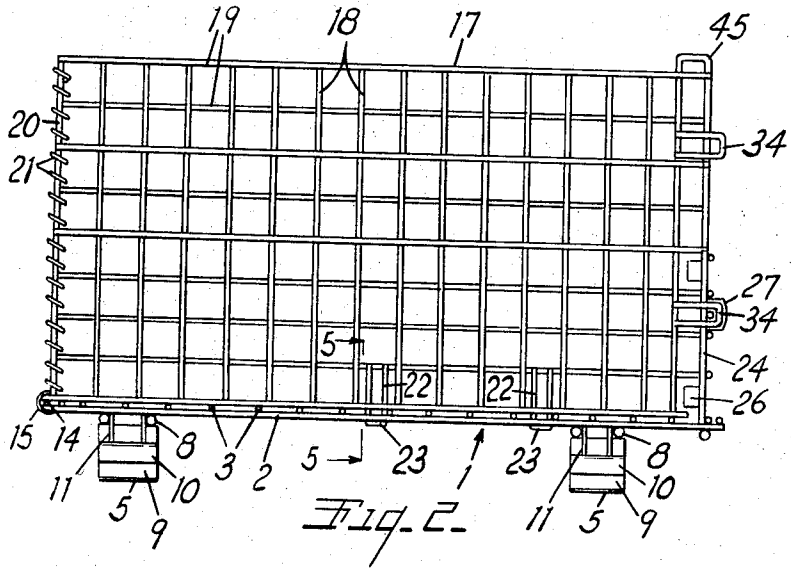


Fig. 2

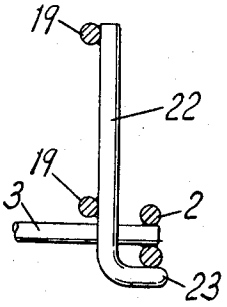


Fig. 5

INVENTOR.
Charles C. Averill
BY
Otto A. Earl
ATTORNEY.

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PORTABLE AND COLLAPSIBLE STACKING BINS OR CRATES

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3 Sheets-Sheet 2

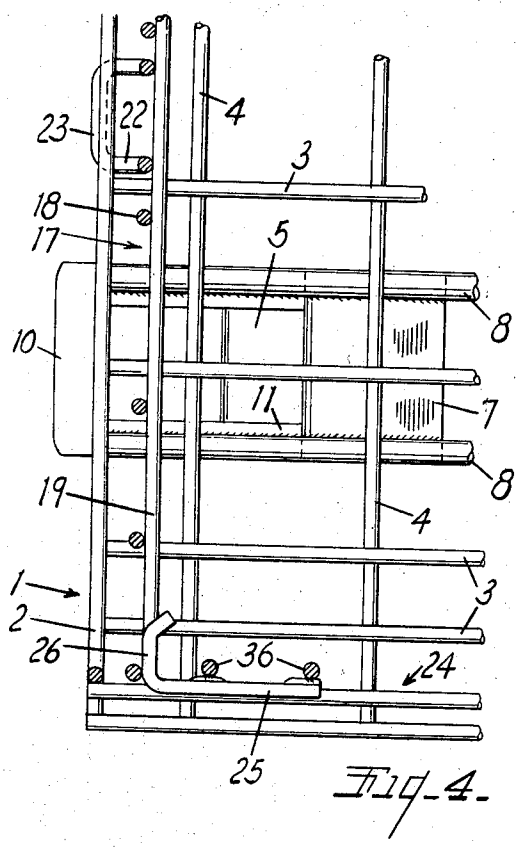


Fig. 4.

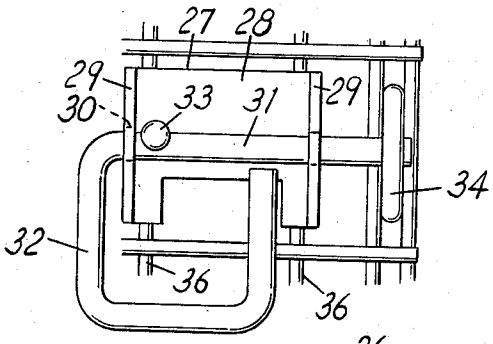


Fig. 7.

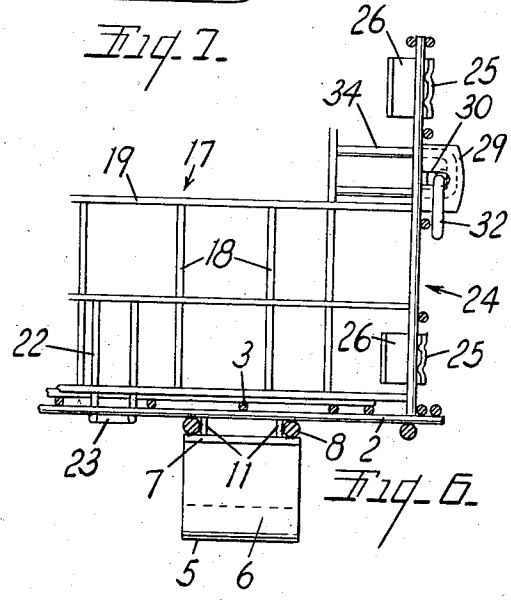


Fig. 6.

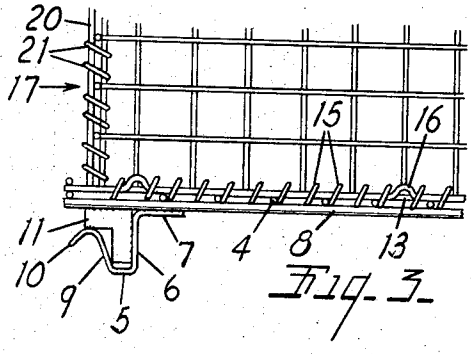
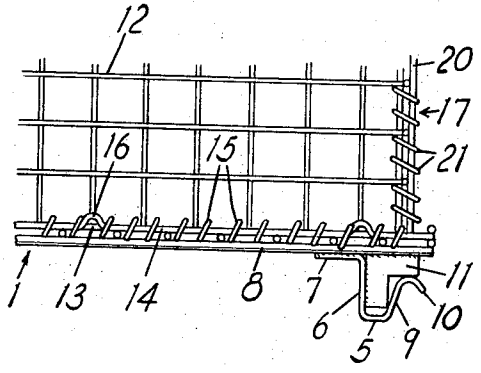


Fig. 3.



INVENTOR.
Charles C. Averill
BY Otis A. Earl
ATTORNEY

Oct. 31, 1967 C. C. AVERILL 3,349,939

PORTABLE AND COLLAPSIBLE STACKING BINS OR CRATES

Filed May 18, 1964 3 Sheets-Sheet 3

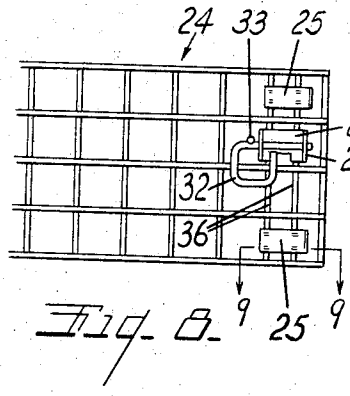
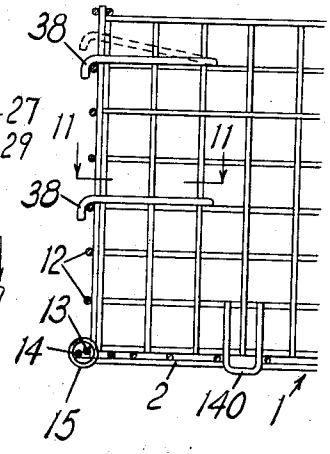


Fig. 8



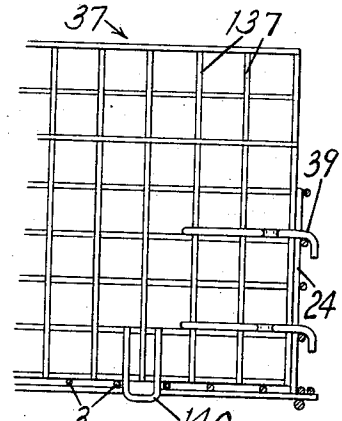


Fig. 10

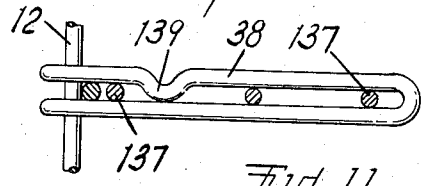


Fig. 11

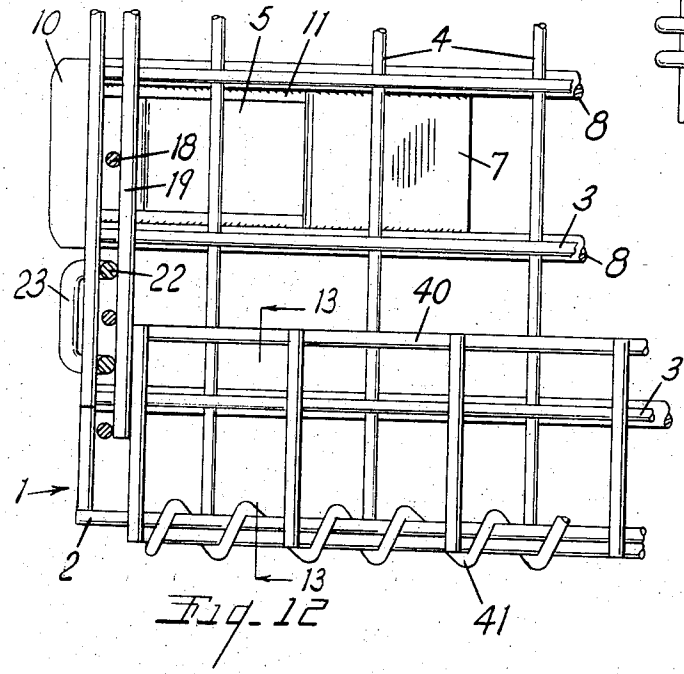


Fig. 12

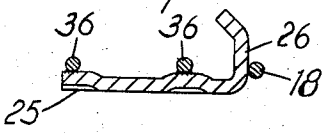


Fig. 9

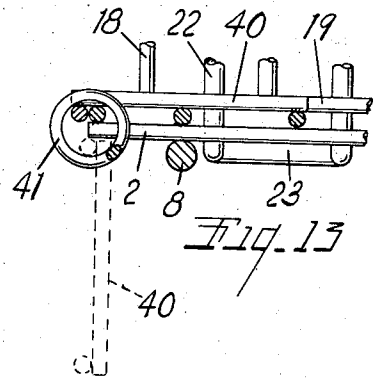


Fig. 13

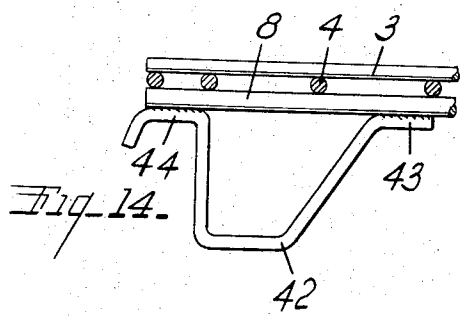


Fig. 14

INVENTOR.
Charles C. Averill
BY
Otto A. Earl
ATTORNEY

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3,349,939

PORTABLE AND COLLAPSIBLE STACKING BINS OR CRATES

Charles C. Averill, Albion, Mich., assignor to Union Steel Products Company, Albion, Mich.

Filed May 18, 1964, Ser. No. 368,034
13 Claims. (Cl. 220—6)

This invention relates to portable and collapsible stacking bins or crates.

The main objects of this invention are:

First, to provide a collapsible container made of light weight wire and rod stock which may be stacked when loaded and which has removable front walls or closures that reinforce the container to hold loads of substantial weight relative to the weight of the container.

Second, to provide a collapsible wire mesh bin or crate of relatively light weight and having sectional front walls of identical shape that can be selectively removed to form accessible openings to the bins or crates when several are stacked in a bank as shelves.

Third, to provide a light weight, mesh container that is collapsible and which has legs connected to its base by heavier reinforcing rods permitting movement with powered lifts and stacking in banks as bins with mutual reinforcing between the containers, the rods acting to both strengthen the connection between the legs and the base mesh, and distribute the lifting forces.

Fourth, to provide a crate having these structural advantages which can be economically produced of relatively light stock and while capable of withstanding heavy loads at the same time are of such weight they can be manually handled.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

FIG. 1 is a front elevational view of two crates embodying the applicant's invention disposed in stacked relation, the upper front closure section of the lower crate being removed.

FIG. 2 is an end elevational view of the lower crate of FIG. 1.

FIG. 3 is a fragmentary rear elevational view of one of the crates.

FIG. 4 is an enlarged fragmentary view in horizontal section on a line corresponding to line 4—4 of FIG. 1.

FIG. 5 is an enlarged fragmentary view on a line corresponding to line 5—5 of FIG. 2.

FIG. 6 is an enlarged fragmentary view in vertical section on a line corresponding to line 6—6 of FIG. 1.

FIG. 7 is an enlarged fragmentary front elevational view illustrating structural details of one of the bolts, locks and keepers therefor with the bolt in locking position.

FIG. 8 is a fragmentary elevational view of one end of one of the front wall members with the bolt in retracted position.

FIG. 9 is a fragmentary view on a line corresponding to line 9—9 of FIG. 8.

FIG. 10 is an enlarged fragmentary view on a line corresponding to line 10—10 of FIG. 1 illustrating one of the partitions and how it is mounted, two such partitions being included in FIG. 1.

FIG. 11 is an enlarged fragmentary view partially in section on a line corresponding to line 11—11 of FIG. 10 showing structural details of the partitions and the mounting thereof.

FIG. 12 is a fragmentary view partially in horizontal section illustrating a modified form or embodiment of my invention.

FIG. 13 is a fragmentary view somewhat enlarged on a line corresponding to line 13—13 of FIG. 12, parts being shown in one position by full lines and another position by dotted lines.

FIG. 14 is a fragmentary view partially in section illustrating a modified form of leg.

The accompanying drawings illustrate a commercial embodiment of the applicant's invention. However, it should be understood that certain parts are illustrated in conventional form as the structural details form no part of my invention, for example the bottom walls and closure members are formed of wire or rod stock. It should be further understood that while the accompanying drawings are made from commercial embodiments of applicant's invention some of the parts and dimensions are conventionally illustrated.

The bottom unit, designated generally by the numeral 1, comprises a rectangular frame 2 including rear, front and end members fixedly connected and longitudinal and cross members 3 and 4 respectively. These are formed of rod stock and are welded at their crossing points, the ends of these longitudinal and cross members being welded to the end, front, rear and bottom frame members.

It should be understood that these crates or containers vary in size and that they are not necessarily of greater length than width but those of greater length than width are the most common commercial embodiments.

The bottom unit is provided with legs, designated generally by the numeral 5, see FIG. 3. In the embodiment illustrated they are formed of bendable metal stock of uniform thickness and include upwardly projecting vertical portions 6 having inwardly projecting portions 7 at their upper ends welded to the cross rods 8 which are secured to the underside of the bottom unit and constitute reinforcing parts thereof and extend from end to end of the bottom, see FIG. 1. These legs are provided with upwardly offset outer end portions 9 terminating in hook-like portions 10, the purpose of which will be further pointed out. Reinforcing strut members 11 are disposed within these legs, as is illustrated, and their inner ends welded to the upright portion of the leg members and their upper ends to the bottom members 8, see FIGS. 3 and 4. These parts or elements constitute a unitary structure.

The rear wall designated generally by the numeral 12 includes a bottom member 13 which is hingedly secured to the rear member 14 of the bottom unit by means of the hinge member 15 in the form of a coil and permits the rear wall being collapsed upon the bottom along with the end walls. The rear member 14 of the bottom has spaced upwardly offset portions 16, see FIG. 3, which prevent outward movement of the rear wall. The coupling relationship of the coil to the bottom and rear wall is illustrated in FIGS. 3 and 10.

The end walls designated by the numeral 17 are duplicates and they are formed of laterally spaced horizontal and vertical rod stock. The vertical members, designated by the numeral 18, are fixedly secured to the top and bottom and intermediate longitudinal members designated by the numeral 19. These longitudinal members 19 are uniformly spaced but in the embodiment illustrated some of the intermediate longitudinal members are arranged on both the inner and the outer side of the vertical members 18, at 119, see FIG. 1.

The rear upright members 20 of the end walls are hingedly secured to the ends of the rear wall by means of the coils 21, see FIGS. 2 and 3. With this arrangement the end walls may be collapsed against the inner side of the rear wall and the collapsed walls collapsed upon the bottom. However, that collapsed position is not illustrated as it is a feature of another application of the ap-

plicant. The end walls are provided with downwardly projecting lugs **22** which are formed of wire stock and fixedly secured thereto and have outturned portions **23** at their lower ends, see FIGS. 2 and 5 which are engageable with the end members of the bottom when the parts are in erected position. These members **22** prevent rearward tilting of the rear wall and also outward swinging movement of the end walls when they are in erected position.

The front wall assembly comprises a plurality of duplicate units or panels designated generally by the numeral **24**, two of these units are illustrated in the accompanying drawing but it should be understood that in some commercial embodiments more than two are used. These front wall panels **24** are provided with vertically spaced support members **25** which are fixedly secured to at least two of the upright members of the front, see FIG. 9, and are provided with inwardly projecting portions **26** which engage end members of the end walls, see FIGS. 4 and 9. With this arrangement these front panels are, in effect, in snap-on engagement with the end walls and the engagement of one unit is entirely independent of the other. One advantage of that is that when the crates are loaded and it is desired to have access to the contents, particularly when crates are stacked, the front wall may be successively removed and in use it is common to remove the upper section or sections first.

Each section is provided with two bolts disposed at the end thereof, the bolts being duplicates.

The bolt units are illustrated in FIG. 1 with the front panels in erected position and FIGS. 6, 7 and 8 illustrate structural details. The bolt support members designated by the numeral **27** are desirably formed of sheet metal or plate stock and include the body portion **28** with forwardly projecting portions **29** having bolt openings **30** therein. The body portion is welded desirably to at least two of the upright portions of the closure member. The bolts **31** are formed of rod stock and have loop-like handpieces **32** which coact with one arm of the bolt support member to limit retracted movement of the bolt. The bolt is provided with a detent **33**, preferably lug-like and welded to the body portion of the bolt.

The loop-like handpieces **32** on the bolt constitute a weight acting to swing the bolt to position the detent **33** in coacting relation to the adjacent arm of the bolt support member which has a slot-like opening **30** therein, see FIG. 6, which permits passage of the lug therethrough when the handpiece **32** is swung outwardly to substantially horizontal position in which position it serves as a handle for the entire front unit on which it is mounted. By grasping the bolt handles and swinging them forwardly and pulling outwardly to disengage the handles from the forwardly projecting keepers **34** the entire front wall section can be removed. These keepers **34** are desirably formed of rod stock as is illustrated, keepers being provided on each end wall to project forwardly therefrom at the ends of each front member.

Each front wall section has at each end thereof the two inwardly projecting end wall engaging members **25** which have body portions disposed on the outer sides of at least a pair of uprights **36**, see FIGS. 7 and 8.

The partition unit designated by the numeral **37** is provided with a vertically spaced pair of rearwardly projecting hooks **38** on its rear end engageable with horizontal strands of the rear wall and with like downwardly facing hooks **39** on its front end positioned to engage longitudinal members of the bottom section of the closure. With this partition arrangement, two partitions being illustrated in FIG. 1, the top closure unit can be removed but the bottom closure unit cannot be removed until the front hooks **39** are lifted up and pushed inwardly behind the front wall section releasing the front section from the partition or partitions. The hooks **38** and **39** are U-shaped wires straddling at least two upright wires **137** of the partition, with U-shaped off-sets **139** coacting with the bight of the hook to hold it loosely in place vertically and horizontally on the partition. The removal of the top closure unit does permit access to contents, which commonly are of different character, disposed in the compartments of the crates. However, it should be understood that these crates are used for handling various kinds of products and with some products it is highly desirable to remove both of the closure sections. Depending loops **140** on the bottom of the partition project through the bottom of the base and prevent the partition from shifting.

In the embodiment of my invention shown in FIGS. 12 and 13 the bottom unit is provided at its front end with a relatively narrow member **40** which is hingedly connected to the front longitudinal member of the bottom by the coil **41**. It may be swung inwardly to collapsed position as illustrated in FIG. 12 and swung downwardly to inoperative position as illustrated by dotted lines in FIG. 13. It will be noted that when in its use position, as illustrated in FIG. 13, it constitutes a spreader element for the front ends of the end walls.

In FIG. 14 I illustrate a modified form of leg **42** which is of generally U-shape and has the rearwardly projecting portion **43** welded to the bottom reinforcing rod **8** and has a downwardly facing outer end portion **44** engageable with a lower crate. While they function the same as the legs shown in FIG. 1 which have been described, different types of legs are illustrated as in commercial practice it is found desirable to vary the height of the legs.

In all forms of the crate, the end walls have lugs **45** at their front upper corners that prevent the legs of an upper crate stacked thereon from sliding off the front of the lower crate. The rear leg of the upper crate will strike the back wall of the lower crate preventing the top crate from sliding off backwardly.

I have illustrated and described my invention in a highly practical commercial embodiment thereof. I have not attempted to illustrate and describe the numerous use adaptations as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired. The crates or containers are not designed as shipping containers for movement over long distances under rough or bumpy conditions but are intended as portable bins movable by lift fork trucks between loading positions, stacked storage positions and shelf or bin-like dispensing positions. The removable front wall sections and partitions strengthen and increase the capacity of the containers for storage and movement while permitting easy and selective removal of parts or articles from the containers when used as bins.

Having thus described the invention, what is claimed as new and desired to secure by Letters Patent is:

1. A crate or container adapted to be disposed in stacked relation to a like crate or container and comprising a rectangular bottom unit, a rear wall hingedly connected to the rear edge of said bottom unit, end walls hingedly connected to the ends of said rear wall, said end walls being provided with downwardly projecting portions engageable with said bottom unit when the end walls are in erected position preventing outward swinging thereof, a front wall assembly comprising a plurality of sections, each section having vertically spaced supporting members fixedly secured thereto and having inwardly projecting portions at their outer ends supportedly and releasably engageable with said end walls, bolts adjustably mounted on said front wall sections, said end walls being provided with keepers with which said bolts may be engaged when said front wall sections are in erected engagement with said end walls, said front wall sections being removable when crates are disposed in stacked relation, and laterally spaced legs mounted on said bottom unit and having downwardly facing recessed portions supportedly engageable with the end walls of an erected crate when disposed in stacking relation thereto.

2. A crate or container adapted to be disposed in stacked

relation to a like crate or container and comprising a rectangular bottom unit, a rear wall hingedly connected to the rear edge of said bottom unit, end walls hingedly connected to the ends of said rear wall, a front wall assembly comprising a plurality of sections, each section having vertically spaced supporting members fixedly secured thereto and having inwardly projecting portions at their outer ends supportedly and releasably engageable with said end walls, bolts adjustably mounted on said front wall sections, said end walls being provided with keepers with which said bolts may be engaged when said front wall sections are in erected engagement with said end walls, said front wall sections being removable when crates are disposed in stacked relation, and laterally spaced legs mounted on said bottom unit and having downwardly facing recessed portions supportedly engageable with the end walls of an erected crate when disposed in stacking relation thereto.

3. A crate or container adapted to be disposed in stacked relation to a like crate or container and comprising a rectangular bottom unit, a rear wall hingedly connected to the rear edge of said bottom unit, end walls hingedly connected to the ends of said rear wall, a front wall assembly comprising a plurality of sections, each section having vertically spaced supporting members fixedly secured thereto and having inwardly projecting portions at their outer ends supportedly and releasably engageable with said end walls, bolts adjustably mounted on said front wall sections, said end walls being provided with keepers with which said bolts may be engaged when said front wall sections are in erected engagement with said end walls, said front wall sections being removable when crates are disposed in stacked relation, and laterally spaced legs mounted on said bottom unit and having downwardly facing recessed portions supportedly engageable with the end walls of an erected crate when disposed in stacking relation thereto, said end walls having upwardly projecting stops for the legs of a superimposed crate.

4. A crate or container adapted to be disposed in stacked relation to a like crate or container and comprising a rectangular bottom unit, a rear wall and end walls, said rear wall being connected to said bottom unit and said end walls being connected at their rear ends to the ends of said rear wall, said end walls having downwardly projecting portions engageable with said bottom unit preventing outward swinging thereof, a front wall assembly comprising a plurality of sections, each section having vertically spaced supporting members fixedly secured thereto and having inwardly projecting portions supportedly and releasably engageable with said end walls, bolts adjustably mounted on each of said front wall sections at the ends thereof, said end walls being provided with keepers with which said bolts may be engaged when said front wall sections are in erected engagement with said end walls, said front wall sections being removable from crates which are disposed in stacked relation, and legs mounted on said bottom unit and supportedly engageable with said end walls of a like erected crate, said end walls having upwardly projecting stops for legs of a superimposed crate.

5. a crate or container adapted to be disposed in stacked relation to a like crate or container and comprising a rectangular bottom unit, a rear wall and end walls, the rear wall being connected to said bottom unit and said end walls being connected at their rear ends to the ends of said rear wall, said end walls having downwardly projecting portions engageable with said bottom unit preventing outward swinging thereof, a front wall assembly comprising a plurality of units, each unit having vertically spaced supporting members fixedly secured thereto and having inwardly projecting portions supportedly and releasably engageable with said end walls, and bolts adjustably mounted on each of said front wall sections at the ends thereof, said end walls being provided with keepers with which said bolts may be engaged when said front wall sections are in erected engagement with said end walls, said front wall sections being removable from crates which are disposed in stacked relation.

6. A crate or container comprising a rectangular bottom unit, a rear wall hingedly connected to the rear edge of said bottom unit, end walls hingedly connected at their rear to the ends of said rear wall, said rear wall being hingedly connected to the bottom and said end walls being hingedly connected at their rear ends to the ends of said rear wall, said end walls being provided with downwardly projecting portions engageable with said bottom unit when said end walls are in erected position preventing outward swinging thereof, a front wall assembly comprising a plurality of sections, each section having vertically spaced supporting members fixedly secured thereto and having inwardly projecting portions supportedly and releasably engageable with said end walls, and bolts adjustably mounted on said front wall sections, said end walls being provided with keepers with which said bolts may be engaged when said front wall sections are in erected supported engagement with said end walls.

7. A crate or container comprising a rectangular bottom unit, a rear wall hingedly connected to the rear edge of said bottom unit, end walls hingedly connected at their rear to the ends of said rear wall, said end walls being provided with downwardly projecting portions engageable with said bottom unit when said end walls are in erected position preventing outward swinging thereof, a front wall assembly comprising a plurality of sections, each section having vertically spaced supporting members fixedly secured thereto and having inwardly projecting portions supportedly and releasably engageable with said end walls, and bolts adjustably mounted on said front wall sections, said end walls being provided with keepers with which said bolts may be engaged when said front wall sections are in erected supported engagement with said end walls.

8. A crate or container comprising a bottom unit and rear and end walls supportedly mounted thereon, said rear wall being hingedly connected to said bottom unit and said end walls being hingedly connected at their rear end to said rear wall, said end walls being provided with downwardly projecting portions engageable with said bottom unit when said walls are in erected position preventing outward swinging movement thereof, a front wall unit having vertically spaced supporting members fixedly secured thereto and having inwardly projecting portions supportedly and releasably engageable with said end walls, and bolts adjustably mounted on said front wall unit at the ends thereof, said end walls having keepers with which said bolts are engageable when said front wall supporting members are in supported engagement with said end walls.

9. A crate or container comprising a bottom unit and rear and end walls supportedly mounted thereon, said rear wall being hingedly connected to said bottom unit and said end walls being hingedly connected at their rear end to said rear wall, said end walls being provided with downwardly projecting poritons engageable with said bottom unit when said walls are in erected position preventing outward swinging movement thereof, a front wall unit having supporting members secured thereto and having inwardly projecting portions supportedly and releasably engageable with said end walls, and manually adjustable means for securing said front wall unit to said end walls with said supporting members thereof in supported engagement with said end walls.

10. A crate comprising a bottom unit, a rear wall and end walls connected at their rear ends to the ends of said rear wall, a removable front wall assembly comprising a plurality of sections having supporting means fixedly secured thereto and releasably engageable with said end walls, manually adjustable means for releasably securing said front wall sections to said end walls, a transverse partition supportedly positioned on said bottom unit and having downwardly projecting lugs engageable with said bottom unit and having rearwardly projecting downward hook-like lugs engageable with said rear wall, and down-

wardly facing hook-like lugs engageable with one of said front wall sections.

11. A crate comprising a bottom unit, a rear wall and end walls connected at their rear ends to the ends of said rear wall, a removable front wall assembly comprising a plurality of sections, manually adjustable means for releasably securing said front wall sections to said end walls, a transverse partition supportedly positioned on said bottom unit and having downwardly projecting lugs engageable with said bottom unit and having rearwardly projecting downward hook-like lugs engageable with said rear wall, and downwardly facing hook-like lugs engageable with one of said front wall sections.

12. A crate or container comprising a bottom unit, rear and end walls supportedly mounted thereon, said rear wall being connected to said bottom unit and said end walls being connected at the rear ends to said rear wall, said end walls being provided with downwardly projecting portions engageable with said bottom unit when said walls are in erected position preventing outward swinging movement thereof, a front wall unit having supporting members secured thereto and having projections supportedly and releasably engaged with said end walls and manually adjustable means for securing said front wall unit to said end walls with said supporting members thereof in supported engagement with said end walls.

13. The device defined in claim **12** wherein said projections comprise inwardly projecting portions supportedly and releasably engageable with said end walls.

References Cited

UNITED STATES PATENTS

2,632,578	3/1953	Brickman	220—6
2,660,328	11/1953	Averill	220—6
2,695,724	11/1954	Averill	220—19
2,811,277	10/1957	Gainer	220—19
2,898,122	8/1959	Beckner	220—19
2,975,929	3/1961	Sjoblom	217—43
3,064,845	11/1962	Maxwell	217—43

FOREIGN PATENTS

1,227,059	2/1960	France.

THERON E. CONDON, *Primary Examiner.*

RAPHAEL H. SCHWARTZ, *Examiner.*