United States Patent [19]

Petersen

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[45] **Jan. 23, 1973**

[54] CONTAINER WITH REMOVABLE SIDE PANELS

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[21] Appl. No.: **175,951**

[52] **U.S. Cl.** **220/84**

[51] **Int. Cl.** **B65d 7/42**

[58] **Field of Search** ..... 220/84, 1.5; 217/12, 43 R, 217/43 A, 65

[56] **References Cited**

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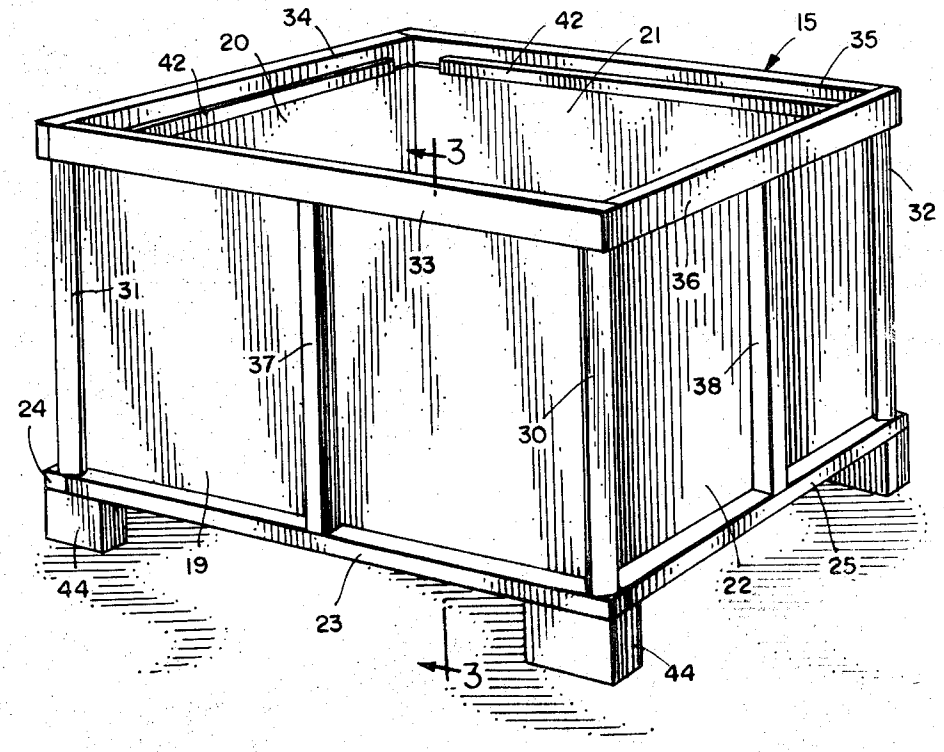
Primary Examiner—Donald F. Norton

Attorney—Dawson, Tilton, Fallon & Lungmus

[57] **ABSTRACT**

A container is provided with at least one removable side panel which can be pushed inwardly when struck with a blow. The container includes a generally rectangular bottom wall and four upwardly extending corner posts which support top rails extending between the corner posts. A side panel extends between each pair of adjacent corner posts and between the bottom wall and the top rail, and at least one of the side panels is formed of relatively flexible and resilient material to permit it to be bowed inwardly. The upper edge of this side panel is releasably held against the top rail by a flange secured to the inside of the top rail, and the lower edge of the side panel is releasably held by another flange secured to the bottom wall.

14 Claims, 12 Drawing Figures



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SHEET 1 OF 3

FIG. 1

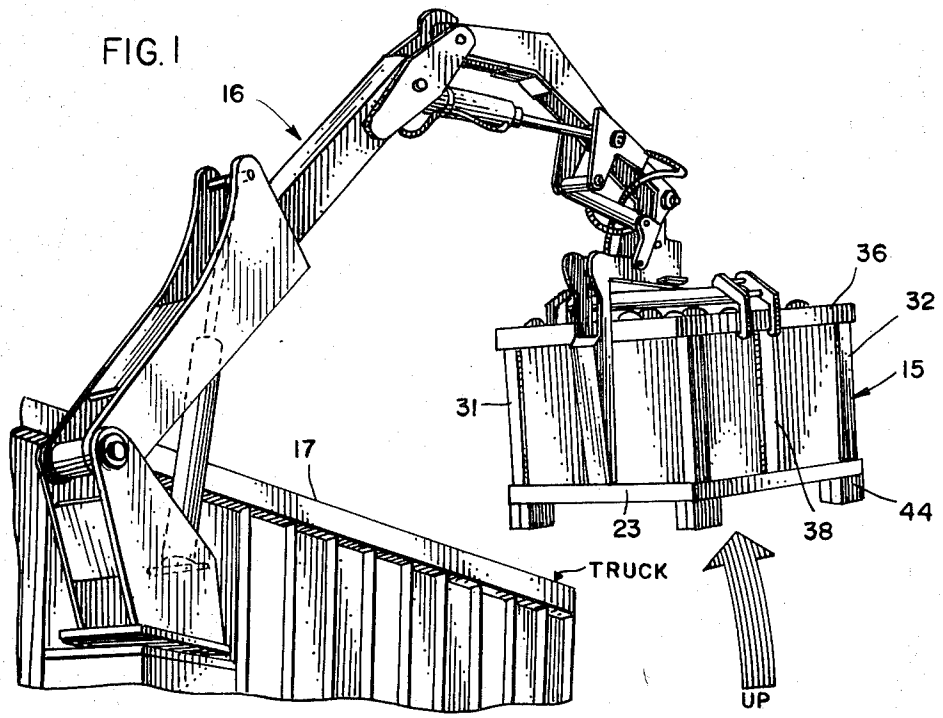

FIG. 2

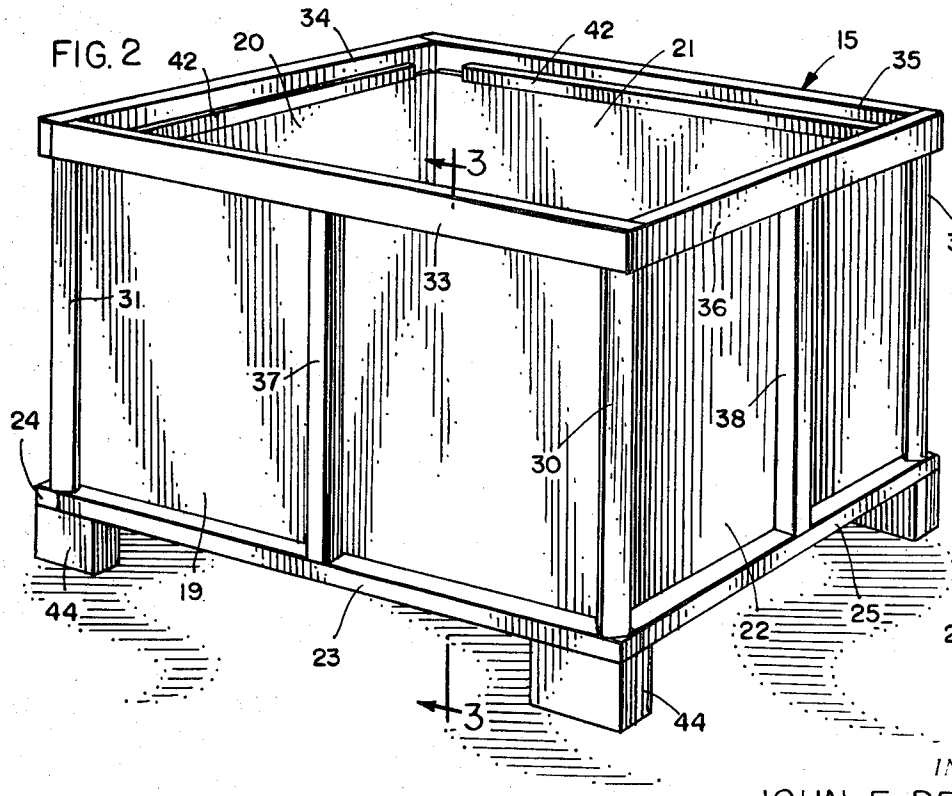

FIG. 3

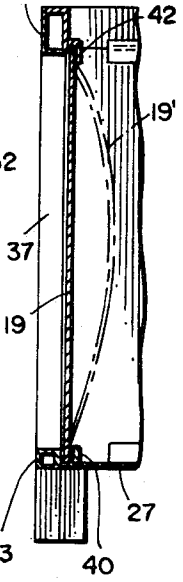

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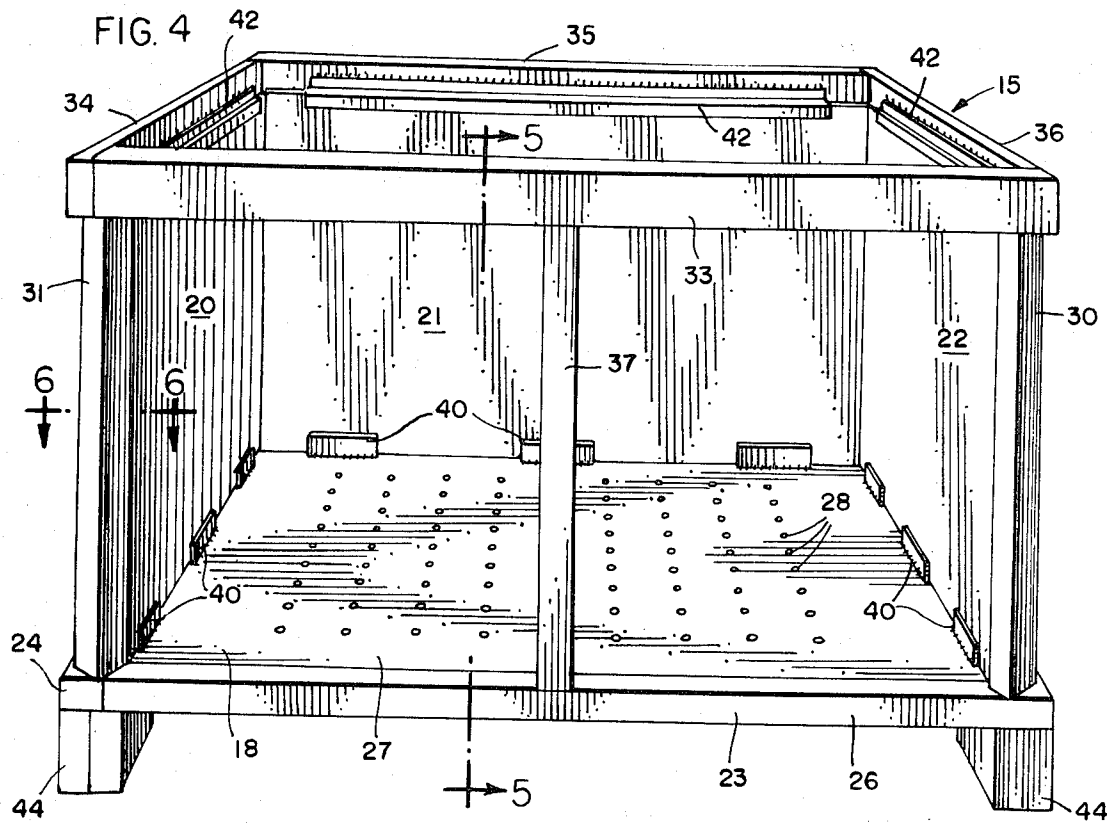
FIG. 4



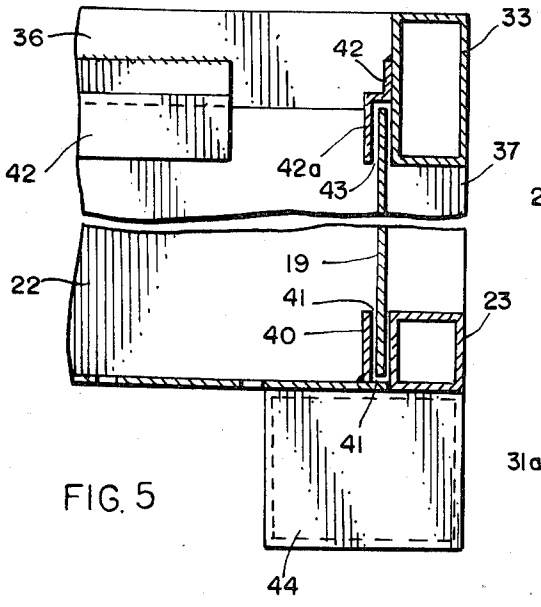


FIG. 5

FIG. 6

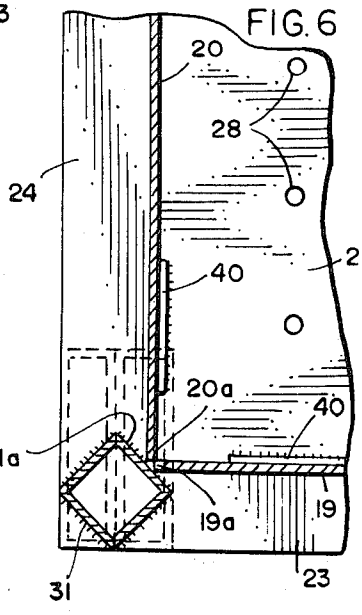


FIG. 7

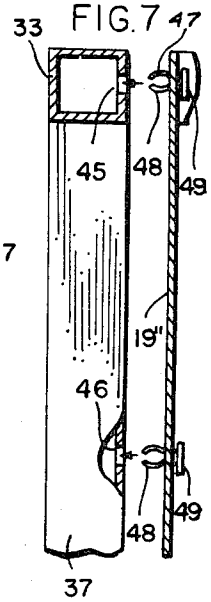


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FIG. 8

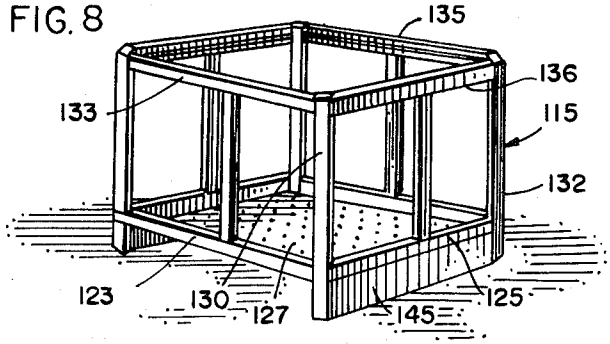


FIG. 9

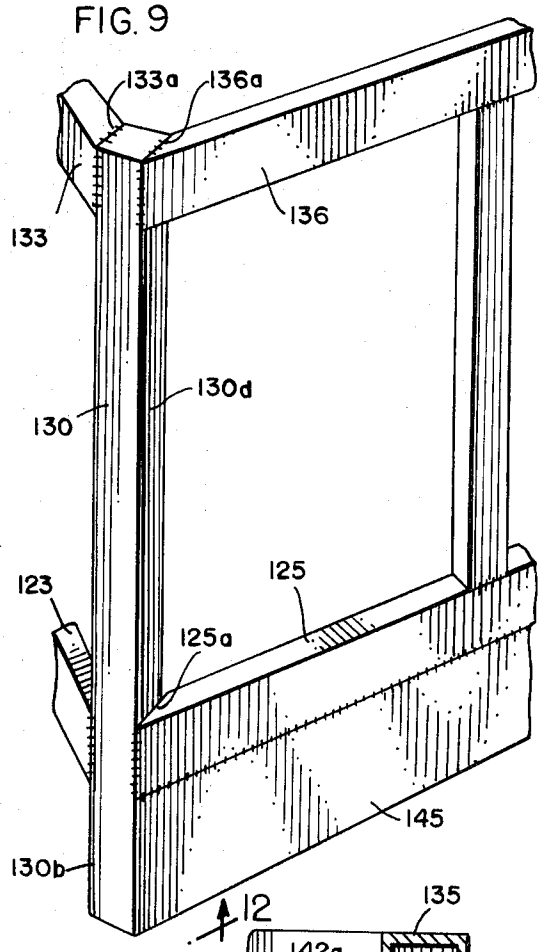
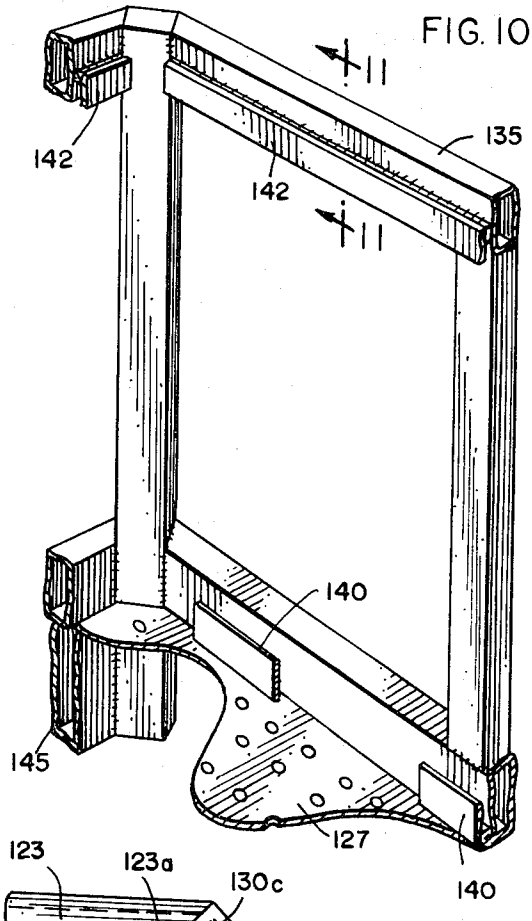


FIG. 10



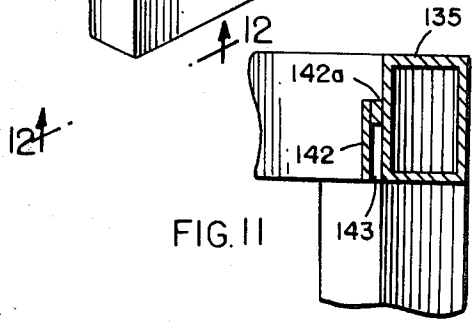


FIG. 11

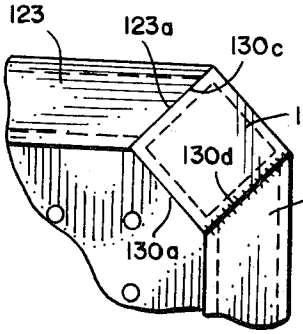


FIG. 12

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CONTAINER WITH REMOVABLE SIDE PANELS

BACKGROUND

This invention relates to containers, and, more particularly, to a container which is particularly suitable for use in storing and transporting fruits, vegetables, and the like.

Fruit such as citrus is generally harvested in one of two ways. In fresh fruit operations, the fruit is picked from the trees and placed in relatively large containers, often called pallet boxes, which hold the equivalent of approximately ten field boxes, the field box being a legal unit of measure in Florida. A pallet box might hold about 900 to about 1,000 pounds of oranges, for example. The full pallet boxes are then transported by a fork lift truck or other mean to a semi-trailer, and the loaded pallet boxes are hauled away from the grove by the semi-trailer.

In bulk loading operations, the picked fruit is generally placed in large containers which also hold the equivalent of about ten field boxes. When a container is full, it is lifted above a larger container, for example, the body of a truck, and the fruit is dumped from the first container into the larger container. The first container is then returned to the ground to be refilled by the picker. Containers and lifting apparatus for use in bulk loading operations can be seen in my prior U.S. Pat. No. 2,981,424 and in my co-pending application entitled "Container-Dumping Apparatus," Ser. No. 868,682, filed Oct. 23, 1969.

Pallet boxes, whether used in fresh fruit operations or bulk loading operations, are conventionally made of wood, and the useful life of wooden pallet boxes is severely limited. The pallet boxes are generally left in the fruit grove or other picking site and are exposed to the elements, and the pallet boxes are generally subjected to extremely rough handling by the picking crew, particularly when the pallet box is being returned to the ground after being dumped. The picking crew is generally paid on a piece rate basis, and the workers therefore attempt to work as fast as possible, sometimes without due regard for the equipment they are using. A wooden pallet box may therefore have a useful life of only about three to five years, and even during this short period a relatively substantial amount of money must be spent in maintaining the pallet box in useful condition.

Even steel containers such as shown in my prior U.S. Pat. No. 2,981,424 can be mishandled by the workers. For example, if a steel container is dropped on its side from a substantial height, the side might become so bent that the container will no longer hold the proper amount of fruit.

Since the containers when full carry a substantial weight and since the empty containers must often be maneuvered on the ground by the picking crew, it is desirable that the containers be both durable and relatively light in weight.

SUMMARY

The invention provides a lightweight yet durable container with removable side panels which will be displaced from their holding frames when struck with a blow rather than becoming permanently bent or otherwise damaged. The side panels are formed of flexible and resilient material such as thin galvanized iron, plastic, plywood or the like, and will bow inwardly when struck. Because the side panels are flexible, they can be easily replaced in the frames by bowing a pair of opposite sides together, and the resilient panels will return to their original planar configuration when the bowing force is removed. If a side panel does become bent, a worker can restraighten the panel without difficulty in the field by placing the panel on the ground and stepping on it or by bending it with one foot while holding on to one of the edges. The frames for holding the panels can be formed of high tensile steel tubing to provide a rigid yet light structure, and the bottom of the container can be formed of expanded metal or perforated metal which permits rain water and the like to drain freely from the container and permits delicate fruit such as peaches and applies to be floated out of the container by lowering the container into a water-filled tank. The openings in the bottom also permit circulation of ethylene gas or the like through the bottom if the container is used in degreening rooms and permits free drainage of water if the container is used in a hydracooler. In an alternative embodiment the side panels are releasably secured to the side frames of the container by spring fasteners or the like.

DESCRIPTION OF THE DRAWING

The invention will be explained in conjunction with illustrative embodiments shown in the accompanying drawing, in which

FIG. 1 is a perspective view of a container formed in accordance with the invention being lifted over the container body of a truck;

FIG. 2 is a perspective view of the container;

FIG. 3 is fragmentary sectional view taken along the line 3—3 of FIG. 2;

FIG. 4 is a front perspective view of the container with one of the side panels removed;

FIG. 5 is a fragmentary and broken sectional view as would be seen along the line 5—5 of FIG. 4 with the side panels in place;

FIG. 6 is a fragmentary sectional view as would be seen along the line 6—6 of FIG. 4 with the side panels in place;

FIG. 7 is a fragmentary view similar to FIG. 3 showing alternative means for releasably securing the side panels;

FIG. 8 is a perspective view of a modified container without the side panels;

FIG. 9 is an enlarged fragmentary view of the front corner of the container of FIG. 8;

FIG. 10 is an enlarged fragmentary view of the rear corner of the container of FIG. 8;

FIG. 11 is a sectional view taken along the line 11—11 of FIG. 10; and

FIG. 12 is a view of the bottom of a corner of the container taken along the line 12—12 of FIG. 9.

DESCRIPTION OF SPECIFIC EMBODIMENTS

Referring now to FIG. 1, the numeral 15 designates generally a container which is filled with fruit and which is being lifted by a lift apparatus designated 16 for dumping into a large container body 17 of a truck. The lift apparatus 16 forms no part of the present invention and need not be described herein, but the details of the structure of such an apparatus and the

manner in which it lifts and dumps the container are described in my prior co-pending application entitled "Container-Dumping Apparatus," Ser. No. 868,682, filed Oct. 23, 1969.

The container is seen to be generally box-like in shape and includes a generally rectangular generally horizontally extending bottom **18** (FIG. 4) and four upstanding side walls or panels **19**, **20**, and **21** and **22**.

The bottom **18** includes four orthogonally related tubular members, three of which are shown at **23**, **24** and **25**, which are joined to form a rectangular bottom frame **26**. The tubular members may advantageously be formed of hollow bar stock (FIG. 5) which provides a sturdy yet light construction, and the bars can be joined by welding. A generally rectangular bottom metal wall or panel **27** is secured to the bottom frame formed by the tubular members by welding, and the particular bottom panel illustrated is provided with a plurality of rows of spaced-apart openings **28**.

An upwardly extending tubular corner post is secured to each corner of the bottom of the container, three corner posts **30**, **31** and **32** being shown. The corner posts are joined to and support four orthogonally related upper tubular members **33**, **34**, **35** and **36**. Each upper tubular member is also supported by the secured to an intermediate tubular member or post which extends upwardly from the associated bottom rail midway between the corner posts. For example, intermediate post **37** extends between the top and bottom rails **33** and **23**, respectively, and intermediate post **38** extends between the top and bottom rails **25** and **36**. Referring to FIGS. **5** and **6**, the upper tubular members, the corner posts, and the intermediate posts can also be formed of hollow, rectangular tubular stock.

Each pair of corner posts and the upper and lower tubular members secured thereto form a frame for removably holding one of the side panels. As can be seen best in FIGS. **4** and **5**, a plurality of spaced-apart flange plates **40** are secured to the bottom panel **27**, as by welding, adjacent each of the bottom tubular members and extend vertically upwardly adjacent the bottom tubular member to provide a panel-receiving channel **41** therebetween. Similarly, an elongated flange **42** is secured to each of the upper tubular members and includes a downwardly extending retaining portion **42***a* which is spaced from the upper tubular member to provide a panel-receiving channel **43** aligned with the panel-receiving channel **41** therebelow.

The side panels **19–22** are formed of relatively resilient and flexible material such as thin galvanized iron, sheet metal, plastic, plywood, or the like, and each panel can be secured within the container by flexing or bowing the panel to permit the top and bottom edges thereof to be inserted into the panel-receiving channels **43** and **41**. This is illustrated in FIGS. **3** in which the bowed panel **19** is illustrated in phantom at **19'**. The panels have sufficient resiliency to return substantially completely to their original, planar configuration after the edges are received by the channels, and each panel will be relatively firmly secured in place during normal operation. When the container is filled, the side panels are forced even more into a planar configuration by the outward force exerted by the contents of the container. However, the panels are prevented from being pushed outwardly by the contents of the container by the intermediate posts and the corner posts.

As can be seen best in FIG. **6**, the corner post **31** is formed of rectangular tubular stock and includes a planar surface **31***a* which extends generally parallel to the diagonal dimension between the corner post **30** and the diagonally opposed corner post. The other corner posts are similarly arranged to provide a planar surface extending generally parallel to a diagonal of the container. The side edges of the side panels are spaced apart a distance slightly less than the distance between the centers of adjacent corner posts but slightly greater than the minimum distance between the corner posts so that each corner post restrains outward movement of a pair of side panel edges. For example, the surface **31***a* of the corner post **31** engages the side edge **20***a* of the side panel **20** and the side edge **19***a* of the side panel **19** and prevents outward movement of these side edges. Outward movement of the central portion of each side panel is prevented by the associated intermediate post.

The bottom of the container is spaced from the ground by support blocks **44** which are secured to the tubular members at each corner of the container. The support blocks not only facilitate drainage of liquid through the openings in the bottom panel but permit the container to be lifted by a fork lift or similar lifting apparatus.

If the container is to be lifted as shown in FIG. **1** by the apparatus described in my said co-pending application, the clamps of the lifting apparatus can engage the upper tubular members on opposite sides of the container without interference from the side panels. The clamp members advantageously engage the top tubular members so that the spaced-apart hooks at each clamp are positioned on opposite sides of an intermediate post. This permits the container to be lifted and tilted for dumping without having the hooks slide relative to the top tubular members.

Another means for releasably securing the side panels to the side frames is shown in FIG. **7**, which is an enlarged fragmentary view of the container similar to FIG. **3**. The top rail **33** is provided with a plurality of horizontally aligned openings **45**, and the intermediate post **37** is provided with one or more openings **46**. Similar horizontally aligned openings are provided in the bottom rail. Spring fasteners or rivets **47** are inserted through suitable openings in the side panel **19**, and the spring fasteners include resilient arcuate spring arms **48** and heads **49**. Each fastener is aligned with an opening in the rails or the posts, and the arcuate spring arms are normally spread apart a distance greater than the diameter of the openings but can be flexed toward each other to permit the spring arms to enter the openings. Thereafter, the resilient spring arms spread apart to restrain withdrawal of the arms and to hold the side panels against the top and bottom rails and the intermediate post. When sufficient force is exerted on the panels, the fasteners will be withdrawn from the openings. Since the panel **19'** does not have to bow, it need not be as flexible as the panel **19**. If sufficient holding force is provided by the fasteners for the top and bottom rails, the fasteners for the intermediate post may be omitted, Alternatively, the fasteners for the intermediate post may make it possible to omit the fasteners for one of the rails.

The spring fasteners are conventional, and further description thereof is believed to be unnecessary. Further, other equivalent fasteners can be used.

A modified container **115** is illustrated in FIGS. 8–12. The container **115** includes side panels which may be identical to the panels **19–22** and a corner post at each corner of the rectangular container. However, rather than terminating at the upper surface of the bottom rails of the container, the corner posts extend downwardly beyond the bottom rail for supporting the container. For example, corner post **130** is seen to extend downwardly beyond the bottom rails **123** and **125** to provide a supporting leg portion **130***b*. The corner post **130** is formed of rectangular tubular stock and is positioned to provide a flat surface **130***a* thereof extending generally parallel to a diagonal dimension of the container. The bottom rails **123** and **125** are provided with mitered ends **123***a* and **125***a* which abut the flat surfaces **130***c* and **131***d*, respectively, of the corner post **130** and are secured thereto, as by welding. Similarly, the top rails **133** and **136** are provided with mitered edges **133***a* and **136***a* which are abutted with and secured to the sides **130***c* and **130***d* at the upper end of the corner post.

The bottom panel **127** is secured to the bottom rails as hereinbefore described, and the bottom flanges **140** extend upwardly therefrom inwardly of the bottom rails. Upper flanges **142** are secured to the inside surfaces of the top rails and are spaced therefrom by spacers **142***a* (FIG. 11) to provide channels **143** for receiving the upper edges of the side panels.

A generally rectangular support bar **145** extends between the support leg portions of the adjacent corner posts **130** and **132** below the bottom rail **125** and includes a flat bottom supporting surface **145***a* which is aligned with the bottom ends of the support leg portions of the corner posts. The support bar can advantageously be provided with mitered ends **145***b* for joining to the corner posts. The support bar can be formed from a hollow rectangular metal tube which is secured by welding or from a wood beam, for example a 4 × 4 which is suitably secured to the corner post or bottom rails in some other manner.

A similar supporting bar may be secured to the supporting leg portions of other pairs of adjacent corner posts, but at least one pair of adjacent corner posts should be left free of a support bar between the support leg portions thereof to provide an opening between the supporting surface for the container and one of the bottom rails to permit the container to be lifted by a fork lift or other lifting apparatus. The elongated support bars permit a plurality of containers to be stacked one on top of another without having to carefully align the containers to position the support leg portions of the corner posts of the container **115** or the support blocks **44** of the containers **15** over the top rails and permit the weight of a container to be relatively uniformly distributed to the next lower container rather than having the entire weight of the container distributed through the four corner posts or support blocks.

When a side panel of an empty container is struck with sufficient force, the panel will bow inwardly until the top and bottom edges are withdrawn from the channels formed by the flanges and the top and bottom rails. A side panel may be struck when the container is being swung by the lifting apparatus or if the container is dropped, and the panels will withdraw from their holding frames rather than becoming permanently deformed or damaged. When the container is to be refilled, the side panel can be quickly reinserted into the holding frame by bowing the panel and inserting the edges into the channels. If a panel does become bent, a field worker can reshape the panel by laying it on the ground and stepping on it or by resting an edge of the panel on the ground and holding the opposite edge while bending the panel with a foot.

I have found that containers formed in accordance with the invention are suitable for both fresh and bulk operations as well as being usuable in degreening rooms and hydracoolers. The openings in the bottom permit free circulation of degreening gas and fast drainage of liquids.

Although I have described by container as having a rectangular cross section, it is possible to make the container with other polygonal shapes.

While in the foregoing specification detailed descriptions of specific embodiments of the invention were set forth for the purpose of illustration, it is to be understood that many of the details hereingiven may be varied considerably by those skilled in the art without departing from the spirit and scope of the invention.

I claim:

1. A container comprising a generally horizontal generally polygonal bottom wall having a plurality of sides, a corner post extending upwardly from the bottom wall adjacent each intersection of adjacent sides thereof, a top rail extending between the upper ends of each adjacent pair of corner posts and secured thereto, and a side panel extending between the top rail and the bottom wall between each adjacent pair of corner posts, at least one of the side panels being formed of relatively flexible and resilient material and having a pair of opposed side edges, flange means on the container engageable with edge portions of said one side panel along the pair of opposed sides to restrain inward movement of the opposed side edges, other side edges of the one side panel being movable inwardly whereby said one side panel may be bowed inwardly to withdraw the pair of opposed side edges from the flange means and to permit the one side panel to be pushed inwardly away from the associated corner posts.

2. The container of claim 1 including flange means on the container for the other side panels, each of the side walls being formed of relatively flexible and resilient material and having a pair of opposed side edges, the flange means for each of the side panels being engageable with edge portions along the opposed sides of the side panel to restrain inward movement of the opposed sides, other side edges of each side panel being movable inwardly, whereby each side panel may be bowed inwardly to withdraw the pair of opposed sides thereof from the flange means and to permit the panel to be pushed inwardly away from the associated corner posts.

3. The container of claim 1 in which the flange means includes a generally downwardly extending upper flange secured to the top rail above said one side panel for engaging a portion of one of the opposed edges of the one side wall and a generally upwardly extending bottom flange secured to the bottom wall of the container for engaging a portion of the other opposed edge of the one side panel.

4. The container of claim 3 in which the bottom wall comprises a bottom rail extending between lower end portions of each pair of adjacent corner posts and being secured thereto and a generally polygonal generally horizontally extending bottom panel secured to the bottom rails, a portion of the upper flange being spaced inwardly from the top rail above said one side panel to provide a channel for receiving one of the opposed edges of the one side panel, the bottom flange being secured to the bottom panel inwardly of the adjacent bottom rail to provide a channel for receiving the other opposed edge of the one side panel.

5. The container of claim 4 in which the bottom panel is generally rectangular and the container includes four corner posts.

6. The container of claim 1 including an intermediate post extending upwardly from the bottom wall to the top rail which extends between the pair of corner posts associated with said one side panel, the intermediate post being positioned outwardly of the one side panel for preventing outward movement thereof.

7. A container comprising four orthogonally related side frames, each of the side frames including a top rail and a bottom rail, a corner post extending between the top rails and bottom rails at each intersection of the side frames, a generally rectangular bottom panel secured to the bottom rails, and a generally planar side panel for each side frame, each side panel having a top edge extending adjacent the inside of the top rail of the associated side frame and bottom edge extending adjacent the bottom rail of the associated side frame and a pair of side edges, each side edge of each panel extending adjacent one of the corner posts, upper flange means secured to each top rail and being spaced inwardly therefrom, each upper flange means extending below and inwardly of the top edge of a side panel, bottom flange means secured to the bottom panel inwardly of each bottom rail and extending upwardly above and inwardly of the bottom edge of a side panel, each side panel being formed of relatively flexible and resilient material whereby each side panel can be removed from the associated side frame by bowing the side edges of the side panel inwardly to withdraw the top and bottom edges of the side panel away from the top and bottom flange means.

8. The container of claim 7 including an intermediate post extending between the top and bottom rails between each pair of corner posts, each intermediate post preventing outward movement of a side panel.

9. The container of claim 7 in which the corner posts extend downwardly beyond the bottom rails, a supporting bar extending between a pair of adjacent corner posts below the associated bottom rail for supporting a portion of the weight of the container.

10. The container of claim 7 in which each of the corner posts includes a generally planar surface extending generally parallel to the diagonal dimension of the container between two other diagonally opposed corner posts, said planar surface of each corner post being positioned adjacent a side edge of each of a pair of adjacent side panels to prevent outward movement of said side edges.

11. A container comprising a plurality of intersecting side frames, each of the side frames including a top rail and a bottom rail, a corner post extending between the top rails and bottom rails at each intersection of the side frames, a generally rectangular bottom panel secured to the bottom rails, and a generally planar side panel for each side frame, each side panel having a top edge extending adjacent the inside of the top rail of the associated side frame and a bottom edge extending adjacent the bottom rail of the associated side frame and a pair of side edges, each side edge of each panel extending adjacent one of the corner posts, upper connecting means releasably securing the top edge of each side panel to the associated top rail and lower connecting means releasably securing the bottom edge of each side panel to the associated bottom rail whereby each side panel can be removed from the associated side frame by pushing inwardly on the side panel.

12. The container of claim 11 in which the upper and lower connecting means comprise resilient fasteners secured to each side panel along the top and bottom edges thereof and openings in the top and bottom rails receiving the fasteners.

13. The container of claim 12 including an intermediate post extending between the top and bottom rails between each pair of corner posts and resilient fastener secured to each side panel and received in an opening in the associated intermediate post.

14. The container of claim 11 in which the upper connecting means comprises a flange secured to each top rail and extending downwardly and inwardly of the top edge of the associated side panel and the lower connecting means comprises a flange secured to the bottom panel inwardly of each bottom rail and extending upwardly above and inwardly of the bottom edge of the associated side panel.

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