United States Patent [19]

Lutz

[11] **3,760,970**

[45] **Sept. 25, 1973**

[54] **CONTAINER**

[75] Inventor: **David E. Lutz,** Carlisle, Pa.

[73] Assignee: **Minicube System, Inc.,** Carlisle, Pa.

[22] Filed: **Feb. 10, 1971**

[21] Appl. No.: **114,257**

[52] **U.S. Cl.** ..... **220/4 F,** 217/12, 220/97 B

[51] **Int. Cl.** **B65d 7/24,** B65d 9/12

[58] **Field of Search** ..... 217/12; 220/4, 4 F

[56] **References Cited**

UNITED STATES PATENTS

3,036,725	5/1962	Shay	217/12 R
3,374,915	3/1968	Verhein et al.	220/4 R
3,104,024	9/1963	Eberly	217/12 R

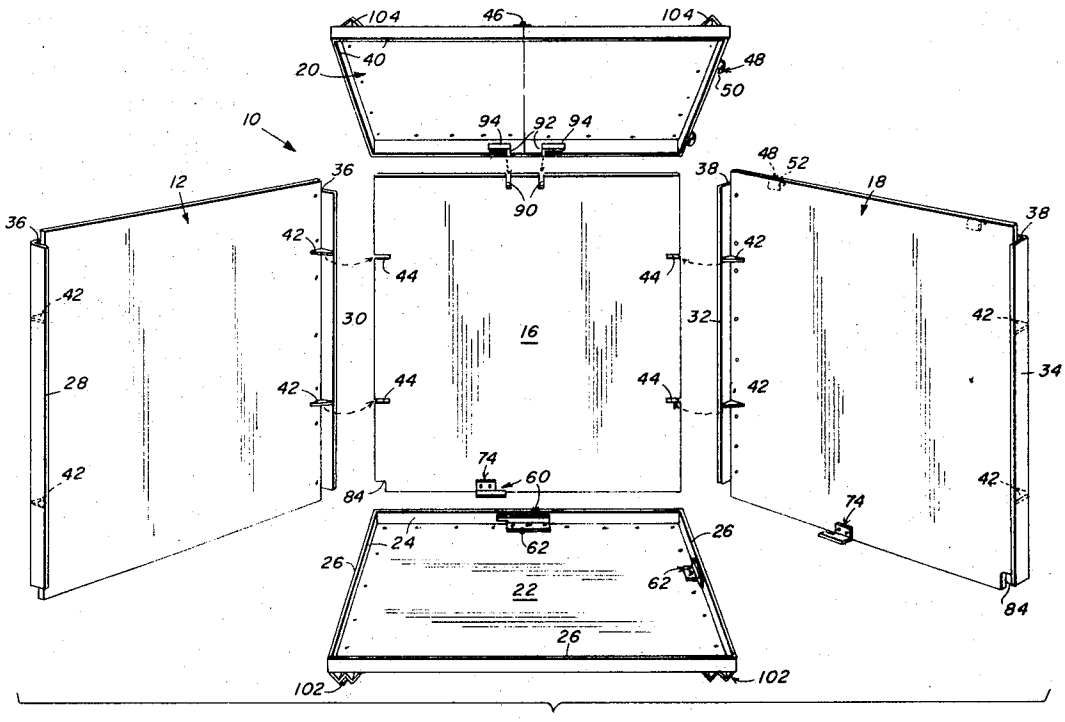
Primary Examiner—George E. Lowrance

Attorney—John J. Byrne

[57] **ABSTRACT**

A collapsible container provided with supporting means and self-aligning stacking means, and a locking device for locking the containers in stacked position with a mating container.

7 Claims, 11 Drawing Figures



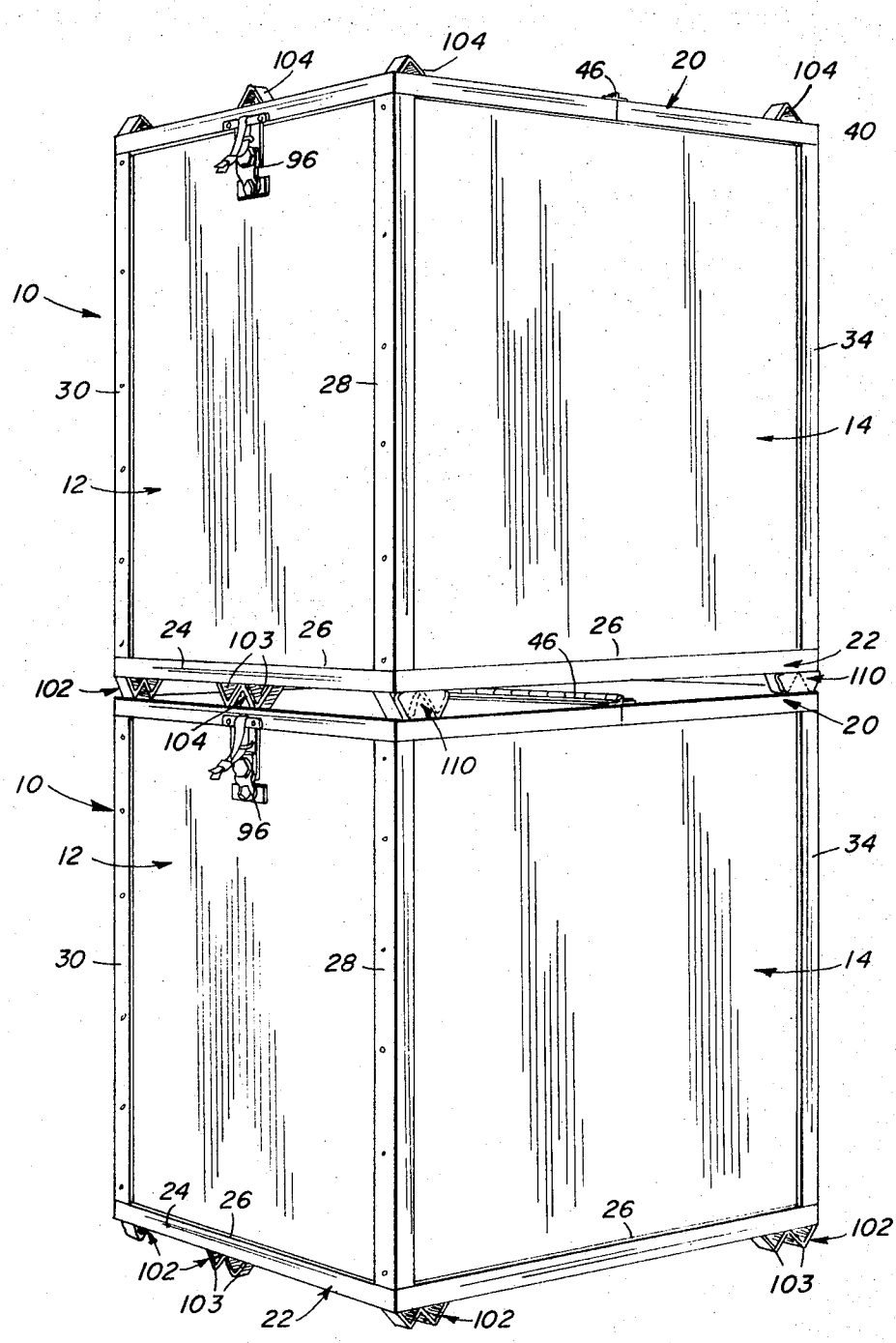
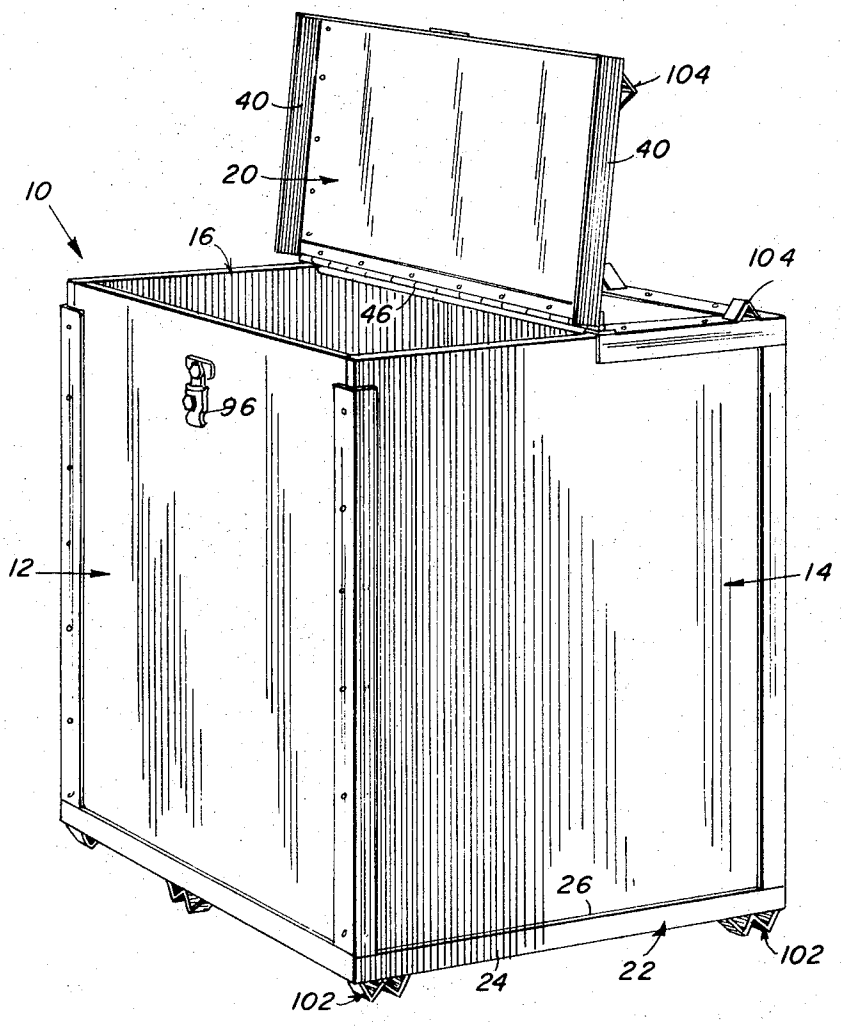


FIG. 1

INVENTOR
DAVID E. LUTZ

BY John J. Byrne
ATTORNEY

FIG. 2



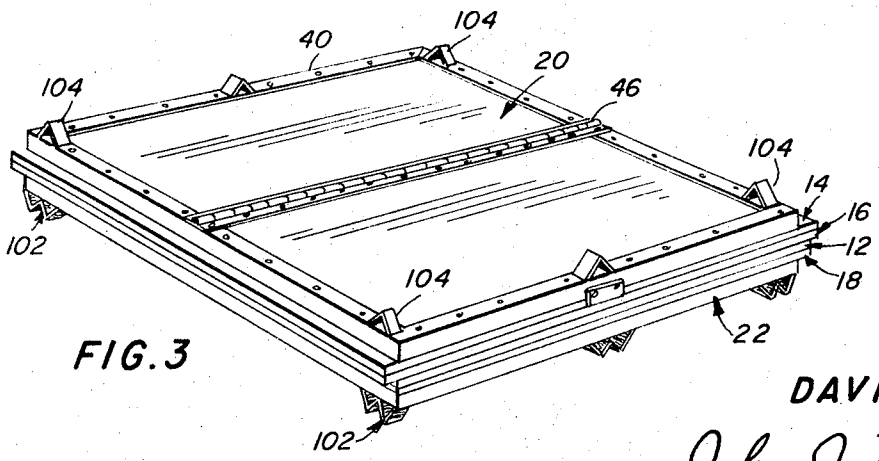
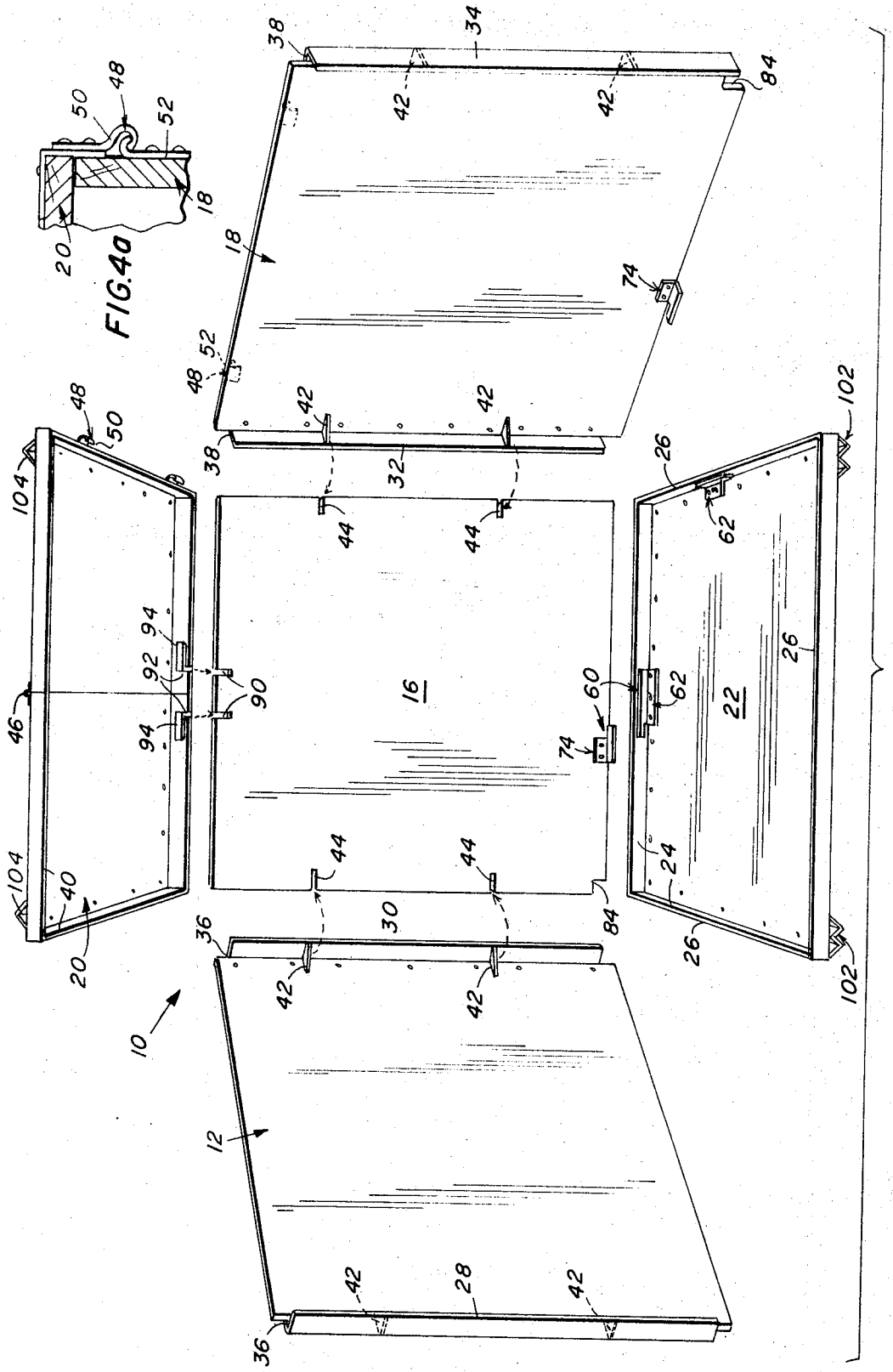


FIG. 3

INVENTOR
DAVID E. LUTZ
BY John J. Byrne
ATTORNEY


FIG.4a
FIG.4
10
12
16
18
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
52
60
62
74
84
90
92
94
102
104

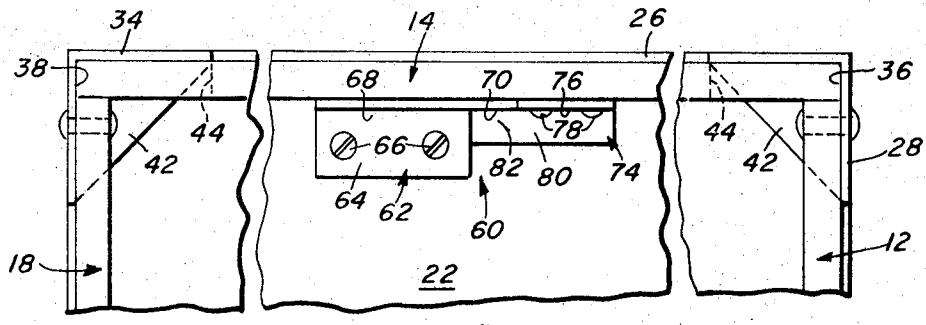


FIG. 5

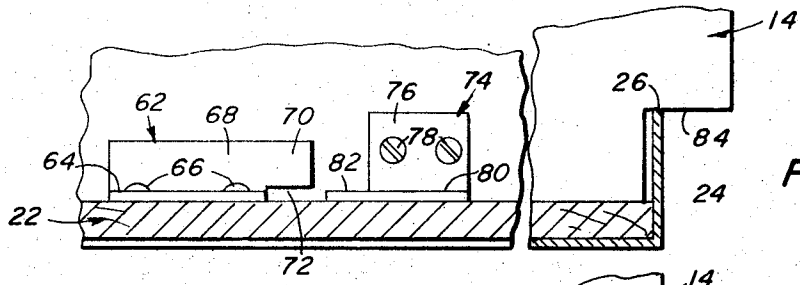


FIG. 6

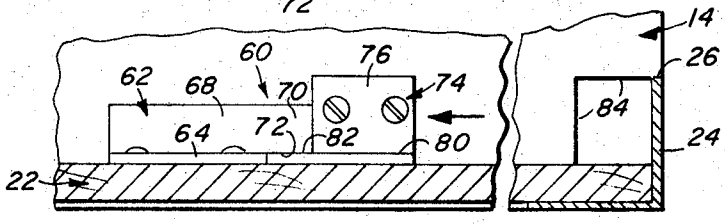


FIG. 7

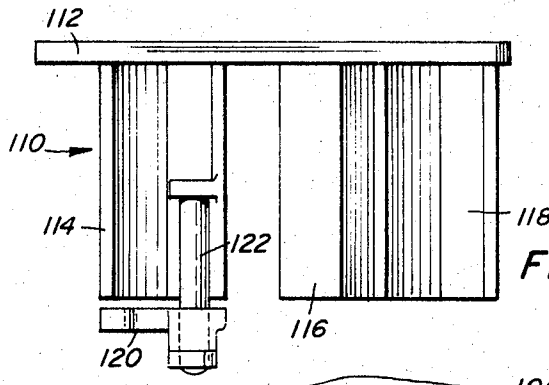


FIG. 8

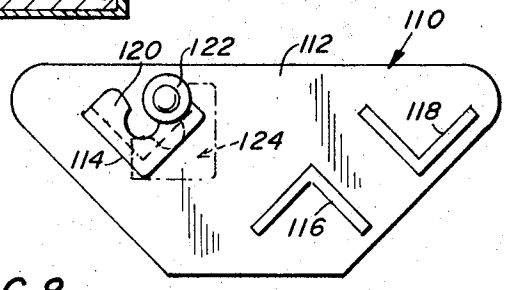


FIG. 9

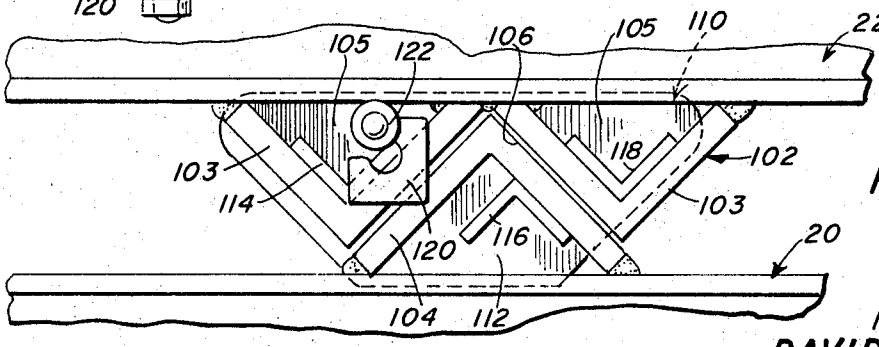


FIG. 10

INVENTOR
DAVID E. LUTZ
BY John J. Byrne
ATTORNEY

CONTAINER

This invention relates to a container and more particularly to a collapsible container for use in containerized shipping systems. Additionally, this invention is directed toward containers designed to be handled by forklift trucks, and also having means whereby mating containers may be stacked one upon another and locked in stacked position.

Containerized shipping is becoming more acceptable as a highly desirable method of shipping. Among the many advantages of containerized shipping is the economical savings due to the reduced need of handling individual items, which further leads to a reduction in the number of claims filed against shipping companies for damaged goods. Simply stated, individual items or goods are packed in a container at a point of origin, the container is sealed and is shipped to its destination without need for handling the individual items between the point of origin and destination, which, of course, results in a reduction in manpower needs. Standardized containers also lend themselves to mechanical handling which is another factor in lessening handling costs and damages to goods during shipment.

Of course, containerized shipping is not without its own added expenses such as the costs of providing strong and durable containers. It is quite obvious that if containers could not be used for an extended period of time over and over again, the cost of such a system would be prohibitive.

In addition to providing strong and durable containers, it is also desirable to provide containers which are versatile with respect to the load and unloading thereof. Generally, the container should be locked at one point only, though access may be gained through more than a single opening, once the single lock is opened. It is not always possible to place the container in the proper orientation such that access thereto can be gained through a single predetermining opening. Hence, it is desirable to provide a container wherein more than one side can be removed to permit access to the interior of the container.

It is also desirable to provide a container which can be mated with substantially identical containers in stacked relationship. In order to stack containers, however, the stacking means must be sufficient to prevent lateral movement in any direction and vertical movement. Also, it is necessary to provide a container with feet which space the base of the container from the floor to permit entry of the forks of the forklift truck. Such feet must be of substantial strength to support the container under day-to-day handling conditions. The advantages of collapsible containers are obvious. Oftentimes the containers have to be "deadheaded" back to their point of origin, and it is more economical to ship the containers back as a small compact bundle then as a large, empty, space-consuming object.

Collapsible containers are, of course, known to the prior art. Generally, speaking, however, these containers are held together in rather loose fashion when in the completely packed or sealed condition, or, in the alternative, are very sturdy in the packed and sealed condition but accordingly, are quite difficult to disassemble. An example of the first situation is the type wherein the side walls, though interlocked against lateral movement, are free to move vertically until secured by circumscribind flexible straps. If the straps break during the course of handling, a not unforeseeable occurrence

especially when used with forklifts, there is a strong likelihood that the container will come apart. In the second situation the side walls are generally bolted together. While this type container is relatively sturdy when in the assembled condition, it is laborious and time-consuming and, therefore, is economically unfeasible to assemble and collapse the container.

It is an objective of this invention to overcome the aforementioned disadvantages of the prior art by providing a container which is quite rigid and sturdy in the assembled condition, but which may be readily disassembled.

It is a further objective of this invention to provide a container including base and cover panels, two side panels and front and rear panels which are interconnected and locked in assembled position and sealed at one point; namely, at the intersection of the top edge of the front panel and the front edge of the cover panel.

It is another objective of this invention to provide a container wherein the panels thereof are so interconnected that access can be gained to the interior of the container through either the front or the sides thereof without having to first remove the contents from the container.

In the container of this invention the two side walls and the rear walls are confined within a rim extending around the side edges of the base panel withthe width of each panel being coextensive with the width of the respective side edge of the base panel. Locking means are provided for each of the side panels and the rear panel. Each locking means includes a locking member attached to the base panel and a locking element affixed to the panel for interengagement with the locking member upon sliding movement of the panel in its own plane relative to the base panel. In this manner, the locking means of the side panels and/or the rear panels can be interengaged without the necessity of having to move the panels inwardly of the container in a direction transverse to the plane of the panel. Further the side panels and rear panel cannot be removed without first removing the front panel.

It is a further objective of this invention to provide a container having support means on the underside thereof spacing the bottom floor of the container from the supporting surface to permit the insertion of the forks of a forklift truck, which supporting means also provides stacking means for stacking mating containers. In this regard, the upper surface of the container is provided with means adapted to mate with the supporting means on the underside of a superposed mating container.

It is a further objective of this invention to provide combination supporting means and stacking means which stacking means are sloped or angulated in a manner to be described such that a container will self-align when placed upon a mating container in stacked position.

It is a further objective of this invention to provide a locking device cooperating with the stacking means to lock the containers in stacked relationship. The locking device provides a retainer which automatically moves to operative, retaining position once the locking device is properly positioned relative to the stacking means.

These and other objects of the invention will become more apparent to those skilled in the art by reference to the following detailed description when viewed in light of the accompanying drawings wherein:

FIG. 1 is a perspective view showing two containers of this invention in stacked relationship;

FIG. 2 is a perspective view showing the container of this invention with the cover partially open;

FIG. 3 is a perspective view of the container of this invention showing it in collapsed form;

FIG. 4 is an exploded view of the container of this invention showing the cover and base panels, one side panel and the rear and front panels;

FIG. 4a is a fragmentary view showing the means for connecting the cover panel to the rear panel;

FIG. 5 is a fragmentary plan view showing the locking means in locked position;

FIG. 6 is a fragmentary side view in elevation showing the locking means in unlocked position;

FIG. 7 is a view similar to FIG. 6 showing the locking means in locked position;

FIG. 8 is a plan view of the locking device for use with the stacking-support means of this invention;

FIG. 9 is a front view of the device of FIG. 8; and

FIG. 10 is a view showing the stacking-supporting means in operative position with the locking device inserted in the passageways defined by the locking-support means.

Referring now to the drawings wherein like numerals indicate like parts, the numeral 10 generally indicates the container of this invention which is of a generally rectangular configuration. The container includes a front panel 12, side panels 14 and 16, a rear panel 18 and cover and base panels 20 and 22 respectively. The base panel is of heavy construction such as wood planking or relatively thick plywood, while the front and rear panels and cover are of a lighter material such as relatively thin plywood or in the alternative, of a plastic or light metal material of the type commercially available for use in the construction of shipping containers.

The components of the container and the assembly thereof can best be understood with reference to the exploded view of FIG. 4 where it can be seen that the base panel 22 has angle irons 24 attached to each side edge thereof with the upstanding legs of the angle irons providing a continuous rim 26 extending along each side edge of the base panel. The angle iron is preferably constructed of aluminum for weight conservation purposes.

The lower edge portions of the front, rear and side panels are snuggly received within the confines of the upstanding continuous rim 26 and are thereby prevented from moving laterally outwardly from the base.

The front and rear panels are provided with angle irons 28 and 30 and 32 and 34 respectively, which angle irons are preferably of aluminum and are bolted, riveted or otherwise attached along one leg thereof to the vertical side edge portions of the front and rear panels. The overall width of the front and rear panels when taking the angle irons into consideration is coextensive with the length of the respective mating side edge of the base panel; however, the front and rear panels per se are somewhat narrower than the side panels and the mating side edges of the base panel by a distance which is substantially equal to twice the thickness of a side wall such that vertically extending grooves 36 are provided between the vertical side edges of the front panel and the outer legs of the angle irons as shown in FIG. 4. Likewise, grooves 38 are provided in rear panel 18. These grooves receive the vertical side edges of the respective side panels when the panels are assembled.

Further, the vertical lengths of the angle irons on the front and rear panels 12 and 18 are less than the lengths of heights of the respective panels to allow the edge portion of the front and rear panels to be inserted within the confines of the upstanding rim in a manner such that the ends of the angle irons on the respective panels abut the top edge of the upstanding rim 26. The same is true with respect to the upper portion of the respective panels wherein the upper edge portions thereof are received within the confines of a downwardly extending rim 40 on the cover panel 20, which rim is defined by the free leg of an angle iron, the other leg of which is bolted, riveted or otherwise attached to the cover panel. Therefore, the vertical angle irons on the front and rear panels abut the rims 26 and 40 at their respective ends such that vertical forces exerted on the container are absorbed primarily by the rims 26 and 40 and the vertical angle irons 28, 30, 32 and 34.

Each of the vertical angle irons are provided with horizontal, vertically spaced web portions 42 spanning the legs of the angle irons, and adapted to be received in slots 44 in the respective side panels, such that when the panels are assembled, the side panels are precluded from vertical movement by interengagement of the webs and the slots. It is to be understood that the side panel 14 is not shown in FIG. 4 but is identical to side panel 16.

The cover panel 20 is hinged intermediate its length by hinge 46 such that the cover can be opened in the manner shown in FIG. 2. The cover panel includes a downwardly extending rim 40 which encompasses the upper edge portions of each of the side, front and rear panels. The cover panel 20 is secured to the rear panel 18 by separable connecting means 48 shown in FIG. 4a. The connecting means 48 includes a first hook 50 attached to the rear of the cover panel and a second hook 52 attached to the rear surface of the rear panel 18 which hooks are interlocked in a manner shown in FIG. 4a when the cover is in the closed position, but can be disengaged by merely tilting the cover panel relative to the rear panel.

The side panels 14 and 16 and the rear panel 18 are each provided with locking means 60 which locks the panels to the base member in such a manner that they are precluded from lateral or vertical movement when assembled. The locking means is more clearly shown in FIGS. 5 through 7. Only one of the three locking means will be described since they are identical in construction and operation. The locking means includes a locking member 62 having a body portion 64 with apertures therein for receiving threaded fasteners 66 for attachment of the locking member to the base panel. The body portion includes an upstanding flange 68 which is disposed parallel to the upstanding rim 26 and defines a guideway therewith approximately the thickness of the side or rear panel with which it is associated. The flange includes a projection 70 which extends in the same plane as the flange 68 and which defines a locking slot 72 with the upper surface of the base panel 22 as best seen in FIG. 6. A locking element generally indicated by the numeral 74 is attached to each of the side or rear panels and includes a body portion 76 having apertures therein for receiving threaded fasteners 78. A flange 80 extends laterally outwardly from the body portion 76 in a plane substantially on the level of the

bottom edge of its respective panel. The flange **80** extends laterally outwardly from the body portion **76** in a plane substantially on the level of the bottom edge of its respective panel. The flange **80** includes a projection **82** in the same plane which is adapted to be received within the locking slot **72** when the panel is in the locked position as shown in FIG. **7.**

As mentioned earlier, the respective panels are substantially coextensive with the length of the side edges of the base panels; therefore, in order to allow the panels to slide between the open and locked position within the confines of the rim **26,** a cutout **84** must be provided in the lower corner of the panel in the direction of the sliding movement to the unlocked position. This can best be understood with reference to FIGS. **6** and **7** where it can be seen that the vertical height of the cutout is sufficient to allow the leading edge of the panel to slide past the upstanding rim **26,** and the lateral width of the cutout is sufficient to allow the panel to be moved the distance necessary to permit the projection **82** to clear the locking slot **72.** It is to be understood that each of the side panels and the rear panel, the ones that have locking means, includes a cutout similar to notch **84.**

The box is assembled as follows, the lower edge portion of the rear panel **18** is inserted within the rim **26** on the rear edge of the base panel and between the rim and the upstanding flange **68** on its respective locking member. The panel is inserted in an offset position relative to the base as permitted by the cutout **84** and is then slid to the locked position. The two side panels are inserted in a similar manner and engaged with their respective locking means with the vertical edges of the side panels being received in the groove **38** of the rear panel **18** when moved to the locked position. The front panel is then inserted by tilting the upper edge of the panel toward the person inserting the panel and inserting the lower edge portion inside the rim **26** and pushing it forward using the point of contact of the lower edge of the panel and the base panel as a pivot point until the vertical side edges of the panels are nested within the grooves **36** and the webs **42** are received within the slots **44.** The cover panel is then locked in place by first interengaging the hooks **50** and **52** and then dropping the cover panel down over the vertically disposed panels such that the rim **40** encompasses the upper edge portions of the respective panels. It is to be noted that the side panels includes slots **90** which receive the transverse leg portions **92** of the L-shaped bracket **94** which are attached to the inner side of the downwardly extending rim **40.** This helps prevent inward movement of the top edge portion of the side panels when in the assembled configuration. Brackets identical to brackets **94** are disposed on the opposite side of the cover panel **20.**

When unloading or collapsing the container one merely must swing back the cover panel as shown in FIG. **2** after unlocking the single latch **96,** which is the only latch or seal means for the whole container, and then pivot forward and remove the front panel. If it is desired to gain access to the interior through one of the side panels, due to the particular orientation of the container when unloading,for example, then the cover panel **20** is completely removed, the front panel is removed and the side panel is slid in its own plane to the unlocked position and removed. It is to be understood, however, that the front panel must be removed prior to removing either side panel,and that likewise at least one of the side panels must be removed prior to removing the rear panel.The container is shown in disassembled or collapsed condition in FIG. **3.** It is to be emphasized that the cover, front, side and rear panels can be completely removed without having to first rearrange the contents of the container in any way.

The container is provided with supporting means **102** on the under surface of its base panel which supporting means is in the form of a pair of V-shaped elements **103** which V-shaped elements are joined to the angle irons at the ends of the free leg portions thereof. Each of the V-shaped elements **103** are attached to the underside with a particular orientation to define V-shaped slots **105** extending transversely to the plane of a panel which it directly underlies. The height of the feet is sufficient to permit the insertion of a forklift truck beneath the container for handling purposes.

The cover **20** of the container is provided with V-shaped elements **104** of substantially identical configuration to the elements comprising the supporting means **102** and are joined to the angle iron at the ends of the free legs thereof. The V-shaped elements **104** are also so positioned that they define triangular passageways extending transversely to the plane of the particular panel which they directly underlie,and are positioned to mate with the supports **102** of a mating container. With reference to FIGS. **1,** and **8** through **10,** it can be seen that the means **102** are stacking means and cooperate with the elements **104** of a mating container to lock the container from lateral movement in any direction when in a stacked condition as best shown in FIG. **1.** The V-shaped elements provide a self-aligning feature when the one container is set upon another. This can best be seen in FIG. **10** wherein a valley **106** is defined between the two V-shaped elements **103** for reception of the element **104.**

Due to the particular arrangement of the V-shaped elements along at least each side of the base and cover panels, the containers when in stacked condition are precluded from lateral movement in any direction. In order to prevent relative vertical movement, a locking device **110** is provided. The locking device **110** includes a base **112** having prongs **114, 116** and **118** projecting outwardly therefrom a distance greater than the length of the V-shaped passageways defined by the V-shaped elements **103** and **104.** The cross-sectional shape of the prongs substantially approximates the shape of the passageways **105.** As best seen in FIG. **10,** the V-shaped elements when disposed in stacked relationship define passageways through which the prongs of the locking device are inserted in the manner shown. Prong **116** is closer to prong **118** than to prong **114** as shown to provide a clamping function with respect to two of the V-shaped elements, as best shown in FIG. **10.**

A V-shaped retainer **120** is pivotally attached to the outer end of prong **114** at **122** and is weighted in such a manner that the retainer **120** normally assumes the dotted line position **124** which is out of the confines of the planes of the outer side surfaces of the prong **114.** To insert the prongs of locking device within the triangular passageways, the retainer must be held in the position shown in FIG. **9.** Whereafter, when the prongs are inserted completely through the passageways, the retainer automatically deops to the dotted line position as best shown in FIG. **10** and engages the inner edges

of the V-shaped elements thereby precluding removal of the locking device without first shifting the retainer to the position shown in FIG. 9.

In a general manner, while there has been disclosed an effective and efficient embodiment of the invention, it should be well understood that the invention is not limited to such an embodiment as there might be changes made in the arrangement, disposition, and form of the parts without departing from the principle of the present invention as comprehended within the scope of the accompanying claims.

I claim:

1. A collapsible container comprising a base, a cover, two side panels and front and rear panels connecting said side panels to form a generally rectantular container, said base having a first continuous upstanding rim extending along each side edge thereof, said cover having a second continuous downwardly extending rim along each side edge thereof, the lower and upper edges of each of the side panels and front and rear panels being snuggly received within the confines of said first and second rims when in assembled condition, locking members attached to said base at points adjacent the intermediate portion of the lower edge portions of each of said side panels and said rear panel, a locking element attached to each of said side panels and said rear panel for sliding interlocking engagement with its respective locking member, a cutout in the end of the lower edge portion of each of said side panels and said rear panel of a dimension to permit each of said panels to slide into and out of the locked position in the plane of said panels relative to said base and said upstanding rim without vertical movement, a pair of elongated angle irons attached to the vertical side edges of each of said front and rear panels along one leg of each of said angle irons, the front and rear panels each being of a horizontal length less than the horizontal lengths of the respective side edges of said base panel, the other leg of each of said angle irons being spaced from the vertical side edges of said front and rear panels to define a groove for the reception of the vertical side edges of the side panels, the locking members and locking elements being so positioned that the front panel must be removed before the side and rear panels can be removed.

2. The container of claim 1 wherein said each of said locking members includes an upstanding flange defining a guideway with said upstanding rim for the reception of the lower edge portions of the side and front and rear panels, whereby the panels are precluded from moving inwardly or outwardly of the container in directions transverse to the planes of the panels,

3. The container of claim 1 wherein said cover has a front edge and a rear edge and is hinged intermediate its length along a line parallel to said front and rear panels, and including cooperating latch means on said front edge and said front panel, and separable connecting means on said rear edge and said rear panel whereby said cover can be completely removed.

4. The container of claim 1 wherein the ends of said angle irons are spaced from the top and bottom edges of said front and rear panels a distance corresponding the distance of the projection of said first and second rims from said base and cover respectively, whereby said ends abut the top edges of said first and second rims.

5. The container of claim 1 wherein each of said angle irons include vertically spaced horizontally disposed webs spanning the legs of the angle iron interiorly thereof, and the vertical side edges of said side panels have slits for receiving said webs whereby said front and rear panels are precluded from vertical movement when said vertical side edges of said side panels are received in said grooves.

6. The container of claim 1 wherein each of said locking elements includes a flat body portion affixed to said base, and a projection extending therefrom parallel to said rim and spaced from said base panel to define a locking slot with said base panels each of said locking elements includes a bodyportion affixed to the respective side or rear panel and a projection extending outwardly from the body adjacent the lower edge of said side or rear panel and adapted to be received in said locking slot by sliding movement of said locking slot by sliding movement of said panel in the plane of said panel relative to said base.

7. A collapsible container comprising a base, a cover, two side panels and front and rear panels connecting said side panels to form a generally rectangular container, locking members attached to said base at points adjacent the lower edge portions of each of said side panels and said rear panel, a locking element attached to each of said side panels and said rear panel for interlocking engagement with its respective locking member by sliding each of said panels in its own plane relative to said base, second locking means between said front panel and the adjacent vertical side edges of said side panels for preventing relative vertical movement between said front panel and said side panels, said front panel being mounted on said base for swinging movement outwardly away from said side panel along a horizontal axis defined by the line of engagement between said front panel and said base, said side and rear panels being removable from said base only after said front panel has been swung outwardly and said second locking means disengaged.

* * * * *