# United States Patent [19]

Kupersmit

[11] 3,770,186

[45] Nov. 6, 1973


[54] **COLLAPSIBLE SHIPPING CONTAINER**


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[52] **U.S. Cl.** ..... **229/23 R,** 24/73, 108/56, 287/20, 287/924

[51] **Int. Cl.** ..... **B65d 5/00,** B65d 5/36, B65d 5/44

[58] **Field of Search** ..... 229/41 A, 41 B, 23 R, 229/23 C; 287/20.924; 24/73; 108/56, 53



[56] **References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 3,443,737 | 5/1969 | Kupersmit | 229/23 R |
| 3,466,710 | 9/1969 | Kupersmit | 24/73 |
| 3,480,196 | 11/1969 | Desimas | 229/23 R |
| 3,580,618 | 5/1971 | Kupersmit | 287/20.924 |



*Primary Examiner*—Davis T. Moorhead
*Attorney*—Charles E. Temko



[57] **ABSTRACT**

An improved collapsible shipping container of the type in which a plurality of side walls are detachably interconnected to a rigid base or pallet. Means is provided for rigidifying the side walls against vertical compressive forces accompanying normal stacking operations. Improved clip and cleat means for interconnecting the walls to the pallet permits more rapid assembly, with greater resistance to pilferage. An improved sealing means interconnects the lid of the container to the side walls thereof in a manner permitting the use of a conventional seal. An improved side door construction affords greater rigidity to the container, and more effectively resists inwardly directed forces against the outer surface of the door.


**4 Claims, 7 Drawing Figures**

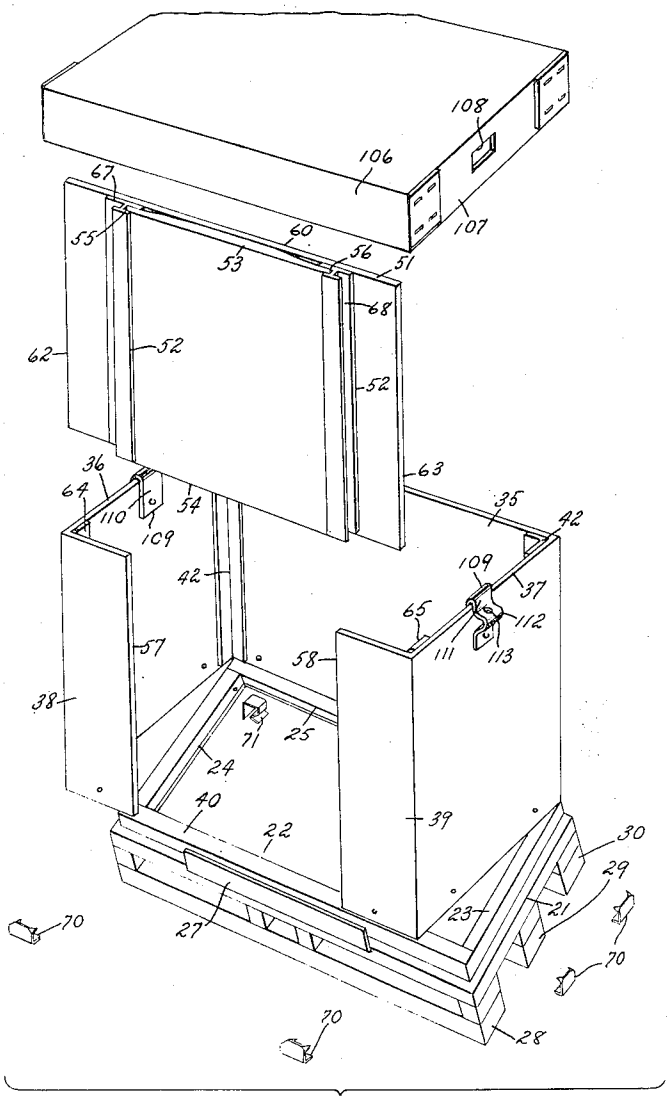

Fig.1

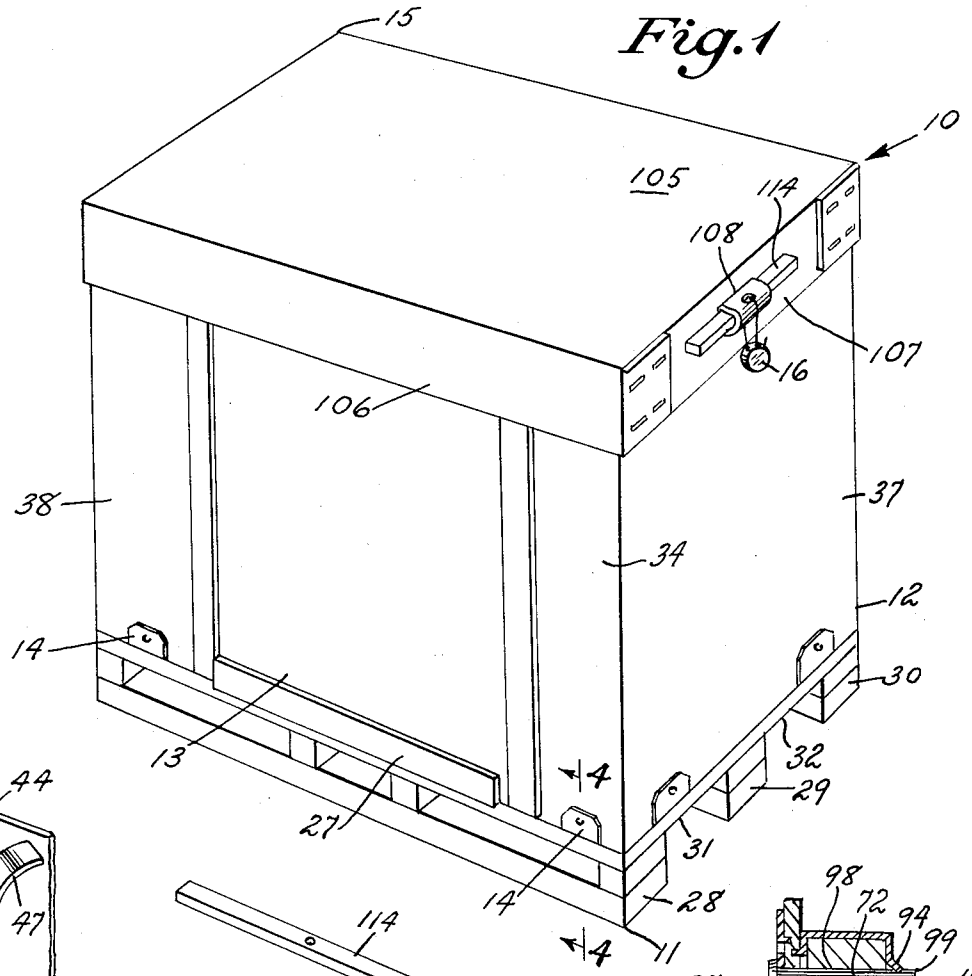





Fig.7

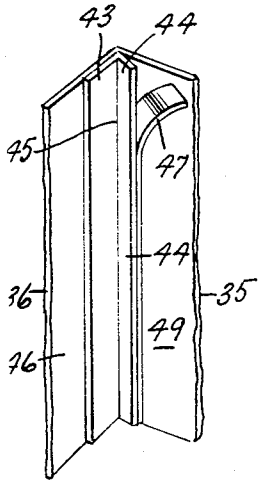


Fig.5

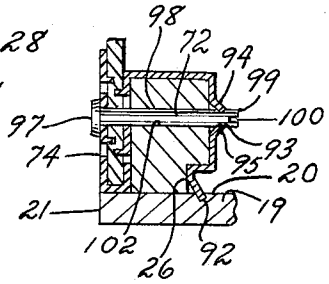


Fig.4

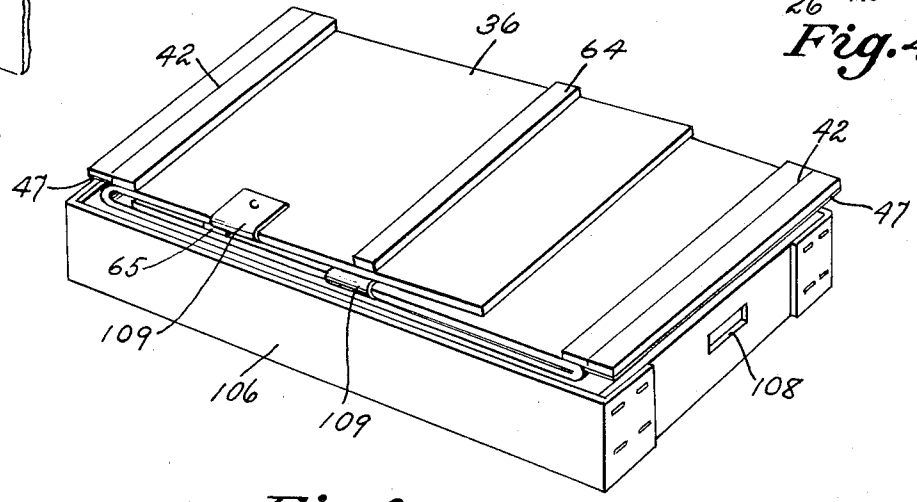


Fig.2

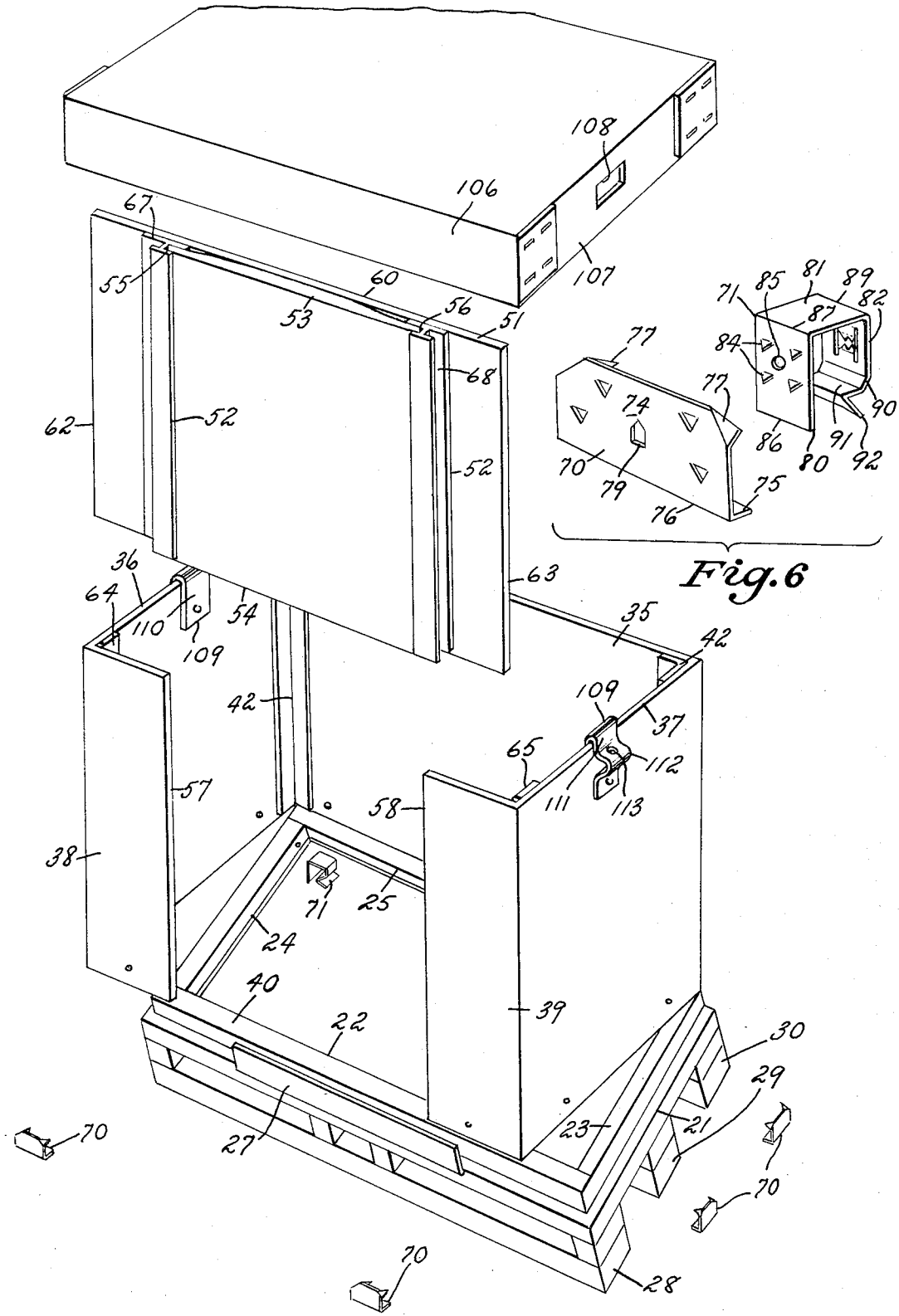
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Fig.6

Fig.3

# COLLAPSIBLE SHIPPING CONTAINER

This invention relates generally to the field of collapsible shipping containers of a type including a relatively rigid pallet conveniently handled by fork-lift trucks, and collapsible side walls which are foldably interconnected with each other, and hingedly interconnected along one edge of the pallet to be folded thereagainst when not in use. Devices of this type are normally provided with a detachable lid or cover, in which the other components are stored in folded condition when not in use. Devices of this general type are known in the art, and the invention lies in specific constructional details permitting more rapid "set up " and "knock down" techniques, increased resistance to crushing during stacking operations, and the use of common lead-type seals which are acceptable to customs authorities throughout the world.

## BRIEF DESCRIPTION OF THE PRIOR ART

The prior art includes applicant's prior U.S. Pat. No. 3,443,737, which discloses a collapsible-reusable bulk shipping container having a rigid pallet and foldable side walls interconnected thereto, as well as a detachable top which is secured by sealable means to the side walls. Applicant's U.S. Pat. No. 3,580,618 discloses a cleat and clip means for selectively interconnecting the erected side walls to the pallet in a manner which permits ready disconnection when it is desired to collapse the container. Applicant's U.S. Pat. No. 3,466,710 discloses a clip suitable for use in maintaining devices of this type in closed condition.

The principal disadvantages involved in the use of prior art structures lies in the inherent weakness of the interconnection between the collapsible side walls and the pallet, which permits rupture and/or pilferage. Because the collapsible side walls are formed of corrugated board, the degree of vertical compression which they can withstand has been limited, in turn limiting the degree of stackability of a plurality of containers. Further, applicant's prior art constructions have required the use of a seal which has not been universally approved by government authorities.

## BRIEF DESCRIPTION OF THE PRESENT INVENTION

Briefly stated, the invention contemplates improvements in a prior art container construction of additional reinforcing means in the corners interconnecting the collapsible side walls to rigidify the same against compression involved in stacking operations. To permit folding of the side walls, the reinforcing structure is in the form of an elongated strip of corrugated board folded axially to form two portions, one of which is permanently glued or otherwise interconneced to an inner surface of one wall, and a second of which is provided with a pressure-sensitive protected adhesive layer, which may be selectively interconnected to an inner surface of an adjacent wall. Further reinforcement is afforded by the presence of a sliding door in one wall which is of multi-ply construction, the inner ply extending rearwardly of the innersurface of the wall forming the door opening. An improved clip and cleat construction is also provided, in which interconnection of the cleat to an associated side wall is accomplished by a threaded bolt engaging a resilient opening in the clip which engages the cleat, so that the same may be driven into position using a hammer, rather than a screwdriver. Once assembled within the structure, the exposed head of the bolt is smooth, and offers no means for engagement with a tool for unauthorized removal. Removal is accomplished by the engagement of a tool with the opposite end of the threaded shank, accessible only interiorly of the container. Improved lid locking means is provided, the same including members providing aligned openings through which the wire portion of a conventional lead seal may be inserted.



## BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, to which reference will be made in the specification, similar reference characters have been employed to designate corresponding parts throughout the several views.

FIG. 1 is a view in perspective of an embodiment of the invention in fully assembled sealed condition.

FIG. 2 is a view in perspective of the embodiment in completely collapsed and stored condition.

FIG. 3 is an exploded view in perspective.

FIG. 4 is an enlarged fragmentary sectional view as seen from the plane 4—4 in FIG. 1.

FIG. 5 is a fragmentary view in perspective showing the interconnection of certain reinforcing structure upon assembly of the device.

FIG. 6 is a view in perspective showing the components of a clip element.

FIG. 7 is a view in perspective of a locking bar.

## DETAILED DESCRIPTION OF THE DISCLOSED EMBODIMENT

In accordance with the invention, the device, generally indicated by reference character **10** comprises broadly: a pallet element **11**, a foldably interconnected side wall assembly **12**, a door element **13**, a plurality of cleat-engaging clip elements **14**, a lid or cover element **15**, and sealing means **16**.

The pallet element **11** is of generally conventional construction, including a main floor **19** bounded by an upper surface **20** and a peripheral edge **21**. Cleat members **22, 23, 24** and **25** (FIG. 3) are spaced inwardly from the peripheral edge **21**, and are of a cross sectional shape best seen in FIG. 4, including a recessed portion **26** for the engagement of elements **14**. A door-engaging lip **27** extends outwardly from the cleat member **22**, and provides a seal for the lower edge of the element **13**. Supporting skids **28, 29** and **30** define elongated interstices **31** and **32** for the entry of a fork of a lifting device (not shown), as is well known in the art.

The side wall assembly **12** is preferably formed of heavy weight multi-ply corrugated board, and includes a rear wall **35** which is hingedly interconnected to the pallet element **11**, side walls **36** and **37**, and forward walls **38** and **39** defining a rectangular opening **40** for the door element **13**.

Reinforcing strips **42** provid a stiffening function at the fold line separating the rear wall **35** from the side walls **36** and **37**, each strip including first and second portions **43** and **44** interconnected by a fold line **45**. The first portion **43** is interconnected to the inner surface **46** of the side wall **36** by glue or staples. A protective strip **47** (FIG. 5) is removable from the outer surface of the second portion **44** to permit detachable pressure-sensitive adhesion to the surface **49** of the rear wall **35**.

The door element **13** is of multi-lamina construction, including an outer lamina **50** and an inner lamina **51**.

Extruded guides **52** of synthetic resinous material or aluminum interconnected the outer lamina **50** within the opening **40** as is known in the art. The outer lamina **50** is bounded by an upper edge **53**, a lower edge **54** as well as side edges **55** and **56** which are disposed opposite the edges **57** and **58** of the opening **40**. The inner lamina **51** is considerably larger, and is of an area equivalent to that of the forward walls **38** and **39** as well as the opening **40**. It is bounded by an upper edge **60**, a lower edge **61** and side edges **62** and **63** which abut the inner surfaces of the side walls **36** and **37**, and provide a stiffening function as they abut the strips **64** and **65** analogous to that of the strips **42**. The guides **52** resemble prior art construction, and include first and second grooves **67** and **68**.

The cleat engaging elements **14** constitute an improvement over those disclosed in my above mentioned prior U.S. Pat. No. 3,580,618. While the earlier construction performed reasonably well under most circumstances, the actual engagement of the fibrous side walls therewith, in one embodiment resulted in retention as a result of resilient means. The more complicated embodiment required separate nut and bolt interconnection means which was time consuming, and which lended itself to pilferage because of the accessibility of the bolt head from the outside of the container.

In the present construction, the elements **14** each include an outer member **70**, an inner member **71** and a bolt **72** passing therethrough. The outer member **70** may be formed as a simple stamping, and includes a main vertical wall **74** and a flange-like horizontal wall **75** interconnected therewith at a lower edge **76**. A plurality of locking tines **77** extend inwardly from the horizontal wall **75** to engage the outer surface of the side wall assembly **12**. A central opening **79** allows for passage of the bolt **72**.

The inner member **71** includes an outer vertical wall **80**, an interconnecting upper wall **81** and an inner vertical wall **82**. The outer wall **80** includes outwardly extending tines **84**, a bolt opening **85**, and a lower edge **86** which abuts the horizontal wall **75**. An upper edge **87** interconnects with the wall **81**. The inner vertical wall **82** is bounded by an upper edge **89** and a lower edge **90**. An offset portion **91** corresponds to the recessed portion **26** in a cleat member **22–25**, and a plurality of downwardly extending teeth **92** engage the upper surface of the pallet element **11** to anchor the inner wall with respect thereto. An opening **93** is formed by a pair of resilient tines **94** and **95**, the ends of the tines being shaped to engage the threads of the bolt **72** in lieu of a conventional nut.

The bolt **72** includes a flat head **97** resembling the head of a carriage bolt, so as to afford no tool-engaging surface. A threaded shank **98** terminates in a free end **99** having a screwdriver slot **100** therein.

Assembly or erection of the device will be understood from a consideration of FIG. **4**, wherein after the side wall assembly **12** has been unfolded from the condition shown in FIG. **2** to the condition shown in FIG. **3**, the elements **14** are assembled such that the bolt **72** is driven by a hammer through a bore **102** in the cleat to engage the resilient opening formed by the tines **94–95**. When the device is collapsed, the screwdriver slot **100** is accessible from the inside of the empty container to authorized personnel. Externally, a closed device cannot be disassembled by unscrewing the bolt **72**, since there is no means for obtaining purchase thereupn.

The lid element **15** is of conventional construction, including an upper wall **105**, peripheral side walls **106** and peripheral end walls **107**. The end walls **107** are provided with rectangular slots **108** which engage lid retaining members **109** when the device is closed.

The lid retaining members **109** each include an inner wall **110**, and an outer wall **111** forming a loop portion **112**. Through openings **113** penetrate the upper and lower portions of the loop portion **112**, and align with corresponding openings in an elongated locking bar **114**, the length of which exceeds that of the rectangular slots **108**. Thus, when the lid is in closed position, and the locking bar **114** inserted as seen in FIG. **1**, a conventional lead seal **116** may be employed, the wires of the same being threaded through the aligned openings to prevent unauthorized removal.

I wish it to be understood that I do not consider the invention limited to the precise details of structure shown and set forth in this specification, for obvious modifications will occur to those skilled in the art to which the invention pertains.

I claim:

**1.** In a collapsible shipping container of a type including a rigid base, a flexible side wall assembly including a plurality of foldably associated side walls, one of which is hingedly connected to said base, the improvement comprising: means for rigidifying the side wall assembly against vertical compression encountered during the stacking of a plurality of said containers, said means including an elongated strip of material having an axially oriented fold line defining first and second planar members on either side thereof, said strip being positioned in an area of hinged interconnection between adjacent side walls with said axially aligned fold overlying a fold line of said side wall assembly; means permanently interconnecting one of said planar members to an inner surface of a side wall, and pressure-sensitive adhesive means selectively adhering the other of said planar members to the inner surface of an adjacent foldably interconnected wall of said side wall assembly.

**2.** In a collapsible shipping container of a type including a rigid base and a foldable side wall assembly hingedly connected to said base along at least one wall of said side wall assembly, said side wall assembly defining in erected condition a rectangular door opening in one wall thereof partially bounded by vertical edges, and a door element arranged for sliding movement within said opening, the improvement comprising: said door element including first and second laminae, said first lamina corresponding in size to the size of said opening, a pair of guides interconnecting said first lamina and said vertical edges for sliding movement of said first lamina within said opening, said second lamina being of overall configuration corresponding to the total area of said wall including said opening, and interconnected in parallel relation to said first lamina for movement therewith, said second lamina thereby overlying inner surfaces of said last mentioned wall.

**3.** In a collapsible shipping container of a type including a rigid base and a flexible side wall assembly hingedly interconnected to said base along one side wall thereof and selectively interconnectable to said base along the remaining side walls thereof, improved means for maintaining such selected interconnection

comprising: a cleat secured to an upper surface of said base, a clip element including an outer clip member having a plurality of inwardly facing tines penetrating an outer surface of a wall of said side wall assembly, said outer clip member defining a bolt-penetrating opening; an inner clip member having a first side wall defining a corresponding bolt-penetratng opening, an inner wall defining a resilient opening and a wall interconnecting said inner and outer walls, said inner wall having downwardly facing teeth thereon engageable with an upper surface of said rigid base and an offset portion adapted to engage a recess in said cleat; and a bolt having a head free of tool-engaging surfaces, and a threaded shank having tool-engaging means on an inner end thereof.

4. In a shipping container of a type including a plurality of side walls and a cover engageable upon the upper edges of said side walls, lid retaining means fixed to at least one of said side walls and having a looped portion penetrating an opening in a peripheral side wall of said cover, improved sealing means comprising: said looped portion including a pair of aligned orifices, an elongated bar insertable into said looped portion, said bar having a length greater than the efective length of said opening, said bar having a through bore alignable with said pair of aligned bores, thereby the wire portion of a conventional lead seal may be inserted therethrough.

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