

[54] CONTAINER FASTENER MEANS
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[51] Int. Cl. A62b 35/00, B65j 1/22, B61d 17/00
[58] Field of Search 24/201; 220/23.4, 220/40, 1.5; 105/366 B, 366 C; 248/361

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[57] ABSTRACT
A fitting extends through the bottom access opening into the cavity of a corner casting on a container. The fitting has a bore formed through the upper portion thereof which is axially aligned with the side access opening of the corner casting. A fastener pin extends through the side access opening and said bore. The fastener pin includes at least one cam surface thereon whereby upon rotation of the pin the fitting and the corner casting are urged in opposite directions to firmly clamp the fitting to the corner casting.

9 Claims, 13 Drawing Figures

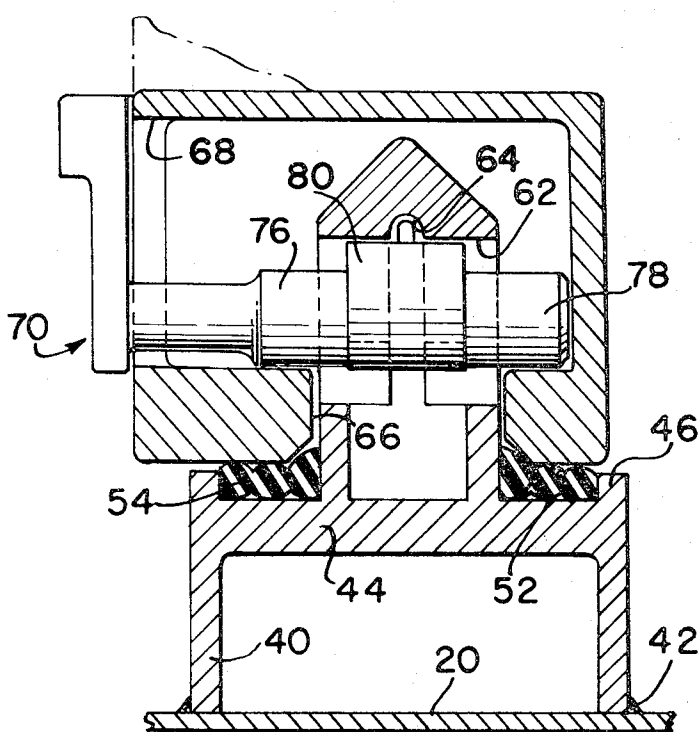


FIG. 1.

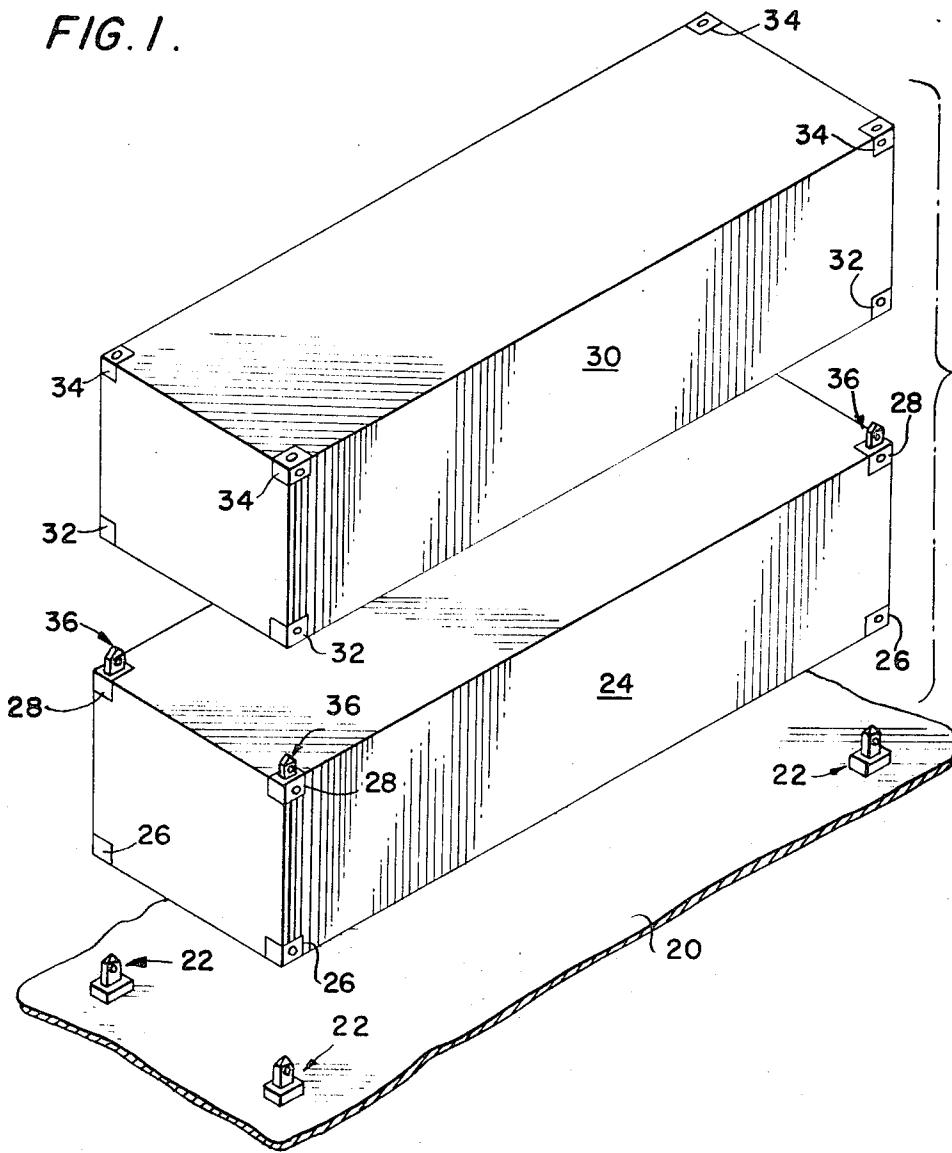


FIG. 2.

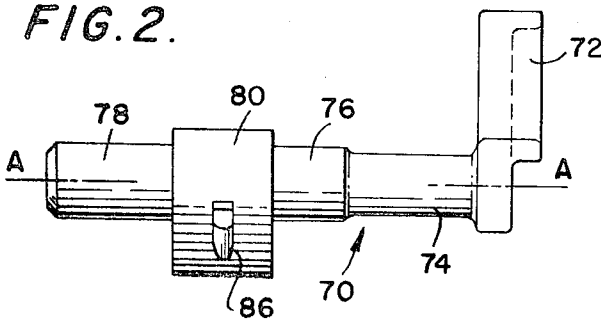
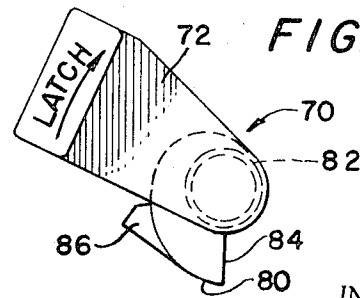


FIG. 3.



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FIG. 4.

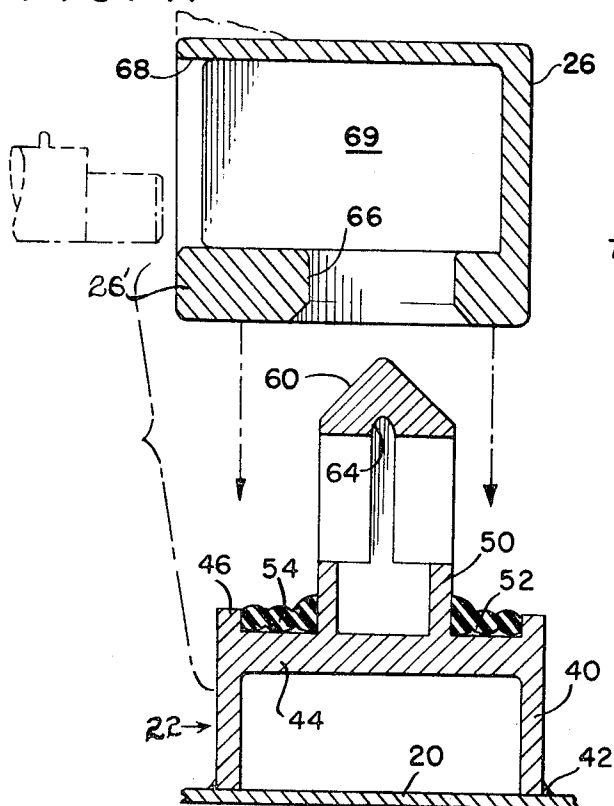


FIG. 5.

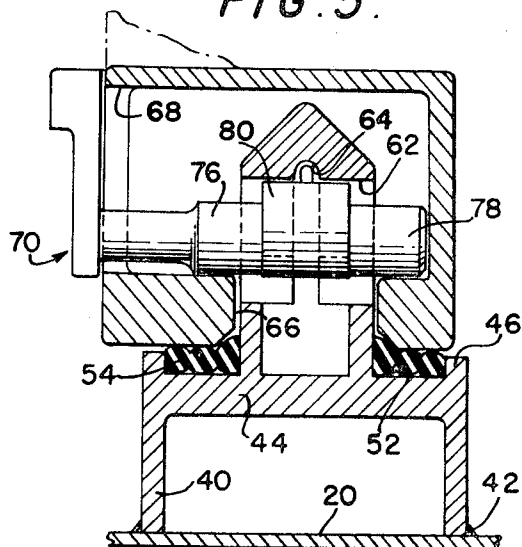
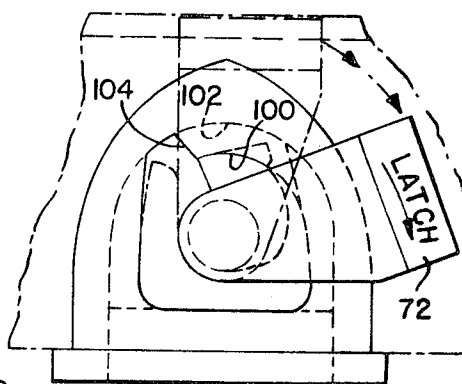
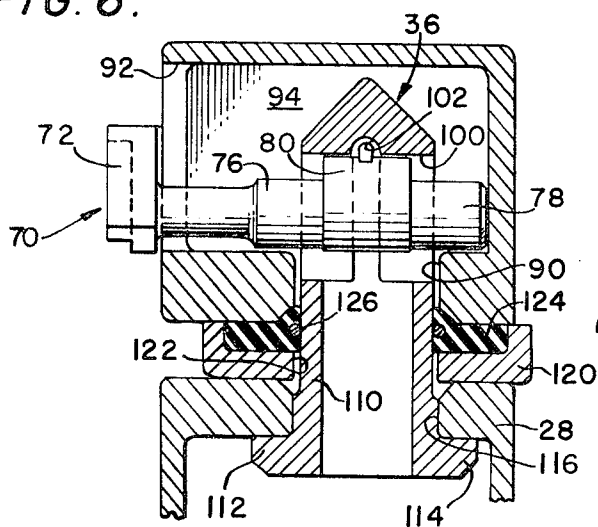


FIG. 7.

FIG. 6.



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FIG. 8.

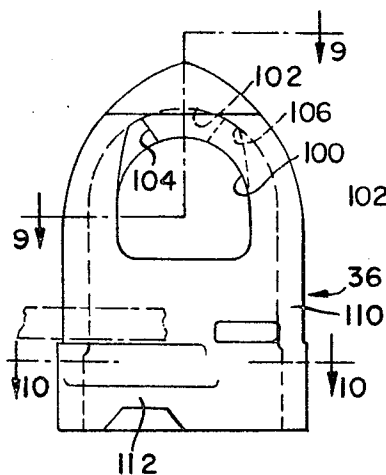


FIG. 9.

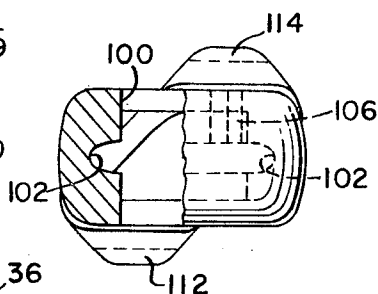


FIG. 10.

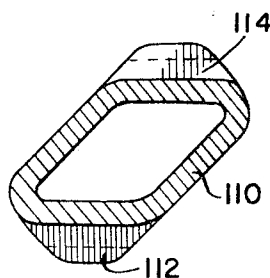


FIG. 11.

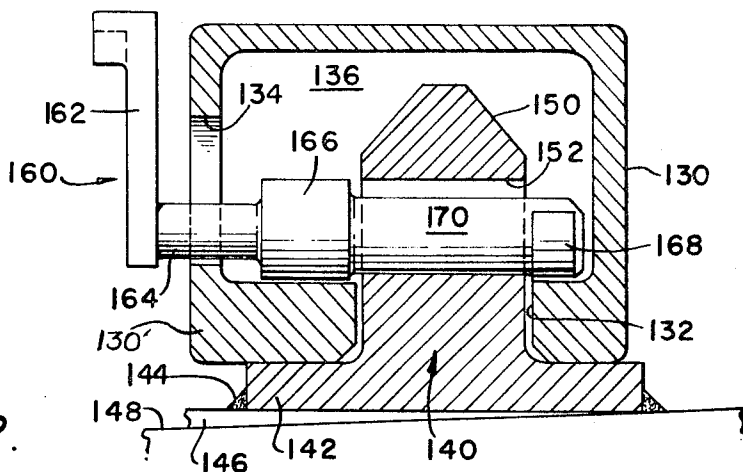


FIG. 12.

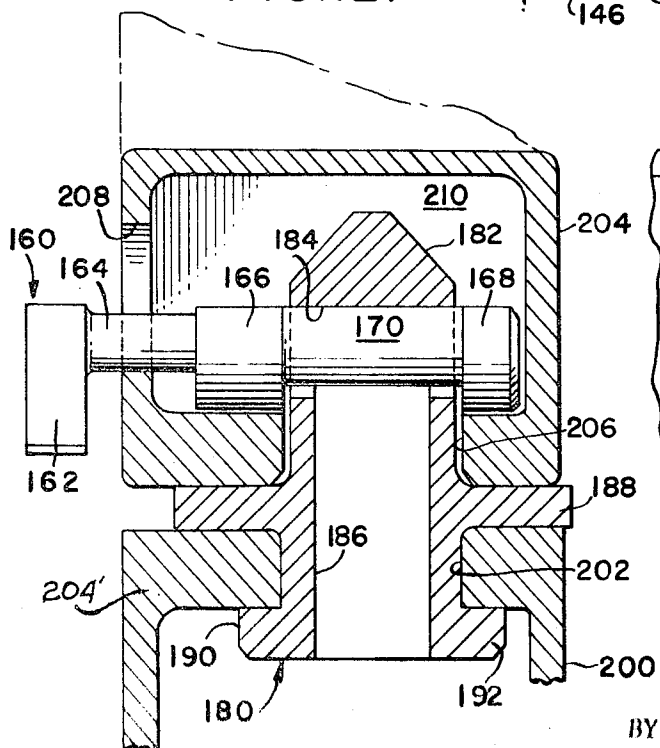
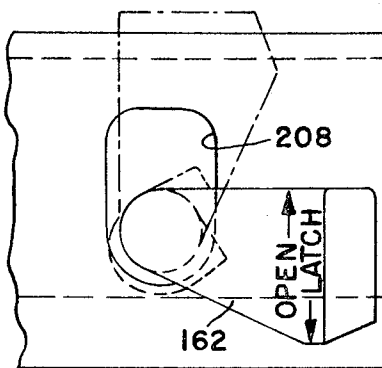


FIG. 13.



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CONTAINER FASTENER MEANS

BACKGROUND OF THE INVENTION

The present invention relates to fastener means especially adapted to fasten shipping containers to one another or to a supporting surface such as the deck of suitable transport means.

The fastener means of the present invention is particularly adapted for use with bulk cargo containers as presently employed in land, sea and air transportation. These containers are generally sealed after loading and are then handled as a unit. Such containers include corner fittings generally designated corner castings at each of the four top and bottom corners of the containers. These corner castings are generally of the same construction including cavities therein as well as access openings to provide access to the cavities.

Prior art fastener means adapted to cooperate with corner castings of containers have often been of relatively complex construction and, furthermore, have failed to provide adequate clamping of the containers in place so as to insure that there will be no relative movement between the containers and the fittings to which they are connected.

SUMMARY OF THE INVENTION

In the present invention, a fitting is provided which is suitable either for connecting a container to a supporting surface such as a deck or for connecting the corner castings of two adjacent containers which are stacked upon one another.

Both forms of the fitting according to the present invention include a portion which extends upwardly through the bottom access opening of a corner casting of a container into the cavity within the casting. The upper portion of the fitting is provided with a bore which is axially aligned with a side access opening in the corner casting whereby a fastener pin can be inserted through the side access opening and the aligned bore.

The fastener pin has at least one cam surface formed thereon so that upon rotation of the pin about the longitudinal axis thereof surfaces of the fastener pin are adapted to urge the fitting and the corner casting in opposite directions to provide a strong clamping force which tightly clamps the corner casting to the associated fitting.

The arrangement of the present invention is quite simple and inexpensive in construction and yet at the same time provides a very strong clamping force to insure that there will be no relative movement between the corner casting and the associated container with respect to the fitting connected thereto.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top perspective exploded view illustrating a pair of cargo containers adapted to be stacked upon one another on a supporting deck;

FIG. 2 is an elevation of the fastener means employed in a first form of the invention;

FIG. 3 is an end view of the fastener pin shown in FIG. 2;

FIG. 4 is an exploded vertical section showing a fitting and a cooperating corner casting on a container;

FIG. 5 shows the components of FIG. 4 in operative relationship with respect to one another with the fastener pin shown in FIGS. 2 and 3 associated therewith;

FIG. 6 illustrates a modified form of fitting according to the invention;

FIG. 7 is a side view illustrating the cooperation between the fitting shown in FIG. 6 and the associated fastener pin;

FIG. 8 is a side elevation of the fitting shown in FIG. 6;

FIG. 9 is a sectional view taken substantially along line 9—9 of FIG. 8 looking in the direction of the arrows;

FIG. 10 is a sectional view taken substantially along the line 10—10 of FIG. 8 looking in the direction of the arrows;

FIG. 11 is a vertical section through still another modified form of the invention illustrating a first type of fitting;

FIG. 12 is a view similar to FIG. 11 showing a different type of fitting; and

FIG. 13 is a side view of a portion of the structure shown in FIG. 12.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings wherein like reference characters designate corresponding parts throughout the several views, as seen in FIG. 1 a deck 20 of any suitable transporting means such as a ship, trailer or railway car and the like is provided with four spaced fittings 22 which are fixedly secured to the deck and which are adapted to cooperate with the corner castings on an associated container for fastening the container to the deck. A first container 24 includes four conventional corner castings 26 at the lower corners thereof and four conventional corner castings 28 at the upper corners thereof. A similar container 30 includes lower corner castings 32 and upper corner castings 34, these containers being in all respects of conventional construction.

The lower container 24 is adapted to be secured to the deck by means of fittings 22, and the upper container 30 is in turn adapted to be stacked on top of lower container 24 and secured thereto by suitable fittings indicated generally by reference characters 36 which have already been placed in operative position in the upper corner castings 28 of the lower container 24.

Referring now to FIG. 4, each of fittings 22 includes a base portion 40 which is fixedly secured as by welding indicated by reference character 42 to deck 20. The fitting includes a thickened top wall 44 having a peripherally extending flange 46 extending upwardly therefrom. An upwardly extending portion 50 is provided at the central part of top wall 44 and a recess 52 provided between flange 46 and portion 50 receives a resilient pad means 54 formed of rubber or the like which is adapted to engage an associated corner casting to flow under the corner casting when a load is applied thereto to prevent lateral motion of the corner casting.

The upper end 60 of central portion 50 is tapered, and a bore 62 is formed through the upper portion of the fitting. A groove 64 is provided in the fitting radially outwardly of bore 62 and extends peripherally about the bore for a purpose hereinafter described.

Corner casting 26 is of conventional construction and includes a bottom access opening 66 through the casting bottom wall 26' and a side access opening 68 each of which opens into the cavity 69 provided within

the corner casting. As seen in FIG. 5, when the container is lowered into operative position, the upper portion of fitting 22 is received through the bottom access opening of the corner casting and the bore 62 provided through the upper portion of the fitting is axially aligned with the side access opening 68 of the casting. When in this operative position, the fastener pin 70 is adapted to be inserted into the position shown in FIG. 5.

Referring now to FIGS. 2 and 3, fastener pin 70 includes a handle portion 72 at the outer end thereof extending generally perpendicular to the longitudinal axis A—A thereof. The pin body itself includes a reduced portion 74 as well as a pair of spaced cylindrical surfaces 76 and 78, each of which is concentric to the longitudinal axis A—A. Formed on the pin body intermediate the two surfaces 76 and 78 is a cam surface 80 which is eccentric to the longitudinal axis of the pin and extends from a low point 82 to a high point 84 as seen in FIG. 3.

A retainer projection or lug 86 is formed on cam surface 80 and projects radially outwardly thereof. This projection is adapted to be received within the groove 64 provided in the fitting for retaining the fitting and pin in proper axial relationship with respect to one another as hereinafter described.

Referring now to FIGS. 6–10 inclusive, fastener pin 70 is disclosed in operative relationship with respect to fitting 36 which is of different construction from fitting 22 previously described. As seen in FIG. 6, fitting 36 has a lower portion thereof disposed within a corner casting 28 and the upper portion thereof disposed within a corner casting 32. The corner casting 32 is provided with the usual bottom access opening 90 and side access opening 92 providing access to the cavity 94 therewithin.

As seen most clearly in FIGS. 7–10, fitting 36 has a bore 100 formed therethrough which is of identical construction with the bore 62 previously described. A retainer groove 102 is provided within fitting 36 outwardly of bore 100 and extending peripherally thereof, groove 102 being of the same construction as groove 64 previously described and adapted to cooperate with the projection 86 formed on the fastener pin for retaining the fastener pin in operative position relative to the fitting.

Fitting 36 is provided with a first cut-out 104 extending from one side of the fitting to groove 102. A similar cut-out 106 is provided from the opposite side of the fitting to the groove, cut-outs 104 and 106 being offset with respect to one another as seen most clearly in FIG. 8. These cut-outs enable the projection 86 formed on the fastener pin to be inserted into groove 102 in the initial unclamped position of the pin. The pin is then rotated about the longitudinal axis thereof whereupon projection 86 on the pin rides within groove 102 to prevent the fitting and pin from being axially misaligned with respect to one another until the pin is again returned to its initial unclamped position. It should be understood that side access opening 92 in fitting 22 is sufficiently large to permit insertion of pin 70 into fitting 36.

Fitting 36 includes a main hollow body portion 110 having a pair of generally opposite radially outwardly extending lugs 112 and 114 at the lower end thereof. These lugs 112 and 114 enable the fitting to be inserted through the top access opening 116 provided in corner

casting 28 whereupon the fitting is rotated so that lugs 112 and 114 are adapted to engage the inner surface of the corner casting to prevent the fitting from moving vertically out of the corner casting.

A floating flange 20 is of generally cup-shaped cross section and includes a central hole 122 loosely receiving the body 110 of fitting 36. A resilient pad means in the form of a rubber pad 124 is supported within the floating flange, and a stop member 126 in the form of a metallic member is rigidly secured to the outer surface of the body of the fitting as by welding or the like so as to limit upward movement of the flange with respect to the fitting. The resilient pad means 124 serves the same general purpose as resilient pad means 54 previously described.

When utilizing the structure as shown in either FIG. 5 or FIG. 6, the fitting is inserted through the lower access opening into the cavity of the corner casting of an associated container. The fastener pin is then inserted into the operative position shown in FIG. 5 whereupon it is rotated in a clockwise direction as shown, for example, in FIG. 7 to move the fastener pin into clamping position.

As the pin is rotated toward its clamping position, surfaces 76 and 78 formed on a fastener pin engage the corner casting while cam surface 80 of the fastener pin engages the fitting inserted within the corner casting. As shown in the drawings, surfaces 76 and 78 will urge the corner casting downwardly while the cam surface 80 will urge the fitting upwardly. Accordingly, the corner casting and the fitting are urged in opposite directions by the surfaces formed on the fastener pin to cause the corner casting and fitting to be tightly clamped to one another. It will be noted that the forces applied to the corner casting and fitting are symmetrical with respect to one another so as to eliminate any tendency of these two components to be canted with respect to one another.

Referring now to FIG. 11, a further form of the invention is illustrated wherein a bottom corner casting 130 includes a bottom access opening 132 and a side access opening 134 providing access to the cavity 136 through the casting bottom wall 130' provided within the corner casting.

In this form of the invention, a fitting indicated generally by reference character 140 includes a base portion 142 suitably fixed as by welding indicated at 144 to a built up portion 146 extending upwardly from a deck or supporting surface 148. Built up portion 146 is only necessary in the event the deck is not horizontal since it is essential to mount the fitting in horizontal position.

The upper end 150 of fitting 140 is tapered and a bore 152 extends through the upper part of the fitting and is aligned with the side access opening 134 when the fitting and corner casting are disposed in operative relationship with respect to one another as seen in this figure.

A fastener pin is indicated generally by reference character 160 and includes a handle portion 162 extending generally perpendicular to the longitudinal axis of the pin. The body of the pin includes a reduced portion 164 and a pair of cam surfaces 166 and 168, each of which is eccentric with respect to the longitudinal axis of the pin. These two cam surfaces are adapted to engage the spaced portions of the corner casting of the associated container.

Fastener pin 160 also includes a cylindrical surface 170 intermediate the two cam surfaces 166 and 168, surface 170 being concentric with the longitudinal axis of the pin and engaging fitting 140.

Referring now to FIGS. 12 and 13, fastener pin 160 is disclosed as being employed with the fitting 180 adapted, for example, to connect two adjacent containers to one another. Fitting 180 includes a tapered upper end 182, a bore 184 being formed through the upper part of the fitting. The fitting includes a main hollow body portion 186 from which extends a transverse flange 188. A pair of lugs 190 and 192 are provided at the lower end of the fitting whereby the fitting may be inserted in operative position in a manner similar to the fitting 36 previously described.

Fitting 180 is illustrated as being operatively associated with a corner casting 200 at the upper part of a lower container, this corner casting having a top access opening 202 receiving the lower end of fitting 180. It will be noted that the top of the corner casting fits snugly between lugs 190, 192 and flange 188 formed on the fitting.

The upper part of fitting 180 is operatively associated with the lower corner casting 204 of an associated container, this lower corner casting having a bottom access opening 206 through the casting bottom wall 204' and through which the fitting extends as well as a side access opening 208 providing access to the cavity 210 formed within the casting.

When utilizing the fastener pin 160 as shown in FIGS. 11-13 inclusive, the fastener pin is initially inserted through the side access opening of a corner casting and through the bore in a fitting received within the casting with the handle in an upright position as shown in FIG. 11. After the fastener pin has been so inserted, it is then rotated in a clockwise direction as shown in FIG. 13 so as to move into the clamped position shown in solid lines in FIGS. 12 and 13. When the pin is rotated in this manner, cam surface 168 of the pin prevents the pin from being removed axially from the bore in the associated fitting. It is apparent that rotation of the pin causes the surface 170 of the pin to urge the fitting upwardly while the cam surfaces 166 and 168 of the pin urge the corner casting downwardly thereby urging the fitting and corner casting in opposite directions so as to tightly clamp the corner casting to the fitting.

As this invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, the present embodiment is therefore illustrative and not restrictive, and since the scope of the invention is defined by the appended claims, all changes that fall within the metes and bounds of the claims or that form their functional as well as conjointly cooperative equivalents are therefore intended to be embraced by those claims.

What is claimed is:

1. Fastener means for a container provided with bottom corner castings each having a bottom wall and defining the lower limit of a cavity therein, said casting including a side access opening to said cavity and a bottom access opening to said cavity, a fitting relatively

fixed with respect to a stationary supporting base member extending through said bottom access opening into said cavity when said casting is lowered onto said supported fitting, said fitting having a transverse bore formed through the upper portion thereof axially aligned with said side access opening, a fastener pin freely extending through said side access opening and said bore and projecting beyond said fitting bore into said cavity, said fastener pin including at least two dissimilar adjacent surfaces within said cavity, one of said surfaces being engageable with said corner casting bottom wall within said cavity to urge the corner casting in one vertical direction upon rotary movement of the pin relative to said fitting, the other of said surfaces being engageable with the upper limit of said fitting bore to urge said fitting in the opposite vertical direction upon rotary movement of said pin relative to said fitting to urge said casting bottom wall toward said supporting base member, and at least one of said surfaces comprising a cam surface eccentric to the longitudinal axis of said pin whereby the effective vertical height of said pin within said cavity is progressively increased or decreased as said pin is angularly displaced in one direction of the other, respectively.

2. Fastener means as defined in claim 1 including retainer means on said fitting and cooperating interengageable retainer means on said pin for longitudinally retaining the pin in operative relationship with respect to said fitting.

3. Fastener means as defined in claim 2 wherein the retainer means on the fitting comprises a recess in the fitting, the retainer means on the pin comprising a radially extending projection.

4. Fastener means as defined in claim 3 wherein the recess on said fitting comprises a groove in the fitting outwardly of said bore and extending peripherally thereof.

5. Fastener means as defined in claim 3 wherein said fitting is provided with a cut-out in communication with said recess for receiving the projection of said pin.

6. Fastener means as defined in claim 1 including a resilient pad means surrounding said fitting for supporting said corner casting bottom wall.

7. Fastener means as defined in claim 1 including a flange disposed in surrounding relationship to said fitting and mounted for movement with respect thereto, resilient pad means supported by said flange and stop means on said fitting for limiting movement of said flange in one direction.

8. Fastener means as defined in claim 1 wherein said other surface engageable with said fitting comprises said cam surface, said pin being provided with a pair of surfaces at opposite sides of said cam surface engageable with said corner casting.

9. Fastener means as defined in claim 1 wherein said pin has formed thereon a pair of spaced said cam surfaces engageable with said casting, said pin having said other of said surfaces intermediate said spaced cam surfaces and engageable with said fitting.

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