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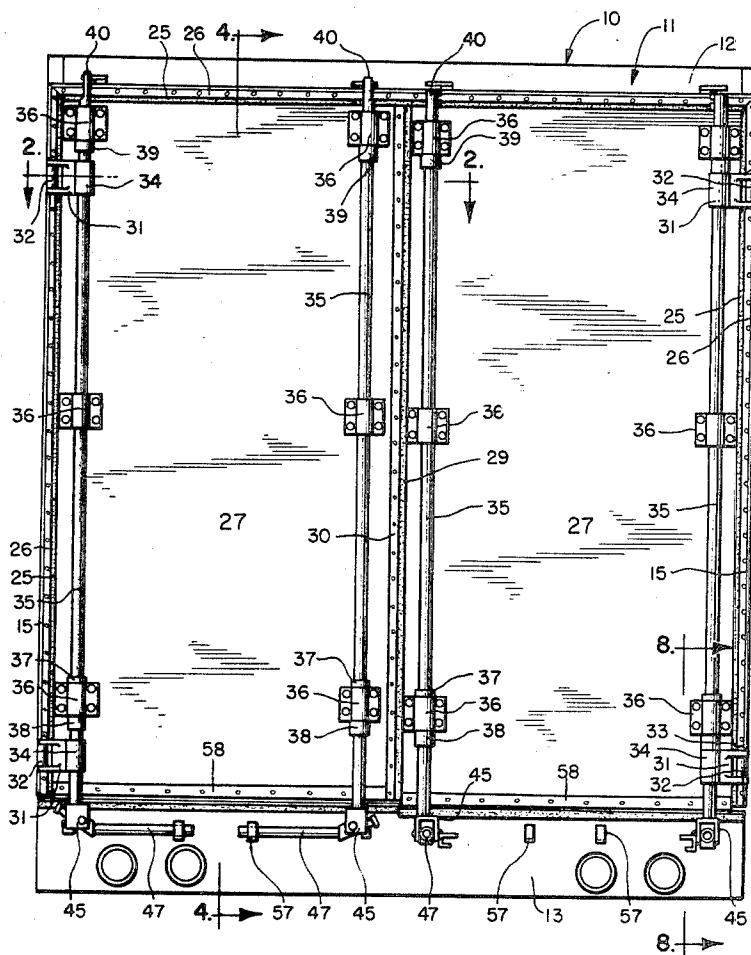
[54] **CONTAINER DOOR CONSTRUCTION**
14 Claims, 13 Drawing Figs.

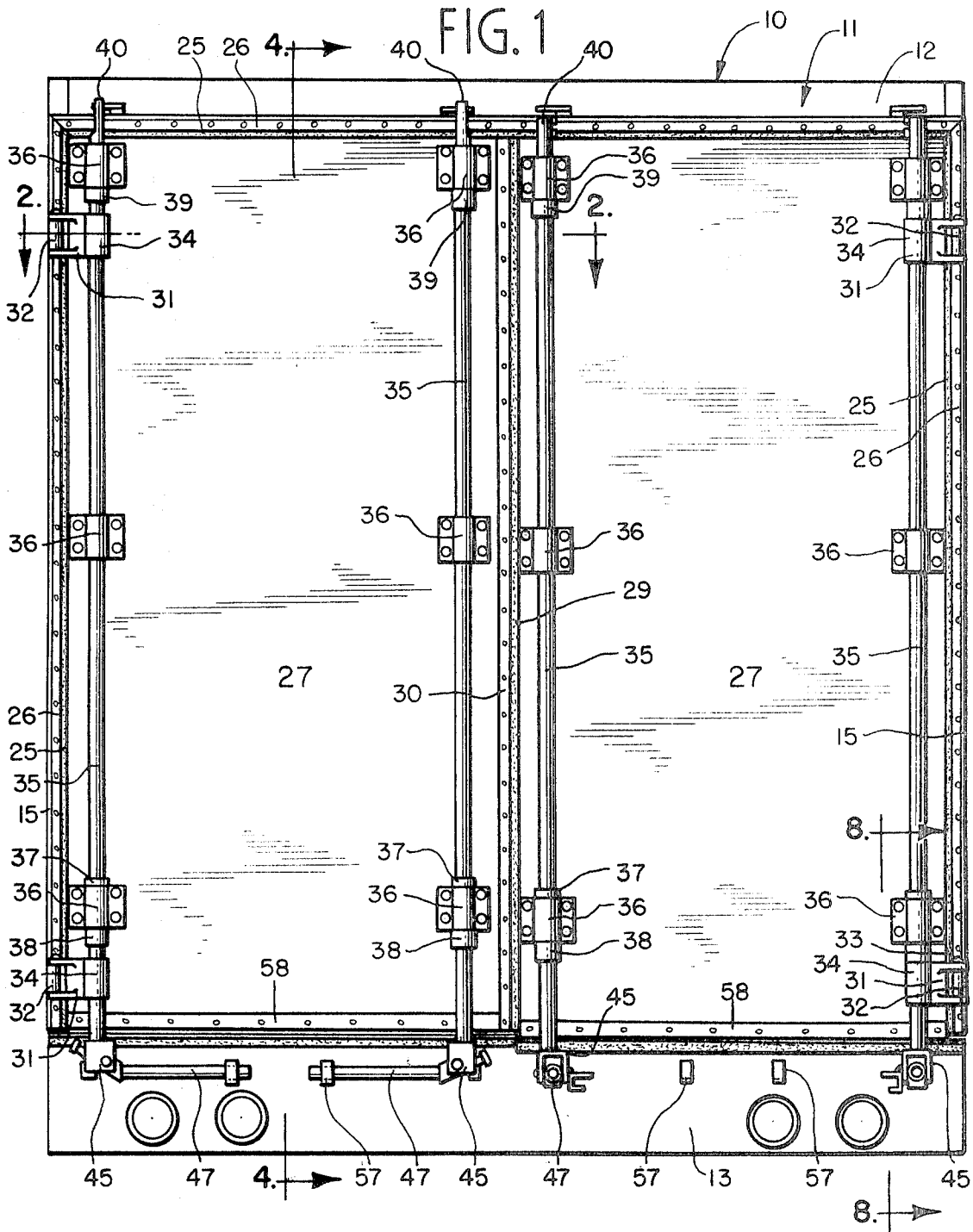
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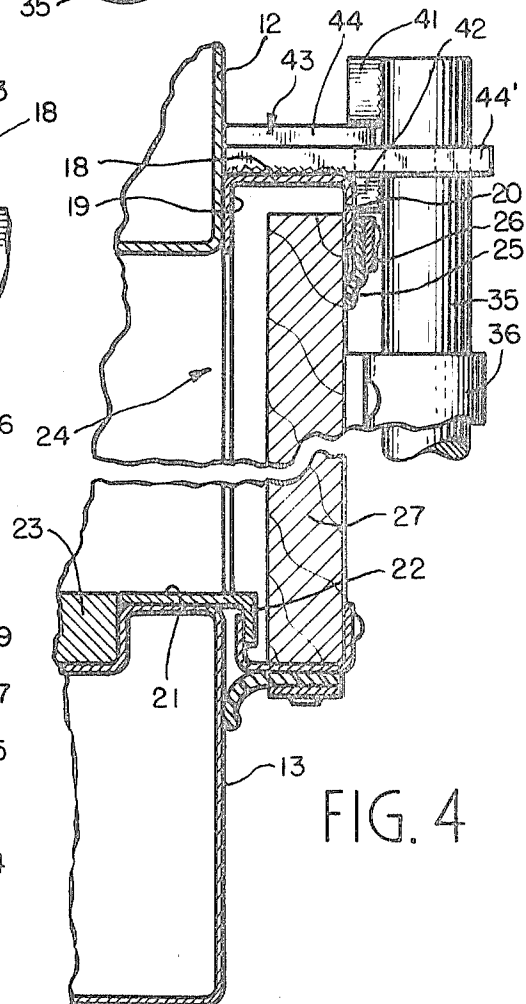
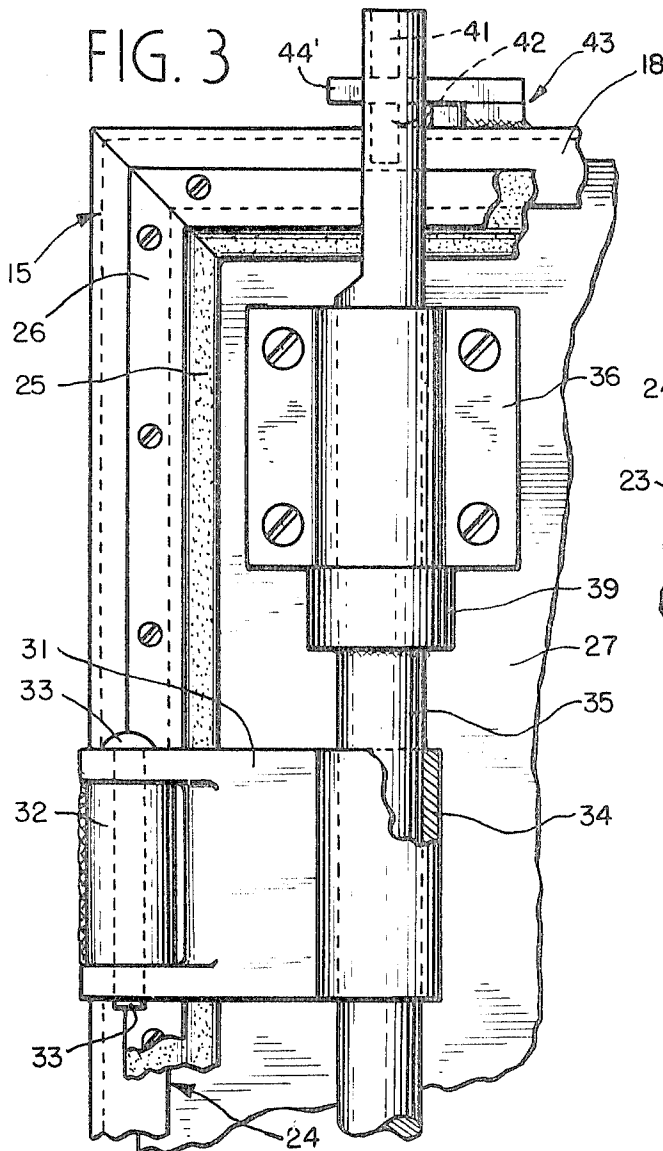
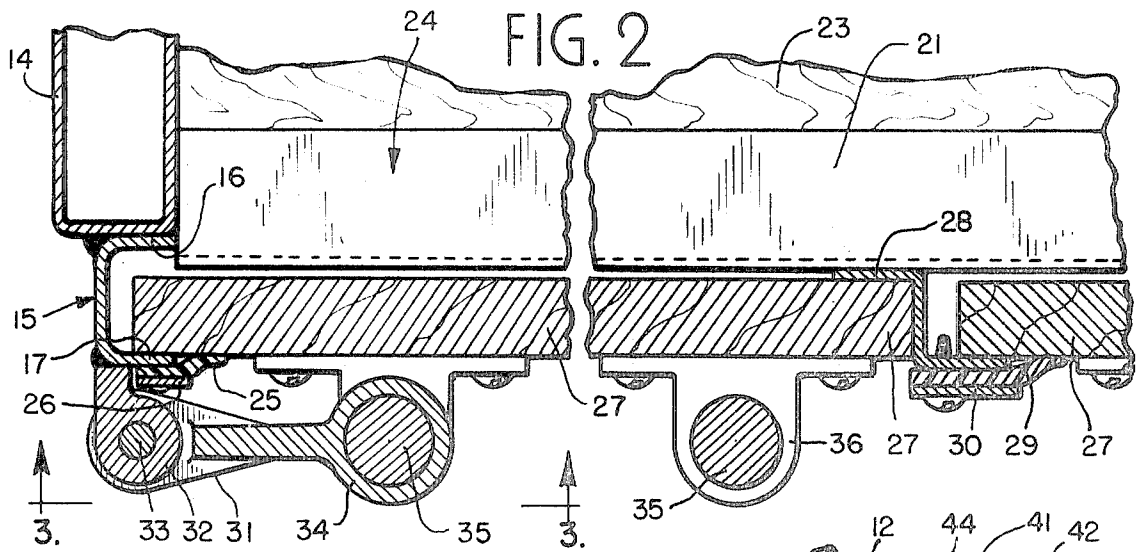
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ABSTRACT: A container includes a door construction having a hinged door which is shiftable vertically when the door is disposed over a container opening. Locking rods are rotatable on the door and are movable vertically therewith. Manually operable levers are connected to the lower ends of the locking rods and abutments on the door frame may be engaged by said levers whereby the door is shiftable to its raised and closed position and maintained therein. In this position the peripheral edges of the door engage peripheral portions of the doorframe so that outwardly directed loads against the door are carried solely by the frame and not on the door hinges or locking rods.

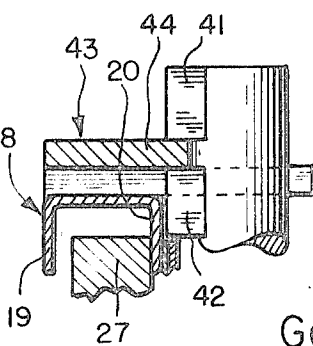
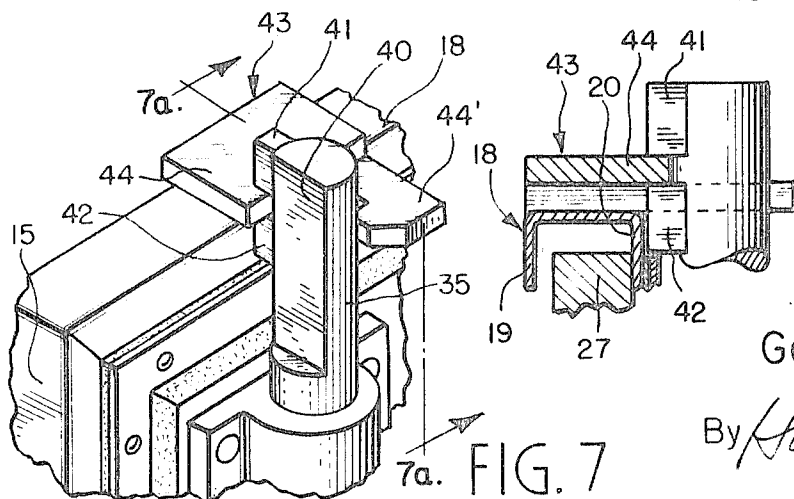
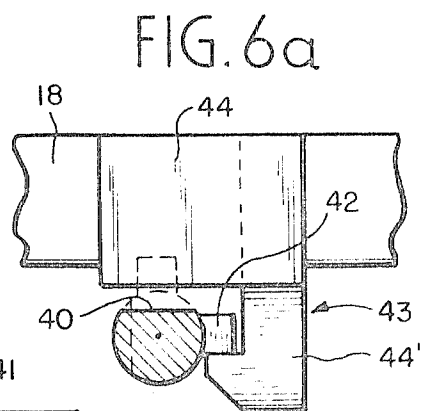
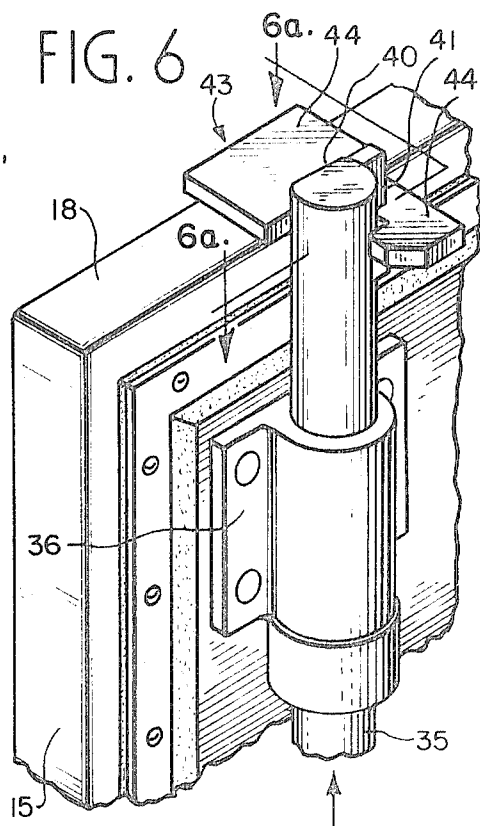
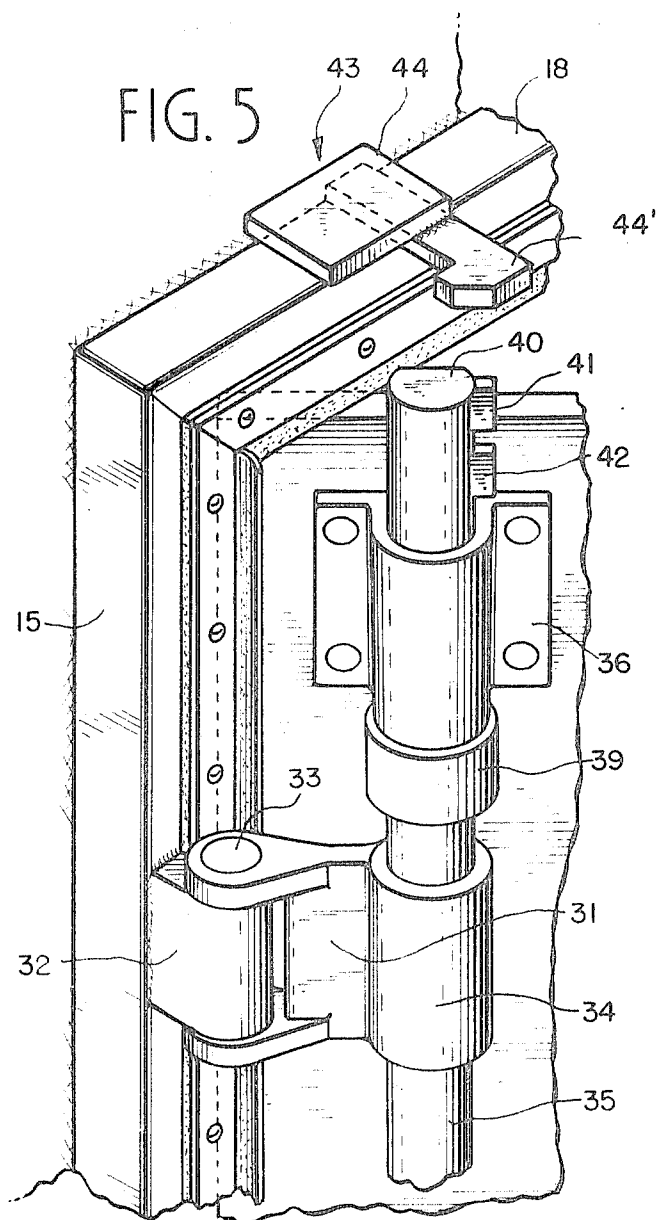




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FIG. 8

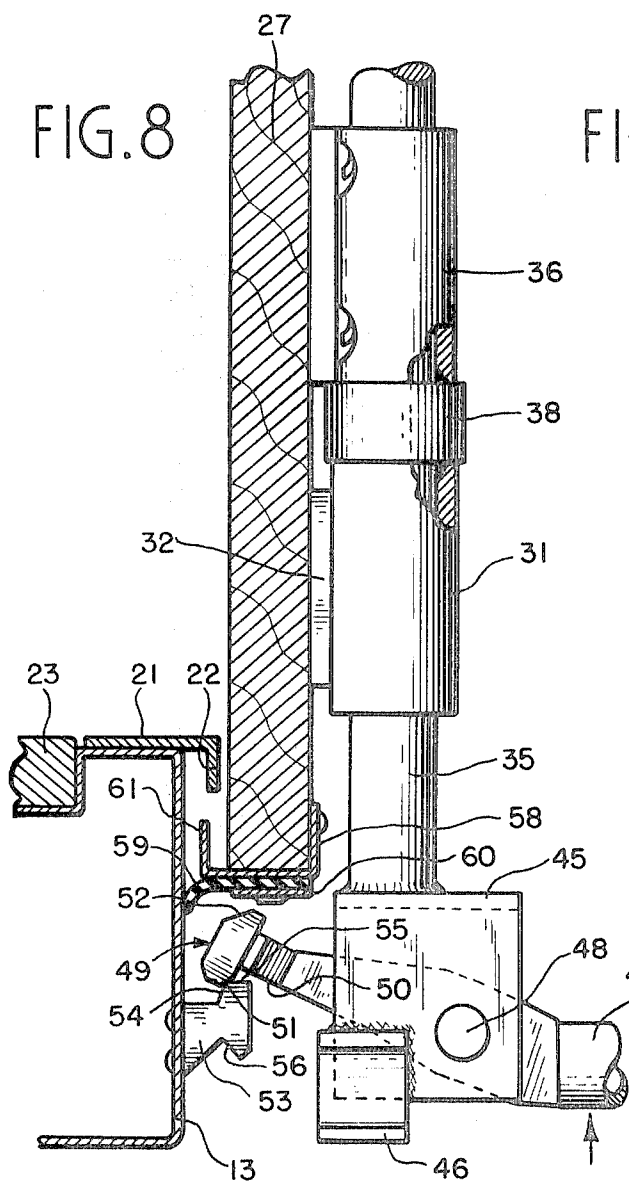


FIG. 8a

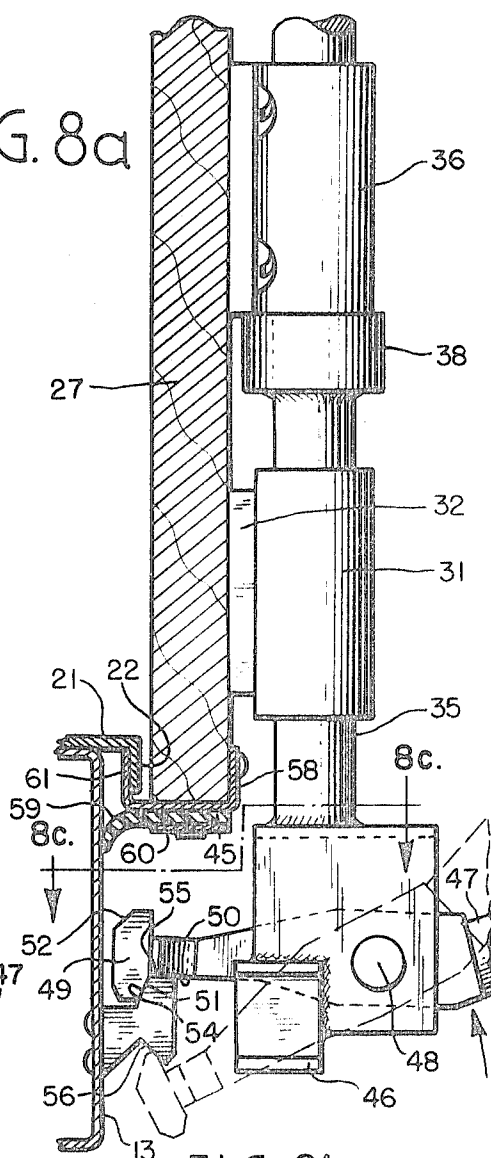


FIG. 8b

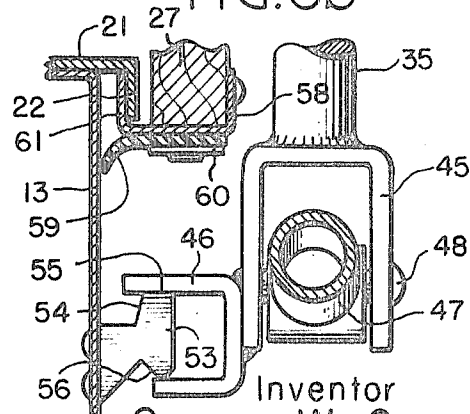
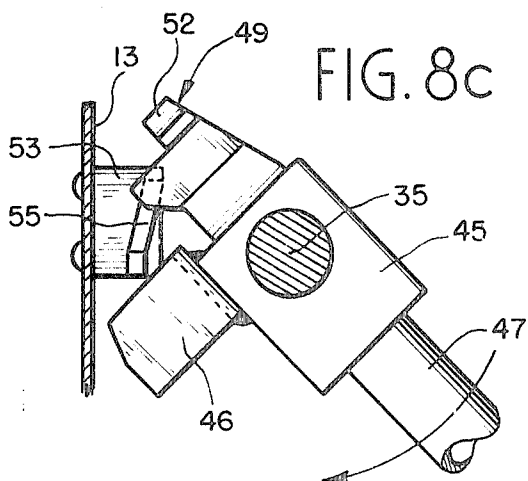


FIG. 8c



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CONTAINER DOOR CONSTRUCTION

SUMMARY

The primary object of the present invention is to provide an improved door construction for a shipping container and the like wherein the thrust forces against the door, occasioned by shifting of the lading therein during shipment, are taken or absorbed in the structural parts of the container such as the header and jambs independently of the operating and locking mechanism of the door.

The door construction disclosed is of a double-door type. To achieve the desired results the doors are shiftable vertically into a raised and locked position after hinging movement from an open to a closed position. Each door is provided with operating and locking rod elements which are provided at their lower ends with hand levers adapted to engage abutments supported on and projecting outwardly from the lower door header. The levers upon actuation provide for the bodily movement of the doors to an upper and raised position wherein the upper edge of the door is against the inner surface of an upper header and the lower edge of the door is provided with an interlocking means adapted to engage portions of the lower header so that outward forces against the door are absorbed in the headers. During pivoting action likewise the doors are shifted into position wherein the outer edges overlap the side jambs of the doorframe so that these also absorb thrust forces during shipment of the container.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a rear elevational view of a container showing an improved door construction;

FIG. 2 is a cross-sectional view taken along the line 2-2 of FIG. 1;

FIG. 3 is a rear elevational view of an upper portion of a door construction taken substantially along the line 3-3 of FIG. 2;

FIG. 4 is a cross-sectional view taken substantially along the line 4-4 of FIG. 1;

FIG. 5 is a perspective view of the door portion shown in FIG. 3 showing a door in a partially open position relative to a doorframe;

FIG. 6 is a view similar to FIG. 5 showing the door in a closed but unlocked position;

FIG. 6a is a cross-sectional view taken substantially along the line 6a-6a of FIG. 6;

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

FIG. 7a is a cross-sectional view taken substantially along the line 7a-7a of FIG. 7;

FIG. 8 is a cross-sectional view taken substantially along the line 8-8 of FIG. 1, showing a door in a lowered position;

FIG. 8a is a view similar to FIG. 8 showing a door in a raised position;

FIG. 8b is a cross-sectional view of the lower end of an operating and locking rod; and

FIG. 8c is a cross-sectional view taken substantially along the line 8c-8c of FIG. 8a.

DETAILED DESCRIPTION

Referring now particularly to FIG. 1 a container 10 comprises a rear wall construction generally designated at 11. The wall construction 11 comprises an upper header 12 and a lower header 13 disposed at the rear ends of sidewalls 14, as best shown in FIG. 2. The container 10 herein shown may be of a conventional type such as is used for container operations or for trailers wherein the container is carried by suitable suspensions and includes a suitable fifth-wheel kingpin arrangement.

The sidewalls 14 have connected thereto rear jambs 15 of channel-shaped configuration respectively connected at their upper and lower ends to the headers 12 and 13. As best shown

in FIG. 2, the jambs 15 include spaced flanges 16 and 17. The header 12 includes a channel-shaped member 18 having downwardly projecting flanges 19 and 20. The member 18 is rigidly connected to the header 12.

The lower header 13 includes a horizontally extending L-shaped member 21 having a downwardly projecting flange or lip 22 spaced rearwardly of the header 13. The container 10 includes a floor 23 and the headers 12, 13 and jambs 15 define a container opening 24. A plurality of seal strips 25, as best shown in FIG. 1, are connected to and extend along the jambs 15 and upper header 12 and are rigidly secured thereto by retaining straps 26.

As best shown in FIG. 1, a pair of swinging doors 27 are disposed over the opening 24 of the container 10. The left-hand door of FIG. 1, as best shown in FIG. 2, has at its inner edge a Z-shaped angle 28 rigidly connected thereto. The angle 28 supports a vertically extending sealing strip 29 connected by means of a retainer strap 30 to the Z-angle 28, said sealing strip 29, as best shown in FIG. 2, being adapted to engage the outer surface of the adjacent door 27 along its inner edge in sealing relation. Both doors 27 at their outer edges are hingedly secured to the container 10 by means of hinge brackets 31. The hinge brackets 31 are connected to hinge members 32 in pivotal relation by means of hinge pins 33. Hinge members 32 are rigidly connected to jambs 15. The inner portions of the hinge brackets 31 are provided with sleeves 34 which rotatably support at the outer edge of each of the doors 27 an operating rod or vertically extending locking member 35. The locking members 35 are also connected to the door by means of swivel brackets 36.

The inner ends of the doors 27 also are provided with identical locking rods 35 which are also connected to the outer surface of the doors 27 adjacent the inner ends thereof by means of swivel brackets 36. The locking rods 35 are provided at their lower ends with vertically spaced shoulders 37 and 38 positioned in a manner in engagement with the swivel brackets 36 to permit rotating movement of the rods 35 but restraining the rods 35 against vertical movement. Each of the rods 35 is also provided at its upper edge with a collar 39 engaging the upper swivel brackets 36 to also prevent vertical movement of the rods 35 relative to the swivel brackets 36 and with respect to the doors 27. The upper ends of each of the rods 35 is provided with a flat locking portion 40 and with upper and lower projecting stops 41 and 42 respectively. As best shown in FIGS. 3 through 7, a keeper element 43 is rigidly supported on the channel-shaped member 18 adjacent the upper ends of each of the rods 35. Each keeper 43 includes a plate 44 which projects outwardly from the member 18 and is connected to a hook-shaped member 44' adapted to overlap the upper portion of each rod 35 in the closed position as best shown in FIG. 6.

As best shown in FIGS. 8 through 8c, the lower end of each operating rod or locking member 35 is provided with a clevis 45 connected to each rod 35 to rotate therewith, said clevis 45 having connected thereto a U-shaped locking element 46 as best shown in FIG. 8b. A handle lever 47 is pivotally connected to each clevis 45 by means of a pivot member 48. One end of each handle lever 47 is provided with a hammer-shaped end portion 49 having a flat neck portion 50. As best shown in FIGS. 8 and 8a, the hammer-shaped end portion 49 is provided with a lower cam surface 51 sloping downwardly and inwardly with respect to the lower header 13. An upper cam surface 52 slopes in a similar fashion and said surfaces 51, 52 are adapted to engage an abutment 53 as shown in FIG. 8a.

Each abutment 53 is rigidly secured to the header 13 and includes a cam surface 54 engageable with the cam surface 51 as best shown in FIG. 8a. The abutment 53 also includes an upper cam surface 55 which slopes downwardly from the horizontal as best shown in FIG. 8c and said abutment 53 also includes a cam surface 56 which is adapted to be engaged by the hammer-shaped end portion 49, as best shown in FIG. 8a. The header 13 also includes a plurality of locking angles 57 which are rigidly connected thereto and which support ends of

the handle levers 47 when the operating rods 35 are disposed in their locked relation relative to the keeper members 43 as best shown in FIG. 1.

As shown in FIGS. 8 through 8b the lower edges of each of the doors 27 has connected thereto a channel 58 which supports a seal strip 59 and a retainer strap 60. The seal strip 59 in the closed position of the door 27 as shown in FIG. 8a engages the lower header 13 in sealing relation. The channel member 58 also includes an upwardly extending flange 61 which as shown in the closed position of FIG. 8a is in engagement with the downwardly extending flange or lip 22 of the L-shaped member 21.

THE OPERATION

In the closed position, as shown in FIG. 2, the outer vertically extending edges of the doors 27 are in engagement with the flanges 17 of the channel-shaped jambs 15. Thus outwardly directed forces against the doors 27, which may be occasioned by shifting of the lading within the container 10 during shipment, are absorbed in the channel-shaped jambs 15 and thus they are not precipitating any substantial loading on the hinge brackets 31 and 32. Similarly, such forces are not exerted on the operating rods 35 or the swivel brackets 36. As the doors 27 are hinged moved toward the closed position, as shown in FIG. 5, the operator moves the doors 27 to the position shown in FIG. 8 and operates the handle levers 47 on one of said doors 27 thus providing for engagement of the hammer-shaped portions 49, as best shown in FIG. 8, with the abutment 53. As the hammer-shaped portion 49 is moved to the position indicated the flat neck portion 50 slides on the cam surface 55 causing a partial movement of the rods 35 and door 27 in a vertical direction. Further movement of the lever 47 in a counterclockwise direction, as shown in FIG. 8, provides for camming engagement of the cam surface 51 with the cam surface 54 thereby tending to draw the door 27 further inwardly toward the closed position in a direction against the header 13. Continued rotation of the handle lever 47 provides for further lifting of the door 27 to the position indicated in FIG. 8a wherein the flange 61 is in engagement with the lip or flange 22 of the L-shaped member 21. When the position of FIG. 8a is reached the upper edges of the door 27 are in the position indicated in FIG. 4 wherein the upper door edge is against the inner surface of the channel-shaped member 18. The operator now rotates the rods 35, as best shown in FIG. 6, by means of the handle levers 47 so that the upper and lower locking projections 41 and 42 are moved into straddling engagement with the plate 44 as best shown in FIG. 7a. In this position the rods 35 are locked against vertical movement and thus the doors 27 are locked in a raised and closed position. As best shown in FIG. 6a the projection 42 is in engagement with the hook-shaped member 44' prior to its rotation into the locked position shown in FIG. 7a. In the upwardly locked position of the rods 35 the handle levers 47 are then placed in a parallel stored position and held in this position by means of the locking angles 57 as best shown in FIG. 1. In FIG. 1 the left-hand door 27 is in the raised and locked position and the right-hand door 27 is in position for raising and locking since the handle levers 47 are disposed normal to the header 13, and are in position for operation by the operator to effectuate raising of the right-hand door 27.

To provide for opening of the doors the handle members 47 are rotated to the position wherein they are normal to the header 13 whereupon the locking projections 41, 42 are rotated in the position shown in FIG. 6 wherein the doors 27 drop from the raised closed position downwardly. During opening of the doors 27, the left-hand door as shown in FIG. 2 must be opened first in view of the Z-shaped element 28 and seal arrangement 29. Both doors 27 however may be dropped downwardly from the raised position before opening of said doors 27 by merely placing the handle levers 47 from the parallel position relative to the header 13 to the normal position as shown on the right-hand side of FIG. 1. The doors 27

may be swung open after the hammer-shaped end portions 49 of the handle levers 47 are moved out of engagement with the abutments 53.

In the closed position, as shown on the left-hand door 27 of FIG. 1, the U-shaped lock element 46 also has been moved into locking engagement with respect to the abutment 53 as shown in FIG. 8b. This further provides means whereby the operating rods 35 and doors 27 are maintained in the raised position and thus supplements the locking action of the upper and lower locking projections 41, 42. When the levers 47 are disposed in a normal position with respect to the header 13, the lock element 46 is disengaged to permit lowering of the doors.

In the event that the doors 27 are frozen in the raised position and thus do not drop by gravity as would normally occur, the operator merely places the handle levers 47 in the broken line position of FIG. 8a wherein the hammer-shaped end portion 49 engages the camming surface 56 and upon downward motion of the levers 47 each of the doors 27 is forced downwardly and thus is broken free from its frozen condition.

It can be seen by the above description that a complete peripheral locking engagement of the doors 27 is achieved so that the headers 12, 13 and the jambs 15 carry the full loads of any outward thrust against the door 27 during use of the container 10. This eliminates the use of bullboards which are sometimes placed in a position spaced from the ends of the containers and secured in a manner to prevent the load from shifting up against the doors and thus damaging the hinge and operating elements of the doors. A completely peripheral locking arrangement is thus provided. Further the arrangement permits an effective sealing of the inner edges of the doors 27 as shown in FIG. 2, the lower edges of the doors 27 as shown in FIGS. 8a and 8b, and an effective sealing at the tops of the doors 27 relative to the upper header 12 and with respect to the side jambs 15 as shown in FIGS. 2, 5, and 6. It is of course also contemplated that the channel-shaped members 18 may be placed on the bottom header 13 with the flanges 19, 20 carried on the upper header 12 with the lip 22 facing upwardly. In this type of construction the door 27 would be lifted and raised before it is swung into place, then placed over the opening and lowered for the closed position which of course is a mere reversal of the arrangement shown and is contemplated in the present invention.

What I claim is:

1. A door construction for a container, said container having a wall including a door opening defined by upper and lower horizontal door opening headers, each header having an inner surface facing said opening,
 - a door having a vertical length greater than said opening,
 - a plurality of hinge brackets pivotally connected to said wall in vertically spaced relation, to provide swinging movement of said door between open and closed positions relative to said opening,
 - means on said hinge brackets connected to said door to provide for relative vertical shifting movement of said door relative to said hinge brackets,
 - a vertically extending locking member,
 - means rotatably connecting said locking member to said door against relative vertical movement,
 - a lever pivotally connected to lower end portions of said locking member for pivotal movement about a horizontal axis,
 - an abutment on said wall below said opening,
 - an engaging portion on said lever adapted to engage said abutment during pivotal movement of said lever about said horizontal axis thereby shifting said door vertically to a closed and raised position whereby an upper edge portion of said door engages said inner surface of said upper header in a raised closed position,
 - whereupon means on said lower edge of said door engages said inner surface of said lower header in interengaging relation and a force on said door tending to move said door horizontally outwardly of said opening is restrained

by said headers independently of said hinges and said locking members, and
 means on said locking member and wall interengageable with each other for retaining said door in said closed and raised position.
 2. The invention in accordance with claim 1, said interengageable means on said locking member and wall including keeper means on the wall, and latch means on the locking member operative with said keeper means for maintaining said door in its raised position.
 3. The invention in accordance with claim 2, said keeper means including a stop projecting from said wall and said latch means including a projection adapted to be rotated with said locking member over said stop.
 4. The invention in accordance with claim 1, said door including on opposite sides thereof jamb elements having inner surfaces engaged by side edges of said door in the closed position.
 5. The invention in accordance with claim 2, said lever being disposed in substantially parallel relation relative to said lower door header in the closed raised position of said door.
 6. The invention in accordance with claim 1, said abutment having a horizontal connector portion projecting outwardly from said door and a second portion projecting upwardly from the outer end of said connector portion, and
 said engaging portion including a hammer-shaped projection engaging a surface of said second portion facing inwardly toward said door during said pivotal movement of said lever about said horizontal axis.
 7. The invention in accordance with claim 6, said surface of said second portion being inclined upwardly and outwardly and upon engagement of said hammer-shaped projection during pivotal movement of said lever biasing said door in a horizontal direction toward said door opening.
 8. The invention in accordance with claim 1, said abutment and engaging portions each including interengaged cam surfaces biasing said door in a horizontal direction over said door opening.
 9. The invention in accordance with claim 7, said hammer-shaped projection having a second surface inclined downwardly and inwardly toward said wall.
 10. The invention in accordance with claim 8, said hammer-shaped projection having an upper edge engageable with a hook-shaped element projecting downwardly from said abutment whereby a downward force on the outermost end of said lever provides a force biasing said door to shift downwardly from said closed position out of engagement with said lower and upper headers.
 11. The invention in accordance with claim 1, said abutment having an upper cam surface engaged by a

horizontal portion of said lever and which during rotation thereof about a vertical axis during said rotation of said locking member engages said cam surface whereby said door is urged upwardly to said raised and closed position.
 12. A door construction for a container, said container having a wall including an opening defined by upper and lower horizontal door opening headers, each header having an inner surface facing said opening;
 a door having a vertical length greater than said opening, a plurality of hinge brackets pivotally connected to said wall and to one side of said door in vertically spaced relation, to provide swinging movement of said door between open and closed positions relative to said opening,
 means on said hinge brackets connected to said door to provide for relative vertical shifting movement of said door relative to said hinge brackets,
 a plurality of vertically extending and horizontally spaced locking members,
 means rotatably connecting said locking members to opposite sides of said door against relative vertical movement, one locking member on one side of said door being rotatably connected to said hinge brackets,
 levers pivotally connected to lower end portions of said locking members for pivotal movement about a horizontal axis,
 abutments on said wall below said opening and each locking member,
 an engaging portion on said lever adapted to engage said abutments during pivotal movement of said levers about said horizontal axis thereby shifting said door vertically to a closed and raised position whereby an upper edge portion of said door engages said inner surface of said upper header in a raised closed position,
 whereupon means on said lower edge of said door engages said inner surface of said lower header in interengaging relation and a force on said door tending to move said door horizontally outwardly of said opening is restrained by said headers independently of said hinges and said locking members, and
 means on said locking members and wall interengageable with each other for retaining said door in said closed and raised position.
 13. The invention in accordance with claim 12, said abutments each having upper cam surfaces engaged by a horizontal portion on said lever and which during rotation thereof about a vertical axis during said rotation of said locking member urges said door upwardly to said raised and closed position.
 14. The invention in accordance with claim 13, said means on said locking members and wall interengageable with each other including latch elements on said wall and upper ends of said locking member, and
 a lock element adjacent the lower end of each locking member movable into engagement with each said abutment.

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