

March 2, 1971

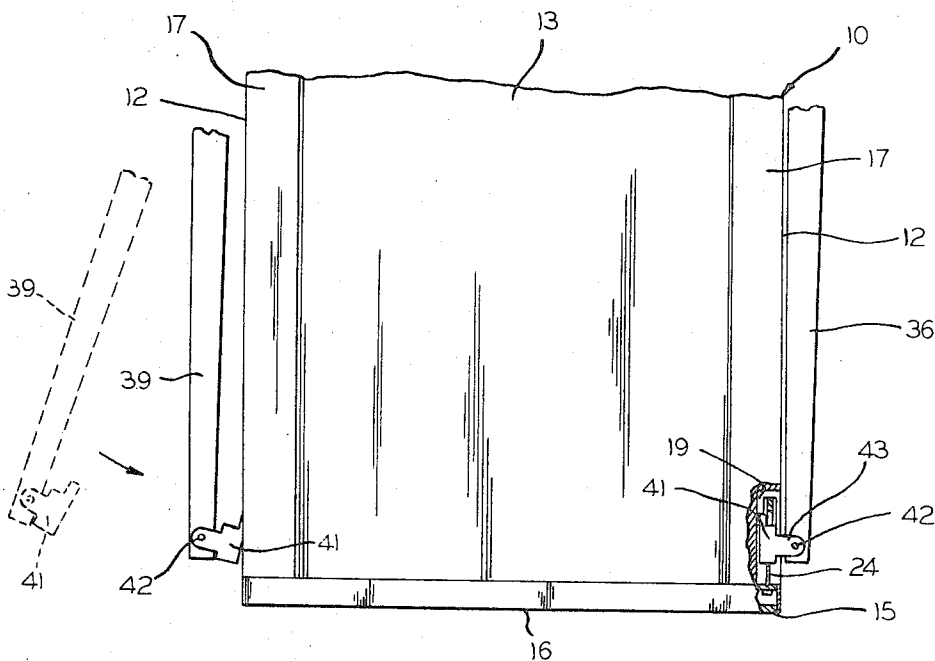
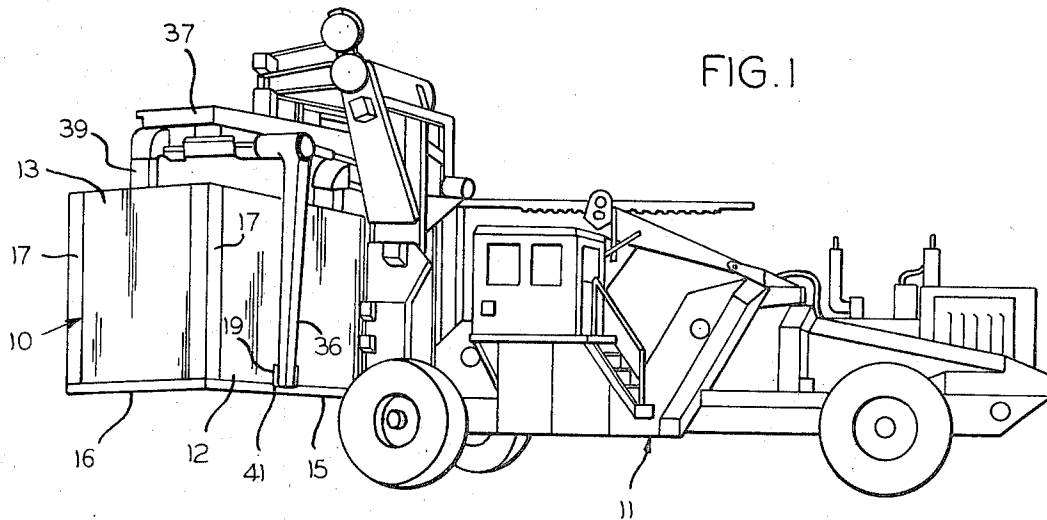
J. BRIDGE

3,567,266

FREIGHT CONTAINER AND GRIPPING AND LIFTING ATTACHMENT THEREFOR

Filed Oct. 15, 1968

3 Sheets-Sheet 1



INVENTOR
JOHN BRIDGE

BY *Will, Sherman, Morris, and Simpson* ATTORNEYS

March 2, 1971

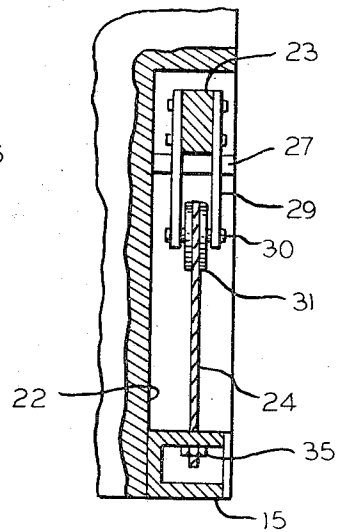
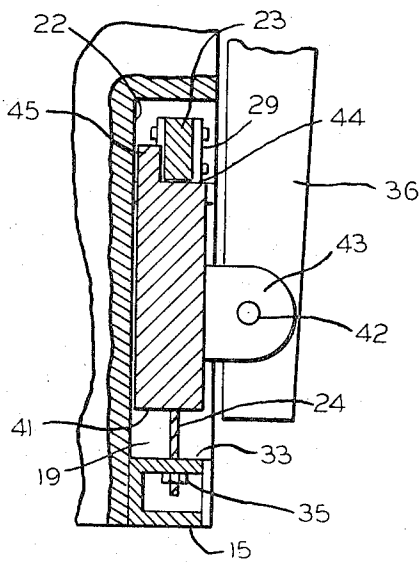
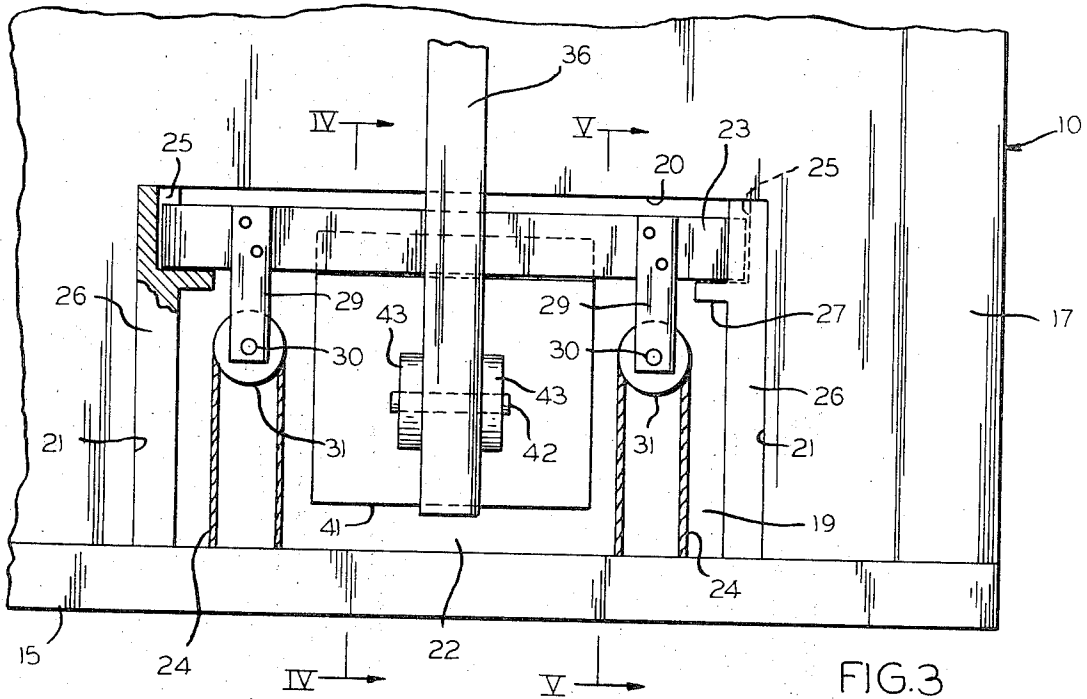
J. BRIDGE

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FREIGHT CONTAINER AND GRIPPING AND LIFTING ATTACHMENT THEREFOR

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3 Sheets-Sheet 2



INVENTOR
JOHN BRIDGE

BY *Hill, Sherman, Nevins, Goodwin* ATTORNEYS

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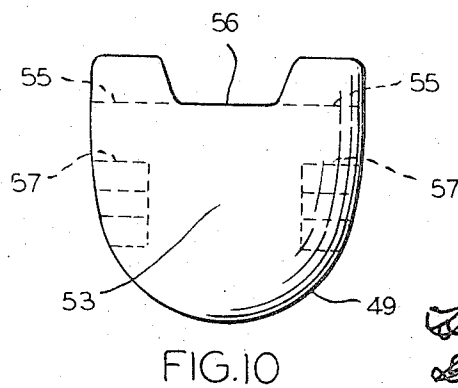
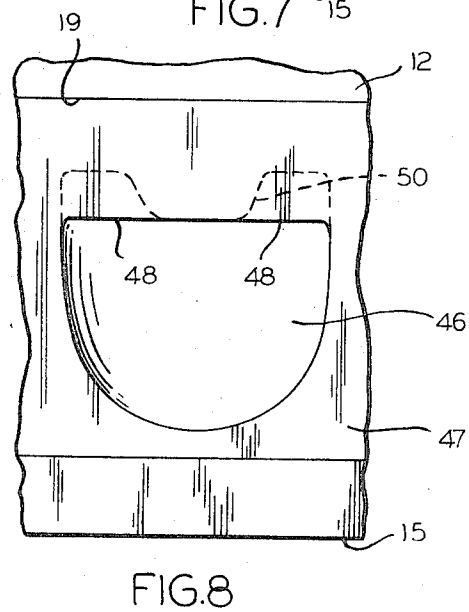
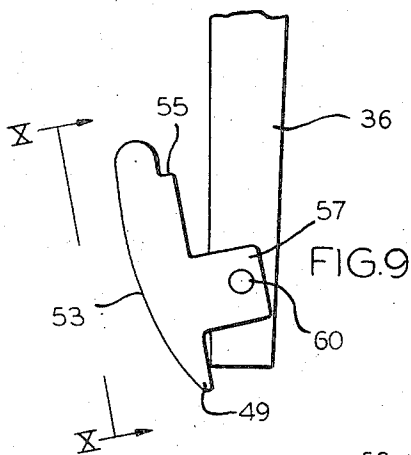
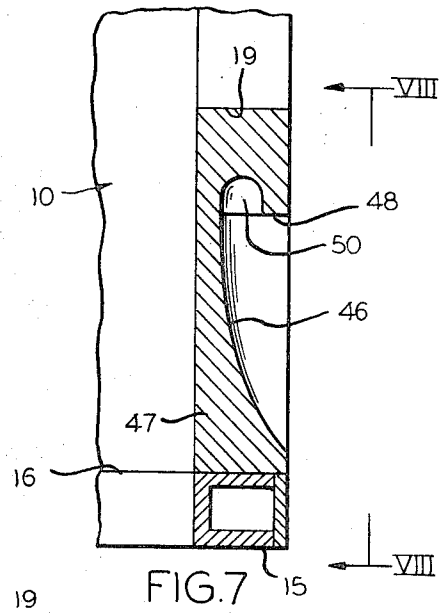
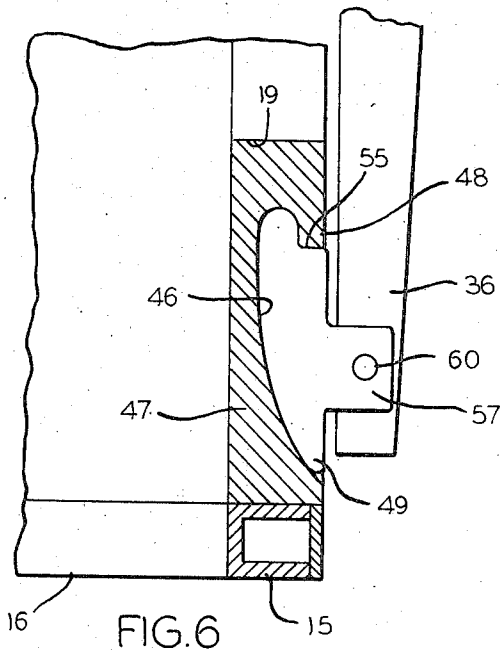
J. BRIDGE

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FREIGHT CONTAINER AND GRIPPING AND LIFTING ATTACHMENT THEREFOR

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3 Sheets-Sheet 3



INVENTOR
JOHN BRIDGE

Will Thomas, Meroni
Evans & Ringman
ATTORNEYS

BY

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3,567,266

FREIGHT CONTAINER AND GRIPPING AND LIFTING ATTACHMENT THEREFOR

John Bridge, 407 S. Dearborn St., Chicago, Ill. 60605

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6 Claims

ABSTRACT OF THE DISCLOSURE

Container for freight having lifting attachments adapted for tong lifting devices. The container has rectangular parallel vertical side and end walls and a reinforcing beam structure extending about the bottom of the container. The side walls have gripping recesses therein spaced longitudinally therealong and forming receptacles for lift members connected with the bottom side beams of the container. Lift blocks, on the lower ends of conventional lift tongs are moved into engagement with the lift members by the tongs, to lift the container vertically upon vertical lifting movements of the tongs. In the principal form of the invention, the lift members are connected with the bottom side beams of the container through flexible draft devices. In another form of the invention, the lift members are directly connected with the bottom side beams of the container and have lifting sockets therein.

OBJECTS OF THE INVENTION

A principal object of the present invention is to provide an improved container having lifting members formed as a part of the container, adjacent the bottom of the container and having lifting connection with the bottom side beams of the container, to enable the container to be readily lifted and lowered by the lift tongs of tong lifting devices commonly used for placing containers on the freight vehicles and removing the containers therefrom, and so arranged as to avoid buckling or deforming of the container as lifted and lowered.

Another object of the invention is to improve upon the freight containers heretofore in use, by so constructing the container as to have lifting members recessed in and formed as a part of the side walls of the container and directly connected with the bottom side beams of the container.

Still another object of the invention is to provide an improved form of freight container having lifting attachments as a part thereof, a recess therein particularly adapted for use with tong lift devices commonly used for placing freight containers on and removing freight containers from freight transporting vehicles and exerting lifting forces on the container, inwardly of the ends thereof, to avoid buckling or distortion of the container during the lifting operation thereof.

Still another object of the invention is to provide a simple and improved form of lifting system for freight containers, adapting the containers to be lifted by conventional tong lift lifting devices, in which longitudinally spaced lift members are recessed within the walls of the container adjacent the bottom thereof and have lifting connection with the container by flexible draft devices and in which lift blocks carried by the conventional lift tongs of a tong lifting device are movable laterally into engagement with the lift members within the lateral margins of the freight container, for lifting and lowering the container by operation of the tong lifting devices.

These and other objects of the invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings.

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DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a tong lift truck positioned to one side of a freight container constructed in accordance with the principles of the present invention, showing the lifting tongs of the tong lift truck in position to have lifting engagement with the freight container.

FIG. 2 is a fragmentary end view of the container shown in FIG. 1 with certain parts broken away and certain other parts shown in section showing one lift tong and block carried thereby in position to lift one side of the container upon vertical lifting movement of the lift tongs and showing the opposite lift tong coming into lifting interengagement with the container.

FIG. 3 is a fragmentary side view of a portion of a freight container constructed in accordance with the principles of the present invention, with certain parts broken away and shown in section in order to more clearly illustrate the lifting mechanism constructed in accordance with one form of the invention.

FIG. 4 is a partial fragmentary transverse sectional view taken substantially along line IV—IV of FIG. 3.

FIG. 5 is a partial fragmentary transverse sectional view taken substantially along line V—V of FIG. 3.

FIG. 6 is a partial fragmentary transverse sectional view taken through a freight container and illustrating another form in which the invention may be embodied.

FIG. 7 is a partial fragmentary sectional view somewhat similar to FIG. 6 but showing the lift block and lift tong removed from the container.

FIG. 8 is a partial fragmentary side view of the lift member, looking substantially along line VIII—VIII of FIG. 7.

FIG. 9 is an enlarged partial fragmentary view of a lift tong having a lift block pivotally carried thereby, adjacent the lower end of the lift tong; and

FIG. 10 is a view of the lift block looking generally along line X—X of FIG. 9.

DESCRIPTION OF PREFERRED EMBODIMENTS OF INVENTION

In the form of the invention illustrated in FIGS. 1 to 5 of the drawings, I have shown a freight container 10 of a type adapted to be loaded onto railway cars, trailers, trucks, ships and the like, and have shown a side lift tong truck 11 backed up along one side of the container 10 in lifting engagement with the container, to lift the container and lower it onto a railway car, ship, or other freight transporting vehicle.

The freight container 10 is of a generally rectangular box-like form and may be of various selected lengths and of widths substantially equal to the width of a railway car. The container 10 has parallel side walls 12 and end walls 13 connecting the side walls together. The top, bottom, side and end walls of the container are usually made from a relatively thin metal skin secured to and reinforced by a supporting and reinforcing frame structure including side beams 15 and end beams 16 connecting the side beams together. Corner posts 17 extend upwardly of the side and end beams along the corners of the container and for the height of the container. One or both end walls 13 may have doors therein (not shown) extending for substantially the width of the container to accommodate the container to be loaded from an end thereof.

Recessed within the side walls 12 of the container, adjacent the bottom thereof and adjacent but spaced inwardly of opposite ends thereof, are longitudinally spaced recessed portions 19 opening to the outer sides of the side walls 12. Four recessed portions are usually provided for each container. Said recessed portions are generally

rectangular in form and open outwardly of the container and extend upwardly of the side beams 15.

Each recessed portion 19 is defined by a top wall 20, end walls 21, extending from the associated beam 15 to said top wall and a back wall 22. A lift member or bar 23 is guided between the end walls 21 for vertical lifting movement with respect thereto, and has lifting connection with the beam 15, as by flexible draft devices 24 connected with said lift bar adjacent opposite ends thereof and having lifting connection with the side beam 15 of the container, as will hereinafter more clearly appear as this specification proceeds.

The lift bar 23 is guided adjacent its opposite ends in vertical guides 25 formed in vertical guide bars 26 extending along the end walls 21 of the recessed portion 19 of the container. The guides 25 are channeled guides opening toward each other and terminate at their lower ends into stops 27, shown as being formed integrally with the guide bars 26 and extending inwardly therefrom. The lift bar 23 has brackets 29 secured to opposite sides thereof and depending therefrom and forming supports for pivot pins 30 for sheaves 31 carried on said pivot pins. The flexible draft devices 24 extend about the sheaves 31 intermediate their ends, and depend therefrom and extend through a top flange 33 of a side beam 15 and are connected thereto at their opposite ends as by nuts 35, which may be lock nuts.

Thus, on lifting movement of the lift bar 23, the lifting forces thereof are transmitted to the beam 15 through the cables or flexible draft devices 24, spaced from the center of and adjacent opposite ends of said lift bar. It will be noted that a space is left between the top of the lift bar 23 and the top wall 20 of the recess 19, which accommodates limited freedom of movement of the lift bar and transfers the lifting forces to the beam 15, prior to engagement of the lift bar with the top wall 20. The nuts 35 may adjust the spacing between the top of the lift bar 23 and the top wall 20 of the recess 19 as the flexible draft devices 24 are under tension, and compensate for stretching of the cables.

Referring now in particular to the lifting means for the lift bars 23 and container 10, a plurality of lift tongs 36 extend downwardly of a lift carriage 37 of the tong lift truck 11 along one side of the container 10. Said lift tongs are retained from swinging movement toward and from the side wall 12 of the container but may swing about their upper end portions parallel to the wall of the container in a conventional manner.

A plurality of lift tongs 39 depend from the lift carriage 37 and are mounted thereon for movement about axes extending longitudinally of the container toward and from the opposite side wall 12 of the container 10, as indicated by dashed lines in FIG. 2. The connection of the lift tongs 39 to the lift carriage 37 and the means for moving said lift tongs toward and from the associated side wall 12 of the container is conventional with tong type lift trucks of the class illustrated in FIG. 1, so need not herein be shown or described further.

The lift tongs 36 and 39 each have a lift block 41 pivoted on the lower end thereof on a pivot pin 42 for movement about an axis extending longitudinally of the container 10. Each lift block 41 has a bifurcated connector 43 extending outwardly therefrom, the furcations of which extend along opposite sides of the associated lift tong 36 or 39 and form a mounting for the pivot pin 42. The lift block 41 is generally rectangular in form with a greater portion of the body of the lift block extending upwardly of the pivot pin 42 to effect pivotal movement of the lift block in a generally downward direction towards the container, as illustrated in FIG. 2, so the top portion of the lift block leads the bottom portion thereof, as inserted in the recess 19. Each lift block 41 is shown as having a shoulder 44 engageable with the bottom surface of the lift bar 23 and terminating at its inner end in a tongue 45 extending upwardly there-

from along the inner portion of the lift bar 23, when the lift block is in its lifting position shown in FIG. 4.

Each lift block 41, therefore, is inserted in an associated recess 19 by its lift tong 36 or 39 depending upon the side of the container the lift block is located, with the lift block disposed entirely beneath the lift bar 23 and the tongue 45 of the lift block inclined to lead the bottom of the lift block and pass beneath the lift bar 23. As the lift block is moved into engagement with the rear wall of the recess 19, said wall will cam the lift block into an upright position, with the tongue 45 disposed inwardly of the lift bar 23. Raising movement of the lift tong supporting said lift block will then move the shoulder 44 into engagement with the underside of the lift bar 23, with the tongue 45 disposed inwardly of said lift bar, to lift the lift bar 23 and thereby lift the container through the flexible draft devices or cables 24.

In operation of the lifting device, the lifting tongs 36 are positioned to extend along one side of the container by manipulation of the truck supporting said lift tongs, with the lift blocks 41 in registry with the recesses 19. The truck is then backed toward the container to insert the lift blocks 41 within the recesses 19 into engagement with the rear wall thereof, with the tongues 45 beneath and spaced inwardly of the lift bars 23. Continued backing of the truck will then bring the lift blocks 41 on the lift tongues into the upright position shown in FIG. 4.

The opposite lift tongs 39 being positioned by the lift truck in registry with the recesses 19 on the opposite side of the container from the lift tongs 36, are then pivoted inwardly toward the side wall 12 of the container by power, until the lift blocks 41 engage the inner wall of the recesses 19 and are cammed thereby into upright lifting positions upon continued movement of the lift tongs 39 toward the wall 12 of the container. When the lift blocks 41 on the lift tongs 39 have been inserted within the recesses 19 and are cammed into upright positions, the carriage 37 on the lift truck 11 may then be moved vertically in a conventional manner, to thereby lift the container 10 above the deck of the vehicle (not shown) on which the container is to be loaded. The lift truck 11 is then backed to move the container 10 over the vehicle. The carriage 37 is then lowered to deposit the container on the vehicle deck, at which time the lift tongs 39 are moved outwardly into general horizontal positions to clear the container loaded on the vehicle, and the lift truck is then moved away from the vehicle.

In the form of the invention illustrated in FIGS. 6 to 10 inclusive, I have shown a lift socket 46 formed in a rectangular lift member 47 recessed in a recessed portion 19 in a side wall 12 of a container 10, and forming a lifting member for the container. The lift member 47 is directly mounted on a side beam 15 of the container, as by welding or any other suitable securing means, to lift the container from the bottom side beam thereof, and to thereby relieve the container of buckling stresses, during transfer of the container from one vehicle to another, or from the ground directly onto a vehicle, a ship and the like.

In this form of the invention, the rear wall of the socket 46 tapers outwardly from the top thereof, and is also contoured inwardly from opposite sides thereof in the general form of the surface of a sphere.

A retainer gib 48 extends downwardly from the top of the socket 46 for a short portion of the height thereof and is spaced outwardly of the rear wall of said socket to retain a pivoted lift block 49 into engagement with the wall of the socket 46. A centering tongue 50 is disposed in the center of the space between the retainer gib 48 and the rear wall of the socket and converges toward the lower end thereof, to center a lift block 51 as moved into the socket 46 and lifted upwardly along the rear wall of

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said socket into lifting engagement with the lift member 47.

The lift block 51 has a face 53 generally conforming to the face of the inner wall of the socket 46, the bulk of which face is of a generally spherical contour. Said lift block 51 also has a shouldered portion 55 engaging under the retainer gib 48 to effect lifting movement of said container upon lifting movement of said lift block. The top portion of the lift block 51 has a recessed portion 56 generally conforming to the form of a tongue 50 and centering the lift block 51 in the socket 46 upon upward lifting movement of said lift block.

Each lift block 51, like the lift blocks 41, has a bifurcated connector 57 extending outwardly therefrom, the furcations of which extend along opposite sides of a lift tong 36 or 39. A pivot pin 60 is provided to pivotally connect the lift block 51 to the associated lift tong and extends through the furcations of the bifurcated connector 57 and is disposed a substantial distance beneath and offset from the center of gravity of the lift block 51, to effect pivotal movement of the lift block outwardly of the lift tong 36 with the lower end portion of the lift block stopped by engaging the bottom of said lift tong.

It should be understood that the lift tongs 36 and 39 on opposite sides of the container each support a lift block 51 in the same manner as in the form of the invention illustrated in FIGS. 1 to 5, and that the tongs move the lift blocks into the socket 46 into the lifting position shown in FIG. 6, to lift the container from the bottom side beams thereof, and that the disclosure of FIGS. 6 to 10 of the invention operates in a manner similar to that of the invention disclosed in FIGS. 1 to 5, except the lift members recessed in the side walls of the container are directly connected to the bottom side beams thereof, rather than through flexible draft devices in the form of cables, as in the form of the invention illustrated in FIGS. 1 to 5 inclusive.

While I have herein shown and described one form in which the invention may be embodied, it may readily be understood that various variations and modifications in the invention may be attained without departing from the spirit and scope of the novel concepts thereof.

I claim as my invention:

1. A container for freight and the like having parallel side and end walls and reinforcing beams extending about the bottom thereof and providing a rigid base framework for said container,

at least two longitudinally spaced outwardly opening recessed portions in each side wall, opening to the side beams of the container,

lift members mounted within said recessed portions and having lifting connection with said side beams, flexible draft devices connecting said lift members with said side beams, and

means engageable with said lift members and mounted for vertical lifting movement, to lift said lift mem-

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bers and container and transfer the lifting forces to said container along the side beams thereof and inwardly of the ends thereof.

2. The structure of claim 1,

wherein the lift members are slidably guided in said recessed portions, and

wherein means are provided to limit downward movement of said lift members.

3. The structure of claim 2,

wherein the flexible draft devices are adjacent opposite ends of said lift members and are liftingly connected with said side beams, and

wherein means are provided for adjusting the lengths of said flexible draft devices.

4. The structure of claim 3,

wherein the flexible draft devices have bights intermediate their ends,

wherein sheaves depend from said lift members adjacent opposite ends thereof, and

wherein the bights of said flexible draft devices are trained about said sheaves.

5. The structure of claim 1,

wherein the means engageable with said lift members is in the form of a lift block having lifting engagement with each lifting member, and

wherein lift tongs have pivotal connection with said lift blocks and support said lift blocks for movement about axes extending longitudinally of the container to effect lifting movement of the container upon vertical lifting movement of said lift blocks.

6. The structure of claim 5,

wherein the pivotal connections of each lift block to its lift tong is adjacent the lower end of said lift block and to one side of the center thereof to bias said lift block by gravity to position the upper end of said lift block, to lead said tongs and be cammed by the recessed portions of said container to come into a lifting position with said lift member as said lift tongs are moved towards the container and then moved vertically to lift said container.

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GERALD M. FORLENZA, Primary Examiner

G. F. ABRAHAM, Assistant Examiner

U.S. Cl. X.R.

214—653; 220—1.5