

- [54] CONTAINER RETRIEVAL SYSTEM
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[22] Filed: Aug. 13, 1973

[21] Appl. No.: 387,734

[52] U.S. Cl. 294/81 R; 294/67 BC; 294/67 DA; 294/81 SF

[51] Int. Cl. B66c 1/66

[58] Field of Search 294/67 B, 67 BB, 67 BC, 294/67 R, 67 C, 67 D, 67 DA, 67 DB, 67 DC, 67 E, 74, 78 R, 82 R, 81 R, 81 SF, 86 R, 88, 106; 24/230.5 R; 105/366 B, 366 C, 366 D; 214/77, 302, 313, 147 G; 248/119 R, 361 R

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[57] ABSTRACT

A device is provided for lifting large containers, for example of the "Matson", "Sea Land" or "ASA 150" type, for placement upon and from a railroad car. The device has a pair of lifting arms pivotally connected to a frame. Each of the lifting arms comprises a stepped shoe portion extending towards the stepped shoe portion of the other lifting arm and means are provided for pivoting the lifting arms from an unlatched position to a latched position wherein the shoe portions enter coaxial openings on opposite sides of the container adjacent a top corner thereof.

2 Claims, 7 Drawing Figures

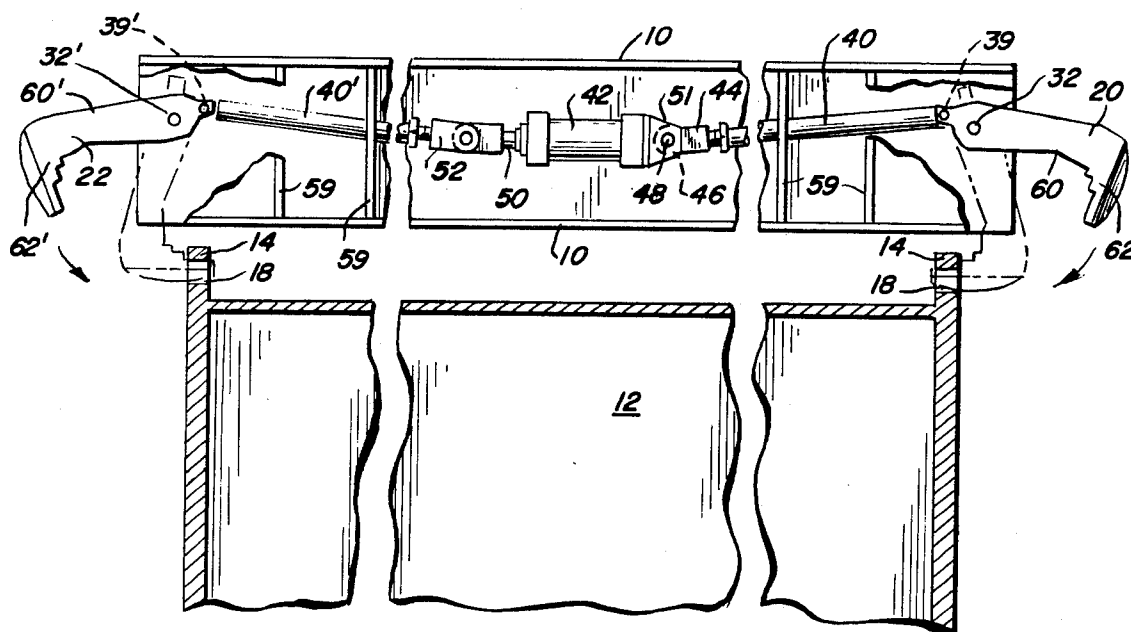


FIG. 1

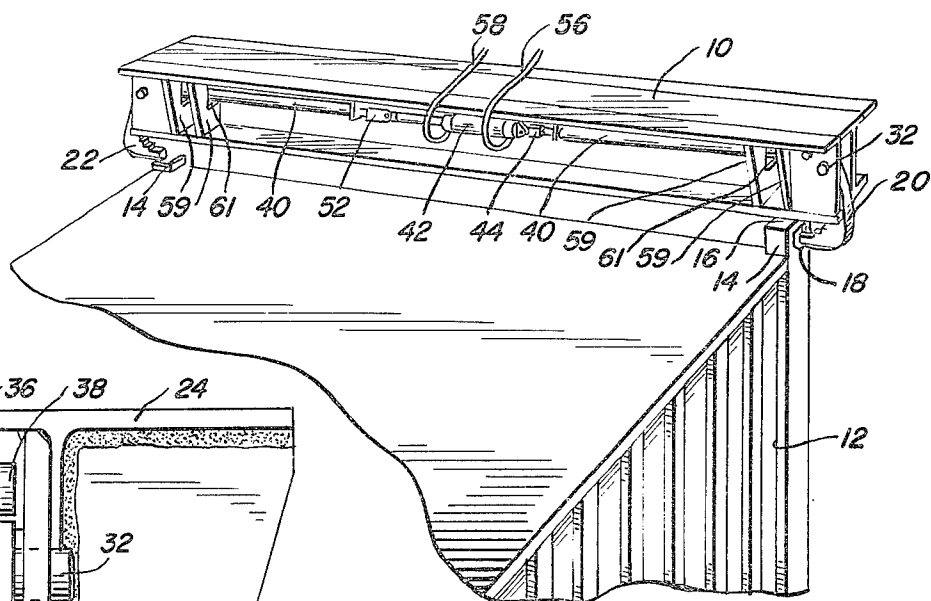


FIG. 3

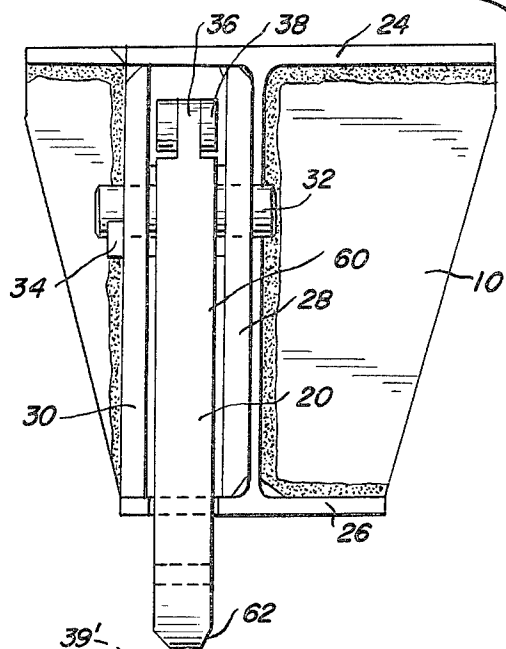
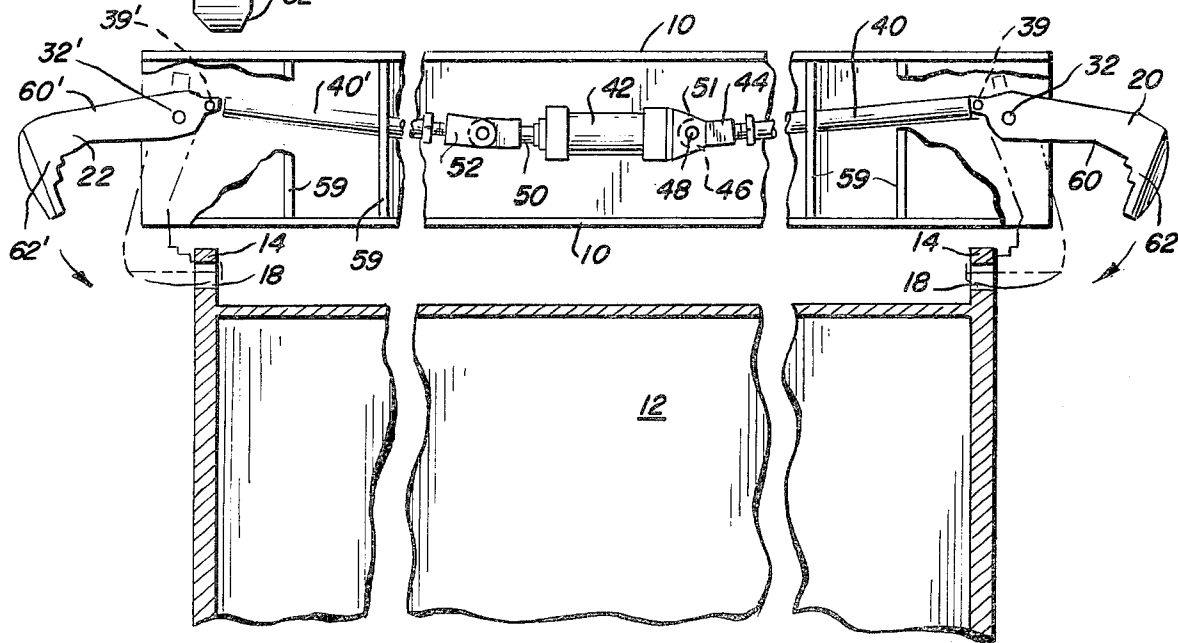
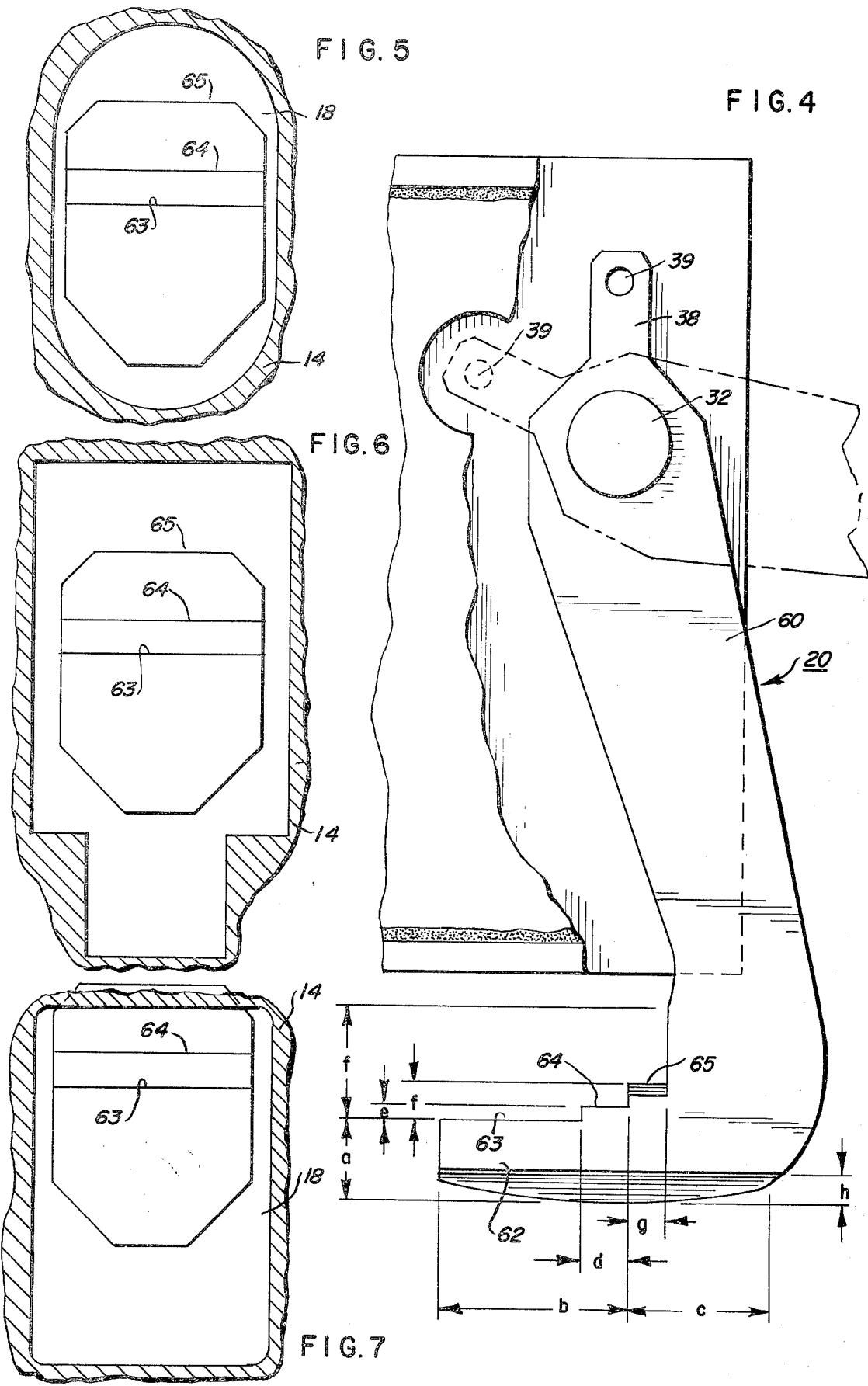


FIG. 2





CONTAINER RETRIEVAL SYSTEM

BACKGROUND OF THE INVENTION

This invention relates to a device for lifting large containers for placement upon and from a railroad car.

There are presently three types of containers which are utilized as "piggyback" trailers in the trucking and railroad industry, whereby these containers form the trailers of trucks and also may be placed on railroad cars. These three types of containers are the Matson type, Sea Land type and the ASA 150 type. Each of these containers has a portion at each of its corners defining apertures which are entered with hooks or the like for lifting the containers. At each corner of these containers there is defined an aperture having a vertical axis and an aperture having a horizontal axis, with the horizontal and vertical axes intersecting. The aperture having a horizontal axis is coaxial with an aperture on the opposite side of the container having a horizontal axis and the vertical axes of the other apertures are parallel to each other.

The walls defining the apertures of the three different types of containers are shaped and positioned slightly different from each other so that a different lifting device has been necessary with respect to each of the three different types of containers. Typically the lifting device is a complex hook member which moves down to enter the apertures having vertical axes and then spreads apart to enter the opposed coaxial apertures.

It is inefficient to require the use of three different types of lifting mechanisms for the three different types of containers, and we have discovered a universal lifting device which is simple to manufacture and yet can handle more than one of the types of containers presently on the market.

It is, therefore, an object of the present invention to provide an improved device for lifting large containers.

A further object of the present invention is to provide a lifting device which is capable of lifting the three different types of containers which are presently on the market.

A further object of the present invention is to provide a lifting device which operates in a manner different from the operation of prior art lifting devices.

Other objects and advantages of the present invention will become apparent as the description proceeds.

BRIEF DESCRIPTION OF THE INVENTION

In accordance with the present invention, a lifting device is provided for lifting large containers for placement upon and from a railroad car wherein the containers have coaxial openings on opposite sides of the container adjacent the top corner thereof. The improvement comprises an elongated frame having a length that is at least as long as the distance between the opposite sides of the container to be lifted.

A first lifting arm is provided and comprises a shank portion and a shoe portion extending at an angle from the shank portion. A second lifting arm is provided and comprises a shank portion and a shoe portion extending at an angle from its shank portion. The first and second lifting arms are pivotally connected to the frame with the shoe portion of the first lifting arm being directed toward the shoe portion of the second lifting arm and with the pivotal axes of the lifting arms being generally parallel to each other and generally perpendicular to the longitudinal axis of the frame.

The frame carries means for pivoting the lifting arms from (1) an unlatched position wherein the shoe portions are spaced apart a distance greater than the distance between the opposite sides of the container to be lifted and (2) a latched position wherein the shoe portions are spaced apart a distance that is less than the distance between the opposite sides of the container to be lifted. Remote control means are coupled to the lifting arm pivoting means for operating the lifting arms between the unlatched position and the latched position.

A more detailed explanation of the invention is provided in the following description and claims, and is illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a lifting device constructed in accordance with the principles of the present invention;

FIG. 2 is a fragmentary front view thereof;

FIG. 3 is an enlarged side view of FIG. 2, taken along the right side thereof;

FIG. 4 is an enlarged view of a portion of the lifting arm of FIG. 2;

FIG. 5 is a view of the lifting arm's shoe entering an ASA 150 aperture;

FIG. 6 is a view of the lifting arm's shoe entering a Matson aperture; and

FIG. 7 is a view of the lifting arm's shoe entering a Sea Land aperture.

DETAILED DESCRIPTION OF THE ILLUSTRATIVE EMBODIMENT

Referring to FIGS. 1-3, there is shown therein a frame 10 comprising an elongated steel beam having a length that is greater than the width of the container 12 to be lifted. Container 12 is the type of large container which may be placed on wheels and utilized as the trailer of a truck or may be placed on the bed of a railroad car. It conventionally includes corner devices 14 for engagement with a lifting device to permit lifting of the container. Corner devices 14 are typically located at each of the eight corners of the rectilinear container and define apertures 16 each having a vertical axis and apertures 18 each having a horizontal axis which intersects the vertical axis of an associated aperture 16 and is coaxial with the horizontal axis of the aperture defined by the device 14 on the opposite corner of the container 12.

A pair of lifting arms 20, 22 are pivotally connected to frame 10 to aid in lifting container 12. As seen most clearly in FIG. 3, frame 12 includes a top portion 24, a bottom portion 26, which top and bottom portions 24, 26 are parallel and are bridged by a pair of vertical members 28 and 30 to form a support for lifting arm 20. Likewise, similar vertical members are provided at the other end of frame 10 to provide a pivotal support for lifting arm 22. A pivot pin 32 is pivotally fastened to lifting arm 20 and is guided within a retainer block 34 while arm 20 pivots. Likewise, similar structure is provided for lifting arm 22.

Lifting arm 20 and lifting arm 22 each have an upper portion 36 which carries a pin journaled within a clevis 38. Clevis 38 is fastened to a connecting link 40 which is coupled to a hydraulic cylinder 42 via coupling member 44. Coupling member 44 includes a clevis 46 to which a pivot pin 48, carried by one end 51 of hydrau-

lic cylinder 42, is journaled. Similar reference numerals (but with a prime added) are used in connection with the corresponding structure of lifting arm 22 and its associated linkage. However, link 40' which is coupled to lifting arm 22 is coupled to rod 50 of hydraulic cylinder 42 by means of coupling member 52. Hydraulic cylinder 42 is operated by remote control via inlet and outlet hydraulic lines 56, 58. Links 40 and 40' are supported by vertical members 59 which define openings 61, all as shown most clearly in FIGS. 1 and 2.

Lifting arms 20 and 22 are identical to each other, for efficiency and manufacturing economy. Thus, the following discussion is necessary only with respect to one of the lifting arms and the following discussion will pertain to lifting arm 20. Referring to FIG. 4 in particular, it can be seen that lifting arm 20 comprises a shank portion 60 and a shoe portion 62. Shoe portion 62 extends generally perpendicular to shank portion 60 and the top surface of shoe portion 62 has steps 63, 64 and 65 which extend upwardly toward the shank portion 60. The purpose of these steps is to permit lifting arm 20 to be universal in its operation so that it can engage the different apertures defined by ASA 150, Matson and Sea Land type containers. In order for shoe portion 62 to properly engage the devices 14 of the various types of containers, certain dimensions are significant. The significance of these dimensions result from the size of apertures 18 defined by devices 14 and the shapes of the wall defining these apertures. It must be kept in mind that these apertures were originally meant to be entered into by a lifting device that first moved downwardly to enter aperture 16 and then extended outwardly to enter aperture 18 from the inside thereof.

As a specific example, although no strict limitation is intended, the dimensions of shoe portion 62 (as shown in FIG. 4) are the following:

Dimension Reference	Dimension
a	1-3/8 in.
b	2-7/8 in.
c	2-11/16 in.
d	7/8 in.
e	5/16 in.
f	13/16 in.
g	11/16 in.
h	1/2 in.

The width of lifting arm 20 is 1 3/4 inches throughout except for top portion 38 which is five-eighths inch in width.

Enlarged views showing how shoe portion 62 would enter apertures 18 of ASA 150, Matson and Sea Land type containers are found in FIGS. 5, 6 and 7 respectively.

In the operation of the lifting device, the hydraulic cylinder 42 is normally in its retracted position as shown in FIG. 2. Frame 10 is brought by a crane or other guide means to overlie an end of container 12 so that lifting arms 20 and 22 will be located adjacent devices 14 of the container 12. when frame 12 is believed to be in proper position, the operator then actuates hydraulic cylinder 42 and rod 50 will extend to pivot lifting arm 22 in the counterclockwise direction (with respect to FIG. 2) so that shoe portion 62' will enter aperture 18. When lifting arm 22 has pivoted to a position wherein it abuts a restraining member carried by the frame, hydraulic cylinder 42, from which rod 50 con-

tinues to be extended, moves to the right with respect to FIG. 2 and forces lifting arm 20 to pivot in the clockwise direction so that shoe portion 62 will enter aperture 18. The lifting arms are now in their latched position.

When it is desired to unlatch lifting arms 20 and 22, hydraulic cylinder 42 is deactuated and lifting arms 20 and 22 will pivot outwardly from apertures 18 as is clear from the illustration in FIG. 2. It is to be understood, however, that a separate hydraulic cylinder may be coupled to each lifting arm although a single hydraulic cylinder controlling both lifting arms, as illustrated herein, is generally more economical.

It is seen that a lifting device has been provided which is simple in construction, easy to manufacture and operates in a novel manner to permit lifting of large containers for placement upon and from railroad cars. The device described herein may be dimensioned for universal operation with the three conventional types of containers on the market today and thus the savings in necessary equipment is readily apparent.

Although an illustrative embodiment of the invention has been shown and described, it is to be understood that various modifications and substitutions may be made by those skilled in the art without departing from the novel spirit and scope of the present invention.

What is claimed is:

1. In a device for lifting large containers for placement upon and from a railroad car wherein the containers have coaxial openings on opposite sides of the container adjacent a top corner thereof; the improvement comprising, in combination: an elongated frame having a length that is at least as long as the distance between said opposite sides of the container to be lifted; a first lifting arm comprising a shank portion and a shoe portion extending at an angle from said shank portion, a second lifting arm comprising a shank portion and a shoe portion extending at an angle from said last mentioned shank portion; said shoe portions being stepped with the steps rising toward said shank portions and with the tops of the steps being planar to provide load bearing surfaces; means pivotally connecting said first and second lifting arms to said frame with the shoe portion of said first and second lifting arm being directed toward the shoe portion of said second lifting arm and with the pivotal axes of said lifting arms being generally parallel to each other and generally perpendicular to the longitudinal axis of said frame; means carried by said frame for pivoting said lifting arms from (a) an unlatched position wherein said shoe portions are spaced apart a distance that is greater than the distance between said opposite sides of the container to be lifted and (b) a latched position wherein said shoe portions are spaced apart a distance that is less than the distance between said opposite sides of the container to be lifted; and remote control means coupled to said lifting arms' pivoting means.

2. A universal lifting arm for aiding in the lifting of large containers having different lifting means for placement upon and from a railroad car which comprises: a shank portion and a shoe portion extending at an angle from said shank portion; said shoe portion being stepped with at least two steps and with the steps rising toward the shank portion and with the tops of said steps being planar to provide load-bearing surfaces, said planar tops being located to lie in substantially horizontal planes during lifting of the containers, each of said tops being selectively engageable with one of said different lifting means.

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