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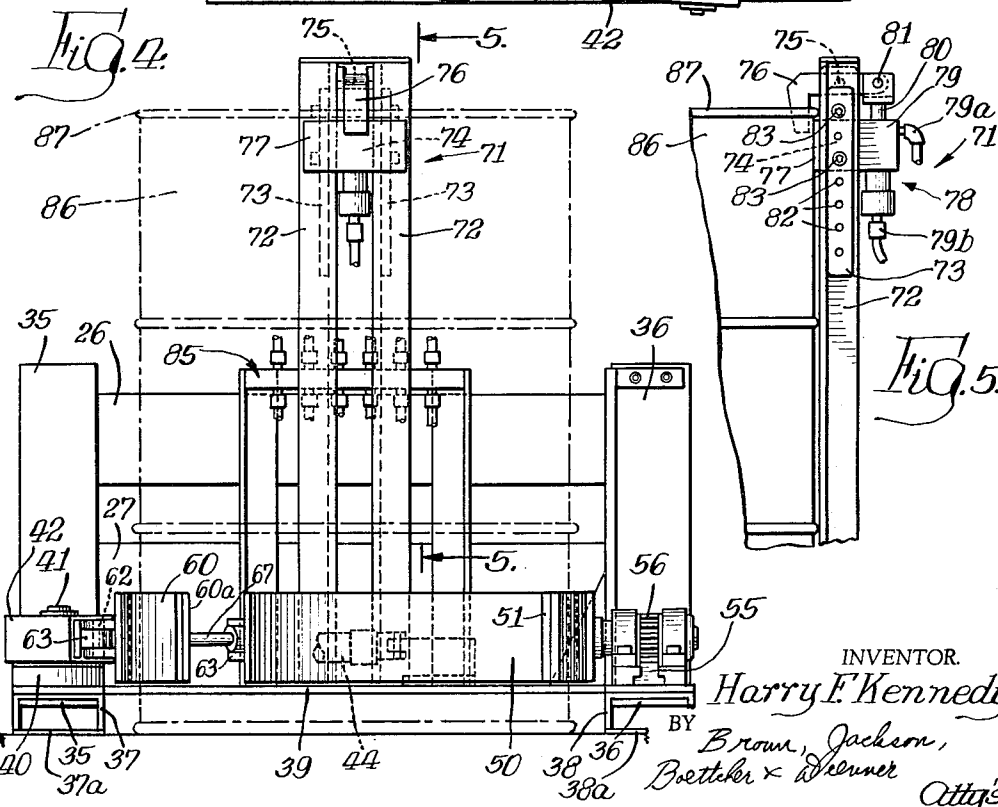
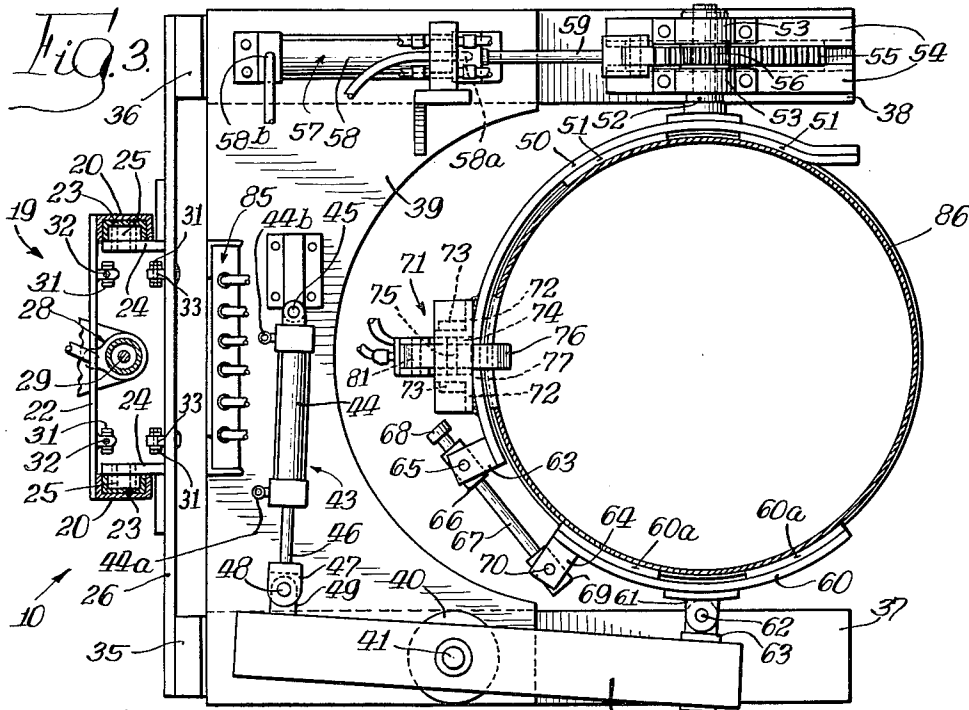
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ATTACHMENT FOR INDUSTRIAL LIFT TRUCK

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2 Sheets-Sheet 2



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ATTACHMENT FOR INDUSTRIAL LIFT TRUCK

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10 Claims. (Cl. 214—313)

My present invention relates generally to industrial lift trucks and more specifically to a barrel handling attachment for an industrial lift truck.

In many commercial operations, containers in the form of barrels are used to accumulate and store various goods such as raw materials, castings, manufacturing components, finished parts, scrap and other refuse. Barrels filled with such goods are necessarily heavy; thus they are difficult not only to transport from one location to another but also to empty.

It is an object of my present invention to provide a novel barrel handling attachment which, when secured to the forward end of an industrial lift truck, is adapted to engage a barrel so that the latter may be transported conveniently by the truck from one location to another.

It is another object of my present invention to provide a barrel handling attachment, as described, which is adapted to upend a barrel forwardly of the truck so as to permit the contents thereof to be emptied.

It is another object of my present invention to provide a barrel handling attachment, as described, which comprises first and second forwardly extending load engaging arm means, with one of the arm means having a forward end that is movable toward and away from the other arm means for selectively gripping the sides of a barrel therebetween.

It is another object of my present invention to provide a barrel handling attachment, as described, wherein load engaging clamp means are rotatably mounted at the forward ends of the load engaging arm means.

It is a further object of my present invention to provide a barrel handling attachment, as described, wherein one of the clamp means is rotatably mounted about a horizontal axis at the forward end of one of the load engaging arm means and the other clamp means is rotatably mounted about a horizontal axis and pivotally mounted about an axis intersecting the horizontal axis at the forward end of the other of the load engaging arm means.

Another object of my present invention is to provide a barrel handling attachment, as described, wherein means are provided for rotating at least one of the clamp means whereby a barrel gripped between the clamp means may be selectively tilted forwardly.

Still another object of my present invention is to provide a barrel handling attachment, as described, wherein the clamp rotating means comprises rack and pinion means and power operated means for effecting actuation thereof.

A further object of my present invention is to provide a barrel handling attachment, as described, wherein the load engaging clamp means are interconnected by stabilizing bar means for ensuring that the forward ends of the clamp means spread apart as the second load engaging arm means is moved away from the first load engaging arm means to facilitate engagement of a barrel.

A further object of my present invention is to provide a barrel handling attachment, as described, wherein a standard is secured at its one end to one of the load engaging clamp means for selective rotation therewith, and load engaging gripping means is provided at the other end of the standard for engaging the upper rim of a barrel.

A still further object of my present invention is to provide a barrel handling attachment, as described, wherein

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the load engaging gripping means comprises power actuated latch means pivotally mounted on the standard and rectilinearly adjustable therealong for accommodating barrels of various sizes.

Now in order to acquaint those skilled in the art with the manner of constructing and using barrel handling attachments in accordance with the principles of my present invention, I shall describe in connection with the accompanying drawings, a preferred embodiment of my invention.

In the drawings:

FIGURE 1 is an elevational view of one side of an industrial lift truck with which the barrel handling attachment of my present invention has been incorporated and shows the barrel handling attachment in two different vertical positions;

FIGURE 2 is a partial elevational view of the other side of the truck of FIGURE 1 and illustrates the barrel handling attachment of my present invention in two alternate operative positions;

FIGURE 3 is an enlarged plan view of the barrel handling attachment of FIGURE 1, taken substantially along the line 3—3 in FIGURE 1, looking in the direction indicated by the arrows;

FIGURE 4 is a front elevational view of the barrel handling attachment of FIGURE 3; and

FIGURE 5 is a partial side elevational view of the barrel handling attachment of my present invention, taken substantially along the line 5—5 in FIGURE 4, looking in the direction indicated by the arrows.

Referring now to FIGURE 1 of the drawings, a preferred embodiment of barrel handling attachment of my present invention is indicated generally by the reference numeral 10 and is shown in association with an industrial lift truck 11. The truck 11 comprises a main frame 12 supported on a pair of forward drive wheels 13 and a pair of rear steering wheels 14. Mounted on the main frame 12 are various components of the truck including an operator's seat 15, a steering column 16 with a hand steering wheel 17 at the upper end thereof, and a cluster of control levers 18 adjacent the seat 15.

Pivotally mounted at the forward end of the main frame 12 is the lower end of a vertically extending telescoping mast assembly indicated generally at 19. The mast assembly 19, as shown in FIGURES 1 and 3, comprises a pair of transversely spaced outer channel members 20 reinforced by vertically spaced transverse braces 21 and 22, a pair of inner movable channel members 23, and a load supporting carriage including forwardly projecting arms 24 with rollers 25 guided in the inner channel members 23 and with forward transverse support plates 26 and 27. Arranged intermediate of the load carriage arms 24 is a vertically extending hydraulic piston and cylinder assembly 28. The upper end of the piston rod 29 of the hydraulic assembly 28 has connection with the upper ends of the inner channel members 23 and carries a pair of sprockets 30 rotatable on a common horizontal axis. Trained over the sprockets 30 are chains 31 which, at their one ends, are anchored by bolts 32 to the outer channel brace 22, and, at their other ends, are anchored by bolts 33 to the load carriage support plate 26. Due to the described interrelation of the hydraulic assembly 28, inner channels 23 and load supporting carriage 24, when the hydraulic assembly 28 is actuated, the inner channel members 23 move at the same rate of travel as the piston rod 29 while the load supporting carriage 24 moves at twice the rate of travel of the piston rod 29 and inner channel members 23. Tilting of the mast assembly 19 may be effected by a generally horizontal hydraulic piston and cylinder assembly 34 (FIGURE 1) having a cylinder carried by the main frame 12 and a piston rod connected with the outer channel members 20.

Having completed a general description of a typical industrial lift truck 11 with which the device of my present invention may be incorporated, I shall now describe in detail the barrel handling attachment 10. Suitably secured to the transverse load carriage support plates 26 and 27 are the vertical leg portions of a pair of L-shaped load supporting fork members 35 and 36. Preferably resting on the horizontal leg portions of the fork members 35 and 36, as shown in FIGURES 3 and 4, are inverted C-shaped channel members 37 and 38 which are interconnected at their upper surfaces by means of a transverse horizontal plate member 39 having a semi-circular concave leading edge. To prevent forward tipping of the members 37, 38 and 39 relative to the fork members 35 and 36, the channels 37 and 38 are enclosed along their bottom edges by plates 37a and 38a, respectively.

Suitably secured, as by welding, to the upper surface of the plate member 39, immediately above the channel member 37 and intermediate of the ends thereof, is an upstanding bearing block 40 having a vertical shaft 41 on which is pivotally mounted a load engaging clamp arm 42. Pivotal movement of the load clamping arm 42, which may be of hollow or solid construction, is adapted to be effected by means of a hydraulic piston and cylinder assembly, indicated generally by the reference numeral 43. The hydraulic assembly 43 comprises a cylinder 44 pivotally anchored at 45 to the horizontal plate 39 and a piston rod 46 having an outer clevis 47 pivotally connected at 48 to a bracket 49 secured to the inner side wall of the clamp arm 42 adjacent the rear end thereof. When hydraulic fluid under pressure is admitted at 44a to the forward end of the cylinder 44 of the hydraulic assembly 43, the piston rod 46 is retracted and the clamp arm 42 is caused to be pivoted in a clockwise direction as viewed in FIGURE 3. Correspondingly, when hydraulic fluid is introduced at 44b into the rear end of the cylinder 44, the piston rod 46 is distended and the clamp arm 42 is caused to pivot in a counterclockwise direction. The channel 38 serves as stationary load engaging arm means while the clamp arm 42 serves as movable load engaging arm means.

Cooperating load engaging clamp means are mounted respectively at the forward ends of the stationary arm means 38 and the pivotally mounted clamp arm 42. The clamp means at the forward end of the stationary arm means 38 comprises a curved plate member 50 having clamp pads 51 along its inner face. The plate member 50 is suitably secured, as by bolts or welding, to the end of a transverse shaft 52 which is journaled in a pair of horizontally spaced pillow blocks 53 bolted to inverted generally L-shaped supporting bar members 54 secured, as by welding, to the upper surface of the channel member 38. Slidably guided in and between the bar members 54 is an inverted T-shaped rack member 55 which, along its upper edge, has gear teeth that engage the teeth of a gear pinion 56 secured to the clamp shaft 52 intermediate of the pillow blocks 53. Rectilinear movement of the rack gear 55 is adapted to be effected by means of a hydraulic piston and cylinder assembly, indicated generally by the reference numeral 57. The hydraulic assembly 57 comprises a cylinder 58 anchored to the clamp plate 39 immediately above the clamp arm channel member 38, and a piston rod 59 connected at its forward end to the rear end of the rack 55. Upon admission of hydraulic fluid at 58a to the forward end of the cylinder 58 of the hydraulic assembly 57, the piston rod 59 is retracted causing rearward movement of the rack 55 and rotation of the pinion 56 and the clamp 50 in a counterclockwise direction as viewed in FIGURE 2. When fluid under pressure is admitted at 58b to the rear end of the cylinder 58, the piston rod 59 is distended causing forward movement of the rack 55 and rotation of the pinion 56 and the clamp 50 in a clockwise direction as viewed in FIGURE 2.

Disposed oppositely of the clamp 50 is associated clamp means which, as shown in FIGURE 3, comprises a curved

plate member 60 having clamp pads 60a along its inner face. Secured to the backside of the plate 60 is a clevis member 61 pivotally mounted about an axis 62 to a clamp shaft 63 rotatably mounted about a horizontal axis in the forward end of the clamp arm 42. The pivotal mounting of the clamp plate 60 about the axis 62 permits the plate 60 to adjust to the outer circumference of a load during engagement thereof, while the mounting of the plate 60 on the clamp shaft 63 permits the plate 60 to be rotated conjointly with the clamp plate 50 when a load is engaged and the rack 55 is actuated.

The adjacent ends of the clamp plates 50 and 60 are each formed with spaced brackets 63 and 64. Pivotaly mounted between the brackets 63 about an axis 65 is a sleeve member 66 through which slidably extends a stabilizing bar 67. The bar 67, at its one end, is formed with an enlarged head portion 68 which serves to limit movement of the rod 67 relative to the sleeve member 66 and, at its other end, is formed with an enlarged portion 69 that is pivotally mounted about an axis 70 between the bracket members 64 of the clamp plate 60. This arrangement of the stabilizing bar 67 serves to ensure that the forward ends of the clamp plates 50 and 60 spread apart as the forward end of the clamp arm 42 is moved away from the clamp arm 38, to facilitate entry of a barrel being engaged between the clamp plates 50 and 60.

As best illustrated in FIGURES 3, 4 and 5, a load engaging standard, indicated generally by the reference numeral 71, is secured at its one end to the clamp plate 50 for selective rotation therewith and at its other end is provided with gripping means for engaging the upper rim of a barrel. The standard 71 comprises a pair of horizontally spaced angle members 72, which extend vertically in the operative position of the attachment 10 shown in FIGURES 3, 4 and 5, and which are reinforced at their upper ends by plates 73. Arranged between the angle members 72 is rim gripping means which comprises a generally U-shaped block member 74. A horizontal pivot pin 75 extends between the legs of the block member 74, and pivotally mounted intermediate of its ends on the pin 75 is a load engaging latch member 76. Arranged for cooperation with the latch member 76 is a transverse rim guide member 77 which is secured to the forward face of the block member 74 below the latch member 76. The latch member 76 is adapted to be selectively pivoted by means of a hydraulic piston and cylinder assembly, indicated generally by the reference numeral 78. The hydraulic assembly 78 comprises a cylinder 79, which is secured to, or integrally formed with, the rear end of the block member 74, and a piston rod 80 having a clevis end pivotally mounted about an axis 81 to the rear end of the latch member 76. Upon the admission of fluid under pressure at 79a to the upper end of the cylinder 79 of the hydraulic assembly 78, the piston rod 80 is retracted and the latch member 76 is caused to pivot about the pin 75 in a clockwise direction as viewed in FIGURE 5. Correspondingly, upon the admission of fluid at 79b to the lower end of the cylinder 79, the piston rod 80 is distended and the latch member 76 is pivoted about the pin 75 in a counterclockwise direction. To facilitate rectilinear adjustment of the described latch means along the standard for accommodating barrels of various sizes, a plurality of openings 82 are formed through the angle members 72 and reinforcing plates 73. The latch means is first moved to the desired position within the range of the openings 82 and then a pair of bolt assemblies 83 are disposed transversely through two of the openings 82 and aligned openings in the U-shaped support member 74.

As will be understood by those skilled in the art, fluid under pressure is transmitted to the several hydraulic assemblies 43, 57 and 78 through conventional hose lines which may, for example, have connection with a source of fluid under pressure through an intermediate hose rack 85 arranged adjacent the load carriage support plates 26

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and 27. Fluid may be selectively directed through the hose lines by manipulation of the control levers 18.

I shall now describe a typical use of the attachment 10 of my present invention in engaging, transporting and upending a barrel 86 containing raw materials, parts, refuse, or the like. Preparatory to engaging the barrel 16, the hydraulic assembly 28 of the truck mast 19 is actuated and the load supporting carriage of the truck 11 is lowered to the general position shown in solid lines in FIGURE 1. Then, the hydraulic assembly 43 is actuated for pivoting the clamp arm 42 in a clockwise direction as viewed in FIGURE 3 so as to move the clamp plate 60 away from the clamp plate 50. At the same time, the latch means carried at the upper end of the standard 71 is adjusted vertically therealong by manually positioning the bolts 83 through the appropriate openings 82 so as to dispose the upper edge of the rim guide member 77 at the proper height for receiving the lower edge of the upper rim 87 of the barrel 86. Also, the hydraulic assembly 78 is actuated so as to open the latch means by pivoting the latch member 76 in a clockwise direction as viewed in FIGURE 5.

After the foregoing preparatory steps have been taken, the truck 11 is driven forwardly until the barrel rim 87 is received along the upper edge of the rim guide member 77 and the clamp plates 50 and 60 are located at opposite sides of the barrel 86. Initial engagement of the barrel 86 is attained by actuating the hydraulic assembly 78 for pivoting the latch member 76 in a counterclockwise direction as viewed in FIGURE 5 until the latter engages the inner surface of the barrel rim 87. Next, the hydraulic assembly 43 is actuated so as to pivot the clamp arm 42 in a counterclockwise direction as viewed in FIGURE 3 so as to firmly grip the barrel 86 between the clamp plates 50 and 60. Then, the hydraulic assembly 28 of the truck mast 19 is actuated for elevating the load supporting carriage, the barrel-handling attachment 10 and the barrel 86 from the positions shown in solid lines in FIGURE 1 to the positions shown in dash lines.

With the barrel 86 in an elevated position, the latter is transported by the truck 11 to the location where the contents of the barrel 86 are to be emptied. After the truck 11 has arrived at the point of destination and the barrel 86 is in the elevated position shown in dash lines in FIGURES 2, upending of the barrel is accomplished by actuation of the hydraulic assembly 57 for causing rearward movement of the rack member 55 and pivotal movement of the pinion 56 and clamp plate 50. As the hydraulic assembly 57 is actuated in the manner described, the barrel 86 is tilted from the position shown in dash lines in FIGURE 2 to the position shown in solid lines.

After the contents have been emptied from the barrel 86, the hydraulic assembly 57 is actuated in a reverse direction for extending the rack member 55 forwardly thereby returning the barrel 86 to its upright position shown in dash lines in FIGURE 2. When the emptied barrel has been transported to the place of deposit, the hydraulic assembly 28 of the truck mast 19 is actuated for lowering the barrel to the ground. Finally, the hydraulic assembly 43 is actuated for moving the clamp plate 60 away from the clamp plate 50, and the hydraulic assembly 78 is actuated for moving the latch member 76 away from engagement with the barrel rim 87. The truck is then backed away from the deposited barrel and is ready to engage, transport and upend another barrel.

While I have shown and described what I believe to be a preferred embodiment of my present invention, it will be understood by those skilled in the art that various rearrangements and modifications may be made therein without departing from the spirit and scope of my invention.

I claim:

1. For use with an industrial lift truck having a mast assembly and an elevatable load supporting carriage mov-

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able therein, load handling means comprising in combination first load engaging arm means extending forwardly from the load supporting carriage, second load engaging arm means extending forwardly from the load supporting carriage and having a forward end that is movable toward and away from said first load engaging arm means, a pair of load engaging clamp means both rotatably mounted about horizontal axes and at least one pivotally mounted about an axis intersecting one of the horizontal axes at the forward ends of said load engaging arm means, and stabilizing bar means at one end being pivotally mounted to one of said load engaging clamp means and at the other end being slidably and pivotally mounted to the other of said load engaging clamp means for ensuring that the forward ends of said clamp means spread apart as the forward end of said second load engaging arm means is moved away from said first load engaging arm means.

2. For use with an industrial lift truck having a mast assembly and an elevatable load supporting carriage movable therein, load handling means comprising in combination first load engaging arm means extending forwardly from the load supporting carriage, second load engaging arm means extending forwardly from the load supporting carriage and having a forward end that is movable toward and away from said first load engaging arm means, load engaging clamp means rotatably mounted at the forward ends of said load engaging arm means, a standard secured at its one end to one of said load engaging clamp means, and load engaging gripping means at the other end of said standard.

3. The load handling means of claim 2 characterized by the provision of means carried by said load supporting carriage for rotating at least one of said load engaging clamp means.

4. The load handling means of claim 2 characterized by said load engaging gripping means comprising latch means.

5. The load handling means of claim 2 characterized by said load engaging gripping means comprising power actuated latch means pivotally mounted on said standard.

6. The load handling means of claim 2 characterized by said load engaging gripping means comprising power actuated latch means pivotally mounted on said standard and rectilinearly adjustable therealong.

7. For use with an industrial lift truck having a mast assembly and an elevatable load supporting carriage movable therein, load handling means comprising in combination first load engaging arm means extending forwardly from the load supporting carriage, second load engaging arm means extending forwardly from the load supporting carriage and having a forward end that is movable toward and away from said first load engaging arm means, a pair of load engaging clamp means both rotatably mounted about horizontal axes and at least one pivotally mounted about an axis intersecting one of the horizontal axes at the forward ends of said load engaging arm means, power actuated rack and pinion means for rotating at least one of said load engaging clamp means, stabilizing bar means at one end being pivotally mounted to one of said load engaging clamp means and at the other end being slidably and pivotally mounted to the other of said load engaging clamp means for ensuring that the forward ends of said clamp means spread apart as the forward end of said second load engaging arm means is moved away from said first load engaging arm means, a standard secured at its one end to one of said load engaging clamp means, and load engaging gripping means comprising power actuated latch means pivotally mounted at the other end of said standard.

8. For use with an industrial lift truck having a mast assembly and an elevatable load supporting carriage movable therein, load handling means comprising in combination first load engaging arm means extending forward-

ly from the load supporting carriage and being stationarily mounted relative thereto, second load engaging arm means extending forwardly from the load supporting carriage and having a forward end that is movable toward and away from said first load engaging arm means, first load engaging clamp means rotatably mounted exclusively about a horizontal axis at the forward end of said first load engaging arm means, second load engaging clamp means rotatably mounted about a horizontal axis and pivotally mounted about an axis intersecting the latter horizontal axis at the forward end of said second load engaging arm means, and means interconnecting said first and second load engaging clamp means for ensuring that the forward end of said second load engaging clamp means is spread apart from the forward end of said first load engaging clamp means as the forward end of said second load engaging arm means is moved away from said first load engaging arm means.

9. For use with an industrial lift truck having a mast assembly and an elevatable load supporting carriage movable therein, load handling means comprising in combination first load engaging arm means extending forwardly from the load supporting carriage and being stationarily mounted relative thereto, second load engaging arm means extending forwardly from the load supporting carriage and having a forward end that is movable toward and away from said first load engaging arm means, first load engaging clamp means rotatably mounted exclusively about a horizontal axis at the forward end of said first load engaging arm means, second load engaging clamp means rotatably mounted about a horizontal axis and pivotally mounted about an axis intersecting the latter horizontal axis at the forward end of said second load engaging arm means, stabilizing bar means interconnecting said first and second load engaging clamp means for ensuring that the forward end of said second load engaging clamp means is spread apart from the forward end of said first load engaging clamp means as the forward end of said second load engaging arm means is moved away from said first load engaging arm means, and means carried by the load

supporting carriage for rotating at least one of said load engaging clamp means.

10. For use with an industrial lift truck having a mast assembly and an elevatable load supporting carriage movable therein, load handling means comprising in combination first load engaging arm means extending forwardly from the load supporting carriage, second load engaging arm means extending forwardly from the load supporting carriage and having a forward end that is movable toward and away from said first load engaging arm means, load engaging clamp means rotatably mounted at the forward ends of said load engaging arm means and engageable with the sides of a container, a standard secured at its one end to one of said load engaging clamp means, a transverse guide member on said standard at the other end thereof and engageable with the outer lower edge of the upper rim of the container, and power actuated latch means mounted on said standard adjacent said transverse guide member and engageable with the inner surface of the upper rim of the container, whereby the container is gripped by said latch means and said transverse guide member and clamped between said load engaging clamp means.

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