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Brudi et al.

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[54] **TOTE PAN HANDLER ATTACHMENT FOR LIFT TRUCKS**

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[52] **U.S. Cl.** **214/620**, 214/670, 214/730, 294/87.22, 294/90

[51] **Int. Cl.** **B66f 9/14**

[58] **Field of Search** ..... 214/620, 621, 730, 214/750, 670, 75 R, 75 G; 294/87.22, 87.2, 99, 90

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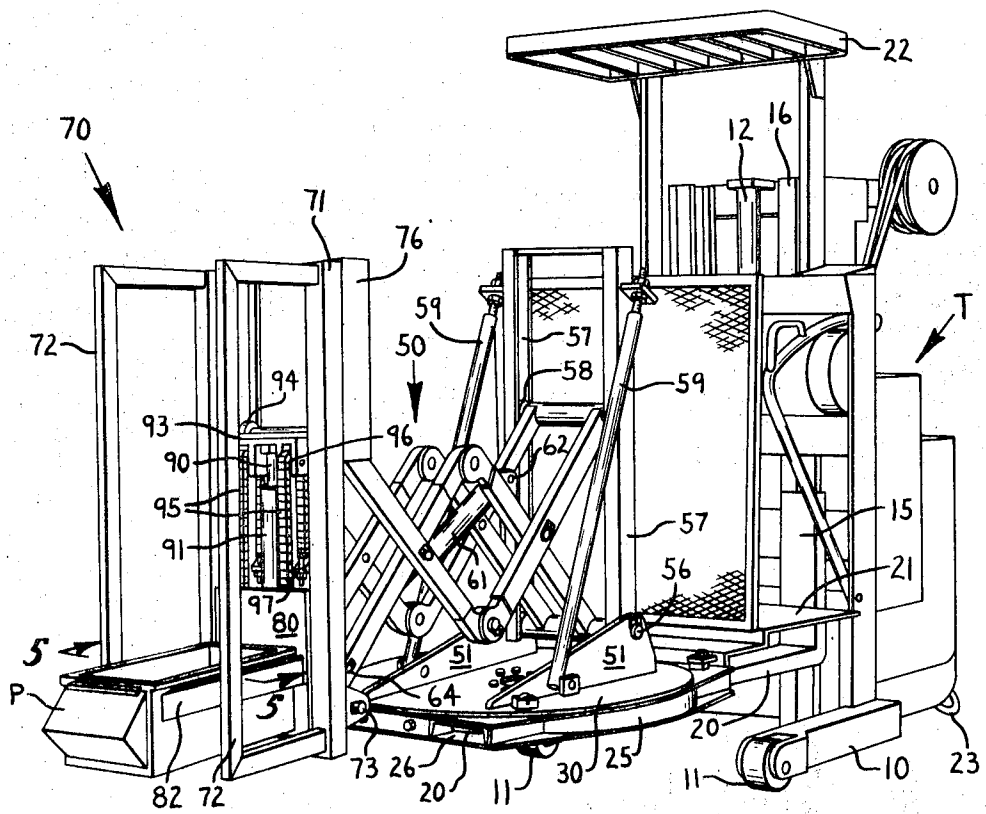
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[57] **ABSTRACT**

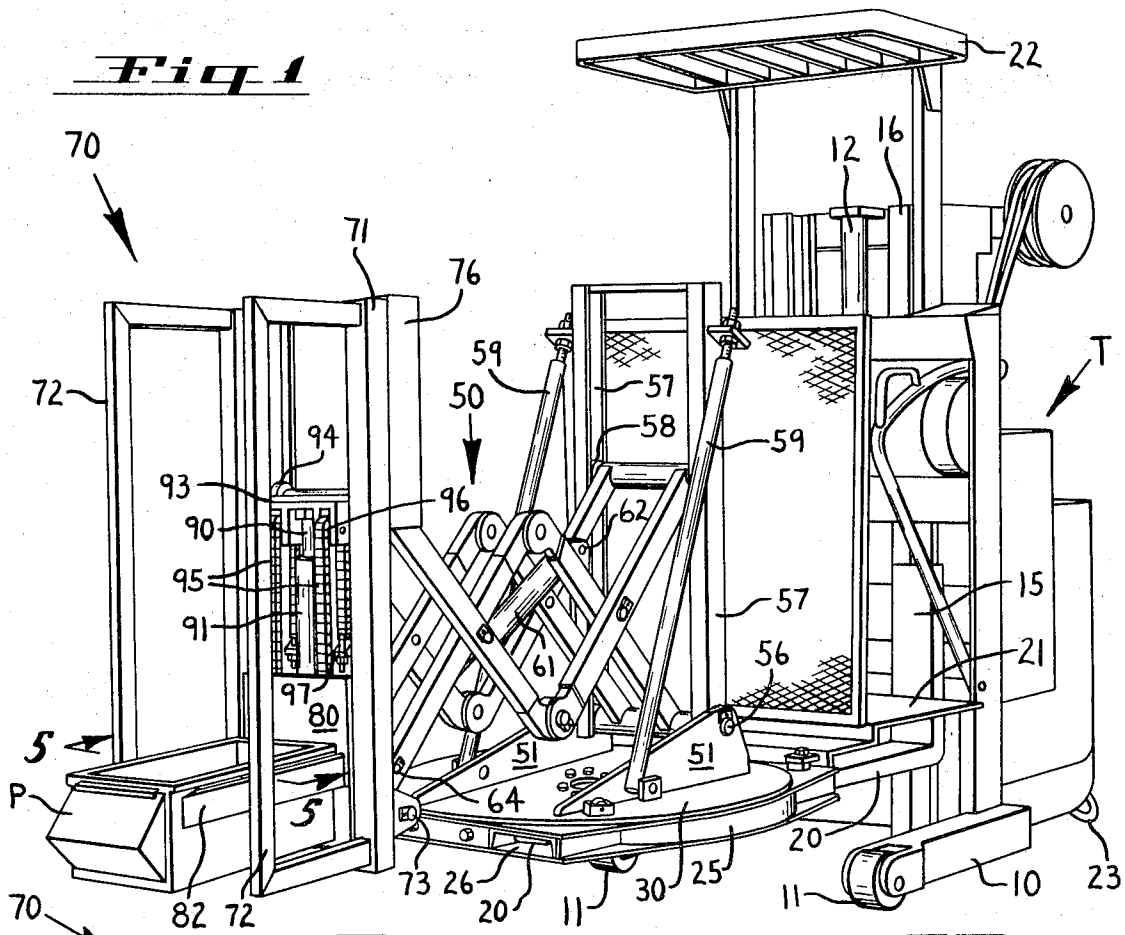
The attachment has a flat base member to support it on the floor when not in use. A pair of fork pockets in the base member receives the arms of a lift truck fork for up and down movement with the lift truck carriage. A turntable on the base member carries an extensible lazy tongs boom for rotation through 190° to reach straight forward, right or left from the truck. A tote pan fork is movable vertically in a vertical guide frame on the boom. The attachment is readily removable to leave the lift truck available for general service.

9 Claims, 7 Drawing Figures



2 Sheets-Sheet 1

Fig 1



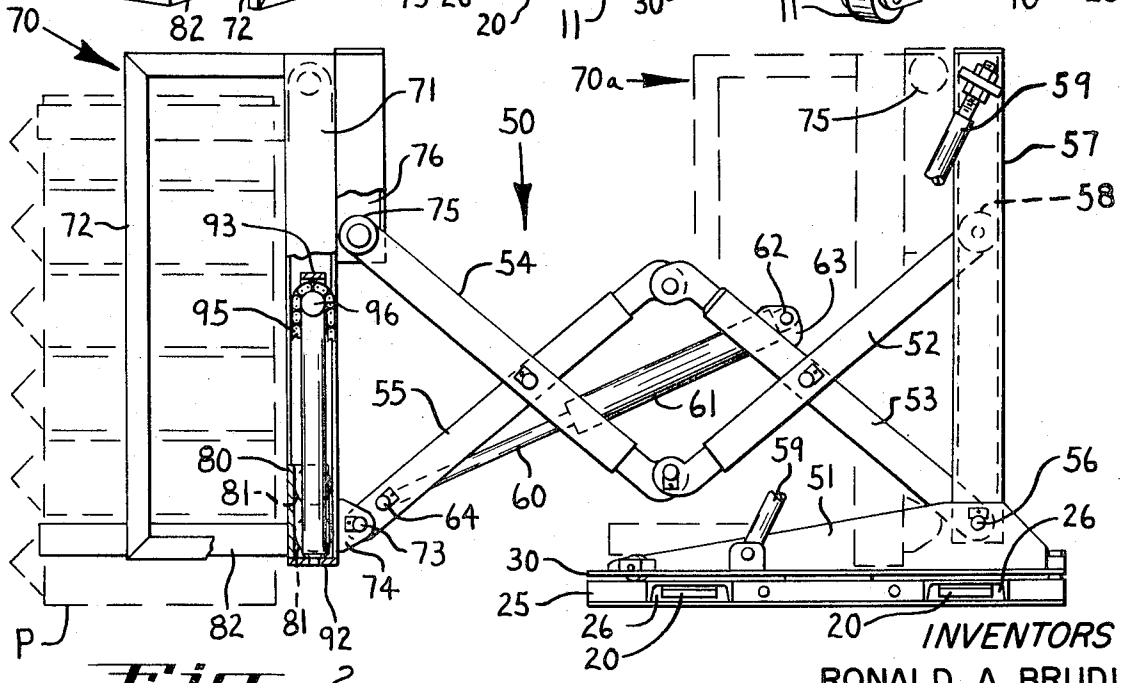


Fig 2

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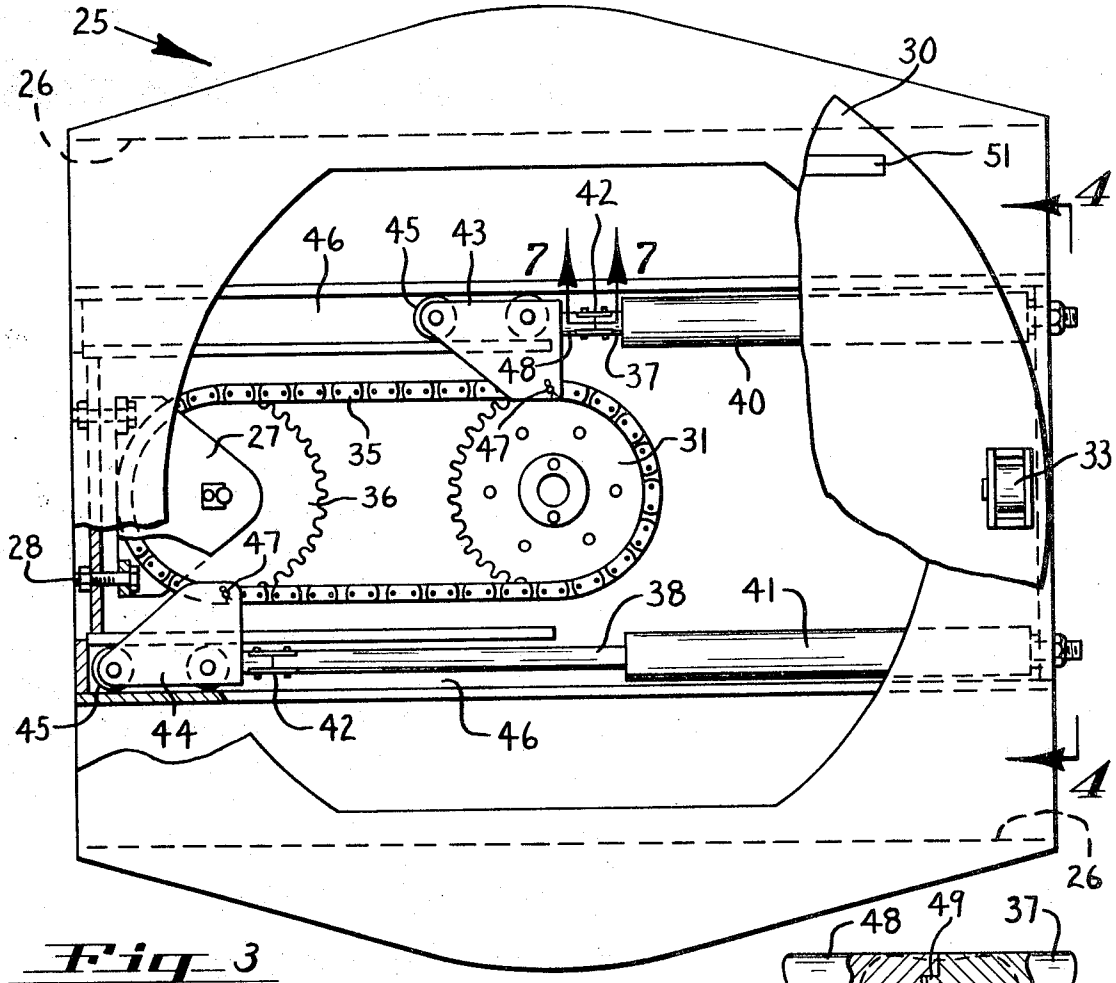


Fig 3

Fig 7

Fig 4

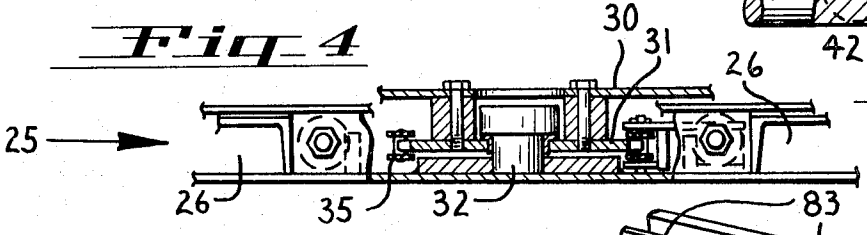


Fig 5

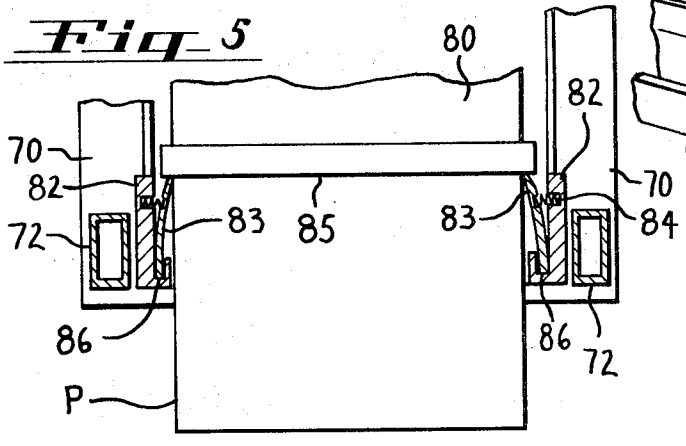
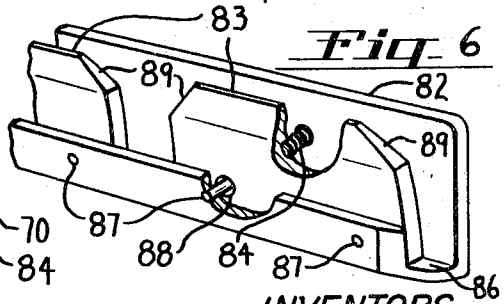


Fig 6



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TOTE PAN HANDLER ATTACHMENT FOR LIFT TRUCKS

BACKGROUND OF THE INVENTION

This invention relates to a removable tote pan handler attachment for lift trucks to enable a lift truck to travel straight forward down a narrow aisle and stack or remove tote pans from storage racks on opposite sides of the aisle without turning the truck.

Devices for this purpose have heretofore been permanently incorporated in the lift carriage of a lift truck or made as a special machine having no other utility. A permanent modification of a lift truck is not always acceptable, however, because it converts the lift truck into a special purpose machine which is no longer capable of general utility as a conventional lift truck. In many cases it may be desired to utilize a lift truck for handling tote pans only a part of the time while leaving the lift truck available for general utility purposes at other times. There is a need for a practical and efficient attachment for handling tote pans, which may be readily removed when the lift truck is needed for other purposes.

Objects of the invention are, therefore, to provide a tote pan handler attachment which may be readily applied to a conventional lift truck only when needed, to provide a tote pan handler attachment having a flat base adapted to rest on the floor in stable position when not in use, to provide a tote pan handler attachment which is rotatable through 190° and capable of reaching straight forward, right or left or at any angle from the truck, to provide a rotatable lazy tongs mechanism forming an extensible boom for a tote pan handler, to provide an improved tote pan fork for carrying one or a stack of tote pans on the end of a rotatable extensible boom, and to provide an attachment of the type described of relatively simple and inexpensive construction which is rugged and reliable in operation.

SUMMARY OF THE INVENTION

The present attachment is built on a flat base member which is adapted to rest in stable position on a floor when not in use. A pair of parallel, horizontal fork pockets in the base member receives the arms of a lift truck fork as in picking up a pallet, without any modification of the lift carriage itself. The lift carriage thereby provides long range vertical movement to an elevated position above the floor. A turntable on the base member provides for rotation through an arc of 190°.

A lazy tongs mechanism on the turntable provides an extensible boom for reaching out to the right or left or straight ahead from the lift carriage. On the end of the boom a pair of parallel horizontal tote pan carrying arms are mounted in a guide frame for a short range of vertical movement relative to the boom. By these means the attachment facilitates the stacking and unstacking of tote pans on opposite sides of a narrow aisle without turning the lift truck. The attachment is readily removable to make the lift truck available for its ordinary use.

The invention will be better understood and the foregoing and additional objects and advantages will become apparent from the following description of the preferred embodiment of the invention with reference to the accompanying drawings. Various changes may be made in the details of construction and arrangement of parts and certain features may be used without others. All such modifications within the scope of the appended claims are included in the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a lift truck equipped with the present attachment, the lazy tongs boom being extended straight forward;

FIG. 2 is an elevation view of the attachment showing the lazy tongs boom extended to one side;

FIG. 3 is a top plan view of the base member FIG. the attachment with parts broken away;

FIG. 4 is a view on the line 4—4 in FIG: 3;

FIG. 5 is a view on the line 5—5 in FIG. 1;

FIG. 6 is a fragmentary view of an arm of the tote pan fork with parts broken away; and

FIG. 7 is a view on the line 7—7 in FIG. 3 with parts broken away.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 the lift truck T is of conventional construction having a base frame **10** with a pair of front wheels **11** and a steerable rear wheel, not shown, driven by an electric motor from batteries carried on the truck. The lift truck includes a hydraulic system and a cylinder and piston unit **12** for raising and lowering a lift carriage **15** on vertical guides or uprights **16.** The lower end of the lift carriage is equipped with a lifting fork having a pair of forwardly extending load arms **20** which may be lowered close to the floor between the front wheels **11.**

The load carriage **15** includes an operator's platform **21** allowing the operator to ride up and down with the load and an overhead guard **22** to protect the operator from falling objects. Controls for driving the truck, raising and lowering the carriage **15** and for operating the mechanisms of the present attachment are also mounted on the carriage **15** in a position convenient to an operator standing on the platform **21.** Skids **23** stabilize the truck when a load overhangs on one side.

The present attachment is built on a hollow, flat base member **25** which is adapted to support the attachment on the floor when not in use. A pair of horizontal fork pockets **26** extend through base member **25** to receive the load arms **20** of lift carriage **15** as shown in FIG. **1.** Thus, the attachment may be picked up from the floor in the same manner as picking up a pallet on the load arms **20.** A turntable **30** is mounted for rotation on top of base member **25.**

Referring now to FIGS. **3** and **4,** turntable **30** is connected to a sprocket wheel **31** which rotates on a pin **32** fixedly mounted in the bottom of base member **25,** the turntable being supported on rollers **33** mounted in the turntable. A chain **35** is trained around sprocket wheel **31** and an idler sprocket **36.** Idler sprocket **36** is carried by a movable bracket **27** which is adjustable by bolts **28** to tighten the chain.

The turntable is rotated by a pair of piston rods **37** and **38** in cylinders **40** and **41.** Links **42** secure the piston rods to a pair of reciprocating slides **43** and **44** on opposite sides of the loop of endless chain **35.** Slides **43** and **44** have rollers **45** traveling in linear guide tracks **46** parallel with the reaches of the chain **35.** Pins **47** connect the slides **43** and **44** with links in the chain.

Each link **42** is a conventional chain repair link having a pin in one end extending through a diametral hole in the piston rod and a pin in the other end extending through a similar hole in a stub rod **48** on the slide. A

boss 49 on the end of the piston rod fits into a socket in the end of the stub rod to transmit thrust as shown in FIG. 7.

In FIG. 3 the turntable 30 has been rotated to its limit of movement in a clockwise direction by the retraction of piston rod 37 and the extension of piston rod 38. When piston rod 37 is fully extended and piston rod 38 fully retracted, the turntable will be rotated 180° in a counterclockwise direction.

Referring back to FIGS. 1 and 2, a lazy tongs boom 50 is mounted on a pair of bracket ears 51 on turntable 30. The lazy tongs linkage comprises two pairs of scissors assemblies in side by side relation having arms 52, 53, 54 and 55 pivotally connected together as shown. The rear ends of arms 53 are pivotally mounted on a horizontal rod 56 spanning the two ears 51 at a distance behind the center of the turntable. A pair of upright channel members 57 is mounted at the lower ends of the members on rod 56 to provide vertical guides for rollers 58 on the rear ends of arms 52. Guide members 57 are secured in vertical position by a pair of braces 59 connected with the bracket ears 51.

The lazy tong linkage is extended and retracted by a piston rod 60 in a cylinder 61. The head end of cylinder 61 is pivotally mounted on a pin 62 in a pair of brackets 63 on the two arms 53 and the piston rod is connected to a pin 64 in the forward ends of the two arms 55.

The forward end of lazy tongs boom 50 is connected to a tote pan guide frame 70. The back side of frame 70 comprises a pair of upright channel members 71 and the front of the frame comprises a pair of upright tote pan guide members 72. The forward ends of arms 55 are pivotally mounted on a rod 73 spanning a pair of ears 74 on the lower ends of channel members 71. The forward ends of arms 54 are connected with rollers 75 which are movable up and down in a pair of guide channels 76 on the upper ends of channel members 71.

It will be appreciated that this arrangement forms a parallel linkage which maintains the guide frame 70 in vertical position parallel with upright members 57 as the lazy tongs boom is extended and retracted by piston rod 60. When the lazy tongs boom is fully retracted, guide frame 70 fits compactly against uprights 57 well within the outline of turntable 30 and base member 25 as indicated in broken lines at 70*a* in FIG. 2.

A lift carriage 80 is mounted on pairs of rollers 81 for vertical travel in the channels 71. Extending forward from opposite sides of carriage 80 is a pair of rigid, parallel, horizontal load arms 82. As shown in FIGS. 5 and 6, a pair of curved plates 83 is supported along the lower edges in a channel 86 on the inside face of each arm 82. The upper edges of plates 83 are deflected toward each other by light springs 84 to engage under a peripheral shoulder 85 extending around the top of the tote pan P, the arms 82 being spaced apart a greater distance than the width of the tote pans. In this manner, a single tote pan or a stack of tote pans may be lifted by the plates 83.

Plates 83 are retained loosely in channels 86 by pins 87 which pass through large holes 88 in the plates 83 permitting the plates to rock and tilt in the supporting channels. The forward corners of plates 83 are beveled at 89. Springs 84 exert sufficient force only to tilt plates 83 away from arms 82 so that an empty tote pan will not be pushed forward by plates 83 as the arms 82 straddle the pan.

Referring back to FIG. 1, carriage 80 is raised and lowered in guide frame 70 by a piston rod 90 in a vertical cylinder 91 which is connected to a bottom cross member 92 interconnecting the lower ends of channel members 71. Piston rod 90 is connected to a cross head 93 having rollers 94 to travel up and down in the channel members 71. Carriage 80 is connected to one end of a pair of chains 95 trained over sprocket wheels 96 in the cross head 93 and anchored at their opposite ends to brackets 97 in guide frame 70.

When guide frame 70 is retracted to its broken line position at 70*a* in FIG. 2, a single tote pan or a stack of tote pans may be carried without projecting forward from the conventional load carriage arms 20. Then, without turning the lift truck, an operator standing on platform 21 may raise the lift truck carriage 15 to the approximate level required for removing or replacing tote pans on storage racks along a narrow aisle. After rotating the turntable and boom toward the storage racks, an accurate height adjustment of the load arms 82 of the tote pan fork may be made by piston rod 90 and cylinder 91, the arms 82 being extended into the storage racks by piston rod 60 and cylinder 61.

It is easier and quicker to make a fine adjustment of the vertical position of load arms 82 by means of the small cylinder 91 which raises and lowers a relatively small weight than to attempt such adjustment by the much larger cylinder and piston unit 12 which supports a much greater weight. This contributes greatly to the ease and convenience of stacking and unstacking large numbers of tote pans, thereby facilitating these operations.

When the lift truck is needed for moving pallet loads or other general utility work, the base member 25 is set on the floor, the hydraulic lines to the cylinders of the attachment disconnected, and the truck backed away from the attachment, withdrawing load arms 20 from the fork pockets 26. The lift truck thereby has a double utility saving the expense of a second machine to handle the tote pans.

Having now described our invention and in what manner the same may be used, what we claim as new and desire to protect by Letters Patent is:

1. A tote pan handler attachment for a lift truck having a lift carriage with a pair of horizontal fork arms, said attachment comprising a flat bottom base member adapted to support the attachment on a floor, a pair of fork pockets in said base member receiving said fork arms to mount the attachment on the truck, a turntable on said base member, means in said base member disposed between said fork pockets and between said turntable and said flat bottom for rotating said turntable, a horizontally extensible lazy tongs boom on said turntable, a vertical guide frame on the end of said boom, a lift carriage in said guide frame, and a tote pan lift fork on said last lift carriage, said rotating means comprising a sprocket wheel in said base member connected with said turntable, an idler sprocket wheel in said base member, an endless chain trained around said two sprocket wheels, a pair of fluid pressure cylinders in said base member, and piston rods in said cylinders connected to said chain on opposite sides of said sprocket wheels; said cylinders extending alongside said fork pockets, a pair of guide tracks extending alongside said fork pockets beyond the ends of said cylinders, a pair of slides mounted for reciprocation in said guide tracks, a pin connecting each slide with said

chain, a stub rod on each of said slides aligned with its associated piston rod, a boss on the end of one of said rods seated in a socket in the end of the other rod, said rods having diametral openings therethrough adjacent said ends, and a chain repair link having pins in said openings connecting said two rod ends together.

2. An attachment as defined in claim 1, said vertical guide frame having a pair of vertical members on opposite sides of said tote pan lift fork intermediate the ends of said fork to stabilize a stack of tote pans carried by said tote pan lift fork.

3. An attachment as defined in claim 1, said tote pan lift fork having a pair of horizontal arms arranged to straddle a shouldered tote pan, and pivotal plates on the inside faces of said arms having horizontal top edges arranged to engage under said shoulder to lift the tote pan.

4. An attachment as defined in claim 3 including pins loosely connecting said plates with said arms for rocking movement on said arms, and springs tilting said plates inward away from said arms.

5. A tote pan handler attachment for a lift truck having a lift carriage with a pair of horizontal fork arms, said attachment comprising a flat bottom base member adapted to support the attachment on a floor, a pair of fork pockets in said base member receiving said fork arms to mount the attachment on the truck, a turntable on said base member, a sprocket wheel in said base member connected with said turntable, an idler sprocket wheel in said base member, an endless chain trained around said two sprocket wheels, a pair of fluid pressure cylinders in said base member, and piston rods in said cylinders connected to said chain on opposite sides of said sprocket wheels, said cylinders extending alongside said fork pockets, a pair of guide tracks extending alongside said fork pockets beyond the ends of said cylinders, a pair of slides mounted for reciprocation in said guide tracks, a pin connecting each slide with said chain, a stub rod on each of said slides aligned with its associated piston rod, a boss on the end of one of said rods seated in a socket in the end of the other rod, said rods having diametral openings therethrough adjacent said ends, and a chain repair link having pins in said openings connecting said two rod ends together.

6. A tote pan handler attachment for a lift truck having a lift carriage with a pair of horizontal fork arms; said attachment comprising a flat bottom base member adapted to support the attachment on a floor, a pair of fork pockets in said base member receiving said fork arms to mount the attachment on the truck, a turntable on said base member, means in said base member for rotating said turntable, a horizontally extensible boom on said turntable, a vertical guide frame on the end of said boom, a lift carriage in said guide frame, and a tote pan lift fork on said last lift carriage; said tote pan lift fork having a pair of parallel horizontal arms arranged to straddle a shouldered tote pan, said last arms each having an upward facing channel extending along its lower inside edge, a plate supported on its lower edge in each of said channels for rocking movement between a vertical position and an inwardly inclined position in said channel, said plates tilting inward toward each other to engage under the shoulders on opposite sides of the tote pan for supporting the tote pan on the upper edges of said plates, and means loosely confining said plates in said channels for said rocking movements.

7. An attachment as defined in claim 6, said confining means comprising transverse pins bridging said channels and extending through holes in said plates.

8. An attachment as defined in claim 6 including springs pressing said upper edges of said plates inward toward each other.

9. An attachment as defined in claim 6 including a plurality of said rocking plates in each of said channels disposed end to end.

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