

Oct. 14, 1952

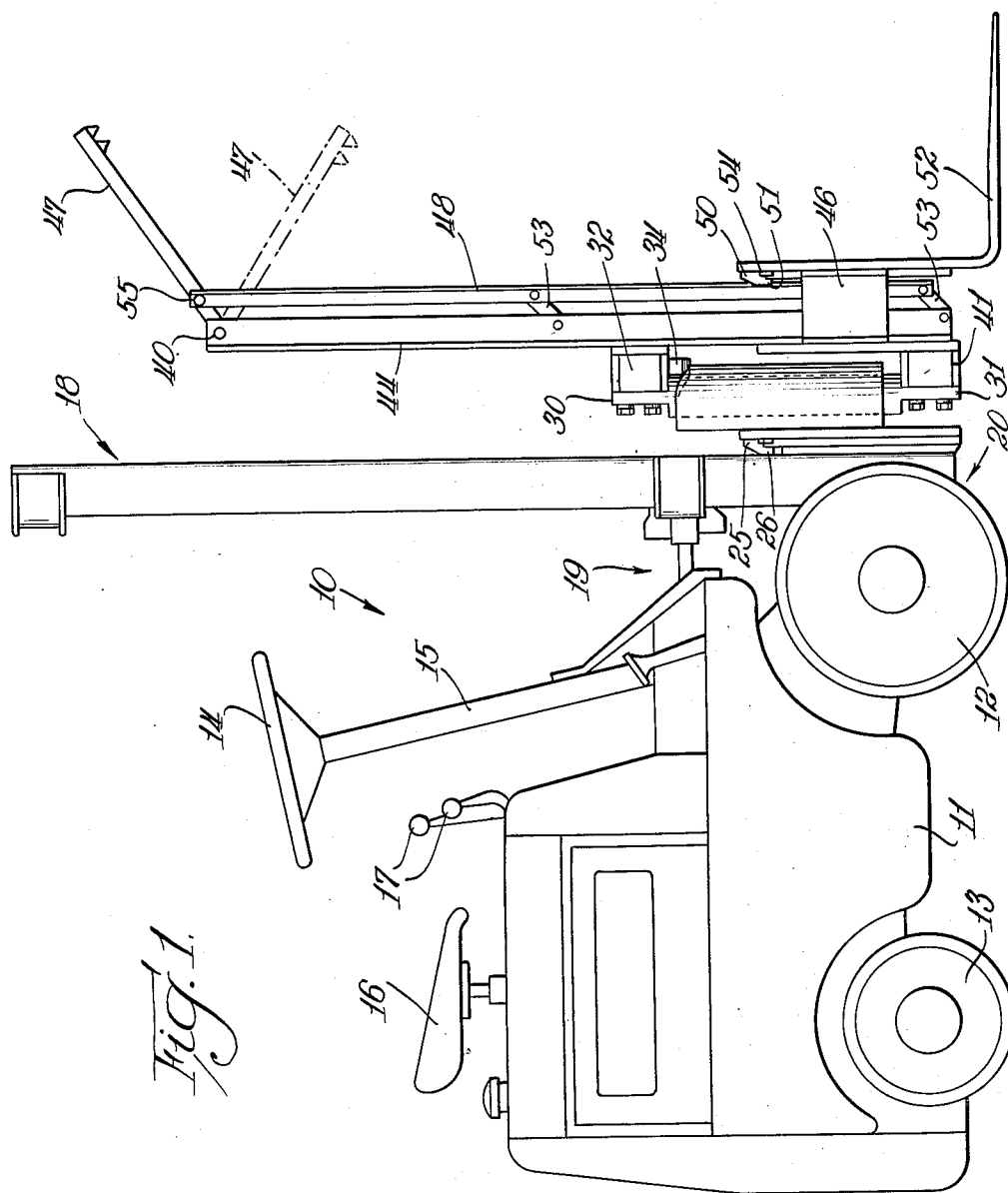
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2,613,829

SELF-CENTERING BALE HANDLER

Filed June 14, 1950

4 Sheets-Sheet 1



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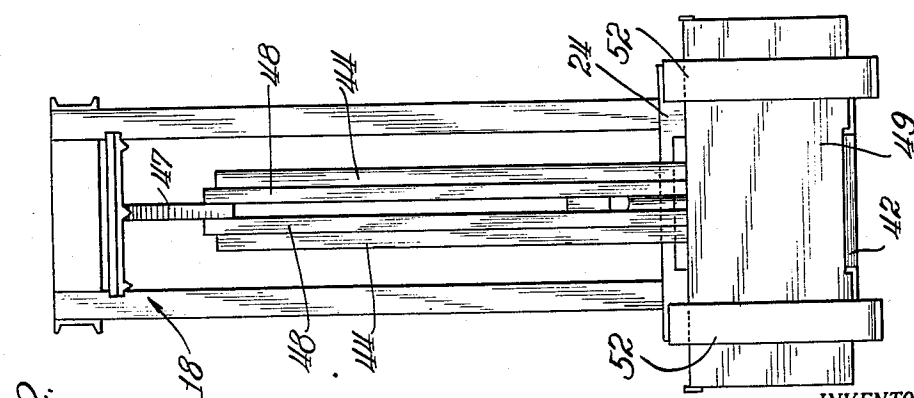
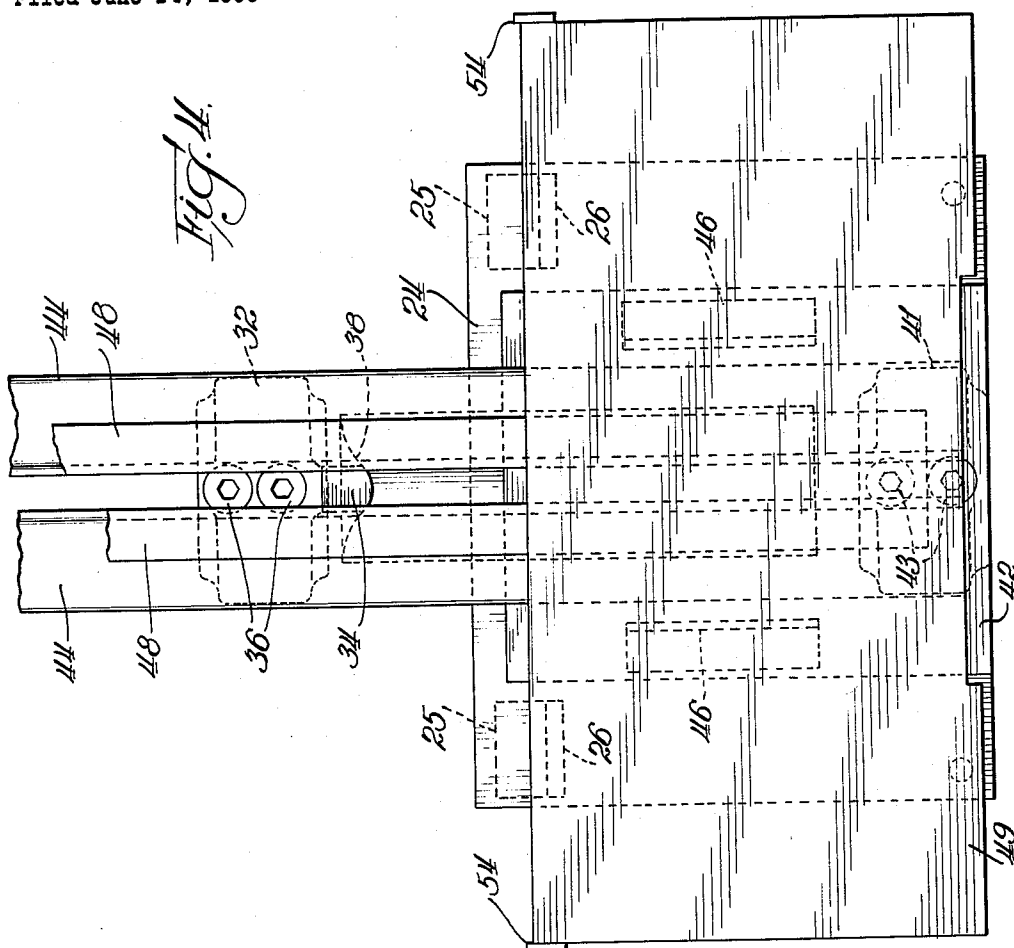
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## SELF-CENTERING BALE HANDLER

Filed June 14, 1950

4 Sheets-Sheet 2



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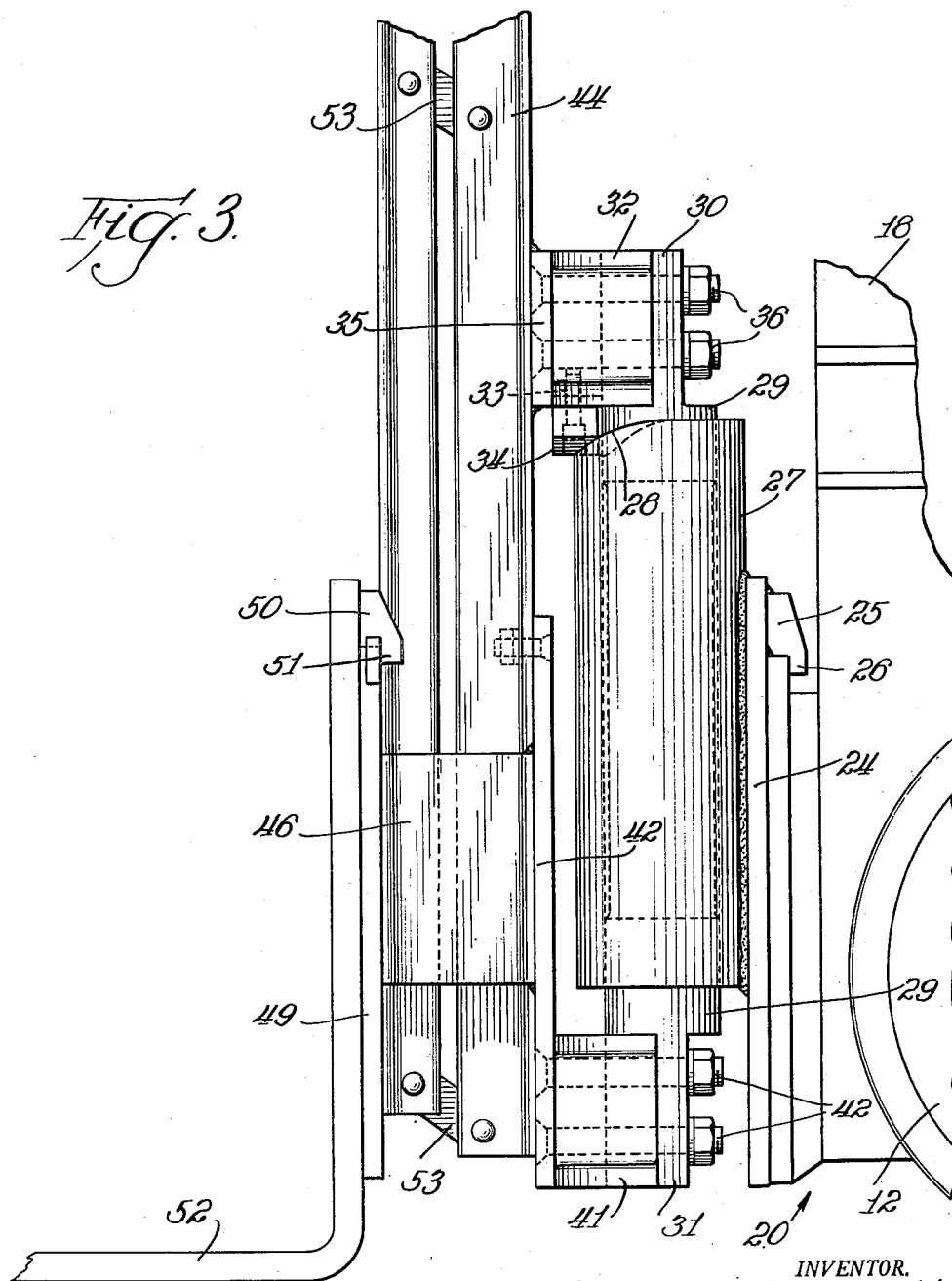
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## SELF-CENTERING BALE HANDLER

4 Sheets-Sheet 3



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4 Sheets-Sheet 4

Fig. 5

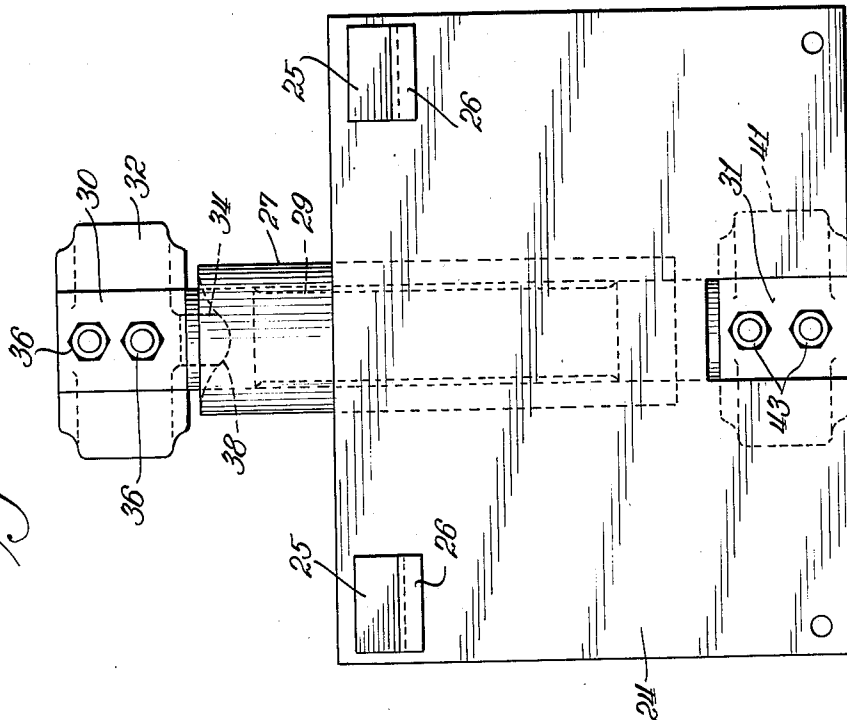
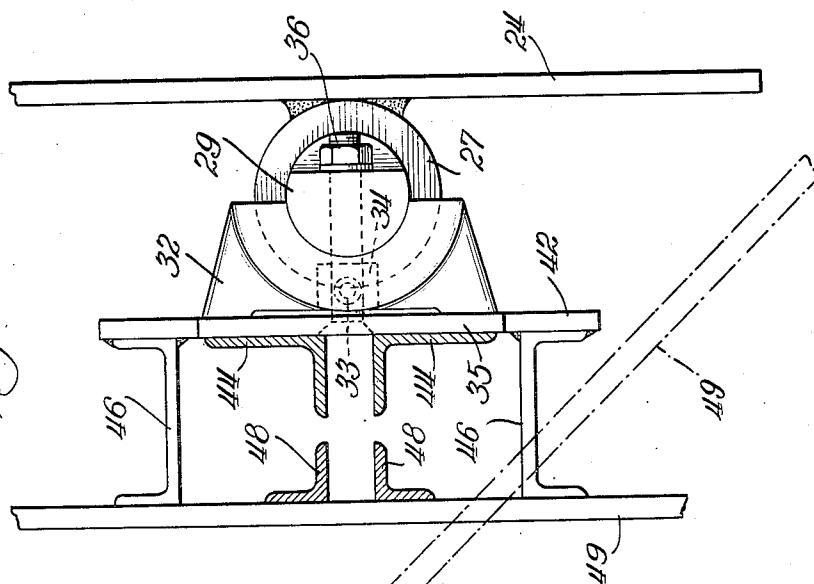


Fig. 6



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## UNITED STATES PATENT OFFICE

2,613,829

## SELF-CENTERING BALE HANDLER

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7 Claims. (Cl. 214-112)

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My invention relates generally to load supporting means for industrial trucks, and, more specifically, is directed to a self-centering bale handler.

At the present time, in the material handling field, there are numerous devices for use with industrial trucks which are adapted to engage the upper and lower surfaces of a tier of bales, as, for example, cotton bales, for transporting the latter within warehouses, yards, freight cars, and trucks. To the best of my knowledge these devices generally comprise horizontal load supporting means and horizontal load engaging means which are mounted for vertical movement toward and away from each other. The load supporting means is mounted usually to the lower end of a first pair of vertically extending slide members and the load engaging means is secured to the upper end of a second pair of slide members, which pairs of slide members are guided one within the other. Suitable rope and pulley means or hydraulic piston and cylinder assembly means is provided for effecting relative movement between the pairs of slide members. Constructions of this character are not only bulky and expensive, but also require the operator of the industrial truck to manually operate suitable control levers for actuating the rope and pulley means or hydraulic piston and cylinder assembly means, in addition to operating the lever provided for controlling vertical movement of the device within the mast of the industrial truck. Furthermore, the aforescribed devices are rigidly mounted to the load supporting carriages of the industrial trucks, and I have noted that considerable time is consumed by the operator of the truck in maneuvering the latter into position adjacent the load to be picked up, since the truck must be substantially in line with the load before the latter can be engaged.

It is an object of my present invention to provide an industrial truck with a bale handler for gripping and releasing loads automatically, relieving the operator of the truck of the necessity of manipulating any control levers other than those which are standard on conventional industrial trucks.

I propose to accomplish this object by providing a bale handler comprising an upper load engaging means adapted to be pivoted toward and away from a lower load supporting means in response to the relative vertical positions between the load supporting means and load engaging means. More specifically, I contemplate the provision of first vertically extending frame means to which, at the upper end thereof, is

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pivottally mounted load engaging means and second vertically extending frame means, to which, at the lower end thereof, is secured load supporting means. I further propose to pivottally mount the upper end of the second frame means to the load engaging means intermediate the ends thereof, whereby relative vertical movement between the load supporting means and the first frame means will cause the load engaging means to pivot about its connection to the second frame means. Thus, when the load supporting means is urged upwardly, with respect to the first frame means, the load engaging means is swung away from the load supporting means, and when the load supporting means is urged downwardly, with respect to the first frame means, the load engaging means is swung toward the load supporting means. The upper end of the second frame means is pivottally mounted to the load engaging means closely adjacent the pivotal mounting of the latter to the first frame means, and thus small relative movement between the first and second frame means effects a large movement of the outer end of the load engaging means. It will thus be understood that when the load supporting means is lowered into engagement with the ground or the upper surface of a tier of bales the second frame means causes the load engaging means to swing away from the load supporting means, thereby permitting the latter to be disposed beneath a tier of goods. After the load supporting means has been positioned beneath the goods to be picked up the operator need only raise the load supporting carriage of the industrial truck, which causes upward movement of the first frame means relative to the second frame means, thereby causing the load engaging means to swing into engagement with the upper surface of the load disposed on the load supporting means. The load may then be driven to the desired location and the load supporting carriage lowered until it contacts the ground, which again causes the load engaging means to swing away from the load, releasing the latter, and permitting the truck to be backed away.

It is a further object of my present invention to provide a bale handler which will permit an operator of a truck, to which the bale handler is attached, to engage loads not in alignment with the lengthwise axis of the truck.

I propose to accomplish this object by pivottally mounting the second frame means, about a vertical axis, to support means secured to the load supporting carriage of the truck, thereby permitting the outer ends of the load supporting

means and load engaging means to be rotated away from the lengthwise axis of the truck.

It is still a further object of my present invention to provide a bale handler, of the character described, which is self-centering with respect to the lengthwise axis of an industrial truck.

I contemplate the provision of support means which will permit the second frame means, load supporting means, and load engaging means to be rotated about the vertical axis when the load supporting means is disposed in engagement with the ground, and support means which will, when the load supporting means is elevated from the ground, urge the load supporting means and load engaging means to a normally forwardly projecting position.

It is a still further object of my invention to provide a bale handler of the character described, which may be easily secured to and detached from the load supporting carriage of an industrial truck in order that other material handling devices may be secured thereto.

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

In the drawings:

Figure 1 is a side elevational view of an industrial truck to which the bale handler of my present invention has been mounted;

Figure 2 is a front elevational view of the bale handler of Figure 1;

Figure 3 is a partial side elevational view of the bale handler of Figure 1;

Figure 4 is a front elevational view of the bale handler of Figure 3;

Figure 5 is a rear elevational view of the bale handler of Figure 3; and

Figure 6 is a partial plan view of the bale handler of Figure 3.

Referring now to Figure 1, there is shown an industrial truck, indicated generally by the reference numeral 10, which comprises a main frame 11, to which at the forward end thereof is mounted a pair of steering wheels 12 and at the rear end thereof is mounted a pair of driving wheels 13. The truck 10 is further provided with a conventional hand steering wheel 14 mounted adjacent the upper end of a steering column 15, which has connection, at its lower end, through suitable linkage means to the forward steering wheels 12. Mounted adjacent the upper end of the frame 11 is a seat 16 which is provided for the operator of the truck. Suitable control levers 17 are disposed adjacent the driver's seat 16 for controlling the various devices of the industrial truck 10. Pivotally mounted to the main frame 11, adjacent the forward end thereof, is the lower end of a substantially vertically extending mast 18 which may be tilted from its normal vertical position by means of a conventional tilting mechanism, indicated generally by the reference numeral 19, which tilting mechanism is secured at its one end to the main frame 11 of the truck 10 and at its other end to the mast 18, intermediate the ends thereof. Mounted for vertical movement within the mast 18 is a conventional load supporting carriage, indicated generally by the reference numeral 20.

Mounted to the forward surface of the load supporting carriage 20 is a vertical transverse plate member 24. The plate member 24 is secured to the load supporting carriage 20 by means of a

pair of inverted hook-shaped bracket members 25, suitably secured, as by welding, to the rear surface of plate 24, which bracket members 25 have tongue portions 26 which engage the rear surface of the load supporting carriage 20 along the upper edge thereof.

Secured, as by welding, to the forward surface of the plate member 24, centrally of the ends thereof, is a vertically extending tubular support member 27 which has formed along its upper forward edge a camming surface 28, including a central pocket. Journaled within the tubular support member 27, for vertical and rotary movement therein, is a shaft 29 which has flat vertically extending flange portions 30 and 31 formed integrally therewith, adjacent the upper and lower ends thereof.

Located in juxtaposition of the upper vertical flange portion 30 is a block member 32 to which, at the lower surface thereof, is secured, as by a bolt 33, a depending tongue member 34. The member 34 is adapted to engage, and co-operate with, the camming surface 28 of the tubular support member 27. Disposed adjacent the forward surface of the block member 32 is a vertical transverse plate member 35 which, together with the block member 32, is secured to the flange 30 by means of a pair of vertically spaced bolts 36.

Located adjacent the lower flange 31 is a block member 41. Disposed adjacent the forward surface of block member 41 is a vertical transverse plate member 42 which, together with the block member 41, is secured to the lower flange 31 by means of a pair of vertically spaced bolts 43.

Secured, as by welding, to the forward surface of the transverse plate member 35 are a pair of horizontally spaced vertically extending standard angle members 44. The angle members 44, adjacent their lower ends, are secured to the forward surface of the transverse plate member 42 by means of bolts 45.

The transverse plate member 42 has secured, as by welding, to the forward surface thereof, adjacent each side of the angle members 44, a pair of vertically extending C-shaped channel members 46.

Pivotally mounted to the upper ends of the angle members 44, about an axis 40, is the one end of the main leg of a T-shaped load engaging member 47. Disposed between the C-shaped channel members 46, in alignment with the angle members 44, are a pair of vertically extending standard angle members 48 which, at their upper ends, are pivotally mounted, about an axis 55, to the load engaging member 47, intermediate of the ends thereof. Secured to the transverse legs of the angle members 48, adjacent the lower ends thereof, is a vertical transverse plate member 49 which is adapted to bear against the forward legs of the C-shaped channel members 46. A pair of fork frames 52 are mounted to the vertical transverse plate member 49, by means of a pair of inverted hook-shaped members 50, having tongue portions 51 engaging the rear surface of the plate member 49 along the upper edge thereof. The fork frames 52 are also suitably secured to the plate member 49, adjacent the lower end thereof. The vertically extending angle members 44 and 48 are interconnected by means of a plurality of link members 53 which are pivotally mounted to the lengthwise legs of the angle members 44 and 48. The link members 53 are provided for maintaining the angle members 44 and 48 in proper spaced relation.

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I shall now describe in detail the operation of the bale handler of my present invention.

When it is desired to pick up a load, as, for example, bales of cotton, the industrial truck 10 is maneuvered adjacent the tier to be picked up. The load supporting carriage 20 is then lowered by operating selectively one of the control levers at 17. Downward movement of the load supporting carriage 20 causes the fork frames 52 to engage with the ground. After the fork frames 52 engage the ground, further downward movement of the load supporting carriage 20 causes the pair of angle members 44 to move downwardly relative to the angle members 48, thereby causing the load engaging member 47 to swing upwardly about axis 55, from the position shown in dotted lines in Figure 1 to the position shown in solid lines. Further downward movement of the load supporting carriage 20 causes the tubular support member 27 to move downwardly, with respect to the shaft 49, thereby causing the tongue member 34 to be withdrawn from engagement with the camming surface 28.

When the bale handler is in the position last described, it may be swung in either direction about the vertical shaft 29, as, for example, to the position shown in dotted lines in Figure 6, thereby permitting the fork frame 52 to be aligned with a load which is not in alignment with the lengthwise axis of the industrial truck 10. By mounting the fork member 52 for swinging movement about a vertical axis considerable time is saved, since the operator of the industrial truck 10 need not align the truck 10 with the load to be picked up.

After the fork frames 52 have been disposed beneath a tier of cotton bales the load supporting carriage 20 may be raised by means of the appropriate control lever at 17. Upward movement of the load supporting carriage 20 causes the tongue member 34 on the shaft 29 to engage with the side of camming surface 28. Further upward movement of the load supporting carriage 20 causes the angle members 44 to move upwardly with respect to the angle members 48, thereby causing the T-shaped load engaging member 47 to swing downwardly about axis 55, into engagement with the upper surface of the load supported on frames 52. After the T-shaped load engaging member 47 has been disposed in engagement with the upper surface of the load, further upward movement of the load supporting carriage causes the fork frames 52 to be elevated from the ground. The weight of the angle members 44 and 48 and the fork frames 52, together with the load supported thereon, tend to cause the tongue member 34, on the post member 29, to ride downwardly along the camming surface 28, on the tubular support member 27, until the tongue member 34 is disposed in the central pocket thereof, thereby self-centering the bale handler with respect to the lengthwise axis of the truck.

After the truck 10, together with the load, has been driven to the desired location, the load supporting carriage 20 need only be lowered until the fork frames 52 engage the ground, whereupon relative movement between the angle members 44 and 48 takes place, which causes the T-shaped load engaging means 47 to swing, about axis 55, out of engagement with the upper surface of the load for releasing the latter. When in this position, the truck may be backed away thereby removing the fork frames 52 from beneath the load.

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If it should be desired to deposit the load in a position other than directly in front of the truck, the load supporting carriage 20 may be lowered still farther until the tongue member 34, on the shaft 29, is removed from engagement with the camming edge 28 of the tubular support 27, whereupon the truck may be maneuvered so as to swing the fork frames 52 about the vertical axis.

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

I claim:

1. For use with an industrial truck, the combination of a vertically extending main frame, load engaging means pivotally mounted to said main frame about a transverse axis adjacent the upper end thereof, vertically extending secondary frame means, load supporting means mounted to said secondary frame means adjacent the lower end thereof, and the upper end of said secondary frame means being pivotally mounted to said load engaging means intermediate of the ends thereof whereby when said load supporting means is urged upwardly with respect to said main frame said load engaging means swings away from said load supporting means and when said load supporting means is urged downwardly with respect to said main frame said load engaging means swings toward said load supporting means.

2. The combination of claim 1 wherein said load supporting means extends horizontally.

3. The combination of claim 2 including a plurality of link members pivotally mounted adjacent their one ends to said main frame and pivotally mounted adjacent their other ends to said secondary frame means.

4. The combination of first frame means adapted to be mounted to the load supporting carriage of an industrial truck, second frame means, means for pivotally mounting said second frame means to said first frame means about a vertical axis, load engaging means pivotally mounted to said second frame means about a transverse axis adjacent the upper end thereof, third frame means, load supporting means mounted to said third frame means adjacent the lower end thereof, and the upper end of said third frame means being pivotally mounted to said load engaging means intermediate of the ends thereof whereby when said load supporting means is urged upwardly said load engaging means swings away from said load supporting means and when said load supporting means is urged downwardly said load engaging means swings toward said load supporting means for gripping a load therebetween.

5. The combination of claim 4 wherein said mounting means normally positions said second frame means parallel to said first frame means.

6. The combination of claim 5 including a plurality of link members pivotally mounted adjacent their one ends to said second frame means and pivotally mounted adjacent their other ends to said third frame means.

7. For use with an industrial truck, the combination of a main frame, load engaging means mounted to said main frame adjacent the upper end thereof, secondary frame means, load supporting means mounted to said secondary frame means adjacent the lower end thereof, and the upper end of said secondary frame means

being mounted to said load engaging means whereby when said load supporting means is urged upwardly with respect to said main frame said load engaging means moves away from said load supporting means and when said load supporting means is urged downwardly with respect to said main frame said load engaging means is moved toward said load supporting means.

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