Our present invention relates generally to clamp attachments for industrial trucks, and, more specifically, to clamp attachments for gripping bales of cotton. It is an object of our present invention to provide a clamp attachment which, when associated with an industrial truck, may be employed to position bales of cotton between the pressure members of a compress unit.

It is another object of our present invention to provide a clamp attachment of the character noted which may be associated with existing industrial lift trucks without modification of the latter.

As industrial truck with which the clamp means of our present invention may be associated, comprises a generally vertically extending mast and an upwardly and downwardly movable load supporting carriage carried therein. The clamp means of our present invention comprises forwardly projecting upper arm means which is secured to the mast at the upper end thereof, and forwardly projecting lower arm means which is secured to the load supporting carriage and is movable upwardly therewith toward the upper arm means for clamping a load therebetween. In order to maintain engaged loads at the forward end of the clamp means, vertically extending load abutment means is secured to the lower arm means intermediate of the ends thereof and such abutment means serves to limit the distance that the lower arm means may be inserted beneath a load.

After the lower arm means has been inserted beneath the load to be engaged, such as a bale of cotton, the load supporting carriage is then elevated for moving the lower arm means and load upwardly whereupon the load is gripped between the upper and lower arm means and may then be transported, for example, to a compress unit. By maintaining the load at the forward end of the clamp means, insertion and depositing of the bale of cotton between the pressure plates of the compress unit is facilitated.

It is a feature of our present invention that the upper arm means may be secured to the mast in any one of a plurality of vertical positions so as to thereby accommodate various sizes of cotton bales and the various operating heights of the pressure plates of the compress unit.

It is a further feature of our present invention that the members of the clamp means are fabricated from channel, bar, and plate stock which is economical in cost and easily fabricated.

Now, in order to acquaint those skilled in the art with the manner of constructing and using clamp means in accordance with the principles of our present invention, we shall describe in connection with the accompanying drawings a preferred embodiment of our invention.

In drawings:
Figure 1 is a side elevational view of an industrial truck with which the clamp attachment of our present invention has been embodied; and

Figure 2 is a perspective view of the lower half of the clamp means of Figure 1; and

Figure 3 is a perspective view of the upper half of the clamp means of Figure 1.

Referring now to the drawings, there is indicated generally by the reference numeral 10 an industrial truck comprising a main frame 12 supported at its forward end by drive wheels 14 and at its rear end by steering wheels 16. The steering wheels 16 are controlled by a hand steering wheel 18 which is mounted at the upper end of a steering column 20 arranged forwardly of a driver's seat 22. The drive wheels 14 are adapted to be driven by suitable prime mover and transmission means (not shown) which are controlled by levers arranged adjacent the driver's seat 22.

A generally vertically extending mast construction, indicated by the reference numeral 24, is arranged at the forward end of the truck 10, and, more specifically, is pivotally mounted at its lower end to the vehicle frame 12. Suitable lifting means, indicated generally at 26, is provided for effecting limited forward and rearward lifting movement of the mast 24. Arranged for upward and downward movement within the mast 24 is a load supporting carriage 28 which has secured to its forward face a pair of vertically spaced transversely extending fork bars 30 and 32. Movement of the load supporting carriage 28 within the mast 24 may be effected by any suitable load lifting mechanism such as an hydraulic piston and cylinder assembly which is well known in the art. Since the means for lifting the load supporting carriage 28 forms part of our present invention, it is believed unnecessary to illustrate and describe such lifting means in the present disclosure.

We shall now describe the clamp attachment of our present invention. The clamp attachment comprises lower clamp arm means indicated generally by the reference numeral 34 which, as shown in Figures 1 and 2, includes a vertical transversely extending rectangular plate member 36. The plate 36 is detachably mounted to the upper fork bar 30 by means of brackets 38 and 40. Additionally, the lower portion of the plate member 36 is secured by means of bolts to the lower fork bar 32. The lower clamp arm means further comprises a pair of laterally spaced L-shaped fork frames 42 having the short vertical legs thereof secured, by welding, to the forward surface of the plate member 36 and with the long legs being normally disposed horizontally and projecting forwardly away from the load supporting carriage 28. The lower ends of vertically extending abutment members 44 are secured to the top sides of the long horizontal legs of the fork frames 42 intermediate of the ends thereof. The load abutment members 44 are preferably formed of channel members for purposes of economy and rigidity.

To lend additional strength to the fork frames 42 and the load abutment members 44, reinforcing gusset plates or elongated members 46 are secured along their lower edges to the top sides of the long legs of the fork frames 42 and at their ends to the vertical legs of the fork frames 42 and the load abutment channel members 44.

The clamp means of our present invention further comprises upper clamp arm means which is indicated generally by the reference numeral 47 in Figures 1 and 3. The upper clamp arm means 47 includes a transversely extending clamp bar member 48 which is adapted to be detachably secured to the mast 24, adjacent the upper end thereof, by means of bolt assemblies 50. The bar member 48 has secured thereto the short legs of a plurality of laterally spaced inverted L-shaped fork frames 52. The generally horizontal long leg portions of the fork frames 52 project away from the mast 24. Elongated reinforcing gusset members 54 are secured to the short legs and
3 underside of the long legs of the fork frames 52 and extend to the midpoints thereof.

Our invention may be used advantageously for transferring bales of cotton from a storage area or other location to a compress machine. In performing this operation we have found it generally desirable first to cut all but two of the bands which hold the bale together. The reason for this is to leave only the two remaining bands to be cut after the bale has been picked up in order to minimize the time during which the bale must be held by the lift truck.

After some of the bands have been cut, the truck is maneuvered so that the lower fork frames 42 are arranged adjacent the bale of cotton to be engaged. Next the truck 10 is driven forward so as to force the forks 42 beneath the bale of cotton until the load abutment members 44 engage the side of the bale. With the forks 42 positioned beneath the bale, the load supporting carriage 25 is elevated, in a known manner, within the mast 24 until the top of the bale contacts the upper fork frames 52. Then, with the clamp attachment holding the bale so that it will not fall apart, a workman may cut the two remaining metal bands around the bale and remove them. It will be apparent from the operation described in the preceding paragraph that when a bale is picked up it should be located in the attachment in a manner such that the remaining bands on the bale lie in planes which are approximately parallel to a vertical plane through the longitudinal center line of the truck 10. Also, the remaining fork frames 42) should be located in a manner such that none of the fork frames engages any of the remaining bands. Since the present attachment carries the bale a considerable distance from the mast 24 of the lift truck it is possible for a workman readily to reach through between the bale and the mast 24 to remove bands which may become entangled with the burlap wrapping around the bale.

After the remaining metal bands have been removed, the bale is transported to the compress unit and is inserted between the pressure plates thereof. The lower fork frames 42 are then lowered until the pressure between the upper fork frames 52 and the upper surface of the bale is relieved. Finally, the forks are withdrawn from beneath the bale simply by backing up the truck while a workman braces the bales so as to prevent it from toppling over.

The abutment members 44 are provided so as to limit the distance that the fork frames 42 may be moved beneath the bale of cotton to be engaged. By maintaining the bale at the outer ends of the fork frames, insertion and depositing of the cotton bale between the pressure plates of a compress is greatly facilitated. It is to be further noted that, although the position of the upper clamp arm means 47 is fixed, it may be changed to accommodate various sizes of bales and also various heights in compresses. Additionally, it should be noted that the clamp arm means are fabricated of inexpensive bar, sheet, and channel stock.

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

We claim:

1. For use with an industrial truck having a generally vertically extending mast and upwardly and downwardly movable load supporting carriage carried therein, clamp means comprising the combination of forwardly projecting upper arm means secured to the mast, forwardly projecting lower arm means secured to the load supporting carriage and being movable upwardly therefrom, intermediate therebetween, vertically extending load abutment means secured to said lower arm means intermediate of the ends thereof and serving to maintain engaged loads at the forward end of said clamp means, and elongated reinforcing means secured to the top side of said lower arm means and extending rearwardly from said abutment means.

2. For use with an industrial truck having a generally vertically extending mast and an upwardly and downwardly movable load supporting carriage carried therein, clamp means comprising the combination of upwardly laterally spaced inverted L-shaped fork frames having short legs secured to the mast and long legs projecting forwardly therefrom, elongated reinforcing members secured to the short legs and underside of said upper fork frames and extending to the midpoints thereof, lower laterally spaced L-shaped fork frames having short legs secured to the load supporting carriage and long legs projecting forwardly therefrom, vertically extending load abutment means secured to said lower fork frames intermediate of the ends thereof and serving to maintain engaged loads at the forward end of said clamp means, and elongated reinforcing members secured to the top side of said lower fork frames and extending between the adjacent short legs and channel members.

3. For use with an industrial truck having a generally vertically extending mast and an upwardly and downwardly movable load supporting carriage carried therein, clamp means comprising the combination of forwardly projecting upper arm means secured to the mast, forwardly projecting lower arm means secured to the load supporting carriage and being movable upwardly therefrom,clamp means comprising the combination of forwardly projecting upper arm means secured to the mast, forwardly projecting lower arm means secured to the load supporting carriage and being movable upwardly therefrom, and second vertically extending load abutment means secured to said lower arm means intermediate of the ends thereof, and a second vertically extending load abutment means secured to another of said lower arm means intermediate the ends thereof, and a second vertically extending load abutment means secured to another of said lower arm means and transversely spaced from said first load abutment means, whereby engaged loads are maintained at the forward end of said clamp means.

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