April 29, 1958 G. O. BAILEY 2,832,489

LIFT BOOM FOR INDUSTRIAL TRUCKS

Filed May 8, 1957 2 Sheets-Sheet 1

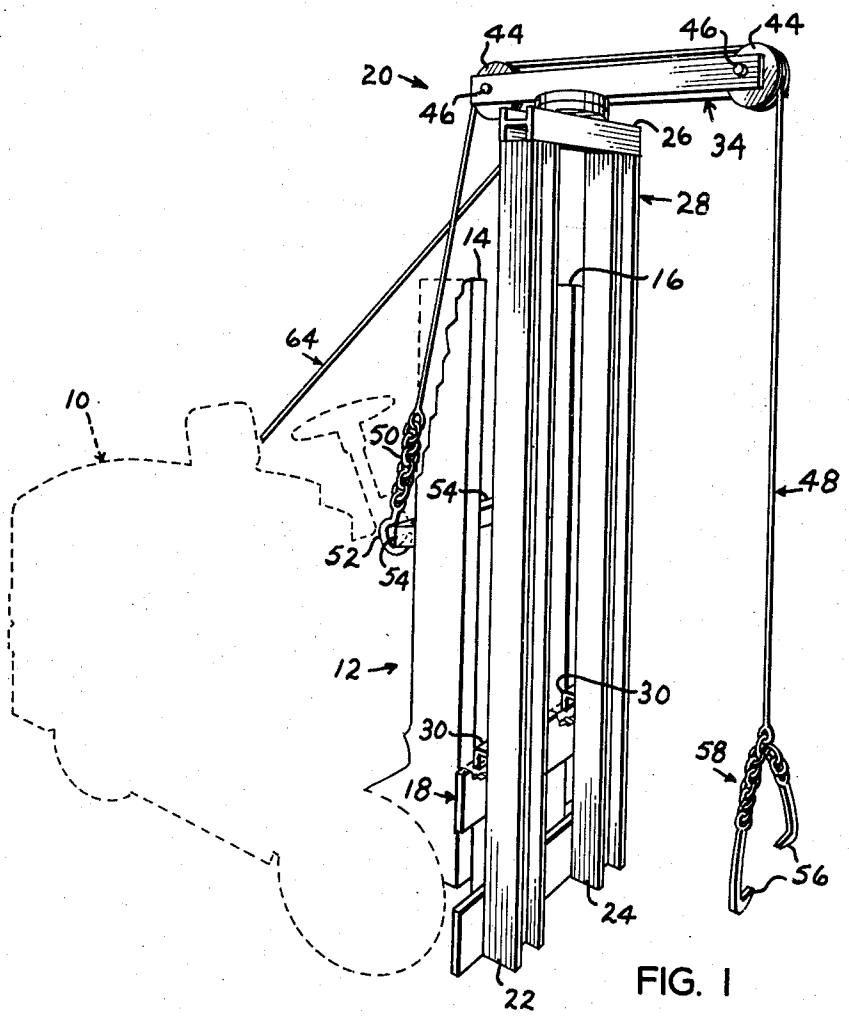


FIG. 1

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LIFT BOOM FOR INDUSTRIAL TRUCKS

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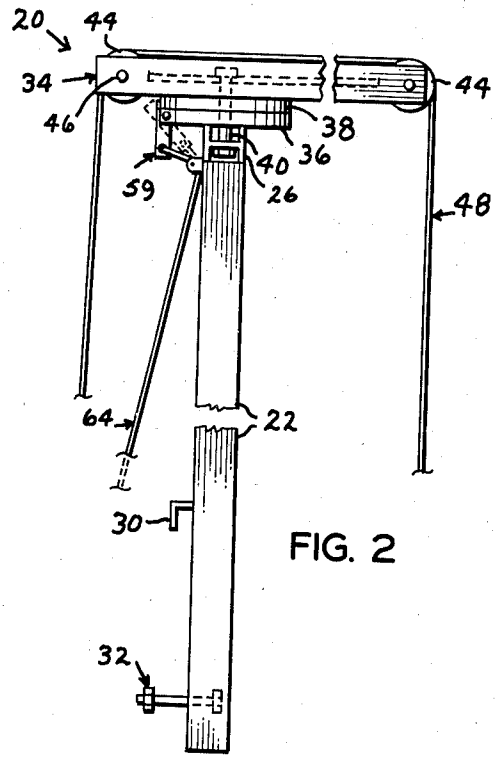


FIG. 2

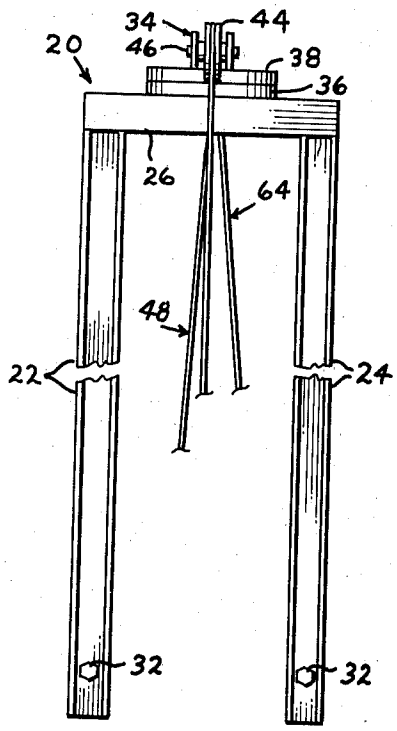


FIG. 3

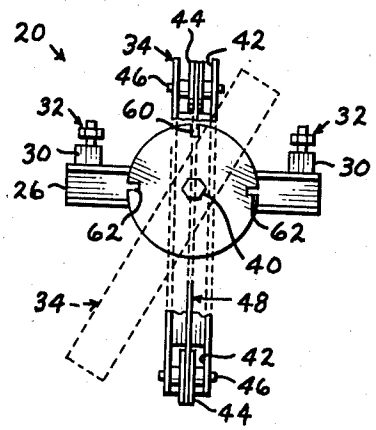


FIG. 4

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LIFT BOOM FOR INDUSTRIAL TRUCKS

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1 Claim. (Cl. 214—620)

The present invention relates to industrial trucks, and more particularly to a pivoting, load-lifting boom attachment for such trucks.

In lifting and stacking or storing certain goods, for example bales of cotton, it is desirable that the industrial trucks being used be equipped with means whereby a load may be engaged by the truck on the same surface supporting the truck, then lifted and transported for storing the same on various elevated levels.

The prior art reveals forks, clamps, and the like, connected to the lifting frame of industrial trucks for raising loads by the chain actuated or telescoping lifting means of the trucks. This lifting distance is limited by the length of the component parts of the lifting mechanism.

One cotton boom lifting mechanism presently available comprises an L-shaped adjustable height hydraulically actuated lifting mechanism carried by the lifting fork frame of an industrial truck. The principal objection to this type of arrangement resides in the fact that the structural arrangement and hydraulic means renders the cost of the same prohibitive for the comparatively small dealer or gin company.

It is therefore the principal object of the present invention to provide a tower or load-lifting boom means for hoisting or elevating loads to a height well above that provided by conventional lifting fork means on an industrial truck.

Another object is to provide a hoisting device comprising a vertical tower which may be easily connected to and removed from the fork frame lift of an industrial truck.

Another object is to provide a load-lifting tower of this class which features a manually actuated horizontally swinging boom.

An additional object is to provide a lifting tower connected to the fork frame of an industrial truck which will effectively extend the load-lifting level of the truck lift means.

A further object is to provide a device of this character having a sheave-equipped horizontal boom at its upper end over which is entrained cable means having one end connected to the lift fork frame, and having its free end adapted for grasping a load.

Still another object is to provide a device of this class comprising a tower carried by an industrial truck with cable means entrained over the tower and arranged to raise a load from a common supporting surface to a point adjacent the upper end of the tower simultaneously with the actuation of the truck load-lifting means.

Yet another object is to provide a device of this class in which the pivoting horizontal boom thereof may be rotated through substantially 180°.

The above invention accomplishes these and other objects by providing a pair of vertically disposed members rigidly connected together adjacent their upper ends

by a horizontal cross member. Each of the upright members are equipped with hook-shaped brackets and bolt means for connecting the lower end portions of the members to the forward surface of an industrial truck lift fork frame. A horizontally disposed boom is pivotally connected intermediate its ends to the cross member by a vertical axle extended through a pair of disks or plates rigidly connected to the cross member and the boom, respectively, and interposed therebetween. The opposing ends of the boom are each provided with vertically disposed sheaves journaled on horizontal axles in aligned relation. Cable means is adjustably connected at one end to the lift fork frame and is entrained over the sheaves of the boom, with the free end of the cable means depending from the boom a distance substantially equal to the height thereof. Latch means carried by the pivotal connection of the boom is released by the truck operator for permitting pivotal movement of the boom.

Other objects will be apparent from the following description when taken in conjunction with the accompanying two sheets of drawings, wherein:

Figure 1 is a perspective view of the device in operating position on an industrial truck, the truck being illustrated in outline and dotted lines;

Figure 2 is a side elevational view of the device, per se;

Figure 3 is a front elevational view of Fig. 2; and,

Figure 4 is a top plan view of the device, the movement of the boom being illustrated in dotted lines.

Like characters of reference designate like parts in those figures of the drawings in which they occur.

In the drawings:

The reference numeral **10** indicates, as a whole, a conventional industrial lift truck having a power driven vertically extendable lifting mechanism **12** at its forward end usually composed of a pair of substantially vertically disposed spaced-apart support members or posts **14** and **16** which extend upwardly above the truck a selected distance. The lifting means **12** further includes a second pair of guide members, not shown, carried inwardly of the posts **14** and **16** in vertical sliding relation. A lift fork frame **18** is rigidly connected to and extends horizontally between the guide members. Suitable power means such as hydraulic cylinders or chain means operated by the truck power means is operatively connected to the guide members and lifting fork frame **18** of the lifting mechanism **12** for extending the same vertically upward, thus disposing the fork frame **18** adjacent the upper end portion of the posts **14** and **16**. The above description is more or less conventional with industrial lift trucks and forms no part of the instant invention other than to set forth a workable combination with which the device of the present invention is intended to be used. The lifting forks normally associated with the lifting fork frame **18**, have been omitted from the drawings since they are normally removable and form no necessary part of the conventional equipment.

The reference numeral **20** indicates, as a whole, the device which includes a pair of rigid upright support members, such as I-beams **22** and **24**, of a selected size, which are rigidly connected together at their upper ends by a horizontal cross member **26**, thus forming a tower **28**. The length of the support members **22** and **24** is preferably such that they may extend from the lowermost portion of the fork frame **18** to a point well above the uppermost end of the lifting mechanism **12** in order that the load to be lifted, as disclosed hereinbelow, will be elevated to a selected elevated level. The tower **28** is adapted to be removably connected to the forward surface of the

fork frame 18 by providing each of the members 22 and 24 with a hook-shaped bracket 30 adapted to be engaged over the upper horizontal edge of the fork frame 18, thus disposing the lower end portion of each of the members 22 and 24 in contiguous contact with the forward surface of the fork frame. The lower end portion of each of the members 22 and 24 are each perforated for receiving bolt means 32 which is extended through co-operating apertures, not shown, in the fork frame 18. Thus, the brackets 30 serve to support the tower 28 and any load lifted thereby, while the bolt means 32 acts to hold the tower in place.

An elongated rigid member or boom 34 is pivotally connected intermediate its ends for horizontal swinging movement to the upper end of the tower 28 by a disk member 36 and a plate member 38 of a desired size. The disk 36 is flatly connected rigidly to the upper surface of the cross member 26 intermediate its ends. The plate member 38, which is substantially equal diametrically with relation to the disk 36, is rigidly connected to the lowermost surface of the boom 34 adjacent one end portion thereof, thus disposing the major portion of the longitudinal length of the boom 34 forwardly of the tower 28, while permitting the remaining portion to project rearwardly thereof toward the position of the truck 10. The disk 36 and plate 38 are adapted to be placed in flat face to face contact and are co-operatingly centrally perforated for receiving bolt means forming a vertical axle 40 which extends through the boom 34 and cross member 26. Thus, the boom 34 is supported by the tower and is free to be pivoted with relation thereto. (Fig. 4).

Each end portion of the boom 34 is vertically slotted, as at 42, for receiving a pair of sheaves or pulleys 44 journaled on horizontal axles 46 in co-operating aligned relation. Flexible means, such as a cable 48, is entrained over the sheaves 44 and has one end thereof connected with a length of chain 50 having an eye-hook 52. The purpose of the chain 50 and hook 52 is to connect this end portion of the cable means 48 in an adjustable manner to a horizontal cross beam or support 54 comprising a stationary portion of the lifting frame mechanism 12. The opposing end of the cable means 48 is preferably provided with a pair of co-operating hook-shaped members 56 interconnected at their ends opposite the hook-shaped ends by a length of chain 58 which is in turn connected to the cable 48. The length of the cable means and the associated hooks 56 is such that when the lifting mechanism 12 is disposed in its downward or retracted position, the hooks 56 are suspended adjacent the upper surface of a common supporting surface. Thus, when the lifting mechanism 12 of the truck is extended or raised, the fork frame 18 is raised to the upper limit of the support members 14 and 16, thus disposing the lower end portion of the tower 28 adjacent the upper end of the lifting frame 12. This action raises the hooks 56, and any load carried thereby, to a point adjacent the forward end portion of the boom 34. Since the end of the cable opposite the load grasping hooks 56 is connected to the stationary member 54 the raising of the tower 28 by the lifting action of the fork frame 18 causes the hooks 56 to be moved from their lowermost extended position to a point adjacent the boom simultaneously wtih the extending action of the truck lift 12. Thus, the chain 50 and eye-hook 52 permits adjustment of the effective length of the cable means 48, so that the hooks 56 may be positioned at a point adjacent the floor or supporting surface from which it is desired to grasp loads, not shown, and yet when the tower 28 is lifted the chain 58 associated with the hooks 56 will not contact the adjacent sheave 44. When the load has been raised to the upper limit of the travel of the hooks 56, the truck 10 may be moved in a conventional manner to the desired location and the load and boom 34 may be manually swung to position the load laterally of the tower by pivoting the boom. When the load is properly disposed above the desired point of disposal, the truck lift 12 is lowered a desired amount, thus lowering the load to its support and releasing the tension on the cable means 48 permitting the removal of the hooks 56 from the load.

Latch means 59, pivotally carried by the disk 36, is adapted to be co-operatingly received by slots 60 and 62 in the periphery of the plate 38. One slot 60 is disposed in alignment with the rearward portion of the boom 34 for holding the boom 34 perpendicular with relation to the cross member 26. Additional slots 62 are disposed in 90° relationship with relation to the slot 60, thus permitting a pivoting and positioning movement of the boom relative to the tower of substantially 180°. Spring means, not shown, which is carried by the latch, urges the same into contact with the slots 60 and 62. Flexible means, such as a length of rope 64, is connected to the latch 59 and extended to the truck operator's position, whereby the truck operator may, by a pull on the rope, release the latch 59 from engagement with the respective slot. It seems obvious that a spring loaded pin might be carried by the disk 36 and adapted to be extended into co-operating perforations or recesses of the plate, if desired, with a similar functional result of selectively positioning the boom 34 angularly.

Obviously the invention is susceptible to some change or alteration without defeating its practicability, and I therefore do not wish to be confined to the preferred embodiment shown in the drawings and described herein, further than I am limited by the scope of the appended claim.

I claim:

A lifting mechanism for an industrial lift truck having vertically extendable lifting means and a vertically disposed lift fork frame, including: a tower, said tower comprising a pair of upright members and a horizontal cross member rigidly connecting said upright members in spaced-apart relation adjacent their upper ends; means carried by the lowermost end portion of said tower for connecting the same to the forward surface of said lift fork frame; a disk flatly connected to said horizontal cross member medially the ends thereof; a boom extending across and pivotally connected to said disk for horizontal pivoting movement with relation to the disk; a circular plate interposed between the lowermost surface of said boom and the upper surface of said disk for forming a bearing surface therebetween, said plate being rigidly connected to said boom, the periphery of said plate having three recesses in 90° spaced-apart relation; a spring loaded latch pivotally carried by the periphery of said disk for movement into and out of the recesses in said plate when said boom is rotated; means for releasing said latch; a sheave journaled on a horizontal axis carried by each respective end of said boom; cable means entrained over said sheaves and having one end adapted to be secured to said lift truck, the opposing end of said cable means depending from said boom a distance substantially equal to the height of said tower, whereby vertically extending said lifting means simultaneously elevates the free end of said cable means to a point adjacent the lower surface of the adjacent end of said boom; and load grasping means carried by the free end portion of said cable means.

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