

Aug. 15, 1967

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3,335,883

LIFT TRUCK

Filed Oct. 11, 1965

2 Sheets-Sheet 1

FIG. 1.

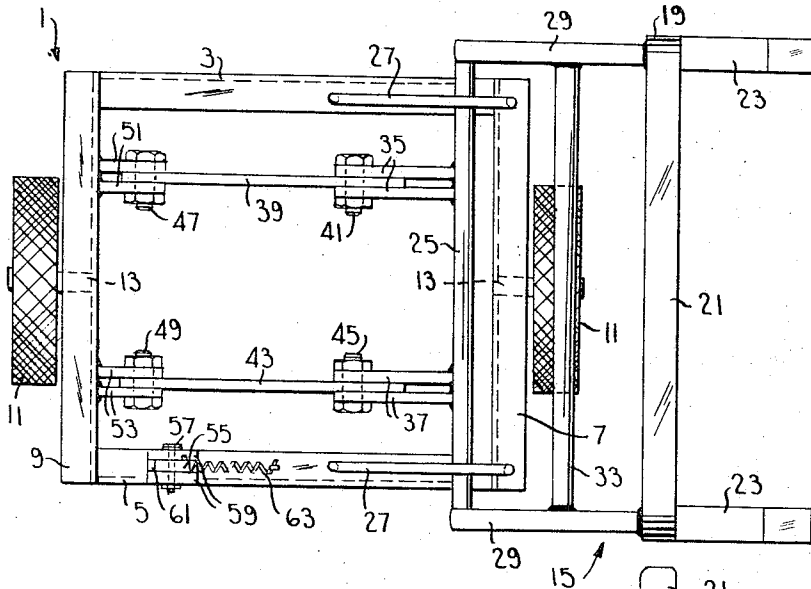
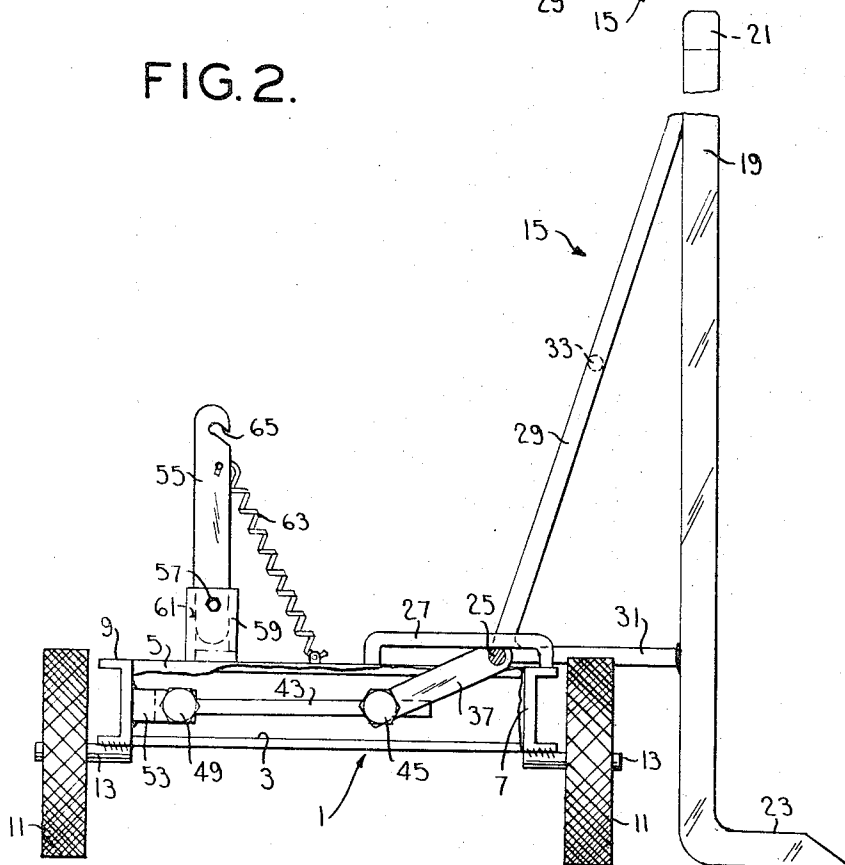


FIG. 2.



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FIG. 4.

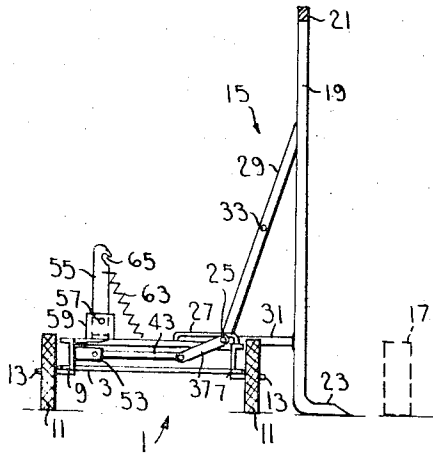


FIG. 5.

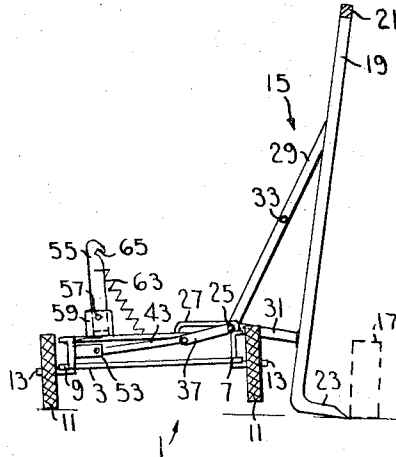


FIG. 6.

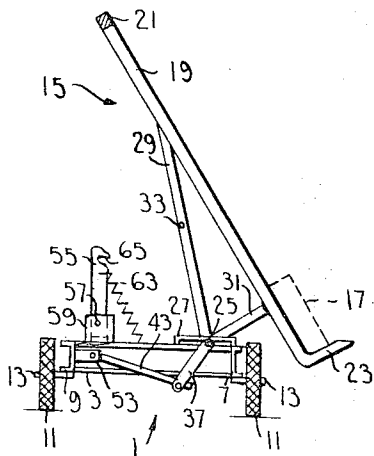


FIG. 7.

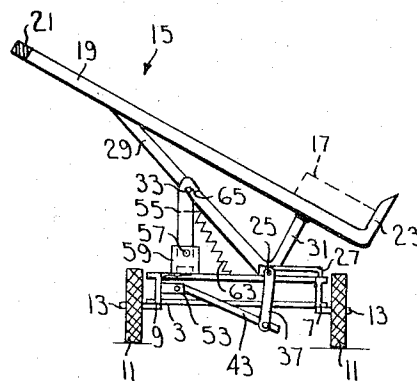
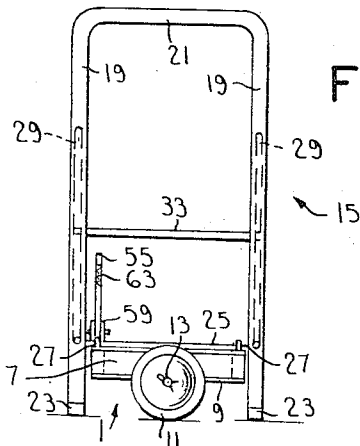


FIG. 3.



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3,335,883
LIFT TRUCK

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This invention relates to a lift truck which is particularly adapted for lifting and moving elongate items, such as beams, pipe, etc.

Among the several objects of this invention may be noted the provision of a lift truck adapted for engaging an elongate item at one side of the lift truck and lifting it above the lift truck for transportation of the item on the truck in a direction generally parallel to the length of the item; the provision of a lift truck movable on wheels along a supporting surface, the truck being adapted to pick up a load from the supporting surface adjacent one of its sides and then move it endwise along the surface; the provision of a lift truck which can be inched sideways into engagement with an elongate item between the ends of the item, then lift the item and move it in a direction parallel to the length of the item; the provision of a lift truck capable of lifting an elongate horizontal item at one side of the truck by swinging the horizontal axis of the item upwardly and simultaneously moving said axis toward the other side of the lift truck; and the provision of a lift truck for supporting an elongate item while it is manually moved and steered by a force applied directly to the item. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated, FIG. 1 is a plan view of a lift truck of this invention;

FIG. 2 is an end view, partially broken away, taken from the bottom of FIG. 1;

FIG. 3 is an elevation taken from the right side of FIGS. 1 and 2; and

FIGS. 4-7 are views similar to FIG. 2 illustrating several positions of the lift truck parts during loading of the lift truck.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring to FIGS. 1-3 of the drawings, a lift truck of this invention is shown to comprise an open rectangular chassis 1 having ends 3 and 5 attached to sides 7 and 9. Chassis 1 may conveniently be made from four lengths of channel joined end to end. Two wheels 11 rotate on axles 13 attached to the lower surface of sides 7 and 9 of chassis 1.

The lift truck includes a load support and carrier generally shown at 15 for engaging, lifting and supporting an elongate item having a horizontal axis such as a beam of wood or metal, a length of pipe, or other load designated 17 in FIGS. 4-7. The load support 15 comprises a pair of spaced parallel arms 19 joined at the top by a handle 21 and terminating at the lower end in a pair of outwardly projecting generally parallel feet 23 which taper to a point at the outer ends as illustrated in FIG. 2. When the load support is in a generally upright loading or pick-up position as shown in FIGS. 1-4, the bottom of feet 23 are generally coplanar with the surface supporting the wheels 11 and they are located alongside of the side 7 beyond the wheel 11 at that side of the chassis.

There is a pivot 25 which is movable horizontally along the upper surfaces of chassis ends 3 and 5 within a pair of elongate guides 27 secured to the ends of the chassis. Extending between the end portions of pivot 25

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and the arms 19 of the load support are two pairs of braces, the upper pair being designated 29 and the lower pair being shown at 31. A latch bar 33 between braces 29 is used for holding the load support in a raised carrying position for movement of item 17 as explained later. Pivot 25 and guides 27 provide a sliding and a swinging or pivotal connection between the load support 15 and chassis 1 whereby the load support may be moved from a lowered pick-up position (FIGS. 1-4) to a raised carrying position (FIG. 7). Pivot 25 is always low and between the wheels 11 so that the weight of the load support and its load is transferred by the pivot to the chassis and does not tend to turn over the lift truck.

Attached to pivot 25 between ends 3 and 5 of chassis 1 are two pairs of crank arms designated 35 and 37. A first linkage member 39 is pivotally connected at 41 to the crank arms 35 and a second linkage member 43 is pivotally connected at 45 to the second pair of crank arms 37. The other ends of linkage members 39 and 43 are pivotally connected at 47 and 49, respectively, to pairs of stationary supports 51 and 53 projecting inwardly from the side 9 of chassis 1. The linkage members and crank arms cause pivot 25 to slide sideways in a generally horizontal plane within guides 27 when feet 23 of the load support are swung clockwise or counterclockwise about pivot 25 by moving handle 21 in an arcuate manner.

A latch plate 55 is pivoted at 57 between a pair of upright standards 59 secured to the upper surface of end 5 of chassis 1. A stop 61 between standards 59 prevents latch plate 55 from moving clockwise from its FIG. 2 position. The latch plate is biased to its upright FIG. 2 position by a spring 63 attached to the upper portion of the latch plate and to the end 5 of the chassis. Latch plate 55 may be moved arcuately in a counterclockwise direction (as viewed in FIG. 2) against the force of spring 63. There is a notch 65 in the upper portion of the latch plate which receives the latch bar 33 on the load support when it is swung to its FIG. 7 position. The latch plate 55 is moved slightly counterclockwise when engaged by bar 33 and it is returned to latching engagement with the bar by the spring 63 when the bar and notch 65 are aligned.

FIGS. 4-7 illustrate use of the lift truck of the invention for lifting and moving a beam 17. The lift truck is first rolled to the position illustrated in FIG. 4 where it is alongside the beam 17 and preferably about half-way between its ends. The lift truck may then be walked or inched sideways (to the right) toward beam 17 by first moving the handle 21 to the right to its FIG. 5 position and then moving it to the left to its FIG. 4 position. When handle 21 is moved to its FIG. 5 position, the load support swings clockwise about the outer ends of feet 23. This raises pivot 25 against guides 27 to lift the right side 7 of chassis 1 and slide the left side of the chassis to the right, thereby tilting the chassis 1 to the position shown in FIG. 5. When the handle is moved back to the FIG. 4 position from the FIG. 5 position, the left wheel 11 remains stationary on the supporting surface and the feet 23 slide to the right (as viewed in FIGS. 4 and 5). These movements or steps are repeated until the feet 23 are adjacent the left edge of beam 17 with the lift truck parts located in their FIG. 5 position. Then movement of the handle 21 to the left will force the pointed ends of feet 23 beneath the beam 17 for picking up the beam. It will be understood that beam 17 can be lifted or tilted clockwise at this time to facilitate insertion of feet 23 beneath the beam.

When the beam 17 is located on feet 23 the handle 21 is then swung to the left through its FIG. 6 position to its FIG. 7 position. As this occurs the entire load support 15 is swung about the generally horizontal axis of pivot 25 and, due to the provision of crank arms 35 and 37 and

links 39 and 43 and their connections to pivot 25 and chassis 1, the pivot 25 is moved horizontally from its FIGS. 2 and 4 position where it is near the right end of guides 27 to its FIG. 7 position where it is near the left end of guides 27. During this movement the feet 23 and the beam 17 carried by it are swung upwardly and moved horizontally to the left (toward side 9) to a load-carrying position above the frame. Since the entire weight of the load support 15 and the beam 17 is (at this time) borne by the pivot 25 and since this pivot is located between wheels 11, there is no tendency for the lift truck to tilt during this lifting movement. Beam 17 is moved from an upright to an inclined position during this movement as shown in the drawings and the axis of the beam remains substantially horizontal throughout this movement.

As the handle 21 is moved to its FIG. 7 position the latch bar 33 on the load support first engages the inclined upper right surface of the latch plate 55 and then, on further movement of the handle, forces the latch plate to the left against the biasing force of spring 63. When bar 33 is aligned with the open end of slot 65 in the latch plate, the plate swings to the right to receive bar 33 in slot 65 and thereby hold the load support in its FIG. 7 carrying position until such time as the latch plate 55 is manually moved to the left to disengage it from bar 33.

With the load support in its FIG. 7 latched position the beam 17 is firmly supported on the lift truck with the downward component of its load on chassis 1 between the wheels 11. The beam is then moved to the desired location by applying a steering and moving force to the beam itself. This moving force is usually applied to one end of the beam but may also be applied to other portions of the beam or to the lift truck itself. Since there are only two wheels on the lift truck it is easily steered and the beam ends may be tilted upwardly or downwardly as desired during movement. The lift truck is unloaded by releasing the latch bar 33 from plate 55 and moving handle 21 from its FIG. 7 position to its FIG. 5 position.

The linkage mechanism connected to the pivot 25 causes the load 17 on the load support to move to the left when it is swung upwardly about pivot 25 until it is over the chassis thereby maintaining a low center of gravity which reduces any tendency of the load to fall off the side of the lift truck or tilt the truck.

The construction of the lift truck is such that a load on the truck is moved in a direction generally parallel to the length of the item being moved as opposed to common hand trucks which require the load to be moved in a direction transverse to the length of the load. The ability of the lift truck to walk or inch sideways into engagement with an item 17 and to pick it up and discharge it from the side of the lift truck makes it easy to load and unload.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

As various changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. What is claimed is:

1. A lift truck comprising a chassis having wheels,

means carried by the chassis for lifting a load adjacent the chassis and bringing the load into a position above the chassis,

said means comprising a load support having a foot, means mounting the load support on the chassis for pivotal movement about a generally horizontal axis between a pick-up position wherein the foot is lowered and receives the load and a load-carrying position wherein the load is raised, and also for sliding movement of the load support relative to the chassis

to bring the raised load into a position over the chassis for stability of the chassis during movement of the latter to convey the load,

and means interconnecting the chassis to the load support and responsive to pivoting of the load support for simultaneously effecting sliding and pivoting of the load support.

2. A lift truck as set forth in claim 1 wherein the load support mounting means comprises an elongate guide on the chassis, the load support having a pivot slidably and pivotally movable in said guide.

3. A lift truck as set forth in claim 1 wherein said means mounting said load support is positioned between said wheels.

4. A lift truck as set forth in claim 1 further comprising cooperating means on the chassis and on the load support for latching the load support to the chassis when the load is in its raised position over the chassis.

5. A lift truck for lifting and moving an elongate load comprising a chassis supported on a surface by a pair of wheels, the wheels being at opposite sides of the chassis for moving the chassis in a front-to-rear direction, a pair of elongate guides on the chassis extending sidewise of the chassis between the wheels, a load support having a pair of feet movable between a lowered pick-up position at one side of the chassis beside one of the wheels for picking up the load from the surface supporting the chassis and a raised position over the chassis for carrying the load, the load support having a pivot confined in the guides for pivotal and sidewise movement relative to the chassis, the load support having a handle for swinging the feet between their pick-up and raised positions about the axis of the pivot, and linkage members connected to the chassis and to the pivot for simultaneously effecting sidewise movement of the pivot in the guides as the pivot is swung about its axis.

6. A lift truck as set forth in claim 5 further comprising a latch plate on the chassis, and a latch bar on the load support adapted to be moved into latching engagement with the latch plate when the feet are swung to their raised position.

7. A lift truck for lifting and moving an elongate load comprising a chassis supported on a surface by a pair of wheels, the wheels being at opposite sides of the chassis for moving the chassis in a front-to-rear direction, a pair of elongate guides on the chassis extending sidewise of the chassis between the wheels, a load support having a pair of feet movable between a lowered pick-up position at one side of the chassis beside one of the wheels for picking up the load from the surface supporting the chassis and a raised position over the chassis for carrying the load, the load support having a pivot confined in the guides for pivotal and sidewise movement relative to the chassis, the load support having a handle for swinging the feet between their pick-up and raised positions about the axis of the pivot, and a linkage connected to the chassis and to the pivot for moving the pivot sidewise in the guides when it is swung about its axis, the linkage comprising a crank arm having one end connected to the pivot, and a linkage member pivoted to the other end of said crank arm and to the other side of the chassis.

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