Aug. 15, 1967 W. M. SHAFFER 3,335,879

SIDE CARRYING LIFT TRUCK

Filed Feb. 23, 1965

3 Sheets-Sheet 1

FIG. 1

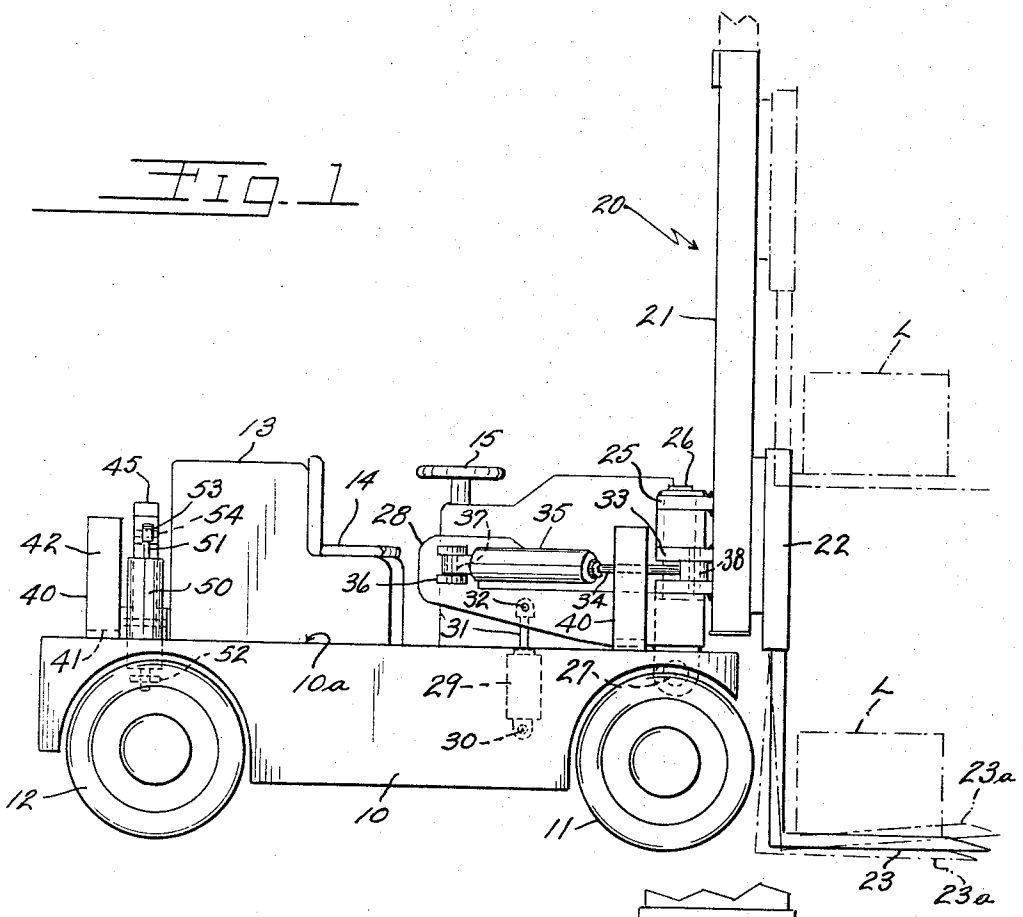

FIG. 2

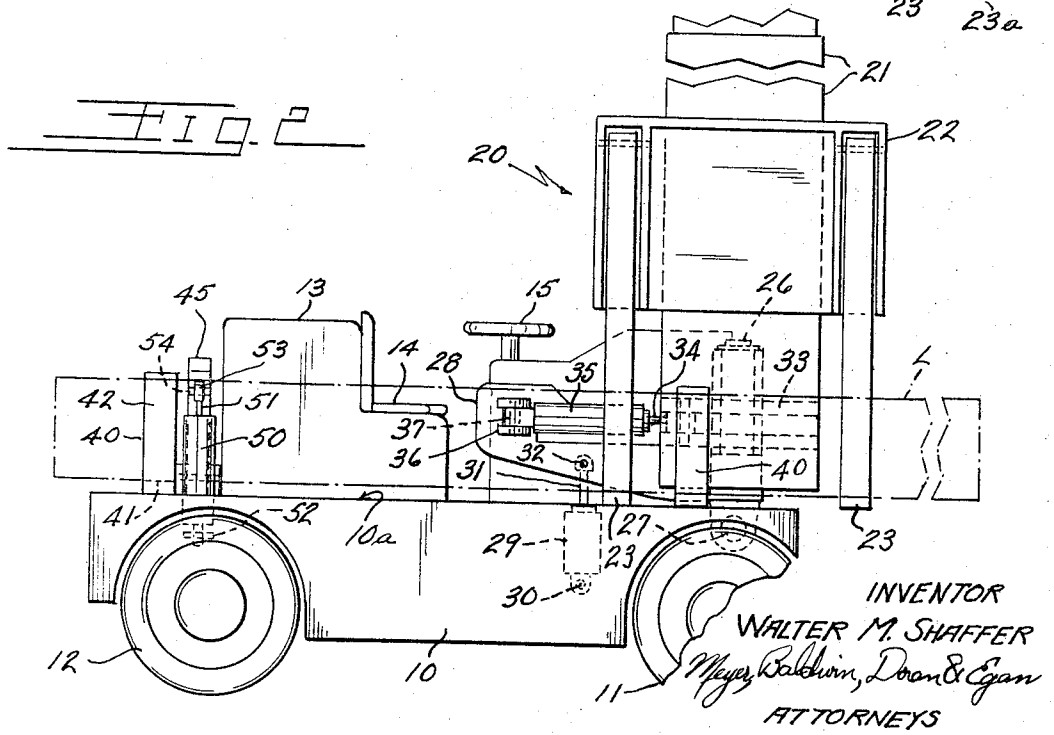

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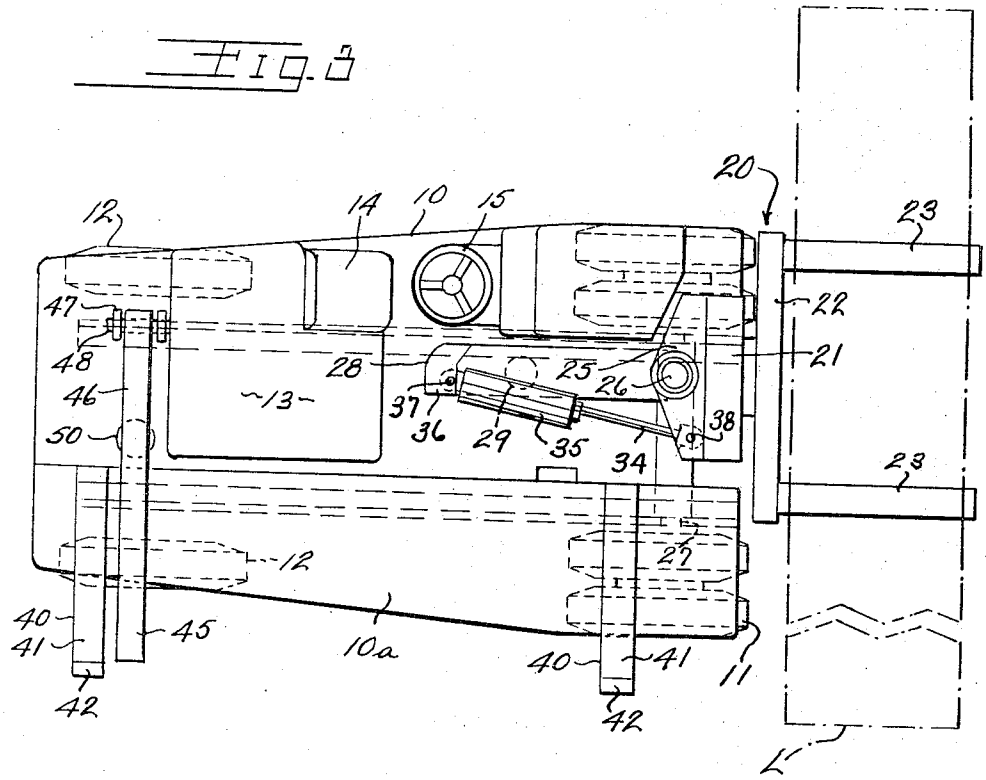
FIG. 3



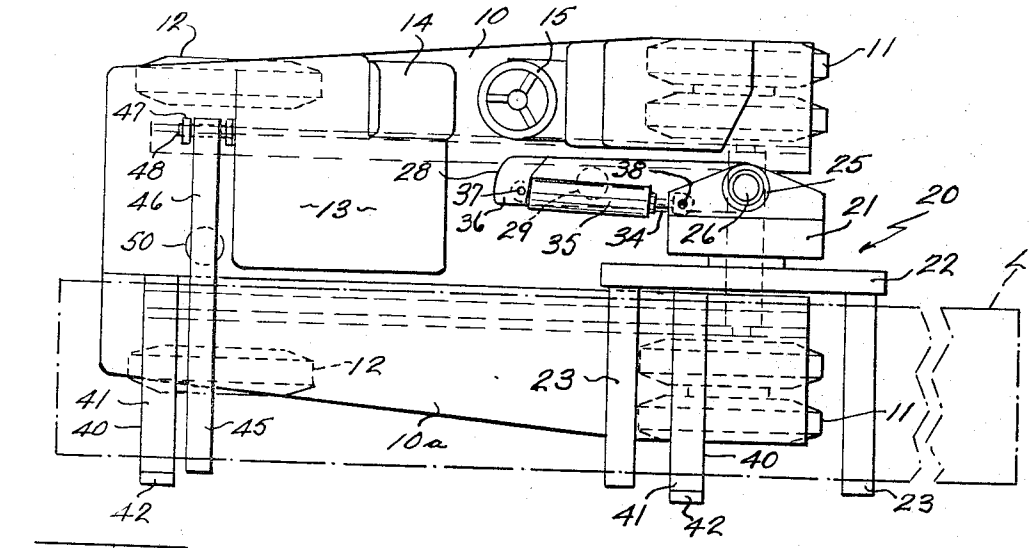


FIG. 4

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Fig. 5

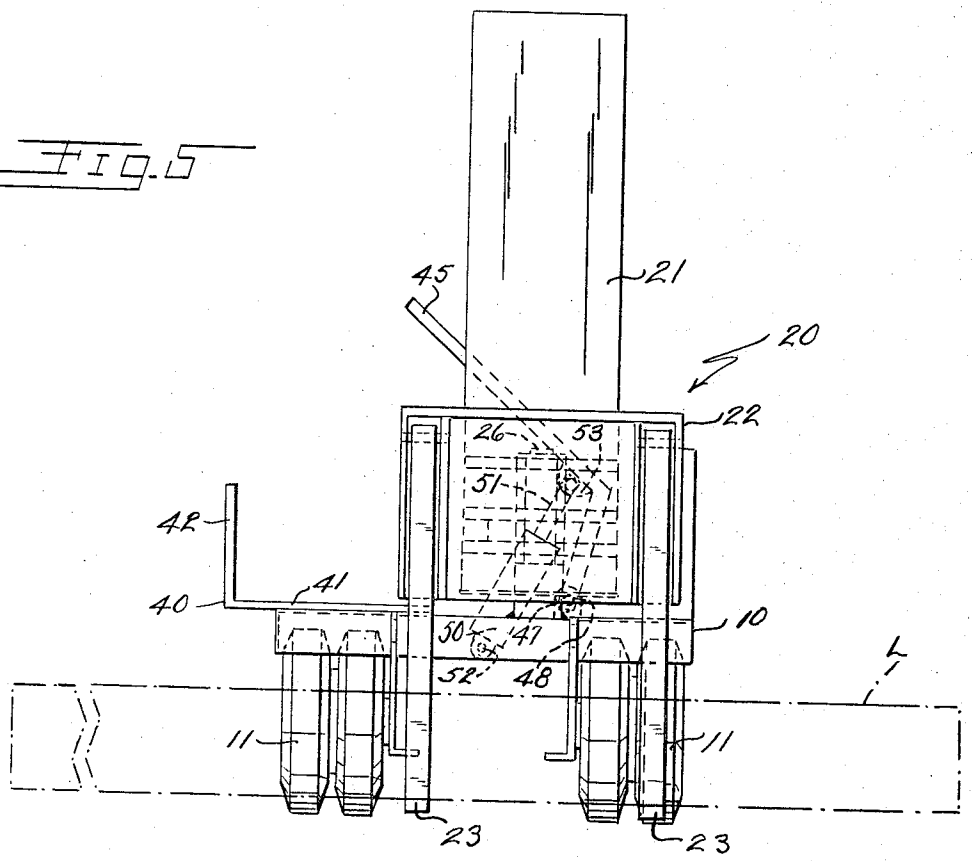
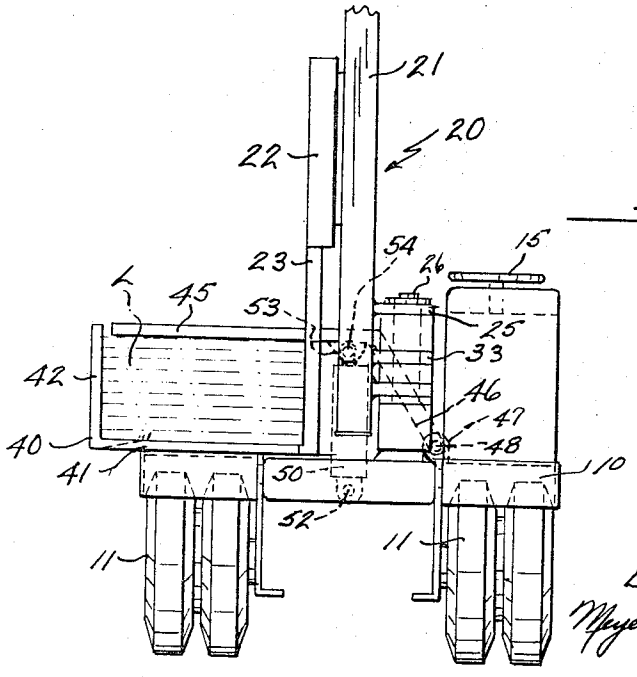


Fig. 6



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SIDE CARRYING LIFT TRUCK

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Filed Feb. 23, 1965, Ser. No. 434,236
3 Claims. (Cl. 214—75)

This invention relates to industrial lift trucks and particularly to a lift truck for handling elongated loads such as steel tubing or long lumber.

The invention has for its primary object the provision of a vehicle of the aforesaid nature which is characterized by its structural simplicity, its inexpensive manufacturing and operating costs, the ease of assembly of its parts, and the particularly effective manner in which it performs its function.

More specifically, it is an object of this invention to provide an industrial lift truck which is adapted to carry elongated loads in relatively narrow aisles or passageways.

It is another object of this invention to provide such an industrial lift truck which is capable of carrying an elongated load in a position parallel with the direction of travel of said lift truck.

Still another object is to provide a lift truck as set forth above having means for swinging an elongated load at least 90° between a position perpendicular to the direction of travel of said truck and a position parallel with said direction of travel.

Yet another object is to provide a lift truck having the above features and characteristics which has means for functioning both as a conventional lift fork and a conventional straddle carrier.

It is another object of this invention to provide a lift truck having the above capabilities with the means of accomplishment being accessory changes to an existing fork lift truck model in order to have low launching and unit costs.

Further objects of the present invention, and a number of its advantages, will be referred to in or will be evident from the following description of one embodiment of the invention as illustrated in the accompanying drawings.

In the drawings,

FIG. 1 is a side elevation of the industrial lift truck of this invention showing the lifting apparatus thereof in one operative position.

FIG. 2 is a side elevation similar to FIG. 1 showing the lifting apparatus in another operative position.

FIG. 3 is a top plan view of the lift truck as shown in FIG. 1.

FIG. 4 is a top plan view of the lift truck as shown in FIG. 2.

FIG. 5 is a front elevation of the lift truck as shown in FIG. 1.

FIG. 6 is a front elevation of the lift truck as shown in FIG. 2.

Before the lift truck and associated apparatus illustrated are specifically described, it will be understood that the invention here involved is not limited to the structural details or arrangement of parts shown since industrial lift trucks embodying the present invention may take various forms. It is also to be understood that the phraseology or terminology herein employed is for the purpose of description and not of limitation since the scope of the present invention is denoted by the appended claims.

Referring now to the drawings, the lift truck of this invention comprises a frame **10** having pairs of dual, nonsteerable front wheels **11** and a pair of steerable rear wheels **12**. A suitable motor and transmission means for driving the front wheels are provided within a housing **13** carried by the frame **10**, and an operator's seat **14** is

provided at the left side of the vehicle adjacent to a conventional steering wheel **15**. It will be understood that suitable controls (not herein illustrated) are provided adjacent to the steering wheel **15** in a conventional manner for starting and stopping the lift truck and operating the lifting and load carrying apparatus thereof. The lift truck thus far described may be a conventional, existing model with the lifting apparatus as herein later described comprising accessory changes therefor. It will be readily appreciated that the use of an existing model effects substantial savings in the initial production of the invention.

A lifing apparatus is generally indicated at **20** and comprises a mast **21**, which is vertically fixed relative to the frame **10**, and a carriage **22**, which is vertically movable relative to the mast **21** in a conventional manner. The carriage **22** carries downwardly and forwardly projecting lift forks **23** which are movable vertically with the carriage **22**. Details of the mechanism for elevating the forks **23** are not herein illustrated but may comprise any suitable mechanism such as that disclosed in assignee's United States Patent No. 2,918,143, entitled "Triple Telescopic High Free Lift Truck," issued Dec. 22, 1959.

The mast **21** is provided with rearwardly projecting bearing members **25** by means of which said mast is swingably mounted upon an upright spindle **26**. The lower end of the spindle **26** is, in turn, pivoted to the frame **10** by means of a horizontally disposed, laterally directed shaft **27** carried by said frame. It will be readily understood that the spindle **26** is forwardly and rearwardly tiltable about the shaft **27** whereby the lift forks **23** can be tilted.

The spindle **26** is provided with a rearwardly projecting arm **28** which is connected to a vertically acting cylinder and piston motor **29**. The motor **29** is pivoted at its lower end upon a horizontal, transverse pivot **30** carried by the frame **10** and is provided with an upwardly directed piston rod **31** which is pivoted to the arm **28** by a transverse pivot **32** carried by said arm. The pivot **32** is disposed substantially rearwardly of the shaft **27** whereby the cylinder and piston motor **29** is effective to tilt the spindle **26** in either a forward or rearward direction.

The mast **21** also carries a pair of horizontally disposed, laterally directed flanges **33** which serve as a clevis at one end thereof for receiving the distal end of a piston rod **34** carried by a cylinder and piston motor **35**. The opposite end of said cylinder and piston motor **35** is connected to a clevis **36**, disposed at the distal end of the arm **28**, by means of a vertically disposed pin **37**. As best shown in FIG. 3, the distal end of the piston rod **34** is pivoted to a vertically disposed pin **38** carried adjacent to the right-hand end of the flanges **33** whereby the force exerted by the cylinder and piston motor **35** rotates the flanges **33** and, therefore, the mast **21** in the right-hand direction or clockwise around the spindle **26**. FIG. 3 illustrates the extended position of the cylinder and piston motor **35** whereby the mast **21** is disposed transversely of the lift truck with the forks **23** being directed forwardly of the vehicle. FIG. 4 shows the cylinder and piston motor **35** in the fully retracted position whereby the forks are swung 90° in a right-hand direction to direct them laterally to the right side of the lift truck.

Approximately the right-hand one-third portion of the upper surface of the truck frame **10** is left unobstructed with the housing **13**, the steering, tilting and swiveling mechanisms being all concentrated on the left-hand side of the vehicle. The reason for such construction is to provide the right-hand side of the vehicle with a load carrying surface area **10***a* which extends throughout the length of the lift truck as is best seen in FIG. 3. Adjacent to either end of the lift truck, there is provided a cradling member **40** having a horizontal base portion **41** and a vertically upright portion **42** (well shown in FIGS. 5 and

6). Each base portion **41** is welded or otherwise suitably secured to the load surface area **10***a*, said base portion being disposed transverse of the lift truck and extending laterally a short distance beyond the right-hand side of the lift truck. Each upright portion **42** is carried at the distal end of the associated base portion **41** and extends upwardly a sufficient distance to retain a load of substantial height along the side of the lift truck above the load surface area **10***a*. The portions **41** and **42** are preferably heavy steel bars of great strength suitable for retaining heavy loads upon the lift truck.

Between the cradling members **40** and closely adjacent to the rearwardly disposed of said cradling members there is provided a pivoted load stabilizing arm **45** which is adapted to project horizontally over the top of a load carried by the cradling members **40** in the lowered position of said stabilizing arm. The stabilizing arm **45** has an obtusely angled leg portion **46** which is pivoted to the frame **10** behind the housing **13** between a pair of upwardly projecting lugs **47** by means of a pivot pin **48**. The stabilizing arm **45** is pivotable between the position shown in FIG. 5 and that shown in FIG. 6 by a cylinder and piston motor **50** having an upwardly directed piston rod **51**. The lower end of the motor **50** is pivoted within the frame **10** upon a pin **52** which is suitably journalled to be oriented horizontally in a direction parallel with the lift truck. The distal end of the piston rod **51** is similarly pivoted between a pair of depending lugs **53** of the stabilizing arm **45** by means of a pin **54**. It will be readily understood that with the motor **50** in its extended position of FIG. 5, the arm **45** is swung upwardly and to the right, away from the cradling members **40**, and that when said motor is retracted, the arm **45** is disposed in the position of FIG. 6 whereby it projects outwardly over a load L carried by said cradling members.

From the foregoing, it will be readily understood that with the cylinder and piston motor **35** in the extended position of FIGS. 1 and 3, the lift forks **23** are directed forwardly of the lift truck and said lift truck may be used in the conventional manner. As indicated in broken line at **23***a*, FIG. 1, said lift forks are tiltable by the cylinder and piston motor **29** for the conventional operation of picking up a load, and by vertical movement of the carriage **22**, the load thus picked up may be raised to any desired level for transporting the same or transferring it to a shelf or bin.

In the handling of elongated loads such as steel tubing or long lumber, as indicated at L, the load is preferably picked up at about the center thereof whereby it is somewhat evenly balanced across the forks with a substantial portion of the load extending laterally in either direction beyond said forks. It is readily understandable that with an elongated load in this position, the forward travel of the vehicle is limited to very wide aisles or to open spaces. To allow movement along a relatively narrow aisle, the elongated load L is placed in the cradling members **40** whereby it is disposed parallel with the direction of travel and therefore greatly reduces the necessary width of operating space for the lift truck. To transfer the load to the cradle members, the operator first raises the load to the point where said load and the forks **23** are disposed above the upper ends of the upright portions **42** of the cradling members **40**. By then causing the cylinder and piston motor **35** to retract, the mast **21** and its associated forks with the load L thereon are rotated 90° in a right-hand direction from the position shown in FIG. 3 to that shown in FIG. 4. This disposes the forks **23** on either side of the most forwardly located cradling member **40** and also disposes a major portion of the load L directly above the load surface area **10***a* and the base portions **41** of the cradling members **40**. It will be understood that at this time the stabilizing arm **45** is in the raised position of FIG. 5 whereby it is out of the way of the pivoted load L. The operator of the lift truck then lowers the carriage **22** and the associated forks **23** whereby the load L is deposited within the cradle members **40**. The forks **23** are thus disposed at the same level as the base portions **41** with one of said forks actually resting on the load surface area **10***a* (FIG. 2). The forks are maintained in this position as long as the load L is being transported in this parallel fashion.

Since an elongated load projects a substantial distance laterally beyond the forks **23**, it will be readily seen that whereas approximately one-half of the elongated load will rest within the cradling members **40**, the opposite portion thereof will project a substantial distance forwardly of both the forks and the vehicle in the direction of vehicle travel. If the lift truck travels over a rough roadway or surface, the bouncing of the vehicle and the load is liable to cause teetering of the load on the forks with consequent displacement relative thereto. Therefore, to stabilize the forwardly projecting, elongated load, the cylinder and piston motor **50** is retracted to cause the stabilizing arm **45** to pivot downwardly whereby it firmly clamps against the load adjacent to the rear end of the lift truck. Thus teetering and displacement of an elongated load during travel are obviated.

Removal of the load from the cradling members **40** and the stacking thereof is effected by reversing the above procedure. The stabilizing arm **45** is first raised to the position shown in FIG. 5 after which the forks **23** with the load thereon are elevated above the upper ends of the upright portions **42** of said cradling members. The cylinder and piston motor **35** is then once more extended whereby said forks are rotated in a left-hand direction 90° to the point where the forks **23** are in the conventional lift fork position. The load is now ready to be stacked or otherwise manipulated in a conventional manner.

It will be understood that many changes in the details of the invention as herein described and illustrated may be made without, however, departing from the spirit thereof or the scope of the appended claims.

What is claimed is:

1. Apparatus for handling elongated loads of lumber or the like, comprising a lift truck, load-handling means carried by said lift truck at the front end thereof for transversely receiving an elongated load; means for raising and lowering said load-handling means and for swinging said load-handling means to and from a position at one side of said lift truck, whereby an elongated load on said load-handling means can be moved between a position in front and transversely of the lift truck and a position generally parallel with said lift truck; load-supporting means having longitudinally spaced portions fixedly carried by said lift truck and projecting laterally from one side thereof, whereby an elongated load on said load-handling means can be swung from a position in front and transversely of said lift truck to a position over and parallel with said load-supporting means and lowered to a supporting position thereon and also raised from said supporting position on said load-supporting means and swung to a generally transverse position at the front of the lift truck, where it may be raised or lowered for the discharge of said elongated load; said apparatus further characterized in that said load-supporting means comprises a pair of longitudinally spaced and laterally extending load-supporting base portions provided at their outer ends with upright load-confining portions and in that a portion of said load-handling means, when in said parallel position, is located between and in general alignment with the base portions of said load-supporting means.

2. Apparatus for handling elongated loads as defined in claim **1**, still further characterized in that load-stabilizing means is pivotally mounted on said lift truck and extends laterally therefrom for movement over and away from load-confining engagement with said elongated load, said load-stabilizing means being in rearwardly spaced relation to said load-handling means when said load-

handling means is in a position at one side of said lift truck.

3. Apparatus for handling elongated loads as defined in claim **1**, still further, characterized in that said load-handling means includes a generally upright member pivoted at its lower end to said lift truck and having connected thereto an arm operable by power means for tilting movement of said load-handling means and in that power means is connected to said arm and to said load-handling means to effect swinging movement of said load-handling means between a position at the front and transversely of said lift truck and a position at one side of and parallel with said lift truck.

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