

Sept. 24, 1957

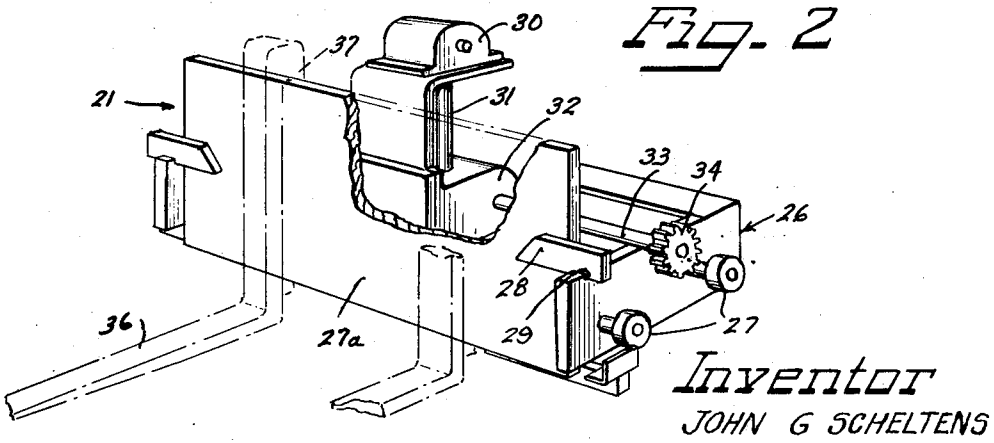
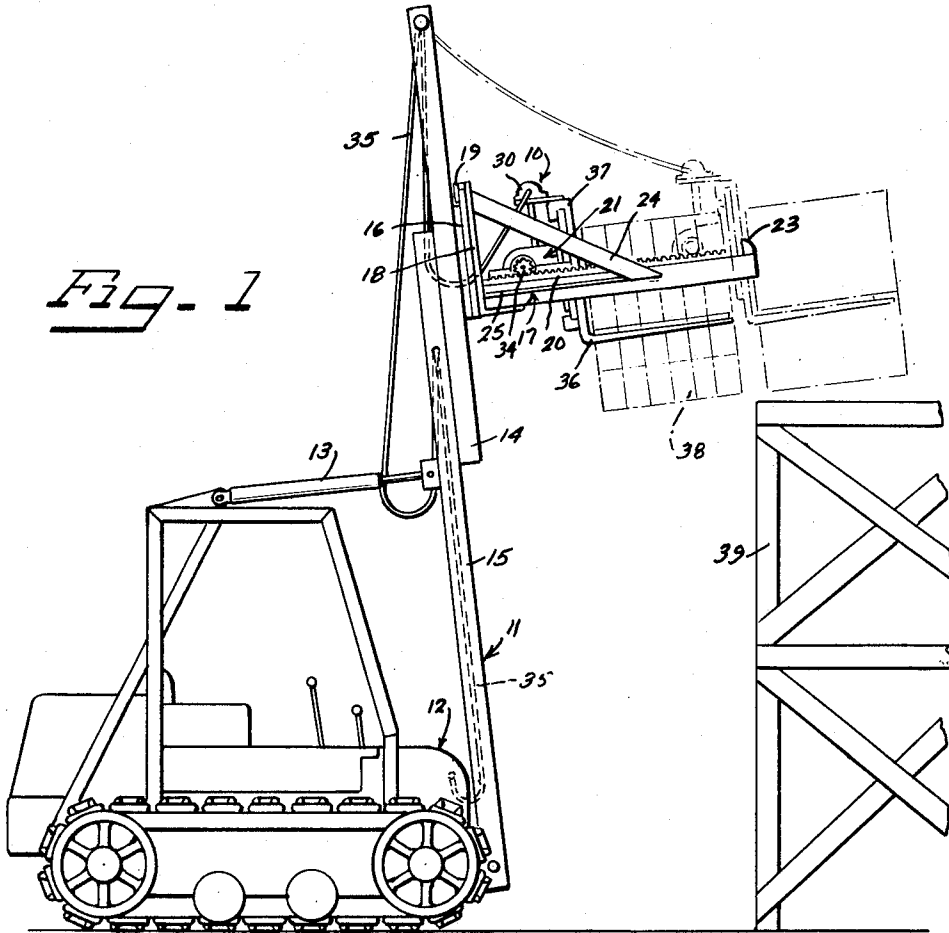
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2,807,383

HYDRAULICALLY POWERED FORK LIFT

Filed Nov. 29, 1955

2 Sheets-Sheet 1



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2,807,383

HYDRAULICALLY POWERED FORK LIFT

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Application November 29, 1955, Serial No. 549,646

11 Claims. (Cl. 214-731)

This invention relates generally to a hydraulically powered fork lift construction which may be assembled with a conventional tractor or other similar vehicle.

More specifically, this invention relates to a vertically movable boom assembly having a novel depending fork lift assembly which may be actuated at substantially right angles to the boom assembly.

It is therefore an object of this invention to provide a new and improved hydraulically powered fork lift construction.

Another object of this invention is to provide a novel fork lift construction which is especially adapted to greatly increase the working versatility of a vehicle having my novel fork lift construction thereon.

A further object of this invention relates to the provision of a fork lift construction which may be readily assembled upon a more or less conventional vehicle having a vertically movable boom assembly.

Yet another object of this invention relates to a novel fork lift construction which is relatively simple to assemble and operate and which may be readily manufactured on a large production scale.

According to the general features of this invention there is provided in a fork lift construction including a self propelled vehicle having a vertical support, the improvement of a fork lift construction depending therefrom including means capable of moving the fork lift back and forth into selective forward and rearward positions at generally right angles to the vertical support.

While some of the more salient features, characteristics and advantages of the instant invention have been above pointed out, others will become apparent from the following disclosure, taken in conjunction with the accompanying drawings, in which:

Figure 1 is a side elevation of a tractor having my novel fork lift construction thereon showing in full and dotted lines how it may be operated;

Figure 2 is a fragmentary detailed view of a movable carriage having the forks mounted thereon;

Figure 3 is a fragmentary isometric view of a support and rack assembly which is adapted to be carried upon the boom assembly;

Figure 4 is an enlarged side elevation of my novel fork lift construction; and

Figure 5 is an enlarged fragmentary detailed view taken substantially on the line V-V of Figure 4 looking in the direction indicated by the arrows.

As shown on the drawings:

The reference numeral 10 indicates generally my novel fork lift construction which is adapted to be carried upon a vertical boom assembly 11 which is carried upon the front end of a tractor 12. It will be appreciated that my novel fork lift construction 10 may be adapted to be used with other types of movable vehicles.

The particular tractor 12 shown in Figure 1 has manual controls adjacent the driver's seat which are adapted to operate a hydraulic piston 13 which is utilized to tilt rearwardly and forwardly the boom assembly 11. Boom assembly 11 includes a boom 14 which is movable relative to stationary boom 15 by means (not shown) which is operated by manually operable controls located adjacent the driver's seat. Upper or movable boom 14 has provided thereon a mounting 16 which is adapted to carry a support and rack assembly 17. It will be noted

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in Figure 1 a vertical support 18 has a hooked end 19 which may be interlocked with the mounting 16 to maintain the components in relative assembly together.

Connected to support 18 is a pair of racks 20 which sustains a generally horizontally movable carriage 21 which is especially adapted to move at substantially right angles to the movable boom 14. Positioned at one end of channels 22 are stops 23 which serve to limit the movement of carriage 21 when assembled therewith. It will be noted that each of the channels 22 is supported by a support 24 and a gusset 25.

Carriage 21 includes a base portion 26 having depending sets of rollers 27 positioned on opposite sides of base 26. Provided at one end of base 26 is a support 27a having attached arms 28 carried in notches 29 (Figure 2) upon the base 26.

Intermediately positioned and carried upon base 26 is a hydraulic motor 30 which drives a shaft 31 connected at its vertically lower end to a speed reducer 32 which in turn drives a second shaft 33 having at opposite ends pinion gears 34 in mesh with the teeth on racks 20.

Suitable controls may be provided for operating the instant hydraulic motor 30 adjacent the driver's seat on the tractor or vehicle 12. More specifically, upon manipulation of the controls hydraulic pressure may be exerted through feed line 35 to the motor 30 for actuation of gears 34.

As the shaft 33 is driven the carriage is moved back and forth upon racks 20. In other words, lift forks 36 each have a hooked end 37 carried, supported and backed-up by support 27a may be guided into and out of engagement with articles to be moved such as pallets of bricks and the like thereby permitting same to be more readily hauled and removed from difficult angles. When the carriage 21 is moved back and forth, by reason of the slack in feed line 35, this movement may be effected without disconnecting the feed line 35 from the motor 30.

It will be readily appreciated that there are a large number of varied situations where my novel lift fork construction may be most advantageously utilized. One example of this is shown in Figure 1 where a load of material 38 is being hoisted upon a platform 39. To this end, the materials 38 are initially picked up by guiding the lift forks 36 into suitable openings in the load of materials 38. Thereafter, upon actuation of cylinder 30 before or after the movable boom has been elevated, the boom assembly 11 is tilted rearwardly to insure that the load does not become dislodged as the truck 12 is driven to the loading platform. At this point, regardless of whether the truck 11 is on level terrain the hydraulic motor 30 may be activated to move the carriage and more specifically the load 38 over the platform. Movable boom 14 may then be lowered and tilted forward so that the material 38 may be easily discharged upon the platform without damage. Boom 14 may then be lowered slightly to allow disengagement of the forks 36 with the load and then retracted by returning carriage 21 to its normal position.

It will be understood that modifications and variations may be effected without departing from the scope of the novel concepts of the present invention.

I claim as my invention:

1. In a vehicle of the type having a vertically movable boom supported thereon, the improvement of power actuated lift means depending from said boom movable back and forth longitudinally with respect to said vehicle at generally right angles to said movable boom, said lift means including a stationary rack and a movable carriage thereon provided with a depending fork for loading, carrying, and discharging materials, said rack having a longitudinal guideway and said carriage having a bearing en-

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gaged in said guideway to assist in the reciprocation of said carriage and provide positive engagement between same to minimize any possibility that said carriage become dislodged from said rack in operation.

2. In a vehicle having a vertically movable boom structure on one of its longitudinal ends, the improvement of a power actuated attachment unit depending from and detachably connected to said boom structure and movable vertically by said boom structure, said unit having a portion movable longitudinally relative to said vehicle, said attachment unit including rack means and a carriage in mesh therewith movable longitudinally of the vehicle with said carriage having a depending fork longitudinally movable therewith for loading, carrying and discharging materials, and stop means on said rack means to insure against accidental disassembly of said carriage from said rack means in operation.

3. In a vehicle of the type having a vertically movable boom supported thereon, the improvement of power actuated lift means depending from said boom movable back and forth longitudinally with respect to said vehicle at generally right angles to said movable boom, said lift means including a depending fork for loading, carrying, and discharging materials, a rack on said lift means having a longitudinal guideway and a carriage having a bearing engaged in said guideway to assist in the reciprocation of said carriage and provide positive engagement between same to minimize any possibility that said carriage become dislodged from said rack in operation, and said carriage having mounted thereon power means, a shaft having gear means driven by said power means to reciprocate said carriage on said rack.

4. In a stacking vehicle having a vertically movable boom centered at the front end of the vehicle and supported thereon including means for vertically moving the boom and a lift fork provided with detachable means for assembly and removal from the boom, the improvement of an independent power actuated attachment unit for extension outwardly substantially in its entirety away from the boom in longitudinal alignment therewith so as to be free of interference with the means for vertically moving the boom, said unit including a stationary supporting structure extending outwardly substantially in its entirety away from the boom so as to be free of interference with the means for vertically moving the boom, detachable cantilever attachment means on the stationary structure for ready assembly and disassembly of the unit as a cantilever with a vertical face of the boom, a movable carriage for carrying the lift fork mounted on said stationary structure and being disposed substantially in its entirety on the same side of the boom as the supporting structure so as to be free of interference with the means for vertically moving the boom, gear means on the carriage and rack means on the supporting structure for moving the lift fork back and forth with respect to the boom, power means supported on said carriage for actuating said gear means and moving said carriage back and forth with respect to said stationary structure, and mounting means on the carriage whereby a lift fork may be mounted on said carriage.

5. A stacking vehicle having a vertically movable boom supported thereon and a lift fork, said fork having detachable means carrying the fork on said boom, an independent power actuated attachment unit extending outwardly substantially in its entirety away from the boom in longitudinal alignment therewith and carrying the lift fork, said unit including a rigidly mounted supporting structure extending outwardly substantially in its entirety away from the boom for suspension as a cantilever therefrom, detachable means between the boom and the rigidly mounted structure for ready assembly and disassembly of the unit with respect to the boom and suspending the rigidly mounted structure as a cantilever therefrom, a movable carriage mounted on and movable only laterally with respect to said supporting structure and being disposed substantially in its entirety on the same side of the

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boom as the supporting structure, gear and rack means connected to said carriage and supporting structure, and power means cooperable with said gear and rack means for moving said carriage back and forth with respect to said stationary structure.

6. In a stacking vehicle of the type having a vertically movable boom supported thereon and a lift fork mounted thereon, the improvement of an independent power actuated attachment unit between said boom and said fork having power actuated lift means depending substantially in its entirety outwardly away from said boom in longitudinal alignment therewith and movable back and forth with respect to the vehicle, said unit means including a stationary structure depending substantially away from the boom, said stationary structure having a rack structure and a movable carriage thereon, detachable means between said fork and said carriage for mounting said fork thereon, means between said stationary structure and said movable carriage to insure against accidental displacement of said carriage from said rack during operation, power means for moving said carriage back and forth on said rack structure, and detachable means between said stationary structure and the movable boom for suspending said lift means and a lift fork therefrom.

7. The independent power actuated unit of claim 6 further characterized by the stationary structure having spaced arms extending away from the boom with the rack structure on each of the arms, and spaced gears on the carriage in mesh with the rack structure driven by the power means.

8. The independent power actuated unit of claim 7 further characterized by the spaced arms each having bearing guideways and with said carriage having bearings engaged therein.

9. In a vehicle of the type having a vertically movable boom supported thereon, the improvement of power actuated lift means depending from said boom movable back and forth with respect to said vehicle, said lift means including horizontally stationary structure and a movable carriage thereon provided with a depending fork for loading, carrying and discharging materials, gear and rack means between said stationary structure and said movable carriage, and bearing means between said carriage and said stationary structure, and stop means between said stationary structure and said carriage to insure against accidental displacement of said carriage therefrom in operation.

10. The power actuated lift means of claim 9 further characterized by the carriage having mounted thereon a motor and speed reducer assembly, said assembly powering a shaft actuating the gear and rack means for reciprocating the carriage on the stationary structure.

11. In a vehicle of the type having a vertically movable boom supported thereon, the improvement of power actuated lift means depending from said boom movable back and forth with respect to the boom, said lift means including a stationary rack and a movable carriage thereon provided with a depending fork for loading, carrying, and discharging materials, said rack having a longitudinal guideway and said carriage having a bearing engaged in said guideway to assist in the reciprocation of said carriage and provide positive engagement between same to minimize any possibility that that carriage become dislodged from said rack in operation, and power means on said carriage for moving the carriage upon said rack.

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