Nov. 15, 1949 D. C. WALMSLEY 2,488,356

HYDRAULIC LIFT TRUCK

Filed May 10, 1945 2 Sheets-Sheet 1

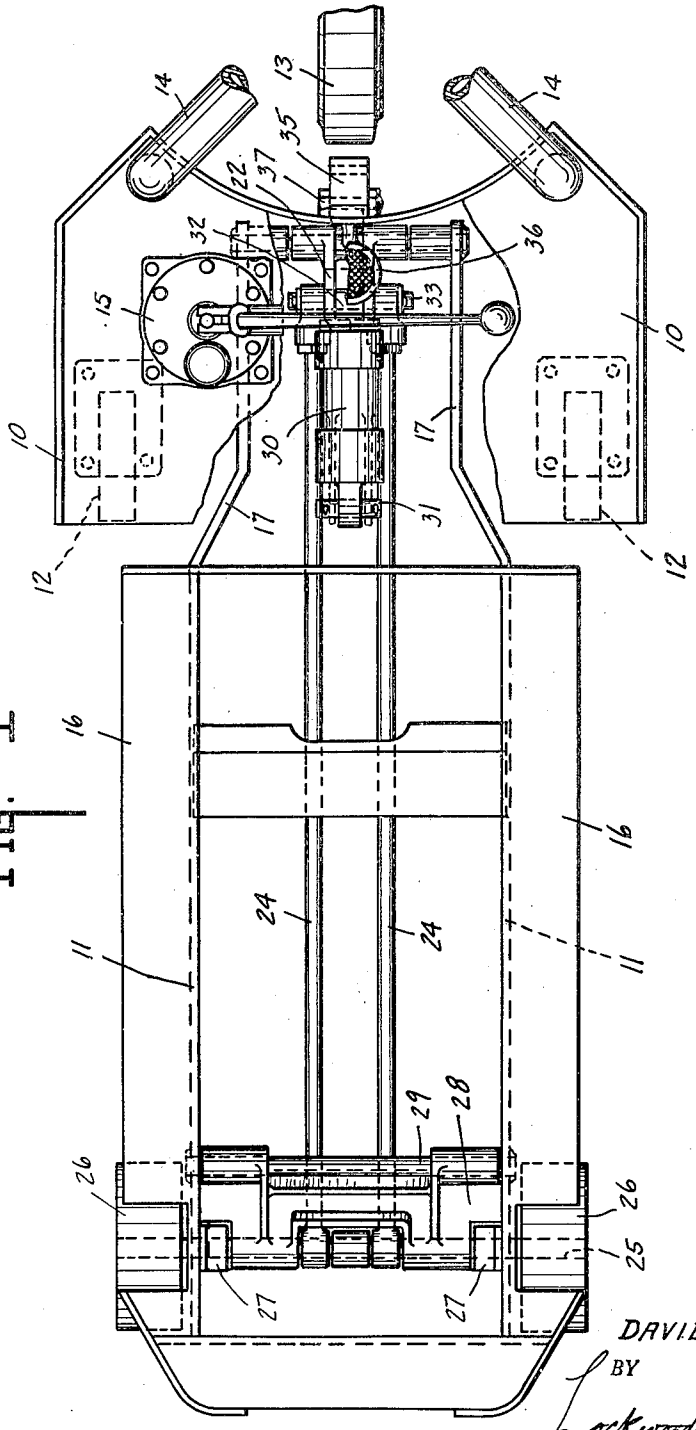


FIG. 1

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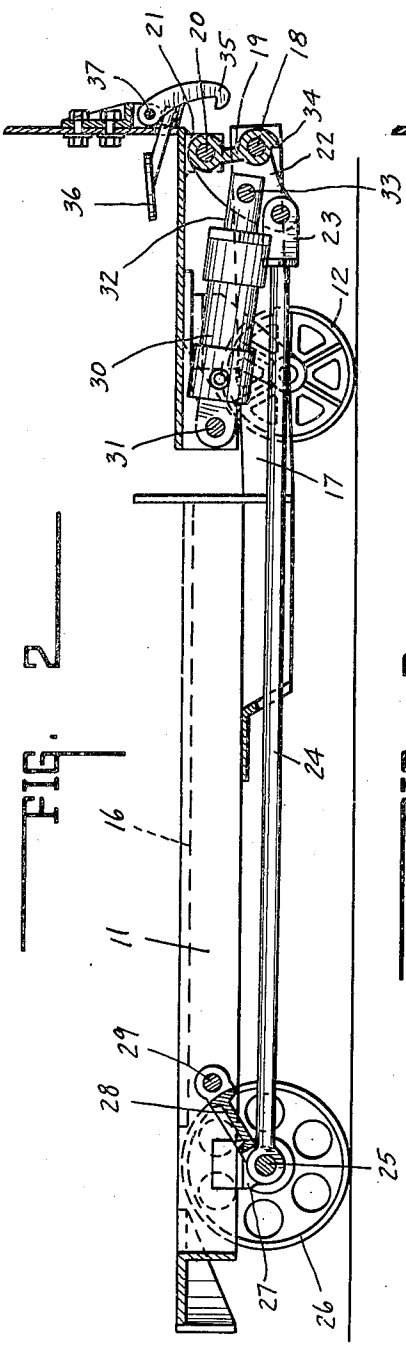


FIG. 2

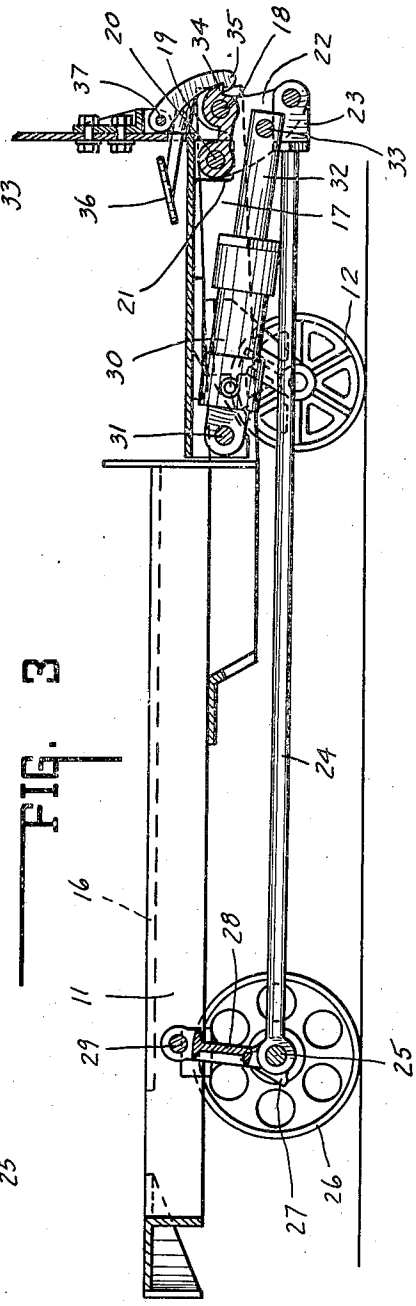


FIG. 3

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2,488,356

HYDRAULIC LIFT TRUCK

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Application May 10, 1945, Serial No. 593,069

3 Claims. (Cl. 254—8)

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This invention relates to a lift truck, particularly that type employed in shops to roll under a load carrying skid to lift and transport it. It is more particularly directed to a power driven truck provided with hydraulically actuated lift mechanism.

The principal feature of the invention resides in the new and novel lift mechanism for a truck, and particularly wherein said mechanism is carried by a supporting frame of fixed level. Thus, the invention contemplates connecting the lift platform with a fixed platform through the medium of a bell crank lever supporting it at one end, and wherein a trunnion supports it at the other end upon the axle of a pair of rear wheels. The actuating means such as a hydraulically operated piston is provided for swinging the bell crank lever and trunnion through a draw bar to simultaneously displace the lift platform upwardly and toward the fixed frame through a parallelogram movement including swinging the supporting wheels from retracted to lift position.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

Fig. 1 is a plan view showing the frame structure of the truck.

Fig. 2 is a central vertical section showing the lift platform in lowered position.

Fig. 3 is the same as Fig. 2 showing it in elevated position.

In the drawings there is illustrated a lift truck having a supporting frame 10 and a lift platform frame 11, the latter being displaceable relative to the supporting frame. The supporting frame 10 is supported at a fixed level by the wheels 12 and a front driving wheel 13 upon which the frame 10 is supported by the overhanging supporting frame bars 14, as illustrated and described in the application of Schwitzer and Roland filed December 11, 1943, Serial No. 513,858, now Patent No. 2,443,480 dated June 15, 1948, entitled "Power driven vehicle." However, the power driving mechanism for the front driving wheel 13 and the mounting of the supporting frame thereon, as shown in the above application, forms no part of this invention, since it is immaterial here as to the means for propelling the truck, either by power or by hand. The supporting frame 10 carries a platform upon which the operator may stand for operating the truck if it is power driven, and mounted upon the frame or the platform there is a double acting hydraulic hand pump indicated at 15, which

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pump is shown and described in my copending application filed April 20, 1945, Serial No. 589,317, entitled "Pump."

The frame 11 of the lift platform may carry a platform bed 16. The forward end of the frame 11 of the lift platform is provided with an underslung extension frame 17 which extends forwardly under the supporting frame 10 with its forward end pivotally supported at 18 by a lift arm 19 having its upper end pivoted at 20 within a bearing 21 secured to the underside of the supporting frame. Said lift arm is in the form of a bell crank lever, as indicated at 22, having its rear portion provided with a socket 23 to which a draw bar 24 is connected at one end. As shown in Fig. 1, there is a pair of such bell crank levers and sockets to which a pair of said draw bars is connected.

Said draw bars extend under the lift platform to the rear thereof, having pivotal connection at their opposite end with the rear axle 25 of the lift platform on which the rear supporting wheels 26 are carried. The axle 25 extends through and is supported by an axle housing 27 which supports and carries most of the load, but is normally mounted relative to the frame 11 and connected thereto by a trunnion 28 acting as a rear lift arm. The trunnion carries the axle housing 27 and is pivotally supported upon a cross bar 29 extending across the frame 11 and secured thereto at opposite ends. This arrangement is such that the rear supporting wheels 26 of the lift platform may be swung from retracted position, as shown in Fig. 2, forwardly to elevating position, as shown in Fig. 3, by the forward movement of the draw bars 24. This swinging movement of the wheels 26 disclose the lift platform to elevate it when in forward position and lower it when in retracted position.

For actuating the bell crank levers 22 and draw bars, there is provided a hydraulic cylinder 30 having fluid connection with the hydraulic pump 15. Said cylinder is pivotally supported at 31 to the underside of the supporting frame 10. The piston rod 32 of said cylinder extends forwardly and slightly downwardly therefrom for pivotal connection at 33 with the bell crank lever 22. Upon the cylinder 30 being hydraulically actuated to force the piston rod 32 forwardly, it swings the bell crank lever with its lift arm 19 forwardly and upwardly from the position shown in Fig. 2 to the position shown in Fig. 3. This movement has the effect of raising the pivotal mounting 18 of the extension frame 17 forwardly and upwardly, such as to elevate

the front end of the lift platform. At the same time, it moves the draw bars forwardly to swing the rear wheels 26 from retracted position to elevating position, such as to elevate the rear end of the lift platform. Thus, the lift platform is displaced upwardly and toward the supporting frame 10 with a parallelogram movement such as to at all times maintain the platform in level position. For this purpose when in lowered position there is a sufficient gap between the forward end of the lift platform and the supporting frame to permit of its displacement and relative movement therebetween.

The forward portion of the bell crank lever or the under portion of the lift arm 19 is provided with a lip 34 positioned to be engaged by a latch 35 which is releasable by a foot treadle 36 operatively connected with the latch to swing it outwardly to unlatching position about its pivotal mounting 37 on the supporting frame 10.

Whereas the invention is shown herein as being actuated hydraulically through the medium of the pump 15 and cylinder 30, a mechanical or hand operated plunger may be substituted for the cylinder 30 and its piston rod 32 to in like manner swing the bell crank lever forwardly and upwardly to latched position for elevating the lift platform.

The lift platform may be gently lowered, the latch 35 being released, by exhausting the cylinder 30 to permit retraction of the piston rod 32 through a suitable valve control in the pump 15 as will be obvious, and as more particularly disclosed in my above-mentioned application.

It will be noted that most of the load is directly carried by the rear wheels and axle housing 27 through the vertically positioned trunnion or lift arm 28 when in elevated position. This takes most of the load off of the hydraulic cylinder 30 at the front end. Also, when in lowered position the frame 11 rests directly on the housing 27 which then provides a fixed support therefor.

The invention claimed is:

1. A lift truck including a supporting frame having wheels for carrying it at a fixed level, a lift platform connected with displaceable relative thereto, a bell crank lever pivotally supported at one end to the underside of said frame, an underslung extension frame extending from the free end of said platform and terminating under said supporting frame and having a pivotal connection with said bell crank lever, a pair of rear supporting wheels for the opposite end of said lift platform, a trunnion pivotally connected to the axle of said wheels at one end and to the underside of said lift platform at the other end thereof to swingably support said platform on said wheels, a pair of draw bars interconnecting the axle of said wheels with said bell crank lever, the bell crank lever and trunnion both swinging in one direction for platform elevation and both swinging in the opposite direction for platform lowering and means carried by said supporting frame and connected with said bell crank lever and operable to displace said bell crank lever relative to said supporting frame to raise the forward end of said lift platform therewith and move the rear supporting wheels forwardly to platform elevating position.

2. A lift truck including a supporting frame having wheels for carrying it at a fixed level, a lift platform connected with and displaceable relative thereto, a bell crank lever pivotally supported at one end to the underside of said frame, an underslung extension frame extending from the free end of said platform under said supporting frame having a pivotal connection with said bell crank lever, a pair of rear supporting wheels for the opposite end of said lift platform, a trunnion pivotally connected to the axle of said wheels at one end and to the underside of said lift platform at the other end thereof to swingably support said platform on said wheels, a pair of draw bars interconnecting the axle of said wheels with said bell crank lever, means carried by said supporting frame connected with said bell crank lever operable to displace said bell crank lever relative to said supporting frame to raise the forward end of said lift platform therewith and move the rear supporting wheels forwardly to platform elevating position, and a manually controlled latch mounted on said frame for latching engagement with one free swinging end of said lever when the lever is in displaced position to lock it in platform elevating position.

3. A lift truck including a supporting frame having wheels for carrying it at a fixed level, a lift platform connected therewith and displaceable relative thereto, a bell crank lever pivotally supported at one end to the underside of said frame, an underslung extension frame extending from the free end of said platform under said supporting frame having a pivotal connection with said bell crank lever, a pair of rear supporting wheels for the opposite end of said lift platform, a trunnion pivotally connected to the axle of said wheels at one end and to the underside of said lift platform at the other end thereof to swingably support said platform on said wheels, a pair of draw bars interconnecting the axle of said wheels with said bell crank lever, a hydraulically actuated piston and cylinder connected between said frame and lever, and a hydraulic pump carried by said truck for actuating said piston and cylinder for moving said lever, bars and wheels to and from platform elevating position.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,234,925	Hastings	Mar. 11, 1941
2,274,164	Quayle	Feb. 24, 1942
2,325,396	Hastings	July 27, 1943
2,359,493	Schreck	Oct. 3, 1944
2,372,585	Klumbe et al.	Mar. 27, 1945

FOREIGN PATENTS

Number	Country	Date
114,052	Australia	Oct. 30, 1941