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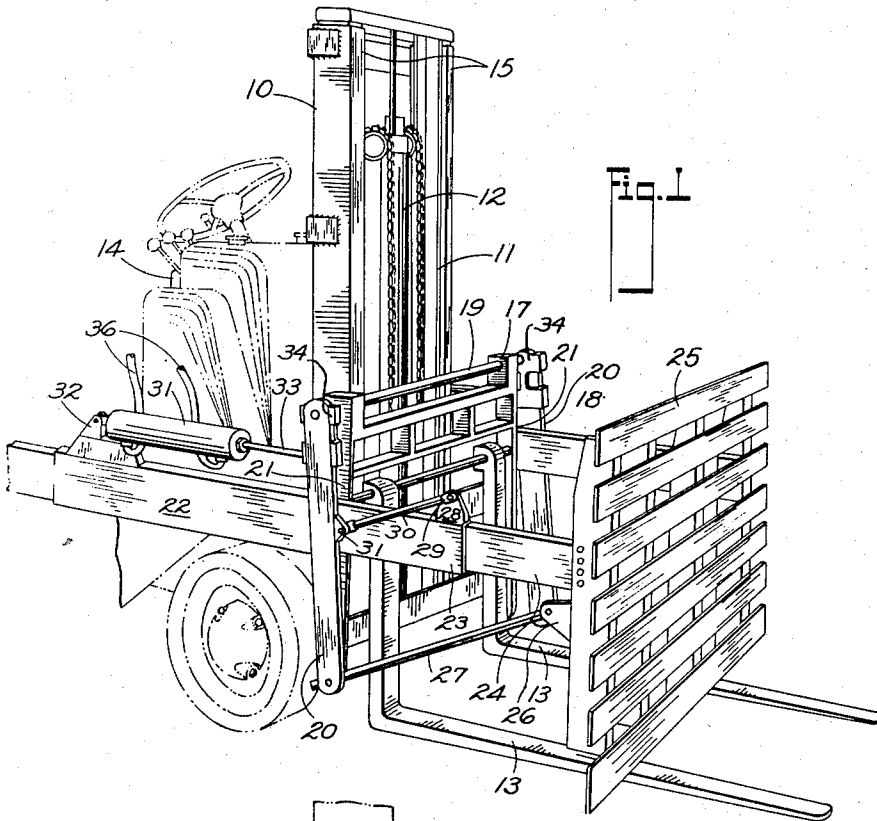
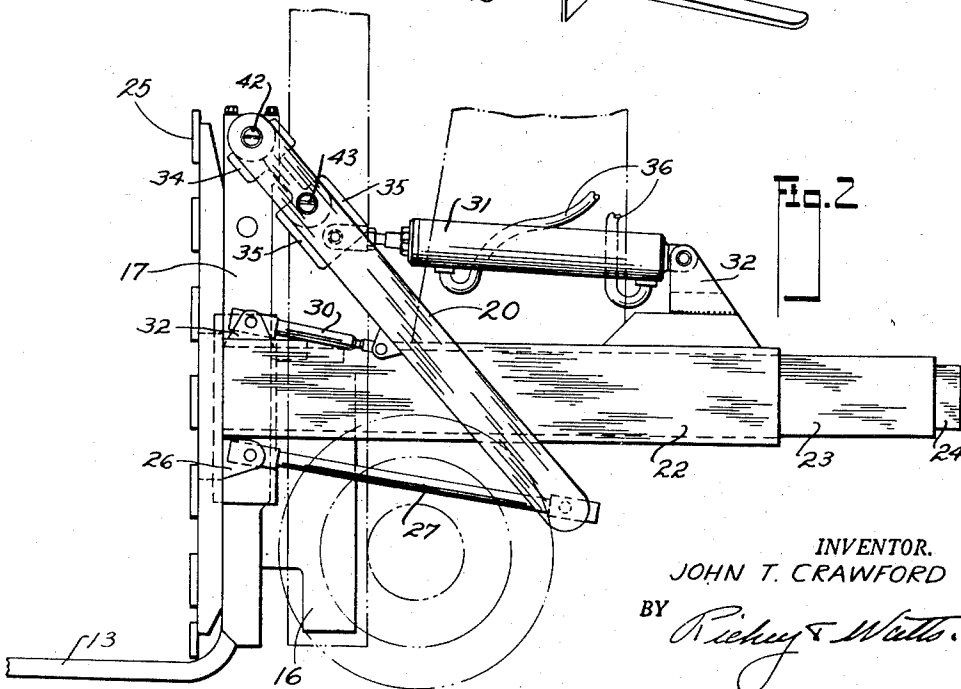
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2,496,039

LOAD PUSHER FOR INDUSTRIAL TRUCKS

Filed March 15, 1948

2 Sheets-Sheet 1



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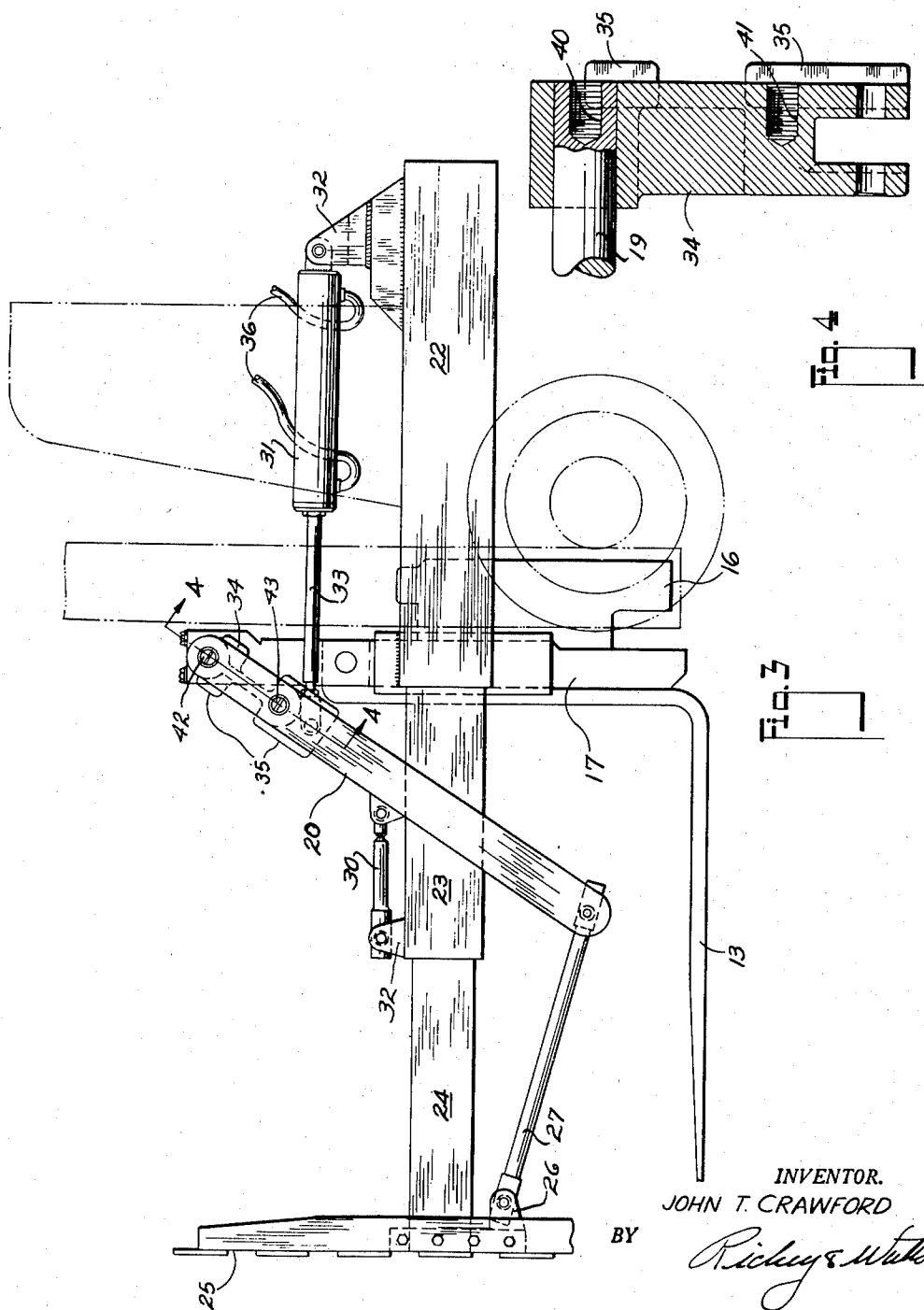
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UNITED STATES PATENT OFFICE

2,496,039

LOAD PUSHER FOR INDUSTRIAL TRUCKS

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3 Claims. (Cl. 214—82)

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This invention relates broadly to industrial lift trucks, and, more specifically, to mechanism for ejecting the load from the material-supporting platform in such trucks.

The invention further pertains to certain structural improvements in the load pusher disclosed in Letters Patent No. 2,418,661, issued to Dwight M. Palm April 8, 1947.

The objects of the invention reside in the provision of an improved and more efficacious organization of levers for actuation of the load pusher, the simplification of the parts embodied therein, the provision of a superior and more economic arrangement of the power units, and certain refinements in the linkage which tend to minimize the thrust imposed upon the bearings therefor.

Other objects and advantages more or less ancillary to the foregoing, and the manner in which all the various objects are realized, will appear in the following description, which, considered in connection with the accompanying drawings, sets forth the preferred embodiment of the invention.

Referring to the drawings:

Fig. 1 is a view in perspective of a fragmentary portion of a lift truck having the improved load pusher mounted thereon;

Fig. 2 is a side elevational view of the pusher and associated parts;

Fig. 3 is a similar side elevational view showing the pusher in its distended position; and

Fig. 4 is a longitudinal sectional view through one of the levers, the section being taken on a plane indicated by the line 4—4 in Fig. 3.

Referring first to Fig. 1, the lift truck may be of any conventional type which, as illustrated, embodies a mast 10 having a vertically movable slide or carriage 11 thereon, a lift cylinder 12 for the actuation thereof, and a load-supporting platform or forks 13. As is customary in such machines, the vehicular engine is coupled with a pump for supplying fluid under pressure to the cylinder 12 and certain other accessories in the machine, the circulation of the fluid in the hydraulic system being controlled by a valve unit 14 which is mounted in an accessible position to the operator of the machine.

The mast, as will be seen in Fig. 1, comprises a pair of spaced channels 15 having rails of similar configuration mounted in telescopic relation therewith which constitute the slide or carriage 11. The lower end of the carriage is provided with a bracket 16 having a frame 17 mounted thereon which supports a cross-bar 18 for the

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retention of the forks 13 and a second crossbar 19 constituting the fulcrum for the pusher rocker arms 20. The side rails 21 of the frame support channeled sleeves or guide ways 22 having slide rails 23 mounted therein which in turn support secondary slides 24. The outer ends of the slides 24 are affixed to a grill 25 which may be formed, as shown, from a latticework of vertical and horizontal strips or a rectangular frame with a coarse mesh heavy screen thereon. The outer rails of the grill 25 are provided with lugs 26 which are drilled for the reception of pins supporting drag links 27 pivotally connected to the free ends of the arms 20. The outer ends of the slide rails 23 are formed with brackets 28 on the upper face thereof which are drilled for the retention of pins 29 supporting the yoked ends of links 30 pivoted at their inner ends to lugs 31 welded to the forward face of the arms 20. The stability of the grill, in its outermost position, is provided through the length of the bearing of the slides 24 within the rails 23. To this end the links 30 are connected to the central portion of the arms 20 so that the rails will move with the slides and encompass the inner half thereof when the grill is advanced to its fully distended position. The arms are actuated by hydraulic cylinder piston assemblies 31 mounted for pivotal movement on brackets 32 secured upon the upper faces of the guide ways 22. The outer ends of the piston rods 33 are pivotally connected to the yoked ends of crank arms 34 which, as will be seen in Fig. 4, are formed with lugs 35 on the outer marginal edges thereof for the retention of the rocker arms 20. In order to retain rocker arms 20 in place, cross-shaft 19 is drilled and tapped as at 40, and crank arm 34 is drilled and tapped as at 41. Screws or bolts 42 and 43 are threaded into these tapped openings to retain the rocker arms 20 in place. The upper ends of the arms 20 and 34 are drilled for the support of the assembly upon the bar 19.

The cylinders are provided with flexible conduits 36 which are connected to the valve unit 14, the cylinders and hydraulic system therefor being arranged to effect the reciprocation of the pistons by the action of the motive fluid upon the opposed ends thereof.

In the event it should be necessary or desirable to use a load-carrying platform or forks 13 of a different length, the throw or travel of the pusher may be readily modified to accommodate such change by merely substituting longer or shorter arms 34 for those formerly employed in the machine.

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From the foregoing description it will be recognized that the over-all height of the pusher-actuating mechanism may be substantially reduced as compared with machines of the type disclosed in the patent to Palm aforesaid, that the thrust on the bearing is materially reduced, and that the construction of the arms 34 is more rigid and dependable than linkage in which the torsional strain is imposed on splined shafts or keys. It will be further observed that the support for the hydraulic cylinders as provided herein is susceptible of more ready assembly, and economy of manufacture, than the power unit mountings heretofore in use.

Although the foregoing description is necessarily of a detailed character, in order that the invention may be completely set forth, it is to be understood that the specific terminology is not intended to be restrictive or confining, and that various rearrangements of parts and modifications of detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

I claim:

1. In a lift truck embodying a mast having a vertically reciprocable carriage thereon and a load-supporting platform on said carriage, mechanism for ejecting a load from said platform comprising a pair of guide ways supported by the carriage, slides mounted thereon, rails mounted for sliding movement in said slides, a pusher plate attached to said rails, depending arms pivoted upon said carriage, secondary arms mounted thereon in parallel relation thereto, links intermediate said secondary arms and said pusher plate, secondary links intermediate said secondary arms and said slides, brackets on said guideways rearwardly of said mast and hydraulic piston cylinder assemblies mounted at one end to the brackets on said guide ways in generally parallel relation thereto, said assemblies being operatively connected to the first-named arms below their pivot points on the carriage for the actuation thereof.

2. In a lift truck embodying a mast having a

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carriage thereon and a load-supporting platform carried thereby, a pusher for ejecting the load from said platform comprising a frame mounted on said carriage, crank arms pivotally mounted thereon, ledges on the sides of said crank arms defining a channel section, rocker arms seated in the channel section of said arms, means detachably connecting said rocker arms to said crank arms, a guide rail mounted on said carriage, slides therein, a pusher plate mounted on said slides, links intermediate said pusher plate and said rocker arms, hydraulic cylinders pivotally mounted on said guide rails in spaced relation thereto, and pistons in said cylinders connected to said crank arms at points that support the cylinders in substantially parallel relation to said guide rails.

3. In a lift truck embodying a mast having a carriage thereon and a load-supporting platform carried thereby, a pusher for ejecting the load from said platform comprising a frame mounted on said carriage, depending arms pivoted at their upper ends upon said frame, guide rails mounted on said carriage, slides mounted therein, a pusher plate supported by said slides, links pivoted to said pusher plate and to the lower ends of said arms, brackets on the upper faces of said guide rails disposed rearwardly of said mast, cylinders pivotally supported by said brackets, and pistons therein pivotally connected to said arms subjacent the upper pivotal connections for said arms.

JOHN T. CRAWFORD.

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

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