Oct. 4, 1949. J. A. FRISCHMANN ET AL 2,483,534

SIDE SHIFT MECHANISM FOR LIFT TRUCK FORKS

Filed Nov. 4, 1947 2 Sheets-Sheet 1

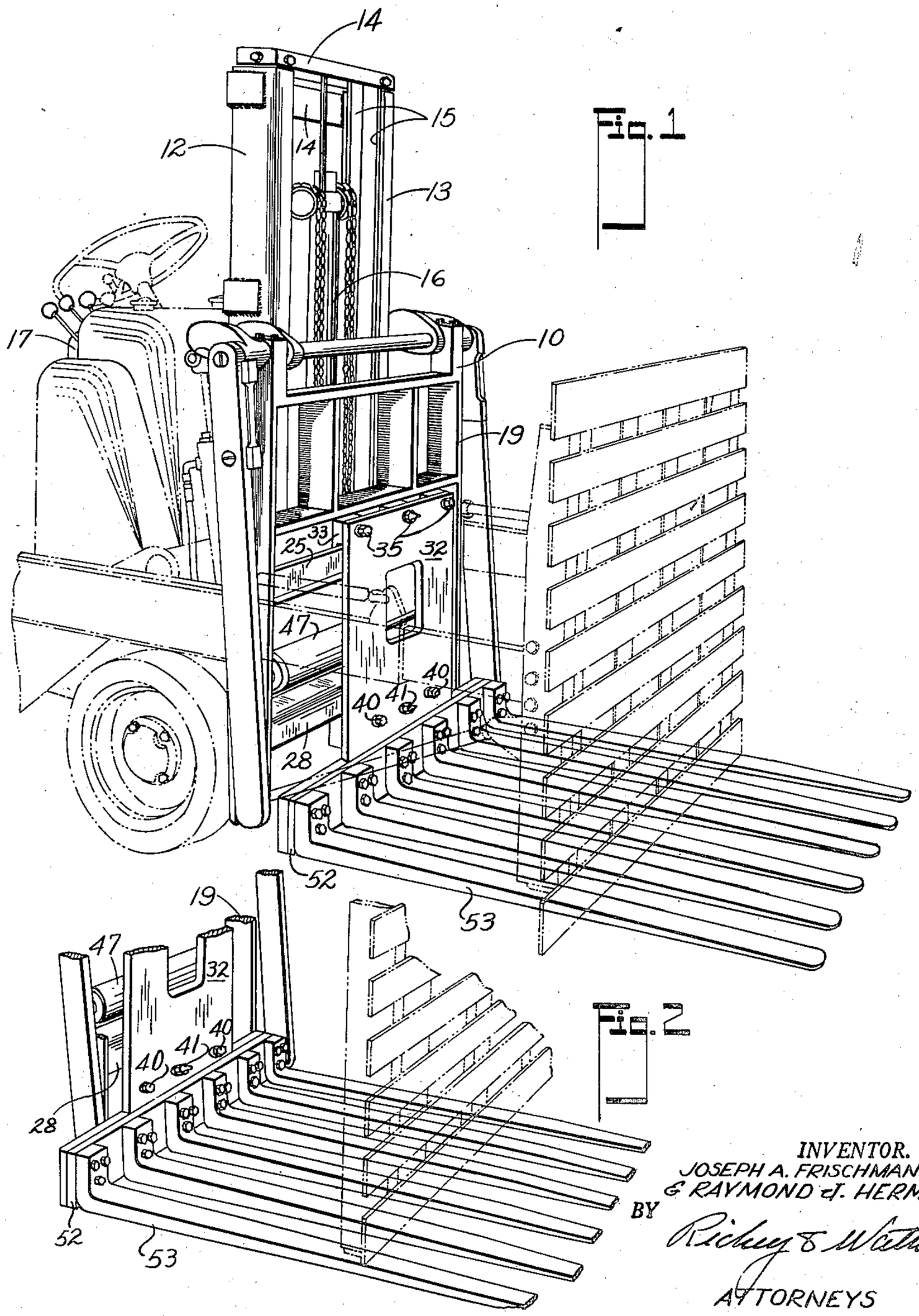

Fig. 1

Fig. 2

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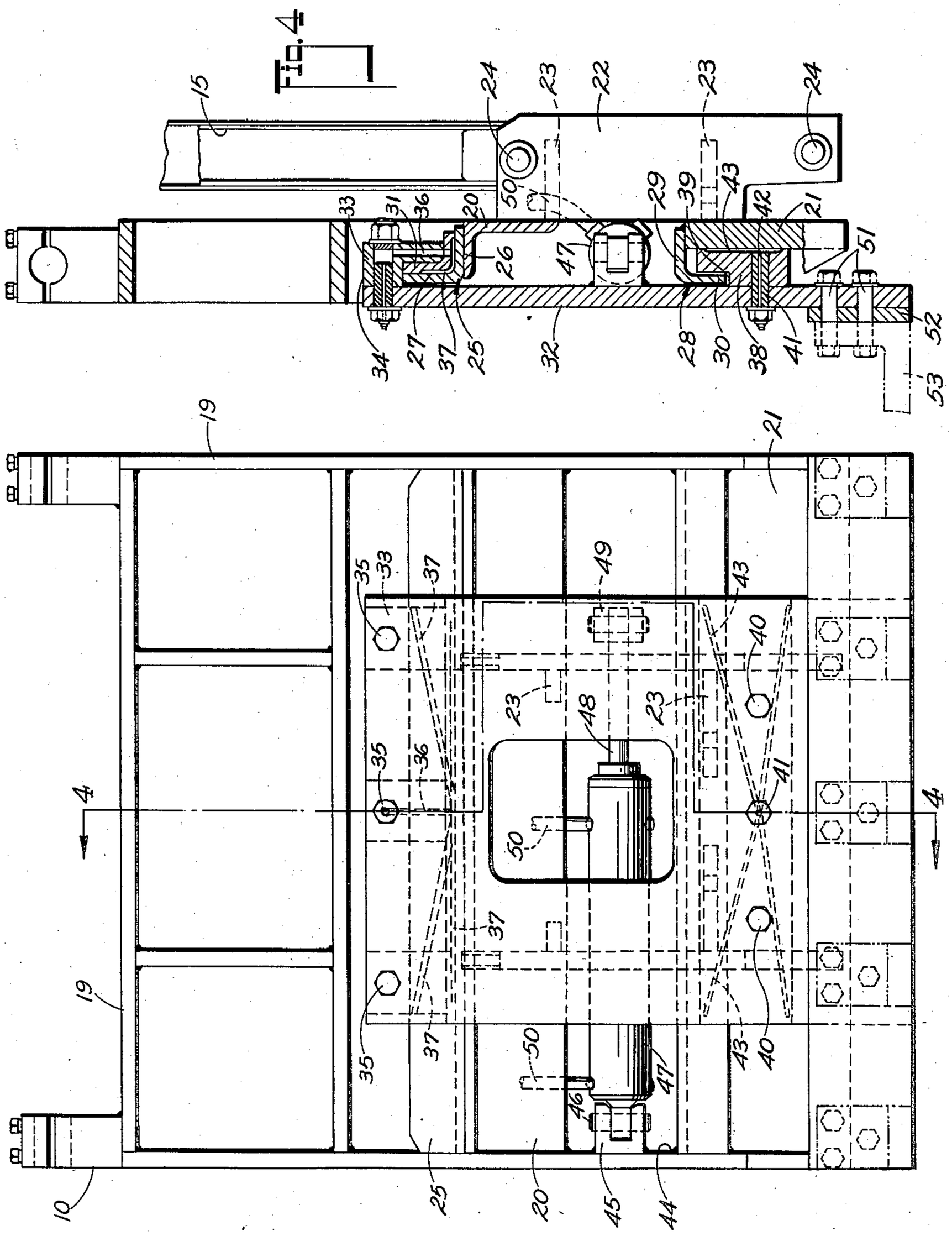

Fig. 7

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SIDE SHIFT MECHANISM FOR LIFT TRUCK FORKS

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4 Claims. (Cl. 214—113)

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This invention relates broadly to industrial trucks and more specifically to mechanism to effect the lateral translation of the load-supporting member thereon.

The invention further relates to certain structural refinements and improvements in the load-supporting mechanism disclosed in Letters Patent No. 2,270,664, entitled "Industrial truck," issued January 20, 1942, to Elverton W. Weaver.

In operating industrial trucks within the confines of a boxcar or similar environs it has heretofore been difficult to deposit the load in contiguous relation with a side wall of the enclosure or in vertical alignment without rehandling the material. Obviously, such practice is costly in point of time and labor, and is particularly objectionable when handling loads at high elevations. The present invention contemplates a structure which will overcome the foregoing difficulties and increase the utility of the machine without sacrifice to the maneuverability thereof in other types of operation.

Further objects and advantages of the invention reside in a construction which is efficient of operation, economic of manufacture, durable of structure, and more flexible of operation than mechanisms of a like character heretofore produced.

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 the forward end of a lift truck illustrating the improved side shifting mechanism in its assembled relation thereon.

Fig. 2 is a similar view of a fragmentary portion of the mechanism shown in Fig. 1, the shifting mechanism being illustrated in its extreme left hand position.

Fig. 3 is a front elevational view of the improved cross slide and supporting frame therefor, and

Fig. 4 is a vertical sectional view of the frame and cross slide, the section being taken on a plane indicated by the line 4—4 in Fig. 3.

As will be seen in Fig. 1, the load-supporting carriage 10 is mounted for vertical reciprocative movement on an extensible mast 12 which in turn is mounted on the forward end of a lift truck of a well-known type. Since the structure

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of the vehicle, the load-elevating mechanism and hydraulic system therefor form no part of the present invention, further description thereof is deemed unnecessary herein.

The mast comprises a pair of channels 13 held in spaced relation by plates 14 mounted in the customary manner for forward and rearward tilting movement on a fulcrum, not shown, adjacent the forward lower end of the truck. The mast further includes a secondary pair of channels 15 disposed for sliding engagement within the members 14 and mounted for vertical distention relative thereto through a hydraulic lift 16 and a chain and sprocket assembly of conventional form. Actuation of the lift is controlled by a hydraulic valve unit 17 coupled with a source of fluid under pressure.

In detail, the carriage 10 comprises a rectangular frame 19 (Fig. 3) having a transversely disposed angle iron 20 on the rearward face thereof, a tie plate 21 mounted in spaced relation therewith and a pair of brackets 22 welded to the angle iron and tie plate in parallel relation with each other and the forward face of the frame. The brackets 22 are braced by reinforcing plates 23 set on edge and welded to a side wall of the brackets and the rearward faces of the respective cross members 20 and 21. The ends of the brackets are fabricated to accommodate the support of pintles 24 having rollers thereon which are engaged with the channels 15 of the inner mast assembly. The upper frame cross member or angle iron 20 is provided with a rail 25 of angular transverse section, having the lower flange 26 thereof welded to the upper face of the angle 20 and the upper flange 27 thereof disposed upwardly in spaced parallel relation to the forward face of the frame 19. The lower frame cross member 21 is provided with an angular rail 28 having the upper flange 29 thereof welded to the top of the plate 21 and the second flange 30 disposed in depending parallel relation therewith in a plane common to that of the flange 27 of the rail 25. The inner face of the flange 27 is engaged with an angle iron 31 constituting a shoe or bearing plate for the carriage cross slide plate 32. The angle 31 is supported by hangers 33 which are welded thereto and machined with outboard ledges 34 designed for engagement with the rearward face of the cross slide plate 32. The plate and hangers are drilled for the reception of bolts 35, the bolt in the center of the assembly being bored and cross-drilled for communication with lubricant channels 36 in the hangers and angle iron and

grooves 37 in the portions of the shoe that are engaged with the rail 25. The inner flange 30 of the rail 28 is engaged with a plate 38 machined with a recess in the forward face thereof which defines a ledge 39 engaged with the rearward face of the cross slide plate 32. The plates 32 and 38 are drilled to receive bolts 40, the center bolt 41 being bored to form a lubricant passageway 42 arranged for communication with grooves 43 in the face of the plate that is engaged with the frame cross member 21.

The inner wall 44 of one of the vertical side members of the frame 19 is provided with a bifurcated bracket 45 which is drilled for the reception of a pin 46 constituting the fulcrum for a cylinder 47 having a piston therein and a push rod 48 protruding therefrom. The end of the push rod is pivoted in a bracket 49 welded or otherwise affixed upon the rearward face of the plate 32. The end portions of the cylinder are drilled and tapped to receive fittings for the support of flexible conduits 50 which are coupled with the valve unit 17.

The lower end of the plate 32 is drilled for the reception of bolts 51 which support a spacer plate 52 and the fork tines 53 or equivalent mechanism of the load-supporting element.

When it is desired to shift the cross slide to accommodate the disposition of the load to the right or left of its supported position, the control lever of the valve unit 17 is manipulated to effect the admission of fluid under pressure to the requisite end of the cylinder to attain the desired translation of the carriage. As the piston is distended or retracted the plate 32 riding on its shoe 31 and guided by the flanged portions of the rails 25 and 28 will slide transversely to the point desired by the operator or to the limit of the piston stroke which in normal conditions of operation positions the outer edge of the load-carrying members 53 flush with the side wall of the truck.

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.

We claim:

1. In a truck embodying a frame, a mast thereon, a carriage supported thereby, and means for elevating the carriage; mechanism for moving the load-supporting member transverse the medial axis of the truck comprising a horizontal rail formed from an angle iron mounted on the carriage with one of the flanges thereof disposed in a vertical plane, a second angle iron constituting a shoe mounted in telescopic relation therewith and for sliding movement thereon, a plate secured to said shoe, a second guide rail formed of an angle iron mounted on the carriage in spaced parallel relation to the first named rail, a guide member engaged with a flange of the last named angle iron, a load-supporting fork affixed to said plate, a hydraulic cylinder pivotally mounted on one side of the carriage, a piston therein, a push rod connected thereto and pivotally connected to said plate and means for the control of fluid under pressure to said cylinder.

2. In a truck embodying a frame, a mast thereon, a carriage supported thereby, and means for elevating the carriage; mechanism for moving the load-supporting member transverse the medial axis of the truck comprising a pair of angle irons constituting cross rails mounted on the carriage in spaced parallel relation, a plate, a pair of guide members mounted on the plate with a flanged portion thereof interengaged with flanged portions of said angle iron rails, a load-carrying member mounted on said plate, and a hydraulic cylinder mounted on the carriage and connected to said plate to effectuate the reciprocation thereof upon said rails.

3. In a truck embodying a frame, a mast thereon, a carriage supported thereby, and means for elevating the carriage; mechanism for moving the load-supporting member transverse the medial axis of the truck comprising a pair of horizontal parallel rails mounted on the carriage, flanges on said rails disposed in opposition to each other, an angle iron constituting a shoe mounted for sliding movement on the upper rail rearward the flanges thereof, a guide member engaged within a flange of the other rail, a plate constituting a cross slide, bolts therein connected to said shoe and guide member, certain of said bolts and said shoe and said guide member having a lubricant passageway therein, a lift fork on said plate and a hydraulic ram interposed between the carriage and cross slide for the actuation thereof upon said rails.

4. A lift truck comprising a frame, a mast supported thereon, a carriage elevatable on the mast, a pair of vertically spaced horizontal rails on the carriage, a support member reciprocable upon the rails and interlocked with both rails, means for engaging and supporting a load mounted upon the support member, and a hydraulic ram coupled between the carriage and support member to reciprocate the member on the rails.

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