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ADJUSTABLE LOAD ENGAGING MEANS FOR LIFT TRUCK

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FIG. 1

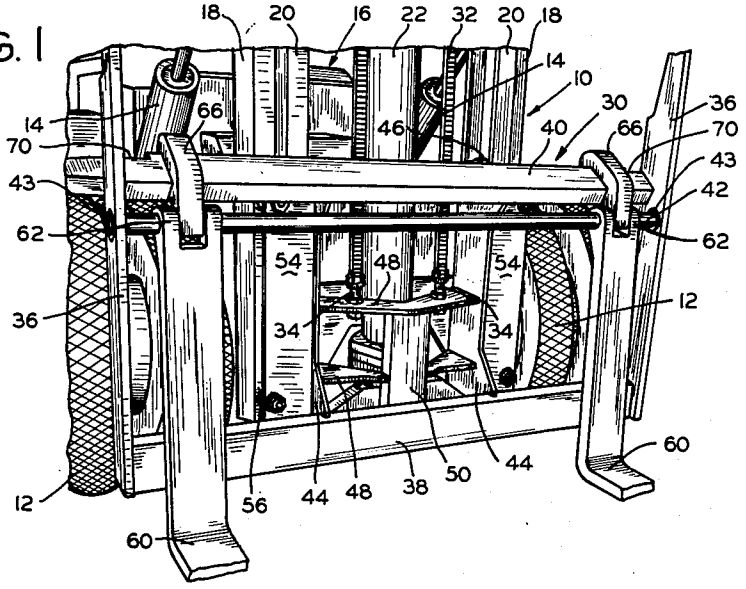


FIG. 2

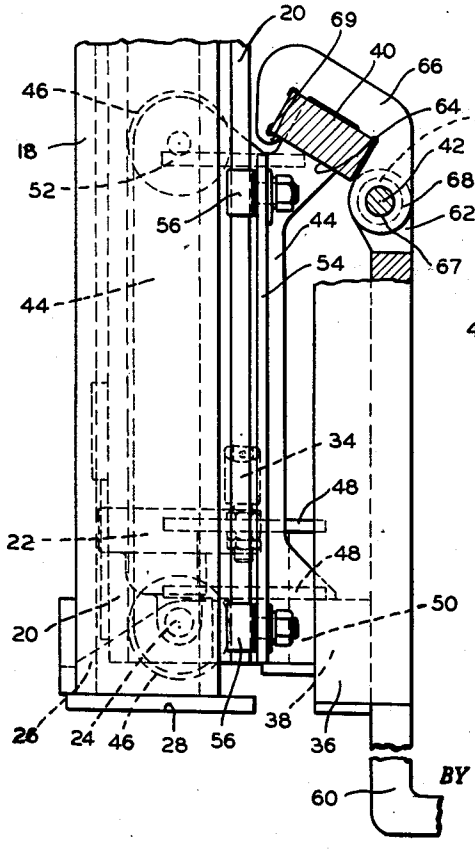
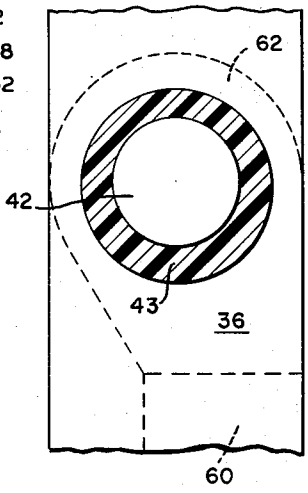


FIG. 3



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ADJUSTABLE LOAD ENGAGING MEANS FOR LIFT TRUCK

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This invention relates to a mounting construction for a lift truck load engaging means and more particularly to a mounting construction which provides full lateral adjustment for pivoted load engaging means.

In the use of certain lift trucks having a pair of fork tines mounted forwardly thereof for engaging, lifting and transporting material, it is desirable that the fork tines be fully adjustable transversely of the truck, as well as being pivotable about a transverse horizontal axis. It is known to mount such fork tines for pivotable movement as aforesaid and to provide limited lateral adjustment therefor, but to my knowledge no prior mounting construction of the type contemplated provides for full lateral adjustment of pivoted fork tines.

It is therefore an important object of the present invention to provide an improved mounting construction for load engaging means of the type contemplated which permits both full lateral adjustment and pivotable movement of the load engaging means.

Another object of the invention is to provide an improved fork tine mounting construction associated with the lifting carriage of a lift truck in which separate means are provided for the support of and for the pivot suspension of the fork tines.

Another object of the invention is to provide a generally improved mounting construction for fork tines or other load engaging means of lift trucks.

In carrying out my invention I provide a lifting carriage which is associated with a mast construction of a lift truck in known manner and which provides a transverse load supporting beam, a transverse pivot shaft adjacent the beam, transversely movable load supporting bracket means connecting the beam and pivot shaft, and a pair of fork tines suspended from the pivot shaft and movable transversely with the bracket means from a position adjacent one side of the carriage to a position adjacent the opposite side thereof.

In the drawings:

FIGURE 1 is a partial view in perspective of the forward end of a lift truck having the mounting construction of the present invention associated with the lifting carriage thereof; and

FIGURE 2 is a side view in partial section of the lifting mast and fork mounting construction shown in FIGURE 1.

Referring now in detail to the drawings, the lower portion of a telescoping lifting mast construction of a lift truck is illustrated at numeral 10 and is pivotally supported from and forwardly of a drive axle, not shown, and intermediate a pair of drive wheels 12 which are mounted at opposite ends of the drive axle. A pair of laterally spaced tilt cylinders 14 are connected to the truck and to the lifting mast for pivoting the mast about the drive axle. A portion of the body construction of the lift truck is shown at numeral 16.

The mast construction may be like that which is described in detail in copending continuation application Serial No. 111,070, filed May 18, 1961, in the names of Hastings and Backofen (common assignee). As illustrated herein it comprises a pair of transversely spaced inwardly opening fixed channel members 18 supported, as aforesaid, upon the drive axle of the truck, a pair of partially nested transversely spaced and elevatable I-beam sections 20 mounted for telescoping vertical movement

relative to the fixed beams 18 and offset forwardly thereof so that the forward flanges of the I-beams overlap the forward flanges of channel beams 18, and an upright hydraulically actuated cylinder motor hoist 22 intermediate of I-beams 20. Hoist motor 22 is pivotally mounted at its lower end upon a transverse pin 24 which is supported in a pair of transversely spaced plates 26, one of which is shown in FIGURE 2. Plates 26 are supported upon a horizontal plate member 28 which connects the lower ends of the beams 18. In the interest of clarity, only the base end of hoist motor 22 is illustrated in FIGURE 2, and guide roller members which are connected between beam members 20 and 18 for supporting the telescoping I-beams in channel members 18 are not shown in FIGURE 2.

Mounted forwardly and extending transversely of the mast construction 10 is a carriage and fork mounting assembly 30 which is supported from the I-beams 20 for vertical movement along mast 10, being connected to hoist motor 22 in conventional manner by means of a pair of lifting chains 32 which are secured to the carriage construction at the one ends thereof by a pair of bracket members 34 and to a fixed portion of the mast at the other ends thereof. Chains 32 extend over rotatable sprockets, not shown, which are connected to the upper end of the piston rod of hoist motor 22.

The carriage assembly comprises a pair of laterally spaced and vertically extending end frame members 36 interconnected by a pair of vertically spaced and transversely extending beams 38 and 40 and a pivot shaft 42 spaced slightly forwardly of and beneath beam 40. Shaft 42 is preferably mounted at its opposite ends in resilient support rings 43 located in end members 36. Intermediate end members 36 is located a pair of transversely spaced and rearwardly extending carriage support plates 44 which are securely connected to transverse beams 38 and 40. Secured to the rearward outer portion of each support plate 44 is a pair of vertically spaced rollers 46 which are mounted for registry with the inner-facing channel portions of I-beams 20 for supporting the carriage assembly 30 in the mast assembly 10 for vertical guided movement with respect thereto. Support plates 44 are connected intermediate the upper and lower ends thereof by a pair of vertically spaced and transversely extending plate members 48, which are in turn connected together by a vertically extending beam 50 located centrally between plates 44 and secured at the lower end to beam 38. An additional transversely extending plate member 52 connects support plates 44 adjacent the upper ends thereof. An additional pair of mounting plate members 54 are secured along inner edges thereof to the forward outer surface portion of support plates 44, and extend transversely outwardly thereof for receiving vertically spaced pairs of side thrust rollers 56 which are mounted for rolling engagement with the overlapping outer edge portions of the forward flanges of I-beams 20.

From pivot shaft 42 depends a pair of transversely spaced fork tines 60, each of which includes an upper bifurcated journal portion 62 for engaging the pivot shaft as shown. The upper forwardly extending end of each support plate 44 terminates in a downwardly diagonally extending surface 64, and main transverse support beam member 40, which is shown of rectangular cross-section, is secured rigidly to each surface 64, as by welding, on the lower long side of the section. Beam 40 is also secured at its opposite ends to carriage frame members 36.

A pair of generally U-shaped brackets 66 including a hook portion 69 embrace the four surfaces of beam 40, as shown, and register with pivot shaft 42 intermediate the bifurcated upper end portions 62 of each fork tine in an opening 67 formed in an enlarged boss section 68 of each bracket. The lower portions of the vertical legs of the

fork tines normally rest against the forward surface of beam 38, which resists the rearward thrust of a load on the fork tines tending to rotate same in a clockwise direction as viewed in FIGURE 2. Assembly notches 70 are cut out of the rear surface portion of beam 40 and are of slightly greater width than the width of brackets 66. In assembling the carriage construction with the beam 40 secured to support plates 44, brackets 66 are threaded on the beam from opposite ends thereof a distance sufficient to permit fork ends 62 to be aligned with openings 67 for receiving shaft 42. Then, with shaft 42 in position in resilient supports 43 of end bars 36, brackets 66 cannot be moved transversely outwardly a sufficient distance to drop into assembly notches 70 and become unintentionally unhooked from beam 40 without removal of shaft 42. Resilient supports 43 are preferably of sufficient firmness to support in position elements 42, 60 and 66 when no load is supported by the fork tines, thus allowing a free fitting relation between elements 66 and 40 which permits standard mill rolled tolerances to be specified for the dimensions of beam 40 which otherwise would require a machined finish. As load is applied to the fork tines 60 the resilient end mounts of shaft 42 yield sufficiently to bring into full supporting abutment brackets 66 with beam 40.

As will now be apparent, the weight of the fork tines and any load carried thereby in supported from the transverse beam 40, and not from pivot shaft 42. Each associated bracket and fork tine is adjustable manually in a direction transverse of the carriage assembly along the entire length of pivot shaft 42 so that any combination of relative transverse position of the pair of fork tines may be effected within the space provided between vertical frame members 36. In the present construction the pivot shaft 42 need not be of appreciable cross-section, as would be sufficient to support a relatively heavy load intermediate the ends thereof, inasmuch as the load is supported from transverse beam 40, the pivot shaft providing means for permitting pivotal movement of the fork tines in a counterclockwise direction such as is desirable during rearward movement of the lift truck over uneven terrain. In addition to functioning as a fork hinge, pivot shaft 42 is an economical means for providing a machined guide which maintains the fork tines in transverse alignment at all times, and the construction of this invention is well suited for use with either manual or powered lateral adjustment of the fork tines. The present invention provides a carriage and fork tine mounting construction in which each fork tine is capable of being adjusted laterally of the carriage substantially throughout the transverse length thereof without imposing upon any portion of the carriage an excessive deflection or stress within the load carrying capacity of the truck.

It will be understood that reference to "fork tines" herein is a matter of convenience of expression, and that any suitable pair of load engaging means associatable with the carriage assembly are within the scope of the invention.

Although only one embodiment of the invention has been disclosed, it will be understood that changes in the form and arrangement of parts may be made without departing from the scope of the invention as defined in the claims appended.

I claim:

1. A load supporting carriage assembly for use with lift trucks comprising a pair of transversely spaced vertically extending frame members, a pair of vertically spaced transversely extending beams connected to said frame members, a transversely extending pivot member connected to said frame members and located adjacent the upper beam, a pair of transversely spaced load engaging means depending from said pivot member, said pivot member being supported for limited vertical movement relative to said upper beam when said load engaging means is subjected to a load, and a pair of members supporting said pivot member from the upper one of said beams such that a load on said load engaging means causes the main support thereof to shift the support of the load from said pivot member to said upper beam, said supporting members being connected to said pivot member adjacent the connection thereto of said load engaging means and being adjustable with said load engaging means transversely of said pivot member and the upper one of said beams.

2. A load supporting carriage assembly for use with lift trucks having a lifting mast construction mounted at one end of the truck comprising a transversely extending beam, a pair of laterally spaced carriage support means secured to said beam and mounted in opposite sides of the lifting mast for supporting said beam forwardly of the lifting mast, a transversely extending pivot member mounted adjacent said beam, a pair of transversely spaced load engaging means depending from said pivot member, a pair of members supporting said pivot member from said beam, said latter supporting members being connected to said pivot member adjacent the connection thereto of said load engaging means and being adjustable with said load engaging means transversely of said pivot member and said beam, and yielding means supporting said pivot member for limited movement relative to said beam such that said supporting members are adapted to move into full load supporting abutment with said beam when said load engaging means is subjected to a load.

3. A load supporting carriage assembly for use with lift trucks having a vertically extending lifting mast construction mounted at one end of the truck comprising a pair of vertically spaced transversely extending beams, a pair of transversely spaced rearwardly extending carriage support means connected to said beams and suporting same in the mast construction for elevating movement, a transversely extending pivot member spaced from the upper one of said beams, a pair of transversely spaced load engaging means depending from said pivot member, and a pair of brackets supporting said pivot member from the upper one of said beams, said brackets being connected to said pivot member adjacent the connection thereto of each said load engaging means and being adjustable with said load engaging means transversely of said pivot member and the upper one of said beams, whereby each load engaging means is pivotable outwardly of the carriage assembly and is adjustable from a position adjacent one end of the pivot member to a position adjacent the opposite end thereof, said upper beam having notched reduced end portions of lesser width than the width of said brackets so that the brackets may be readily threaded on the upper beam from the ends thereof but cannot drop into said notched end portions following assembly of the carriage.

4. A carriage assembly as claimed in claim 3 wherein each load engaging means and associated bracket are mounted upon the pivot member in interlocking relation such that the weight of the load engaging means and any load carried thereby is supported from the upper beam, and yielding means supporting the ends of said pivot member for limited movement relative to said upper beam whereby to assure continuous support of the load engaging means and load from said upper beam.

5. A load supporting carriage assembly for use with lift trucks having an upright mast construction located at one end of the truck comprising a beam member of substantially rectangular cross-section supported from and forwardly of the mast construction for vertical movement relative thereto, said beam member extending transversely of the mast construction and being located in a biased plane which extends downwardly and forwardly from the plane of the mast construction, a pair of transversely spaced generally U-shaped bracket support members embracing said beam and movable lengthwise thereof, each said support bracket having a downwardly extending portion, a transversely extending pivot shaft in registry with

the downwardly extending portions of said support brackets, and a load engaging member mounted upon the pivot shaft in interlocking relation with each said support bracket for movement therewith, each said load engaging member being pivotal on said shaft and supported from said beam.

6. A carriage assembly as claimed in claim 5 wherein said pivot member is supported for limited vertical movement relative to said beam member when said load engaging members are subjected to a load.

7. A carriage assembly as claimed in claim 6 wherein said beam member has notched reduced end portions of lesser width than the width of said support members.

References Cited in the file of this patent

UNITED STATES PATENTS

2,596,747	Ward et al.	May 13, 1952
2,904,203	Mindrum	Sept. 15, 1959