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HYDRAULIC LIFT TRUCKS

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Fig. 3.

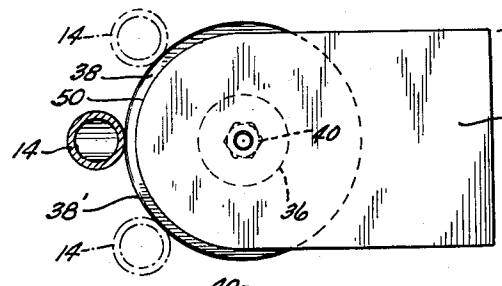


Fig. 1.

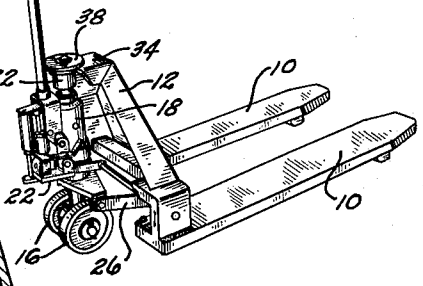


Fig. 2.

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HYDRAULIC LIFT TRUCKS

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This invention relates to improvements in hydraulic lift trucks, and more particularly to a lift truck which is especially designed so that when the truck is being pushed rearwardly by the upwardly swung steering handle, the thrust will not be borne by the hydraulic jack mechanism.

When moving a load with a conventional hydraulic lift truck, or when initially positioning the lifting forks under the load, the truck is often manually pushed rearwardly by means of the upswung steering handle, and with conventional trucks the thrust from the handle reacts directly against the hydraulic cylinder during this operation. This not only strains the structure, but it has been found that the force exerted against the hydraulic cylinder when the ram is in a raised position creates a jack-knifing effect between said ram and cylinder, thus causing the fluid seals therebetween to separate and permitting hydraulic fluid to leak out. In addition, this jack-knifing effect has a tendency to cause wear and enlargement of the cylinder opening through which the ram extends, which is objectionable.

With the above considerations in mind, the principal object of the present invention is to provide a novel hydraulic life truck having a special abutment member mounted on the main frame and against which the steering handle bears when the truck is pushed rearwardly, thus minimizing the strain on the hydraulic jack members.

A further object of the present invention is to provide a hydraulic lift truck having a special handle abutment member mounted on the main frame as described, which member is designed to transmit and distribute the pushing forces to the main truck frame, thereby relieving the steering frame and hydraulic assembly thereon of strain.

A further object is to provide a lift truck as described wherein the novel handle abutment member is in the form of a disc, thus ensuring that the steering handle will engage and bear against the same in all steering positions.

A further object of the invention is to provide an improved hydraulic lift truck having a novel handle abutment disc mounted on the main truck frame as described, wherein said disc is mounted to rotate with the steering handle when the latter is engaged therewith and moved to turn the truck, thereby minimizing the friction and wear on said disc and handle member.

Still further objects of the present invention are to provide an improved hydraulic lift truck which is simple in design and construction, which is reliable in operation, and which is otherwise especially well suited for its intended uses.

With the above and other objects in view, the invention consists of the improved hydraulic lift truck, and all of its parts and combinations, and all equivalents thereof, as set forth in the following specification and claims.

In the accompanying drawing, wherein the same reference numerals designate the same parts in all of the views:

FIG. 1 is a perspective view of the complete hydraulic lift truck;

FIG. 2 is an enlarged fragmentary side elevational view of the improved truck with parts thereof broken away and shown in section; and

FIG. 3 is a transverse sectional view looking upwardly along the line 3—3 of FIG. 2, the broken lines indicating alternate positions of the handle during steering.

With more particular reference now to the drawing, it will be seen that the hydraulic lift truck comprising the present invention includes a main frame having a bifurcated, rearwardly-projecting lifting fork **10**; and extending upwardly therefrom is a fork-supporting frame **12** of strong, arc-welded steel construction and forming part of the main frame. As best appears in FIG. 2, the steering frame includes a horizontal platform **22**, and mounted thereon is a hydraulic jack unit including a cylinder **18**, ram **20**, pump **19**, and an elongated pumping and steering handle **14**. The lower end of said handle **14** is pivotally connected to the steering frame, as at **15**, and said handle is adapted to be moved in an up and down stroke around said pivot connection to actuate the hydraulic pump **19** and to thereby raise or lower the ram **20**.

As will be hereinafter described in greater detail, the upper end of the ram **20** reacts against the forward portion of the main frame **12**, and when said hydraulic ram is extended by the pumping action of the handle **14** it causes a corresponding elevation of the lifting fork **10**.

Rigidly connected to and depending from the platform **22** is a spindle **24** which extends downwardly through a suitable sleeve assembly **25** below the platform **22** and having a bearing **25'**. Carried by the lower end of said spindle is a transverse axle **17** on which are mounted a pair of spaced wheels **16**. A plurality of pivotally interconnected lifting levers **26** are connected between the member **25** and the lower portion of the fork-supporting frame **12**.

In the preferred form of the invention the handle and pump assembly is provided with a compression spring **28** which is adapted to normally maintain said handle **14** in an upright position. In addition, the truck is provided with a foot control pedal **30** which is operatively connected to a suitable hydraulic valve, and which pedal is conveniently located to permit easy access.

In the use of a lift truck such as that illustrated, the workman first sets the lifting fork **10** in its lowermost condition and positions the truck adjacent the pallets or other objects to be transported. With the handle **14** in its upright position he manually pushes the entire unit rearwardly until the forks are properly arranged beneath the load, and the handle **14** is pumped up and down to raise the lifting fork, together with the load thereon. The handle may then be used to pull or it may be released and allowed to return to the position of FIG. 1 and the truck manually pushed to its intended location. To steer the truck it is merely necessary to manipulate the handle in a manner to rotate the steering frame. This includes the jack unit and the spindle **24** depending therefrom, and causes the wheels **16** to turn as desired. When the load reaches its destination it is lowered hydraulically.

As hereinabove mentioned, with prior hydraulic lift trucks of the general type described, when the steering handle **14** is in its upright position, as when it is desired to push the truck, said handle either bears directly against the hydraulic cylinder or it bears against an abutment member which is welded thereto, and the pushing load is all borne by said jack. This is a strain on the hydraulic mechanism, and when the ram is in its extended position the transverse thrust thereagainst causes a jack-knifing effect which damages the hydraulic fluid seals between said members and may permit fluid to escape. Moreover, this jack-knifing effect causes wear and enlargement of the opening in the cylinder through which the ram extends. To remedy this defect of conventional lift trucks, the present truck is provided with a special ram assembly

and handle abutment member which will now be described.

As will best be seen in FIG. 2, the upper end of the hydraulic ram **20** is engaged in a socket **32** which is fixed to the underside of a plate **34**, there being a suitable ram cap **23** and thrust bearings **21** in said socket assembly. Said plate **34** is welded or otherwise rigidly secured to the upper end of the main or lifting fork frame **12**, and the forward end portion of said plate is circular in outline as at **50** (FIG. 3). Rigidly mounted on and projecting upwardly from said plate **34** is a stud **36** having a lubricated bearing **39**, and rotatably mounted thereon is a disc **38** the periphery of which projects a short distance beyond the circular forward end portion **50** of the plate **34**, there being a retaining screw **40** and washer **41** retaining said disc in position.

As is apparent in FIG. 2, the disc member **38** is off center with respect to the vertical axis of the hydraulic cylinder and ram members **18** and **20**, with the result that the forward peripheral edge **38'** of said disc projects forwardly to form an abutment for the handle **14** when the latter is moved to an upright position. Consequently, when the handle **14** impinges against the disc **38** and when force is applied to said handle to propel the truck rearwardly, said force is transmitted through the disc **38** to the plate **34** thereunder, and thence to the rigid main frame **12**, thus eliminating strain on the hydraulic cylinder and ram members.

An important feature of the novel handle abutment device employed in the present invention is that because the disc **38** is circular the handle **14** will engage and bear against its periphery throughout its full steering range, as is illustrated by the broken line positions of said handle in FIG. 3. Moreover, because said disc **38** is rotatably mounted on the bearing **39** as described, when the steering handle **14** is engaged thereagainst and is moved to turn the truck wheels **16**, said disc will turn also, thus eliminating any frictional wear between said handle and disc members and increasing the life of the structure.

From the foregoing detailed description it will be seen that the present invention provides an improved hydraulic lift truck wherein there is less possibility of damage or wear on the hydraulic lifting mechanism than with conventional trucks. With the novel handle impingement structure characterizing the present invention any rearward pushing forces applied to the truck handle are transmitted to the rigid frame, and there is relatively little strain on the hydraulic mechanism.

It is to be understood, of course, that various changes and modifications may be made in the improved hydraulic lift truck above described without departing from the spirit of the invention, and all of such changes or modifications are contemplated as may come within the scope of the following claims.

What I claim is:

1. In a hydraulic lift truck having a lifting frame provided with an upright front member having an upper forwardly-extending portion; a spindle bearing connected to a lower part of said frame in a position spaced below said forwardly-extending lifting frame portion; a vertically-disposed wheeled steering frame having a vertical spindle rotatable in said spindle bearing and having a hydraulic lift cylinder above said spindle bearing and in alignment with said spindle, the upper end of said cylinder having a ram opening; a ram extensibly projecting from said cylinder through said ram opening and having its upper end swivellingly engageable from beneath with said forwardly-extending lifting frame portion; a steering handle pivoted at its lower end to said steering frame above said spindle bearing and close to the lower front of said hydraulic cylinder for movement to and from an upright position toward the upper portion of said hydraulic cylinder; and abutment means on the forwardly-extending lifting frame portion positioned to be engaged by said steering handle to prevent said handle engaging the upper portion of said hydraulic cylinder, thereby preventing jackknifing forces from being exerted against the top of the hydraulic cylinder when the lift truck is being pushed rearwardly by the raised handle.

2. In a hydraulic lift truck having a lifting frame provided with an upright front portion having means at its upper end supporting a downwardly-facing socket, a spindle bearing connected to a lower part of said frame in a position spaced below said socket; a vertically-disposed wheeled steering frame having a vertical spindle rotatable in said spindle bearing and having a hydraulic lift cylinder above said spindle bearing and in alignment with said spindle, the upper end of said cylinder having a ram opening; a ram extensibly projecting from said cylinder through said ram opening and having its upper end swivellingly engageable with said socket; a steering handle pivoted at its lower end to said steering frame above said spindle bearing and close to the lower front of said hydraulic cylinder for movement to and from an upright position toward the upper portion of said hydraulic cylinder; and abutment means rotatably carried by the upright front portion of the lifting frame above said socket and positioned to be engaged by said steering handle to prevent said handle engaging the upper portion of said hydraulic cylinder, thereby preventing jackknifing forces from being exerted against the top of the hydraulic cylinder when the lift truck is being pushed rearwardly by the raised handle.

3. In a hydraulic lift truck having a lifting frame provided with an upright front portion having means at its upper end supporting a downwardly-facing socket, a spindle bearing connected to a lower part of said frame in a position spaced below said socket; a vertically-disposed wheeled steering frame having a vertical spindle rotatable in said spindle bearing and having a hydraulic lift cylinder above said spindle bearing and in alignment with said spindle, the upper end of said cylinder having a ram opening; a ram extensibly projecting from said cylinder through said ram opening and having its upper end swivellingly engageable with said socket; a steering handle pivoted at its lower end to said steering frame above said spindle bearing and close to the lower front of said hydraulic cylinder for movement to and from an upright position toward the upper portion of said hydraulic cylinder; an abutment disc rotatably mounted on said upright front portion of the lifting frame above said socket, said disc having a circular edge projecting forwardly of said hydraulic cylinder and positioned to be engaged by said steering handle to prevent said handle engaging said hydraulic cylinder, thereby preventing jackknifing forces from being exerted against the top of the hydraulic cylinder when the lift truck is being pushed rearwardly by the raised handle, and the rotatable mounting of said disc permitting the same to turn with said upright handle when the latter is moved to turn the truck.

References Cited in the file of this patent

UNITED STATES PATENTS

2,913,062	Ulinski	Nov. 17, 1959
2,993,703	Paradise	July 25, 1961