April 18, 1950 I. F. SCHRECK 2,504,885

ADJUSTABLE COUNTERWEIGHT LIFT TRUCK

Filed March 23, 1948 2 Sheets-Sheet 1

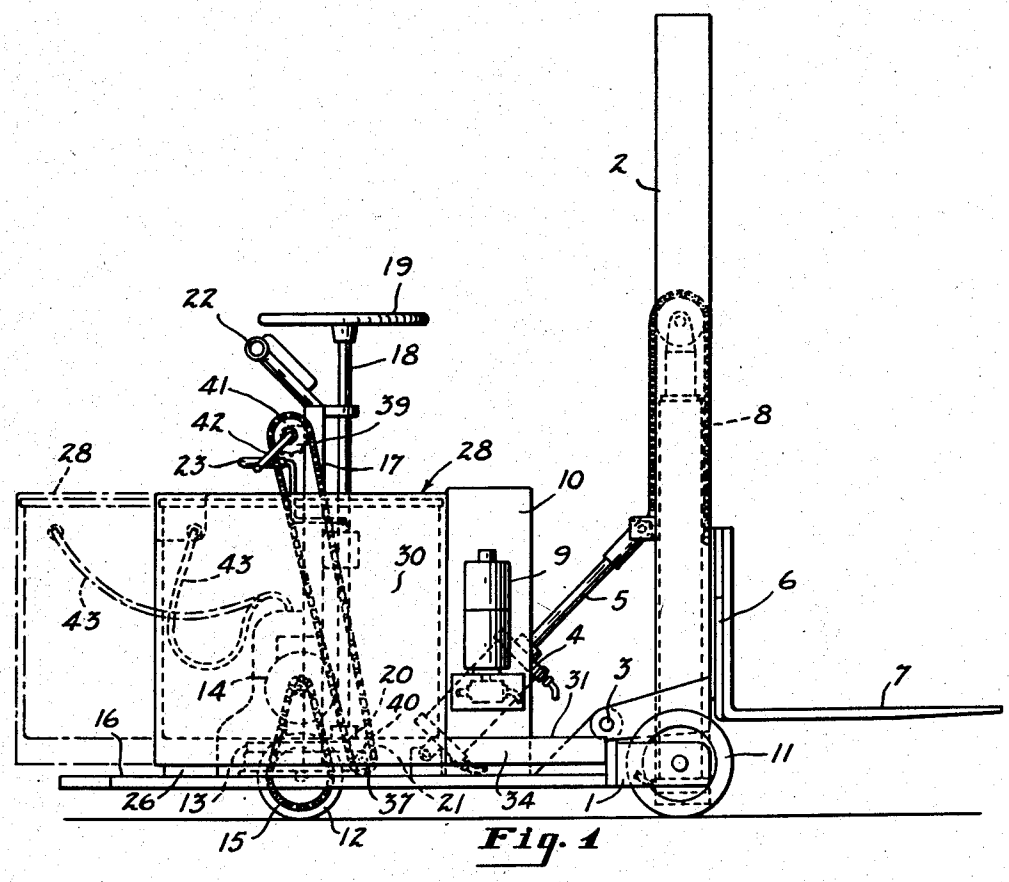


Fig. 1

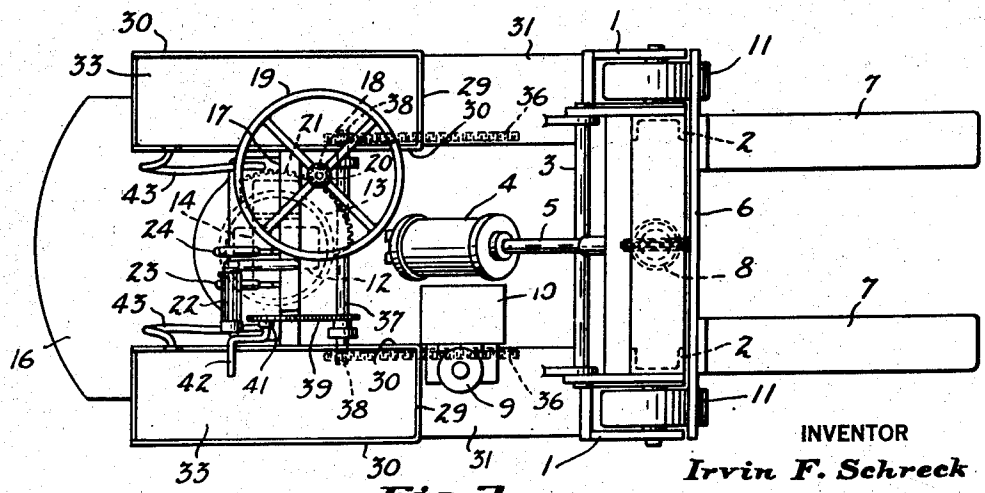


Fig. 2

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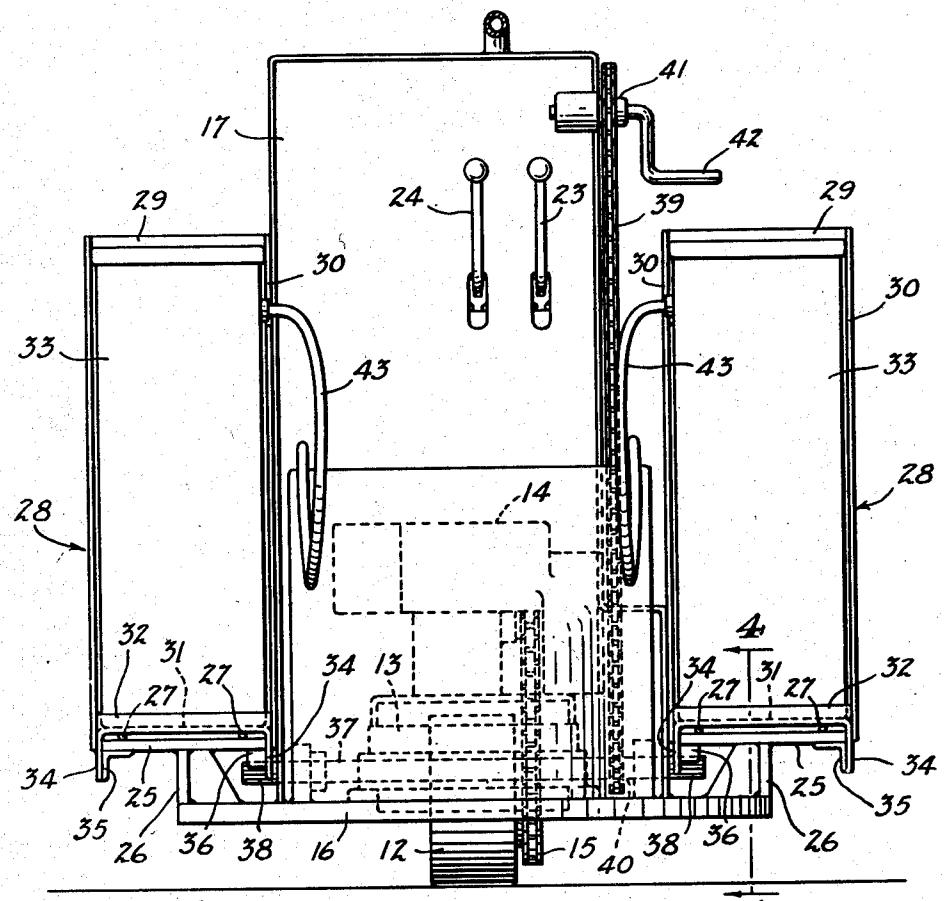


Fig. 3

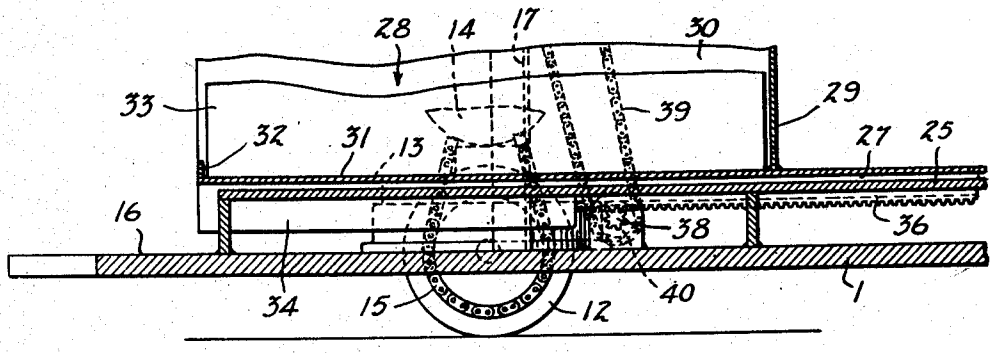


Fig. 4

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ADJUSTABLE COUNTERWEIGHT LIFT TRUCK

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2 Claims. (Cl. 214—113)

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This invention relates to counterbalancing means for lift trucks of the type having a vertically movable load carrier that picks up and supports a load in advance of the front wheels of the truck.

For convenient maneuverability in restricted passages of warehouses and other buildings, it is desirable that the frames of lift trucks of the character referred to be relatively short and when so constructed the trucks are of limited load carrying capacity unless of excessively heavy construction, due to the tendency of the load to overbalance the truck.

It is the object of the present invention to provide means to enable a lift truck to handle heavier loads without increasing the weight thereof and without impairing its maneuverability.

More specifically objects of the invention are to provide the lift truck frame with a rearwardly extensible portion that carries a counterweight so that the load balancing characteristics of the truck may be varied and to employ the batteries that supply current to the truck propelling motor as counterweights.

With the above and other objects in view, the invention may be said to comprise the truck as illustrated in the accompanying drawings, hereinafter described and particularly set forth in the appended claims, together with such variations and modifications thereof as will be apparent to one skilled in the art to which the invention pertains.

Reference should be had to the accompanying drawings forming a part of this specification, in which:

Figure 1 is a side elevation of a truck embodying the invention;

Fig. 2 is a top plan view of the truck;

Fig. 3 is a rear elevation of the truck; and

Fig. 4 is a fragmentary vertical, longitudinal section taken on the line indicated at 4—4 in Fig. 3.

Referring to the accompanying drawings, the present invention is shown applied to a lift truck of a well known type having a frame 1 and a standard 2 connected to the front end portion of the truck frame 1 by a horizontal pivot 3. The standard 2 is movable from its vertical position shown in Fig. 1 to a rearwardly inclined position by means of an inclined hydraulic cylinder 4 that is pivoted to the frame 1 at its lower end and that has a piston 5 pivoted at its upper end to the standard 2. A carriage 6 is mounted for vertical movement on the

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standard 2 and has a forwardly projecting load carrying platform 7 preferably adapted to be inserted under a load supporting pallet to lift the same. The carriage 6 is operated by means of a hoist cylinder 8 mounted on the standard 2 and liquid under pressure is supplied to the cylinders 4 and 8 by a suitable pump 9 from a liquid reservoir 10 mounted on the frame rearwardly of the standard 2.

The frame 1 is supported upon front wheels 11 that are positioned on opposite sides of the standard 2 and upon a rear traction and steering wheel 12 that is mounted in a frame 13 swiveled in the truck frame 1 to turn about a vertical axis. The frame 13 carries an electric motor 14 which drives the wheel 12 through a sprocket chain 15. An operator's platform 16 is provided at the rear end of the frame 1 rearwardly of the swiveled frame 13 and at the front end of this platform there is a vertical panel 17 which provides support for a steering column 18 journaled in bearings carried by the panel and frame 1 and having a steering wheel 19 at its upper end positioned conveniently for operation by an operator standing on the platform 16. The column 18 has a pinion 20 at its lower end that meshes with a large gear 21 on the frame 13 through which the frame 13 is turned about its axis to steer the truck. The panel 17 also provides support for a suitable motor controller 22 of the sleeve type which is also positioned for convenient operation by an operator standing on the platform 16. A pair of levers 23 and 24 are also provided for controlling the delivery of fluid under pressure to the cylinders 4 and 8.

On opposite sides of the swiveled frame 13 the truck frame 1 has longitudinally extending ways formed by horizontally disposed longitudinally extending plates 25 that are supported centrally by members 26 extending longitudinally of the frame. On their upper faces the plates 25 have parallel longitudinal bars 27 attached thereto upon which frame members in the form of battery receptacles 28 are adapted to slide. The battery receptacles have front and side walls 29 and 30 and a flat bottom 31. The rear end of the receptacle is open for insertion or removal of batteries, a cross bar 32 being provided across the rear end above the bottom to provide a stop to retain a battery in the receptacle. The batteries 33 fit within the receptacles 28 and these batteries, which weigh 400 pounds or more apiece, serve as counterweights as well as to supply current to the truck propelling motor.

The battery receptacles are mounted for movement rearwardly to positions in which they project beyond the rear ends of the plates 25 and form an extension of the truck frame. The bottom 31 of each of the battery receptacles is provided with downwardly extending flanges 34 that straddle the plates 25 and the outer flange of each of the receptacles has an angle bar 35 attached thereto that closely underlies the under side of the plate 25. The inner flange of each of the receptacles has a rack bar 36 attached thereto which underlies the plate 25 so that each receptacle has telescopic engagement with its supporting plate 25, the teeth of the rack bar 36 being below the lower edge of the portion of the flange 34 to which it is attached. A cross shaft 37 journaled in the frame 1 is provided with pinions 38 at its opposite ends that mesh with the rack bars 36 and is driven by a sprocket chain 39 through a sprocket 40 on said shaft, the chain 39 being driven by a sprocket 41 adjacent the upper end of the panel 17 which is adapted to be operated by a hand crank 42.

The truck frame with its traction wheel, the propelling motor, the operator and the traction wheel 12 serves to balance normal loads on the platform 7 and prevent tilting of the truck about the axis of the front wheels 11 by loads imposed upon the platform 7. However, when very heavy loads are being handled a greater counterbalancing effort is desirable, and this may be provided by adjusting the portion of the frame carrying batteries rearwardly by operating the crank 42. The telescopic connection between the battery receptacles and the plates 25 permits the battery receptacles to be adjusted rearwardly to extend the truck frame and position the batteries at a considerably greater distance from the front end of the truck to enable a heavy load to be lifted by the carriage without overbalancing the truck. After the load has been elevated and the standard 2 has been tilted rearwardly to load carrying position, less counterbalancing is required and the batteries may be adjusted forwardly if desired to restore the truck frame to its normal length so that the maneuverability of the truck is not impaired while the load is being transported. The batteries 33 are connected to the motor 41 by suitable flexible conductor cables 43 of sufficient length to permit the desired travel of the batteries on the truck frame.

It is to be understood that variations and modifications of the specific devices herein shown and described for purposes of illustration, may

be made without departing from the spirit of the invention.

What I claim is:

1. A lift truck comprising a frame having a standard at its forward end, a load carrying platform extending forwardly from said standard and movable vertically on the standard, supporting wheels at the forward end of the frame, a carrying frame swiveled in said truck frame rearwardly of said front wheels, a traction wheel carried by the swiveled frame, a motor on the swiveled frame for driving said traction wheel, an operator's platform on the truck frame rearwardly of said swiveled frame, longitudinal ways on said truck frame disposed on opposite sides of said swiveled frame, counterweights slidable on said ways, a steering mechanism and a controller for said motor mounted on the truck frame between said counterweights, and means for simultaneously shifting said counterweights forwardly and rearwardly on said ways.

2. A lift truck comprising a frame having a standard at its forward end, a load carrying platform extending forwardly from said standard and movable vertically on the standard, supporting wheels at the forward end of the frame, a carrying frame swiveled in said truck frame rearwardly of said front wheels, a traction wheel carried by the swiveled frame, a motor on the swiveled frame for driving said traction wheel, an operator's platform on the truck frame rearwardly of said swiveled frame, longitudinal ways on said truck frame disposed on opposite sides of said swiveled frame, said ways being in opposite sides of said swiveled frame and extending rearwardly over opposite sides of said operator's platform, batteries for supplying current to said motor slidably mounted on said ways, a steering wheel and a motor controller mounted on the truck frame adjacent said operator's platform and between said batteries, and means for simultaneously shifting said batteries along said ways to vary the load counterbalancing effect thereof.

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