June 21, 1955 W. L. SHIMMON 2,711,227

WEIGHT UNIT FOR FORK LIFT TRUCKS

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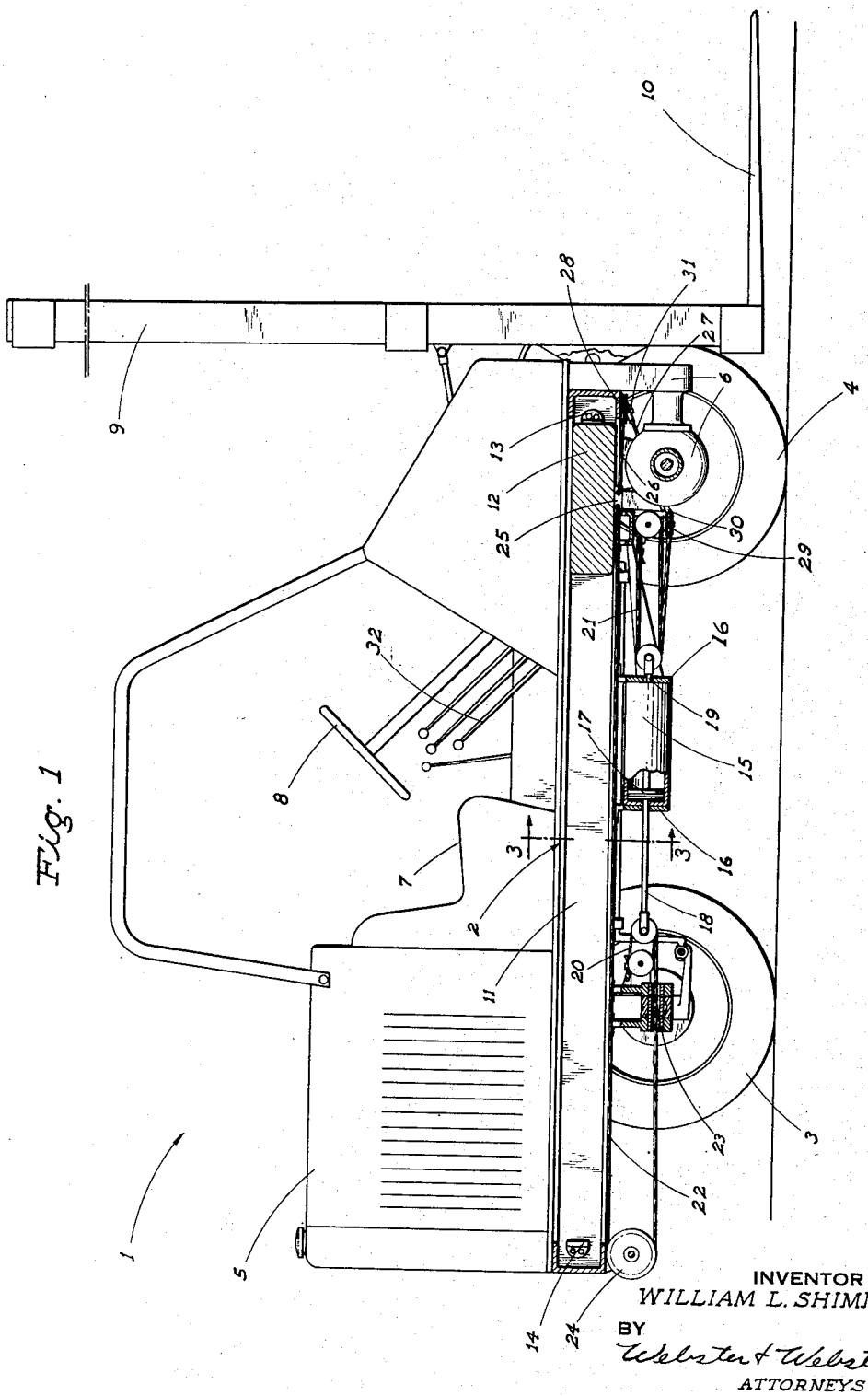


Fig. 1

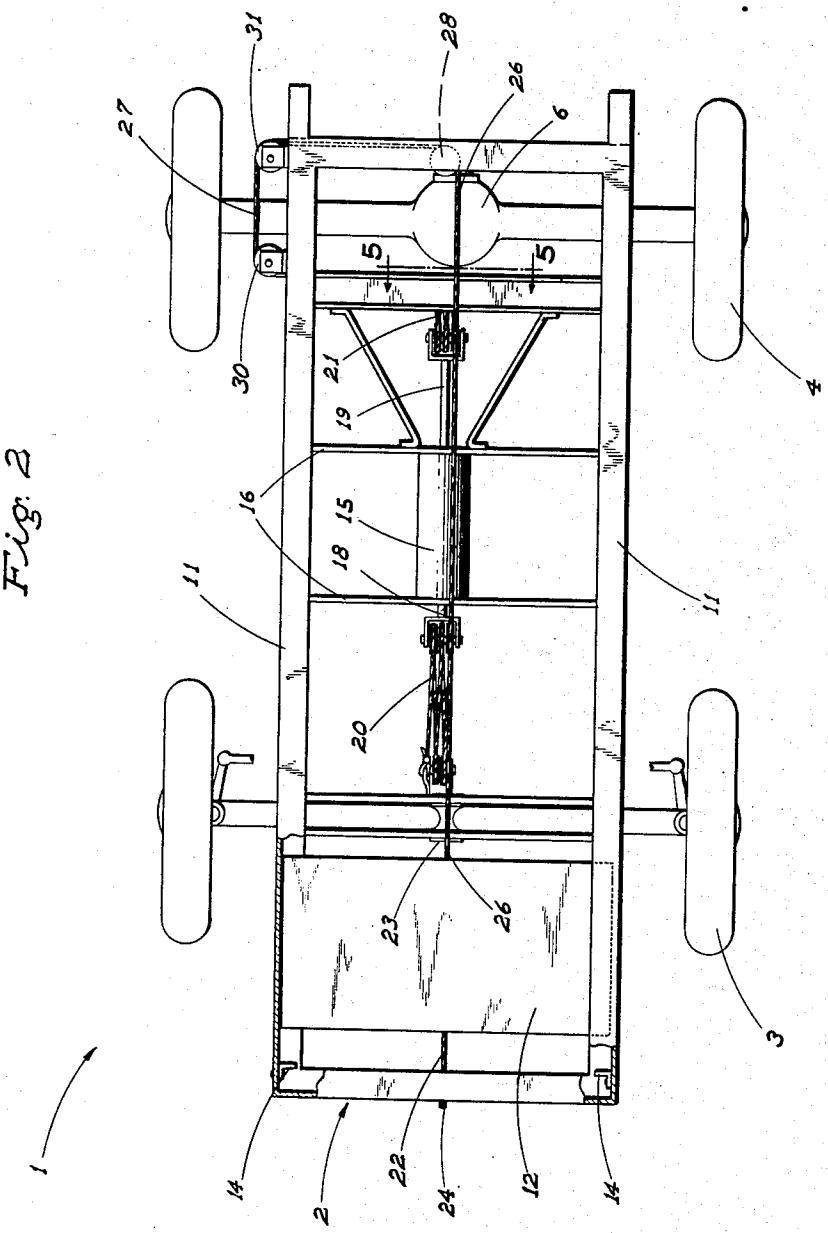
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Fig. 2



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Fig. 3

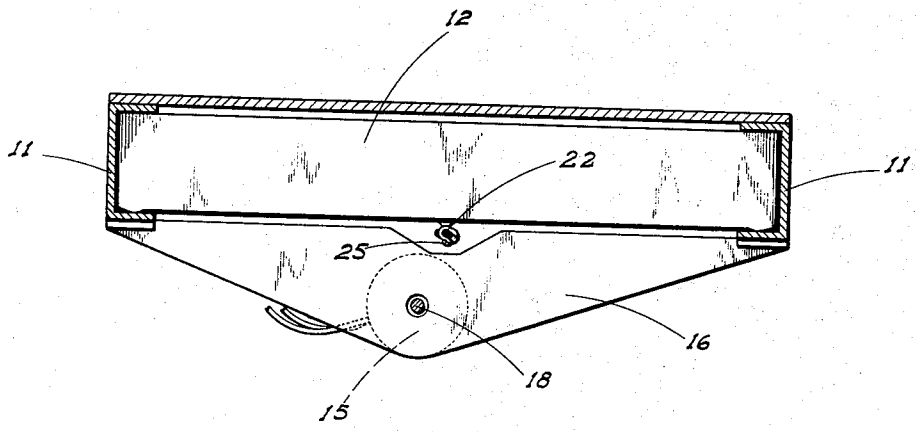


Fig. 4

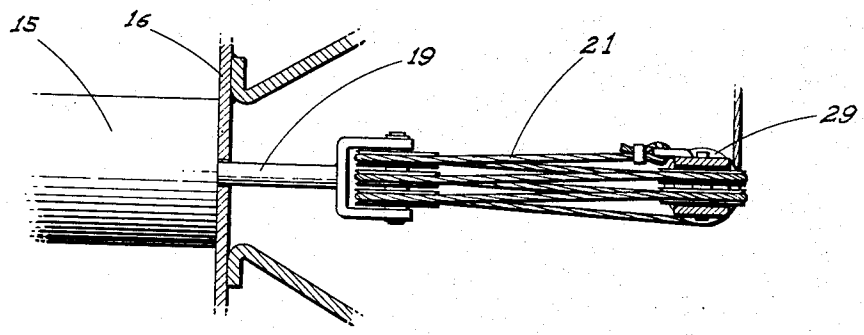
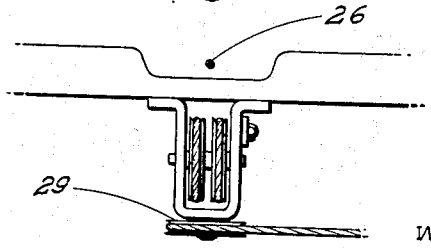


Fig. 5



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WEIGHT UNIT FOR FORK LIFT TRUCKS

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3 Claims. (Cl. 187—9)

The invention is directed to an improvement in fork lift trucks of the type which include a heavy weight conventionally disposed at the rear end of the truck, i. e., opposite the fork lift assembly; the purpose being to counterbalance the load as picked up by the forks.

When there is a load on the forks, the counter-balancing action of the weight at the rear end of the truck is effective. However, when the truck is operated without a load on the forks there is a definite over-weighting at the rear which impairs free steering of the steerable rear wheels, and often causes considerable loss of traction at the driven front wheels.

It is therefore a major object of the present invention to provide a weight unit, for a fork lift truck, which comprises a weight mounted in novel manner on the chassis of the truck for longitudinal shifting motion between a rearward position and a forward position; the arrangement thus being such that the weight can be desirably located at the rear when the forks carry a load and located at the front to increase traction at the driven front wheels and to relieve the weight on the steerable rear wheels when the forks are empty.

Another important object of this invention is to provide a weight unit, as in the preceding paragraph, which is shifted to and fro on the truck by novel power mechanism; which mechanism includes a fluid pressure actuated power cylinder under the control of the operator.

It is also an object of the invention to provide a weight unit for fork lift trucks which is designed for ease and economy of manufacture; convenience of operation; and long service with a minimum of servicing or maintenance required.

Still another object of the invention is to provide a practical and reliable weight unit for fork lift trucks, and one which will be exceedingly effective for the purpose for which it is designed.

These objects are accomplished by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings:

Fig. 1 is a side elevation, partly in section, of a fork lift truck embodying the present invention.

Fig. 2 is a plan view of the truck chassis illustrating the weight unit as mounted thereon.

Fig. 3 is an enlarged fragmentary transverse section on line 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary sectional plan showing the forward block and tackle unit as connected to the power cylinder.

Fig. 5 is an enlarged fragmentary elevation on line 5—5 of Fig. 2; the view looking rearwardly at the forward block of the front block and tackle unit.

Referring now more particularly to the characters of reference on the drawings, the numeral 1 indicates generally the fork lift truck; such truck including a main frame 2 supported by steerable rear wheels 3 and driven front wheels 4. The engine unit 5 is mounted on the rear

of the truck and drives the front wheels 4 through suitable mechanism indicated in part at 6. The truck is operated by a driver from a seat 7 adjacent the steering wheel 8.

As is conventional the truck includes an upstanding fork lift assembly 9 mounted in connection with the front end of the frame 2; such assembly being fitted with forwardly projecting forks 10 for engagement with the load from beneath.

The main frame 2 includes transversely spaced side beams 11 which are of inwardly opening channel configuration, and a heavy metallic block 12 spans between the side beams 11 slidably engaging at the ends therein. As so mounted, the weight block 12 is shiftable between a forward position as in Fig. 1 and a rearward position as in Fig. 2; there being motion limiting stops front and rear as at 13 and 14 respectively.

As working conditions may require, the weight block 12 is shifted between its positions on the frame 2, and this shifting is accomplished by the following power mechanism:

A double ended, double acting power cylinder 15, is disposed beneath the main frame 2 centrally of its sides and intermediate its ends; such cylinder being fixed to the frame by underslung cross members 16.

The power cylinder 15 includes a piston 17 and piston rods 18 and 19 projecting rearwardly and forwardly, respectively, from the cylinder.

The piston rods 18 and 19 are attached at their outer ends to the adjacent ends of a rear block and tackle unit 20 and a front block and tackle unit 21, respectively. At their outer, or free ends, the block and tackle units 20 and 21 are fixed to the frame 2 as shown.

The rear block and tackle unit 20 includes a pull reach 22 which extends rearwardly through a bore 23 in the rear axle pivot and rearwardly thereof said pull reach 22 turns about a sheave 24, thence running forward to connection with the weight block 12 as at 25.

The front block and tackle unit 21 likewise includes a pull reach 26, which reach—after being directed through a lateral course 27 to clear certain working parts—turns about a direction-changing sheave 28 and thence extends rearwardly to the connection 25 on the underside of the weight block 12. The direction-changing pulleys for the lateral course 27 of the pull reach 26 are indicated at 29, 30, and 31.

With the cable system reaved as above described and wherein one block and tackle unit 20 is extended while the other is contracted, the power cylinder 15 is operative to shift the weight block 12 between its forward position and rearward position on the main frame 2. The power cylinder 15 is reversibly controlled by a valve regulated fluid pressure conduit system (not shown) but wherein the valve is regulated by a hand lever 32 which upstands adjacent the operator's seat 7. It is thus possible for the operator to cause shifting of the weight block 12 to a forward or rearward position selectively, and as working conditions may require.

The block and tackle units 20 and 21 are included for the purpose of imparting substantial travel to the weight block 12 by the power cylinder 15 which has a relatively shorter stroke than said length of travel.

The described weight unit is adaptable to fork lift trucks with a minimum of redesign, and such weight unit, while being exceedingly practical and reliable, requires very little servicing or repair.

From the foregoing description it will be readily seen that there has been produced such a device as will substantially fulfill the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations therefrom may be resorted to as do not

form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described the invention, the following is claimed as new and useful, and upon which Letters Patent are desired:

1. A weight unit for a fork lift truck which includes a frame, wheels supporting the frame adjacent its ends, and a fork lift assembly mounted on one end of the frame; said weight unit comprising a counter-balancing weight, means mounting the weight on the frame for longitudinal shifting motion between positions adjacent said ends of the frame, a longitudinal power cylinder mounted on the frame clear of the path of motion of the weight, said cylinder being double acting and including a double ended piston rod, and a cable system connected between opposite ends of said rod and the weight operative to so shift the latter a relatively great distance upon actuation of said power cylinder through a relatively short stroke-movement of the piston rod.

2. A weight unit for a fork lift truck which includes a frame, wheels supporting the frame adjacent its ends, and a fork lift assembly mounted on one end of the frame; said weight unit comprising a counter-balancing weight, means mounting the weight on the frame for longitudinal shifting motion between positions adjacent said ends of the frame, a longitudinal power cylinder mounted on the frame clear of the path of motion of the weight, said cylinder being double acting and including a double ended piston rod, a separate block and tackle unit disposed lengthwise beyond each end of the cylinder, each unit including a cable anchored at one end relative to said unit and leading at the other end away therefrom as a pull reach, means securing the adjacent blocks of said units to corresponding ends of the piston rod, the other blocks being anchored to the frame, and sheaves on the frame guiding said pull reaches to connection in longitudinally opposed relation to the weight.

3. In combination in a fork-lift truck having a fork lift assembly at one end thereof, a wheel-supported frame for the truck which includes transversely spaced side beams leaving a horizontal unobstructed space therebetween extending for a substantial distance lengthwise of the truck, a weight-forming block extending between and on a level with and supported by said side beams for movement along the same from end to end of said space, and power means on the truck and connected to the weight block to so move said block; said means comprising a cable connected to and extending forwardly from the underside of the weight block, another cable connected to and extending rearwardly from the weight, direction changing sheaves mounted on the frame adjacent its ends and over which the cables pass to direct said cables rearwardly and forwardly respectively, a power cylinder extending lengthwise of and rigid with the frame beams below the same, a piston rod projecting from both ends of the cylinder, and connecting units between the cables and the ends of the piston rod arranged to cause the cables to move a greater distance than the length of the stroke of the piston rod upon reciprocation of the rod so that the weight block may be shifted from end to end of said space with a relatively short piston rod stroke.

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