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A. E. ROWE

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VEHICLE LIFT UNIT FOR DOCKS

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2 SHEETS—SHEET 1

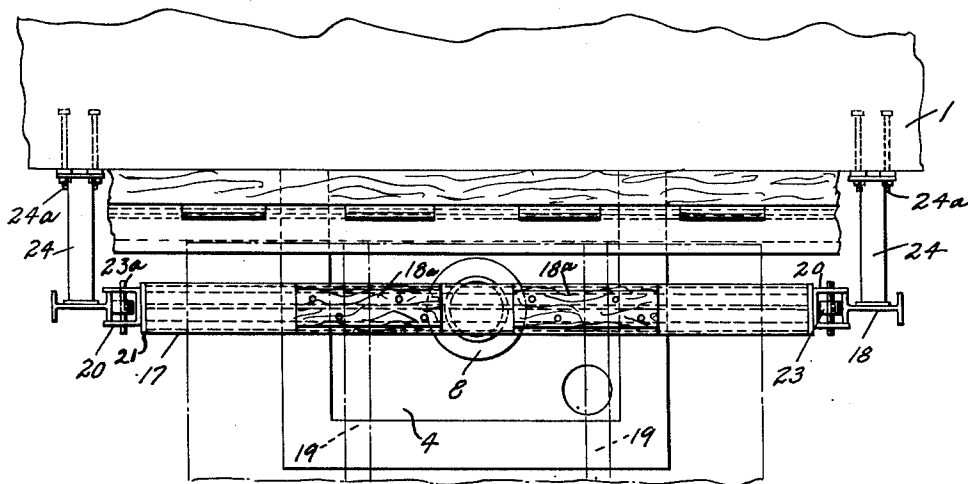


FIG. 1

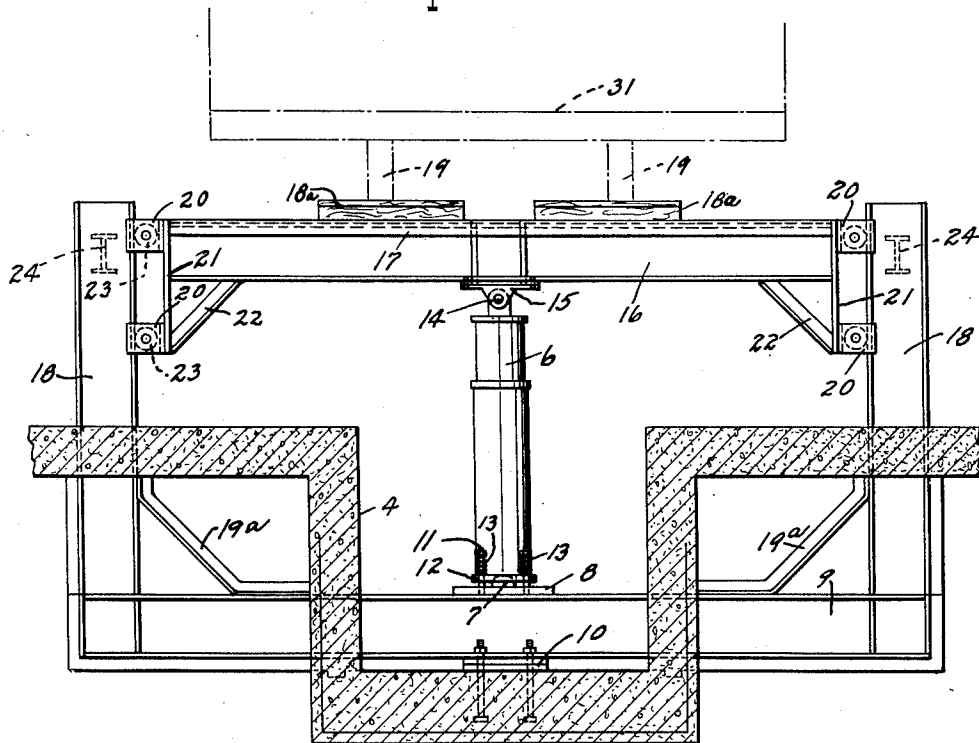


FIG. 2

INVENTOR.

Arthur E. Rowe
BY Robert Robb
Attorney

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2 SHEETS—SHEET 2

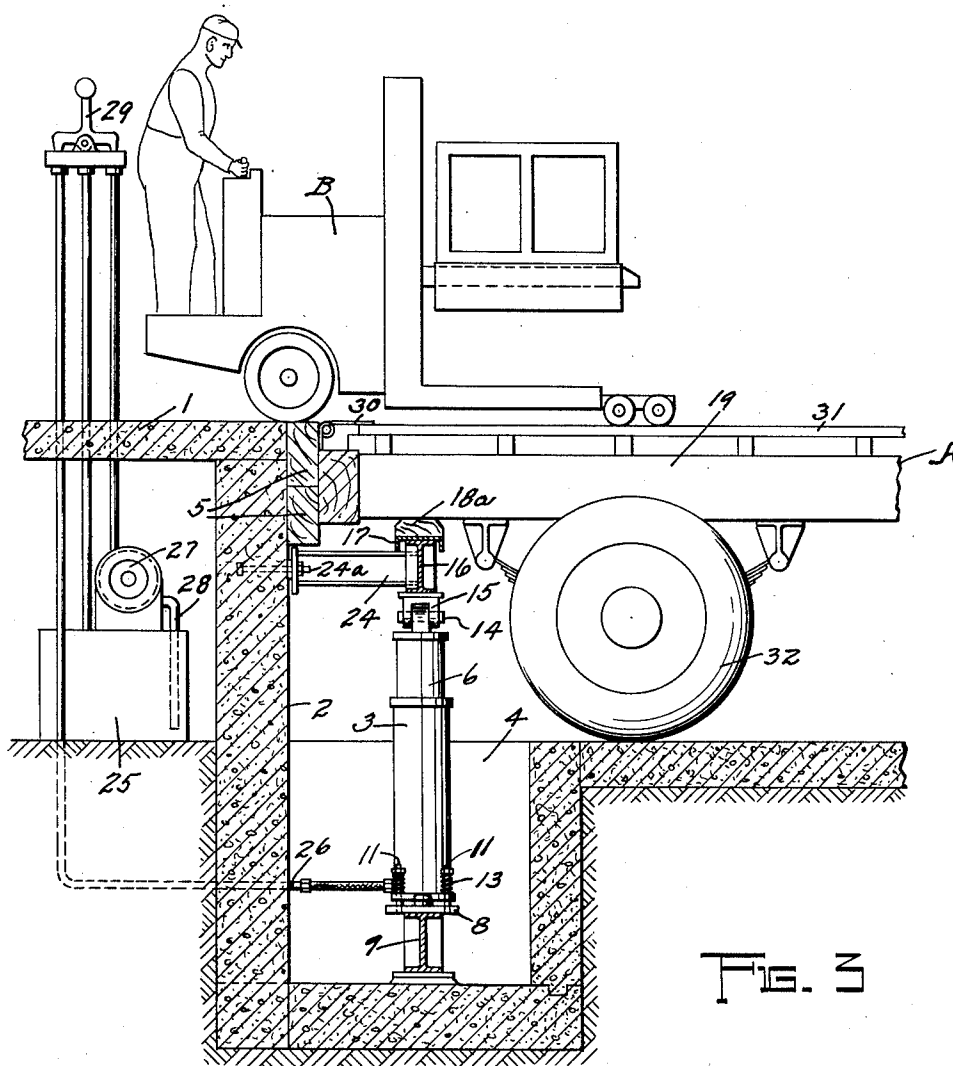


FIG. 3

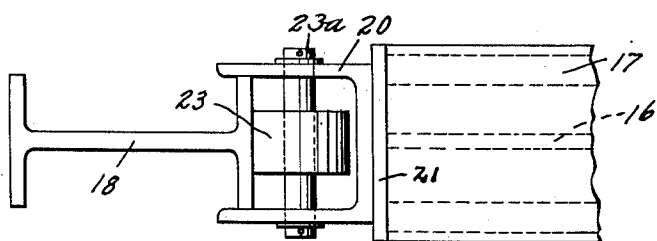


FIG. 4

INVENTOR.
Arthur E. Rowe
BY *Robert Robb*
Attorneys

UNITED STATES PATENT OFFICE

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VEHICLE LIFT UNIT FOR DOCKS

Arthur E. Rowe, Cleveland, Ohio

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1 Claim. (Cl. 214—38)

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My present invention embodies a novel construction of truck lifting unit for use in connection with loading docks such as employed in conjunction with warehouses.

This invention deals with a problem involved in the loading operations and unloading operations of trucks and similar vehicles when the latter are backed up to the dock preliminary to the loading or unloading thereof.

As a general thing, loading docks of the type referred to are built so that the dock is usually approximately six inches higher than the floors of the trucks, trailers, or similar vehicles positioned with their rear ends adjacent to or against the dock. Therefore, it is highly desirable to facilitate the movement of weight by hand truck, power truck, or manual operation in shifting the same to and from the truck, that the floor of each truck, as it is driven up to the dock, shall be positioned substantially at the same level as the surface of the dock.

With the foregoing in mind, I have devised a levelizing unit largely comprising a lift beam adapted to be raised and lowered and located in front of the dock, where the vehicles are backed up to the dock, the lift beam being adapted to be operated by hoisting means in the form of a suitable vertically operating ram, and said beam being adapted to engage the chassis or frame of the vehicle at its rear end so as to raise the body of the vehicle the necessary few inches for bringing the floor of the vehicle at the rear end thereof to a point substantially opposite and on the same level as the dock surface.

My invention further involves a novel construction of lifting unit of the class described embodying special provisions for guiding the lift beam in its vertical movement, upwardly or downwardly, the upward movement of course to raise the vehicle body at the rear end and the lowering movement for disengaging the lift beam from the body and restoring the weight of the latter and its contents, if loaded, to the rear truck and wheels of the vehicle.

My invention further involves a novel general mounting for the hydraulic or other fluid pressure type ram that comprises the hoist unit employed in conjunction with my invention.

With the foregoing special objects in view, a full understanding of my invention and the merits thereof in practical use will be had by referring to the following detail description, in conjunction with the accompanying drawings, in which:

Figure 1 is a fragmentary plan view of the loading side of a loading dock of conventional

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type, the lifting unit of my invention being shown properly mounted in relation thereto, said unit including the pressurized ram or hoist disposed in a special pit which is provided outwardly of the said side of the dock. In this view certain dotted lines indicate the chassis of the vehicle and other dotted lines indicate the body of the vehicle broken away.

Figure 2 is a vertical sectional view taken through the hoist unit pit transversely of the view of Figure 1 and illustrating the hoisting means of the invention and various supporting features in elevation; also illustrating in dotted lines the chassis and floor and side walls of a truck which has been backed up to the dock and is ready to be elevated or lowered by means of the ram forming a part of the hoist means.

Figure 3 is a sectional view, similar to Figure 2, but taken transverse to the latter view, illustrating a vehicle backed up to the loading dock, and the floor of which vehicle has been raised to a position level substantially with the surface of the dock, a power operated truck being shown as working for carrying freight from the dock onto the floor of the truck. In this view the lift beam is shown supporting the rear end of the truck by engagement with the rear portion of the chassis and the load of the truck body and any freight on the truck body floor is under the condition of the illustration, carried by the lift beam.

Figure 4 is a detail plan view, partially broken away, bringing out more clearly the construction of the guide means intermediate each end of the lift beam and the vertical guides that are located at opposite ends of said beam, said guide means including certain guiding and thrust rollers carried by the beam ends.

Referring to the drawings, the loading dock is designated at 1 and the outer wall of said dock is designated 2 and has the pressure hoist unit 3 located adjacent thereto and largely mounted in a pit 4, one of which would be provided near each loading section or unloading section of the dock 1. The dock 1 has a truck platform extending therefrom on the side of the pit 4 opposite that at which the dock is located. Suitable reinforced concrete construction may be employed for the purpose of the dock erection and the pit construction, along conventional lines. The dock 1 will usually be provided with the buffer timbers 5, as quite common, for engaging the chassis of the vehicle as the latter is backed to the dock for loading or unloading operation. The hoist means, previously referred to

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as part of my invention, includes the ram 3 which comprises a cylinder having the vertically movable piston section 6 mounted therein, the cylinder 3 being supported by a rocker bearing 7 between its lower end, and a bearing plate 8. The plate 8 is suitably fixed in any substantial manner, as by welding, to a horizontal I-beam 9 carried by bolted in place plates 10 on the bottom of the pit 4. Bolts 11 are fixed at their lower ends to the plate 8 and pass through openings in a plate 12 attached to the lower end of the cylinder 3, said bolts 11 having nuts screwed on their upper ends and engaging the upper ends of coil springs 13 interposed between the plate 12 and the said nuts. The parts 8, 12, 11, and 13, therefore, afford a sort of resilient mounting for the cylinder 3 connecting the latter with the rocker bearing 7 previously referred to.

The piston member 6 of the pressure unit mentioned has a pivotal connection 14 at its upper end with a bracket member 15 affixed to the under side of the lift beam 16 at the middle portion of the latter. The lift beam 16 is largely an I-beam, on the top of which may be welded or secured a U-shaped and somewhat wider plate 17 upon which may be disposed the wooden blocks 18 intended to be interposed between the sides of the chassis 19 of the truck, at the rear ends of said sides, and the lift beam 16. The blocks 18a are preferably used to prevent any mutilation of the plate 17 or the chassis metal side members, and are fixed to the beam 16 by bolts.

Since the beam 16 has a sort of pivotal floating mounting on the ram 3—6, it is necessary and desired to provide special means for guiding the beam 16 during its vertical movement. With this end in mind, I provide at the ends of the beam 16, and spaced some distance from such ends, the vertical guide members 13 which, as seen in Figure 1, are virtually I-beams, and these beams are rigidly attached at their lower ends to the base beam 9 which supports the hoisting unit 3—6. The guide beams 13 will preferably be connected by braces 18a between their inner sides and the upper flange of the beam 9 for rigidifying the whole combination beam structure composed of the parts 9 and 13.

On each end of the lift beam 16 I provide two vertically spaced guide brackets 20 which are largely of U-form as seen in Figure 4, the inner sides of the brackets being rigidly attached to the ends of the beam 16 by means of vertical plates 21 secured to such ends, and also by means of the diagonal braces 22 connecting the lower ends of the plates 21 with the under side of the beam 16. In each of the brackets 20 or between the sides thereof there are interposed the rollers 23, one for each bracket, said rollers being carried by suitable axis shafts 23a. The sides of each bracket 20 near their free ends, straddle or engage the opposite edges of the inner vertical flange of the associated vertical guide member 13, so that during the up and down movement of the lift means 16 the latter is guided by the action of the brackets 20 working on the beams or guide members 13, and guiding movement is facilitated by the employment of the guiding and thrust rollers 23 which are adapted to engage at their periphery the inner side of the adjacent guide member 13.

For stabilizing the guide members 13 in their vertical positions as seen in Figure 2, there may be provided the horizontal arms 24 made from I-beam members, said arms attached at their inner ends by suitable anchorage bolts 24a to the side 2 of the dock 1, and the outer ends of

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the arms being welded or otherwise attached to the sides of the guide members 13 adjacent to the dock.

The means for pressurizing and releasing the pressure in conjunction with the ram 3—6 may be conventional, and I have illustrated a suitable pressure reservoir 25 connected by a pipe 26 which leads to the bottom of the cylinder 3 as a part of such means. The pressure medium in the reservoir 25 may be put under pressure by means of a pump 27 connected by conduit 28 to the reservoir and the whole pressurizing unit may be under the control of a hand valve 29 located at a convenient point on the dock 1.

Carried by the upper one of the bumper members 5 is a hinged bridge plate 30 which is pivoted to the said member 5 and is adapted to fold or pivot outwardly to a position in which its free edge portion will rest upon the floor 31 of the vehicle backed up to the dock.

The operation of my invention will be quite apparent upon reference to the foregoing description. It will be seen that when the truck generally indicated at A is backed against the side 2 of the dock the rear end of the frame or chassis of the truck or other vehicle, as the case may be, will be located above the lift means 16, the latter being in a lowered position assumed by release of pressure in the cylinder 3 of the ram or hoist unit. At this time, or later, the bridge plate 30 may be thrown inwardly to lie upon the bumper member 5 primarily. The ram 3—6 is now ready to be operated, so that a pressure medium is supplied thereto and the beam 16 is lifted, causing the blocks 18a to engage the chassis side members 19 and raise the floor of the truck A to a level substantially corresponding with the level of the upper surface of the dock 1. The bridge plate 30 will then be thrown over to its outward position to overlap the floor of the truck at the rear open end thereof, and the truck is now ready to be loaded or unloaded as desired. In Figure 3 there is shown a conventional type of motor lift truck 3 in the operation of transferring a load of freight from the dock to the floor 31 of the vehicle A. As illustrated in Figure 3, the load of the rear end of the vehicle has been taken upon the lift beam 16 and off the wheels 32 of the truck which may remain upon the pavement incidental to the resiliency of the spring mounting for said wheels. If one side of the truck chassis is slightly lower or higher than the other, when the lift means 16 engages the side members 19 the load of the body of the truck and any contained freight will be leveled transversely without racking or adversely straining the structure by reason of the relatively simple pivotal mounting of the beam 16 and the guiding connection between the ends of the said beam and the vertical guide members 13.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

A truck frame lifting device of the class described comprising a substantially U-shaped frame, including spaced vertical guide members, and a transverse member, a lift beam extending between said guide members, guide means on said beam engaging said guide members, and a lift unit intermediate the transverse member aforesaid and the lift beam, said lift unit comprising an hydraulic ram, said ram being pivotally connected with the lift beam intermediate its ends, and connected with said transverse member by re-

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silent means for limiting tilting movement of
said ram.

ARTHUR E. ROWE.

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