May 10, 1927. 1,628,389

C. E. COCHRAN

INDUSTRIAL TRUCK

Filed Sept. 20, 1924 3 Sheets-Sheet 1

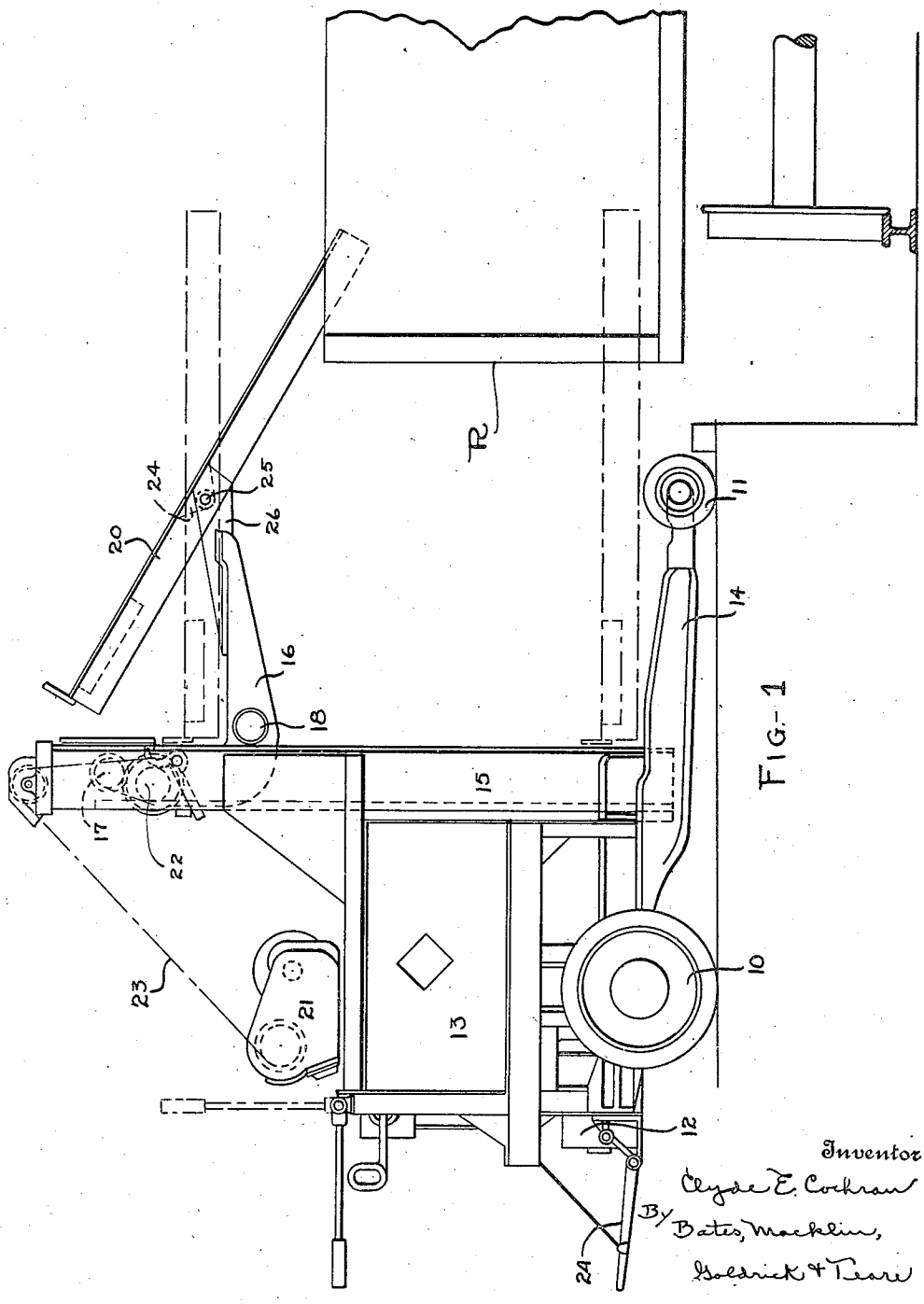


FIG. 1

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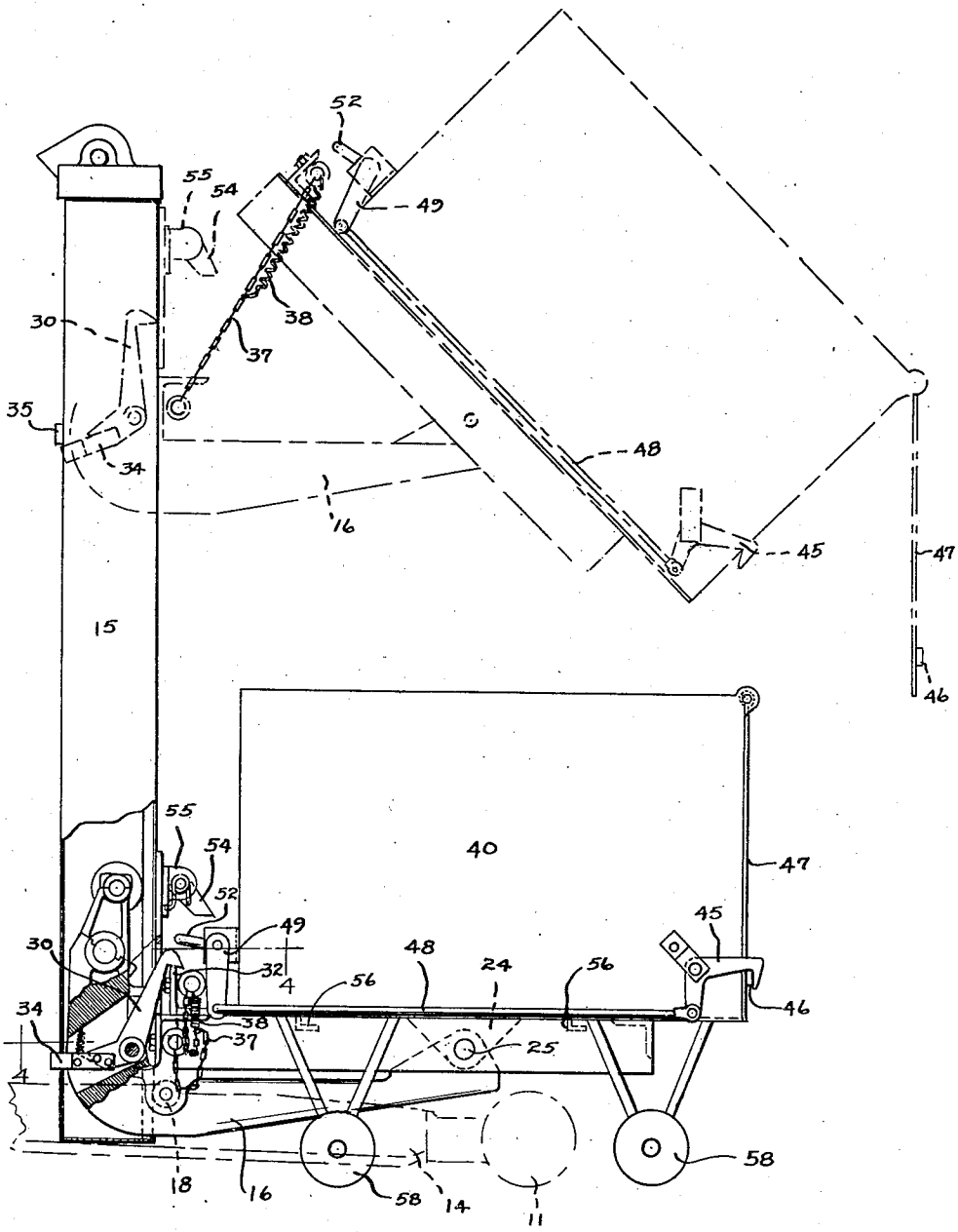


FIG.- 2

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Filed Sept. 20, 1924 3 Sheets-Sheet 3

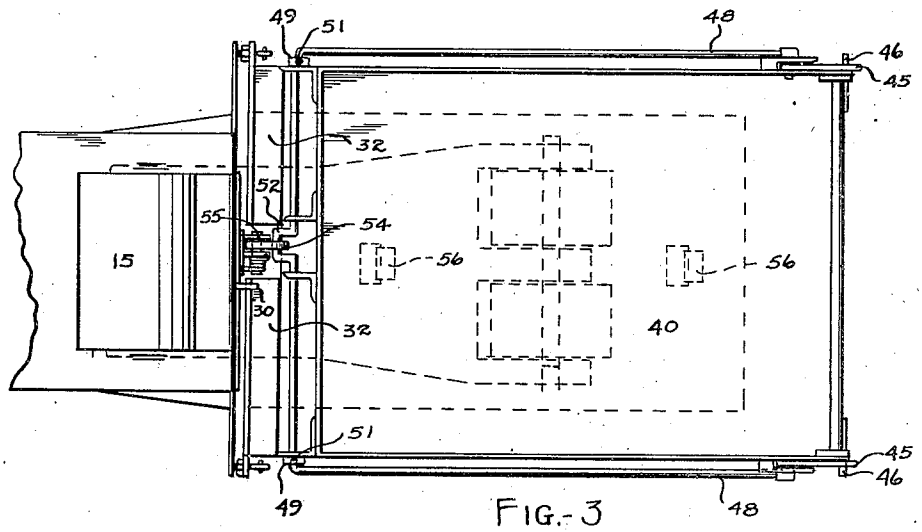


FIG.-3

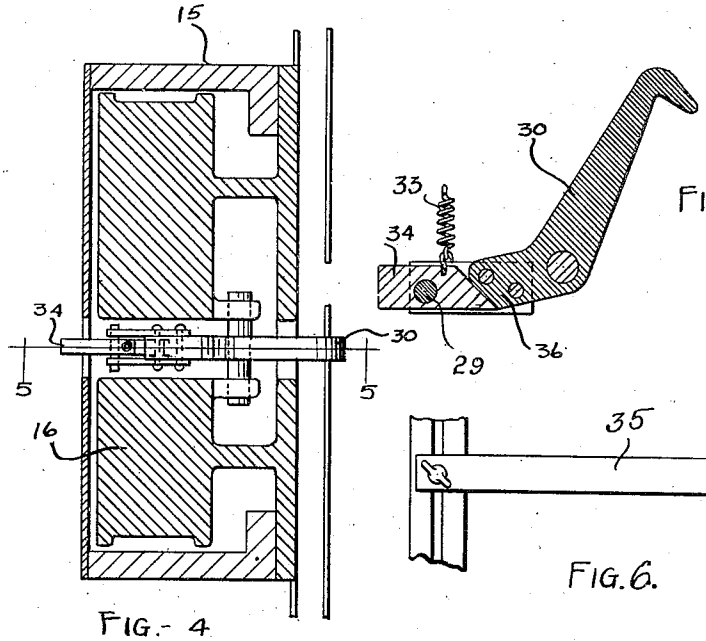


FIG.-4

FIG.-5

FIG.6.

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UNITED STATES PATENT OFFICE.

CLYDE E. COCHRAN, OF CLEVELAND, OHIO, ASSIGNOR TO THE ELWELL-PARKER ELECTRIC COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

INDUSTRIAL TRUCK.

Application filed September 20, 1924. Serial No. 738,339.

The invention is concerned with industrial trucks and particularly that type of truck equipped with a load elevating platform.

The general object of my invention is to provide an industrial truck adaptable to the automatic loading and unloading of various objects including fungible material, in an economical and expeditious manner. When transporting fungible material such as crushed stone, sand, etc., carried in portable bins, my object is to provide a truck which will engage, transport, elevate, and then unload the bins by a dumping action, while the bins remain on the truck.

A more specific object of my invention is the provision of an attachment for industrial trucks of the load elevating type which is adapted to engage dumping bodies containing the material to be handled and to elevate the body and its contained load, while maintaining it in a horizontal position, to a considerable predetermined height, whereupon the load elevating platform and removable body are automatically dumped while the body remains upon the platform.

Other objects of my invention will hereinafter be set forth in the following description referring to the accompanying drawings, illustrating a preferred form thereof. The essential characteristics are summarized in the claims.

In the drawings, Fig. 1 is a side elevation of an industrial truck equipped with my novel load elevating and dumping mechanism; Fig. 2 is an enlarged elevational view of the rear portion of the truck and the load elevating mechanism thereof; Fig. 3 is a plan view of the load elevating mechanism; Fig. 4 is an enlarged cross sectional view taken substantially along the lines 4—4 of Fig. 2; and Fig. 5 is a cross sectional detail taken along the lines 5—5 of Fig. 4 and Fig. 6 is a fragmentary detail showing an adjustable tipping means.

My invention when adapted to the transporting of fungible materials, contemplates the use of a plurality of removable dumping bodies which may be supported on casters, or otherwise supported with the bottoms thereof at a sufficient elevation to permit the engaging of the bottoms of the bodies by the load elevating platform of an industrial truck, whereby a loaded body may be positioned on the truck, transported to some remote station and by equipping the load elevating truck with my novel mechanism to elevate the load and automatically dump it from the body while the body is retained on the truck.

My novel dumping mechanism is illustrated in the drawings as being adapted to use on a tier lift truck such as I have described and claimed in Patent No. 1,541,029 issued June 9, 1925, to the Elwell-Parker Electric Company of Cleveland, Ohio, which company is also the assignee of this present application, on an industrial truck. In general, such a truck comprises a motor and battery carrying frame which is elevated at the back and low slung at the front whereby a load elevating platform may be lowered close to the ground and an upright frame interposed intermediate the ends of the truck frame for supporting the load elevating mechanism which carries the platform.

As shown in the drawings, the truck has a pair of motor driven wheels 10 at the rear thereof, the wheels 10 being driven by a motor through suitable reduction gearing (not shown) the motor being energized by batteries contained within a housing 13, mounted upon the forward portion of the frame adjacent the midportion of the platform. Front steering wheels 11 of relatively small diameter are controlled by suitable steering mechanism controlled from the rear of the truck. The forward end of the truck has low slung frame members 14 which support an upright frame comprising channel members 15, the channel members, which are suitably braced laterally, form a rigid structure supporting a vertically movable L shaped frame having arms 16. Rollers 17 and 18 are attached to the L frame and ride upon the flanges of the channel members.

The L frame and arms 16 constitute a support for a load receiving platform 20 which is pivotally mounted thereupon, whereby the load platform may be permitted to be tilted by gravity. The frame comprising the arms 16 is actuated vertically by a motor driven winding mechanism represented at 21, cooperating with a winding mechanism 22 mounted upon the arms 16 and a cable 23 extending between the respective winding mechanisms. The winding mechanism is controlled from the operator's position on

the truck, a platform 24 comprising a support for the operator.

The pivotal mounting for the platform 20 is located relative to the load bearing surface of the platform in such position that when the platform is uniformly loaded the center of gravity of the load will lie outside of the pivotal center of the platform. The weight of the load thus has a tendency to tilt the platform and I provide a mechanism which may be automatically tipped at any predetermined elevation for releasing the platform whereby the dump body may be tilted. The swinging movement of the body is utilized for opening a door or end gate in the body.

In Fig. 1, the platform 20 is shown as being of a greater length than the platform supporting the dump body and illustrated in Fig. 2, the platform shown in Fig. 1 being adapted to support and discharge objects without the use of a dump body. The tilting of this platform for unloading purposes however is effected in the same manner for both platforms and the tilting mechanism hereinafter described is adaptable for use with a platform when carrying or not carrying a dump body. As shown in Fig. 1, the platform 20 is provided with brackets 24 on its underside engaging a pivot bar 25 which is supported by brackets 26 mounted upon the outer ends of the arms 16.

The platform may be maintained in a normally horizontal position by any suitable latching means, but I prefer to provide a latching means which may be caused to disengage the platform automatically upon a predetermined elevating movement thereof. In Fig. 2, I show a latch 30 mounted upon a pin 31 carried by the L frame. The latch comprises two members extending beyond the sides of the upright frame structure, the forward end being shaped to engage a cross angle 32 secured to the inner end of the platform 20 to prevent the tilting thereof. The lower end of the latch 30 comprises a latch 34 pivotally mounted at 29 on the latch 30 and positioned to contact with an adjustable trip member 35 mounted upon the upright frame. The latch 34 has the inner end thereof beveled to engage the end 36 of the latch 30 to cause the upper end of the latch 30 to shift inwardly and thus release platform. The inner end of the latch 34 is provided with a tension spring 33 whereby it is normally caused to abut the tapered end 36 of the latch 30. Thus the latches 34 and 30 act in unison upon an upward movement of the arms 16, but the latch 34 may be actuated by contacting with the top of the bar 35 upon downward movement of the arms 16.

The tilting movement of the platform 20 may be limited by any suitable means such as chains 37 secured to the arms 16 and to the inner ends of the platform. Tension springs 38, connected to the chains, serve to eliminate the shock to the mechanism consequent to the release of the platform when carrying a heavy load.

In Fig. 2, I show a short platform 20 engaging a dumping body or crate 40. The tripping mechanism, as stated, comprises a bar 35 adjustably mounted to the upright frame 15, whereby the platform may be released at any desired elevation, whence a dump body provided with an end gate, when once positioned upon the platform 20, may be automatically dumped consequent to its elevation by the platform.

The means for maintaining the dump body closed may comprise bell cranked latches 45 preferably mounted upon the sides of the dump body, and lugs 46 positioned adjacent the lower end of a horizontally pivoted gate 47 of the dump body. Bars 48 extend from the bell cranked latches 45 rearwardly to links 49, the links 49 being rigidly attached to the ends of a trip bar 50 extending transversely at the rear of the dump body and supported by brackets 51 attached to the real wall of the dump body. The trip bar 50 has an offset portion 52 formed midway of its ends which, when the platform 20 tilts is swung into engagement with a yieldable trip latch 54. The latch 54 is supported by a suitable bracket 55 attached to the L frame carrying the arms 16.

As shown in Fig. 2, the dump bodies are preferably provided with casters 58 which support the dump bodies at a sufficient elevation to permit the maneuvering of the truck whereby the platform 20 may be positioned thereunder, this elevation being such that the platform will clear lugs 56 protruding from the bottom of the dump bodies. The lugs are formed to engage the platform in suitable openings whereby the dump body will be retained upon the platform when both are tilted. The operation of the apparatus is as follows:

When it is desired to load solid objects, for example metallic pigs, into a gondola freight car, the load may be placed upon the platform in any suitable manner while the platform is in the lowered dot and dash position shown in Fig. 1, the latch of course being in engagement with the inner end of the platform. The load is then transported to the place of unloading with the platform in a low transportable position. Upon arriving at the side of the railroad car R, the load is elevated by operating the winding mechanisms 21, 22 and cable 23 until the platform is elevated above the side of the freight car. The latch 30 may then be manually tripped or the tripping bar 35 adjusted to desired tripping position whereupon the platform will tilt to the full line position shown in Fig. 1. The load will

then slide therefrom into the freight car, the tilting action of the platform being effected by the unbalanced relation of the load to the platform pivots 25.

When handling fungible material such as sand, crushed stone etc. the material may be first loaded into the dump body 40 in any convenient manner and the truck platform 20 inserted thereunder bringing the lugs 56 on the body into alignment with the openings therefor in the platform surface. The platform 20 may then be elevated a slight amount by operation of the winding mechanism to raise the casters 58 free of the floor. The load then may be transported to the place of destination and the body sufficiently elevated to permit the platform body to swing freely when released, or if the load is being unloaded into a railroad car the platform may first be elevated to sufficient height to clear the top of the car sides when dumping. The upward movement of the arms 16 carries the operating latch 30 into contact with the tripping bar 35, thus causing the latch 30 to be swung free of the platform cross bar 32. The platform will thereupon begin to tilt, bringing the offset portion 52 of the dump body bar 50 into contact with the yieldable latch 54, thus swinging the links 49, through the bars 48. This movement of the links is effective to operate the bell crank latches 45 to release the lugs 46 on the end gate 47. The load will thus flow and be dumped from the body. The truck may then be operated to remove the body from juxtaposition with the railroad car and upon a lowering movement of the arms 16, platform and body, the rear casters 58 will contact with the supporting surface of the truck, thus causing the body and platform to be swung to horizontal position, whereupon the latch 30 will first be shifted inwardly and then shifted outwardly over the bar 32 by the spring 33.

It will be seen that an industrial truck equipped with my novel dumping apparatus may have added utility over the well known uses thereof in that the truck may be used in the ordinary manner for elevating loads without dumping them and when desired it may be used for transporting loads which are to be unloaded by a dumping operation.

Having thus described my invention, I claim:—

1. In an industrial truck of the tier lift type, the combination of an upright frame, load elevating mechanism traversing the frame, a tiltable platform carried by said mechanism, a dump body on the platform, a latching device carried by said load elevating mechanism for preventing a tilting movement of the platform, means to release said latch to permit the platform and dump body to tilt, the dump body having a gate and a latch mechanism carried by the dump body for maintaining the gate in a closed position.

2. In an industrial truck of the tier lift type, the combination of an upright frame, a load elevating mechanism traversing the frame, a tiltable platform carried by said mechanism, a dump body on the platform, a latching device carried by said load elevating mechanism for preventing a tilting movement of the platform, means to release said latch to permit the platform and dump body to tilt, a mechanism acting on the dump body for releasing the load therefrom subsequent to the actuation of said latch.

3. In an industrial truck of the platform elevating type, the combination of a load elevating platform, an elevating frame for pivotally supporting the platform, means carried by the frame for preventing a tilting movement of the platform, stationary means acting on said last named means when the platform is elevated for permitting a tilting movement thereof, a detachable dump body and means for removably securing the dump body to the platform during an elevating movement of the platform.

4. In an industrial truck, a load elevating platform, a vertically movable frame for supporting and elevating the platform, the platform being pivotally mounted upon said frame, a latch mechanism carried by the frame for preventing a tilting movement of the platform, a removable dump body mounted on the platform, and means for releasing an end gate on the dump body during the tilting movement thereof.

5. In combination with an industrial truck, a load elevating platform, said platform being tiltable, means traveling with the platform in its elevating movement for preventing a tilting movement thereof, a removable dump body attached to the platform and means for automatically opening the dump body during the tilting movement of the platform.

6. In an industrial truck of the platform elevating type, the combination of a load elevating platform, means for pivotally supporting the platform while elevating it vertically, a latch mechanism for preventing a tilting movement thereof, a stationary latch tripping means adapted to act on said last named means for releasing the platform when the platform is elevated a predetermined distance, whereby the platform and its load may be permitted to tilt, and a dump body which is automatically locked to the platform when the latter is being tilted.

7. In an industrial truck, a load elevating platform, means for supporting and elevating the platform, the platform being pivotally mounted whereby it may tilt, mechanism for engaging one end of the platform

to prevent the tilting movement thereof, and a removable dump body held in position on the platform during a tilting movement of the platform and means for automatically opening an end gate of the dump body during the tilting movement of the platform.

8. In an industrial truck, a dump body, a vertically movable means for supporting and elevating the dump body while the latter remains in a horizontal position, the dump body being pivotally mounted upon said means, a latch mechanism carried by said means for preventing the tilting movement of the dump body, and means for releasing an end gate on the dump body during a tilting movement thereof.

9. In combination with an industrial truck, a load elevating means in the form of a dump body, said dump body being tiltable, a mechanism for elevating the dump body while it remains in a horizontal position, means traveling with said mechanism in its elevating movement for preventing a tilting movement of the dump body, the dump body being removably attached to said mechanism, and means for automatically opening the dump body during a tilting movement thereof.

10. In an industrial truck of the tier lift type, the combination of a load elevating platform, means for lifting said platform, means for preventing a tilting movement of the platform, means cooperating with said last named means for permitting tilting thereof, and a detachable load receiving body removably secured to said platform.

11. In an industrial truck, a load elevating platform, a vertically movable frame for supporting and elevating the platform, the platform being pivotally mounted upon said frame, a latch mechanism carried by the frame for preventing a tilting movement of the platform, a removable dump body mounted on the platform, and means for releasing an end gate on the dump body during the tilting movement thereof, at a predetermined elevation.

12. In an industrial truck of the tier lift type, the combination of an upright frame mounted on the body of the truck, a load elevating mechanism traversing said upright frame including means for actuating said load elevating mechanism, said means and load elevating mechanism being operative to raise the load vertically, a tiltable platform pivotally mounted to the load elevating mechanism, and a locking mechanism carried by the load elevating mechanism for maintaining the platform normally horizontal whereby the platform may receive a load when the load elevating mechanism is in a lowered position and the truck may transport the load when the load elevating mechanism and platform are in a lowered position, and means for automatically causing the locking mechanism to release the platform when the load elevating mechanism raises the load whereby the load may be dumped from the platform at an elevated position.

In testimony whereof, I hereunto affix my signature.

CLYDE E. COCHRAN.