Nov. 10, 1931. R. T. ROMINE ET AL 1,831,140

INDUSTRIAL TRUCK

Filed June 8. 1927 5 Sheets-Sheet 1

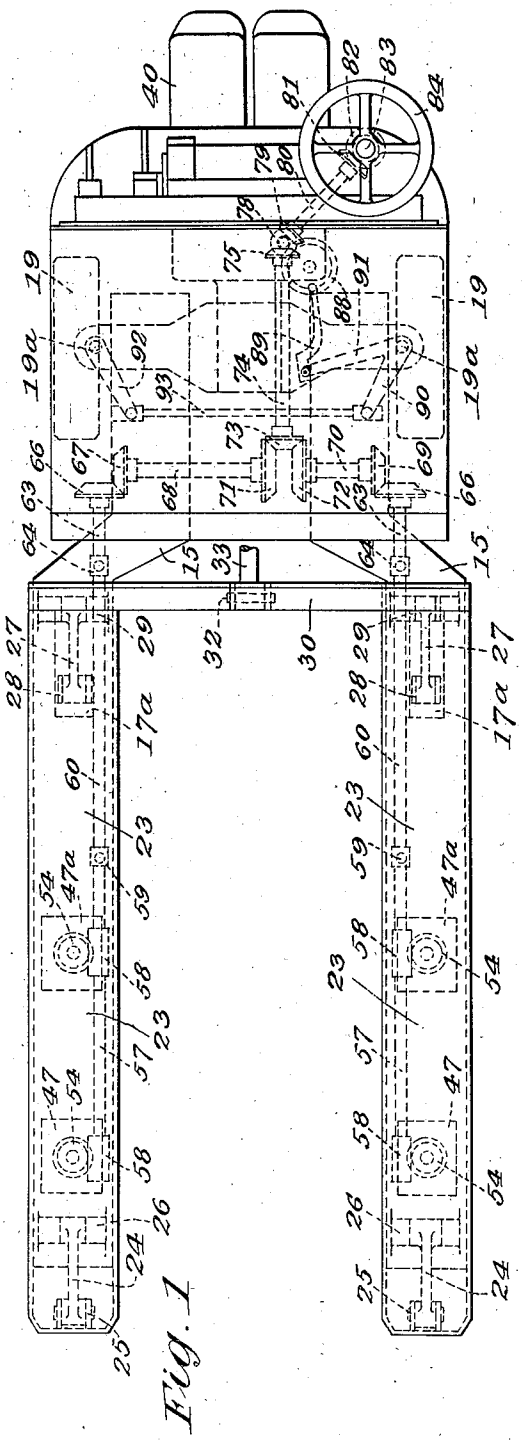


Fig. 1

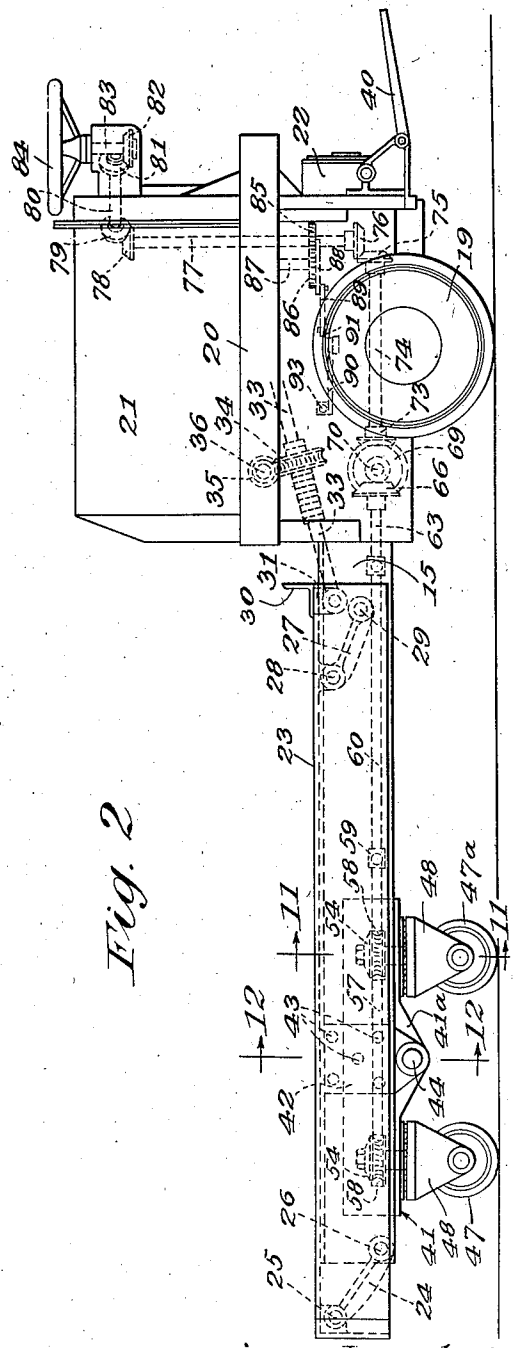


Fig. 2

Inventors:
Robert T. Romine
Jay F. Warren
Ernest W. Systrom

By Macleod, Calver, Copeland & Dike Attorneys.

Nov. 10, 1931. R. T. ROMINE ET AL 1,831,140

INDUSTRIAL TRUCK

Filed June 8. 1927 5 Sheets-Sheet 2

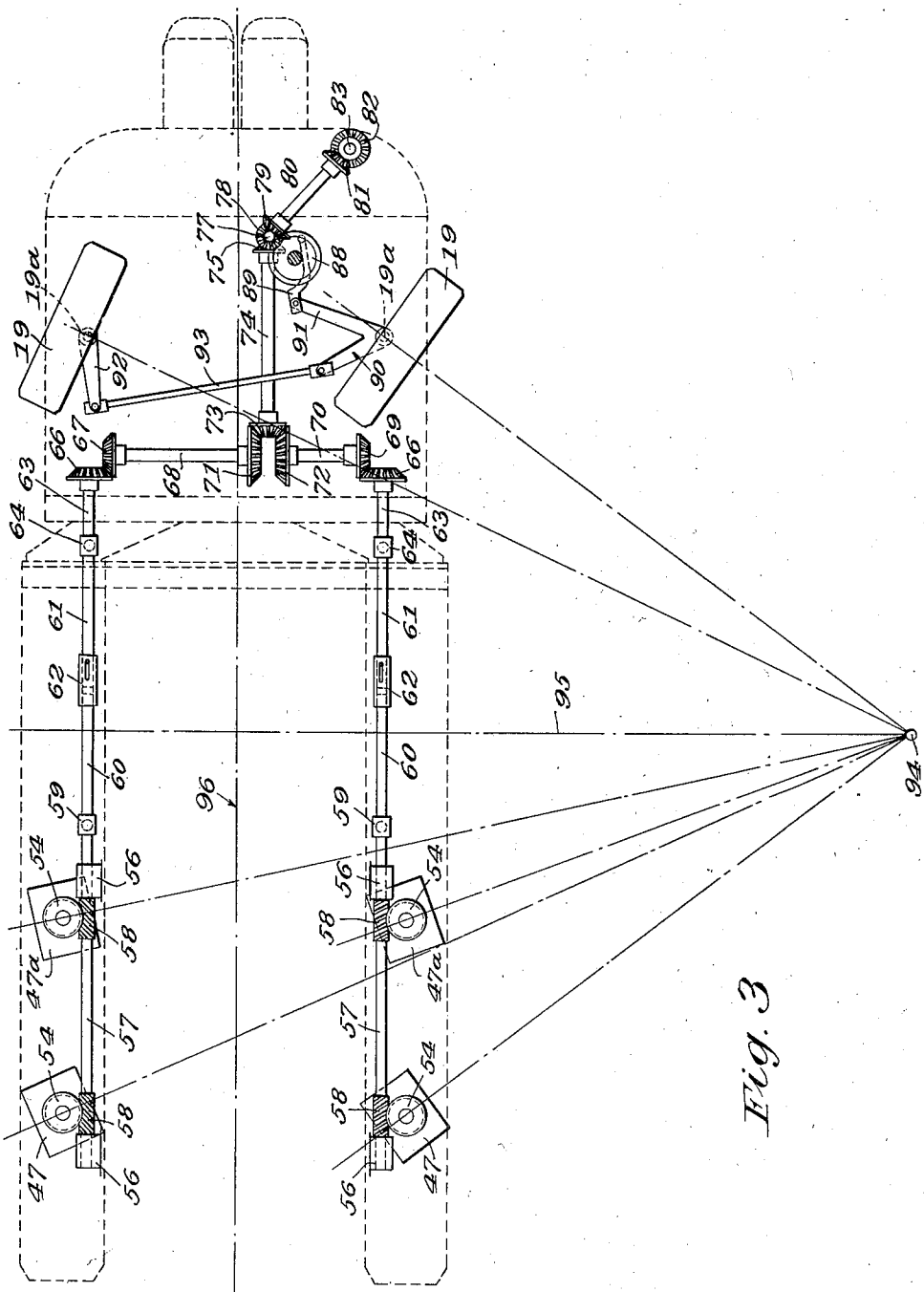


Fig. 3

Inventors:
Robert T. Romine
Jay F. Warren
Ernest W. Systrom

By Macleod, Calver, Copeland & Dike Attorneys.

C4

Nov. 10, 1931. R. T. ROMINE ET AL 1,831,140

INDUSTRIAL TRUCK

Filed June 8. 1927 5 Sheets-Sheet 3

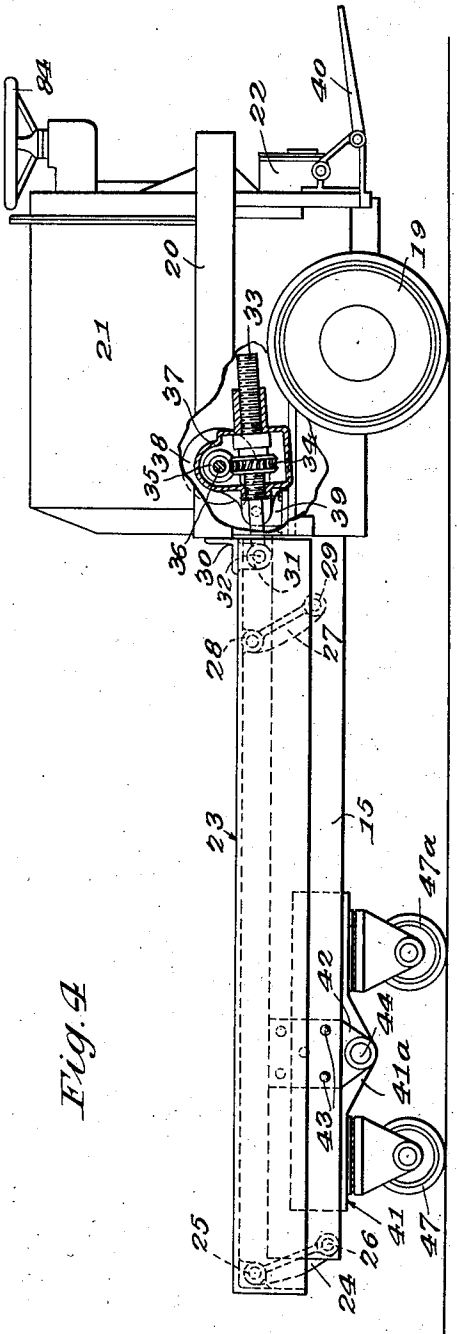


Fig. 4

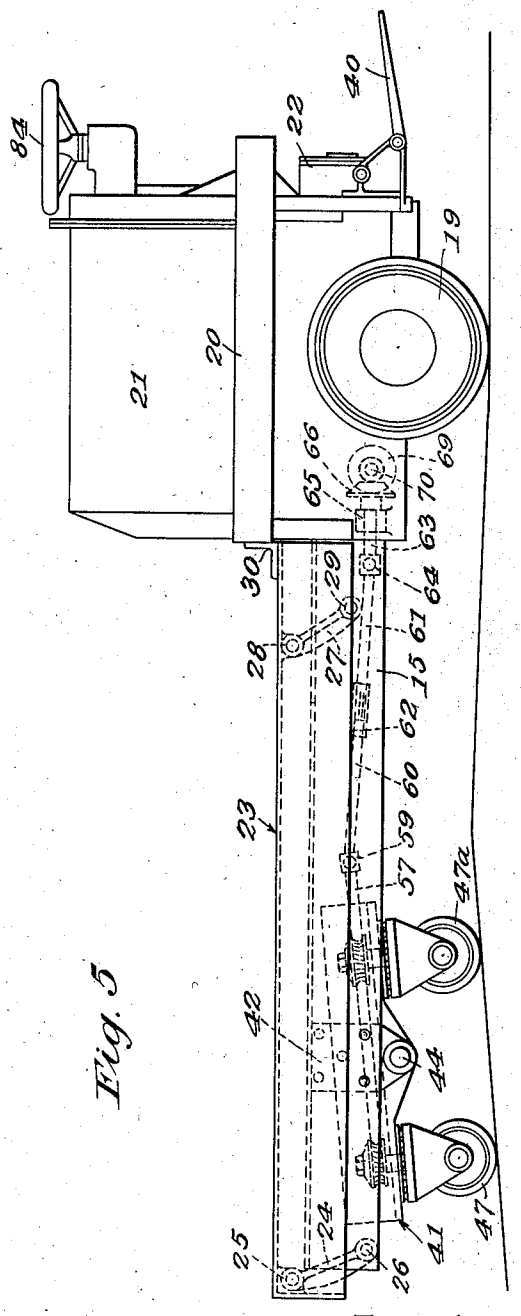


Fig. 5

Inventors:
Robert T. Romine
Jay F. Warren
Ernest W. Systrom

By Macleod, Calvin, Copeland & Dike
Attorneys.

Nov. 10, 1931. R. T. ROMINE ET AL 1,831,140

INDUSTRIAL TRUCK

Filed June 8. 1927 5 Sheets-Sheet 4

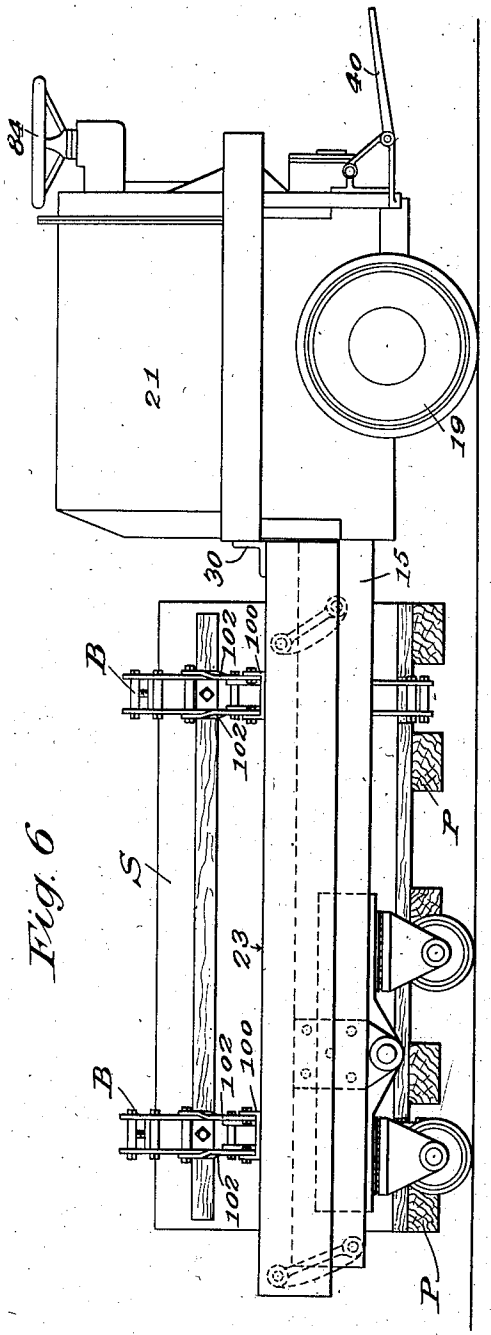


Fig. 6

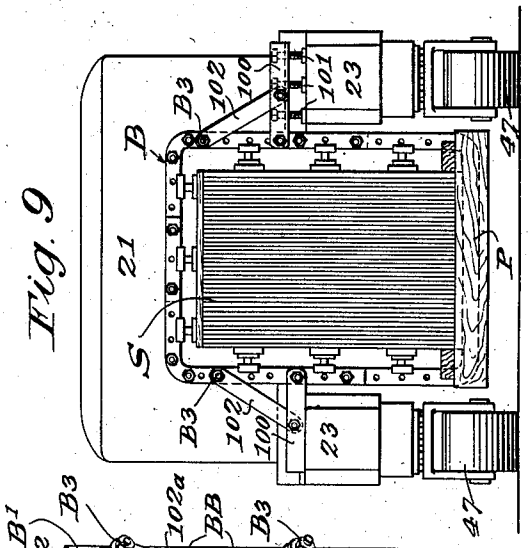


Fig. 9

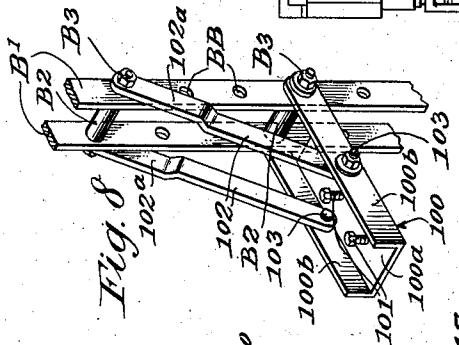


Fig. 8

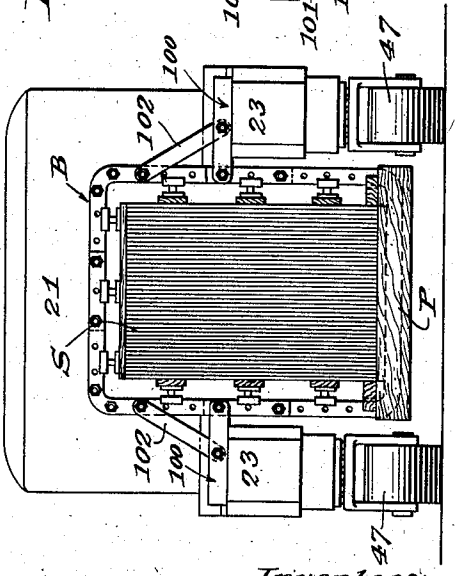


Fig. 7

Inventors:
Robert T. Romine
Jay F. Warren
Ernest W. Systrom

By Macleod, Calver, Copeland & Dike
Attorneys.

Nov. 10, 1931. R. T. ROMINE ET AL 1,831,140

INDUSTRIAL TRUCK

Filed June 8, 1927 5 Sheets-Sheet 5

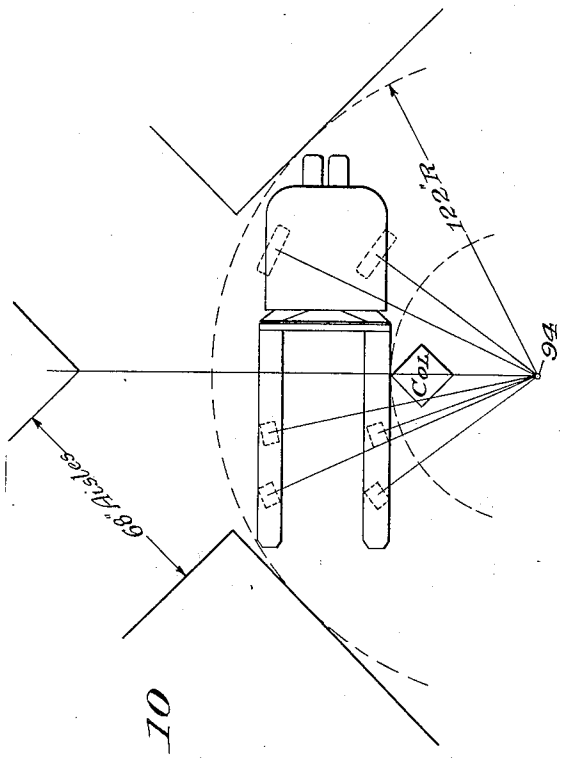


Fig. 10

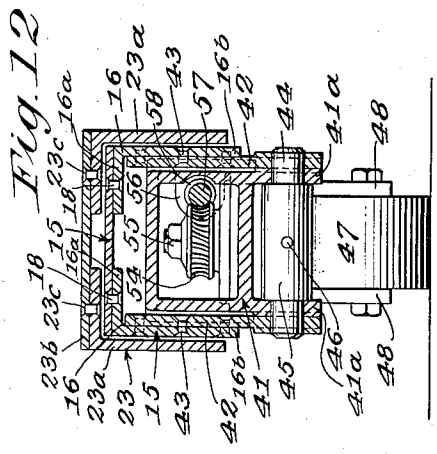


Fig. 12

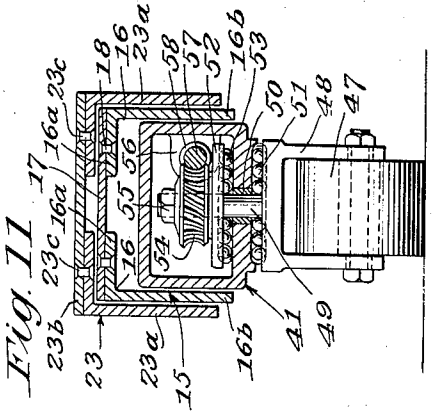


Fig. 11

Inventors:
Robert T. Romine
Jay F. Warren
Ernest W. Systrom

By Macleod, Calvin, Copeland & Dike Attorneys.

Patented Nov. 10, 1931 1,831,140

UNITED STATES PATENT OFFICE

ROBERT T. ROMINE, OF MOUNT CLEMENS, AND JAY F. WARREN AND ERNEST W. SYSTROM, OF DETROIT, MICHIGAN; SAID WARREN AND SAID SYSTROM ASSIGNORS TO SAID ROMINE

INDUSTRIAL TRUCK

Application filed June 8, 1927. Serial No. 197,455.

This invention relates to power driven lift trucks and has for an object the provision of a lift truck having a pair of forwardly projecting low mounted lift or load elevating platforms capable of being moved into position to straddle a load, lift the same and transport it to destination.

Another object of the invention is to provide a truck of the foregoing construction which is capable of lifting and transporting heavy loads, such as five or more tons, and in which the truck is provided with relatively small wide tread wheels beneath the spaced lift platforms capable of distributing the load, such wheels being preferably dirigible whereby the truck may be turned on a relatively short turning radius to permit it to be operated within a freight car or in factory aisles.

A further object is to provide a power driven lift truck having a pair of forwardly projecting relatively narrow lift platforms each supported by means of longitudinally spaced load supporting wheels of small diameter to permit relative vertical articulation beneath the lift platforms, and in which the load wheels are capable of being turned substantially within the area of the lift platforms in order to steer the truck on a short turning radius.

Other objects of the invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In said drawings:

Fig. 1 is a top plan view of the truck of our invention.

Fig. 2 is a side elevation of the truck of Fig. 1.

Fig. 3 is a diagrammatic plan view showing the manner in which the load carrying wheels and driving wheels are steered.

Fig. 4 is a side elevation of our improved truck partly broken away showing the lifting mechanism for the elevating platforms.

Fig. 5 is a view similar to Fig. 4 showing the action of the sub-frame structure when the truck is passing over an uneven surface.

Fig. 6 is a side elevation of our improved truck supporting a load.

Fig. 7 is an end elevation of the construction shown in Fig. 6 looking toward the right.

Fig. 8 is a detail perspective of one of the platform and load engaging devices.

Fig. 9 is a view similar to Fig. 7 illustrating the adjustability of the load lifting devices or dogs.

Fig. 10 is a diagrammatic view illustrating the steering of the truck in the aisles of a factory.

Fig. 11 is a section along the line 11—11 of Fig. 2.

Fig. 12 is a sectional view taken along the line 12—12 of Fig. 2.

Before explaining in detail the present invention, and the method or mode of operation embodied therein, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention beyond the terms of the several claims hereto appended or the requirements of the prior art.

The truck of our invention is particularly applicable to the handling and transporting of relatively heavy unitary packs or bundles, such as metal and especially to the loading of freight cars with such bundles or the unloading thereof. The truck is capable of being propelled into a freight car and turned therein so that the spaced lift platforms of the truck may be introduced at opposite longitudinal sides in order to straddle a pack or unit to be removed from the car, which removal may be accomplished by the truck without the necessity of employing auxiliary means, such for example as a stack lifter or portable crane of the character shown and described in Patent 1,745,046, dated January 28, 1930, in the name of one

of the inventors hereto, for placing the unit in position upon the truck or for removing such unit from the truck and depositing it upon the freight car floor, or elsewhere. In practice, relatively heavy bundles or packs of metal or the like may be loaded into a freight car or unloaded therefrom with a minimum of labor and time.

The present improved truck comprises in general a frame having at its rear end an upright housing for supporting the motors, battery and control mechanism. Beneath this housing are mounted a pair of driving wheels. The frame at its forward end is bifurcated to provide two narrow parallel spaced arms adjacent the ground. A narrow lift platform surmounts each forked frame arm, and the lift platforms are spaced the maximum distance to accommodate loads of varying widths. Beneath each arm of the frame are preferably located a pair of longitudinally spaced load wheels of small diameter and wide tread to distribute the load. These wheels are preferably mounted to turn substantially within the area of the frame arm on independent axes, and are preferably mounted on a sub-frame member to permit relative vertical articulation. A common steering mechanism is provided for turning the load wheels and driving wheels simultaneously about substantially a common turning center.

By virtue of this invention the lift truck is capable of operating over uneven ground while maintaining the lift platforms substantially level, thus minimizing the danger of the load becoming displaced. Furthermore, the load is widely distributed by means of longitudinally spaced, small diameter wheels facilitating steering of the truck and enabling it to be operated safely on factory floors.

Referring to the drawings wherein we have illustrated a present preferred form of our invention, the truck comprises a relatively low chassis or frame bifurcated at its forward end to provide spaced lengthwise extending frame members or arms 15 each of which comprises a pair of spaced structural steel members preferably in the form of angle bars 16 having inwardly extending horizontal flanges 16*a* and depending flanges 16*b*. A longitudinally extending metal plate 17 is mounted upon the flanges 16*a* and secured thereto by means of rivets or the like 18 to connect the bars together. The truck is provided at its rear end with a pair of driving wheels 19 mounted on the chassis. Extending upwardly from the rear end of the chassis 15 is a suitable housing or frame structure designated in general at 20 forming a platform support for a housing or casing 21 within which are carried the batteries for the motor. A motor 22 is supported beneath the battery casing or housing 21 and is connected by mechanism hereinafter described, to the driving wheels 19 for the purpose of driving the same.

A narrow load elevating or lift platform 23 extends forwardly from a point adjacent the housing 21 above each of the frame members or arms 15. Each platform 23 comprises a pair of longitudinally extending angle bars 23*a* having depending flanges and inwardly extending flanges which overlie the plate 17. In order to connect the angle bars 23*a* together and to provide a top surface for each elevating platform, we provide, preferably, a longitudinal metal plate 23*b* which is connected to each flange of the angles 23*a* by means of rivets or the like 23*c*. It will be seen that each lift platform 23 is in the form of an inverted channel shaped structure substantially similar to the lengthwise extending frame members 15. The plates 23*b* of the platforms provide a flat and unobstructed top surface. The platforms are pivotally attached to the frame members 15 at the forward ends thereof by means of links or brackets 24 the ends of which are mounted upon pins 25 and 26 carried by the elevating platforms and frame members, respectively. The rear end of each load elevating platform 23 is connected to its respective frame member by means of a link or bracket 27 connected at opposite ends with the elevating platform and frame member by means of pins 28 and 29. The plate 17 of each frame member 15 is provided adjacent its inner end with a slot or opening 17*a* to permit the link or bracket 27 to project upwardly therethrough when the elevating platform 23 is lifted, as shown in Figs. 4 and 5. In order to allow the pair of platforms 23 to be lifted simultaneously, a transverse angle bar or the like 30 is connected to the rear end of each platform.

Suitable mechanism is provided for raising or elevating the lift platforms 23, which is adapted to be operated by an electric motor 38 positioned within the housing 21. The mechanism comprises, preferably, a bracket 31 carried by the transverse angle 30 to which is pivotally connected by means of a pin 32 a threaded rod or ram 33. Mounted upon the ram is a worm gear 34, the hub of which comprises a nut engaging the threads formed on the rod or ram 33. The worm gear 34 is preferably driven by a worm 35 which is mounted upon the shaft 36 of the electric motor. The motor is electrically connected to one of the batteries within the housing 21 and is adapted to be controlled by suitable mechanism at the rear or operator's end 40 of the truck.

It will be seen that when the rod or ram 33 is retracted or drawn upwardly by operating the electric motor, the elevating platforms will be raised simultaneously from the positions in which they are shown in Figs.

1 and 2 to the position of Figs. 4 and 5. A housing 37 supports the motor 38 and encloses the worm gear 34 and the worm 35. This housing is pivoted upon a bracket 39 to permit swinging movement upon lifting or lowering the load elevating platforms.

The truck is propelled by means of the motor 22 which is operatively connected with the driving wheels 19.

Beneath each of the spaced elevating platforms 23 and connected with the frame sills or arms 15, is a rocking sub-frame 41 which in the present instance is in the form of a casting having a reduced central portion and being open at opposite ends to permit convenient access to the interior thereof. The side walls of each sub-frame member 41 are provided with a depending portion 41*a* (Figs. 2 and 12). Each sub-frame is pivotally mounted beneath one of the fixed frame members or sills 15 and is capable of vertical rocking movement or articulation with respect to the frame member. A pair of brackets or plates 42 are secured at their upper portions to the inner faces of the depending flanges 16*b* by means of rivets or the like 43. The sub-frame member 41 is pivotally connected to the lower ends of the brackets 42 by means of a short rock shaft 44 held in position by means of a sleeve 45 pinned at 46 to the shaft.

Each sub-frame member preferably carries a pair of longitudinally spaced load carrying wheels 47 and 47*a* of relatively small diameter and provided with wide tire treads to distribute the load and permit easy steering. In the present instance each load wheel is dirigible and is provided with a caster mounting to permit the entire wheel structure and its steering mechanism to be mounted within the width of the narrow sills or frame arms 15 and also to enable the load to be transmitted at all times through the vertical axis of turning of the wheel. Each load wheel 47 and 47*a* is mounted in the same manner. This construction comprises a forked carrier or bracket 48 provided with a vertically extending pin or pintle 49 projecting through a bushing 50 at the lower part of the sub-frame member 41. Interposed between each carrier 48 and the base of the sub-frame member 41 is a ball bearing race having ball bearings 51. An annular plate or ring 52 is secured to the upwardly projecting portion of the pintle within the sub-frame casting and is provided with a ball race or recess on its under surface to maintain a series of ball bearings 53 in place between it and the casting (Fig. 11).

Secured to the upper end of each pintle is a worm wheel 54 which is held in position by a nut 55 which is threaded onto the upper end of the pintle.

Each sub-frame casting is provided interiorly thereof with a pair of longitudinally spaced brackets or fixed bearings 56 which serve to support a shaft 57 extending longitudinally of the casting and within the same. Each shaft 57 carries a pair of worms 58 which are in mesh with the worm gears or wheels 54, which are provided with different gear ratios to permit the load wheels 47 and 47*a* to turn on different axes. The shaft 57 is connected at its inner end by means of a coupling or universal joint 59 with a relatively short shaft 60. The shaft 60 is in turn connected with another shaft 61 through the medium of a slide bearing or sleeve 62. The inner end of the shaft 61 is connected to a shaft 63 through the medium of a coupling or universal joint 64. The shaft 63 is carried by a fixed bearing 65 (Fig. 5) mounted upon the frame work of the truck and carries at its inner end a bevel gear 66 forming a part of the gear train and shafts positioned beneath the truck frame 20. The purpose of providing the universal joints 59 and 64 and the slide bearing or sleeve 62 is to maintain the several shafts 57, 60, 61 and 63 interconnected in operative relation when the sub-frame structure rocks or articulates as shown in Fig. 5.

Supported by the frame work of the truck beneath the housing 21 is the steering mechanism for simultaneously steering the pairs of load wheels 47 and 47*a* and also the driving wheels 19. As will be seen in Fig. 3 the bevel gear 66 at the right hand side of the truck is in mesh with a similar gear 67 carried upon the outer end of a transverse rotary shaft 68. The left hand bevel gear 66 is in mesh with a bevel 69 carried by a relatively short horizontal rotary shaft 70. Upon the inner opposed ends of the shafts 68 and 70 are bevel gears 71 and 72 respectively which gears are of somewhat greater diameter than the bevel gears 66, 67 and 69. The gears 71 and 72 are in mesh with a smaller bevel gear 73 carried upon the outer end of a longitudinal shaft 74. Upon the inner end of the shaft 74 there is mounted a similar bevel gear 75 which in turn is in mesh with a bevel gear 76 carried upon the lower end of a vertically extending shaft 77 (Figs. 2 and 3). Mounted upon the upper end of the shaft 77 is another bevel gear 78 which gear meshes with a bevel gear 79 carried upon a relatively short horizontal shaft 80 having at its opposite end another bevel gear 81 which is in mesh with a similar bevel gear 82 mounted upon a short vertical shaft 83 which carries at its upper end a steering wheel 84. It will be understood that the several shafts referred to are each supported by suitable bearings or brackets (not shown) carried by the frame work of the truck. It will be understood from the foregoing that when the operator turns the steering wheel 84, the several wheels 47 and 47*a* may be turned or steered through the medium of the shafts and train of gearing referred to.

In order to steer the driving wheels 19 simultaneously with the load wheels, we provide steering mechanism which is likewise controlled by the steering wheel 84. This mechanism is best shown in Figs. 1 to 3 inclusive and comprises, preferably, a gear wheel 85 mounted upon the shaft 77 above the bevel gear 76 (Fig. 2) which gear is in mesh with a larger gear 86 mounted upon a shaft 87 extending vertically and in parallelism to the shaft 77. Secured to the under side of the gear 86 is an annular disk or plate 88 to which is connected through the medium of a pin an arm 89 pivotally connected at its outer end with an offset arm 91 of a steering arm 90 which is connected with the driving wheel 91 through the medium of a steering knuckle 19*a*. A steering arm 92 is connected with the steering knuckle 19*a* of the steering wheel 19 at the opposite side of the truck and the two steering arms 90 and 92 are interconnected by means of a transverse rod or link 93. It will be seen therefore that when the steering wheel 84 is rotated in one direction, the driving wheels 19 will be turned as shown in Fig. 3 while at the same time such rotation of the steering wheel 84 will cause the several load wheels 47 and 47*a* to be turned thereby effecting a turning movement of all the wheels about a common center or locus point 94, Figs. 3 and 10. The turning center 94 at all times lies substantially on an imaginary line 95 extending at right angles to the central longitudinal axis 96 of the truck, and this locus line 95 extends intermediate the normal axes of the driving wheels 19 and the load wheels 47, 47*a*, and as a result of this construction an extremely short turning radius may be obtained, as shown in Fig. 10.

It will be particularly noted that by mounting the load carrying wheels 47 and 47*a* upon the rocking sub-frames 41, these wheels are permitted to yield vertically when encountering uneven ground or inclined surfaces (Fig. 5) so that the weight of the load will at all times be distributed to these wheels and permit the truck with capacity loads to be propelled upon uneven ground without difficulty.

If desired means may be provided for effecting the independent lifting and lowering of the platforms 23. This may prove desirable on account of conditions where a load to be lifted and transported by the truck is resting upon an uneven surface, or to compensate for variations in the height of load engaging devices at opposite sides of the load.

In Figs. 6 to 9 inclusive is illustrated a method of handling packs or bundles of material, such as bound packs of sheet metal, for the purpose of loading or unloading freight cars. The pack is handled by moving the spaced lift platforms into position to straddle opposite sides of the pack, and through the medium of adjustable brackets or lifting dogs detachably connected to the pack, the latter may be lifted and transported. In the present embodiment the lifting devices or dogs are particularly adapted for use in connection with the lifting and supporting of bound packs of metal such for example as the pack S shown in Figs. 6, 7 and 9. The constituent sheets of the pack S are bound together into a unit by means of binders B, the pack being provided on its under side with a pallet P. The pack, binders and pallet are substantially like those shown and described in a co-pending application Serial No. 137,867 filed September 27, 1926, in the name of one of the inventors hereto. As fully disclosed in said co-pending application, the binders B each comprises spaced metal bars B^1 which are secured together in spaced relation by means of sleeves B^2 and bolts and nuts B^3.

Each bracket or lifting dog comprises, preferably, a channel bar 100 having a base or web portion 100*a* and vertical upstanding flanges 100*b*. The inner ends of the flanges 100*b* are provided with aligned apertures which are adapted to receive any one of the bolts B^3 of the binders. The web portion 100*a* is provided with a plurality of adjusting screws 101. In order to brace the channel member, we provide a pair of bars or metal straps 102 which are connected at their lower ends with the flanges 100*b* by means of short bolts and nuts 103. The members 102 are offset outwardly at their upper ends as shown at 102*a* so as to straddle the spaced bars B^1 of the binder. The members 102 are likewise provided at their free ends with apertures adapted to receive another of the connecting bolts B^3 of the binder.

In practice, after the truck has been propelled into position so that the lift platforms 23 thereof will straddle a bound pack to be lifted and transported by the truck, the channel members of the brackets are connected with the vertical bars B^1 of the binders so that the under surface of the channel will rest upon the top surface of the lift platform 23, or at least be in close proximity thereto and overlie the same. After the channels have been thus connected with the binders, the free apertured ends of the members 102 are swung into position to straddle the members B^1, whereupon one of the bolts B^3 is inserted through the aligned apertures and a nut applied thereto to maintain the members in fixed relation. It will be seen, Figs. 7 to 9 inclusive, that when the lifting brackets are connected with the binders, the channels 100 are positioned at right angles to the vertical sides of the binders. Where the holes BB provided in the binder members B^1 are in such positions that the brackets and opposite ends of the binder can be po-

sitioned in the same transverse plane as shown in Fig. 7, the adjustment screws 101 are not employed, although these screws are preferably maintained in position in the web portion 100*a* at all times. Where, however, the apertures BB in the vertical members B^1 of the binders at opposite sides of the pack are not in the same relative positions so that the bracket members will not extend or lie in the same horizontal plane, the screws 101 are adjusted to compensate for the variations in the relative positions of the several brackets and the lift platforms, as shown in Fig. 9. This relatively fine or secondary adjustment of the bracket members is likewise desirable where the pack to be lifted is not positioned in an upright manner but on the other hand is canted or tilted to one side or the other. In such case it is necessary to arrange the brackets in position upon the binders at opposite sides of the pack in different horizontal planes in order that the pack may be lifted by the truck without the necessity of moving the pack to a strictly vertical position between the lift platforms 23.

After the brackets have been adjusted as shown in either of Figs. 7 or 9, the lifting mechanism is operated to elevate the platforms 23, whereupon the bound pack and its pallet are lifted from the ground as shown in Figs. 6, 7 and 9, and is then in readiness to be transported by the truck.

By employing a fork truck such as that embodied in this application, it is possible to load bound packs of metal or the like in freight cars by simply causing the lift platforms of the truck to straddle the pack, attaching the brackets or lifting dogs to the binders of the pack and thereafter lifting the platforms 23 to remove the pack from the ground. When thus supported by the truck, the truck may be propelled into the freight car and steered into the proper position for unloading the pack. The bound pack is then deposited upon the floor of the freight car, the brackets removed from the binders, and the truck propelled out from the car. It will be understood also that substantially the reverse operation will be employed to remove loads such as bound packs or bundles of metal from a freight car.

Referring to the above mentioned co-pending application it will be noted that the packs of metal are arranged for transit on the freight car floor with aisle spaces at opposite sides of each pack. The present truck is so constructed that the narrow lift platforms thereof may be introduced in such aisle spaces to straddle the pack. These lift platforms are of sufficient length to handle packs of maximum and minimum lengths, while at the same time they are supported by load wheels capable of widely distributing the load on the car floor. The load wheels lie within the width of the lift platforms, so that the wheels will be accommodated within the aisle spaces. Furthermore the steering construction is such that the truck may be propelled through the car doorway and turned within the car sufficiently to permit the forked lift platforms to be introduced at opposite sides of a pack on the car floor.

What we claim is:

1. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, power driven ground wheels supporting the main end portion of the frame, and dirigible load supporting wheels mounted beneath each of said laterally spaced frame members within the width thereof.

2. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, power driven ground wheels supporting the main end portion of the frame, a dirigible load supporting wheel mounted beneath each of the laterally spaced frame portions and wholly between the vertical planes of the side faces of said frame portions, and steering mechanism for said load supporting wheels carried by the laterally spaced frame members between the opposite side edges thereof.

3. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, power driven ground wheels supporting the main end portion of the frame, a load supporting wheel beneath each of said laterally spaced frame portions and wholly between the vertical planes of the side faces of said frame portions, a worm connected with the support of each of the last said wheels and rotatable about a vertical axis, and means controlled from the main end portion of the frame for simultaneously actuating all of said worms.

4. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, power driven ground wheels supporting the main end portion of the frame, and a pair of load supporting wheels beneath each of said laterally spaced frame portions, the members of each

pair of said wheels being arranged in tandem relation and in vertical planes wholly between the vertical planes of the side faces of said frame portions and each said wheel being independently movable about a vertical axis.

5. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, power driven ground wheels supporting the main end portion of the frame, and a pair of load supporting wheels beneath each of said laterally spaced frame portions, the members of each pair of said wheels being arranged in tandem relation and between the vertical planes of the sides of the frame portions, each pair of wheels being adapted to rock about a horizontal axis and the members of each pair being independently rotatable about vertical axes.

6. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, power driven ground wheels supporting the main end portion of the frame, and a pair of load supporting wheels beneath each of said laterally spaced frame portions, the members of each pair of said wheels being arranged in tandem relation and between the vertical planes of the sides of the frame portions, each pair of wheels being adapted to rock about a horizontal axis located between the wheels of said pair and the members of each pair being independently rotatable about vertical axes.

7. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, power driven ground wheels supporting the main end portion of the frame, a support depending from each of the laterally spaced frame portions, a sub-frame pivotally connected to each depending support to rock about a horizontal axis, and load supporting wheels carried by each sub-frame at opposite sides of said axis and each independently movable about a vertical axis.

8. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, a bracket-like support depending from each of the laterally spaced frame portions, a sub-frame connected to each said bracket to rock about a horizontal axis beneath the frame portion, and two load supporting wheels mounted in each sub-frame at opposite sides of said axis and each independently movable about a vertical axis.

9. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, power driven ground wheels supporting the main end portion of the frame and movable about vertical axes, dirigible load supporting wheels mounted beneath and within the width of each of the laterally spaced frame members, and means controlled from the main end portion of the frame for turning all of said wheels about vertical axes, for the purpose described.

10. In an industrial power driven truck, a frame comprising a main end portion and a pair of laterally spaced load supporting portions extending from one end of said main portion adjacent the ground, whereby they can be positioned at opposite sides of a load to be transported by the truck, each of said laterally spaced portions having a downwardly facing channel, a bracket supported in each downwardly facing channel in each of the laterally spaced frame members, and depending from said frame, a sub-frame connected to each said bracket to rock about a horizontal axis, and a pair of load supporting wheels arranged in tandem relation in each sub-frame, at opposite sides of said horizontal axis, each said wheel being independently movable about a vertical axis.

In testimony whereof we affix our signatures.

ROBERT T. ROMINE.
JAY F. WARREN.
ERNEST W. SYSTROM.