March 11, 1941. R. HASTINGS, JR 2,234,925

ELEVATING TRUCK FOR PALLETS AND THE LIKE

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Fig. 2.

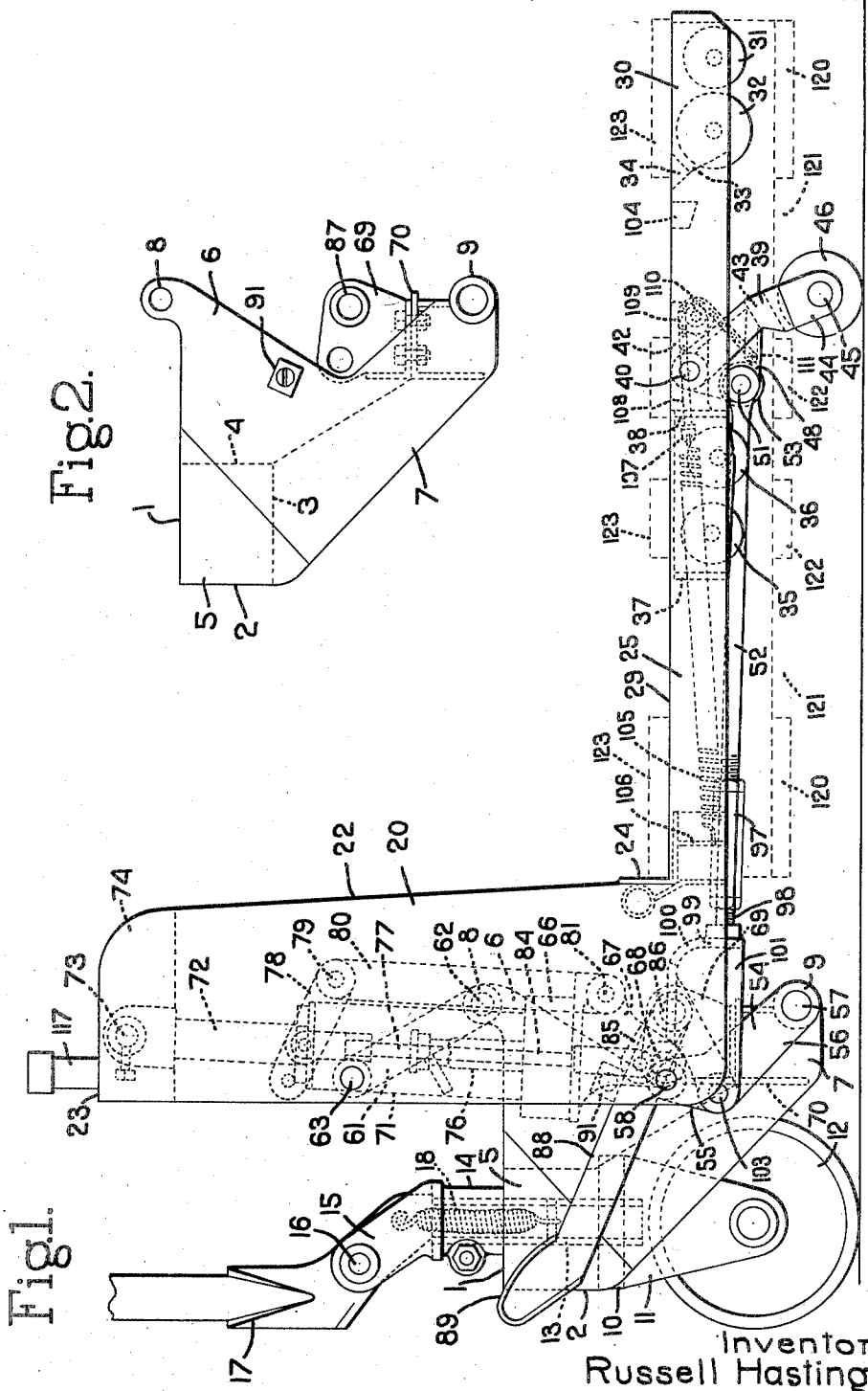

Fig. 1.

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ELEVATING TRUCK FOR PALLETS AND THE LIKE

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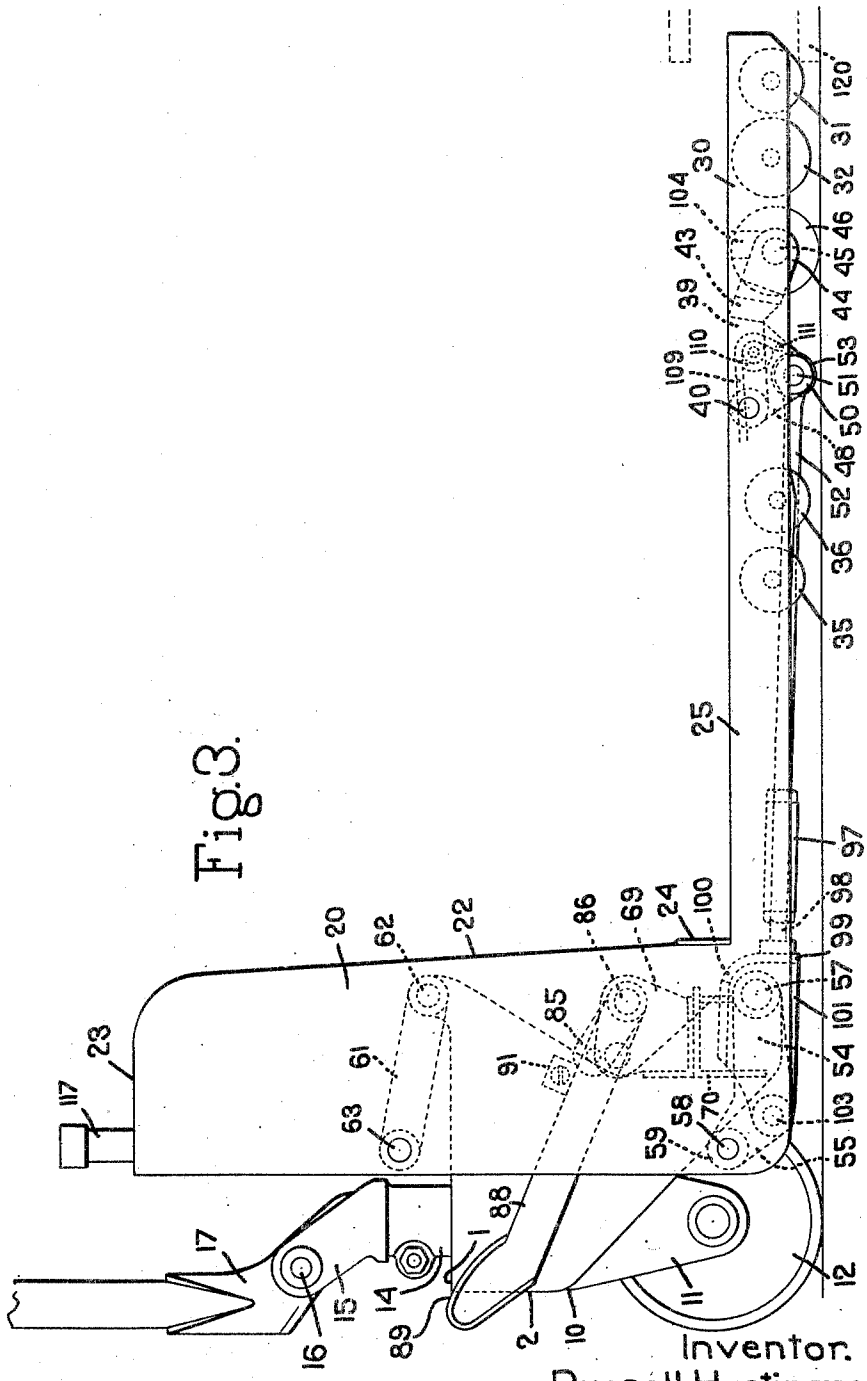

Fig. 3.

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ELEVATING TRUCK FOR PALLETS AND THE LIKE

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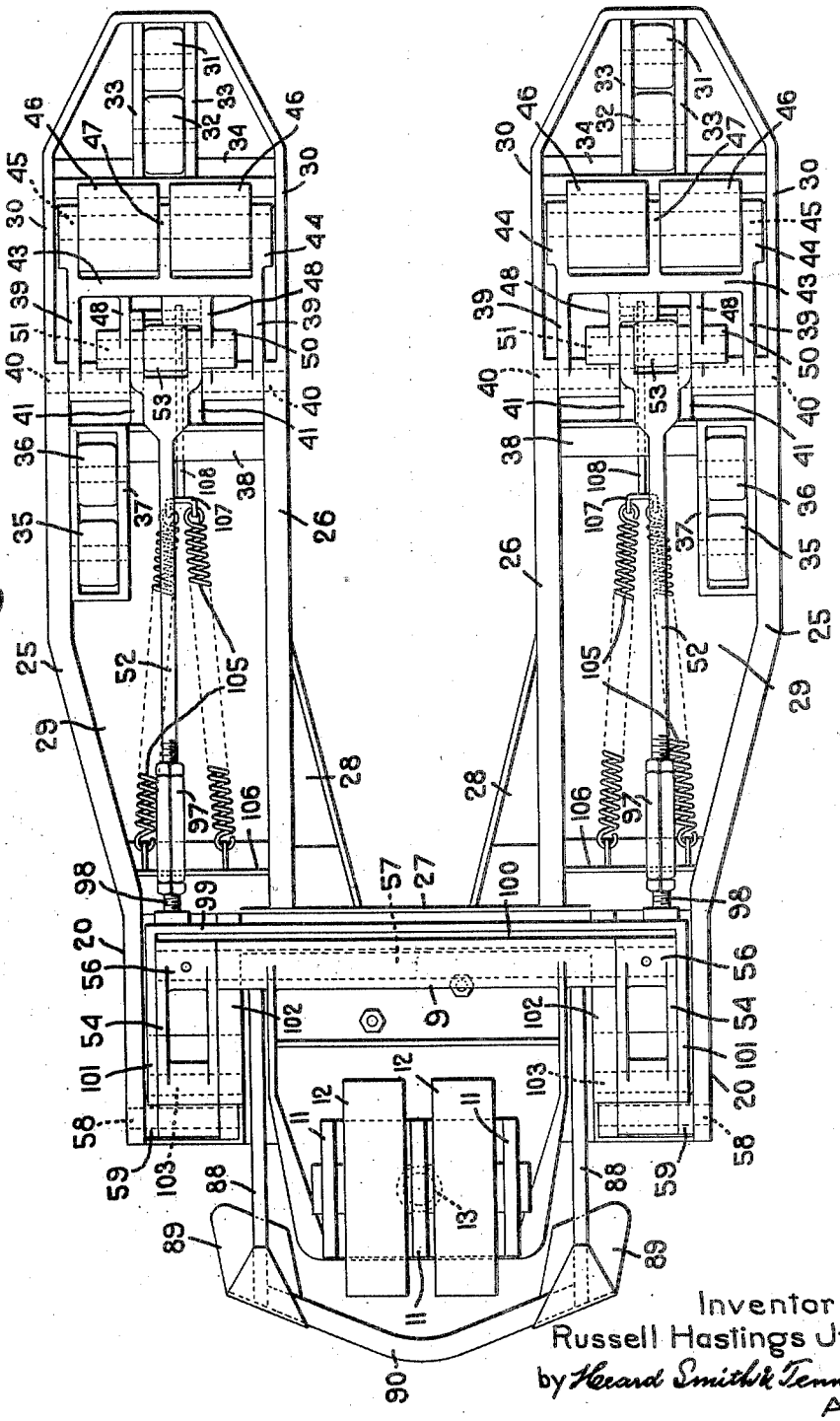
Fig. 4.



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ELEVATING TRUCK FOR PALLETS AND THE LIKE

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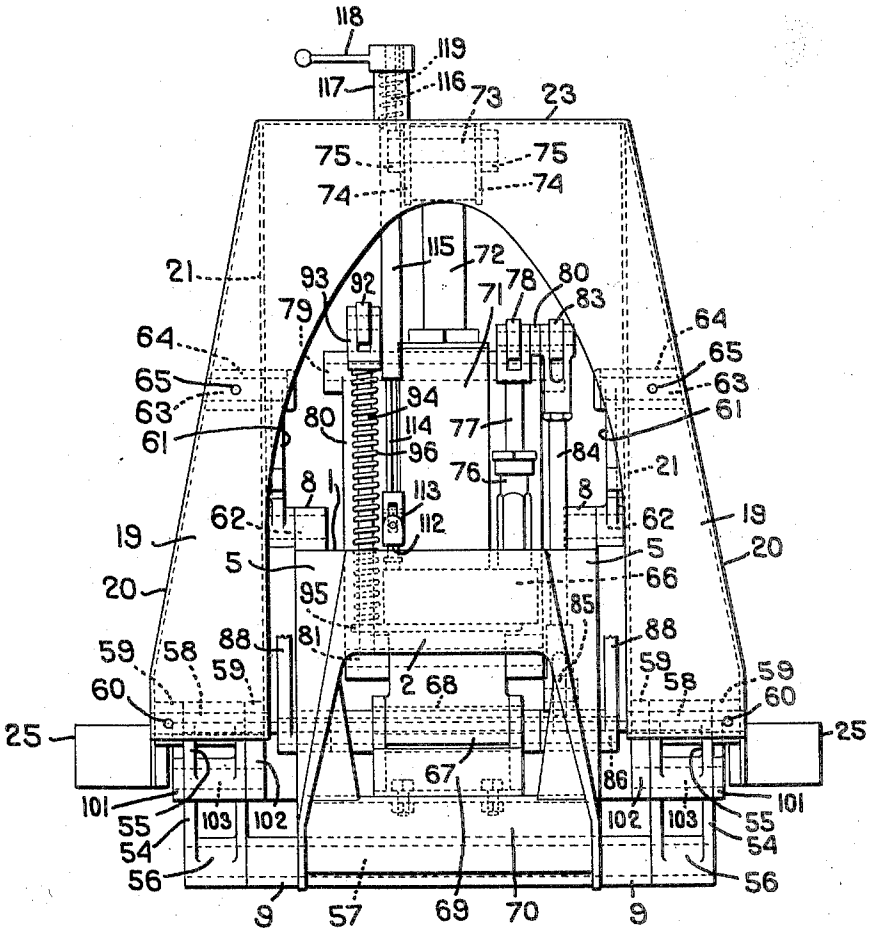
Fig.5.



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UNITED STATES PATENT OFFICE

2,234,925

ELEVATING TRUCK FOR PALLETS AND THE LIKE

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Application December 28, 1939, Serial No. 311,231

31 Claims. (Cl. 254—2)

This invention relates to improvements in elevating trucks and particularly to the type of elevating trucks which are used for transporting pallets which support loads of various character and which are generally employed for transporting material between interdepartmental divisions of a factory, or are used as parts of crates for shipping materials to enable several crates to be superimposed or economically tiered for transportation. Such pallets are usually of the double-faced type comprising parallel wooden scantlings or runners, usually of 2 x 4'' cross section, having upper and lower end boards secured to them, and intermediate boards leaving spaces between the end boards and the next adjacent intermediate boards to permit the rear lifting mechanism of the elevating truck to pass therethrough into engagement with the floor.

Similar longitudinally extending scantlings or runners may be provided intermediate of the end runners to form a central brace or bolster. Such pallets are frequently used in industry by reason of the fact that they are of very much less height than skids ordinarily employed, and also because they are adaptable to the formation of the lower and some times the upper walls of crates for use in shipment of materials and readily adapted for tiering, and furthermore because they can be constructed cheaply of such inexpensive materials that they can be discarded after they have served their purpose in transportation.

One of the objects of the invention is to provide an elevating truck having load supporting means preferably formed of two parallel load receiving members which can be lowered sufficiently closely to the floor to enable them to be introduced into the space between the upper and lower floor boards of the pallet truck, with suitable mechanism for lifting the load supporting means and the pallet thus engaged thereby.

Another object of the invention is to provide novel lifting mechanism which will raise the load supporting means sufficiently to enable it properly to transport usual types of skids and also to raise pallets when carried by the load supporting means a sufficient distance above the floor to avoid contact of the lower boards thereof with the angular junction of a ramp with the floor or the junction of different angularly positioned areas of the ramp and also to avoid obstructions which otherwise might interfere with the transportation of the truck.

One of the principal objects of the invention is to provide an elevating truck so constructed that the load supporting means can be lowered in close proximity to the floor and the front and rear ends of the load supporting means raised to a considerable height for the purpose above described for the transportation of a load, the rear lifting mechanism being so constructed that when in its lowered position it will lie mainly within the depths of the load supporting members, thereby providing sufficient underclearance to enable the truck to be readily drawn over the angular junctions between the floor and the ramp and the angularly disposed surfaces of the ramp without contact therewith. This is accomplished by providing rear elevating mechanism comprising levers which are pivotally connected at their upper ends to the rear portions of the load supporting members and at their free ends with wheels to engage the floor, with mechanism operable by the lifting mechanism to raise the load supporting means and to move it longitudinally relatively to the head of the truck, thereby avoiding the necessity for employing the wheel-supported main frame of the character commonly used in elevating trucks and consequently enabling the load supporting means to be lowered into much closer proximity to the floor.

Another important object of the invention is to provide a construction in which a constant wheel base is maintained between the steering wheels and wheels of the rear lifting mechanism during the lifting movement.

Another object of the invention is to provide an elevating truck of the character described in which the load supporting means moves forwardly relatively to the head during the lowering operation, thereby preventing the load from abutting against another load which has been deposited rearwardly thereof, or causing the load to engage a wall in proximity to which the load is being deposited.

Another object of the invention is to provide an elevating truck of the character described with lifting mechanism including foot pedals located on opposite sides of the steering head and which can be operated to lift the load supporting means from either side so that the operator can use alternatively a left or right foot, or which will permit two men simultaneously to actuate the pedals.

Another feature of the invention consists in providing means for maintaining the steering tongue in upright position in such manner that the operator can steady himself while throwing his weight upon the pedal.

Another object of the invention is to provide an elevating truck of the character described having load supporting means provided with a hollow integral upwardly extending standard adapted at all times to enclose the front lifting mechanism of the truck.

Another object of the invention is to provide a pallet elevating truck of the character described with lifting means mounted upon said head engaging and acting upon the upper portion of the standard and having separated substantially parallel rearwardly extending load-receiving members adapted to be inserted into the pallet particularly when the pallet has a central bolster or runner, with novel rear lifting mechanism for raising the load-receiving members.

Another feature of the invention consists in providing the rearwardly extending load-receiving members with tapering ends adapted to facilitate the introduction of the load-receiving means into the pallet.

A further object of the invention is to provide the load-receiving means of the truck with booster mechanism to engage the floor boards of the pallet during the introduction into and withdrawal of the truck from the pallet including floating booster rollers mounted upon the rear lifting means adapted to prevent abrupt engagement of the rear lifting mechanism with the floor boards upon insertion into or withdrawal of the truck from the pallet.

Another object of the invention is to provide load supporting means of the character described comprising a standard fabricated from integrally united sections of sheet material and load-receiving members integrally connected with and extending rearwardly therefrom fabricated from structural steel and welded to form an integral whole.

Another object of the invention is to provide an elevating truck of the character described having lifting mechanism including an hydraulic jack so constructed that the hydraulic jack mechanism can be readily removed from the truck for repair or replacement.

A further important object of the invention is to provide an elevating truck of the character described of compact construction in which the actuating parts are wholly housed within the standard and load-receiving members of the load supporting means.

Another object of the invention is to provide an all-steel elevating truck in which substantially all parts except the wheels and booster rollers and the hydraulic lifting mechanism are formed of structural sheets or plates properly assembled and welded together to provide integral units.

These and other objects and features of the invention will more fully appear from the following description and the accompanying drawings and will be particularly pointed out in the claims.

A preferred embodiment of an elevating truck particularly designed for transportation of pallets but which can be used for transportation of usual skids embodying the above objects, advantages and features of the invention is illustrated in the accompanying drawings, in which—

Fig. 1 is a side elevation of the elevating truck shown with the load supporting means in raised position, the hydraulic lifting mechanism being graphically illustrated in dotted lines; and also showing in dotted lines a pallet in lifted position;

Fig. 2 is a detail side view of the head of the truck;

Fig. 3 is a side elevation of the elevating truck showing the load supporting means in lowered position adapted to enter a pallet, details of the head and lifting mechanism being omitted;

Fig. 4 is an under side plan view of the truck shown in Figs. 1 and 3, the steering mechanism being omitted in the interest of clearness of illustration: and,

Fig. 5 is a front elevation of the truck, the steering mechanism being omitted to permit observation of other essential mechanisms of the truck.

The elevating truck illustrated in the accompanying drawings is provided with an integral head, preferably formed of fabricated plates welded at their abutting or overlapping edges to provide a box-like construction comprising a flat top 1, a vertical front side 2, a flat bottom 3, and a rear vertical wall 4, the side walls having portions 5 diverging outwardly from the front wall and merging into upper and lower vertical extensions 6 and 7 having flanges forming a channel-like structure, the upper and lower ends and side walls being provided with bosses providing journals 8 for upper parallel links and the lower extensions having welded to them a tubular sleeve 9 forming a journal for the lower links of the lifting mechanism, as will hereinafter more fully appear.

The steering head of the truck is mounted upon the box-like front portion of the head and comprises a flat plate 10 preferably having three downwardly extending arms 11 between which are mounted a pair of wheels 12. The plate 10 has secured centrally of it an upwardly extending hollow steering post 13 which is journaled in suitable bearings in the box-like head and has detachably secured to its upper end a sleeve 14 provided with a pair of upwardly and forwardly extending forks 15 in which is mounted a shaft 16 forming the fulcrum of the steering tongue 17 of the usual type. The lower end of the steering tongue is provided with an extension which may lie within the forks 15 of the steering head and which is connected by a spring 18 to a suitable anchorage in the hollow steering post. The spring 18 acts normally to maintain the tongue in upright position as illustrated in Figs. 1 and 3.

The load supporting means comprises load receiving members connected together at their front ends by a standard or saddle, preferably fabricated from steel plates bent to form a box-like structure, the abutting or overlapping edges of the plates being welded together to form an integral construction. The standard illustrated in the drawing comprises a front plate 19 provided with a substantially semi-elliptical recess which straddles the steering head, and side plates 20, the forward edges of which are welded to the outer edges of the front plate, vertical reenforcing walls 21 which are spaced from the side plates 20 and welded at their forward edges to the front plate and at their rear edges to a back plate which fits upon and is welded to the side plates 20 and to the reenforcing walls 21. The back plate 20 is bent forwardly over the rounded upper ends of the side plates to form a top plate which is welded to the side walls and at its forward edge to the front wall. The standard may, however, be made from a suitably developed single sheet plate bent

or folded to produce a construction with contiguous edges of the several sheet sections suitably welded together. The lower end of the front wall has welded to it the vertical flange of an angle iron girder 24 which extends across the entire width of the standard and a platform or platforms which constitute the load-receiving members are welded to and extend rearwardly from the girder 24. As illustrated in the preferred construction two spaced parallel load-receiving members which are thus integrally connected to the standard extend rearwardly therefrom and the forward part of each of said load-receiving members is provided with channel-shaped outer side bars 25 which preferably diverge outwardly to increase the width of the load supporting means and thence directly rearwardly. The inner side bars 26 of the load supporting members are likewise formed of channel bars which extend directly rearwardly and are welded at their front ends to a vertical plate 27 which is welded to the under face of the angle bar 24. Suitable triangular gussets 28 having flanges extending downwardly from their inner edges are welded to the inner side bars 26 and to the plate 27 and serve to reenforce the construction of the load supporting means. Each of the load-receiving members desirably, but not necessarily, is provided with a flat cover plate 29 which is mounted upon the upper flanges of the channel bars and extends rearwardly from the standard substantially the full distance of the length of the side channel bars and serve with said side bars to provide a chamber for housing actuating mechanism for the rear lifting means for the load-receiving members as will hereinafter more fully appear.

The rear ends of each of the load-receiving members comprise flat steel bars 30 having the same width as the side channel bars bent to U-shape and welded at their front ends to the respective inner and outer channel bars and extending rearwardly in the same plane therecf. The U-shaped rear ends of these channel bars converge in such manner as to provide guides which will enable the rear end of the truck more readily to be introduced into pallets which form platforms for supporting the articles to be transported.

One of the novel features of the invention comprises sets or pairs of booster rollers located fore and aft of the mechanism for lifting the rear end of the load-receiving members which will enable the load-receiving members more easily to ride over the end floor boards of the pallets as the load-receiving members are backed into the pallets. In the construction illustrated rear booster rollers 31 and supplemental booster rollers 32 of larger diameter are mounted in a pair of webs 33 welded to and extending forwardly from the rear U-shaped end of the extensions of the load-receiving members and welded at their front ends to a transverse bar 34 preferably of triangular cross section which is welded at its ends to the parallel portions of the flat extensions 30 of the side frames. The booster rollers 31 are of smaller diameter than the booster rollers 32, thereby serving progressively to raise the rear ends of the load-receiving members.

Complementary pairs of booster rollers 35 and 36 are located forward of the lifting mechanism for the rear ends of the load-receiving members. These rollers, like the rollers 31 and 32, are so arranged as progressively to engage and ride over the floor boards of the pallets. As illustrated herein the rollers 35 and 36 are of the same diameter, but the axle of the roller 36 is located below the plane of the axles of the rollers 35, 31, and 32. The axles of the rollers 35 and 36 are mounted in a box-like metal frame 37 which is welded to the outer side frame 25 and also to the cover plate 29. A short transverse channel-shaped girder 38 is interposed between the box-like frame 37 and the inner side girder 26 and is welded at its ends to both. The preferred form of booster rollers which are embodied in the present invention comprise oil-soaked wooden cylindrical bodies rotatably mounted on suitable shafts and provided with sheet metal tires which are compressed on the rollers in such manner as to present crowned faces adapted to engage the floor boards of the truck without presenting any cutting edges.

Any suitable mechanism may be provided for raising the rear end of the load-receiving members. As illustrated herein the rear lifting mechanism comprises levers having a pair of channel-shaped arms 39 which are fulcrumed at their front end upon shafts 40 which are mounted in inner and outer side frames 25 and 26 and at their inner ends upon parallel webs 41 which extend rearwardly from the transverse channel shaped girder 38 and are welded to the under side of an extension 42 of the cover plate 29. The channel-shaped lever arms 39 are connected intermediate of their length by an integral web 43 and the free end portions of the lever arms are thickened to provide bosses 44 to receive the shaft 45 upon which a pair of rear wheels 46 provided with roller, anti-friction or other bearings are mounted. A central web or arm 47 is integral with and extends rearwardly from the web 43 between the wheels 46 and provides an additional bearing for the shaft 45. The inner flanges 48 of the channel-shaped lever arms 39 are of triangular form and are provided at their apexes with bosses 50 in which a shaft 51 is mounted. The shaft 51 has pivotally mounted upon it a forked rear end of an actuating bar 52 and a floating booster roller 53 is rotatably mounted upon this shaft. The levers for raising the rear end of the load supporting means have downwardly offset rear ends and are so constructed that when they are in the uppermost position relative to the load supporting member the major portions of said levers will lie within and substantially parallel to the flat bar extensions of the side frames of the load supporting members. When in this position the floating booster rollers 53 will be in position to engage the floor board of the pallet and further facilitate easy withdrawal of the load supporting members from the pallet as they will engage the floor board and raise the rear end of the load supporting members during their withdrawal thus avoiding possibility of engagement with the floor board of the forked end of the actuating bar 52.

Mechanism for lifting the load supporting means comprises the rear lifting levers above described and parallel links which connect the front end of the load supporting means to the head of the truck, lifting mechanism preferably in the form of an hydraulic or other jack being mounted upon the head and engaging or connected to the standard in such manner that actuation of the lifting means or jack will raise the front end of the load supporting means and at the same time move the load supporting means, preferably rearwardly, relatively to the head during the lifting movement. The construction therefore is such that when the load supporting means is raised

it will be moved rearwardly and when lowered it will be moved forwardly. Such forward movement of the load supporting means during the lowering movement will therefore prevent the load supporting means or the load carried thereby from engaging a wall or another load which may be positioned directly back of the truck when the load is deposited.

The pivotal link connection between the wheel-supported head and the front end of the load supporting means, or load supporting platform, is such that the front end of the load supporting means is solely supported by the head and the head supported in the vertical position by its wheel and the load supporting means or elevating platform.

One of the important features of the present invention is the provision of means for raising and lowering the load supporting means relatively to the floor without changing the length of the wheel base between the front steering wheels and the wheels of the rear lifting mechanism. This is accomplished by providing front lifting links pivotally mounted upon the head which are parallel to and of the same effective length as that of the levers 39 of the rear lifting mechanism and by providing a connection between the front links and the levers of the rear lifting mechanism which will maintain a constant wheel base between the steering wheels and the wheels of the rear lifting links during the raising and lowering of the load supporting means.

As illustrated in the accompanying drawings the front lifting mechanism comprises a pair of side links 54 formed of parallel bars having upwardly offset upper ends 55 spaced apart and having sleeves which form bearings for pivotal connections. The lower bearings 56 of said front parallel links are mounted upon and fixedly secured to a shaft 57 which extends transversely of the machine and is journaled in the tubular sleeve 9 which is welded to the downward extensions of the integral head. The offset upper ends 55 of the links 54 are pivotally mounted upon shafts 58 which extend through and are detachably mounted in bosses 59 welded to the side plates 20 and the reenforcing walls 21 respectively of the standard. The shaft 58 is detachably secured in place by set screws 60 mounted in said bosses and engaging the shafts 58.

The effective length of the front sde links 54 between the centers of the pivotal shafts 57 and 58 is the same as the length between the center of the fulcrum 40 of the rear lifting lever and the center of the shaft 45 upon which the rear wheels are mounted.

Another pair of links 61 of the same effective length as and parallel to the side links 54 connect the upper and rearward extensions 6 of the head to the standard. The links 61 are pivotally connected to the shafts 62 which are detachably mounted in the journals 8 in the upper extension of the head and are pivotally mounted at their upper ends upon short shafts 63 which are detachably mounted in sleeves 64 interposed between and welded to the side plates 20 and reenforcing plates 21 of the standard. The shafts 63 are normally secured in position by set screws 65 which when released will permit removal of the shaft 63.

Any suitable lifting means may be provided for raising the front end of the load supporting means preferably step by step. A preferred lifting means which is illustrated herein comprises an hydraulic jack unit which is detachably mounted upon the head and so connected to the head and standard that by uncoupling the forward ends of the upper parallel links from the shafts upon which they are mounted the head and lifting mechanism may be rotated 90-degrees forward about the shaft 57 to permit ready removal and replacement of the hydraulic jack.

The hydraulic jack mechanism illustrated in the accompanying drawings may be and is of the construction disclosed in Patent No. 2,161,660 granted to Frederick J. Shepard, Jr., and Nathaniel Warshaw June 6, 1939, and need not therefore be described in detail. In that construction the means for actuating the pump of the lifting jack comprises a pedal lever which normally extends upwardly and forwardly along one side of the head and is provided at its free end with a pedal adapted to be depressed by the foot of the operator to pump fluid from the reservoir of the pump into its cylinder thereby to raise the plunger of the pump.

One of the features of the present invention consists in providing pedal mechanism for actuating the pump of the hydraulic jack comprising pedal levers located alongside each side of the head of the truck so that the operator can actuate the hydraulic jack from either side of the truck and the operator can use either the right foot or the left foot, and also providing means whereby two men may simultaneously throw their weight upon the respective pedal levers to actuate the pump where unusually heavy loads are to be transported. The tongue, which as above described is normally maintained in upright position, provides means for enabling the operator or operators to steady himself or themselves during the pumping operation.

In the construction described the base 66 is detachably secured to a metallic block 67 which is pivotally journaled upon a shaft 68 which is mounted in a bracket 69 which is bolted to an angle bar 70 which is welded at its ends to the lower extensions 7 of the head. The hydraulic lifting means, which as before stated is similar to that of the patent to Shepard and Warshaw above mentioned, comprises a cylinder (not shown) and an enclosing reservoir 71 which is mounted upon and extends upwardly from the base 66 with the ram 72 of the jack rotatably mounted on a shaft 73 which is secured in brackets 74 and bosses 75 which are welded thereto, said brackets 74 being welded to the vertical front, top and back plates of the standard. The pump 76 is mounted on the base 66 and suitably communicates with the cylinder and reservoir and is provided with a piston having an upwardly extending piston rod 77 which is pivotally connected to an arm 78 extending forwardly from a rock shaft 79 which is mounted in the upper ends of a swinging frame 80, the lower ends of which are pivoted upon a shaft 81 which is mounted in a bearing in the lower rear portion of the block 67 upon which the base of the pump is mounted. The rock shaft 79 has another forwardly extending arm 83 which is pivotally connected to the yoke-shaped upper end of a rod 84 the lower forked end of which is pivotally connected to the forwardly extending arm 85 of a shaft 86 which is mounted in bearings 87 in the bracket 69 of the head (see Figs. 1 and 2). The shaft 86 extends transversely of the machine and has secured to its ends forwardly extending pedal levers 88 which extend alongside the sides of the head and are provided at their ends with pedals 89 adapted to be engaged by the foot of the operator and which

are located sufficiently below the steering mechanism to avoid interference therewith when the tongue is swung to any steering position.

Desirably the free ends of the pedal levers 88 are connected by a bar 90 which is welded both to the pedal levers and to the pedals thereby reenforcing the pedal structure. The pedals are normally maintained in upraised position by a spring actuated mechanism hereinafter described and the upward movement of the pedal levers is limited by suitable stops 91 secured to the upper extension 6 of the head. The rock shaft 78 is provided with a third forwardly extending arm 92 which is pivotally connected to the forked upper end 93 of a rod 94 which is reciprocably mounted at its lower end in an extension 95 of the base plate and a compression spring 96 surrounding the rod 94 interposed between the forked upper end 93 of the rod 94 and the base plate extension 95 tends normally to raise the arms 92, 78 and 83 of the rock shaft and through the arm 83 to raise the rod 84 and the pedal levers so as to maintain them in the upraised position illustrated in Figs. 1 and 3, and also serves to eliminate back lash.

The lifting mechanism for raising the front end of the load supporting means therefore comprises a pedal-actuating jack which exerts substantially vertical force upon the standard and vertical and longitudinal movements of the load supporting means relatively to the head are produced by the parallel link connections between the load supporting means and the head.

In the preferred construction illustrated the rear lifting levers 39 for the load-receiving members are substantially parallel to the side lifting links 54 which connect the lower portion of the standard to the head and are also parallel to the upper parallel links 61 which connect the upper portion of the standard to the head. The rear lifting levers may cooperate with either or both of the front parallel links to produce relative longitudinal movement of the load supporting means relatively to the head and to cause the load supporting members to move upwardly in parallelism to the floor and consequently to lift both ends of the load supporting means simultaneously and equally. Any suitable mechanism may be employed for causing the front lifting mechanism to actuate the rear lifting mechanism and properly to coordinate the lifting movement of the rear lifting mechanism with that of the front lifting mechanism in such manner as to maintain a constant wheel base between the steering wheels and the wheels of the rear lifting mechanism. In the construction illustrated the rods 52, which are pivotally connected to the shafts 51 which in turn are mounted in the webs 48 of the rear lifting levers 39, are screw threaded at their front ends to the rear ends of turnbuckles 97 the front ends of which are mounted upon screw threaded studs 98 having heads which are welded to a bar 99 which extends transversely of the machine and is provided at each end with yoke-like members 100 having parallel forwardly extending arms 101 and 102 which are mounted at their forward ends upon short shafts 103 which are pivotally connected to the front parallel side links 54 at the base of the upwardly extending offset portion 55 thereof.

The pivotal shafts 103 are thus so positioned intermediate of the effective lengths of the lower side links 54 that the arc through which the shaft 103 swings about the shaft 57 is of a shorter radius than the arc through which the shaft 58, which connects the upper ends of the side links to the standard, swings about the same shaft 57. The longitudinal movement therefore which is imparted to the rod 52 is shorter than the longitudinal movement imparted to the load supporting means through the parallel links 54. It will be noted that the mounting of the floating booster rollers 53 directly on the shafts 51, which are mounted in the flanges 48 of the lever arms 39, permit the shafts 51 to which the actuating rods 52 are connected to be located very close to the floor when the load receiving members are in lowered position and thereby to provide a maximum radius between the pivotal shafts 40 and 51, thus enabling the rear lifting mechanism to be actuated by a minimum of force applied through the actuating rods 52 from the front lifting mechanism.

In the construction shown the connection between the front lifting links 54 and the rear lifting levers 39 is such that the longitudinal movement which is imparted to the links 52 is such that the pivotal shafts 51 which connect the rear ends of the rods 52 to the rear lifting levers 39 swing substantially equal distances across the vertical plane of the fulcrum 40 of the rear lifting levers 39, so that during the lifting and raising movements of the rear end of the load supporting means a constant wheel base is maintained between the front steering wheels and the wheels of the rear lifting mechanism.

In the construction above described the front lifting links lie in a substantially horizontal position, as illustrated in Fig. 3, when the load supporting means is in lowered position and at the same time the major portions of the rear lifting levers 39 lie within the vertical width of the U-shaped bar 30 which forms an extension of the channel-shaped side bars 25 and 26 of the load supporting members as shown in Fig. 3. The upward swinging movement of the rear lifting levers is limited by suitable stop blocks 104 which are welded to the inner sides of the outer and inner parallel sections of the U-shaped extensions 30 of the load receiving members. As the front end of the load supporting means is lifted by the hydraulic jack, or equivalent front lifting mechanism, the rear lifting levers 39 are swung about their fulcrums to raise the rear end of the load receiving members simultaneously and equally with the lifting of the standard until the load supporting means reaches its uppermost position as illustrated in Fig. 1 without changing the length of the wheel base between the rear wheels 46 and the steering wheels 12.

In order to insure prompt and complete raising of the rear lifting levers to their uppermost positions relative to the load supporting means when the load receiving members are lowered for introduction to or removal from the pallets and also to prevent any lost motion in the pivotal connection of the rear ends of the rods 52 to the shafts 51 of the rear lifting levers, resilient means are provided tending constantly to swing the rear lifting levers to uppermost position. In the preferred construction illustrated a pair of heavy springs 105 are anchored at their forward ends to transverse webs 106 which extend transversely of the front ends of the load supporting members and are welded to the side channels and to the cover plate thereof and the rear ends of said springs are connected to arms of a yoke 107 upon a bar 108 which extends through a suitable aperture in the transverse girder 38 and is connected at its end to a roller chain 109 which passes

around a guiding sprocket 110 and thence forwardly and is connected to a stud 111 which is mounted upon one of the triangular inner flanges 48 of the rear lifting lever.

It will be noted that these springs 105 and the connections thereof to the load supporting means and to the rear lifting levers lie within the chambers of the load receiving means which is formed by the side frames and cover plates thereof, and also that the rod 52 which actuates the rear lifting levers also lies almost completely within said chamber when the load supporting members are in their lowered position and does not extend any considerable distance below the side frames when the load supporting means is in elevated or lowered position, thereby providing a maximum under-clearance both when the rear ends of the load supporting means are introduced into the pallet and when the load supporting means is in a sufficiently elevated position to permit transportation of the load without engagement with angular junctions of a floor and ramp, or other obstruction over which the truck may be drawn.

The spring 105 also functions when the rear lifting levers are raised to the position within the side bars, shown in Fig. 3, to prevent rotation of the parallel links unless the front lifting means is actuated. By reason of this construction, the pivotally connected assemblage between the head and the load supporting means is maintained rigid so that if the rear end of the load supporting means is raised by any other force than the front lifting mechanism, the entire truck will pivot upon the axis of the front wheels.

In order to permit the lowering of the load supporting means from raised position to enable the insertion of the load receiving members into a double-faced pallet or beneath a skid, suitable means such as that disclosed in the patent to Shepard and Warshaw above mentioned is provided for releasing the liquid from the hydraulic cylinder to the reservoir of the pump. This mechanism comprises a ball valve of the character disclosed in the aforesaid patent in the passage from the cylinder to the reservoir provided with an upwardly extending valve stem 112 having a screw threaded connection with a suitable nut fixedly secured in the base of the hydraulic jack and which is connected by a universal joint 113 to a square rod 114 which is telescopically mounted in a complementary bearing in a sleeve 115 which is connected at its upper end to a rod 116 which extends through the top plate 23 of the standard and also through a sleeve 117 which is welded to said top plate and is provided at its upper end with a hand lever 118. A helical spring 119, which is connected at its lower end to the sleeve 116 and at its upper end to the lever 117, tends normally to hold the valve in closed position. In order therefore to lower the load supporting means it is merely necessary to swing the lever in a proper direction to cause the screw threaded connection of the valve stem to the nut to release the ball valve, thereby permitting the oil to flow from the cylinder of the jack to its reservoir. The hydraulic mechanism therefore serves not only to raise the load supporting means when the pump is actuated by the pedal levers, but also as a dash pot to sustain the load supporting means in elevated position and to cushion its descent without any abrupt shock which might injure fragile articles carried by the load supporting means. Furthermore the spring 119, which tends to force the relief valve of the hydraulic jack to closed position, will act instantly as a "dead man control" if the operator accidentally or otherwise releases the lever 118 during the descent of the load supporting means.

The load supporting means is illustrated in Fig. 3 in lowered position adapted to enter the space between the upper and lower floor boards of a double-faced pallet, the end of which is illustrated in dotted lines and it will be noted that the rearmost booster rollers 31 are shown as in contact with the lower floor board 120 and adapted to raise the rear end of the load receiving members when the truck is forced rearwardly. Further rearward movement of the truck will cause the larger booster rollers 32 to engage the front floor board 120 and further raise the rear end of the load supporting means until the wheels 46 engage and roll over the floor board 120. The same action will occur as the rear end of the load supporting member passes over successive floor boards of the pallet until the wheels 46 are finally positioned above a space between the floor boards of the pallet. The hydraulic jack may then be actuated to raise the front end of the load supporting means and through the actuating rods 52 to swing the levers 39 downwardly thereby causing the wheels 46 to pass through the opening in the pallet and upon engagement with the floor to raise the rear end of the load supporting means. As the load supporting members of the truck are thus raised upwardly they engage the upper floor boards 123 of the pallet and thereafter raise the pallet to any desired height sufficient to provide proper underclearance between the lower face of the pallet and the floor so that the truck may be drawn to its destination without engaging an obstruction.

When the truck has reached its destination the load supporting means is lowered at a controlled rate of speed by proper manipulation of the handle 118 which controls the release valve of the hydraulic jack. Inasmuch as this relief valve is necessarily at all times under manual control of the operator and is instantly closed upon release of the actuating handle, there is no danger of such dropping of the load as would cause breakage of fragile articles which may be supported on the pallet.

When the truck is to be removed from the pallet after the pallet has been deposited upon the floor, the truck merely has to be drawn forward for the reason that during the lowering operation the arm 39 and wheel 46 will have been swung upwardly relatively to the load supporting members to the position illustrated in Fig. 3, the complete upward movement of the lifting mechanism being insured by the action of the springs 105 and/or the floating booster rollers 53. As the truck is drawn forward after depositing the pallet upon the floor the rollers 35 and 36 will ride upon the floor board in front of the space through which the wheels 56 have been swung. The booster roller 53 will engage the edge of such floor board and raise the rear end of the truck sufficiently to enable the wheels 46 to readily ride over such floor boards as the truck is drawn forward. The floating booster roller 53 also serves to prevent any obstructive engagement between the connection of the rods 52 to the wheel-carrying levers 39 and any floor board of the pallet.

The maintenance of a constant wheel base between the steering wheel and the wheels of the rear lifting mechanism is important for the reason that it eliminates the force required to move

the rear wheels lengthwise of the truck during the lifting operation in addition to the force required to raise the load. Furthermore if in lowering the load with the front wheels partially turned sidewise no changes in the wheel base will occur which will cause the front wheels to rotate and thereby move the truck more or less laterally so that the load will not be deposited in the proper place or may be caused to engage and injure an adjacent load.

By reason of the construction above described an elevating pallet truck is provided in which the lifting mechanism is so constructed that the load supporting means may be raised a greater distance from the floor than in usual types of pallet trucks, thereby providing a greater underclearance for the truck and pallet as it is transported from place to place. Such construction also enables the load supporting means to be lifted to a sufficient height as to enable the truck to be employed for transporting usual types of skids the legs of which are much greater than the thickness of either single-faced or double-faced pallets.

It will be understood that the particular embodiment of the invention disclosed herein is of an illustrative character and is not restrictive, and that various changes in form, construction and arrangement of parts may be made within the spirit and scope of the following claims.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means, parallel side links connecting the front end of said load supporting means to said head, and movable relatively to the horizontal, lifting means operable to raise the front end of said load supporting means and in cooperation with said links to move the same longitudinally, lifting means pivotally connected to the rear end portion of said load supporting means having floor-engaging wheels mounted on the free end thereof, and means operable by the movements of said load supporting means simultaneously to cause said rear lifting means to raise the rear end of said load supporting means without substantially varying the length of the wheel base between the steering wheels and the wheels of said rear lifting mechanism.

2. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means, parallel forward side links connecting the front end of said load supporting means to said head and movable relatively to the horizontal, lifting means operable to raise the front end of said load supporting means and in cooperation with said links to move the same longitudinally, lifting mechanism pivotally connected to the rear end portion of said load supporting means having floor-engaging wheels mounted on the free ends thereof, and means operable by said lifting movement of the front end of said load supporting means simultaneously to cause said rear lifting means to lift the rear end of said load supporting means an equal distance without varying the length of the wheel base between said steering wheels and the wheels of said rear lifting mechanism.

3. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means, parallel forward side links connecting the front end of said load supporting means to said head and movable relatively to the horizontal, lifting means mounted on said head operable to raise the front end of said load supporting means relatively to said head and in cooperation with said links to move the same longitudinally, levers pivotally connected at their upper ends to the rear portion of said load supporting means, and having supporting wheels mounted upon their lower ends, and means connecting said levers to said forward links and operable by the swinging movement thereof simultaneously to raise the rear end of said load supporting means.

4. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means, parallel forward side links connecting the front end of said load supporting means to said head and movable relatively to the horizontal, lifting means mounted on said head operable to raise the front end of said load supporting means relatively to said head and in cooperation with said links to move the same longitudinally, levers pivotally connected at their upper ends to the rear portion of said load supporting means having floor engaging wheels mounted on the free ends thereof, and adjustable links connected at one end to said levers intermediate of the pivots thereof and said rear wheels and connected at their front ends to said forward links operable by the movement of said links during the lifting of the front end of said load supporting means simultaneously to raise the rear end of said load supporting means.

5. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means, parallel side links pivotally connected to said head and extending forwardly and having upwardly offset ends pivotally connected to the front end of said load supporting means, lifting means mounted on said head operable to raise said load supporting means relatively to said head, levers pivotally connected at their upper ends to the rear portion of said load supporting means and extending downwardly and rearwardly and having supporting wheels mounted on their lower ends, and rigid means pivotally connected to said side links at the base of said offset portion and to the rear levers intermediate of the pivot thereof and said wheels, operable by the differential movements of said load supporting means and said rigid connecting means to maintain a constant wheel base between the wheels of said steering mechanism and the wheels of said rear lifting mechanism.

6. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means, parallel side links pivotally connected to said head and extending forwardly and having upwardly offset ends pivotally connected to the front end of said load supporting means, lifting means mounted on said head operable to raise said load supporting means relatively to said head, levers pivotally connected at their upper ends to the rear portion of said load supporting means and extending downwardly and rearwardly and having supporting wheels mounted on their lower ends, rods pivotally connected to said side links at the base of said offset portion and to the rear levers intermediate of the pivot thereof and said wheels operable by the swinging movement of said front side links to cause said rear levers to raise the rear end of said load supporting means, and resilient means connected to said load supporting means and to said rear levers operable continuously to impose tension upon said rear levers tending to raise

the same toward their uppermost position relatively to the load supporting means.

7. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means, parallel side links pivotally connected to said head and extending forwardly and having upwardly offset ends pivotally connected to the front end of said load supporting means, lifting means mounted on said head operable to raise said load supporting means relatively to said head, levers pivotally connected at their upper ends to the rear portion of said load supporting means and extending downwardly and rearwardly and having supporting wheels mounted on their lower ends, rods pivotally connected to said side links at the base of said offset portion and to the rear levers intermediate of the pivot thereof and said wheels operable by the swinging movement of said front side links to cause said rear levers to raise the rear end of said load supporting means, and coiled springs connected at their front ends to the load supporting means and at their rear ends to chains passing over guide pulleys and extending downwardly therefrom and so engaging means on said levers that said springs will maintain a constant tension upon said chains tending to swing said levers to uppermost position relatively to the load supporting means.

8. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard rigid therewith, lower parallel links, one or more upper links substantially parallel to said lower links connecting said standard to said head, means for lifting the front end of said load supporting means, and means for simultaneously lifting the rear end of said load supporting means.

9. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard rigid therewith, a pair of lower parallel links having offset portions, one or more upper links substantially parallel to said lower parallel links and spaced apart therefrom, and means connected to the offset portions of said lower parallel links operable upon actuation of said lower links to raise the rear end of said load supporting means.

10. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard rigid therewith, a pair of lower parallel links having offset portions, a transverse member rigidly connecting said lower parallel links to cause them to move in unison, an upper link parallel to said lower parallel links and spaced apart therefrom, and means connected to the offset portions of said lower parallel links operable upon actuation of said lower links to raise the rear end of said load supporting means.

11. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard rigid therewith, parallel links connecting said standard to said head, lifting mechanism mounted on said head and having means engaging said standard and operable to lift the front end of said load supporting means relatively to said head and in cooperation with said links to move the same longitudinally, movable wheeled lifting mechanism connected to the rear end portion of said load supporting means and means connecting said rear wheeled lifting mechanism to the means for actuating the front end of the load supporting means operable by the mechanism for lifting the front end of the load supporting means simultaneously to raise the rear end of the load supporting means.

12. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard rigid therewith, upper and lower pairs of parallel links connecting said standard to said head, lifting mechanism mounted on said head engaging said standard having means engaging said standard and operable to lift the front end of said load supporting means relatively to said head and in cooperation with said links to move the same longitudinally, movable wheeled lifting mechanism connected to the rear end portion of said load supporting means and means connecting said rear wheeled lifting mechanism to the means for actuating the front end of the load supporting means operable by the mechanism for lifting the front end of the load supporting means simultaneously to raise the rear end of the load supporting means an equal distance without varying the length of the wheel base between the steering wheels and the wheels of the rear wheeled supporting means.

13. An elevating truck for transporting pallets and the like comprising a head, wheeled steering mechanism mounted in said head, load supporting means parallel side links connecting the load supporting means to said head, lifting mechanism mounted on said head engaging said load supporting means and operable to raise said load supporting means and move the same longitudinally, means for raising the rear end of said load supporting means comprising levers fulcrumed at their upper ends upon the rear end portions of the load supporting means and having wheels at their lower ends, means connecting said levers intermediate of the lengths thereof to said side links, and floating booster rollers mounted on said levers in advance of the wheels thereof adapted to prevent abrupt engagement of the rear lifting mechanism with the floor boards of the pallet upon withdrawal of the load supporting means therefrom.

14. An elevating truck for transporting pallets and the like comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard and spaced parallel load receiving means each having a pair of vertical side bars of narrow width integrally connected to and extending rearwardly from said standard, front lifting mechanism including parallel side links pivotally connected to said head and extending forwardly and having upwardly offset ends pivotally connected to the front end of said load supporting means, and lifting means mounted on said head and engaging said standard operable to raise the front end of said load supporting means relatively to said head step by step, levers fulcrumed at their upper ends in the side bars at the rear end portions of said load receiving means each adapted to swing mainly into the space between and within the width of the side bars thereof and provided at their ends with floor engaging wheels, webs extending downwardly from the central portion of said levers, shafts mounted in said webs, rigid bars pivotally mounted at their rear ends upon said shafts and pivotally connected at their front ends to said side links at the base of the offset portion thereof and operable by the upward swinging movement of said front links to cause said rear lifting levers to raise the rear

end of said load supporting means, and floating booster rollers mounted on the shafts of said webs adapted to engage the edges of the floor boards upon withdrawal of the truck and to prevent abrupt engagement of the rear lifting mechanism therewith.

15. An elevating truck for transporting pallets and the like comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard and spaced parallel load receiving members each having a pair of vertical side bars of narrow width integrally connected to and extending rearwardly from said standard, front lifting mechanism including parallel side links pivotally connected to said head and extending forwardly and having upwardly offset ends pivotally connected to the front end of said load supporting means, and lifting means mounted on said head and engaging said standard operable to raise the front end of said load supporting means relatively to said head step by step, levers fulcrumed at their upper ends in the side bars at the rear end portions of said load receiving means each adapted to swing mainly into the space between and within the width of the side bars thereof and provided at their ends with floor engaging wheels, webs extending downwardly from the central portion of said levers, shafts mounted in said webs, rigid bars pivotally mounted at their rear ends upon said shaft and pivotally connected at their front ends to said side links at the base of the offset portion thereof and operable by the upward swinging movement of said front links to cause said rear lifting levers to raise the rear end of said load supporting means, a plurality of booster rollers mounted respectively on said load receiving members forwardly and rearwardly of said floor engaging wheels operable to facilitate introduction of the load receiving members into a pallet and withdrawal of the same therefrom, and floating booster rollers mounted on the webs of said rear lifting levers operable to prevent abrupt engagement of the rear lifting mechanism with the edges of the floor board.

16. An elevating truck for transporting pallets and the like comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard and spaced parallel load receiving members each formed of a pair of vertical side bars of narrow width integrally connected to and extending rearwardly from said standard, front lifting mechanism mounted on said head operable to raise said load supporting means and move the same forwardly, levers fulcrumed at their upper ends in the side bars at the rear end portions thereof each adapted to swing mainly into the space between and within the width of the side bars and provided at their free ends with floor-engaging wheels, webs extending downwardly from the central portion of said levers, shafts so mounted in said webs as to move from one side to the other of the vertical planes of the fulcrums of said levers, rigid bars pivotally mounted at their rear ends upon said shafts and connected at their front ends to said front lifting mechanism and operable by the lifting movement thereof simultaneously to raise the rear end of the load supporting means, said rods lying within said spaces of said load supporting means when the same is either in lowered or elevated position thereby providing a maximum under clearance.

17. An elevating truck for transporting pallets and the like comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard and spaced parallel load receiving members each formed of a pair of vertical side bars of narrow width integrally connected to and extending rearwardly from said standard, a cover plate mounted upon and inwardly connected to said side bars providing therebeneath a chamber, front lifting mechanism including parallel side links pivotally connected to said head and extending forwardly and connected to the front end of said load supporting means, an hydraulic jack mounted on said head engaging said standard operable to raise the front end of said load supporting means, levers fulcrumed at their upper ends on the side bars at the rear end portions of said load receiving means each adapted to swing mainly into the space between and within the width of the side bars thereof and provided at their ends with floor-engaging wheels, webs extending downwardly from the central portion of said levers, shafts so mounted in said webs as to move from one side to the other of the vertical planes of the fulcrums of said levers, rigid bars pivotally mounted at their rear ends upon said shafts and pivotally connected at their front ends to said side links operable by the swinging movement of said front links to cause said rear lifting levers to raise the rear end of said load supporting means, and said rods lying within the chambers of said load supporting means when the same is either in lowered or elevated position thereby providing a maximum under clearance.

18. An elevating truck for transporting pallets and the like comprising a head, wheeled steering mechanism mounted in said head, load supporting means having a front standard and spaced parallel load receiving members each formed of a pair of vertical side bars of narrow width integrally connected to and extending rearwardly from said standard, front lifting mechanism mounted on said head operable to raise said load supporting means and move the same forwardly, levers fulcrumed at their upper ends in the side bars at the rear end portions thereof each adapted to swing mainly into the space between and within the width of the side bars and provided at their free ends with floor-engaging wheels, webs extending downwardly from the central portion of said levers, shafts so mounted in said webs as to move from one side to the other of the vertical planes of the fulcrums of said levers, rigid bars pivotally mounted at their rear ends upon said shafts and connected at their front ends to said front lifting mechanism and operable by the lifting movement thereof simultaneously to raise the rear end of the load supporting means, said rods lying within the spaces of said load supporting means when the same is either in lowered or elevated position thereby providing a maximum under clearance, and spiral springs located within said spaces connected at their front ends to said load supporting means and flexibly connected at their rear ends to said rear levers in such manner as to maintain a constant tension upon said levers tending to raise them to their uppermost position.

19. An elevating truck for transporting pallets and the like comprising a head, wheeled steering mechanism mounted on said head, hydraulic lifting mechanism pivotally mounted on said head, load supporting means connected to said head by front parallel side links and comprising a hollow standard of integral box-like construc-

tion enclosing said hydraulic lifting means and provided with integral rearwardly extending parallel load receiving members, means for lifting the rear end of said load receiving members comprising levers pivotally connected to the rear end portions thereof and having wheels at their lower ends and rods pivotally connected to said levers intermediate of their ends and connected at their forward ends to said front parallel links intermediate of the length thereof.

20. An elevating truck for transporting pallets and the like comprising a head, wheeled steering mechanism mounted on said head, a block pivotally mounted on the lower portion of said head, an hydraulic jack detachably secured to said block, load supporting means connected to said head by front parallel side links and comprising a hollow standard fabricated from steel plates forming an integral box-like construction enclosing said hydraulic jack, detachably connected to the ram of said jack and having an apertured front plate to permit introduction or removal of said jack therethrough, and provided with integral rearwardly extending parallel load receiving members, means for lifting the rear end of said load receiving members comprising levers pivotally connected to the rear portions thereof and having wheels at their lower ends, rods pivotally connected to said levers intermediate of their ends and connected at their forward ends to said front parallel side links intermediate of the length thereof, supplemental parallel links pivotally connected to the upper portion of said head and detachably connected to said standard whereby by disconnecting said upper links from said standards and detaching the ram from said standard the hydraulic jack may be swung forward into position easily accessible for repair or replacement of said jack.

21. An elevating truck comprising a head, wheeled steering mechanism mounted in said head, load supporting means, lifting mechanism for the front end of said load supporting means mounted on said head, including an actuating shaft journaled in the lower portion of said head and having a pair of rigid arms respectively extending forwardly along and adjacent to the sides of said head and provided at their ends with pedals, to permit actuation of the lifting mechanism by the foot of an operator or operators from either or both sides of the steering mechanism, yieldable means acting normally to raise said pedal levers, and means operable by said lifting mechanism for raising the rear end of said load supporting means simultaneously with the lifting of the front end thereof.

22. An elevating truck comprising a head, wheeled steering mechanism mounted on said head having a steering tongue mounted to swing vertically, load supporting means, lifting mechanism for the front end of said load supporting means mounted on said head including an actuating shaft journaled in the lower portion of said head and having a pair of rigid arms respectively extending forwardly along and adjacent to the sides of said head and provided at their ends with pedals to permit actuation of the lifting mechanism by the foot of an operator or operators from either or both sides of said steering mechanism, means normally supporting said tongue in upright position to permit an operator by grasping the tongue to steady himself when throwing his weight upon the pedal, yieldable means acting normally to raise said pedal levers, and means operable by said lifting mechanism for raising the rear end of said load supporting means simultaneously with the lifting of the front end thereof.

23. An elevating truck comprising a head, wheeled steering mechanism having a vertical steering post rotatably mounted in said head, having a tongue mounted on said steering post above said head to swing vertically, means normally supporting said tongue in upright position, load supporting means, lifting mechanism for the front end of said load supporting means mounted on said head, including an actuating shaft journaled in the lower portion of said head and having a pair of rigid arms extending forwardly along the sides of said head and provided at their ends with pedals, to permit actuation of the lifting mechanism by the foot of the operator or operators from either or both sides of the steering mechanism, yieldable means acting normally to raise said pedal levers, means for preventing such upward movement thereof as to interfere with the lateral steering movements of said tongue, a bar connecting said pedals located below the path of movement of said tongue, and means operable by said lifting mechanism for raising the rear end of said load supporting means simultaneously with the lifting of the front end thereof.

24. In a lift truck, a lifting head, wheels supporting said lifting head, an elevating platform, wheel supporting links pivoted to the rear end of said platform, supporting means securing the front end of said platform to the lifting head whereby to form an assembled truck, means connecting sair rear wheel supporting links to said supporting means, means on said lifting head for moving said platform upwardly relatively to said lifting head and through said supporting means and thereby to effect a movement of both said supporting means and said rear wheel supporting links whereby to lift simultaneously both ends of said platform, and springs for resisting movement of said platform relatively to said head, whereby application of lifting pressure to the said platform other than through said lifting head means will merely tilt said platform and lifting head as a unit about the wheels supporting said lifting head.

25. In a lift truck, a lifting head, wheels supporting said lifting head, an elevating platform, wheels under the rear end of said platform, a vertically extending saddle at the front end of said platform, upper and lower links pivoted at one end to said saddle and at the other end to said lifting head whereby to maintain a parallelogram arrangement between said links, said platform and said lifting head, means in said lifting head for moving the platform upwardly relatively to said lifting head through said links, and springs for resisting movement of said platform relatively to said head, whereby application of lifting pressure to the said platform other than through said lifting head means will merely tilt said platform and lifting head as a unit about the wheels supporting said lifing head.

26. In a lift truck, a lifting head, wheels supporting said lifting head, an elevating platform, wheel supporting links pivoted to the rear end of said platform, links secured at one end to the front end of said platform and at the other end to the lifting head whereby to form an assembled truck, and with the front end of the elevating platform supported by said lifting head, rods connecting said rear wheel supporting links to said front end links, means for moving said

platform upwardly relatively to said lifting head and through said front end links, and thereby to effect a pivotal movement of both said front end links and said rear wheel supporting links whereby to lift simultaneously both ends of said platform.

27. In a lift truck, a lifting head, wheels supporting said lifting head, an elevating platform, wheel supporting links pivoted to the rear end of said platform, links secured at one end to the front end of said platform and at their other end to the lifting head whereby to form an assembled truck and with the front end of the elevating platform supported by said lifting head, rods connecting said rear wheel supporting links to said front end links, means on said lifting head for moving said platform upwardly relatively to said lifting head and through said front end links, and thereby to effect a pivotal movement of said front end links and said rear wheel supporting links whereby to lift simultaneously both ends of said platform, and springs for resisting movement of said platform relatively to said head on said links, whereby application of lifting pressure to the said platform other than through said lifting head means will merely tilt said platform and lifting head as a unit about the wheels supporting said lifting head.

28. In a lift truck, a lifting head, wheels supporting said lifting head, an elevating platform, wheel supporting links pivoted to the rear end of said platform, supporting means securing the front end of said platform to the lifting head whereby to form an assembled truck, means connecting said rear wheel supporting links to said supporting means, means on said lifting head for moving said platform upwardly relatively to said lifting head and through said supporting means, and thereby to effect movement of both said supporting means and said rear wheel supporting links whereby to lift simultaneously both ends of said platform, rollers at the rear end of said platform and rearwardly of said wheels whereby said rollers tend to lift said platform as said rollers encounter an obstruction, and springs for resisting movement of said platform by said rollers relatively to said head, whereby application of lifting pressure to the said platform by said rollers will merely tilt said platform and lifting head as a unit about the wheels supporting said lifting head.

29. In a lifting truck, a lifting head, an elevating platform, wheels under the rear end of said platform, means including links pivoted to the front end of said platform and having pivotal connection to said lifting head at their other end, means on said lifting head for lifting said platform through said links relatively to said lifting head, and means connecting said links to the wheels at the rear end of said platform for moving said wheels downwardly relatively to said platform, whereby to lift simultaneously the front and rear ends of said platform.

30. An elevating truck comprising a head, wheel steering mechanism mounted on said head, hydraulic lifting mechanism pivotally mounted on said head having an upwardly movable ram, load supporting means comprising horizontal load receiving members, a standard integral with and extending upwardly from the front end of the load receiving members and pivotally connected to said ram, parallel links connecting the front end of said load supporting means to said head, and means for lifting the rear end of said load receiving means comprising levers pivotally connected to the rear portions thereof and having wheels at their lower ends, and rods pivotally connected at their rear ends to said levers and pivotally connected at their forward ends to said front parallel links.

31. An elevating truck comprising a head, wheel steering mechanism mounted on said head, hydraulic lifting mechanism pivotally mounted on said head having an upwardly movable ram, load supporting means comprising horizontal load receiving members having an integral hollow standard of box-like construction enclosing said hydraulic lifting means and pivotally connected to said ram, parallel links connecting the front end of said load supporting means to said head, means for lifting the rear end of said load receiving members comprising levers pivotally connected to the rear end portions thereof and having wheels at their lower ends, and rods pivotally connected at their rear ends to said levers and pivotally connected at their forward ends to said front parallel links.

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