

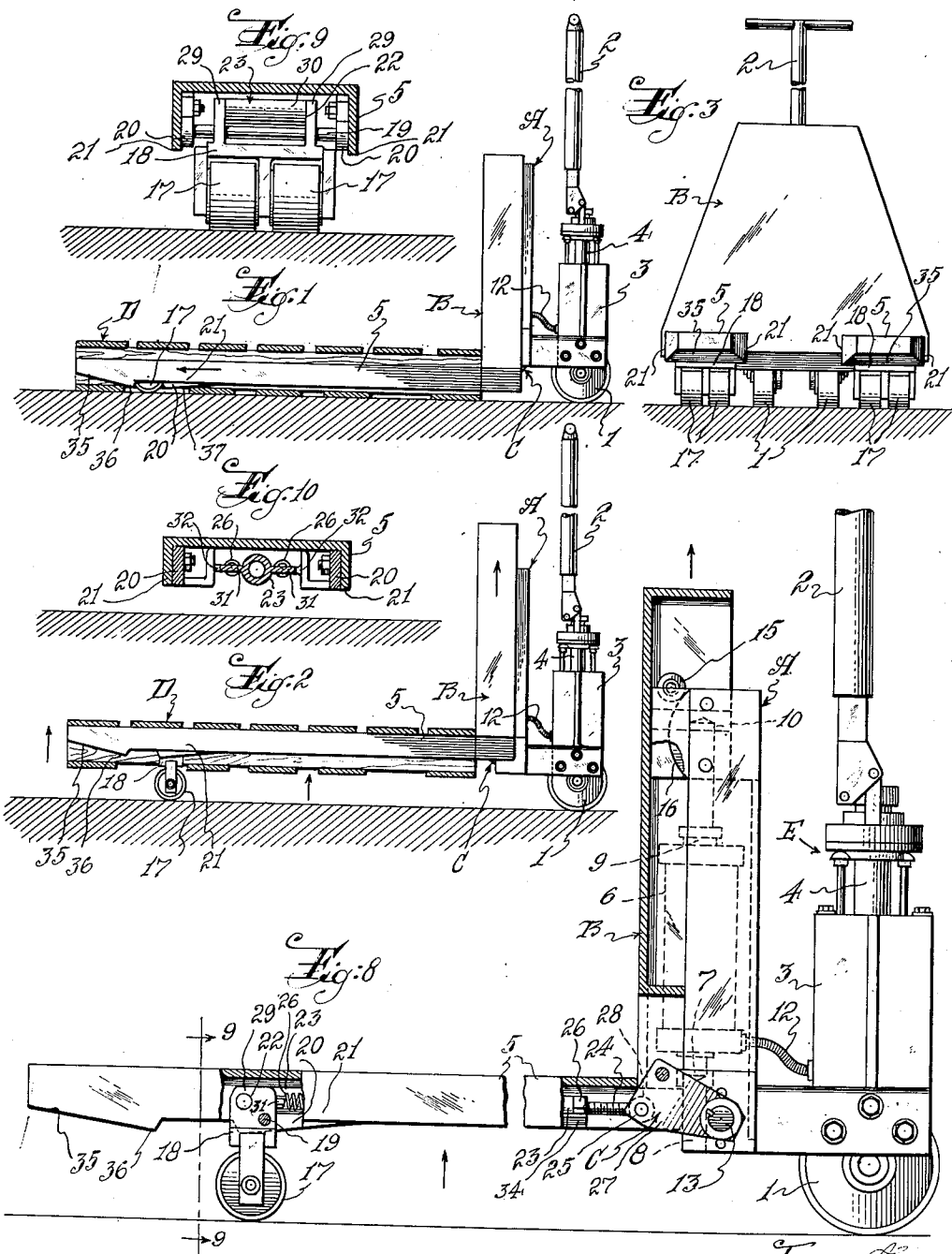
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P. D. GERMOND
PALLET TRUCK

2,681,202

Filed July 8, 1950

5 Sheets-Sheet 1



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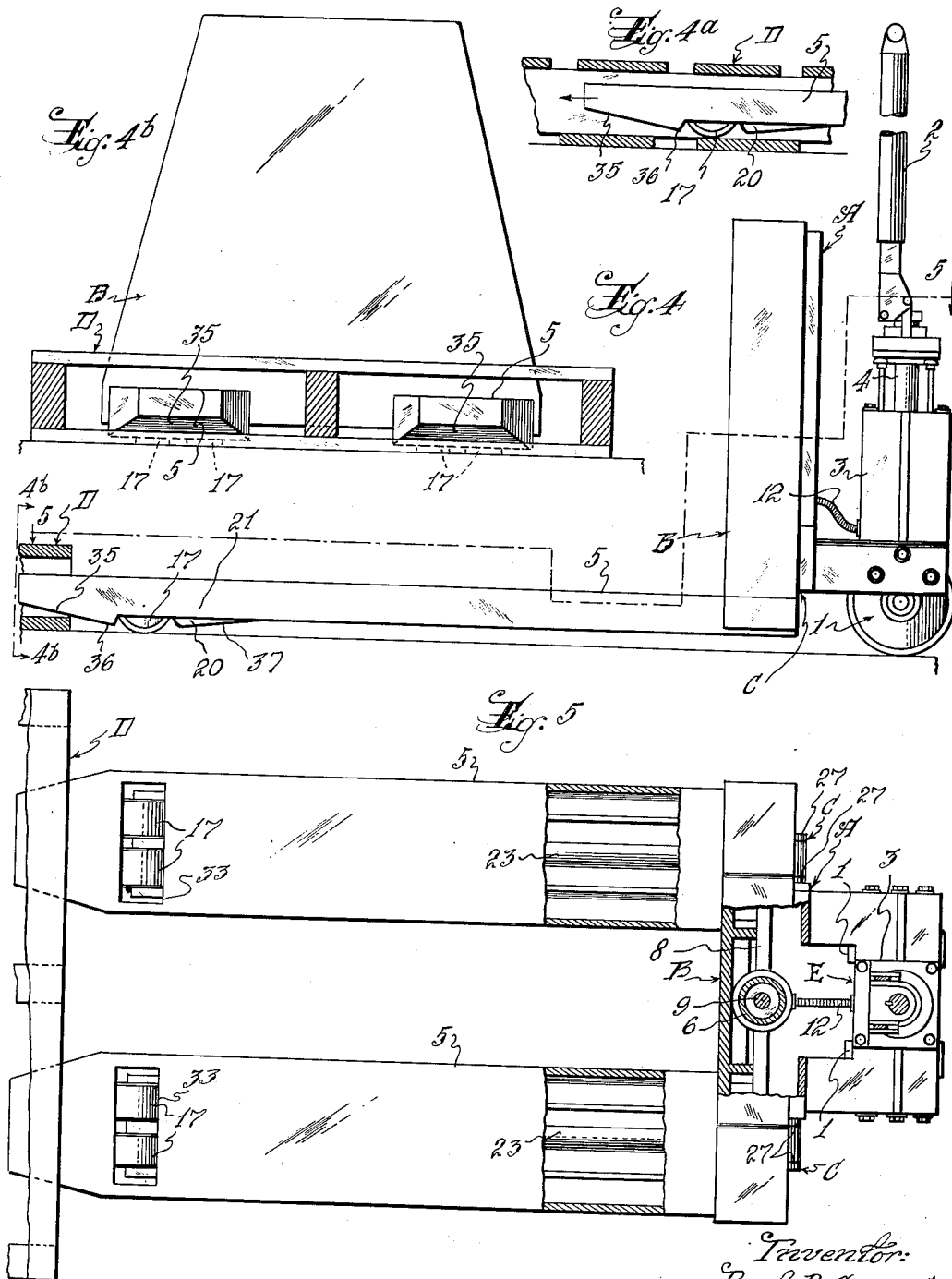
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PALLET TRUCK

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5 Sheets-Sheet 2



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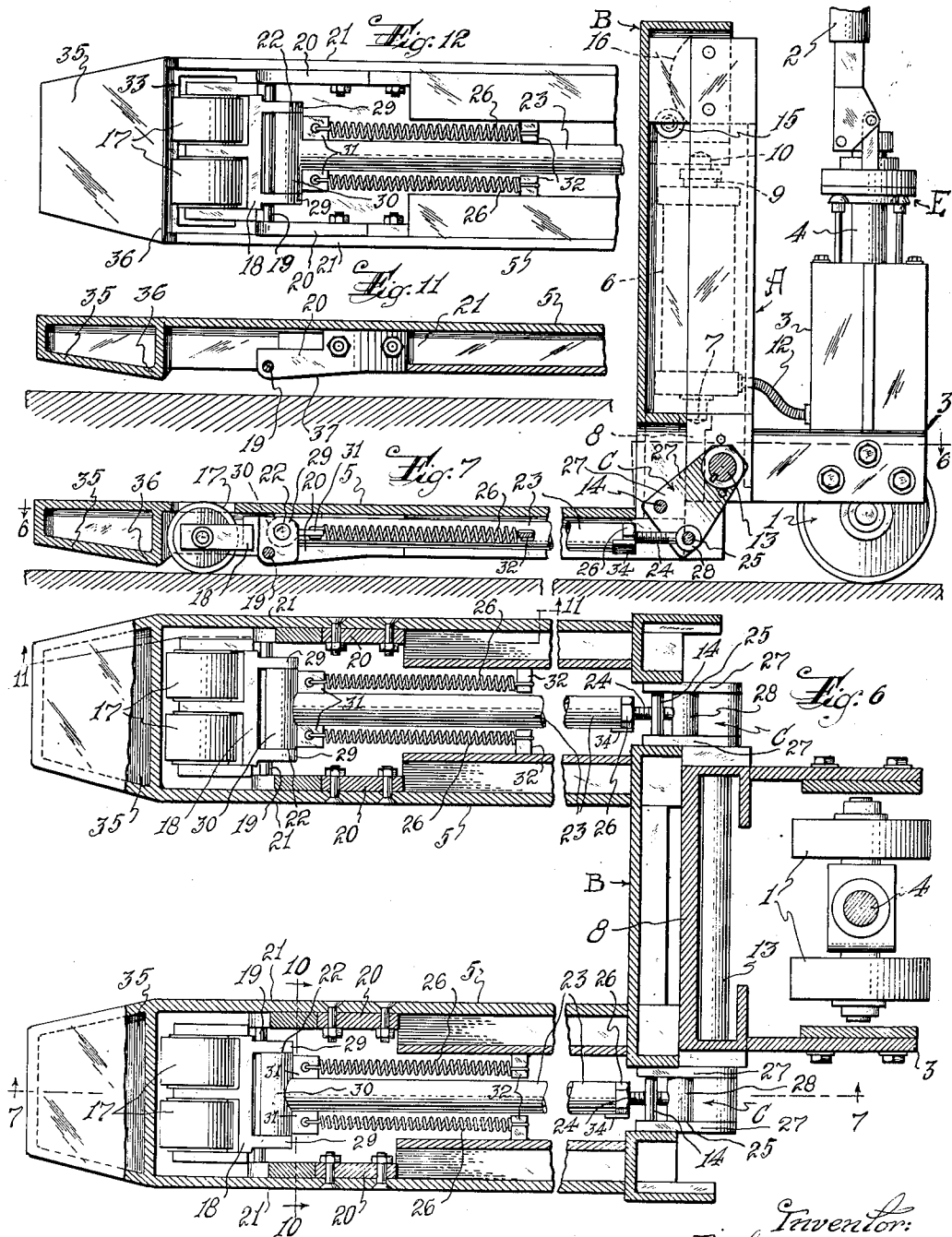
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P. D. GERMOND
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5 Sheets-Sheet 3



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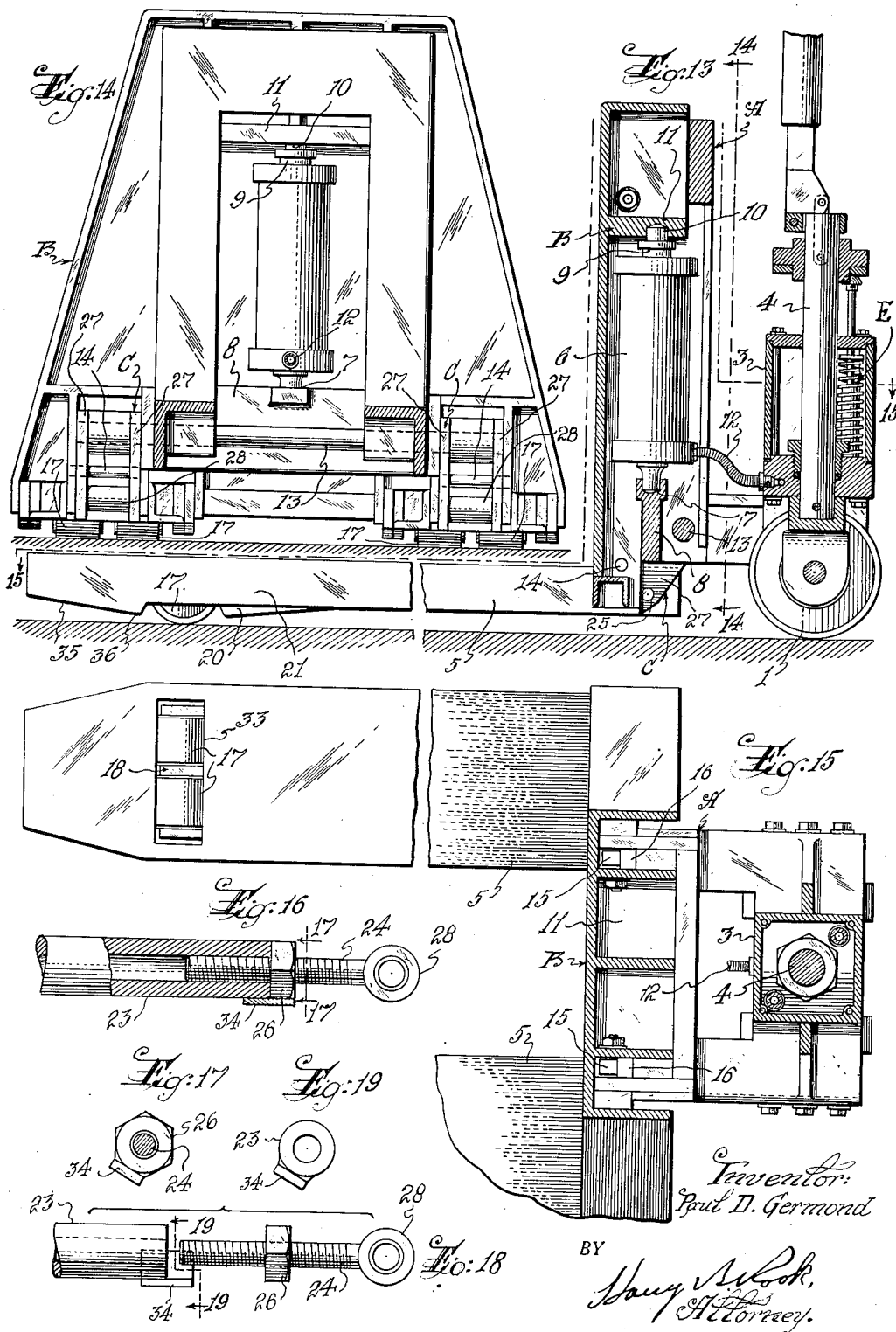
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PALLET TRUCK

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5 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

2,681,202

PALLET TRUCK

Paul D. Germond, Englewood, N. J.

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7 Claims. (Cl. 254-2)

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This invention relates in general to an industrial truck of the general type including a main frame and an elevating platform; and more particularly the invention contemplates a truck of the type in which the elevating or lifting platform may enter between the upper and lower floors of a skid of the pallet type for lifting and transporting a load stacked on the pallet.

One object of the invention is to provide a lift truck of this character which shall be capable of efficiently lifting and transporting relatively heavy loads with a minimum number of wheels and simple, strong and movable parts.

Another object is to provide such a truck which shall include a lifting head and an elevating platform having a standard associated with said lifting head in a novel and improved manner in combination with a lifting unit such as a hydraulic ram to ensure reliability and efficiency in operation.

A further object is to provide a lift truck of the character described wherein the elevating platform shall have lifting wheels each of which is journaled at one end of a bracket which is pivotally mounted intermediate its ends on the platform, and a lifting link shall be pivotally connected to both said lifting head and said standard and shall also be connected by a push rod to the other end of each of said brackets, whereby upon lifting of the elevating platform, a thrust shall be exerted on said push rod to swing said brackets and thereby cause said brackets and wheels to cooperate with the lifting unit to lift the elevating platform.

Other objects are to provide a simple and strong mounting for the lifting wheels on the elevating platform; to provide simple and reliable means for guiding and raising the lifting wheels over the floor boards of a pallet to facilitate entry and exit of the elevating platform into and from the space between the upper and lower floor boards of the pallet; and to obtain other advantages and results that will be brought out by the following description in conjunction with the accompanying drawings in which:

Figure 1 is a side elevational view of a pallet truck embodying the invention, showing it in relation to a pallet preparatory to lifting the pallet;

Figure 2 is a similar view showing the elevating platform lifted and supporting the pallet;

Figure 3 is a rear elevational view of the pallet truck;

Figure 4 is an enlarged side elevational view of the pallet truck showing the elevating platform about to pass over the floor boards of a pallet;

Figure 4a is a fragmentary side elevational view showing the movement of the elevating platform between the upper and lower boards of the pallet;

Figure 4b is an end elevational view approxi-

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mately on the plane of the line 4b-4b of Figure 4;

Figure 5 is a composite top plan and horizontal sectional view of the pallet truck approximately on the plane of the line 5-5 of Figure 4;

Figure 6 is a horizontal sectional view approximately on the plane of the line 6-6 of Figure 7;

Figure 7 is a vertical sectional view approximately on the plane of the line 7-7 of Figure 6;

Figure 8 is a side elevational view of the truck with the elevating platform in its uppermost position and with portions broken away and shown in section;

Figure 9 is a transverse vertical sectional view approximately on the plane of the line 9-9 of Figure 8;

Figure 10 is a similar view on the plane of the line 10-10 of Figure 6;

Figure 11 is a vertical sectional view approximately on the plane of the line 11-11 of Figure 6;

Figure 12 is a fragmentary bottom plan view of one of the legs of the elevating platform;

Figure 13 is a central longitudinal vertical sectional view through the elevating truck with the elevating platform in its lowermost position;

Figure 14 is a transverse sectional view approximately on the plane of the line 14-14 of Figure 13;

Figure 15 is a composite plan and horizontal sectional view approximately on the plane of the line 15-15 of Figure 13;

Figure 16 is an enlarged detached side elevational view of one end of one of the push rods with portions broken away and shown in section;

Figure 17 is a transverse sectional view on the plane of the line 17-17 of Figure 16;

Figure 18 is a composite side elevational view of two of the sections of the push rod in separated relation;

Figure 19 is an end view of one of the sections of the push rod from the plane of the line 19-19 of Figure 18;

Figure 20 is a detached side elevational view of the elevating platform;

Figure 21 is a front elevational view thereof;

Figure 22 is a transverse sectional view on the plane of the line 22-22 of Figure 21;

Figure 23 is a fragmentary side elevational view of the lifting head or main frame of the truck;

Figure 24 is a rear elevational view thereof approximately from the plane of the line 24-24 of Figure 23 and showing in broken lines the relation of the standard of the elevating platform to the lifting head; and

Figure 25 is a vertical sectional view on the plane of the line 25-25 of Figure 24.

Specifically describing the invention, the pallet truck comprises a main frame which includes a lifting head A that is mounted on steering and traction wheels 1 and may be pulled from place

3 to place by a draft handle 2, of any suitable construction. For the purpose of illustrating the invention, the main frame A has been shown as provided with a bolster block 3 on its forward side in which is journaled a king pin 4 revol-
5 able about a vertical axis and carrying the steering wheels 1 at its lower end, all substantially as shown in my United States Patent No. 2,163,675 granted on June 27, 1939.

The elevating platform includes a forward 10 standard B which is vertically movably associated with the lifting head A, said platform also having a pair of parallel horizontal legs 5 rigidly secured to the standard and of a thickness to slip between the upper and lower boards of a pallet D as best shown in Figures 1 and 2.

Any suitable lifting unit may be utilized for elevating the platform, but I have shown a unit similar to that disclosed in my above-mentioned patent and including a hydraulic ram comprising a cylinder 6 having one end seated with a ball and socket joint 7 on a transverse bar 8 forming a part of the lifting head A, said cylinder having a piston 9 therein which has a ball and socket joint 10 with a cross beam 11 that forms a part of the standard B of the platform. Hydraulic pressure is applied to the cylinder 6 through a tube 12 from pumping mechanism like that shown in my above-mentioned patent.

The means for mounting the standard of the 30 platform on the lifting head includes a link C at each of opposite sides of the lifting head keyed or otherwise fast connected on a cross shaft 13 that is journaled in the lower end of the lifting head, each link being swingable in a vertical plane that extends approximately longitudinally medially of each of the legs 5 of the platform as best shown in Figures 6 and 7. Each link is pivotally connected by a pin 14 to the lower end of the platform standard B, while the upper end of the platform standard has a roller 15 at each of opposite sides thereof which rides on an arcuate track 16 the radius of which approximately corresponds to the distance between the centers of the shaft 13 and the pin 14, said track being on the lifting head.

The rear end of the platform is mounted on lifting wheels 17 one of which is provided for each leg 5 of the platform and is journaled in one end of a bracket 18 which is pivotally mounted intermediate its ends on a pivot rod 19 which is mounted in blocks 20 each of which is bolted or otherwise rigidly secured on the inside of the corresponding side flange 21 of the respective platform leg 5. The other end of each mounting bracket 18 is pivotally connected at 22 to a push rod 23 that is formed of two sections one of which comprises a pipe while the other is a screw threaded rod 24 freely slidable in one end of the pipe and having its other end pivotally connected at 25 to the corresponding lifting link C. An adjustable abutment nut 26 is threaded on the rod 24 to abut the end of the pipe.

As shown, the relation of the pivotal connection 22 to the connection 19 of the mounting bracket to the platform is such that when the platform is in its lowermost position as shown in Figures 1 and 7, the platform leg will be supported on the lifting wheels 17 with the brackets 18 disposed approximately horizontally and with the connection 22 disposed above and forwardly of the connection 19, while when the rods 23 are pushed rearwardly, the brackets 18 will be swung about the pivot rods 19 to a vertical position so as to move the lifting wheels forwardly to sup-
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port the platform legs in their uppermost position as shown in Figures 2 and 8. One or more tension springs 26 are provided for normally influencing the lifting wheels into their normal position as shown in Figure 7.

In operation of the truck, assuming that the platform is in its lowermost position, to elevate the platform the pumping mechanism E is operated to actuate the hydraulic ram so as to force the piston 9 thereof upwardly and thereby raise the platform standard. During this movement, the links C are swung rearwardly by their pivotal connections 14 with the platform standard, and the rollers 15 ride along the arcuate tracks 16. At the same time, the push rods 23 are forced rearwardly by virtue of their connections 25 with the respective links C and the mounting brackets 18 are thereby swung to move the lifting wheels 17 forwardly. To cause descent of the platform, the hydraulic pressure is released from the ram in known manner so that the platform may descend by action of gravity, assisted by the influence of the springs 26.

While various details of structure may be utilized for the links C and mounting brackets 18, it is desirable that the links C comprise two side plates 27 between which a tubular head 28 of the section 24 of the push rod is disposed. Preferably each of the mounting brackets 18 has two spaced arms 29 between which a tubular head 30 on the end of the push rod is disposed, and each spring 26 has one end connected to a fin 31 on the push rod and the other end connected to a stud 32 on the platform leg.

The lengths of the push rods are adjustable to insure proper movements of the lifting wheel; by adjusting the nut 26 on the rod 24, obviously the length of the push rod may be varied, and it is desirable to provide some means for holding the nut in adjusted position. Such means has been shown as comprising a lock finger 34 projecting from the end of the pipe and normally overlying one side of the nut as best shown in Figures 16 and 17. When it is desired to adjust one of the push rods, the platform is elevated as shown in Figure 2 whereupon some means is provided for holding the lifting wheel of the corresponding rod against returning to its normal position when the ram is released for lowering the platform; for example a block of wood could be inserted between the lifting wheel and the edge of the corresponding clearance opening 33 in the platform leg. Then the platform is released and one leg is lowered. At the same time, the leg having the chocked wheel is held in its upper position but the threaded section 24 of the corresponding push rod is pulled partially out of the pipe so as to provide a clearance between the nut 26 and the lock finger 34, as shown in exaggerated form in Figure 18. Then the nut can be adjusted and the chocked wheel released so as to permit the corresponding platform leg to descend to its normal position. Both push rods can be adjusted in this way until the proper relationship between the two lifting wheels is obtained.

The truck is also provided with means to facilitate entry and exit of the platform legs into and from the space between the upper and lower boards of a pallet. Secured to the lower side of the rear end of each of the platform legs is an inclined plate 35 the lower surface of which is so formed at the forward end 36 as to lie above the plane of the lower portion of the periphery of the corresponding lifting wheel 17, so that when the platform is in its lowermost position,

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the wheel 17 will roll along the ground and the plate 35 will clear the ground. Each block 20 has its lower side formed with a similar inclined surface 37 which is inclined upwardly and forwardly from a point just above the lower portion of the periphery of the wheel 17 when the platform is in its lowermost position, or as best shown in Figure 7.

With this construction, it will be observed that when it is desired to insert the platform legs between the upper and lower boards of a pallet, the inclined surface 35 will first strike the lower floor board of the pallet and will then slide along said floor board so as to raise the platform until the lifting wheels 17 engage said pallet board (see Figures 4, 4a and 1). Similarly the inclined surfaces 37 will raise the platform over the pallet boards as the platform is withdrawn from the pallet.

While the preferred embodiment of the invention has been illustrated and described, it will be understood by those skilled in the art that the detailed construction of the truck may be widely modified and changed within the spirit and scope of the invention. Particularly the use of other types of lifting units than that hereinbefore described is contemplated.

I claim:

1. A lift truck comprising a wheeled lifting head, an elevating platform having a vertical standard at its forward end, means connecting said vertical standard of said elevating platform to said lifting head for vertical movement including a pair of links each pivotally connected at one end to said lifting head at one of opposite sides thereof on a common axis with the other link and also pivotally connected adjacent its other end to said elevating platform, wheel-carrying brackets each pivotally mounted intermediate its ends on said platform and swingable between a horizontal position and a vertical position and having a wheel journaled in one end thereof, push rods each pivotally connected at one end to the second-mentioned end of one of said links below and rearwardly of the pivotal connection of said link to the lifting head and below the pivotal connection of said link to said platform, each push rod being connected at its other end to the other end of one of said brackets above and forwardly of the pivotal connection of said bracket to the platform when said bracket is horizontally disposed, so that upon upward movement of the forward end of said platform said push rods will be pushed longitudinally rearwardly to swing said brackets and move said wheels forwardly and said platform upwardly, and a lifting unit on said lifting head for raising the forward end of said platform.

2. A lift truck as defined in claim 1 wherein said links are connected adjacent the lower ends of said lift head and said vertical standard of the elevating platform and said means also includes a convex arcuate track on one and a follower therefor on the other of said lift head and said vertical standard adjacent the upper ends thereof.

3. A lift truck as defined in claim 1 wherein each push rod includes two freely relatively longitudinally slidable telescoping sections and an adjustable abutment element on the inner section to abut the adjacent end of the other section when said push rod is pushed rearwardly.

4. A lift truck as defined in claim 3 with the addition of means on the outer section of the

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push rod for releasably holding said abutment element in adjusted position.

5. A lift truck comprising a lifting head, an elevating platform having a vertical standard at its forward end and having two load-carrying legs each of which has spaced and parallel vertical side flanges, means connecting said vertical standard to said lift head for vertical movement, a bearing block separately fastened on the inside of said flange of each platform leg opposite the block on the other leg, bolts separably fastening said blocks to the respective flanges, a pivot rod having its ends pivoted only in said blocks and extending transversely of said platform leg, a wheel-carrying bracket journaled on each of said pivot rods, means on said lifting head for raising said vertical standard on the platform, and means operable upon ascent of said vertical standard for actuating said wheel carrying brackets to raise the rear ends of said platform legs.

6. A lift truck as defined in claim 5 with the addition of a plate at the underside of the rear end of each platform leg inclined upwardly and rearwardly from the corresponding wheel to contact the floor boards of a pallet and raise the rear end of the platform as the latter is pushed into the space between the upper and lower boards of a pallet, the lower surfaces of said bearing blocks also being inclined upwardly and forwardly to contact the floor boards of a pallet and raise the platform during movement of the latter out of the space between the upper and lower boards of the pallet.

7. A lift truck comprising a wheeled lifting head, an elevating platform having a vertical standard at its forward end, means connecting said vertical standard of said elevating platform to said lifting head for vertical movement including a link pivotally connected to one end to said lifting head and also pivotally connected adjacent its other end to said elevating platform, a wheel-carrying bracket pivotally mounted intermediate its ends on said platform and swingable between a horizontal position and a vertical position and having at least one wheel journaled in one end thereof, a push rod pivotally connected at one end to the second-mentioned end of said link below and rearwardly of the pivotal connection of said link to said lifting head and below the pivotal connection of said link to said platform, said push rod being connected at its other end to the other end of said bracket above and forwardly of the pivotal connection of said bracket to the platform when said bracket is horizontally disposed, so that upon upward movement of the forward end of said platform said push rod will be pushed longitudinally rearwardly to swing said bracket and move said wheel forwardly and said platform upwardly, and a lifting unit on said lifting head for raising the forward end of said platform.

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