

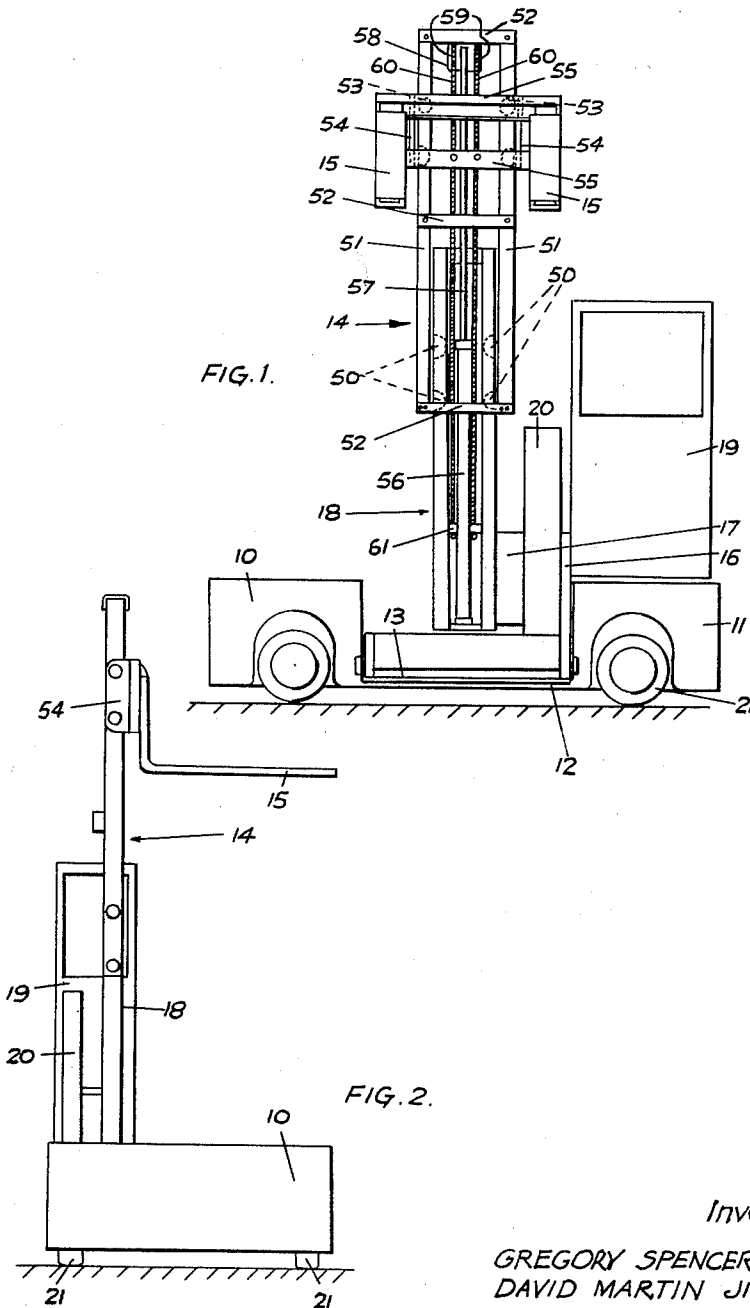
Feb. 9, 1965

G. S. JINKS ETAL
FORK LIFT TRUCKS

3,168,956

Filed Dec. 1, 1960

7 Sheets-Sheet 1



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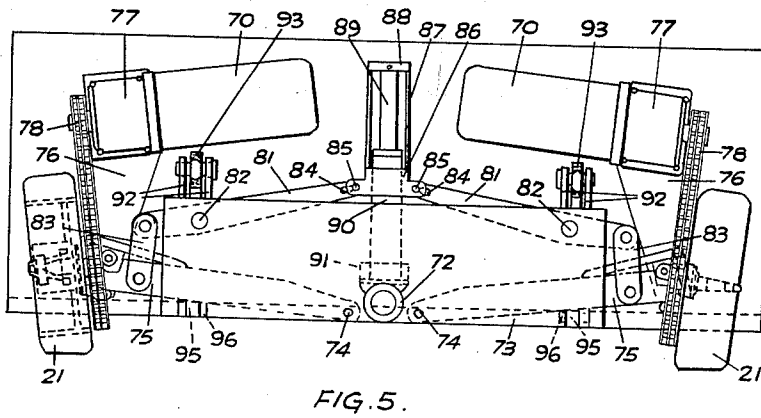
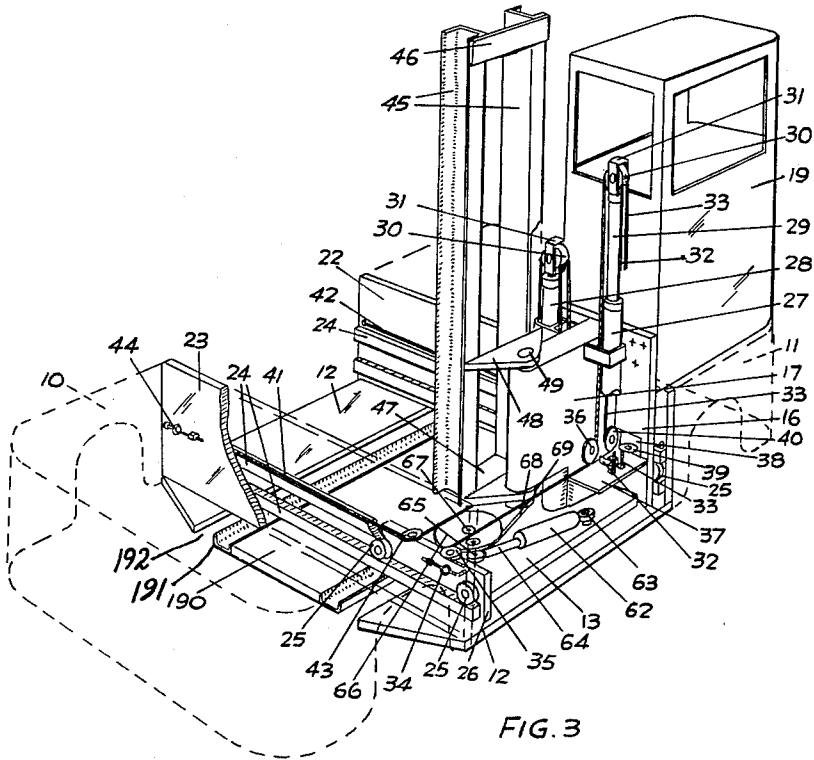
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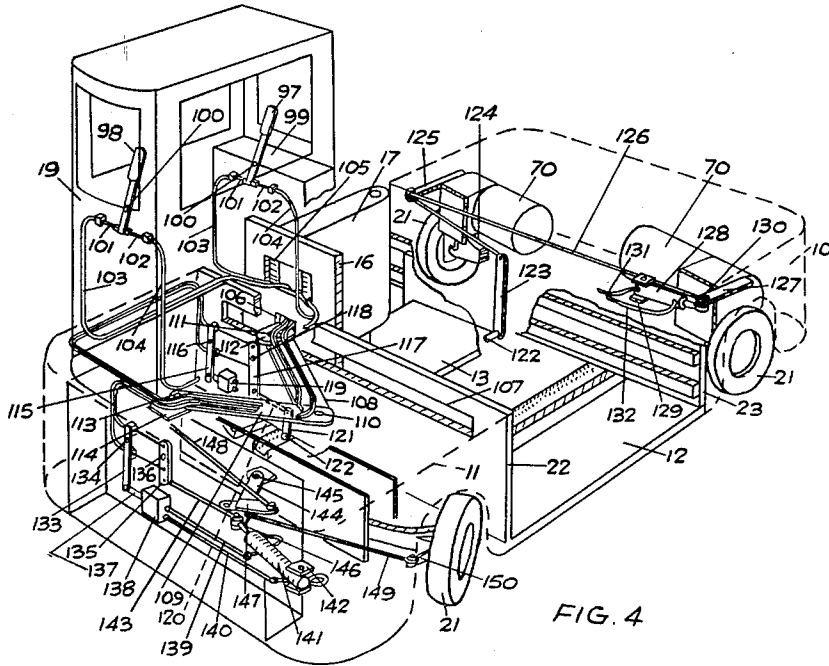


FIG. 4

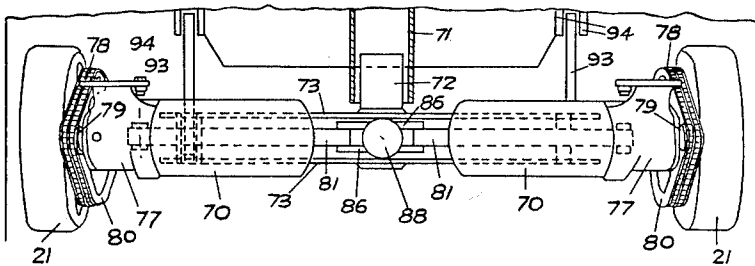


FIG. 6.

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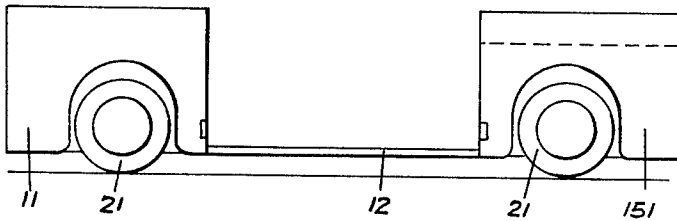


FIG. 7

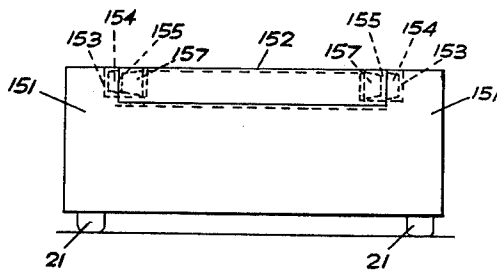


FIG. 8.

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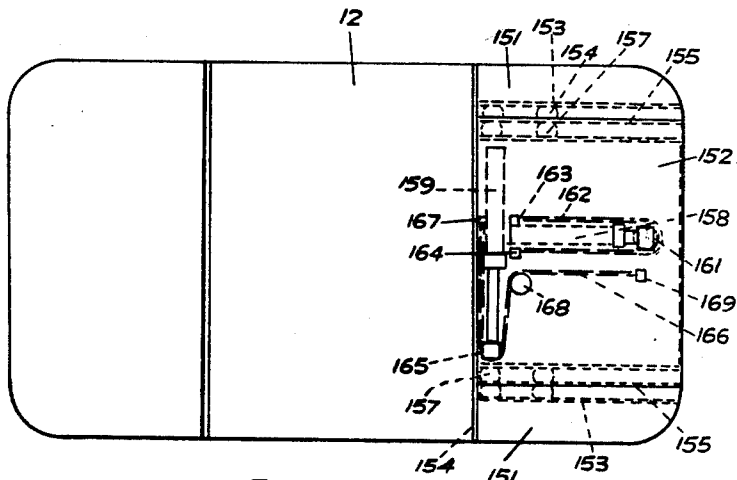


FIG. 9.

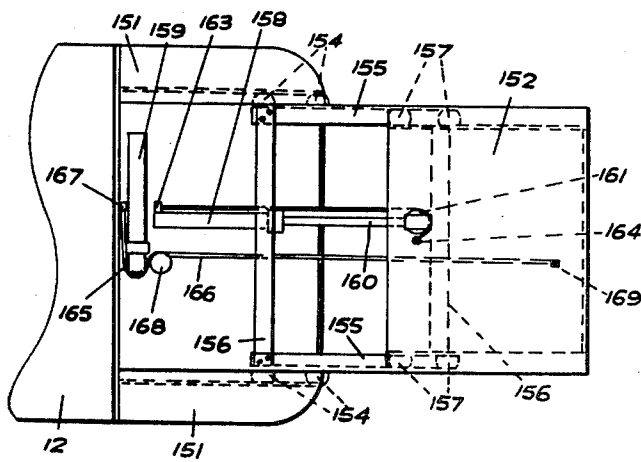


FIG. 10.

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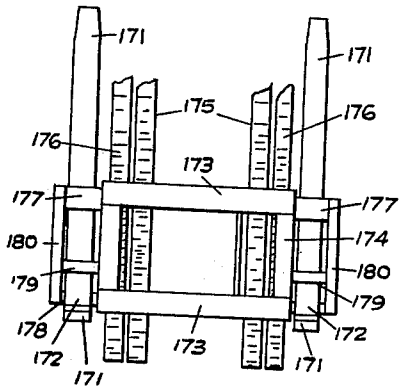


FIG. 11.

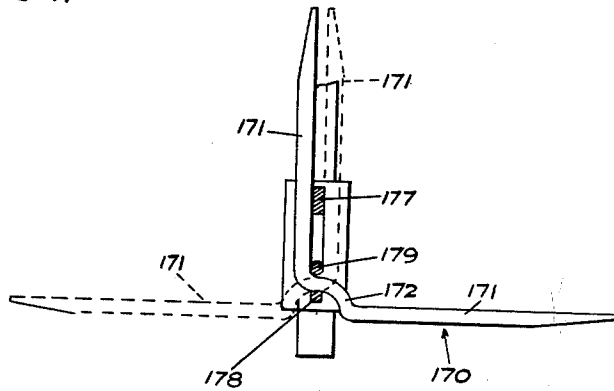


FIG. 12.

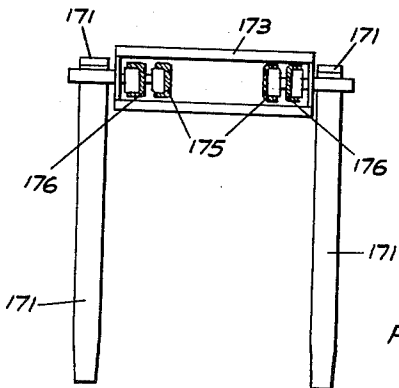


FIG. 13.

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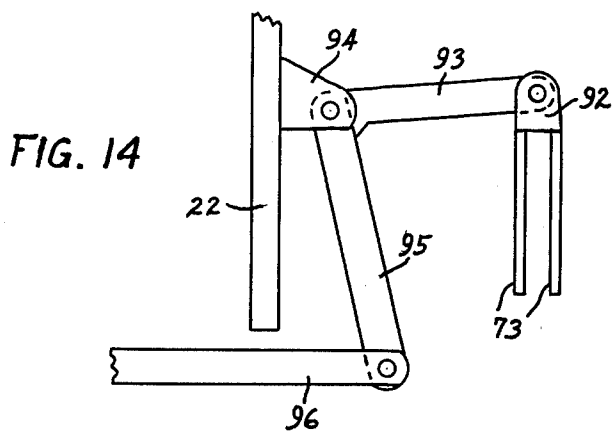
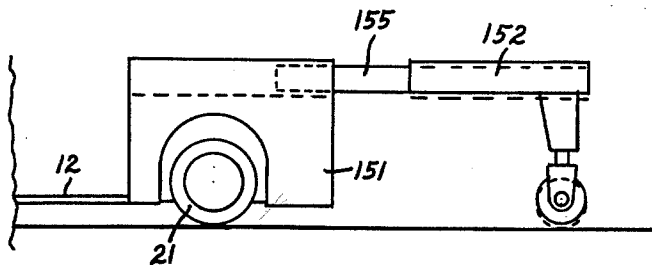


FIG. 15



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FORK LIFT TRUCKS

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Filed Dec. 1, 1960, Ser. No. 73,103

Claims priority, application Great Britain, Dec. 1, 1959, 40,787/59

8 Claims. (Cl. 214-75)

This invention is for improvements in or relating to load handling fork lift and like trucks and has for one of its objects to provide a truck which is particularly suited for dealing with loading and unloading operations on one or both sides of a narrow gangway.

In accordance with the invention there is provided a load handling truck having front and rear platforms braced together at low level across their width and having a travelling mast mounted to move transversely of the truck between said platforms and load handling means mounted for raising and lowering movement on the mast, with the parts so arranged and organised that the load handling means may be caused to project laterally from either side of the truck at will between the front and rear platforms for picking up or depositing a load. Thus the truck can operate in gangways having a width little greater than that of the truck for loading or unloading at either side and the handling of the goods in compactly arranged storage lines is greatly facilitated and expedited.

The load handling means may be constituted by lifting forks or an equivalent load engaging device and it is so arranged that it can be projected laterally from the truck at either side to an extent approaching the width of the truck and withdrawn to within the compass of such width so that loads of corresponding width may be handled which when loaded on to the truck may be lowered to rest on the front and rear platforms. The load handling means and mast are mounted on a carriage for lateral traversing movement and a driver's control cabin may conveniently also be supported by the carriage so as to partake of the lateral traversing movement so that from whichever side of the truck a load is handled space is left clear on the front and rear platforms to receive a long load.

It is advantageous to provide the truck with wheel mountings permitting heightwise adjustment of the truck frame to bring the bottom of the truck closer to or further from the ground between the wheels supporting the ends of the truck. By this provision the truck frame can be adjusted to suit different ground conditions and to enable the load handling means to operate from as low a level as ground conditions permit.

It is advantageous for stability purposes to mount the truck on four wheels arranged in pairs towards the front and rear of the truck and so to relate the wheel mountings that in each pair an upward movement of one relatively to the truck frame causes a corresponding downward movement of the other relatively to the frame, with a similar interconnecting relation provided between the two wheels on each side. Thereby the truck suspension is self adjusting to compensate for irregularities in ground surface and in addition good stability when off loading at either side is secured. It is further advantageous to arrange that all four wheels can be steered and to have the wheels in each of the front and rear pairs coupled for simultaneous steering with separate controls for steering the front and rear wheels. Thereby the manoeuvring of the truck is greatly increased in scope.

In a preferred form of construction the load handling means is pivoted about an upstanding axis to enable it to be turned through a 180° for presentation at either side

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of the truck. The mast may be mounted to turn with the load handling means or be fixed with the load handling means pivoted to it. In an alternative construction a modified form of load handling means is arranged to be mounted to turn about a horizontal axis for presentation at either side of the truck.

Other provisions of the invention relate to a longitudinally movable deck on one of the end platforms and to certain constructional features whereby control connections are accommodated within the depth of the low level bracing means between the platforms.

Examples of preferred constructional forms of the invention are illustrated in the accompanying drawings in which:

FIGURE 1 is a side elevation view of a side loading truck,

FIGURE 2 is an end elevation view of the same truck, FIGURE 3 is an enlarged broken perspective and partly phantom view of certain details of the truck showing particularly the mounting of the mast or gallows,

FIGURE 4 is an enlarged broken perspective and partly phantom view of certain parts of the truck seen from the opposite view point of that of FIGURE 3 and illustrating the steering arrangements,

FIGURE 5 is a detail view in end elevation showing the wheel mountings at one end of the truck,

FIGURE 6 is a view in plan of the parts shown in FIGURE 5,

FIGURES 7, 8 and 9 are respectively, a side elevation, end elevation and plan view of a truck body (omitting the load handling mechanism) illustrating a modification,

FIGURE 10 is a view corresponding to FIGURE 9 showing the parts in a different setting,

FIGURES 11, 12 and 13 are respectively detail views in front and side elevation and plan of a modified form of the load handling means.

FIGURE 14 is a fragmentary view of a portion of the steering mechanism shown in FIGURE 5; and

FIGURE 15 is a side elevation of one end of the truck showing the movable platform.

Referring firstly to FIGS. 1 and 2, the side loading truck shown therein comprises front and rear platforms 10 and 11 braced rigidly together at low level by a bottom plate 12 at each side of the vehicle. In the space between the tables 10 and 11 and just above the plates 12 there is mounted for movement across the vehicle a carriage 13 carrying a mast or gallows indicated at 14 on which is mounted load handling means constituted by spaced lifting forks 15. The carriage 13 has an upstanding wall 16 from which there extends a buttress 17 on which a bottom frame portion 18 of the mast 14 is mounted to swing about a vertical pivot. The upstanding wall 16 also has fixed to it a driver's cabin 19 the bottom of which is spaced slightly above the table 11 so that as the carriage 13 is moved laterally of the truck both the mast 14 supporting the lifting forks 15 and the driver's cabin 19 are moved with it. The carriage 13 also supports casings 20 on each side of the buttress 17 which house the operating means for traversing the carriage. The truck is supported on ground engaging wheels 21 these being four in number and located two underneath each of the tables 10 and 11 just within the lateral boundaries of the truck.

As shown more clearly in FIG. 3 the inner ends of the platforms 10 and 11 carry upstanding plates 22 and 23 which are spaced apart parallel to one another and at right angles to the length of the truck, and through which the platforms are braced by plates 12. The plates 22 and 23 support upper and lower guide bars 24 between which engage rollers 25 rotatably mounted on the outer faces of wall 16 and a short wall 26 at the opposite end of the

carriage 13. The latter is thus mounted to run transversely of the truck and guided accurately for its transverse movement by guideways 24. To effect traversing of the carriage there are provided two hydraulic ram cylinders 27 and 28 mounted within the casings 20 aforementioned, the piston rods 29 of which carry at their upper ends pairs of pulleys 30 all mounted to rotate in mountings thereon. The near cylinder 27 has associated with it cables or ropes 32 and 33 whereof the rope 32 extends from an anchorage 34 securing it at one end to the upstanding plate 23, through an aperture in such plate, around a pulley 35 on the side wall 26 of the carriage, around a pulley 36 mounted on the buttress 17, over one of the pulleys 30 associated with the cylinder 27 and down to an anchorage on a bracket 37 secured to the lower part of the buttress 17. Similarly the rope 33 extends from an anchorage corresponding to anchorage 34 but on the opposite side plate 22, through a hole in such plate and an aperture 38 in side wall 16, around pulleys 39 and 40 corresponding to pulleys 35 and 36, over the other of the pulleys 30 associated with cylinder 27 and down to the anchorage plate 37. A corresponding arrangement of cables 41 and 42, guide pulleys 43 and one not seen in the drawings, is associated with the hydraulic cylinder 28, the cables 41 and 42 having anchorages 44 at the opposite sides of the truck to that at which the anchorages 34 are positioned and anchorages at their other ends in fixed relation to the carriage to which the cables pass downwardly from the pulleys 30 associated with the cylinder 28. Thus when the hydraulic cylinder 27 is energised to urge its piston rod 29 upwardly the cables 32 and 33 are taken up in bights to draw the carriage 13 to the near end of its runway as seen in FIG. 3 and conversely when the cylinder 28 is energised the ropes 41 and 42 are taken up to draw the carriage 13 to the opposite side of the truck. The cylinders 27 and 28 are operated by orthodox control means by which they can be actuated simultaneously in opposite directions.

The mast or galleys comprises a rigid upstanding bottom frame composed of side channels 45 braced together by top and bottom cross pieces 46 and 47 and having fixed to them at their lower parts triangular cross brackets 48 to provide a pivotal mounting means. The plates 48 fit above and below the buttress member 17 to which they are pivotally attached by aligned pivots indicated at 49 so that the bottom part 45, 46 of the mast can be swung through 180° about a vertical axis on the pivots 49 thereby permitting the mast to be positioned on either side of the buttress member 17. The channel members 45 form guideways for inwardly projecting rollers 50, FIG. 1 on a heightwise movable upper part of the mast formed by channel section side members 51 which are braced by cross members 52 to form a frame which straddles the bottom part of the mast. The channel side members 51 in turn form guideways for inwardly directed rollers 53 on a further framework composed of side pieces 54 which carry the rollers 53 and upper and lower cross members 55. The latter project beyond the side pieces 54 to carry the back portions of the L-shaped forks 15. Raising and lowering of the forks 15 on the mast is controlled by a hydraulic ram 56 having a piston rod 57 the upper end of which is anchored to a bracket 58 secured to the top cross member 52 on the upper part of the mast. The bracket 58 also carries two pulleys 59 over which there extend cables or chains 60 each connected at one end to the lower cross member 55 of the fork frame and at the other end to an anchorage 61 on the lower mast frame. When ram 56 is extended the upper mast framework 51, 52 is raised to cause the cables or chains 60 to be drawn upwards by the pulleys 59 so that not only is the upper mast framework 51, 52 raised but the forks 15 are also caused to ride upwardly on the upper frame members 51. When the ram 56 is contracted the weight of the upper frame 51, 52 and of the forks 15 and their carrier frame causes them to fall to a lowered

position and the arrangement is such that the forks can be lowered to the level of the plates 12 at the lower part of the truck body.

The pivotal mounting on the pivots 49 of the lower part of the mast permits the mast together with the forks to be turned through a range of 180° from a position in which the forks 15 are directed laterally of the truck in one direction to a position in which they are oppositely directed, that is towards the other side of the truck. The turning of the parts about the pivots 49 is effected by means of a small hydraulic ram 62 anchored at 63 to the carriage 13 and having its piston rod 64 coupled at 65 to an arm coupled to a chain wheel 66 mounted to turn on a spindle 67. The chain wheel 66 is engaged by an endless chain 68 through which it drives a sprocket 69 fixed to the lower one of the pivot brackets 48. The ram 62 is double acting so that it may be operated to rotate the gear wheel 66 in either direction for the purpose of swinging the mast and forks 15 from one to the other of their opposite setting, and is preferably so controlled as to permit the turning movement to be arrested for an intermediate setting of the mast and forks for a purpose later explained.

It will be seen from the foregoing description that the load handling means on the truck are so organized that the lifting forks can be raised and lowered on the mast, and can be set to project laterally towards either side of the truck, and can be moved by means of the carriage 13 to travel across the truck and project therefrom as required. Thus the forks may be used to pick up or deposit a load at either side of the truck and at any level on the mast ranging from a low level near the ground to a high level near the top of the elevated mast. With a load on the forks 15 and the forks raised to above the level of the platforms 10 and 11 the carriage can be travelled across the truck to bring a picked up load on to the truck and within the width thereof or project a load outwardly for delivery as the case may be. A load longer than the width of the forks can be picked up from either side and deposited lengthwise to rest on the platforms 10 and 11, and subsequently lifted from the platforms and deposited laterally of the truck. It is to be noted that by having the driver's cabin 19 mounted on the carriage 13 to partake of the lateral travelling movement thereof space is provided on the platform 11 to accommodate a load to be deposited partly thereon by the forks 15 irrespective of which side of the truck the loading operation is performed.

To enable the load handling facilities afforded by the construction so far described to be utilised more fully the truck has certain advantageous arrangements of its suspension, steering, level adjustment and propulsion which will now be described. These arrangements provide for good stability, wide range of manoeuvrability and centralised control of the propulsion and steering from the driver's cabin without interference with the central space required for traversing the mast, as well as adjustability of the level of the truck body to suit varying ground conditions.

The propulsion of the truck is effected in the example shown by driving motors 70 associated one with each driving wheel and supported on the stub axle bracket of the wheels. The wheels 21 at only one or at both ends of the truck may be thus fitted with driving motors which may be electric or hydraulic or other type of motors, and actuated by common control means in the driver's cabin. All four of the wheels 21 are arranged as steering wheels, and are coupled in pairs at the two ends for steering, those at one end of the truck being arranged to be steered together by means of one control and those at the other end being steered together by a separate control. Thus the driver can steer the truck conventionally by means of the leading wheels only in either direction of travel, or turn all wheels in the same direction for crab-wise steering, or turn the wheels at one end oppositely to

the wheels at the other end for short radius turning movement of the truck.

The suspension of the truck is such that the two wheels of each end pair are so interconnected that a rising movement of one in relation to the truck body caused a falling movement of the other and in addition each two wheels on the same side of the truck are similarly interconnected. This arrangement ensures particularly good stability when dealing with heavy off loads and also avoids excessive localised stresses on parts of the truck body arising from load concentration or passage of the truck over uneven ground. In particular stresses tending to deform the guideways for the carriage 13 out of parallelism are avoided.

FIGS. 5 and 6 show the wheel suspension, the same arrangement being applied at each end of the truck. The plates 22 and 23 have secured centrally to them bearing sleeves 71 in which tubular pivot members 72 are mounted to turn in bearings on the longitudinal centre line of the truck. The tubes 72 are secured to a box framework comprising spaced rectangular plates 73 extending transversely of the vehicle. Between the plates there are pivoted at 74 two axle bars 75 extending outwardly to support the wheel mountings. The latter consist of stub axle brackets pivoted for steering movements in orthodox manner on king pins at the outer ends of the axle bars 75. For the driving wheels the stub axle brackets have upward extensions 76 to support the motors 70 which drive the related wheels 21 through reduction gear boxes 77, chains 78 and sprockets 79 and 80, the last mentioned sprockets being secured to the wheels 21.

The heightwise settings of the outer ends of the axle bars 75 in relation to the supporting plates 73 are determined by upper levers 81 pivoted at 82 between the plates 73 and coupled by links 83 to the axle bars 75. The levers 81 have at their inner ends slots 84 in which pins 85 in a cross head 86 engage. Attached to the cross head 86 is an extension fram 87 having a cross piece 88 coupled to the piston rod 89 of a hydraulic ram 90 the cylinder of which is contained between the plates 73 and also forms a bearing for the cross head 86. The ram 90 is fixed at its lower end to the tube 72 by means of a mounting indicated at 91. Rams 90 and leverages 81, 83 provided at the two ends of the truck are operated in unison to effect heightwise adjustment of the bottom of the truck in relation to the ground. When the piston rods 89 of the rams 90 are extended to raise the cross head as in FIG. 5, the two axle bars 75 are lowered to increase the ground clearance of the truck body. Collapse of the rams 90 on release of the hydraulic fluid from them to a greater or less extent occurs under the weight of the body of the truck and causes the axle bars 75 to rock upwardly thereby reducing the ground clearance of the bottom of the truck to any extent required.

By the form of construction just described it will be seen that at each end of the vehicle the two wheels 21 form part of an assembly which is centrally pivoted to rock bodily about a longitudinal axis so that if one wheel is raised in relation to the truck body the opposite wheel is lowered correspondingly. For the longitudinal interconnection of the wheels on each side the plates 73 are fitted with the pivot brackets 92 at the top towards each end. To these pivot brackets are anchored extremities of bell crank levers 93 (FIGS. 5 and 14) which are pivoted to brackets 94 secured to the plates 22 and 23. The levers 93 have depending arms 95, connected to the forked ends 96 of links which extend along the truck and are coupled at their other ends to depending arms 95 of the corresponding bell crank levers 93 at the other end of the truck. Thus when one wheel 21 is lowered the corresponding wheel on the same side of the truck is raised in relation to the truck body due to the operation of the bell crank levers 93 and the longitudinal links.

The steering connections for the wheels can be seen in FIG. 4 the control being my means of hand operated

levers 97 and 98 in the driver's cabin 19. These levers are preferably positioned fore and aft of the cabin 19 so that the lever 97 can be used for two-wheel steering when travelling in the direction towards the right as seen in FIG. 4 and the lever 98 similarly used for two-wheel steering when travelling in the opposite direction. Thus lever 97 controls the steering for the wheels 21 appearing at the far end of the truck towards the right of FIG. 4, while lever 98 controls steering of the wheels at the opposite end. The cabin 19 also contains a control box indicated at 99 housing control gear by which the propulsion of the truck and the operation of the load handling mechanism is controlled. Each of the levers 97 and 98 has an intermediate pivot indicated at 100 and operates two Bowden wires 101 and 102. The sheaths 103, 104 of these are anchored near the levers 97 and 98 and extend through an opening 105 in the plate 16 of the carriage and back through a lower opening 106 in the plate. It is necessary to articulate the Bowden cables to allow for the lateral travel of the driver's cabin with the carriage 13, and to this end the Bowden cables are brought together and after passing through a transverse slot 107 formed in the plate 22, are carried along an articulated mounting consisting of levers 108 and 109 pivoted to one another at 110 and having their free ends pivoted respectively at 111 to a bracket 112 on plate 16 and at 113 to a bracket 114 fixed under the platform 11.

The cables 103, 104, extending from the lever 97 pass from the bracket 114 to one side and then inwardly along the interior of the platform 11 and the ends of their sheaths are anchored to opposite arms of a lever 115 pivoted at 116 to the plate 22. The wires 101, 102 of these Bowden cables are similarly connected to a lever 117, pivoted to the plate 22 at a point 118 between the connections of the wires. The lever 115 operates a hydraulic control valve 119 while the lever 117 is coupled by a link 120 to a further lever 121 on a spindle 122 which extends along the vehicle and is connected at its other end to an upstanding lever 123 coupled by a link 124 to a steering arm 125 of one of the motor and wheel assemblies. The steering arm 125 is in turn connected by a cross link 126 to a similar steering arm 127 on the opposite wheel assembly. A double acting hydraulic arm 128 attached by a bracket 129 to the plate 23 on the face thereof remote from the centre of the truck has its piston rod 130 coupled to the steering arm 127. The ram 128 has pipes 131, 132 for supply of hydraulic fluid to operate it in opposite directions, the supply of such fluid being controlled by the valve 119 aforesaid operated by the lever 115. Thus when handle 97 is moved to turn the related wheels for steering the reaction resisting turning movement acting on lever 117 will set up a force on the sheaths of the Bowden cables causing lever 115 to be rocked to operate the control valve 119 and energize the ram 128 to effect the required steering movement until the forces on the levers 117, 115 are again in equilibrium.

Similarly the steering of the wheels 21 at the opposite end of the truck by means of the lever 98 is effected through the Bowden cables 103, 104 associated therewith which extend from the bracket 114 and have their sheaths coupled to a lever 133 on opposite sides of the fixed pivot 134 thereof. Also the wires 101 and 102 of the cables are similarly connected to a lever 135 on opposite sides of the fixed pivot 136 thereof. The lever 133 like the lever 115 is coupled by a link rod 137 to a hydraulic control valve 138 which controls the flow of operating fluid through pipes 139, 140 to a double acting hydraulic ram 141 anchored at 142 to the truck frame. The lever 135 is coupled by a link rod 143 to the free end of a lever 144 pivoted to the truck frame at 145. The lever 144 is also coupled to the piston rod 146 of the ram 141 and carries a bracket 147 the ends of which are coupled respectively by track rods 148 and 149 to steering arms of the wheel assemblies at the adjacent end of the truck one such arm being indicated at 150. The

steering action of the parts operated by hand lever 98 is precisely similar to that of the parts operated by hand lever 97, the reaction to the force acting lever 135 causing the lever 133 to be rocked to operate the hydraulic ram 141 to effect the required steering movement of the wheels at the appropriate end of the truck. The articulation of the levers 108 and 109 and their mountings are so designed that lateral travel of the cabin 19 with the carriage 13 has no effect on the steering of the wheels.

It will be seen from FIGS. 3 and 4 that a central low slung bracing plate 190 connects the platforms 10 and 11 between the plates 12 and that upturned channel members 191 adjoin the plate 190 leaving spaces 192 between them and the plates 12. The longitudinal spaces 192 and channel members 191 serve conveniently to accommodate the links connecting the bell-crank levers 93 at front and rear on each side of the truck, and the steering rod 122 as well as electrical and hydraulic connections extending between the ends of the truck, such parts being contained within the depth of the plates 12 so as to avoid interference with the travel of the carriage 13 or with the ground clearance.

It is often desirable when handling loads in gangways to have facility for picking up and temporarily parking one load whilst the load handling means are freed for handling another load. For instance, in the case of palletized goods when the pallets are stacked one on another in a storage line it may be desired to remove one or more upper pallets to enable a lower pallet to be transported separately to another place. For the performance of such an operation the truck may have an endwise movable platform section on which a load picked up from one side of the truck can be deposited by the forks 15 after they have been slewed round to a position over the platform remote from the driver's cabin. The provision of the endwise movable platform section enables the load to be released from the forks 15 by movement with the platform section away from them, so that the forks can then be turned one way or the other and moved away to deal with another load. A form of construction suitable for this purpose is illustrated in FIGS. 7 to 10 wherein the platform corresponding to that indicated at 10 in the earlier figures is composed of fixed side portions 151 and an endwise movable central portion or deck 152.

Along the parallel inside edges of the platform sections 151 there are channel guide members 153 to receive rollers 154 projecting laterally from an intermediate frame composed of side members 155 and cross members 156 the members 155 being of channel section to form guides for rollers 157 projecting laterally from the movable platform deck 152. To operate the movable deck 152 in opposite directions there are provided longitudinal and transverse hydraulic rams 158 and 159. The ram 158 is anchored at one end to the truck and has on its piston rod 160 an end pulley 161 around which passes a cable 162 whereof one end is attached to the underside of the movable deck 152 and the other end is anchored to the frame of the truck at 163 adjacent to the ram 158. The pulley end of the piston rod 160 is anchored to the outer cross member 156 of the intermediate frame 155, 156 so that as the ram 158 is extended the intermediate frame is pushed outwardly and at the same time the movable deck 152 is moved outwardly along the intermediate frame.

To retract the movable deck 152 the transverse ram 159 is energised to extend it and move a pulley 165 on its piston rod transversely of the truck and thereby form a bight in a further cable 166 at a position between an anchorage 167 of one of its ends to the truck and a guide pulley 168 mounted on the truck frame. The cable 166 extends from the pulley 168 outwardly lengthwise of the truck and is anchored at 169 to the underside of the deck. The action of extending the ram 159 accordingly draws the deck 152 inwardly to its fully withdrawn position as shown in FIG. 9.

The modified construction shown in FIGS. 7 to 10 may

be further improved as shown in FIG. 15 by the addition of supporting wheels carried by a downward extension from the outer end of the movable deck 152 to assist in supporting loads carried by the deck 152 when extended. Such further supporting wheels may be mounted in caster fashion on the said downward extension and normally supported slightly above the ground and be adapted to move against it when a load is applied. Thus the guide rails 153 may be mounted on compression springs so as to occupy a slightly raised setting when the deck 152 is free of load so that the additional supporting wheels are then held clear of the ground as in FIG. 15. When a load is applied to the deck the springs will yield until the additional supporting wheels make contact with the ground. If desired an assembly consisting of a main framework with underneath spring mountings and a longitudinally travelling deck corresponding to that shown at 152 mounted on such framework and having a downward extension provided with additional supporting wheels as aforesaid may be provided as a separate unit for attachment to a truck as shown in FIG. 1. Such arrangement may but need not incorporate an intermediate frame such as 155, 156 and operating mechanism for connection to appropriate control means on the truck. The provision of the additional supporting wheels may adapt the deck 152 to support a stack of loads of total weight greater than the capacity of the load handling means.

In a further modification the load engaging means constituted by the forks, instead of being pivoted about a vertical axis, is adapted to swing about a horizontal axis for presentation towards opposite sides of the truck. Such a modified construction is illustrated in FIGS. 11 to 13 wherein a pair of forks 170 of special form are used providing in effect two sets of forks approximately at right angles to each other as viewed in side elevation, each fork having arms 171 connected by an arcuate portion 172 at the junction of the arms. The forks 170 are mounted on a mast similar to that shown in FIGS. 1 and 2 but fixed to the carriage 13 and having its general plane extending lengthwise of the truck, the driver's cabin being also supported by the carriage in alignment with the last lengthwise of the truck. The forks 170 are mounted on outwardly projecting portions of a boxlike frame comprising upper and lower transverse members 173 and side pieces 174, which embrace the parts of the mast indicated in FIG. 11 at 175 and 176. From the side pieces 174 of the fork frame there extend upper, lower and intermediate projections 177, 178 and 179 the spaces between which are closed by side pieces 180. Each fork 170 has its arcuate portion 172 fitted between the projections 178 and 179 at the appropriate side of the frame 173, 174 so that in one position shown in full lines in FIG. 12 one fork arm 171 is horizontal and projects from one face of the mast to the right in FIG. 12. The forks can be swung over about the bottom projections 178 to the alternative position shown in dotted lines in FIG. 12 in which they project from the opposite face of the mast, that is to the left in FIG. 12. In each of these positions the fork arms 171 which are upstanding rest against the projections 177 to arrest turning movement of the forks and resist downward thrust on the horizontal fork arms.

The modification of FIGS. 11 to 13 can be applied to the truck to give similar side loading facilities to those afforded by the first construction except that, since the forks are not slewed round about a vertical axis, transfer of a load from one side to the other of the truck or to deposit it across the end platform of the truck, which the first construction permits, cannot be performed with this modification.

The truck constructions in accordance with the invention provide for greatly improved load handling facilities and with the alternative steering procedures possible and adjustment of the level of the truck it is made eminently suitable to deal efficiently with all kinds of loading and unloading problems, many of which could not be dealt

with satisfactorily without the present improved load handling facilities.

What we claim is:

1. A load handling truck comprising in combination, pairs of front and rear wheels, front and rear load supporting platforms, means bracing said platforms together at low level across their width and presenting a transverse recess between them, a travelling mast, means supporting said mast for movement transversely of the truck between said platforms, load handling means mounted for raising and lowering movement on the mast, and means for selectively projecting said load handling means laterally from either side of the truck between said front and rear platforms for picking up or depositing a load, said load handling means comprising a lifting fork mounted so as to be projected laterally from the truck at either side and withdrawn to within the contour of the truck, so that loads may be handled and lowered to rest on the front and rear platforms, said pairs of front and rear wheels having mountings permitting heightwise adjustment of the truck frame to bring the bottom of the truck closer to or further from the ground between the wheels supporting the ends of the truck.

2. A load handling truck according to claim 1, wherein said heightwise adjustment is simultaneous with respect to each pair of wheels.

3. A load handling truck according to claim 1, wherein said lifting fork has two sets of load engaging arms positioned at right angles to each other in side elevation and mounted to pivot about a horizontal axis.

4. A load handling truck comprising in combination, front and rear frame members, front and rear load supporting platforms on said frame members, means bracing said platforms together at low level across their width and presenting a transverse recess between them, a travelling mast and control cabin, carriage means supporting said mast and control cabin for simultaneous movement said carriage means being movable transversely of the truck between said platforms, load handling means mounted for raising and lowering movement on said mast, and means for selectively projecting said load handling means laterally from either side of the truck between said front

and rear platforms for picking up or depositing a load, said load handling means comprising a lifting fork mounted so as to be projected laterally from the truck at either side and withdrawn to within the contour of the truck, so that loads may be handled and lowered to rest on said front and rear platforms, and said control cabin having control means therein to control the movement of said carriage, said load handling means and said truck.

5. A load handling truck according to claim 4, wherein said mast is mounted for movement about a vertical axis for at least 180° to present the fork means at opposite sides of the truck.

6. A load handling truck according to claim 4, wherein the control means includes a plurality of control means for controlling the steering and propelling of the truck.

7. A load handling truck according to claim 6, wherein the means for controlling the steering comprises separate and independent control means for the front and rear wheels respectively.

8. A load handling truck according to claim 6, wherein there is a separate driving motor for each wheel mounted on said frame adjacent each wheel.

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