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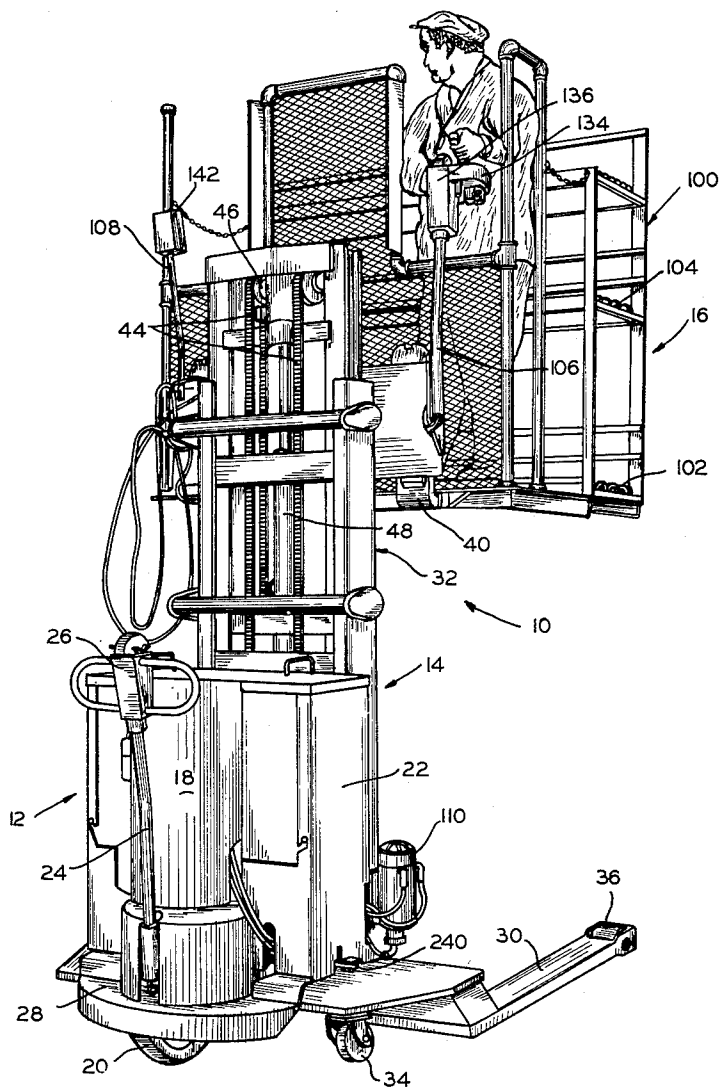
3,016,973

LIFT TRUCK

Filed Dec. 29, 1958

3 Sheets-Sheet 1

FIG. 1



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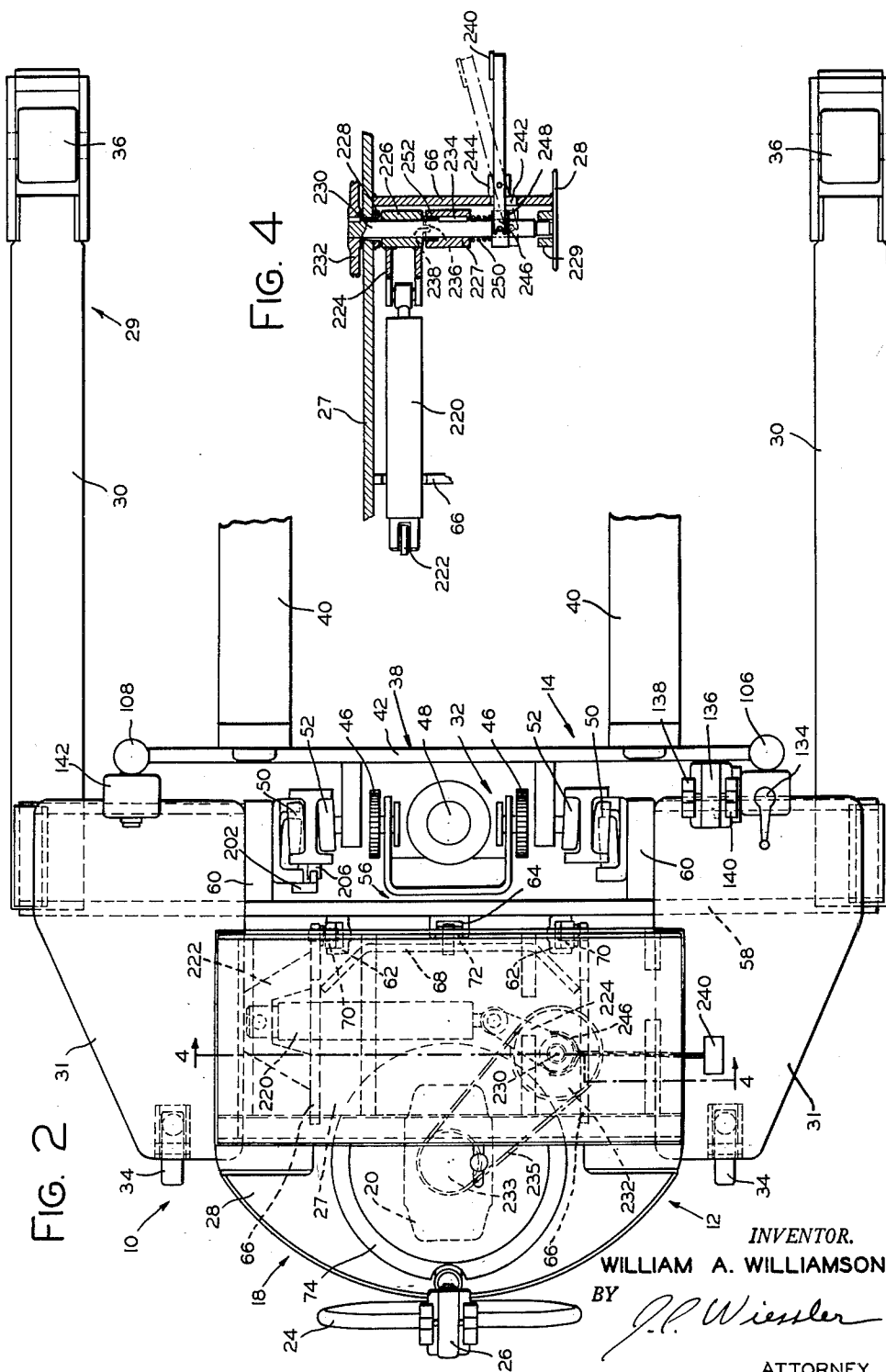
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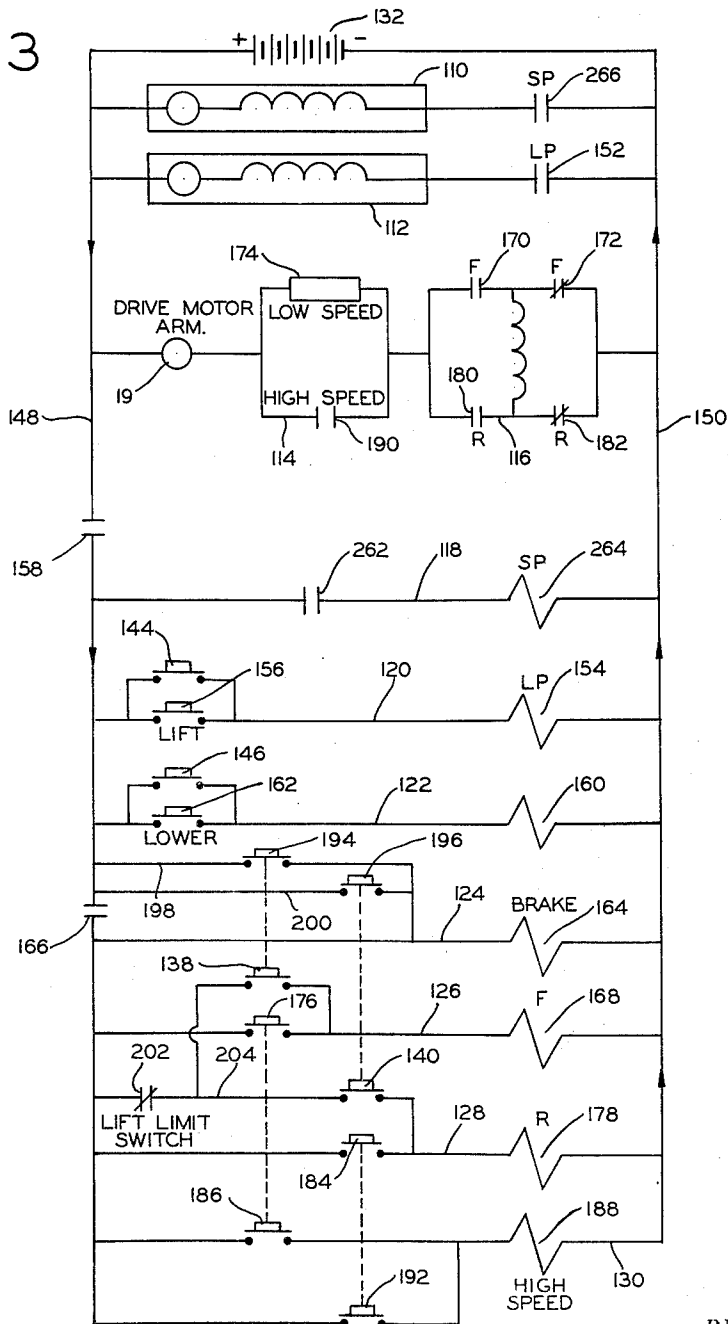
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LIFT TRUCK

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FIG. 3



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LIFT TRUCK

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12 Claims. (Cl. 182—14)

This invention relates to lift trucks and more particularly to a lift truck providing a remote operator station located on a lifting platform of the truck and from which the truck can be controlled.

Lift trucks of the type contemplated are particularly useful for transporting and locating in elevated position inside of buildings workers who are responsible for maintenance of elevated building fixtures, utilities, machinery and the like, and for the accurate spotting of materials in elevated bins, racks and the like.

It is an important object of the present invention to provide a lift truck which is controllable in all of its functions by an operator located remotely on a lifting platform of the truck.

It is another object of the invention to provide a remote control operator station on the lifting forks of a lift truck from which an operator can control forward and reverse movement of the truck, can steer the truck, can control lifting and lowering of the station on the extensible upright of the truck, and can operate braking mechanism of the truck.

It is a further object of the present invention to provide control mechanism in a lift truck of the type contemplated both at a remote control station on the lifting forks of the truck and at a location conventional in such trucks, said control mechanism at the remote station providing safety features relative to operation of the travel, lift, and steer functions of the truck.

A still further object of the invention is to provide improved alternate steering systems for steering the truck from a normal or from a remote location on the truck.

A feature of the invention is to provide a remote drive control for the truck which limits the available speed of the truck in a forward direction below the speed available when the truck is driven from the conventional operator's station.

Another feature of the invention provides a connection between the remote forward and reverse drive control means and remote lifting means so that the truck can be driven in forward or reverse only when the lifting forks or platform is below a predetermined height in the upright.

The above and further objects, features, and advantages of this invention will appear to those familiar with the art from the following detailed description and with reference to the accompanying drawings.

In the drawings:

FIGURE 1 is a perspective view of my lift truck taken from the rear, starboard quarter of the truck and showing an operator located at the remote control station in elevated position;

FIGURE 2 is a somewhat schematized plan view of the truck structure shown in FIGURE 1, with the remote operator's station removed from the lifting forks;

FIGURE 3 is a schematic wiring diagram of the remote and conventional controls of the truck; and

FIGURE 4 is a sectional view taken along line 4—4 of FIGURE 2, said section being rotated 90° counter-clockwise.

Referring now in detail to the drawings, there is illustrated generally at numeral 10 a straddle stacker type industrial truck which includes a tractor unit indicated generally at numeral 12, a load carrying unit or trailer frame indicated generally at numeral 14, and a remote control operator station and article handling attachment

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associated with the trailer frame and indicated generally at numeral 16.

The tractor unit comprises a powerhead 18, which includes an electric drive motor (illustrated schematically in FIGURE 3 at 19) mounted in driving association with the traction wheel 20 and adapted to receive electrical energy from a battery unit located within a battery compartment 22, and a truck control and steering handle 24, which is operatively connected to the traction wheel and the drive motor for turning same in a horizontal plane to steer the truck and which includes an operator control box 26 for operating the truck in forward or reverse drive, for lifting and lowering the forks or platform with which the remote control station 16 is associated and for operating solenoid actuated brake (not shown) associated with the drive motor 19. A hydraulic pump and motor combination and suitable electric and hydraulic control units, cables, hoses and the like (shown in part in FIGURE 3) are all mounted on a battery compartment 22 of the tractor unit 12, being operatively connected to the control box 26 of the steer handle 24, to control lifting and lowering movements of the remote station 16 as will be explained in detail hereinafter. The battery compartment 22 is mounted upon a platform 27 which is spaced above and is parallel to a platform 28 of tractor unit 12.

The load carrying unit or trailer frame 14 comprises generally a U-shaped frame 29 having a pair of outrigger straddle arms 30 connected at one end to a telescoping upright or mast 32. The entire frame 29 is supported on, first, two caster wheels 34 (one of which is shown in FIGURE 1) connected to the mast 32 by a pair of horizontally disposed plates 31 suitably connected to the mast 26, extending in a direction opposite to the outrigger arms 30 and partially encompassing the frame 28 of the truck unit, and, second, a pair of trail wheels 36 adjacent the outer ends of the outrigger arms 30.

Centrally of the U-shaped frame 29 and the mast 32 is a lifting unit 38 of the remote control station 16. The lifting unit comprises a pair of tines 40 connected at one end by a cross member 42 which, in turn, cooperates and is suitably connected in known manner to sprocket chains 44, sprockets 46, a power lift piston 48 and roller arrangements 50 and 52 cooperating in channels, such as illustrated in plan in FIGURE 2, all of which are operated by the aforesaid hydraulic pump and motor combination to raise and lower the tines 40 relative to the mast 32 when desired.

The tractor unit 12 and trailer unit 14 are connected to each other by an articulating coupling means, indicated generally at numeral 56. The coupling comprises generally a connecting plate 58 attached to the opposite sides of the mast 32 by means of a pair of forwardly extending plate members 60 and having connected to the one surface thereof a pair of laterally spaced and outwardly opening vertical channel members 62 and a centrally disposed rearwardly opening channel member 64. A pair of laterally displaced, longitudinally extending frame members 66 are connected together by means of a vertically extending concave connecting plate 68, and are also secured between the platforms 27 and 28. Each of frame members 66 includes a vertically extending section at the forward end thereof supporting a pair of rollers 70 which are mounted for vertical movement in the corresponding channel members 62, whereas transverse plate member 68 mounts a pair of vertically spaced rollers 72 for vertical movement in intermediate channel member 64, said pairs of rollers 70 having axes of rotation transverse to the truck and said pair of rollers 72 having axes of rotation longitudinal of the truck. Thus, the tractor and the load carrying units 12 and 14 are arranged for some vertical parallel or articulated movement relative to each other for permitting the traction wheel 20, which sup-

ports the entire tractor unit, free to accommodate any depressions or obstacles in the line of travel to maintain traction throughout. The pairs of rollers 70 and 72 cooperate with the respective channel members 62 and 64 in order to maintain the units 12 and 14 in proper alignment by resisting side and forward thrust, as well as torque forces, which would tend to separate or misalign the said units.

The lift truck 10 has been described up to this point in rather general terms. The details of construction of the lift truck as thus far described are essentially conventional and form no part of the present invention except as certain portions thereof may appear in combination with remote control means to be described in detail hereinafter. For a more detailed disclosure of the powerhead 18, control handle 24 and associated parts, reference may be had to U.S. Patents Nos. 2,762,444 and 2,788,093, issued in the names of R. H. Gardner and D. S. Steinberg et al. on September 11, 1956 and April 9, 1957, respectively, and to assignee's sales publication entitled "Powrworker® power," which carries identification No. T.C. 90-1057-15M.

The Gardner patent is, in the main, directed to the manner of mounting the drive head unit, including drive motor 19 and traction wheel 20, on a plurality of rollers mounted in a circular track formed by open ring 74 of platform 28 so that the entire drive head unit may rotate with control handle 24 about a vertical axis for steering the truck.

The Steinberg et al. patent discloses a steering handle control, including brake means which is automatically applied to the drive motor whenever the control handle is in either a vertical or horizontal position and which is released when the control handle is intermediate such positions. The brake structure which is intended to be utilized in the present lift truck differs essentially from that of said latter patent only in the substitution of an electrically motivated rotary solenoid for the brake shoe control cam linkage of the patent. The solenoid performs the same function as the cam of the patent.

The details of the overall truck configuration, including mounting of the tractor and load carrying units one to the other, is fully disclosed in the co-pending U.S. patent application Ser. No. 727,481, now Patent No. 2,959,235 issued Nov. 8, 1960 filed April 9, 1958 in the names of Deville H. Hubbard, deceased by Martha A. Hubbard et al. (common assignee).

A complete disclosure of the details of the construction of upright 32 appears in the co-pending U.S. continuation-in-part patent application Ser. No. 760,744, filed on September 12, 1958 in the names of Russell Hastings, Jr. et al. (common assignee).

Now referring in detail to the operator's remote control station of my invention, station 16 includes a vertically upstanding structure shown generally at numeral 100 which is engageable by and supported upon fork tines 40 for vertical movement in upright structure 32 with the forks. Generally, the structure 100 is a fabricated construction and includes a protected operator's station, as shown in FIGURE 1, forwardly of which is located, for example, a pair of vertically spaced roller beds 102 and 104 upon which articles may be supported for subsequent discharge into elevated stationary bins in a warehouse and the like. Of course, any one of a variety of article supporting or handling devices may be supported upon the fork tines forwardly of the remote operator's station.

Vertically extending hollow posts 106 and 108 are mounted upon opposite side portions of carriage plate member 42 for housing electrical conduits which are adapted to variously connect remote operator control means in circuit with one or more components of the lift truck, including a steer pump motor 110, a lift pump motor 112, the drive motor (armature) 19 and speed and directional controls (including the motor field) 114

and 116 thereof, respectively, a steer pump motor control circuit 118, lift and lower control circuits 120 and 122 for the lift pump motor 112, a remote brake control circuit 124, forward and reverse travel control circuits 126 and 128, and high speed circuit 130. A battery 132 is adapted to supply electrical energy to all of the foregoing circuits. All of the conventional or normal controls of the various operating components of the lift truck are located in the control handle 24 and control box 26 thereof which provides a plurality of manually operable switches for operating the truck in forward or reverse, and for lifting and lowering the fork tines in the mast structure. The remote steering control includes manually operable directional valve means 134 located on the post 106 and connected to control power steering means which will be fully described hereinafter. Remote travel control means 136 is also mounted upon post 106 and includes manually operable forward and reverse switches 138 and 140 which are located in circuits 126 and 128, respectively. Mounted upon post 108 at the opposite side of the truck is a control box 142 which includes manually operable switches 144 and 146 which are adapted to control the lifting and lowering operation of the lift cylinder construction of the upright 32. Other remote control means which are interrelated automatically with one or more of the foregoing remote controls will be described hereinbelow.

As illustrated schematically in FIGURE 3, all of the various foregoing control circuits, both normal and remote, are connected with the battery 132 by means of lead lines 148 and 150. The lift pump motor 112 is adapted to be connected to drive a hydraulic lift pump for supplying pressure fluid to the lift cylinder 48 whenever a normally opened switch 152 is closed. The switch 152 is energized to closed position by a coil 154 whenever the remote switch 144 is closed or a normal switch 156 of control box 26 is closed. Of course, it is assumed that an ignition switch 158 is closed permitting operation of various ones of the truck components. The operator may thus lift himself to any selected elevation within the range of the mast 32 for performing necessary maintenance work and/or for conveniently loading and unloading materials on and from the device 100.

In order that the operator may lower the device 100 from the remote control position a lowering switch 146 is provided, as aforesaid, which, when closed, energizes a coil 160 of a solenoid valve which causes the valve to open the lift cylinder to a fluid sump for permitting controlled exhaust of the fluid from the lift cylinder with consequent lowering movement of the fork tines 40. A normal switch control 162 is connected in parallel with switch 146 and is located at handle control box 26.

It is conventional practice in powered hand trucks of the type disclosed herein to provide brake means at the drive motor which is normally engaged. Thus, if an operator should leave the truck the control handle 24 may be automatically returned to a vertical position wherein the brakes are applied so that the truck cannot move without an operator being in attendance. In order that the brakes be released it is required that the control handle be moved by the operator to a position intermediate the vertical and horizontal positions thereof, for example, whereupon the brake is automatically released so that the drive motor may be energized to mobilize the truck. I have provided a brake solenoid having a coil 164 in circuit 124 which, when energized, causes the brake to be released. In operating the truck in the normal manner by means of control handle 24, movement of the control handle to the aforesaid intermediate position causes a normally open brake switch 166 to be closed which energizes brake solenoid coil 164, thereby releasing the brake. When the truck is operated from the remote control station, however, it is apparent that the brake switch 166 will remain open inasmuch as the control handle 24 is automatically maintained in a vertical

position wherein the brake solenoid is normally de-energized which causes the brake to be applied.

Circuit 126 controls the low speed forward operation of the drive motor. It includes a coil 168 which, when energized, closes a normally open switch 170 and opens a normally closed switch 172 of the series field 116 of the drive motor, whereby the battery supplies energy through the motor armature and a low speed resistor 174 downwardly through the series field 116 causing the truck to be driven forwardly at low speed. Coil 168 may be energized by closing a switch 176 in circuit 126, the switch 176 being located on the control box 26 of the control handle. Likewise, the truck may be driven at low speed in reverse by energizing a coil 178 which causes a normally open switch 180 to be closed and a normally closed switch 182 to be opened, whereby the energy supplied by the battery through the armature and low speed resistor 174 moves in the opposite direction or upwardly through the series field causing the motor to be driven in a reverse direction. Coil 178 may be energized by closing manual switch 184 in circuit 128, which latter switch is also located on control box 26.

In order to operate the truck at high speed in a forward direction, a sequence contactor switch 186, which is connected to switch 176, is closed which causes a high speed coil 188 to be energized. Coil 188 closes a normally open high speed switch 190 in motor speed control circuit 114 in parallel with the resistor 174, and the motor is then operated at relatively high forward speed. A second switch 192 is connected in parallel with switch 186 in high speed circuit 130 and is operated in sequence, but subsequent to, low speed reverse control switch 184, whereby high speed reverse operation of the drive motor may be utilized. However, it will be noted that brake switch 166 must be closed before closure of either of switch units 176, 186 or 184, 192 will be effective to energize the drive motor. In other words, unless the control handle 24 is in its intermediate position, switch 166 remain open, the brake remains engaged, and the truck drive motor cannot be energized. This arrangement affords a safety device which permits operation of the truck only after certain positive measures have been taken by the operator.

A pair of brake solenoid switches 194 and 196 are connected to switches 138 and 140, respectively, and are located in lines 198 and 200 of circuit 124 which by-passes brake switch 166. Therefore, the brake can be released from the remote station by closing either of switches 194 or 196, subsequent to which switch 138 or 140, respectively, may be closed to energize coils 168 or 178 for forward or reverse drive of the truck respectively. It will be noted that a normally closed lift limit switch 202 is located in a line 204 in that portion of circuits 126 and 128 which includes remote control forward and reverse switches 138 and 140. The lift limit switch is also shown in FIGURE 2, it being secured to the rearward flange of one of the fixed upright channel sections of upright 32 at a pre-selected elevation of, say, six feet. A projection 206 is connected at the lower end of the adjacent extensible section of the upright in overlapping relation with switch 202. Thus, extension of the inner extensible section of the upright to an elevation of six feet will trip switch 202 to an open position, thereby opening automatically the remote control portions of circuits 126 or 128 so that it will not be possible to drive the truck either in forward or reverse from the remote control position when the predetermined elevation has been exceeded. In other words, closing either switch 138 or 140 will not energize coils 168 or 178 if limit switch 202 is open. All other remote controls remain operative above said predetermined elevation; i.e., the operator may operate the brakes, steer the traction wheel, or extend the upright to maximum elevation. The lift limit switch is utilized as a safety device which prohibits travel of the truck from the remote station if the operator is elevated above

a predetermined safe height. It will also be understood that the truck may not be operated at high speed from the remote station since the remote travel controls 138 and 140 cannot energize high speed coil 188.

As was pointed out hereinabove, steering is normally accomplished by rotating control handle 24 which swings the traction wheel 20 and the drive motor about the vertical axis thereof in track 74. A power steering system has been devised which permits the truck to be steered when the operator is located at the remote control station. A hydraulic boost cylinder assembly 220 is secured at its base end to a frame member 222 of the tractor unit 12, and is pivotally connected at the piston rod end thereof to a lever member 224 which is secured to a normally freely rotatable sleeve member 226. Extending downwardly just inwardly of the one frame member 66 and through openings in the platform 27, a spacer member 228, sleeve member 226 and a second sleeve member 227 is a shaft 230 which is supported at its lower end in a bearing 229. A sprocket 232 is mounted on the upper end of shaft 230 above platform 27 and is drivingly connected to a sprocket 233 of the drive motor assembly by means of a chain 235. The sleeve 227 is connected to shaft 230 by means of a key 234 and is formed to provide on opposite sides of the upper edge thereof a groove 236 which is registrable with projection 238 formed on opposite sides of the lower edge of sleeve 226, said groove and projection together forming clutch means which when engaged connect power cylinder 220 to shaft 230 for rotating sprocket 232 by way of sleeves 226 and 227.

A foot lever 240 extends through an opening 242 in the one frame member 66 and is pivotally mounted on a supporting member 244; it extends laterally outwardly of the battery compartment 22 and inwardly of the frame member to pivotally connect with a sleeve member 248 by means of a yoke and pin means 246. Sleeve 248 is slidable on shaft 230 and is urged downwardly thereon by means of a spring 250 mounted upon the shaft between sleeve members 227 and 248. A second spring member 252 is also mounted on shaft 230 in an enlarged portion of the opening through sleeve member 227 and between sleeve members 226 and 227.

When the foot pedal 240 is moved in a counterclockwise direction, as viewed in FIGURE 4, to a disengaged position, spring 250 elongates permitting spring 252 to separate clutch members 236 and 238 of sleeves 226 and 227. When the clutch is thus disengaged, energization of power cylinder 220 will rotate sleeve 226 freely on shaft 230 and effects no steering action. However, when foot pedal 240 is actuated in a clockwise direction to the solid line position illustrated in FIGURE 4, spring 250 is forced upwardly in compression with sleeve member 248 to actuate sleeve member 227 upwardly along shaft 230 and engage clutch members 236 and 238. If double-acting cylinder 220 is now energized for either extension or retraction of the piston rod thereof, rotation of sleeve 226 will, through the clutch connection to sleeve 227, cause the latter sleeve to rotate with sleeve 226, which in turn actuates shaft 230 in rotation by means of the key connection 234 thereof to sleeve 227. Rotation of shaft 230 causes sprocket 232 to rotate, thereby rotating the drive motor and traction wheel through the sprocket and chain connection 233, 235. Steering of the truck in either direction may be thus effected by energizing power cylinder 220 to either extend or retract the piston rod thereof.

The steering control valve 134 is connected by hydraulic lines, not shown, intermediate the steering pump motor 110 and the power cylinder 220. Pump motor 110 is, of course, connected to a hydraulic sump, not shown, and is adapted to supply pressurized fluid to the power cylinder 220 through directional valve 134, the low pressure side of cylinder 220 always being connected to the sump.

When the control valve 134 is located in its neutral position a normally open switch 262 (FIGURE 3) is open and the steer pump motor 110 remains inactive. If the op-

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erator should now move the directional lever in one direction, switch 262 is closed and communication is established between pump motor 110 and a selected end of power cylinder 220 through valve control 134. Closure of switch 262 energizes a coil 264 in circuit 118 of a steering pump switch 266, thereby closing switch 266 and energizing pump motor 110. Assuming, of course, that the foot pedal 240 is engaged, consequent energization of power cylinder 220 will cause the traction wheel 20 to be turned in the selected direction for steering the truck.

It will be understood that steering of the truck can be effected in normal operation only by means of control handle 24 and with the foot pedal 240 disengaged. On the other hand, remote control steering can be effected only by means of control valve 134, power cylinder 220 and associated mechanism, and when the foot pedal 240 is actuated to engaged position. During such remote steering control handle 24 merely swings with the drive motor and traction wheel to the right or to the left as the truck is steered remotely, while remaining in a vertical position.

From the above it will now be understood that I have provided a remote control system for lift trucks which can be utilized to perform all normal truck functions, including driving, steering, braking, lifting and lowering, but with safety limitations on available speed and maximum fork elevation while the truck is being driven from the remote position.

It will be understood that changes in construction and the arrangement of parts may be resorted to without departing from the field and scope of my invention, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention has been disclosed.

I claim:

1. In a lift truck having a motor driven dirigible wheel, normal control means located on the truck and connected to the wheel for steering same, and an extensible upright connected to the truck and supporting a secondary or remote control station thereon for elevating movement along the upright; remote control steering means comprising reversible motor means connectible to the wheel for turning the wheel in either steering direction, clutch means selectively engaging and disengaging the motor means with the wheel, the normal control means being movable to steer the wheel when the motor means is disengaged from the wheel, and motor control means located on the remote control station and operatively connected to the motor means for actuating same in a selected steering direction.

2. A lift truck as claimed in claim 1 wherein the dirigible wheel is steerable by said normal control means only when said clutch means disengages the motor means from the wheel and is steerable by said remote control means only when said clutch means engages the motor means and the wheel.

3. A lift truck as claimed in claim 1 wherein said motor means comprises a hydraulic power cylinder assembly connected to the frame of the lift truck and through said clutch means, when the latter is engaged, to the dirigible wheel, said motor control means including directional control valve means connected to the hydraulic cylinder for operating same in either direction from an elevated position on the remote control station.

4. A lift truck as claimed in claim 3 wherein the operative connection between the hydraulic cylinder and dirigible wheel comprises an upright rotatable shaft member supported upon the truck frame and connected to the wheel by sprocket and chain means, a normally freely rotatable sleeve member on the shaft connected to the operating end of the hydraulic cylinder, a second sleeve means keyed to the shaft, engageable clutch means formed between said first and second sleeve members, and a control member connected to the second sleeve member for actuating same into clutching engagement

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with the first sleeve member, whereupon energization of the hydraulic cylinder assembly effects rotation of said shaft with the first and second sleeve members to rotate the wheel through the sprocket and chain means.

5. In a lift truck having a motor driven wheel, normal control means located on the truck for effecting tractive movement of the wheel in either a forward or a reverse direction, an extensible upright connected to the truck, and an elevatable load carrying means supported on the upright; electrical control means associated with the normal control means for effecting elevating movement of the upright, and a remote control station mounted upon the load carrying means and elevatable therewith comprising operator controlled electrical means for controlling the elevation of the remote control station with the load carrying means on the upright, other operator controlled electrical means for operating the motor driven wheel in either forward or reverse, and travel limit means operatively connected to the motor driven wheel for de-energizing the wheel upon predetermined elevation of the upright.

6. A lift truck as claimed in claim 5 wherein said normal control means for driving the wheel in a forward or reverse direction includes low and high speed selection switches, and said remote control means for driving the wheel includes only low speed selection switches.

7. A lift truck as claimed in claim 5 wherein remote electrical brake control means are associated with the remote forward and reverse travel control means in such a manner that operation of the aforesaid electrical brake and travel control means first operates to release brake means and then to energize the motor driven wheel for forward or reverse tractive movement.

8. A lift truck as claimed in claim 5 wherein said travel limit means comprises switch means connected to the upright.

9. In a lift truck having a motor driven dirigible wheel, normal control means located on the truck for effecting tractive movement of the wheel in a forward or a reverse direction, other normal control means located on the truck and connected to the wheel for steering same, and an extensible upright connected to the truck and supporting a secondary or remote control station thereon for elevating movement along the upright; remote control steering means including reversible steering motor means connectible to the wheel for turning the wheel in either steering direction, means selectively engaging and disengaging said steering motor means with the wheel, the normal steering control means being movable to steer the wheel when the steering motor means is disengaged from the wheel, and remote steering motor control means located on the remote control station and operatively connected to the steering motor means for actuating same in a selected steering direction, electrical control means associated with the normal tractive control means for effecting elevating movement of the upright, remote operator controlled electrical means controlling the elevation of the remote control station on the upright, other remote operator controlled electrical means on the remote control station for operating the motor driven wheel in either forward or reverse, and travel limit means operatively connected to the motor driven wheel for de-energizing the wheel upon predetermined elevation of the remote control station.

10. A lift truck as claimed in 9 wherein said means for selectively engaging and disengaging the steering motor means comprises clutch means which permits said wheel to be steered by said normal steering control means when the clutch means disengages the steering motor means from the wheel and permits said wheel to be steered by said remote steering control means when the clutch means engages the motor means and the wheel.

11. A lift truck as claimed in claim 9 wherein remote electrical brake control means is associated with the remote operator controlled means for operating the motor driven wheel such that said remote electrical brake and

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motor driven wheel control means operates in sequence to first release the brake means and to then energize the driven wheel for forward or reverse tractive movement.

12. In a lift truck having a motor driven dirigible wheel, an extensible upright connected to the truck and supporting a remote control station for elevating movement along the upright, and normal control and motive power means located on the truck for steering the motor driven wheel, for driving said wheel selectively in forward and reverse rotation, for elevating said remote control station along the upright, and for braking said wheel; remote control steering means connectible to the dirigible wheel including means selectively engaging and disengaging the steering means and control means located on the remote control station operatively connected to the remote steering means for actuating same in a selected steering direction, remote operator control electrical means operating the motor driven wheel in either forward or reverse rotation, travel limit means operatively connected to the

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motor driven wheel for de-energizing the wheel upon predetermined elevation of the remote control station in the upright, and remote electrical brake control means associated with said remote forward and reverse driven wheel control means such that said remote brake and driven wheel control means operates sequentially to first release said brake means and to then energize the motor driven wheel for forward or reverse tractive movement.

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