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2,804,218

LOAD TRANSFER MEANS FOR LIFT TRUCKS

Filed Dec. 31, 1953

2 Sheets-Sheet 1

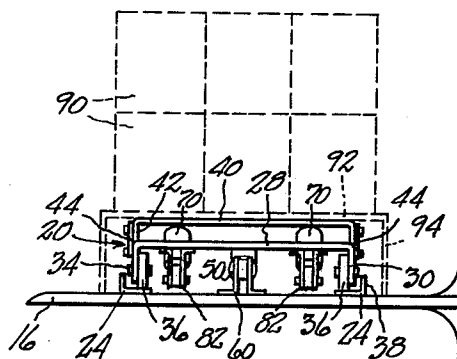


FIG. 1

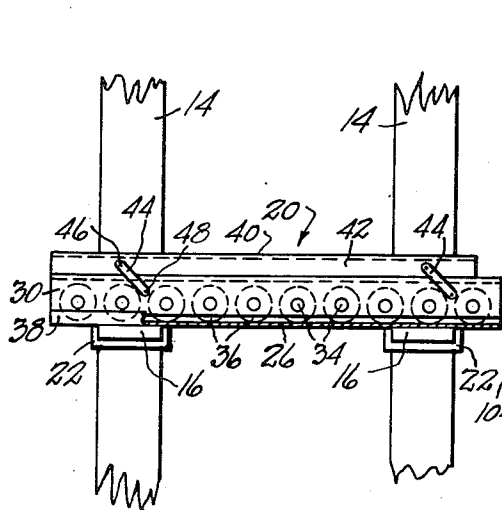
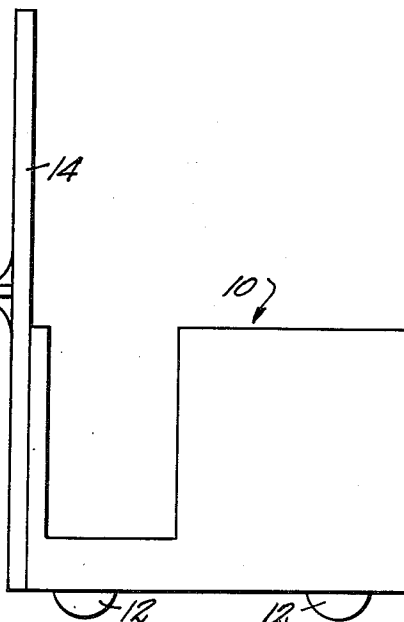


FIG. 2

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2 Sheets-Sheet 2

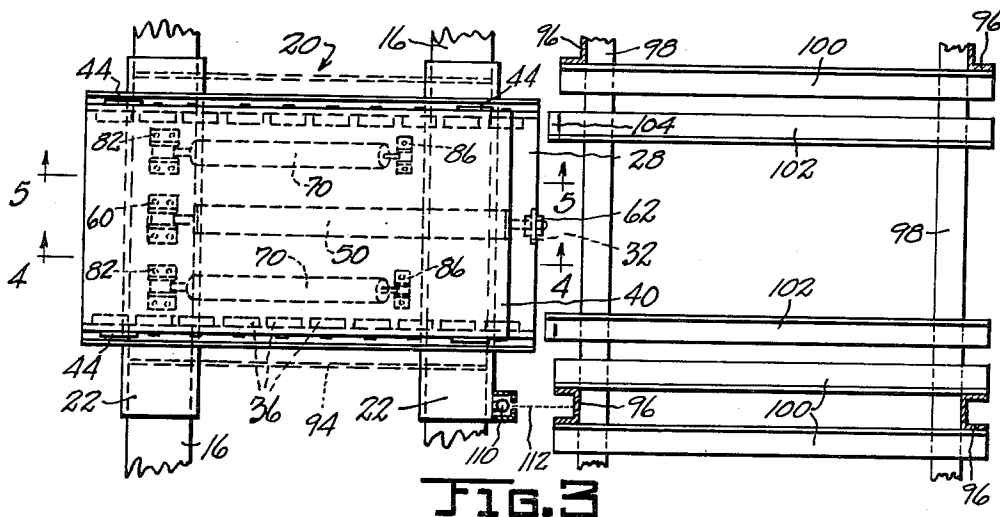


FIG. 3

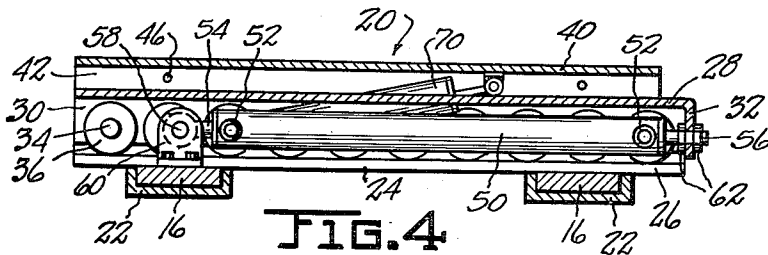


FIG. 4

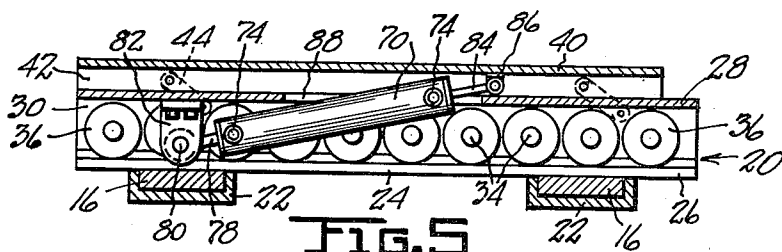


FIG. 5

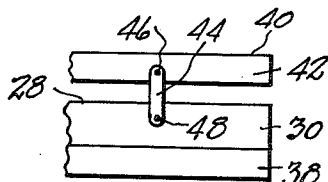
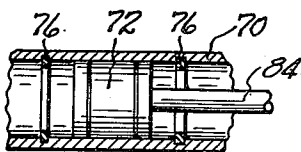


FIG. 6



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LOAD TRANSFER MEANS FOR LIFT TRUCKS

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3 Claims. (Cl. 214—16.4)

This invention relates to load transfer means for lift trucks, and more particularly to a device for mounting a load upon a lift truck and for discharging the load from the lift truck in an economical manner.

The storage of goods in factories and warehouses in a manner to be readily accessible is important in many business operations. Many devices have been developed to speed the handling of materials and to render it economical. Two of the most important material-handling items presently used by business and industry are the fork lift truck and platform type of work carriers, such as pallets, skids and boxes which are supported in elevated position relative to a supporting surface by means of uprights or legs carried thereby, which enable the forks of a fork lift truck to engage thereunder.

The use of fork lift trucks and elevated work carriers engageable by the truck forks is economical of man power but requires large storage spaces in warehouses. In particular, space must be provided within which fork lift trucks can be maneuvered and turned. This necessitates the provision of wide aisles so that a truck may travel through the aisle to a point at which the desired work carrier is located and then may turn to head toward a selected work carrier in order that its forwardly projecting fork arms may pass under the work carrier between the upright supports thereof to position it to lift the work carrier. The truck requires space to permit it to back up with its load until the load is clear of adjacent stored items, and then must have additional freedom to turn lengthwise of the aisle to move to the discharging station. It will be evident that where a warehouse contains a large number of different items, all of which must be accessible for selection at will, preferably without requiring shifting of other items in order to reach the desired item, a very large proportion of the floor space of such a warehouse must be given over to aisles and passageways so as to make possible the maneuvering of the fork lift truck which has been described above.

It is the primary object of this invention to provide a novel load transfer means for lift trucks which will reduce the space required in a warehouse to maneuver lift trucks and which will increase substantially the percentage of floor space of a warehouse which may be devoted to material storing purposes.

A further object is to provide a device of this character which will permit loading and unloading of a lift truck from the side thereof by power actuated means.

A further object is to provide a load transfer means for lift trucks having means for shifting a load laterally relative to a lift truck and for raising and lowering the load when in a laterally offset position relative to the lift truck.

A further object is to provide a self-powered truck having a substantially horizontal vertically shiftable projecting load carrier, which is characterized by a laterally extensible and retractable part and selectively operable means for actuating the same, and also by a vertically

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adjustable work-engaging and supporting part upon the extensible part and provided with selectively operable power means for actuating the same.

Other objects will be apparent from the following specification.

In the drawings:

Fig. 1 is a side view of substantially schematic nature illustrating a fork lift truck having our improved load transfer means mounted thereon;

Fig. 2 is a fragmentary front view of our improved load transfer means mounted upon a fork lift truck in load-transferring position or relation to a work storage rack;

Fig. 3 is a top plan view of our improved load transfer device positioned in loading and unloading relation to a work support;

Fig. 4 is a vertical section view taken on line 4—4 of Fig. 3;

Fig. 5 is a vertical sectional view taken on line 5—5 of Fig. 3;

Fig. 6 is a fragmentary side elevation of a portion of the work carrier in elevated position; and

Fig. 7 is a detail axial view of one of the power members employed in the device.

Referring to the drawings which illustrate the preferred embodiment of the invention, the numeral 10 designates a self-propelled vehicle of the type commonly known as a fork lift truck, which is mounted upon wheels 12 and is provided with controls (not shown) by which its movement and operation may be effected by an operator. In the usual form such trucks include a part upon which the operator rides. The truck mounts upright members 14 adapted to be traversed by substantially horizontal fork lift arms 16 which are controlled by positioning means (not shown) of power operated character and capable of supporting, elevating and lowering a load mounted upon the fork arms. The fork arms will preferably project lengthwise of the truck 10 and preferably forwardly thereof. The fork lift trucks which are now available on the market vary as to individual construction thereof, but we contemplate that this invention may be practiced with any such truck regardless of its source of manufacture or individual design.

Our improved load transfer means is designated generally by the numeral 20 and is supported upon the fork arms or horizontal supports 16 of the fork lift truck in any manner found suitable. Thus it may be applied or mounted as a fixed and permanent part of the fork lift truck in the manner illustrated in Fig. 1, or it may be mounted upon elongated flat tubes or sleeves or guides 22 which fit snugly but detachably upon the arm 16, as illustrated in Fig. 3. The device includes or operates with reference to a base or support, and this base may either be the lift forks or platform 16 of the truck or a separate member carried by the truck forks or supports 16 or by sleeve or tube members 22. The base or support has a pair of track or guide members 24, here shown as angleirons having substantially horizontal webs or portions 26. The guide members 24 extend parallel to each other and transversely of the fork arms or supports 16 of the truck, and preferably project laterally from the sides of said fork arms or supports, as illustrated in Fig. 4 or 5. The lateral projection of the parts will not be great and preferably will not be substantially greater than the overall width of the fork lift truck 10.

A wheeled extensible and retractable unit is supported by and traverses the horizontal guides 26. As here shown, the extensible unit includes a frame member 28 having rigid downwardly projecting side rails 30 and a rigid downwardly projecting end wall 32. Each of the

longitudinal rails 30 mounts a plurality of closed spaced pins or axle members 34. Each axle member or stud mounts a roller or wheel 36 of a diameter which is comparatively small. The axle studs 34 are so located that the rollers 36 will project below the bottom edge of the longitudinal rail 30 so that they may bear upon and traverse the guide members 26 while the bottom edges of the rails 30 are held slightly above said guide surfaces. Each roller will have a slight clearance with the frame 28 in the preferred construction, but the arrangement preferably will be such that the vertical dimension of the extensible unit and the spacing of the frame 28 from the fork arms 16 will be small. The extensible member 28 will preferably be of substantially the same length as the guide members 26. The wheels or rollers 36 will be close spaced so that a substantial number thereof are provided, as shown in Fig. 5, and the axle members 34 will preferably be studs of short length, each mounting or journaling only one roller positioned adjacent to the rail 30 which carries the stud or axle. The axes of rotation of the rollers 36 will be parallel to each other and substantially parallel to the fork arms 16 so that the extensible member may travel in a straight path lengthwise of the guide members 24. Upright flanges 38 on the guide members 24 will restrain the extensible member from travel in a path angularly displaced from the lengthwise direction of said guide members.

The laterally extensible unit includes a rigid load-engaging member 40 having downwardly extending rigid members 42 at opposite sides thereof. Thus the parts 40, 42 may be of substantially inverted U-shape in cross-section, as best seen in Fig. 1, of a width substantially equal to the width of the extensible frame member 28 so that the downwardly projecting parts 42 may bear upon the opposite sides of the member 28 and be substantially vertically aligned with the vertical parts 30 of the member 28 in their normal relation or position. The members 30 and 42 at each side of the structure may be connected by a plurality of similar links 44, each pivoted at one end at 46 to the rail 42 and pivoted at its opposite end 48 to the rail 30. The links 44 are rigid, are parallel to each other, and extend at an angle to the vertical in the normal relation of the parts when the bottom edges of the rails 42 bear upon the top of the member 28. This construction permits relative longitudinal movement of the parts 40 and 28 to a position as illustrated in Fig. 6 in which the depending rails 42 are clear of the member 28 and the top surface of the part 40 is elevated relative to the position illustrated in Fig. 2. Alternatively, other means may be provided to guide raising and lowering of the member 40.

The device is equipped with power actuated means for extending it laterally relative to the fork arms or support 16. Such means may be constructed to operate by any selected type of motive power, such as hydraulic, electrical or pneumatic. We prefer to have hydraulic means as here illustrated. This mechanism is best illustrated in Fig. 4 and comprises a cylinder 50 having a piston (not shown). The cylinder piston unit is of the double acting type having ports 52 at the opposite ends of the cylinder with which lines connected to a pump and reservoir (not shown) are connected. The system will be of the usual type having a control valve (not shown) which will permit the supply of liquid under pressure to a selected one of the two end ports 52 and which will connect the opposite end port with the intake of the pump so as to cause travel of the piston in desired direction and in a desired stroke in that direction. The power unit 50 has a connector 54 projecting from one end thereof, and a connector 56 projecting from its opposite end. One of the connectors 54, 56 will constitute a stem mounted on a piston and shiftable relative to the cylinder 50. The other connector will be carried by and project longitudinally from the cylinder 50. The connector 54 has con-

nection at 58 with ears or other rigid projecting members 60 carried by the base of the device. Thus the members 60 project upwardly into the member 28, 30 preferably at the center thereof, as seen in Fig. 3, and may be connected fixedly to fork arms 16 or to a base separate from those fork arm and associated with the sleeves 22. The projection 56 at the opposite end of the power member passes through an aperture in the downturned wall 32 of the extensible unit and is fixedly anchored thereto by nuts 62 or other fastening means mounted upon the part 56. The power unit 50 will preferably be of a length so that only one, or at most a few, of the rollers 36 will remain in engagement with the track 26 when the unit is extended at its maximum projection. It is important that at least one roller 36 remain in contact with the guide members 26 so that retraction of the device may proceed without difficulty or interference.

The device is also provided with power operated means for elevating and lowering the platform 40 relative to the retractable frame 28 between the lowered position shown in Figs. 1 and 2 and the elevated position shown in Fig. 6. Any source of power may be employed for this purpose, but we have elected to illustrate the same as an hydraulic power member in Fig. 5. The hydraulic power member comprises a cylinder 70 having a double acting piston 72, said cylinder having ports 74 at its opposite ends for the admission and discharge of liquid under pressure. The ports 74 will be connected by fluid lines (not shown) with the hydraulic pressure system which may include a pump, a reservoir, and control valves, in the manner well understood in the art and so arranged that control of the valves will make possible the movement of the piston 72 in a selected direction within the cylinder 70. Since the elevation of the platform member 42 to its maximum height occurs when the links 44 are at vertical position as illustrated in Fig. 6, it is necessary that the stroke of the piston within the cylinder shall be limited in at least one direction so that the movement of the unit cannot proceed beyond the position of maximum elevation. Any suitable means may be provided for limiting the stroke of the piston and, as illustrated in Fig. 7, we have shown stop members 76 in the nature of rings seated in grooves in the interior of the cylinder 70 and projecting into the path of the piston 72 as means for limiting the stroke of the piston. A connector 78 extends from the cylinder 70 at one end thereof and has pivotal connection at 80 with a bracket 82 which is fixed to the extensible member 28. The piston has connection through a stem 84 with a bracket 86 carried by the platform member 40. The connection of the parts is such that the cylinder will preferably be inclined, as best seen in Fig. 5, and in cases where the platform supporting extensible member 28 is of solid plate construction, an aperture 88 is formed therein to accommodate extension therethrough of a part of the cylinder and of the stem 84.

Where hydraulic controls are employed, it will be understood that the reservoir and the pump and control valves will be mounted upon the lift truck 10 with the pump (not shown) having a driving connection with the prime mover of that truck, such as an internal combustion engine (not shown). The leads which extend from the pump to the cylinder piston units 50 and 70, respectively, will be flexible and will be of such length that they will accommodate the movement of the parts of this device and, particularly with respect to the member 70, will accommodate its bodily movement as the member 28 is extended and retracted. It will also be understood that the number of power units employed is optional and, as seen in Fig. 3, one power unit 50 is illustrated, while two power units 70 are illustrated located on opposite sides of the power unit 50.

The goods or material to be handled and maneuvered by the device will be supported in racks in a warehouse and preferably will be supported on tables or supports

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adjacent to or alongside machines in a factory, so that each item will be elevated above the floor level upon which the tractor runs. For this purpose the goods, as illustrated schematically at 90 in Fig. 2, are mounted upon pallets or skids providing a horizontal supporting member 92 elevated relative to a supporting surface by downwardly extending supports, such as flanges, legs or the like, as illustrated by the numeral 94. The spacing of the supports 94 will be greater than the total overall width of this device, as best illustrated in Fig. 1. Likewise, as best illustrated in Fig. 2, the height of the support 94 and of the bottom surface of the platform member 92 of the pallet or the like member will be greater than the collapsed elevation of the vertically shiftable pallet engaging platform 40 of this device.

A rack is illustrated in Figs. 2 and 3 for supporting the pallets at sufficient elevation so that this device may engage under the pallets. The rack as here illustrated will include uprights 96 interconnected by longitudinal horizontal members 98. The parts 96 and 98 will preferably be standard structural steel shapes, the uprights 96 being shown in Fig. 3 as being channel members, and the horizontal members 98 being shown in Fig. 2 as being angleirons. Fore and aft sets of structural members 96, 98 are interconnected by transverse horizontal structural members 100, such as angleirons, which are bolted, welded or otherwise secured to the structural members 96 or 98 to serve to form a rack structure. The structural members 100 will preferably include horizontal plate portions adapted to support the upright portions 94 of the pallets. The spacing between adjacent uprights 96 will be greater than the width of the pallet. Track means are also provided on the rack at each pallet-receiving portion thereof and extending fore and aft horizontally thereon to be traversed by the rollers 36. As illustrated in Fig. 3, such track members 102 may be formed of angleirons. Alternatively, of course, the structural members 100 may have widened horizontal flanges of a width sufficient to support the pallet edge and also to permit the rollers to run thereover. As best seen in Fig. 2, the front ends of the members 102 will preferably be downwardly curved at 104 projecting outwardly from the rack, for purposes to be mentioned.

In the use of the device, assuming that the operator of a fork lift truck desires to remove a pallet loaded with work pieces from a rack, he drives the fork truck in a path parallel and close to the front of the rack until the fork arms are positioned opposite the compartment or location on the rack at which the desired work loaded pallet is located. He next operates the lift arms 16 carrying the new device to such an elevation that the track members 24 of the device are substantially at the same level as the track members 102 on the rack. Thereupon the power operated extension member 50 is actuated by the operator to shift the extensible member 28 laterally. The member 28 travels on its rollers 36 which successively leave engagement with the horizontal portion 26 of the track members 24 of the device and move it to engagement with the track members 102 of the rack. In the event the level of the track members 24 is slightly lower than the level of the member 102, the rollers will engage the cam surface 104 as they leave the track 26 and will then be guided onto the track portion 102. At this time the vertically adjustable member 40 will be retracted in the Fig. 2 position and the laterally extensible unit will be compact vertically so that it will be free to travel under the platform 92 of the pallet to assume a position substantially in register therewith and therebelow. When this position is reached operation of the extension member 50 is stopped.

Power member 70 is then operated from the position illustrated in Fig. 5 in a direction toward the right as viewed in Fig. 5, thus laterally shifting the platform member 40 relative to the laterally extensible member 28.

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This movement is guided by the pivoted links 44 which swing in an arc to the position illustrated in Fig. 6, and in so doing raise the level of the member 40 and bring it into engagement with the bottom of the platform 92 of the pallet and subsequently lift that pallet and its contents out of engagement with the part of the rack, such as the members 100, upon which the pallet has previously rested. Thereupon, operation of the power member 70 is stopped, and the power member 50 is then again actuated but this time in a retracting position to return the parts to the position illustrated in Fig. 4.

The fork lift truck is then moved to the desired delivery position or station alongside of a platform or table, and, after having been properly spotted or located, it is stopped and the power member 50 is again operated to laterally extend the member 28 and its associated parts, including the load, after the fork arms have been located at a position or elevation which will insure that the rollers 36 of the work carrier will engage the table top when the extension member 50 is operated. During the time that the fork lift truck is moved from one location to another, the power operated positioning member 70 may be extended to hold the pallet clear of the fork lift arms, or, alternatively, it may have been moved to the Fig. 5 position to permit the bottom edges of the support 94 of the pallet to rest upon the fork arms. In any event, when discharge of the load is to occur, the operator makes sure that the power member 70 has been operated to elevate the pallet platform 40 so that the pallet support 94 is clear of the fork lift arms 16. The lateral discharging movement of the extensible member 28 proceeds to such an extent as to deliver the work above the table, whereupon the power member 50 is deenergized to stop the lateral extending movement of the part 28. Thereupon the power member 70 is operated to move the platform 40 in a lowering direction, thus permitting the pallet supports 94 to engage the table or delivery point and to effect disengagement of the new device with the pallet. When the laterally extensible device has been contracted vertically to a position clear of the work, the power member 70 may be deenergized, and the power member 50 may be energized to return the work carrier to a centered relation to the fork lift arms 16 and to thereupon permit movement of the fork truck to the location of its next assigned load.

It will be evident from the foregoing description of the operation of this device that the aisles between racks in a warehouse need only be wide enough to permit a truck to travel therealong with reasonable clearance while carrying a loaded pallet. Thus the spacing between adjacent racks may be substantially less than a dimension represented by the overall length of the fork lift truck as determined from its rearmost position to the tip of its fork lift arms. Such spacing is to be compared to a required spacing at present which is greater than the overall length of a truck in order to permit a fork lift truck to head into the rack in order to take on a load. Maneuvering of the truck is also greatly reduced since it is not necessary that any turn shall be made within an aisle and, instead, the operator of the truck may merely head his truck into the aisle, take on the load, and then back up in the aisle until he reaches a passageway wide enough to permit further maneuvering. This permits an arrangement of a warehouse having one wide aisle or passageway sufficient to permit turns into perpendicular extending parallel aisles which are of comparatively narrow width. Consequently, a much higher proportion of the floor space of a warehouse may be used for the storage of goods than is possible under present conditions using conventional fork lift trucks which must head into the racks in order to pick up a load.

One interesting and important consideration of this invention is the use of a large number of close spaced rollers 36 extending substantially full length of the member 28 and providing a plurality of points of support

for the member 28 and the parts carried thereby. This arrangement is important because it limits to a substantial extent the occurrence of unbalance laterally of the truck incident to the loading and unloading operation. Viewing Fig. 2 it will be apparent that only a slight amount of lateral movement of the load-carrying unit 20 can occur with relation to the uprights 14 of the fork lift truck before the leading rollers 36 engage the guide member 102 of the rack. Consequently, no danger exists of overbalancing the truck laterally, and the weight of the load is progressively taken by the rack or the work support after the first roller engages that work support. Furthermore, the amount of lateral unbalance which can occur before the first roller engages the rack is limited. By reason of this situation, the factor of safety of this device is high and danger of unbalance is negligible.

The most successful and efficient operation of the device requires accuracy of positioning of the truck, the extensible unit and the truck lift arms relative to the rack and to the storage space of the skid or other work carrier to be removed from the rack or delivered thereto. The first requirement of accuracy as to position relates to the position of the truck so that it is substantially parallel to the rack and spaced a predetermined distance therefrom. Various means may be provided to insure such a position. One such means is to provide a painted guide stripe upon the floor which may be observed by the truck operator as he approaches the selected space in the rack and which he may follow to insure parallelism of the truck to the front of the rack and to insure accurate spacing of the truck from the rack.

The next requirement of accuracy of position is that the truck be so positioned that the extensible device is free to move properly into the rack to engage a work skid therein or to deliver a work skid thereto. This resolves itself into several factors, one of which is the position of the truck relative to the rack upon the floor, and another is a control of the elevation of the lift forks upon the mast 14. Still another control position may be assurance that the extensible unit is horizontal, in other words that the forks do not dip out of horizontal position under load. A simple means for insuring such positioning is illustrated in Figs. 1 and 3 and constitutes the mounting upon the device of a source of light 110 for projecting a beam of light 112 toward the rack. As shown, the means 110 is mounted upon one of the sleeves 22 which maintains a fixed orientation relative to the guides 24 and to the elevation of the fork arms 16 of the truck. The rack and preferably the uprights 96 thereof will have juxtaposed to each storage space or compartment therein a mark (not shown) which will be so related to that storage space that when the operator observes that the beam of light is centered on that mark, which may be a cross to enable to operator to observe both vertical and horizontal deviation from true register, the worker can be assured that his device is positioned properly with respect both to alignment of the device with the storage space vertically and alignment thereof with the storage space horizontally or lengthwise of the rack. In the event it is desired to provide means to insure the worker that the horizontal position of the device is accurate, two such lights may be provided at vertically spaced points adapted to shine upon similar marks upon the rack. If the light beam strikes both of these marks upon the rack simultaneously, the operator is insured of registry on the vertical and horizontal, and also is insured of a true horizontal position of the platform member 40. Any tilting observed by the device will require tilting of the mast, as is commonly possible through controls provided upon the lift truck.

In the event it is desired to insure by mechanical means the proper extent of projection of the member 28 into the rack, a stop (not shown) may be provided in the

rack, adapted to be engaged by the extensible member to physically stop the same in its movement. Another physical means which may be used to insure proper positioning of the parts is to provide a rounded curb upon the floor engageable by the truck wheels as they move alongside the rack, thus causing the operator to be insured when both wheels contact such track or curb that both the spacing and the parallelism of the track relative to the rack are accurate.

While the preferred embodiment of the invention has been illustrated and described, it will be understood that changes in construction may be made within the scope of the appended claims without departing from the spirit of the invention.

We claim:

1. Load transfer means for shifting a load mounted on a carrier having spaced substantially upright supports, comprising a self-propelled dirigible wheeled vehicle, cantilevered fork arms carried by and projecting forwardly beyond the front wheels of the vehicle, means for raising and lowering said fork arms on said vehicle relative to a low level position adjacent the surface on which the vehicle travels, a power unit on said vehicle, a base detachably carried by said fork arms and having a guide extending transversely of said fork arms, an extensible unit traversing said guide and including anti-friction supporting means, selectively operable means on said base actuated by said power unit for shifting said extensible unit along said guide, a rigid load-carrier-engaging member narrower than the spacing of the carrier supports carried by said extensible unit, and selectively operable means actuated by said power unit in all operative positions of said extensible unit for raising and lowering said last named member relative to said extensible unit between low level and high level positions, said last named member elevating said carrier clear of said base in high level position and being shiftable freely under said carrier and between the supports thereof in low level position.

2. Load transfer means for shifting a load mounted on an elevated work carrier having a horizontal part and spaced downwardly projecting supports to and from a rack having a plurality of storage compartments each including track means and load supporting means, comprising a self-propelled dirigible wheeled vehicle, a power unit on said vehicle, vertically shiftable cantilevered load-supporting means carried by and projecting forwardly beyond the wheels of the vehicle and substantially horizontally from said vehicle, positioning means for raising and lowering said load-supporting means relative to a low level position adjacent the surface on which the vehicle travels, a base detachably carried by said supporting means and having a guide, an extensible unit having a plurality of spaced anti-friction supporting means and shiftable in a predetermined path on said base laterally of said vehicle to and from the track means of said rack, selectively operable means on said base actuated by said power unit for shifting said extensible unit in said path on said base into and from a selected compartment of said rack, a rigid load-engaging member carried by said extensible unit, and selectively operable means on said extensible unit and actuated by said power unit for shifting said load-engaging member between elevated and lowered positions on said extensible unit in all operating positions of the latter, said load-engaging member being narrower than the spacing between the supports of said elevated work carrier, said load-engaging member in its lowered position being shiftable freely below the horizontal part of said work carrier and in its elevated position lifting the carrier to a position with its downwardly projecting supports clear of the surface traversed by said wheeled extensible unit.

3. Load transfer means for shifting a load mounted on a work carrier having a horizontal part and spaced downwardly projecting supports, comprising a dirigible self-propelled wheeled vehicle, vertically adjustable cantilevered forwardly projecting load supports on said vehicle

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extending beyond the front wheels thereof, positioning means for elevating and lowering said load supports relative to a low level position adjacent the surface on which the vehicle travels, a base adapted to be carried detachably by the said load supports of said vehicle, horizontal guide means on said base adapted to extend laterally relative to said vehicle, an extensible unit having anti-friction supporting means shiftable on said guide, a vertically adjustable load-engaging member carried by said extensible unit, said load-engaging member having a lowered position fitting with clearance between the supports and below the platform of a work carrier supported on the base and having an elevated position for supporting a work carrier spaced above the said load supports of said vehicle a hydraulic power unit carried by said vehicle, hydraulic means carried by said base for shifting said extensible unit along said guide, hydraulic means on said extensible unit

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for elevating said load-engaging member in all operating positions of the extensible unit, and means for detachably connecting said hydraulic means to the hydraulic power unit of said vehicle.

References Cited in the file of this patent

UNITED STATES PATENTS

1,824,201	Eisenberg	Sept. 22, 1931
1,879,713	Scott	Sept. 27, 1932
2,299,150	Kennedy	Oct. 20, 1942
2,416,071	Shonnard	Feb. 18, 1947
2,584,240	Stewart	Feb. 5, 1952
2,626,065	Sanders et al.	Jan. 20, 1953
2,633,809	Robinson et al.	Apr. 7, 1953
2,663,434	Pierce	Dec. 22, 1953