

Aug. 18, 1959

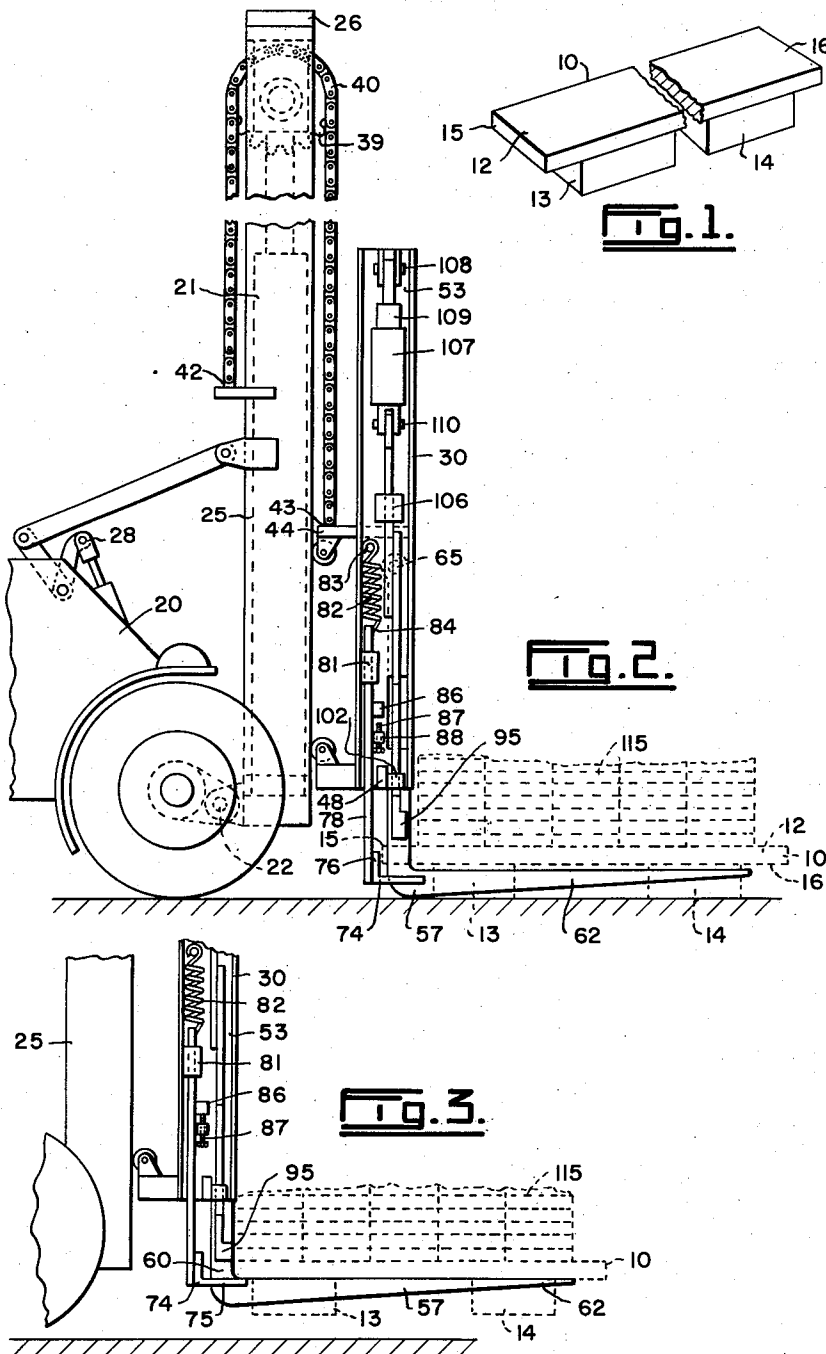
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2,900,098

FORK LIFT TRUCK LOAD SUPPORT CARRIER

Filed Nov. 12, 1957

2 Sheets-Sheet 1



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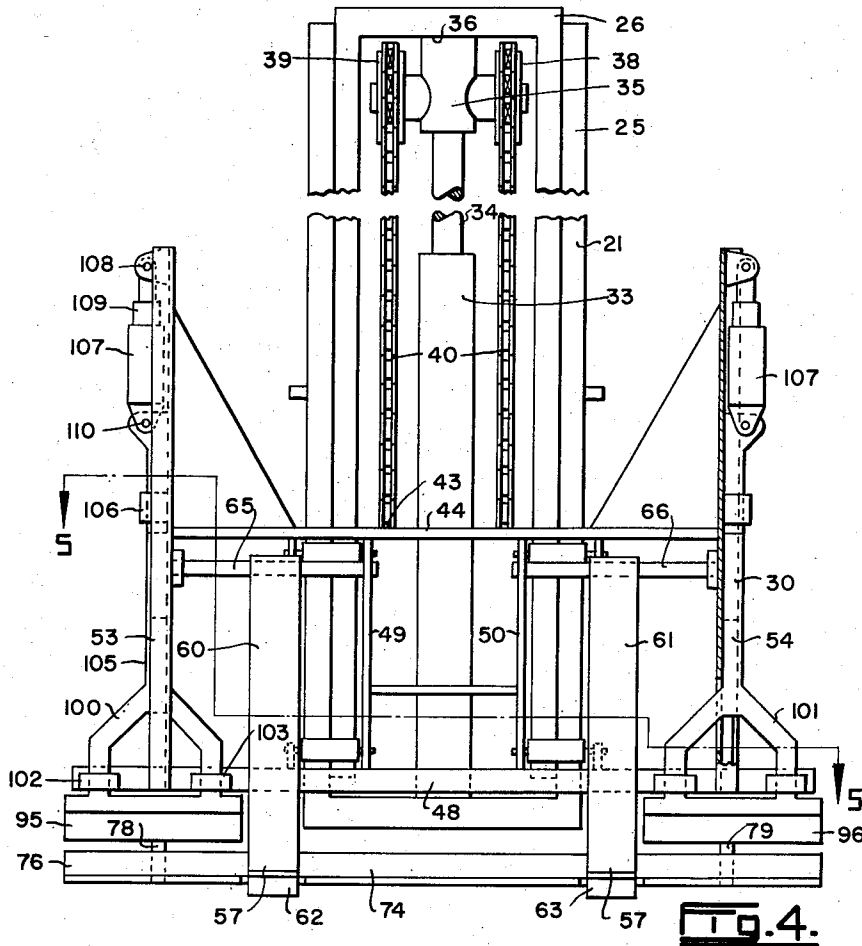
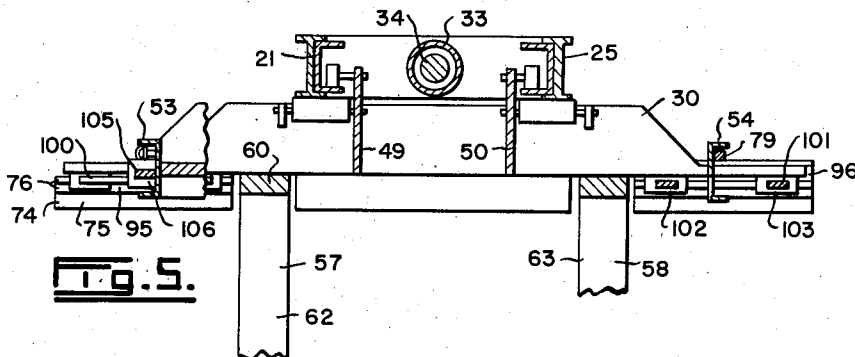
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FORK LIFT TRUCK LOAD SUPPORT CARRIER

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FORK LIFT TRUCK LOAD SUPPORT CARRIER

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Application November 12, 1957, Serial No. 695,811

11 Claims. (Cl. 214—650)

This invention relates to a load support carrier for fork lift trucks and the like.

Lumber is usually piled in groups or bundles constituting a load that may be lifted by a fork lift carrier or other means. The load is placed on suitable supporting means, such as spaced blocks or strips of wood, so that the forks of a lift truck may be moved beneath the bundle in order to pick it up and transport it to some other place. When the load is to be deposited, supporting strips or blocks are first laid down and then the load placed on them. This is done even if a load is placed on top of another load. This involves the necessity of men shifting the supporting blocks with the constant possibility of injury.

The present invention eliminates the necessity of having men move the supporting blocks for the lumber loads or bundles. Each load of lumber is placed on a support which may be in the form of one or more carrier blocks. When it is desired to lift the load, the lift truck is moved so that its forks are positioned beneath the load in the usual manner. The load support carrier is so designed and mounted on the lift truck that when the forks are raised to lift the load, the carrier grips the load support and lifts it beneath the load. When the load is moved towards the ground, the support rests on the ground first and then the load is deposited on it. Thus, the load support is always with the load, and there is no necessity for anyone to go near the load when it is being lifted or deposited.

Although this apparatus is particularly designed for lumber loads and is so described herein, it will be understood that it may be used with other types of load as well.

Fork lift trucks have substantially vertical lifting frames with forks at the bottoms thereof projecting outwardly therefrom. These frames are movable from and to lower positions where the forks are near the ground.

The load support used with this invention may be of any desired shape and construction provided that it has a projecting part spaced above the ground and will allow forks of the truck to be moved beneath the load being supported.

A load support carrier according to the present invention comprises pick-up means mounted on the lifting frame of a lift truck for limited vertical movement on said frame near the forks thereof, and stop means mounted on the frame spaced above the pick-up means. When the forks are moved beneath the load on the support, the pick-up means is moved beneath the projecting part of the support. As the lifting frame of the truck is raised, the forks lift the load and the pick-up means presses the support against the stop means to raise the support with and beneath the load. Although not absolutely necessary, it is desirable to provide means connected to the stop means for moving the latter towards and away from the pick-up means. When this moving means is provided, the stop means may be moved to press the load support against the pick-up means firmly to grip said support.

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An example of this invention is illustrated in the accompanying drawings, in which,

Figure 1 is a perspective view of one form of load support that may be used with this invention,

Figure 2 is a side elevation of the front portion of a fork lift truck, showing the load support carrier in side elevation, the forks of the truck being in their lowermost position beneath a load which is shown in broken lines,

Figure 3 is a fragmentary view similar to Figure 2, but showing the forks elevated from the ground,

Figure 4 is a front elevation of the load support carrier and the lift truck, with the prongs in their lowermost position, and

Figure 5 is a horizontal section through the load support carrier taken substantially on the line 5—5 of Figure 4.

Referring to Figure 1 of the drawings, 10 is one form of load support that may be used with this invention. This support has a top 12 with blocks 13 and 14 near and spaced inwardly from the ends thereof to support the top above the ground. One or both ends of the top project outwardly, as indicated at 15 and 16.

Support 10 may be large enough to carry the entire load itself, in which case, blocks 13 and 14 will have to be positioned so that the forks on the lift truck may be moved beneath top 12. However, in ordinary practice, these supports are comparatively narrow and two or more of them are spaced apart and placed beneath the load, in which case, the truck forks move beneath the load at points where there are no supports.

Referring to Figures 2 to 5, 20 diagrammatically illustrates a conventional fork lift truck having a substantially vertical lifting tower 21 pivotally mounted at its lower end at 22 thereon. This tower has the usual stationary section 25 which slidably supports an inner section 26 that is movable vertically relative to the stationary section. Suitable means generally designated by the numeral 28 are provided for tilting the tower back and forth in the customary manner.

Fork lift trucks have lifting frames mounted on the towers thereof, said frames having forks projecting outwardly from them and from the truck. Truck 20 may have a standard lifting frame thereon to which are attached the necessary elements to form the present invention. The illustrated load support carrier is mounted on a lifting frame 30 which is slidably mounted for vertical movement on the tower 21 in the usual manner. As the mounting of this frame does not form part of the invention, and is well known in the art, it does not need to be described herein. It is sufficient to say that a vertical hydraulic cylinder 33 is mounted at its lower end on the tower near the bottom thereof and projects upwardly within said tower. A ram 34 slidably extends outwardly from the cylinder and is connected at its upper end to a crosshead 35, said head being connected at 36 to the inner or movable section 26 of the tower. A pair of sprockets 38 and 39 are rotatably mounted on the crosshead, and chains 40 extend over these sprockets. One end of each chain is anchored at 42 to the stationary section 25 of the tower, while the opposite end of said chain is anchored at 43 to a bar 44 which constitutes part of frame 30 and projects inwardly from said frame towards the tower, see Figure 2.

With this arrangement, when ram 34 is extended from cylinder 33, the inner section 26 of the tower is raised, sprockets 38 and 39 moving therewith. As the inner ends of chains 40 are anchored to the stationary section of the tower, the outer ends 43 thereof move upwardly drawing lifting frame 30 with them. This action is reversed when the ram is retracted. The controls for the hydraulic cylinder have been omitted for the sake of clarity.

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Frame 30 is provided with a lower bar 48 extending parallel to bar 44, and it has spaced vertical supporting plates 49 and 50 secured at their opposite ends to said bars. Channel-shaped standards 53 and 54 are secured to the outer ends of the upper and lower bars 44 and 48, and project upwardly above the latter, as clearly shown in Figure 4.

A pair of forks 57 and 58 are secured to frame 30 in any desired manner. Forks 57 and 58 have vertical portions 60 and 61, and horizontal portions 62 and 63, respectively. In this example, horizontal shafts 65 and 66 are carried by standard 53 and support 49, and standard 54 and support 50, respectively. Shaft 65 extends through the vertical portion 60 of fork 57, while shaft 66 extends through the vertical portion 61 of fork 58. The vertical portions of the forks extend downwardly over and bear against lower bar 48 of the lifting frame.

Pick-up means is provided on lifting frame 30 for limited vertical movement thereon near the forks 57 and 58 thereof. In the illustrated form of the invention, this pick-up means comprises a shoe 74 which extends the full width of and beyond the sides of frame 30 near the horizontal portions of the forks, see Figures 2 to 4. This shoe has a horizontal base 75 and preferably, although not necessarily, a back 76 projecting upwardly from this base near the inner edge thereof. This shoe is supported adjacent its opposite ends by arms 78 and 79 which extend upwardly beside standards 53 and 54, respectively. As the mounting of these arms is exactly the same, one only will be described in detail. Arm 78 slidably extends through a bracket 81 carried by standard 53. A spring 82 has one end anchored at 83 to the standard, and its opposite end 84 connected to the upper end of arm 78. Means is provided for limiting the downward movement of the arm and, consequently, shoe 74. This may be accomplished by a block 86 mounted on the arm and a set screw 87 threaded through a sleeve 88 carried by the standard. This set screw may be adjusted to vary the limit of the downward movement of the block and arm.

As arms 78 and 79 are mounted in the same manner, shoe 74 is suspended by resilient means (springs 82), from the lifting frame 30. The shoe is permitted a limited degree of movement relative to the lifting frame and to the forks thereof.

Stop means is mounted on the frame spaced above the pick-up means or shoe 74. This stop means may be in the form of one or more stop bars mounted above the shoe. In this example, stop bars 95 and 96 are positioned above the ends of the shoe 74 for this purpose. As these stop bars are mounted in exactly the same manner, only one, namely bar 95, will be described in detail.

The stop bar may be permanently or adjustably mounted at a predetermined distance above shoe 74. However, it is preferable to provide means for moving the bar towards and away from the shoe.

Each of the stop bars 95 and 96 is carried by a pair of arms 100 and 101 projecting upwardly therefrom and slidably through brackets 102 and 103 carried by lower bar 48 of the lifting frame. The upper ends of these arms converge inwardly to a common supporting arm 105 which extends upwardly parallel to the adjacent frame standard. This arm slidably extends through a bracket 106 carried by the standard, and a hydraulic cylinder 107 is connected to the upper end of the arm at 108. A ram 109 slidably projecting from this cylinder is connected at 110 to the standard. The pipes and controls for this cylinder have been omitted for the sake of clarity since they are standard equipment in the hydraulic field. There are, of course, two cylinders 107, one on each of the standards 53 and 54. These cylinders may be operated to move stop bars 95 and 96 towards and away from shoe 74. These stop bars are normally retained in position spaced from the shoe.

The operation of this load support carrier is relatively simple. As previously stated, the load, indicated in

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broken lines at 115 in Figures 2 and 3, is placed on a plurality of spaced and substantially parallel load supports 10. When it is desired to pick the load up, the forks 57 and 58 of the truck 20 are moved to their lowermost positions, and then the truck is moved to insert the forks beneath the load on the supports or blocks, see Figure 1. At this time, shoe 74 is moved beneath the projecting ends 15 of the supports. Then the lifting frame 30 is moved upwardly by means of cylinder 33 to cause the forks to lift load 115. As the frame and forks move upwardly, the shoe is moved against the under surfaces of the support projections, but the springs 82 prevent the shoe from lifting the supports until the forks have taken the full load. At this time, blocks 86 of arms 78 have moved into engagement with set screws 87 so that the shoe moves upwardly with the lifting frame.

As previously stated, stop bars 95 and 96 may be set in fixed predetermined positions about the level of shoe 74. If this is the case, the shoe would lift the support projections against the stop bars to grip said projections. However, it is preferable to provide the cylinders 107 so that the operator of the truck can cause said cylinders to move the stop bars downwardly against the upper surfaces of the load support projections firmly to grip said projections between the bars and the shoe. As the lifting frame continues to move upwardly, the gripped load supports are lifted with it beneath the load. Therefore, the supports are never separated from the load, and they remain in their proper positions relative thereto so that when the supporting frame is moved downwardly the supports contact the ground first and then as the forks continue to move downwardly, the load is deposited on said supports, the latter being released by raising the stop bars by means of cylinders 107. Thus, there is no need for men to place load supports beneath or remove them from beneath a load during loading operation of the lift truck. In other words, the operator of the truck has full control of both the load and the supporting blocks therefor during both the lifting and lowering of the load.

What we claim as our invention is:

1. A load support carrier for fork lift trucks having substantially vertical lifting frames with forks at the bottoms thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such that the forks can engage a load to lift it off the support, said carrier comprising pick-up means mounted on a lifting frame for vertical movement relative thereto and located near the forks thereof, said pick-up means when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and the relative movement of the pick-up means preventing said means from lifting the support during the first part of upward movement of the forks to take the load, means on the frame for stopping downward relative movement of the pick-up means when the forks have moved upwardly a predetermined distance, and stop means mounted near but spaced above the level of the pick-up means, whereby the pick-up means presses the projecting part of the support against the stop means firmly to grip said part after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

2. A load support carrier as claimed in claim 1 in which the pick-up means is resiliently suspended from the lifting frame and retained just above the ground when the forks are at the ground.

3. A load support carrier for fork lift trucks having substantially vertical lifting frames with forks at the bottoms thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such

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that the forks can engage a load to lift it off the support, said carrier comprising a pick-up shoe resiliently mounted on a lifting frame for vertical movement relative thereto and located near the forks thereof, said shoe when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and the relative movement of the shoe preventing said shoe from lifting the support during the first part of upward movement of the forks to take the load, means on the frame for stopping downward relative movement of the shoe when the forks have moved upwardly a predetermined distance, and a stop bar mounted near but spaced above the level of the shoe, whereby the shoe presses the projecting part of the support against the stop bar firmly to grip said part after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

4. A load support carrier for fork lift trucks having substantially vertical lifting frames with forks at the bottom thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such that forks can engage a load to lift it off the support, said carrier comprising a pick-up shoe resiliently suspended from a lifting frame and movable vertically relative thereto near the forks thereof, said shoe projecting outwardly in the same direction as the forks, said shoe when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and the relative movement of the shoe preventing said shoe from lifting the support during the first part of upward movement of the forks to take the load, means on the frame for stopping downward relative movement of the shoe when the forks have moved upwardly a predetermined distance, and a stop bar mounted near but spaced above the level of the shoe, whereby the shoe presses the projecting part of the support against the stop bar firmly to grip said part after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

5. A load support carrier for fork lift trucks having substantially vertical lifting frames with forks at the bottoms thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such that the forks can engage a load to lift it off the support, said carrier comprising pick-up means mounted on a lifting frame for vertical movement relative thereto and located near the forks thereof, said pick-up means when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and the relative movement of the pick-up means preventing said means from lifting the support during the first part of upward movement of the forks to take the load, means on the frame for stopping downward relative movement of the pick-up means when the forks have moved upwardly a predetermined distance, stop means mounted on the frame near but spaced above the level of the pick-up means, and means carried by the frame and connected to the stop means for moving the latter towards and away from the pick-up means, whereby when the stop means is moved towards the pick-up means the projecting part of the support is gripped therebetween after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

6. A load support carrier for fork lift trucks having substantially vertical lifting frames with forks at the bottoms thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a pro-

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jecting part spaced above the ground and is such that the forks can engage a load to lift it off the support, said carrier comprising a pick-up shoe resiliently mounted on a lifting frame for vertical movement relative thereto and located near the forks thereof, said shoe when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and the relative movement of the shoe preventing said shoe from lifting the support during the first part of upward movement of the forks to take the load, means on the frame for stopping downward relative movement of the shoe when the forks have moved upwardly a predetermined distance, a stop bar mounted on the frame near but spaced above the level of the shoe, and means carried by the frame and connected to the stop bar for moving the latter towards and away from the shoe, whereby when the stop bar is moved towards the shoe the projecting part of the support is gripped therebetween after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

7. A load support carrier for fork lift trucks having substantially vertical lifting frames with forks at the bottom thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such that forks can engage a load to lift it off the support, said carrier comprising a pick-up shoe resiliently suspended from a lifting frame and movable vertically relative thereto near the forks thereof, said shoe projecting outwardly in the same direction as the forks, said shoe when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and the relative movement of the shoe preventing said shoe from lifting the support during the first part of upward movement of the forks to take the load, means on the frame for stopping downward relative movement of the shoe when the forks have moved upwardly a predetermined distance, a stop bar mounted on the frame near but spaced above the level of the shoe, and means carried by the frame and connected to the stop bar for moving the latter towards and away from the shoe, whereby when the stop bar is moved towards the shoe the projecting part of the support is gripped therebetween after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

8. A load support carrier for fork lift trucks having substantially vertical lifting frames with forks at the bottoms thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such that the forks can engage a load to lift it off the support, said carrier comprising a horizontal pick-up shoe located near the forks, arms connected to the shoe and extending upwardly therefrom, said arms being slidably mounted on the lifting frame for vertical movement relative thereto, resilient means connecting the arms to the frame permitting relative movement therebetween, said shoe when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and the relative movement of the shoe preventing said shoe from lifting the support during the first part of upward movement of the forks to take the load, means on the frame for stopping downward relative movement of the shoe when the fork have moved upwardly a predetermined distance, a stop bar near but spaced above the level of the shoe, an arm connected to the bar and extending upwardly therefrom, said arm being vertically slidable on the frame, and means carried by the frame and connected to the arm of the stop bar for moving the latter towards and away from the shoe, whereby when the stop bar is moved towards the shoe the projecting part of the support is gripped therebetween after the above-

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mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

9. A load support carrier for fork lift trucks having substantially vertical lifting frame with forks at the bottoms thereof projecting outwardly therefrom, said frame being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such that the forks can engage a load to lift it off the support, said carrier comprising supporting means carried by and movable with a lifting frame near the bottom thereof and extending laterally therefrom, a substantially vertical shoe arm slidably mounted on said supporting means for vertical movement relative thereto, a substantially horizontal pick-up shoe connected to and movable with the arm at the lower end thereof, means resiliently connecting the arm to the supporting means and normally retaining the shoe substantially at the level of the forks, said shoe when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and said relative movement preventing said shoe from lifting the support during the first part of upward movement of the forks to take the load, means on the supporting means for limiting the downward relative movement of the arm and shoe as the forks are moved upwardly, and a stop bar mounted on the supporting means near but spaced above the level of the shoe, whereby the shoe presses the projecting part of the support against the stop bar firmly to grip said part after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

10. A load support carrier for fork lift trucks having substantially vertical lifting frame with forks at the bottoms thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such that the forks can engage a load to lift it off the support, said carrier comprising supporting means carried by and movable with a lifting frame near the bottom thereof and extending laterally therefrom, a substantially vertical shoe arm slidably mounted on said supporting means for vertical movement relative thereto, a substantially horizontal pick-up shoe connected to and movable with the arm at the lower end thereof, means resiliently connecting the arm to the supporting means and normally retaining the shoe substantially at the level of the forks, said shoe when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and said relative movement preventing said shoe from lifting the support during the first part of upward movement of the forks to take the load, means on the supporting means for limiting the downward relative movement of

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the arm and shoe as the forks are moved upwardly, a supporting arm slidably mounted on the supporting means for vertical movement thereon, a substantially horizontal stop bar secured to the lower end of the supporting arm and normally spaced above the level of the shoe, and means on the supporting means and connected to the supporting arm for moving the latter arm and the stop bar towards and away from the pick-up shoe, whereby when the stop bar is moved towards the shoe the projecting part of the support is gripped therebetween after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

11. A load support carrier for fork lift trucks having substantially vertical lifting frames with forks at the bottoms thereof projecting outwardly therefrom, said frames being movable from and to lower positions where the forks are near the ground, and the load support has a projecting part spaced above the ground and is such that the forks can engage a load to lift it off the support, said carrier comprising supporting means carried by and movable with a lifting frame near the bottom thereof and extending laterally therefrom, a substantially vertical shoe arm slidably mounted on said supporting means for vertical movement relative thereto, a substantially horizontal pick-up shoe connected to and movable with the arm at the lower end thereof, means resiliently connecting the arm to the supporting means and normally retaining the shoe substantially at the level of the forks, said shoe when the forks are moved beneath a load on a support being positioned to move beneath the projecting part of the latter and said relative movement preventing said shoe from lifting the support during the first part of upward movement of the forks to take the load, means on the supporting means for limiting the downward relative movement of the arm and shoe as the forks are moved upwardly, a supporting arm slidably mounted on the supporting means for vertical movement thereon, a substantially horizontal stop bar secured to the lower end of the supporting arm and normally spaced above the level of the shoe, and a fluid-operated cylinder mounted on the supporting means and having a piston rod projecting therefrom and connected to the supporting arm to move the latter down and up when the cylinder is operated thereby to move the stop bar towards and away from the pick-up shoe, whereby when the stop bar is moved towards the shoe the projecting part of the support is gripped therebetween after the above-mentioned relative movement has taken place during the upward movement of the forks, at which time the support is moved with the load independently thereof.

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