PORTABLE LOAD LIFTER
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6 Claims. (Cl. 254—10)

This invention relates to a portable load lifter adapted to elevate a load of any type of material to a desired extent, for any of the various purposes, as for instance, stacking, machine feeding, off bearing, and the like.

The primary purpose of the invention is to provide a portable and low cost lifting device of conveniently low overall height, having a platform or load lifting carriage capable of being lowered completely to the floor, thus to permit loading of said platform with rolling material handling equipment.

Another important object is to provide a device of the character described which is so constructed as to distribute a lifting force applied at one end thereof equally beneath both ends of the platform in a manner to elevate the load a selected distance, with the apparatus accomplishing this result while still retaining the lowered height of the platform and lifting mechanism on at least three sides thereof within small dimensional limits, thus to permit handling of overhanging stock such as plywood loaded on pallets, skids, or floor trucks.

Another important object is to construct a load lifting device as described wherein lifting effort will be in direct proportion to the load.

Still another important object is to provide a load lifting device of the character described that will be of simple construction, without the necessity of constructing the same with a base or special chassis, the device being so formed as to comprise essentially no more than a platform or carriage, and supporting legs and associated power means.

Still another object is to mount the casters or wheels, which make the device portable, on the legs of the apparatus in such a way as to cause said casters or wheels to support the lifter while in an elevated position and to automatically permit retraction to lowered position for rolling of a material handling truck or the like onto the platform.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts, hereinafter more fully described and pointed out in the claims, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Referring to the drawings
Fig. 1 is a side elevation of one form of the invention in an elevated position.

Fig. 2 is an elevation taken from the right of Fig. 1 on a reduced scale.

Fig. 3 is an enlarged fragmentary vertical sectional view through the connection between a feed screw and toggle.

Fig. 4 is a side elevation of a modified form, a load of material being illustrated on said modified form.

Fig. 5 is a view similar to Fig. 4, the load being reduced somewhat and the load lifter being elevated a distance necessary to make up for the reduction in the load size.

Referring to the drawings in detail, in the form of the invention as illustrated in Figs. 1 to 3 inclusive I provide at opposite sides of the lifting device inclined legs 1 extending from front to rear of the device and provided at their free ends with casters 2 supported upon the floor or other supporting surface 5.

Intermediate their ends, the legs 1 are respectively pivotally joined at 3 to other legs 4 equipped with the casters 5.

In the lowered position of the lifter, the legs 1 and 4 are adapted to extend horizontally in longitudinal contact with each other, thus to permit lowering of the platform 5' fully to floor level. In this connection, the platform 5 is provided with the raised side walls 6 the top edges of which are provided with the outturned longitudinal flanges 7.

The upper or inner end of the legs 1 are pivotally connected to the side walls 6 at a point above the plane of the platform 5', by pivot pins 8.

The upper ends of the legs 4 are connected, by pivotal connections 9, to the front portions of the side walls 6, also above the plane of the platform 5', the pivot pins 10 passing through slots 11 formed in said side walls.

Rigidly secured to the rear edge of the platform 5' and extended transversely thereof is an inverted channel member 11, and carried by the channel member 11 adjacent opposite ends thereof are trunnions 12 to which are pivotally connected, the upper ends of toggle links 13 also disposed transversely of the platform.

At their other ends, the links 13 are pivotally connected as at 14 to sleeves 15 having the internally threaded bores 16 in which is engaged a screw 17 having right and left hand threads as best seen from Fig. 2.

The pivotal connections 14 also connect to the sleeves and to the toggle links 13 lower toggle links 18, which are pivotally joined at their lower ends to trunnions 19 carried by a channel member 20 adjacent opposite ends thereof. This chan-
nel member is fixed at opposite ends to the legs 5 adjacent the lower ends thereof and extends transversely of the load lifter beneath the channel member 11.

A motor supporting platform 21 is provided with the forwardly extended hinge brackets 22, that are pivotally hung upon the smooth intermediate portion of the screw 11. As a result the motor supporting platform 21 is itself swingingly mounted upon the feed screw.

A motor 23 is mounted upon the support 21, and drives the small drive sprocket 24 around which passes the chain 25 driving the larger driven sprocket 26 secured to the feed screw 11 for the purpose of rotating said feed screw.

In use, it will be understood that the device can be lowered to a point at which the base of the platform is flat upon the floor or other supporting surface 8. Since three sides of the carriage or elevatorable platform are small dimensioned and are completely clear of the power source, loads can be placed upon said platform from any of these three sides, and in addition, can overhang all three sides as desired.

When the load is to be elevated, the motor 23 is actuated, and will swing the platform 21 upwardly. As a result, the sleeves 15 are fed longitudinally of the screw in opposite directions, actuating the toggle link 13, and 16 in a manner to elevate the load supporting platform that comprises the platform base 5 and the side walls 6. Of importance, in this connection, is the fact that in any position to which the platform is elevated, the weight of the load is centrally borne by the scissors type supporting leg arrangement. In other words, the entire weight of the load is uniformly applied to the upper ends of the legs 17 and 18, respectively, and transferred down said legs to opposite sides of the device to the pivotal connections 3 and thence to the lower end portions of said supporting legs.

As the device is raised or lowered, the motor supporting platform 21 swings upon the screw, while at the same time maintaining the motor in operative driving relationship to said screw.

Of importance, in this connection, is the fact that although the power is applied to lift the load supporting platform at one end of the apparatus, the downward pressure exerted by the weight of the load upon said platform is not assumed by said end only of the apparatus, but is taken up uniformly and equally throughout the load supporting platform and the supporting means thereof.

In Figs. 4 and 5, there is illustrated another form of the device, including the legs 27 and 28, these being castor mounted and being pivotally connected at 29 and 30 to the load supporting platform 31 having the slot 32 through which passes the pivotal connection 38. A pellet or skid P, constituting no part of the present invention, is supported upon the platform 31, and in turn carries a load of material L.

In this form of the invention a C-shaped motor support 33 supports a motor 34 driving the chain 35 which in turn rotates the vertical feed screw 36. The feed screw 36 is journaled at its lower end in a bearing extension 37 of the support 33 and at its upper end is journaled in the upper end portion of said motor support. Intermediate its ends, the screw has threaded en- graisments with a threaded bore in the rear end of the platform 31. As a result, when the motor is actuated the screw 36 is rotated, and feeds the platform 31 upwardly. As in the previous form of the invention, although the lifting power is applied only at one end of the apparatus, the weight of the load is uniformly and evenly throughout the apparatus.

In the form of the invention illustrated in Figs. 4 and 5, a limit switch 38' comprises an L-shaped arm equipped with the roller 39. The limit switch 38' is pivotally mounted upon the upper end of the support 33 and would be spring urged to a position as seen in Fig. 5. Leads 40 extend from a suitable source of electric power, not shown, through the switch and leads 41 extend from the switch to the electric motor.

When the load of material L, comprising sheets in the present instance, is so high as to be above the level of the roller 39, the switch will be pressed backwardly by the side of the load, as in Fig. 4. In this position the switch is off and the motor will not be actuated. When the load drops to a level which permits the roller 39 to swing forwardly over the top of the load, the switch is moved to the on position actuating the motor and causing elevation of the load platform. The platform is elevated only to an extent as will cause the roller 39 to again be swung to the position of Fig. 4, and the motor will be cut off. In this way the top level of the load L is kept at a prescribed level of elevation.

In the form of the invention as seen in Figs. 4 and 5, the same characteristics are present as in the first form. In other words, the load can overhang three sides of the loading platform, and said loading platform is low-dimensioned on these three sides. Additionally, the lifting power is exerted at one end only of the apparatus, but the load weight is absorbed uniformly throughout the area of the load platform.

Of further importance is the fact that in both cases, the devices are fully portable and self-contained and can be moved to any desired position for use. In this way, they are readily adaptable for use in warehouses, factories, and at other locations. When used in any location wherein materials have been previously manually handled, they reduce effort and increase efficiency. In other locations, the devices can be used for serving as automatic off bearing devices for machinery processing materials in sheet form, and can also be used to feed sheet materials into machines directly from floor trucks, skids, and pallets when used with feeding equipment suitable for removing material piece by piece from the top of the load.

In the illustrated modifications, there have been respectively shown a screw and toggle lift, and a feed screw lift. However, except as necessarily limited by the claims, I do not desire to limit myself to these particular lifting means, and in my opinion other methods, such as hydraulic and air cylinders, and combinations of these devices with levers, toggles, cans, wedges, cranks, and the like, might well be used. In each instance, however, the device will be characterized by its arrangement wherein the device is made fully portable, wherein load weight is uniformly taken, wherein there is low overall height, and wherein loads of many shapes can be efficiently handled, including loads that overhang the device on three sides.

What is claimed is:

1. In a load lifter of the type which includes an elongated load supporting platform, a pair of legs adjacent each longitudinal side edge of the platform and one leg of each pair of legs being
pivotally connected to the platform adjacent one end thereof, the opposite leg of each pair of legs being pivotally and slidably connected to the platform adjacent the opposite end thereof, and the legs of each pair of legs being pivoted together intermediate their ends to move about a common axis, means for moving the legs and raising or lowering the platform comprising toggle links carried by the platform adjacent the end thereof to which the legs are pivoted, said toggle links being connected to the opposite legs, nuts carried by the toggle links, a threaded bar threadedly engaging the nuts for moving the nuts and expanding or collapsing the toggle links, and a prime mover carried by the bar and operatively connected thereto for rotating said bar and moving the nuts.

2. A load lifter comprising spaced parallel pairs of legs, the legs of each pair being pivotally connected together intermediate their ends to move about a common horizontal axis, spaced parallel trunnions carried by the legs and extending longitudinally from the load lifter beyond one end thereof, spaced pairs of convergent toggle links pivotally connected to the trunnions and extending inwardly from opposite sides of the load lifter, and means carried by the toggle links and operatively connected thereto for moving the links about the trunnions and the legs about their pivotal connections.

3. A load lifter which includes an elongated load supporting platform, a pair of legs adjacent each longitudinal side edge of the platform and one leg of each pair of legs being pivotally connected to the platform adjacent one end thereof, the opposite leg of each pair of legs being pivotally and slidably connected to the platform adjacent the opposite end thereof, the legs of each pair of legs being pivoted together intermediate their ends to move about a common axis, a nut carried by the platform adjacent the end thereof to which the legs are pivoted, and means carried by the opposite legs and operatively engaging the nut for raising and lowering the platform and moving the legs about the common axis.

4. A load lifter which includes an elongated load supporting platform, a pair of legs adjacent each longitudinal side edge of the platform and one leg of each pair of legs being pivotally and slidably connected to the platform adjacent one end thereof, the opposite leg of each pair of legs being pivotally and slidably connected to the platform adjacent the opposite end thereof, the legs of each pair of legs being pivoted together intermediate their ends to move about a common axis, a nut carried by the platform adjacent the end thereof to which the legs are pivoted, a screw carried by the legs which are pivotally and slidably connected to the platform, said screw being located adjacent the end of the platform to which the legs are pivoted and threadedly engaging the nut, a prime mover carried by the load lifter adjacent the screw, and means establishing driving connection between the prime mover and the screw.

5. A load lifter which includes an elongated load supporting platform, a pair of legs adjacent each longitudinal side edge of the platform and one leg of each pair of legs being pivotally connected to the platform adjacent the end thereof to which the legs are pivoted, said toggle links being connected to the opposite legs, nuts carried by the toggle links, a threaded bar threadedly engaging the nuts for moving the nuts and expanding or collapsing the toggle links, and a prime mover carried by the bar and operatively connected thereto for rotating said bar and moving the nuts.

6. A load lifter which includes an elongated load supporting platform, a pair of legs adjacent each longitudinal side edge of the platform and one leg of each pair of legs being pivotally connected to the platform adjacent one end thereof, the opposite leg of each pair of legs being pivotally and slidably connected to the platform adjacent the opposite end thereof, the legs of each pair of legs being pivoted together intermediate their ends to move about a common axis, a frame carried by the legs which are pivotally and slidably connected to the platform adjacent the ends thereof remote from their pivotal and slidable connection with the platform, a screw mounted in said frame to rotate about a vertical axis, a nut carried by the platform and threadedly engaging the screw, and a prime mover carried by the frame and operatively connected with the screw.

References Cited in the file of this patent

UNITED STATES PATENTS

<table>
<thead>
<tr>
<th>Number</th>
<th>Name</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>663,083</td>
<td>James</td>
<td>Sept. 3, 1901</td>
</tr>
<tr>
<td>1,553,074</td>
<td>Engel</td>
<td>Sept. 8, 1925</td>
</tr>
<tr>
<td>1,701,314</td>
<td>Shook</td>
<td>Feb. 5, 1929</td>
</tr>
<tr>
<td>1,941,301</td>
<td>Hanson et al.</td>
<td>Dec. 26, 1933</td>
</tr>
<tr>
<td>1,986,035</td>
<td>Wells</td>
<td>Jan. 1, 1935</td>
</tr>
<tr>
<td>1,991,285</td>
<td>Martin</td>
<td>Feb. 12, 1935</td>
</tr>
<tr>
<td>2,542,296</td>
<td>Meredith</td>
<td>Feb. 27, 1951</td>
</tr>
<tr>
<td>2,554,494</td>
<td>Hodgins</td>
<td>May 29, 1951</td>
</tr>
</tbody>
</table>

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