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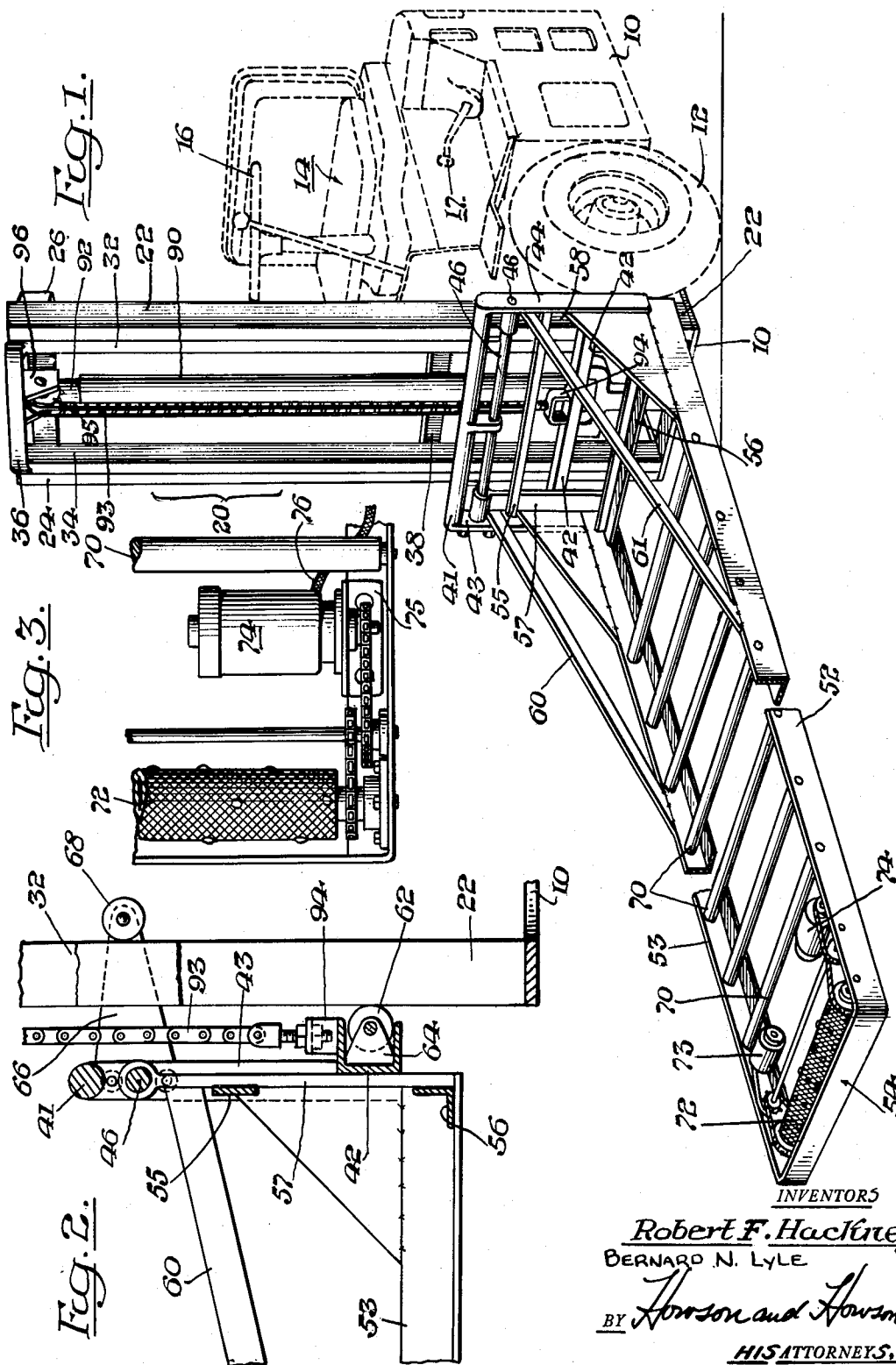
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ATTACHMENT FOR LIFTING TRUCK, WITH END LOADING MEANS

Filed Jan. 12, 1954

2 Sheets-Sheet 1



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Fig. 4.

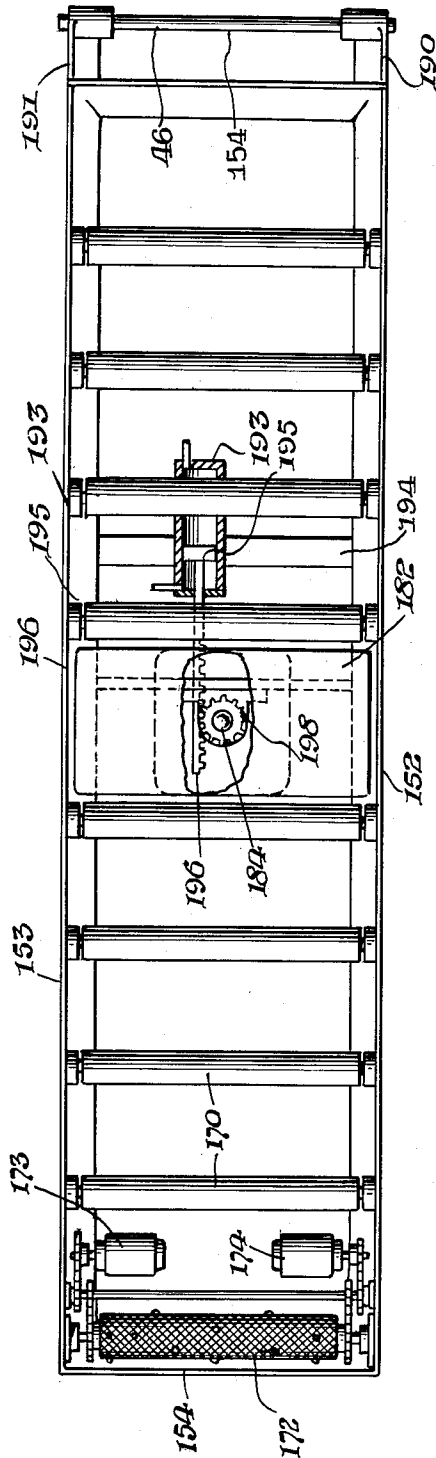
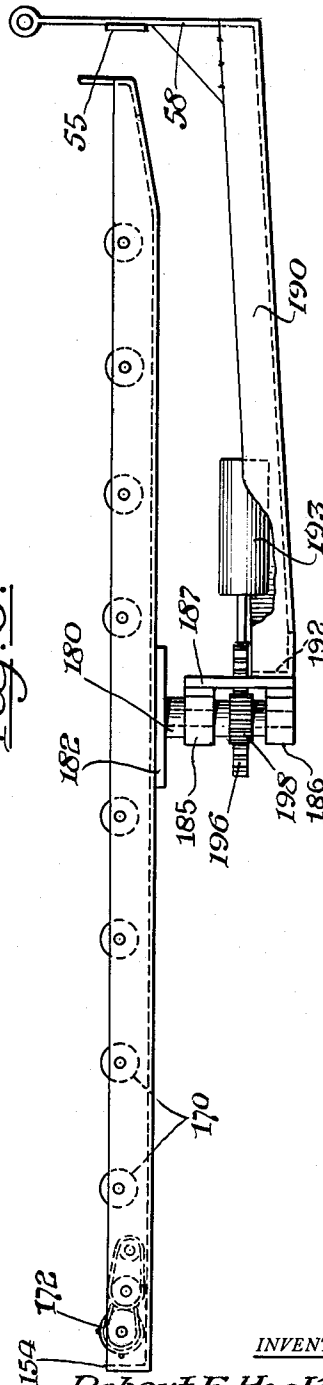


Fig. 5.



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ATTACHMENT FOR LIFTING TRUCK, WITH END LOADING MEANS

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9 Claims. (Cl. 214—512)

This invention relates to mobile lift trucks, and more particularly to lift trucks adapted to lift and move articles that are long and narrow, such as rolled rugs and the like.

Devices of this sort, as heretofore made, have had provision for loading and unloading from the side of the lifting platform. Such devices are not feasible, and are actually useless, when rugs and other long narrow articles are stored in bins endwise. For storing and removing such articles endwise in and from bins, it is necessary to have the articles loaded and unloaded endwise from the truck platform; and there should be power driven means to move the article off and on the platform, with controls therefor conveniently located for manipulation by the truck driver after he has driven the truck to the desired spot and elevated the platform to the desired level.

An object of this invention is to provide a lift truck having an elevator carriage, with an attachment providing a platform onto and off of which platform long narrow articles can be loaded and unloaded endwise at any elevation of the platform.

Another object is to provide a lift truck having the foregoing characteristics with power driven means to move the load endwise onto and off the platform.

Another object is to provide means to control the operation of the loading means from the truck near to the driver's seat.

Another object is to provide a swivel mounting for the platform to enable turning of the platform with or without the load thereon at any elevation of the platform and whether the load is fully or only partially on the platform.

Another object is to provide power means for moving the platform about its swivel mounting, with controls for the driver to manipulate from his seat.

Another object is to provide an attachment which accomplishes the foregoing objectives and is attachable as a unit to the vertically movable carriages of existing or new lift trucks.

Other objects and advantages of the invention will occur as it is described in connection with the accompanying drawings.

In the drawings:

Fig. 1 is a perspective view of a lifting truck embodying the invention.

Fig. 2 is a fragmentary detail view in side elevation of the inner end of the platform and its support.

Fig. 3 is a fragmentary detail view showing in plan one corner of the outer end of the platform.

Fig. 4 is a plan view of a modified form of platform.

Fig. 5 is a side elevation view of the structure shown in Fig. 4.

Referring to the drawings, a truck 10 comprises a chassis mounted on wheels 12 and carrying a motor. A seat 14 for the driver is mounted upon the chassis with a steering wheel 16 and a lever 17 for controlling for-

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ward and reverse movement of the truck and within easy reach of the driver's seat, as usual.

At the front end, the truck has mounted thereon on a vertical frame or column designated by numeral 20 constituting a support for lifting mechanism to raise and lower an elevator. The column is fixedly mounted upon the truck and is or may be made of a pair of parallel vertical channel beams 22 and 24 which are joined at their bottom to the truck base or chassis, and are joined at their top by a transverse horizontal U-shape metal bracket 26.

Adapted to ride up and down between the rails of the frame is a slide made up of a pair of parallel vertical channel beams 32 and 34, which are joined at their top by a transverse beam or head member 36, and are joined near their lower ends by a similar transverse beam 38.

Riding up and down on the slide is a carriage composed of a top horizontal bar 41, from which is vertically spaced a bottom horizontal member or angle bar 42, the two being joined at their ends by parallel bars 43, 44 to form a rectangular frame. A platform whose details will be more particularly described hereinafter is carried by the carriage.

The platform is made up of a pair of long parallel horizontal angle-iron members or rails 52 and 53, which are joined at their outer end by a transverse angle-bar 54. At their inner ends, the horizontal angle-irons 52 and 53 are welded to a vertical frame portion composed of vertically spaced horizontal struts 55, 56 which are welded at their ends to horizontally spaced vertical members 57 and 58, thus forming a rectangular framework. For additional support of the platform, inclined parallel tie bars 60 and 61 may be welded at one end to the angle-irons 52 and 53 near their mid-portion while the other ends of the tie bars are welded to the upper ends of the vertical frame-members 57 and 58.

The platform is pinned to and supported on the carriage as a unit by a rod 46 extending transversely between the vertical bars 43, 44 of the carriage near its top bar 41. The rod 46 passes through horizontally cylindrical enlargements on the upper ends of the vertical bars 57, 58 and into the bars 43, 44 (see Fig. 1).

In order to enable the carriage and platform to ride easily up and down the slide, a pair of lower rollers, such as 62, are mounted at the bottom portion of the carriage by means of a pair of brackets, such as 64, welded to the horizontal bar 42 of the carriages at horizontal spaced points so that the rollers 62 and 63 may roll along the outer surface of the vertical slide members 32 and 34. At the top of the carriage, other bracket members, such as 66, carry upper rollers, such as 68, in position to roll along the inside surfaces, i. e. those surfaces nearest the truck driver of the vertical slide member 32, 34.

In order to raise and lower the slide, an hydraulic cylinder 90, supported from the truck, is mounted between the fixed vertical members 22, 24, and with its axis parallel thereto. Within the cylinder, an hydraulic plunger 92 moves up and down as hydraulic fluid is fed into and discharged from the cylinder under the plunger by conventional hydraulic pressure means (not shown). The top end of the plunger is fixedly attached to the slide by a connection between the transverse bar 36 and the top of the plunger.

To cause the carriage to ride up and down on the slide as the latter is raised and lowered, a chain 93 or cable is connected at one end to the carriage by a bolt and bracket 94 mounted on the carriage cross bar 42. The chain may be trained over a toothed wheel or pulley 95 pivotally mounted in a bracket 96 attached to the cross-bar 36 of the slide; and the other end of the chain may be connected to any convenient fixed part of the vertical supporting column such as the top transverse bar 26

thereof. The invention is not limited, however, to the lifting mechanism which is described and illustrated only as an example of one simple form presently available on the market. For higher lifts and heavier loads, other available lifting mechanisms may be desirable. Since the controls of the hydraulic fluid for raising and lowering actions per se form no part of my invention, they need not be described.

In order to support a load consisting of a long narrow article upon the platform in such a way that the load may move endwise, a plurality of parallel cylindrical rollers 70 are mounted transversely between the angle-irons 52 and 53 in suitable bearings located at spaced points therealong.

In order to move a load, such as a rolled up rug contained in a carton or not, or any article of similar shape endwise on the platform, a large power driven cylinder 72 is mounted at the outer end of the platform and is adapted to be driven in forward or reverse direction so as to move the load onto or off the platform endwise thereof. By means of right angle mounting brackets 75, two similar motors 73, 74 are mounted separately and oppositely between and supported by the horizontal members 52, 53 of the platform adjacent the driving cylinder 72. The motor shafts are each connected to opposite ends of the cylinder by a sprocket and chain or other suitable drive. One motor is placed to run in one direction while the other motor runs in the opposite direction so that when one motor is running, the cylinder will be revolved in one direction while when the other is running, the cylinder will be revolved in the other direction.

Suitable conventional electric wiring connections 76 are made to a double-throw control switch (not shown) on the truck adjacent the truck driver so that when the switch lever is moved in one position, it will cause operation of one motor while when moved into another position, it will cause operation of the other motor. In a neutral position of the lever, neither motor is operated.

It is often desirable to turn the load after it has been picked up. The need to turn may be manifested just before storing the load or just after it has been removed or at any intermediate time. For that purpose, a variation of the invention may be provided as illustrated in Fig. 4.

A platform comprising parallel rails 152, 153 may be joined at one end by an angle bar 154 as in the previous form. In this variation of the invention, the inner end of the platform is not joined to the carriage, but the ends of the rails 152, 153 are connected by a transverse angle bar 154' like the bar 154. A power driven cylinder 172 may be driven by motors 173, 174 as before to cause the endwise loading and unloading over the transverse free rollers 170 like rollers 70.

The platform is pivotally mounted at its center on a vertical hub 180 carried by and extending down from a horizontal supporting plate 182 extending between the rails 152 and 153 at the center of gravity of the platform. Within the hub is a vertical axle 184 which extends into coaxial spaced bearings 185, 186 in a bearing member of which the bearings 185, 186 are joined by a vertical supporting bar 187.

Supporting the bearing assembly 185, 186, 187 and through it, the platform is supporting structure consisting of a pair of parallel angle iron rails 190, 191 slightly inclined from the horizontal and joined at their outer ends by a transverse horizontal angle iron member 192. At their inner ends, they are joined to a rectangular inner end support, as in the previously described form, which consisted of the members 55, 56, 57, 58 for mounting the whole attachment, as a unit, on the carriage cross bar 46 of the raising and lowering mechanism.

In order to cause controlled pivoting under power of the platform, an hydraulic cylinder 193 may be mounted on a transverse strut or struts 194 between the bars 190, 191. A plunger 195, movable inwardly and outwardly

of the cylinder, reciprocates a rack member 196 fixedly attached thereto. The teeth of the rack mesh with a pinion 198 affixed on the pivot shaft 184 to cause rotary movement of the shaft 184 and the platform which is also affixed thereto.

Fluid conduits at each end of the hydraulic cylinder may be suitably connected to a source of liquid. The liquid may be under control of a motor in a closed circuit so that as fluid is caused to enter on each side of the plunger alternately under pressure, it will at the same time be permitted to leave the other end of the cylinder. The motor may be reversible so that the piston may be caused to move in either direction, and thus the direction and amount of pivoting may be controlled by the direction and degree of rotation of the motor. Obviously, however other forms of power means may be employed such as a direct drive between an electric motor and the pivot 184 of the platform through suitable reduction gearing. Also a friction clutch may be provided to permit rotation of the motor in case the platform should become stuck or its rotation prevented while the motor is operating.

The control of the motor for controlling the pivoting of the platform may be by the usual electric connections to a conventional reversing switch mounted upon the truck at a place convenient to the driver's seat so that the driver may readily control the rotation of the platform as well as its elevation, and as well as the movement of the truck from his seat.

From the foregoing, it will be observed that we have provided an attachment which may be applied to existing lifting truck structures or incorporated during the manufacture of new lift trucks. It not only enables loading of long narrow articles endwise on its platform, but also permits raising and lowering with a supporting platform to the desired height when it is desired to store such articles in a bin or to load them or place them at any desired location.

The invention also provides for turning the platform with the load thereon or not, by power means controlled from the truck and easily accessible to the driver. It is thus possible to pick up or to discharge an article in a different direction than the direction of unloading or loading respectively, without the necessity of turning the truck to face in a different direction. Since it is sometimes impossible to turn the truck, the ability to turn the platform is a valuable feature of the invention.

Many modifications within the scope of the invention will occur to those skilled in the art. Therefore, we do not limit the invention to the specific form illustrated and described.

What is claimed is:

1. A movable lift truck having a vertical frame, means movable vertically along said frame, power driven means to move said vertically movable means, supporting means on said vertically movable means, a platform pivotally mounted for horizontal movement upon said supporting means, means operable from the truck to cause pivoting of said platform, a rotatable cylinder on the end of said platform, and motor means operable from the truck to rotate said cylinder clockwise or counterclockwise for moving onto or off said platform endwise thereof.

2. The combination claimed in claim 1 wherein the means causing pivoting of the platform comprises a rack, a pinion connected to said platform and engaged by the rack, and power means to move the rack.

3. An attachment for a lift truck having a vertical frame composed of a pair of vertical parallel rails, and a carriage slidable vertically and relative to said frame, said attachment comprising a long narrow horizontal platform extending perpendicularly to the plane of said rails, a pair of spaced parallel arms extending substantially vertically from one end of the platform, and horizontal rod means to connect the upper ends of said arms to the carriage to join the platform as a unit to the truck, the lower

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ends of said arms engaging the carriage and holding the platform in substantially horizontal position, a plurality of transverse rollers mounted on said platform facilitating sliding of articles endwise therealong, a rotatable cylinder at the free end of said platform, remotely controlled means to drive said cylinder clockwise or counter-clockwise alternatively to cause said articles to move "on" or "off" the platform over said rollers.

4. An attachment as claimed in claim 3 wherein the means to drive the article-moving cylinder is a motor, and control means on the truck for operating the motor in forward or reverse directions.

5. An attachment for a lift truck having a vertical frame composed of a pair of vertical parallel rails and a carriage slidable vertically and relative to said frame, said attachment comprising a horizontal supporting means extending perpendicularly to the plane of the rails, a pair of spaced parallel arms extending substantially vertically from one end of the support, and means to connect the upper ends of said arms to the carriage to join the supporting means and the parts carried thereby as a unit to the truck, a long narrow platform pivotally mounted for horizontal movement upon said supporting means, and power operated means at one end of said platform operable from the truck for moving long narrow articles endwise on to and off the platform.

6. An attachment as claimed in claim 5 having power-operated means operable from the truck to pivot said platform on said supporting means.

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7. An attachment as claimed in claim 6 having rack and pinion means associated with the pivotal mounting of the platform to cause pivoting of the platform.

8. An attachment as claimed in claim 5 wherein the power-operated means comprises a rotary cylinder engageable with the articles, and motor means to operate said cylinder in clockwise and counter-clockwise directions.

9. An attachment as claimed in claim 5 wherein the arms are connected to the carriage by horizontal rod means, the lower ends of said arms engaging the carriage and holding said supporting means in substantially horizontal position.

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