Dec. 4, 1945. R. A. PENNEY 2,390,268

TRUCK ELEVATOR

Filed June 2, 1944 3 Sheets-Sheet 1

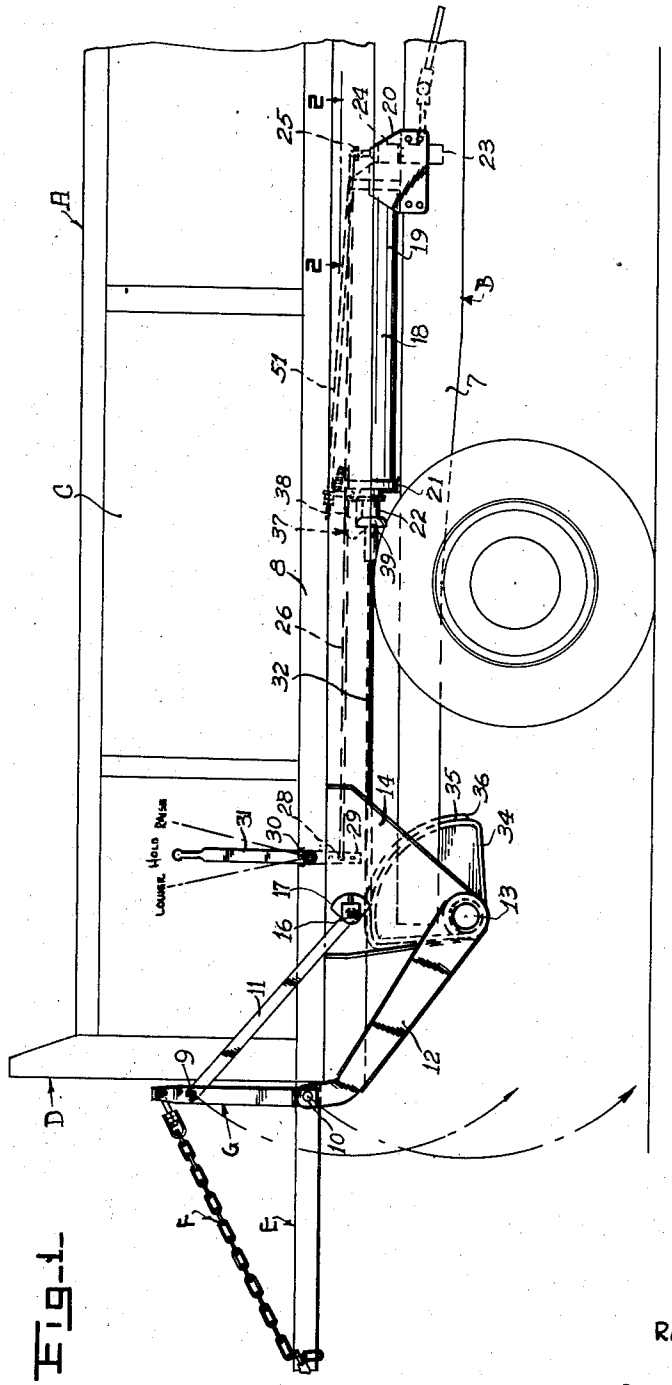


Fig-1.

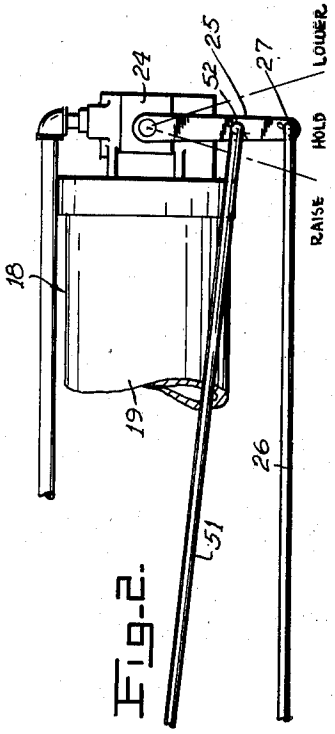


Fig-2.

Inventor

RAYMOND A. PENNEY

By Carlsen & Hazle

Attorneys

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TRUCK ELEVATOR

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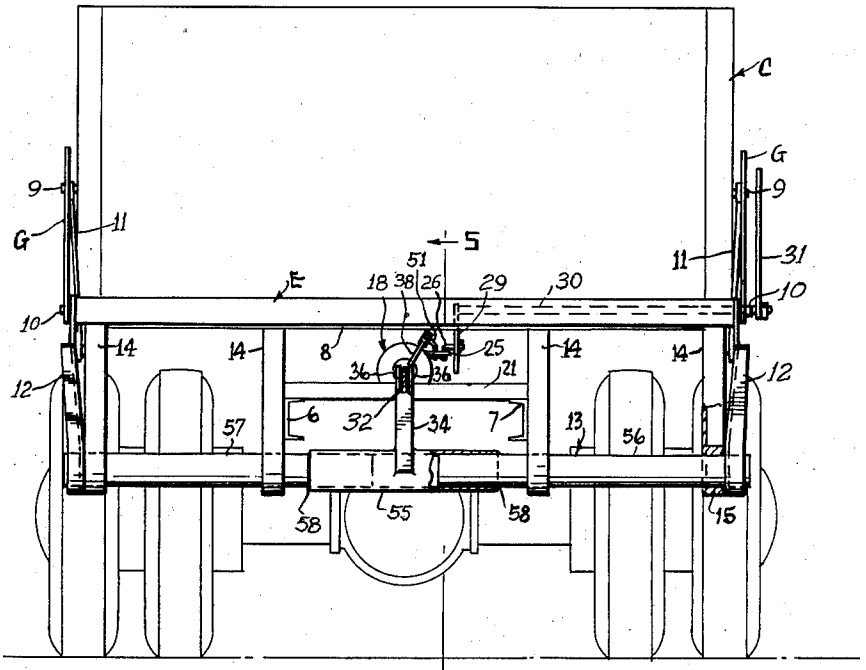


Fig. 3.

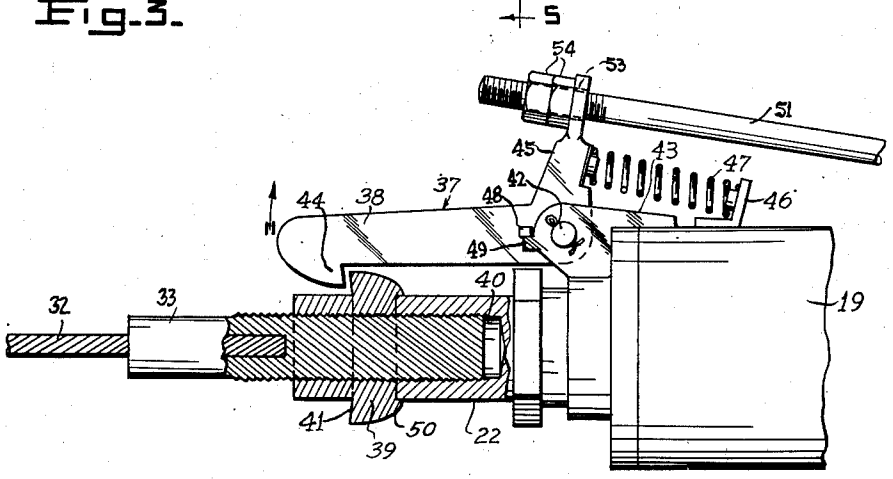


Fig. 4.

Inventor

RAYMOND A. PENNEY

By Carlson & Hazle

Attorneys

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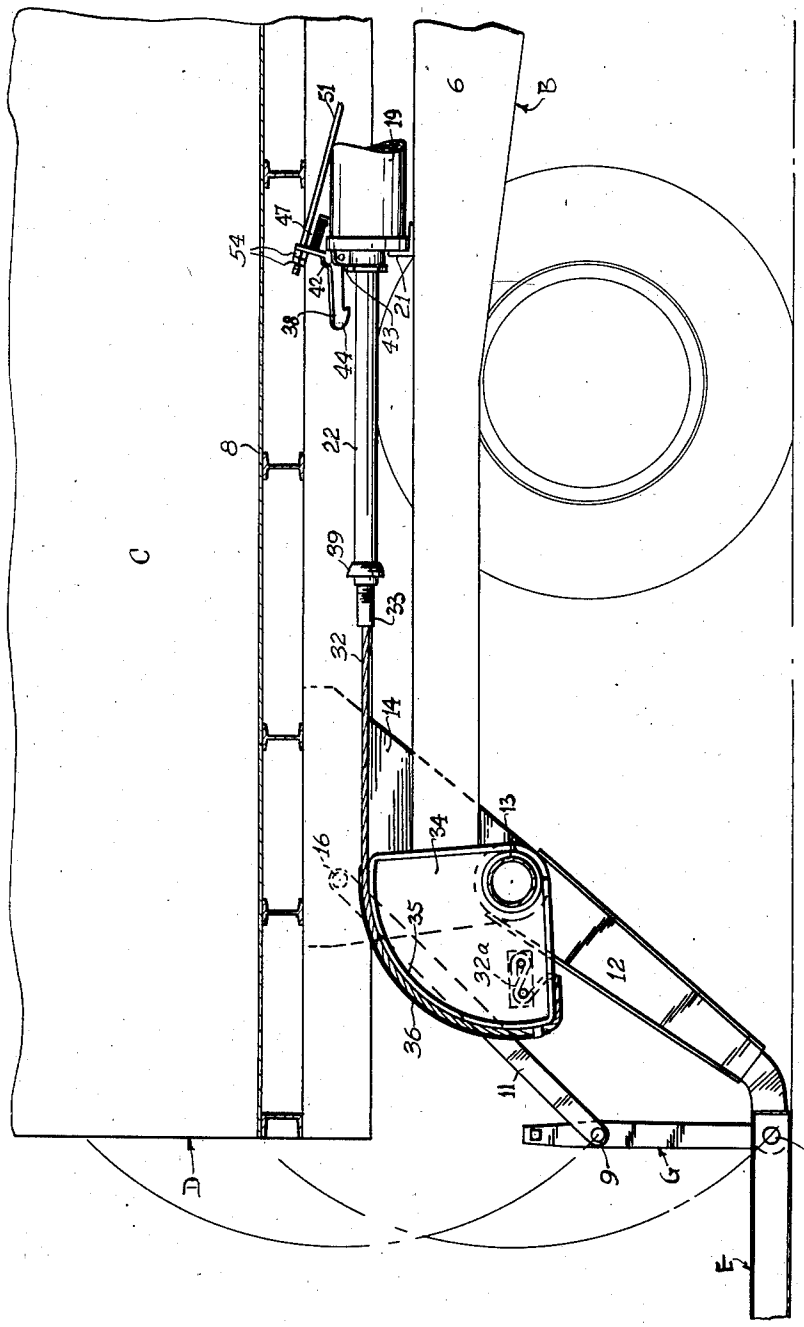


Fig-5.

Inventor

RAYMOND A. PENNEY

By Carlson & Hagle

Attorneys

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UNITED STATES PATENT OFFICE

2,390,268

TRUCK ELEVATOR

Raymond A. Penney, Minneapolis, Minn., assignor to St. Paul Hydraulic Hoist Company, Minneapolis, Minn., a corporation of Michigan

Application June 2, 1944, Serial No. 538,495

9 Claims. (Cl. 214—77)

This invention relates to improvements in loading and unloading elevators for trucks.

The invention further relates to, and has as its primary object, the improvement of that type of lift for trucks wherein the tail gate may be swung to a horizontal position to act as a load carrier, or platform and then raised and lowered with respect to the truck body to raise and lower heavy articles such as crates, barrels and like loads, without requiring manual labor in lifting the load.

Another object is to provide improvements in latch means for positively holding the load carrying member in its elevated position while the load is rolled or slid onto the truck floor, and relieving the lifting hoist of the load. Still another object is to provide an improved construction of the main lifting roll as used in such devices making it adjustable to fit trucks of various types.

These and other objects of the invention will be made apparent in the course of the following detailed specification forming a part hereof, and in which reference is made to the accompanying drawings wherein—

Fig. 1 is a side elevation of the rear portion of a truck equipped with the load elevator of my invention and showing the same in its elevated position.

Fig. 2 is an enlarged fragmentary plan view of the forward portion of the hoist and associated parts, taken substantially along the line 2—2 in Fig. 1.

Fig. 3 is a rear end view of the truck as shown in Fig. 1.

Fig. 4 is an enlarged fragmentary detailed view of the forward end of the hoist and showing the latch mechanism.

Fig. 5 is an enlarged longitudinal and vertical section along the line 5—5 in Fig. 3, showing the elevator in its lowered position.

Referring now more particularly and by reference characters to the drawings, A designates generally a truck having the usual chassis B over which is mounted a truck body C open at its rear end D and adapted to be closed thereat by a tail gate E. Said tail gate E also constitutes the load carrier or platform by which the truck is loaded and unloaded, and for this purpose the tail gate may be swung downwardly to the horizontal position shown and there supported by chains F connected between rear corners of the gate and upper ends of side members G. The truck chassis B is conventional in form and includes the usual longitudinal beams 6 and 7 above which the bed 8 of the truck body C is supported in any conventional manner.

Each side member G is pivotally connected at 9 and 10 to the rear swinging ends of upper and lower arms 11 and 12. The forward end of the arm 12 is secured rigidly to the ends of a transversely extending roll or rock shaft 13 which is supported below the truck body C near the rear end thereof, in brackets 14. The brackets 14 are four in number as here shown, and are secured at upper ends to the bed 8 while at lower ends they have bearings 15 in which the roll 13 is journaled. Each upper arm or link 11 is pivotally mounted at 16 in a bracket 17 secured to the outermost bracket 14. It will be noted that the pivots 16 for the respective arms 11 are located directly above the roll 13 at about the same spacing as that existing between the pivots 9 and 10, and that the arms 11 and 12 will therefore have a parallel link motion such that the tail gate E may be raised and lowered by oscillating the roll 13 while maintaining the tail gate substantially horizontal at all elevations.

For oscillating the roll 13 I provide a conventional hydraulic hoist unit, designated generally at 18, which comprises a cylinder 19 supported rigidly on the chassis B by means of brackets 20 and an angle 21. Slidably mounted in the cylinder 19 is a plunger 22 and the cylinder is arranged lengthwise on the chassis B with this plunger directed rearwardly toward and at an elevation above the roll 13. Fluid under pressure is provided for actuating the plunger 22 by a conventional pump 23 operated from the truck engine, and the fluid is admitted to either end of the cylinder in a conventional fashion under control of a valve 24. The valve 24 is positioned by means of an arm 25 to which is connected one end of an operating rod 26, as shown at 27. The operating rod 26 extends rearwardly beneath the truck body C and is pivotally connected at its rear end 28 to a lever arm 29 which is secured to the inner end of a transversely extending shaft 30 journaled in the bed 8. The outer end of the shaft 30 is equipped with a hand lever 31 disposed alongside the body C, and it will be evident that by swinging the hand lever forwardly and rearwardly the operating rod 26 may be reciprocated to swing the arm 25 and actuate valve 24. As here shown, movement of the hand lever toward the forward end of the truck actuates the valve 24 to admit fluid to the rear end of the hoist cylinder 19 and draw the plunger 22 inwardly or in a forward direction. Movement of hand lever 31 toward the rear reverses this

operation, causing the plunger 22 to be projected in a rearward direction from the cylinder; while positioning the lever 31 in a central or holding position will cause the hoist to hold the plunger 22 in any position during its forward and rearward movement.

A wire cable 32 is secured at its forward end by a conventional coupling 33 to the rear end of the hoist plunger 22, and extends rearward therefrom over an operating member or sector 34. The sector 34 is secured rigidly to the center of the roll 13 and has a curved track 35 located between side flanges 36, which track is concentric with the axis of the roll 13. The cable 32 is secured as indicated at 32a to a rear corner portion of the sector 34, and it will be obvious that with the cable 32 of proper length the forward or inward movement of the hoist plunger 22 will pull on said cable to oscillate the sector 34 and roll 13 in a clockwise direction as viewed in Fig. 1. The arms 11 and 12 will thus be swung upwardly and the tail gate E raised to the level of the bed 8 of truck body C, and in this position the plunger 22 is drawn inwardly into the hoist cylinder nearly to the limit of such movement. On the other hand, the rearward or outward movement of the hoist plunger 22 will pay out the cable 32 enabling the sector 34 and roll 13 to oscillate in a counterclockwise direction to lower the arms 11 and 12 and tail gate E, and in this operation the cable will come to rest about the curved track 35 as seen in Fig. 5.

In the operation of the structure as thus far described, it will be evident that the manipulation of the control lever 31 will permit the tail gate E to be raised or lowered as required. Thus in loading the truck the tail gate E may be lowered to ground level and heavy boxes, crates or the like may be pushed thereon without lifting. Then by raising the tail gate E it will act as a load carrier, lifting the articles up to the level of the bed 8 of the truck body, and they may then be rolled or slid into the body without great effort. Obviously the truck may be unloaded with equal ease. When not in use as a load carrier or platform the tail gate E may be readily folded upwardly and forwardly to close the rear end D of the truck body in the usual manner.

It is desirable that with the load in its maximum elevated position as seen in Fig. 1 some means be provided to lock the lift mechanism and relieve the hoist 18 of the strain of holding the load in this position. This is particularly true where, as is frequently the case, the truck is driven from place to place with a part of the load projecting over and supported on the tail gate. For this purpose I provide a latch mechanism, designated generally at 37, and comprising a latch member 38 and a stop member 39. As best shown in Fig. 4, the stop member 39 is threaded on the cable coupling 33 which is in turn threaded into a tapped bore 40 formed in the rear end of the plunger 22. The stop member 39 is circular and has a rear face 41 which is hollowed out and angles forwardly toward the center on all sides. The latch member 38 is pivotally mounted by a pin 42 on an ear 43 formed on the rear end of the cylinder 19, and from this point the latch member extends in a rearward direction substantially parallel with the path of plunger 22 and has a hook 44 turned inwardly to engage the face 41 of stop member 39. The latch member has an arm 45 extending outward from its pivoted end, and braced between this arm 45 and a lug 46 on the hoist cylinder 19 is an expansion coil spring 47 which biases the latch member in a direction such as to swing its rear end toward the plunger 22, this movement being limited by the engagement of a stop 48 on the latch member with a lug 49 on the bearing ear 43. It will be evident that as the plunger 22 moves forwardly and raises the load to its maximum elevation the stop member 39 will traverse the hook 44, and the outer curved cam face 50 of the stop member will cam over the hook permitting the stop member to move forward thereof until the hook will again come to rest in engagement with the face 41. At this point the cable 32 will obviously be locked against rearward movement, holding the tail gate E flush with the bed 8 of the truck body, and relieving the hoist 18 of the load.

To swing the latch member 38 clear of stop member 39 I provide a link 51 which is pivotally connected at a forward end 52 to the valve operating arm 25 and which, at its rear end, is slidably mounted through an opening 53 formed in the arm 45. Rearwardly of the opening 53 the link 51 is provided with lock nuts 54 which act as an adjustable stop. Assuming now that the valve operating arm 25 is moved forwardly in order to pay out the cable 32, as indicated in Fig. 2, it will be obvious that this movement will exert a pull upon the link 51. With the lock nuts 54 properly adjusted the pull on the link 51 will oscillate the latch member 38 in such direction as to swing the hook 44 clear of stop member 39. Thus it will be evident that the normal movement of the hand lever 31 in a direction for lowering the load will automatically disengage the latch, and it will be understood, of course, that the latch is actually disengaged by the initial part of the movement of the hand lever 31 and prior to the opening of the valve 24 to project the plunger 22 in a rear direction. It may here be noted, however, that the angularly engaging faces of the latch hook 44 and stop 39, while providing a positive latching effect at that point, have a tendency to seize under a load, making it difficult to free the hook from the stop member. I find, however, that this tight frictional engagement may be broken, so that the latch member may swing freely away from the stop member 39, by simply moving the hand lever 31 first in a direction to raise the load before it is swung in the opposite direction to lower the same. This action has the effect of admitting fluid to the rear end of the cylinder 19, causing the plunger 22 to move forwardly a slight amount to free the hook from the face 41 of the stop member, as indicated in Fig. 4. Then as the lever is swung in the opposite direction, the latch 38 will be swung clear before the stop member comes into tight engagement with the hook 44 again. Only a very slight forward movement of the plunger 22 is required, of course, and the wire cable 32 will be found to stretch sufficiently for this purpose if the tail gate E is originally tight against the rear end of the truck body C.

In order to adapt the roll 13 to truck bodies of varying widths, I form the roll of a center tubular section 55 on which the sector 34 is mounted as seen in Fig. 3 and complete with separate end sections 56 and 57 which telescope into the ends of center section 55 as clearly indicated in the drawings. In the installation of the roll, the end sections 56 and 57 may be moved inwardly or outwardly to form a roll of an over-all length suitable to any particular truck and the parts may then be anchored solidly together by any suitable

means such as the welds indicated at 58, causing the various roll sections 55, 56 and 57 to operate as a unit.

It is understood that suitable modifications may be made in the structure as disclosed, provided such modifications come within the spirit and scope of the appended claims. Having now therefore fully illustrated and described my invention, what I claim to be new and desire to protect by Letters Patent is:

1. In a load raising and lowering mechanism for a truck, a member movable in a lengthwise direction with respect to the truck and an actuating means for said member for moving the same in either direction, a load handling device operatively connected to said member and adapted to be raised and lowered with respect to the truck in response to opposite movements of said member, and latch means releasably engageable with said movable member as it substantially completes its movement in one direction to raise the load, said latch means being operative when engaged to lock the movable member against movement in the opposite direction to thereby maintain the load in a raised position while relieving said actuating means of strain.

2. In a truck load raising and lowering mechanism of the character described, a load carrier, a cable connected to raise and lower said carrier, a hoist unit connected to one end of the cable for pulling the cable in one direction for raising the load and paying out the cable in an opposite direction to lower the load, a stop member rigid with respect to the cable, and a latch member adapted to automatically engage said stop member as the load is raised and to hold the cable against paying out.

3. In a truck load raising and lowering mechanism of the character described, a load carrier, a cable connected to raise and lower said carrier, and a hoist unit connected to one end of the cable for pulling the cable in one direction for raising the load and paying out the cable in an opposite direction to lower the load, a stop member rigid with respect to the cable, a latch member adapted to automatically engage said stop member as the load is raised and to hold the cable against paying out, a control lever for the hoist unit and movable to one position to cause the hoist to pay out the cable and to another position to cause the hoist unit to pull on said cable, and means operative by movement of said control lever toward a position for paying out the cable to disengage said latch member from said stop member.

4. The combination with a truck loading mechanism of the character described including a hoist unit having a plunger and a flexible cable connected at one end thereto and at its other end operatively arranged to raise a load in response to a pull exerted by the inward movement of the plunger and to lower the load as the plunger moves outward, of a latch mechanism comprising a stop member secured rigidly with respect to the cable and plunger and having a beveled face, a pivotally supported latch having a hooked end adapted to engage said beveled face of the stop member as the plunger is drawn inward and the load raised substantially to highest position and to lock the cable against paying out to lower the load, means for swinging said latch to release said stop member and permit the load to be lowered, and the arrangement being such that the tendency of the latch hook to seize on the beveled face of the stop member may be counteracted by actuating the plunger in an inward direction to slightly stretch the cable and pull the stop member clear of the hook preliminary to swinging the latch clear to lower the load.

5. In a truck loading mechanism, a hoist unit having a plunger, a cable connected to the plunger, a load carrier operated by the cable and adapted to be raised by a pull on the cable and lowered by paying out the cable, a stop member on the cable having an angular face, a swingable latch member having a hook adapted to engage over said angular face of the stop member as the cable is pulled to raise the load, and control means for the hoist including a swingable arm and a link connected between the arm and latch member to release the latter from the stop member as said arm is swung in one direction to pay out the cable.

6. In a truck loading mechanism, a hoist unit having a plunger, a cable connected to the plunger, a load carrier operated by the cable and adapted to be raised by a pull on the cable and lowered by paying out the cable, a stop member on the cable, a swingable latch member having a hook adapted to engage over said stop member as the cable is pulled to raise the load, and control means for the hoist including a swingable arm and a link connected between the arm and latch member adapted to swing the latch member in one direction to release the hook from said stop member as the arm is swung to a position for paying out the cable, said link being freely slidable with respect to the latch member as the arm is swung to an opposite position for pulling in the cable.

7. In a truck loading mechanism of the character described, a transverse roll rotatably supported from the truck, a load carrier supported from the roll and adapted to be raised and lowered by oscillation of said roll, and said roll comprising a tubular center section and separate end sections adapted to be telescoped at inner ends into said center section to adjust the overall length of the roll according to the width of the truck and when thus adjusted secured to said center section to turn as a unit therewith.

8. In a truck loading mechanism of the character described, a load carrier, a hoist unit having a cable connected to said carrier for raising and lowering the same in response to opposite movements of the cable, a control member movable in opposite directions for controlling said hoist unit, latch means operative to automatically lock the load carrier in a raised position as it reaches said position, and means operative by movement of said control member to cause the hoist to lower the carrier for automatically disengaging said latch means.

9. In a truck loading mechanism of the character described, a load carrier arranged for up and down movements with respect to the truck, a hydraulic hoist unit for raising and lowering the carrier, a latch mechanism operative automatically as the load carrier is raised to lock it in a raised position, a control member for the hoist unit movable in one direction to raise the load carrier and in an opposite direction to lower the same, and means operative by movement of the control member in the last mentioned direction for automatically disengaging said latch mechanism.

RAYMOND A. PENNEY.