June 22, 1943. E. H. KIDDER 2,322,636

TIE UNLOADING AND LOADING MECHANISM

Filed July 9, 1941 3 Sheets-Sheet 1

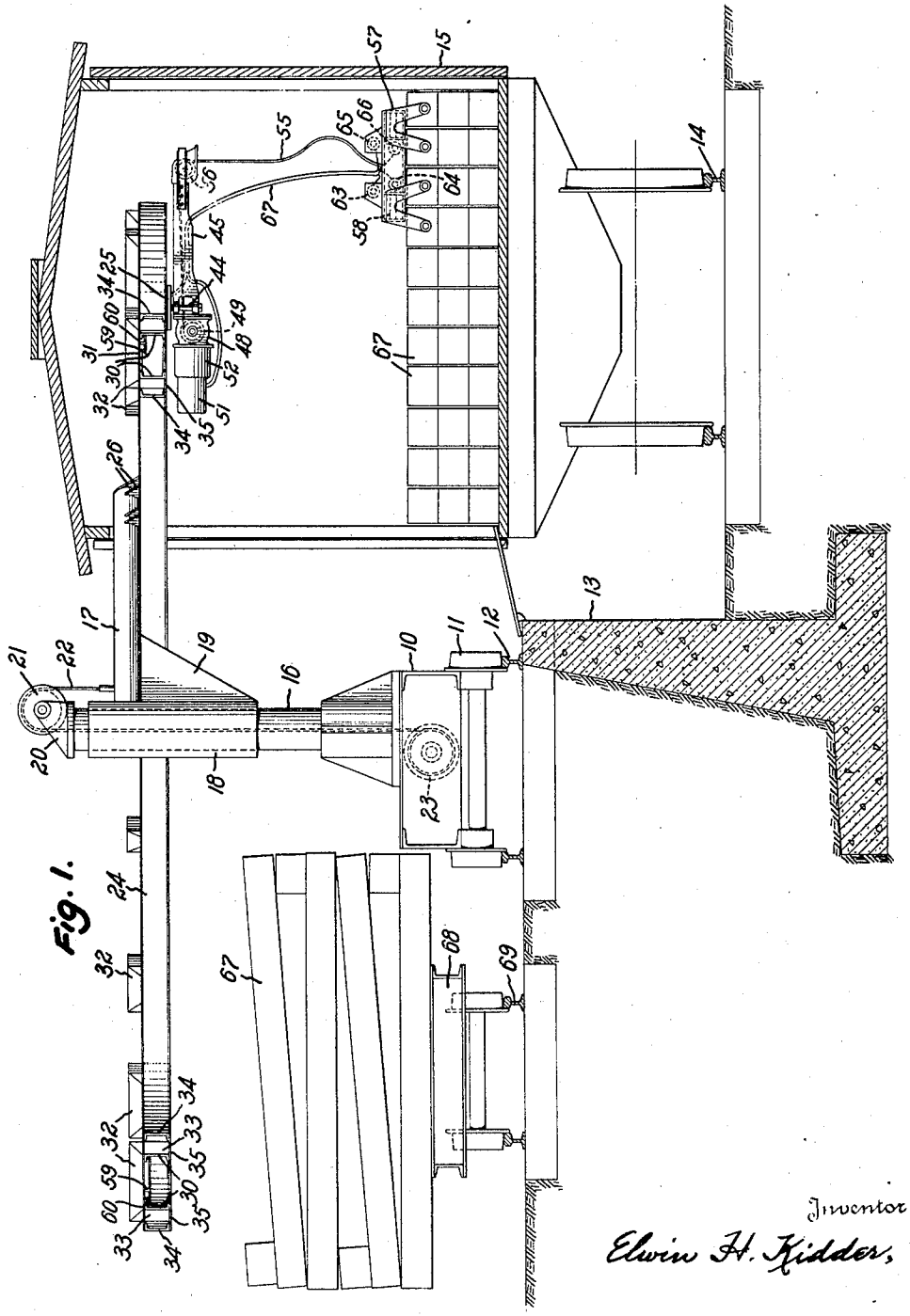


Fig. 1.

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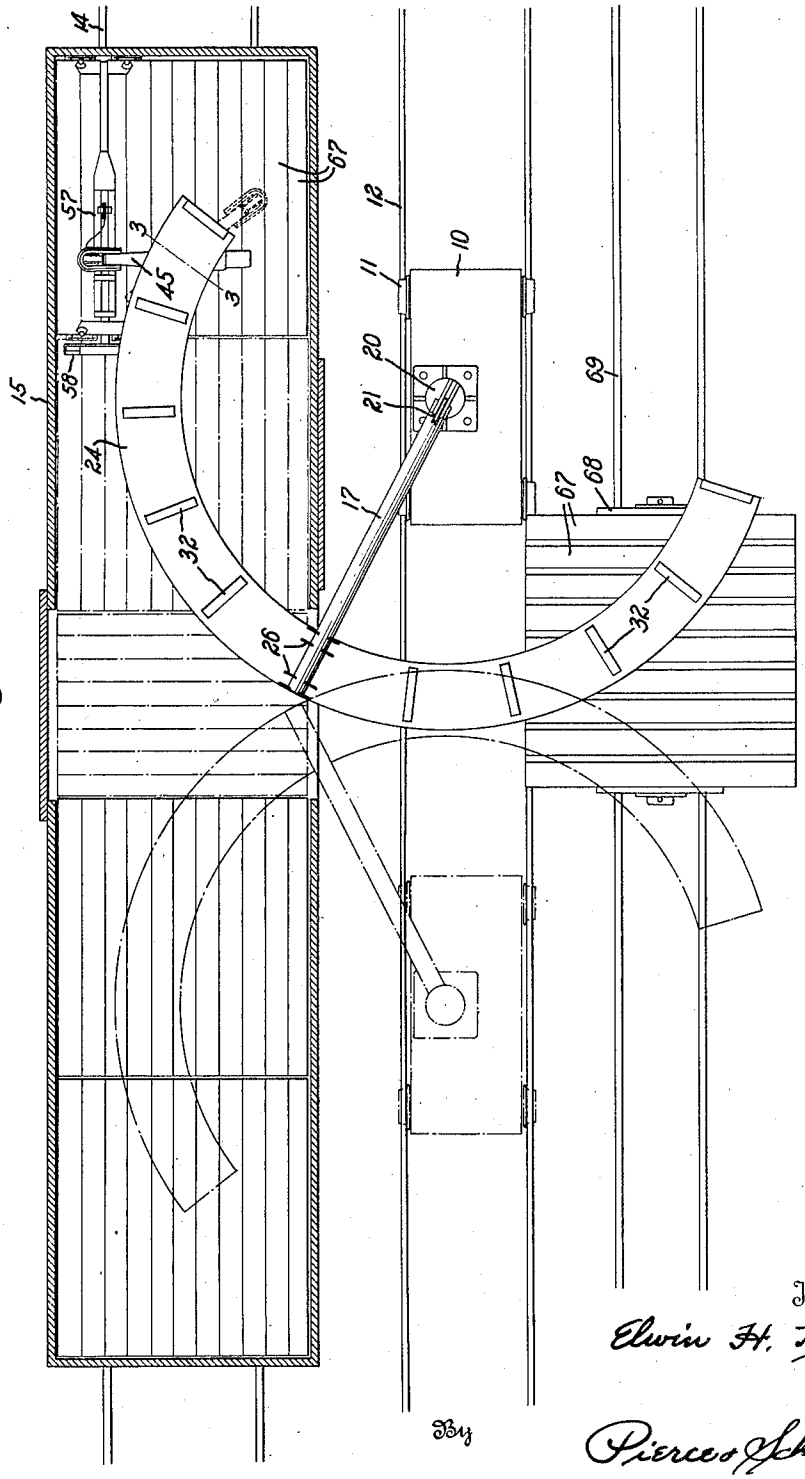


Fig. 2.

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Fig. 3.

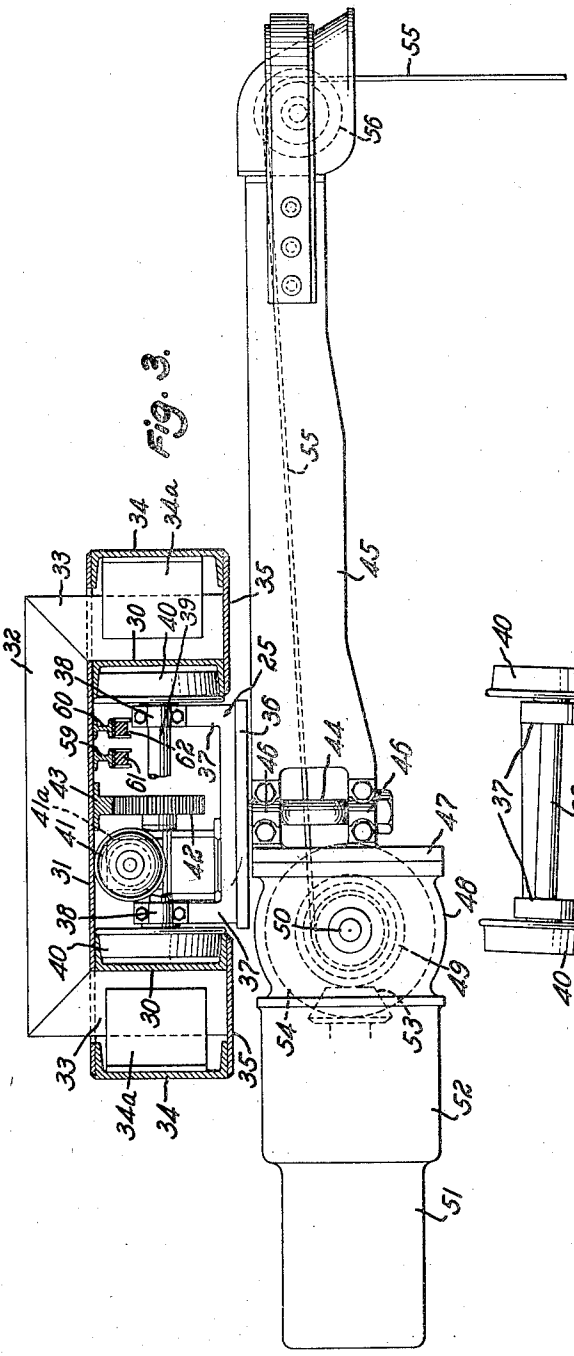
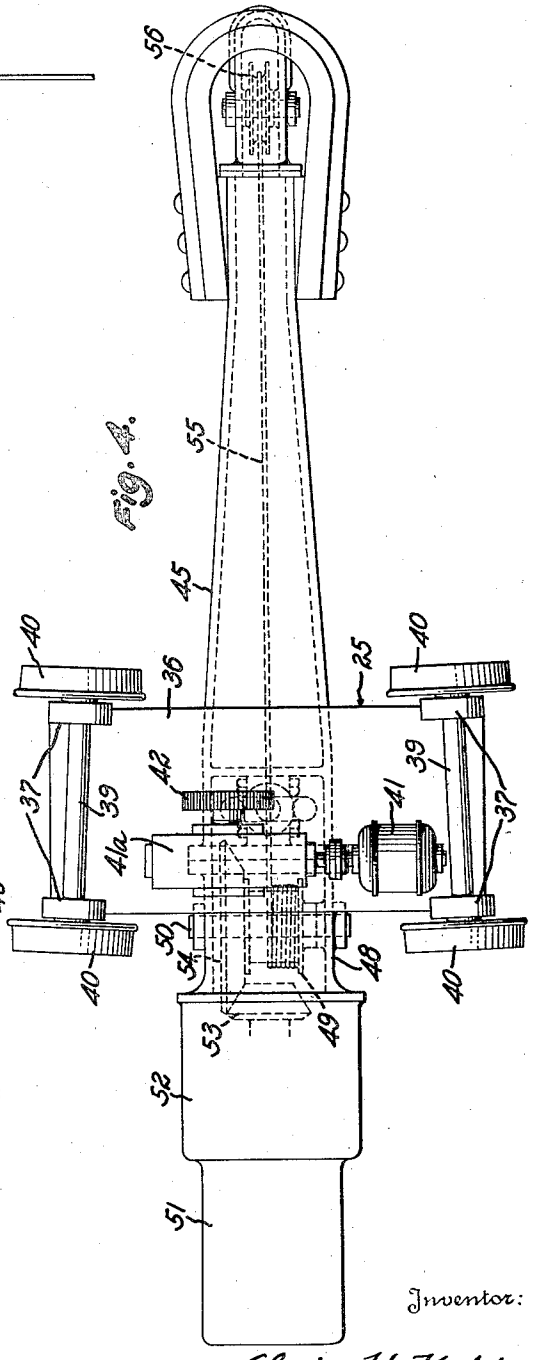


Fig. 4.



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UNITED STATES PATENT OFFICE

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TIE UNLOADING AND LOADING MECHANISM

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Application July 9, 1941, Serial No. 401,672

8 Claims. (Cl. 212—42.5)

The invention relates to mechanism for loading and unloading railway cars and particularly to means for transferring railway ties between a box car and a stack adjacent thereto.

The primary object of the invention is to provide a hoist structure which is equally well adapted to handle ties or the like when stacking them in or removing them from either end of a car, one which is simple in construction and operation and which requires no relative adjustment of the parts thereof when transferring operations from one end of a car into the other.

Another object of the invention is the provision of a hoist mechanism including a boom mounted substantially semi-circular trackway disposed in a horizontal plane and adapted to have either end thereof swing through the door of a railway car, a traveling carriage mounted by said trackway and movable from one end to the other thereof, hoist means mounted on said carriage and a carrier suspended by said hoist means whereby when either end of said boom mounted trackway is swung into a car through the center door thereof the end of the trackway will occupy a position adjacent one end of the car and the other end will extend outside a considerable distance to provide for movement of the carriage on the trackway from within the car to a point substantially removed therefrom for the stacking of removed materials outside the car.

Another object of the invention is the provision of power operated means for traversing the carriage from end to end of the trackway, power operated hoist means on the carrier and control means for both the hoist means and the power operated traversing means whereby a single operator may load or unload a car, stacking the ties or other material in place in the car or on dolly cars adjacent the car, as the case may be, with a minimum of effort, it being necessary merely for the operator to actuate suitable control switches conveniently located on an article engaging member such as a tie grab and to guide the same as it is moved by the power means into and out of the car and raised and lowered for picking up and depositing a load.

These and other objects and advantages of the invention will be apparent from the following detailed description of a preferred embodiment of the invention as illustrated in the accompanying drawings which form a part hereof and wherein:

Fig. 1 is an end view of an embodiment of the invention in position for loading or unloading a railway car;

Fig. 2 is a plan view thereof;

Fig. 3 is an enlarged vertical sectional view taken on the line 3—3 of Fig. 2 and

Fig. 4 is an enlarged plan view of the traveling carriage and swivel hoist arm carried thereby.

Referring now more particularly to the details of the accompanying drawings 10 indicates a truck, preferably provided with flanged wheels 11 for running on a narrow gauge track 12 such as on a dock 13 parallel to a siding 14 for a railway car 15 to be unloaded or loaded with ties or the like. Although the invention will be described with particular reference to the loading and unloading of railway ties from box cars, it will be understood that it may be used for handling other material, as well, when desired.

A vertical mast 16, rigidly mounted on the truck 10 has a radial horizontal arm 17 swivelled thereon. The arm 17 is in the form of a tube and is carried by a bearing sleeve 18 to which it is rigidly secured and which is journalled on the mast and is also vertically adjustable thereon. A gusset brace plate 19 between the sleeve 18 and horizontally extending arm 17 contributes to the rigidity thereof. A swivel head 20 journalled on the upper end of the mast 16 carries a pulley 21 over which a cable 22 passes. The cable 22 is attached to the arm 17 at one end and from the pulley 21 passes down through the hollow mast 16 and winds on a drum 23 carried on the truck 10. By paying out or taking in the cable 22, the elevation of the arm 17 can be adjusted within the limits of movement of the sleeve 18 on the mast 16.

A substantially semi-circular horizontal trackway structure 24, for a wheeled truck or hoist carriage 25 adapted to traverse the same, is rigidly mounted on the outer end of the radial arm 17. The point of connection of the arm 17 to the track structure is substantially midway of the ends of the same so that a quadrant of approximately 90° of track extends in each direction circumferentially from the outer end of the arm.

The semi-circular horizontal trackway structure 24 comprises a plurality of spaced concentric curved channel sections formed into a rigid unit and welded or otherwise rigidly secured at its central point to the outer end of the radial arm 17 so that the two lie in substantially the same horizontal plane. Gusset plates 26 welded to the track structure and arm 17 strengthen the

structure against both lateral and torsional strains.

The curved track proper for the wheeled truck 25 comprises a pair of spaced channel members 30 in facing relation. A top tie plate 31 rests on the upper flange of the channel members 30 and is welded thereto so as to form a rigid unit. At intervals a transverse saddle or yoke 32 in the form of an inverted U-shaped member, formed of square tubular stock, is mounted athwart the track members with the depending legs 33 thereof extended down in back of the respective channel members 30 and secured thereto. Additional strength and rigidity is provided by a second pair of channel members 34 outside of the legs 33 of the yokes 30 and rigidly connected to the top tie plate 31 at the upper end and bottom tie plates 35 which are secured to the bottom flanges of the respective channel members 30 and 34 at each side, leaving the middle space clear for the passage of the carriage 25. Angle brackets 34a additionally fasten the channel members 34 to the legs 33 of yokes 32.

The carriage 25 comprises a base or frame member 36 having upstanding bearing hangers 37 at each end for the bearings 38 of the axles 39 of the flanged wheels 40 by which the carriage is supported on the track members 30. The base 36 mounts a reversible electric motor 41 which through a worm gear reducer 41a drives a spur gear 42 meshing with a toothed rack 43 mounted on the under face of the top tie plate 31 for the purpose of propelling the carriage along the curved trackway from end to end thereof.

A depending pivot pin 44 rigidly mounted on the base of the carriage 25, substantially centrally thereof, provides the mount for a swivelled boom arm 45, suitable bearings 46 being provided so that the arm 45 will swing freely about the supporting pivot pin 44 in a horizontal plane. On one side of the bearings 46, the arm 45 is provided with a vertical flange 47 to which is attached a housing 48 of a hoist drum 49 mounted on a shaft 50 extending transversely thereof.

A reversible electric motor 51 and reduction gear unit 52 therefor are in turn mounted on the hoist drum housing 48. The power output gear 53 of the motor-gear drive is a bevel gear which extends into the housing 48 and meshes with a bevel gear 54 which drives the winding drum 49.

A hoist cable 55 winding on the drum 49 extends through the arm 45 and over a pulley 56 mounted at the other end thereof. To provide for travel of the cable laterally as it winds on and off of the drum 49, the pivot pin 44 is forked between the bearing ends thereof to pass the cable.

The end of the cable 55 depending from the pulley 56 is attached to a tie grab 57 which mounts a handle 58. The handle 58 carries a plurality of push button switches for controlling the operation of the traversing motor 41 and hoist motor 51. Power for operation of the motors is taken from trolley rails 59 and 60, mounted on the underside of tie plate 31 of the track structure, by trolley shoes 61 and 62 mounted on the carriage 25.

The trolley shoes 61 and 62 are connected to the switches 63, 64, 65 and 66 through cable 67, the circuits being arranged so that, for instance the switch 63 controls the hoist motor 51 to raise the tie grab, switch 64 controls the same to lower the grab, switch 65 controls the traversing motor 41 to cause it to run in one direction to move the carriage 25 toward one end of the curved trackway and switch 66 controls the same to run in the opposite direction to move the carriage toward the other end.

In operation, for instance in unloading ties 67 from a railway car, the height of the radial arm 17 and curved track 24 may first be adjusted so that the track will clear the stacks of ties in the car to be unloaded. The base 10 is positioned alongside the car to one side of the door in the direction of the end to be first unloaded. The arm 17 and trackway 24 are then swung about the axis of the mast 16 to swing one end of the trackway into the car a sufficient distance to reach a position over the stack of ties to be removed. The operator then grasps the handle of the tie grab 57 and by pressing the appropriate switch buttons adjusts the height thereof and causes the carriage 25 to be propelled to a position over the ties. During this operation, the operator follows the grab, merely guiding the same through the door and to final position as he operates motor 51 to lower the grab on the ties. The free swinging arm 45 permits the operator to reach ties disposed laterally of the trackway and beyond the end thereof. Having lowered the grab on the ties to be taken out, the operator presses the button switch 63 to hoist the load and presses the button 65 or 66 as the case may be to actuate the motor 41 and propel the carriage with the suspended load along the trackway out of the car to a position over a dolly car 68 on tracks 69 alongside the unloader. He then presses the button 64 to lower the ties onto the dolly car, which, after a stack of sufficient size has been built up thereon, is replaced by an empty one.

After repeating this operation until the first end of the car is unloaded, the trackway is swung out of the car and the base 10 is moved to a similar position on the other side of the door. The rotation of the trackway about the mast 16 is then continued to swing the other end of the trackway through the door to unloading position within the car. It will thus be observed that by the provision of a semi-circular, center-mounted trackway structure which can be rotated in a horizontal plane completely about its central axis, a very simple and readily adaptable unloader is provided which can be used in either end of a car without readjustment of any of its parts or without requiring duplication of parts to effect its purpose.

Although a preferred embodiment of the invention has been shown and described by way of illustration, it will be understood that modification of the details of construction and mode of operation may be resorted to within the spirit of invention as defined in the appended claims.

I claim:

1. In car loading and unloading apparatus, a boom support mounted to rotate about a vertical axis, a substantially horizontal boom arm mounted on said support, a semi-circular horizontal track structure mounted on the outer end of said boom arm coaxial with said boom support, the point of connection of said boom arm to said track structure being substantially midway of the ends thereof to provide complementary arcuate track sections of substantially equal length extending in opposite directions from the outer end of said boom arm whereby said boom arm may be swung about its axis selectively in either direction to position the respective ends of said track structure in the opposite ends of a railway car through the center doorway thereof with the other end of said track structure extending outwardly from

the doorway, a carriage movable from end to end of said trackway and hoist means mounted on said carriage.

2. In car loading and unloading apparatus, a wheeled base, a vertical mast mounted on said base, a horizontal boom arm mounted at one end of said mast and swingable about the axis thereof as a center, a substantially semi-circular horizontal track structure mounted at the outer end of said boom arm with the point of connection between the arm and track structure substantially medially of the ends thereof and with the track structure disposed coaxially with said mast to provide complementary arcuate track sections of substantially equal length extending in opposite directions from the outer end of said boom arm whereby said boom arm may be swung about its axis selectively in either direction to position the respective ends of said track structure in the opposite ends of a railway car through the center doorway thereof with the other end of said track structure extending outwardly from the doorway, a hoist carriage mounted on said track structure and movable from end to end thereof, a horizontally disposed swivel arm pendently supported by said hoist carriage, and motor operated hoist means mounted on said arm.

3. In car loading and unloading apparatus, a wheeled base, a vertical mast mounted on said base, a horizontal boom arm mounted at one end on said mast and swingable about the axis thereof as a center, a substantially semi-circular horizontal track structure mounted at the outer end of said boom arm with the point of connection between the arm and track structure substantially medially of the ends thereof and with the track structure disposed coaxially with said mast to provide complementary arcuate track sections extending circumferentially in both directions from the outer end of said boom arm, a hoist carriage mounted on said track structure and movable from end to end thereof, a reversible motor drive mounted on said carriage for propelling the same back and forth along said track, a horizontally disposed swivel arm pendently supported by said hoist carriage, and motor operated hoist means mounted on said arm.

4. In car loading and unloading apparatus, a wheeled base, a vertical mast mounted on said base, a horizontal boom arm mounted at one end on said mast and swingable about the axis thereof as a center, a substantially semi-circular horizontal track structure mounted at the outer end of said boom arm with the point of connection between the arm and track structure substantially medially of the ends thereof and with the track structure disposed coaxially with said mast, a hoist carriage mounted on said track structure and movable from end to end thereof, a reversible motor drive mounted on said carriage for propelling the same back and forth along said track, a horizontally disposed swivel arm pendently supported by said hoist carriage, a motor driven winding drum mounted on said arm, a hoist cable wound on said drum and extending over the end of said arm, an article lifting member carried by sai hoist cable, and control means for said carriage propelling motor and said motor driven winding drum on said article gripping member.

5. In car loading and unloading apparatus, a mobile base, a substantially horizontally extending boom arm mounted on said base to swing completely around a vertical axis, a substantially semi-circular horizontally disposed track structure rigidly attached midway of its ends to the outer end of said boom arm, in concentric relation to said vertical axis to provide complementary arcuate track sections of substantially equal length extending in opposite directions from the outer end of said boom arm whereby said boom arm may be swung about its axis selectively in either direction to position the respective ends of said track structure in the opposite ends of a railway car through the center doorway thereof with the other end of said track structure extending outwardly from the doorway, a carriage mounted on the track structure and movable from end to end thereof and hoist means mounted on said carriage.

6. In car loading and unloading apparatus, a mobile base, a substantially horizontally extending boom arm mounted on said base to swing completely around a vertical axis, a substantially semi-circular horizontally disposed track structure rigidly attached midway of its ends to the outer end of said boom arm, in concentric relation to said vertical axis, a carriage mounted on the track structure and movable from end to end thereof, a reversible motor drive mounted on said carriage for propelling the same back and forth along said track, a horizontally disposed swivel arm pendently supported by said hoist carriage, and motor operated hoist means mounted on said arm.

7. In car loading and unloading apparatus, a substantially horizontally extending boom arm mounted to swing completely around a vertical axis, a substantially semi-circular horizontally disposed track structure rigidly attached intermediate its ends to the outer end of said boom arm, a carriage mounted on the track structure and movable from end to end thereof, a reversible motor drive mounted on said carriage for propelling the same back and forth along said track, a horizontally disposed swivel arm pendently supported by said hoist carriage, a motor driven winding drum mounted on said arm, a hoist cable wound on said drum and extending over the end of said arm, an article lifting member carried by said hoist cable, and control means for said carriage propelling motor and said motor driven winding drum on said article gripping member.

8. In car loading and unloading apparatus, a mobile base, a substantially horizontally extending boom arm mounted on said base to swing completely around a vertical axis, a substantially semi-circular horizontally disposed track structure rigidly attached midway of its ends to the outer end of said boom arm, in concentric relation to said vertical axis, a carriage mounted on the track structure and movable from end to end thereof and means for adjusting the height of said boom arm and track structure with respect to said base.

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