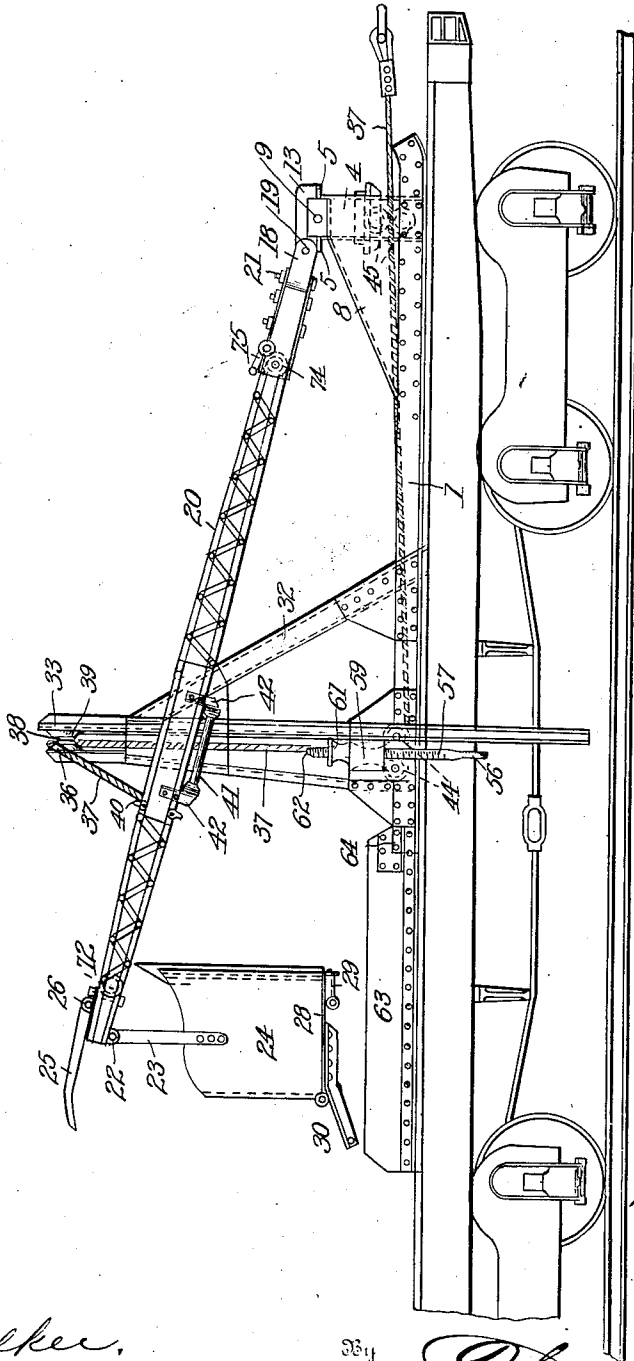


D. J. WREN, DEC'D.
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DITCHING MACHINE.
APPLICATION FILED JAN. 14, 1908.

910,256.

Patented Jan. 19, 1909.
5 SHEETS—SHEET 1.

Fig. 1.



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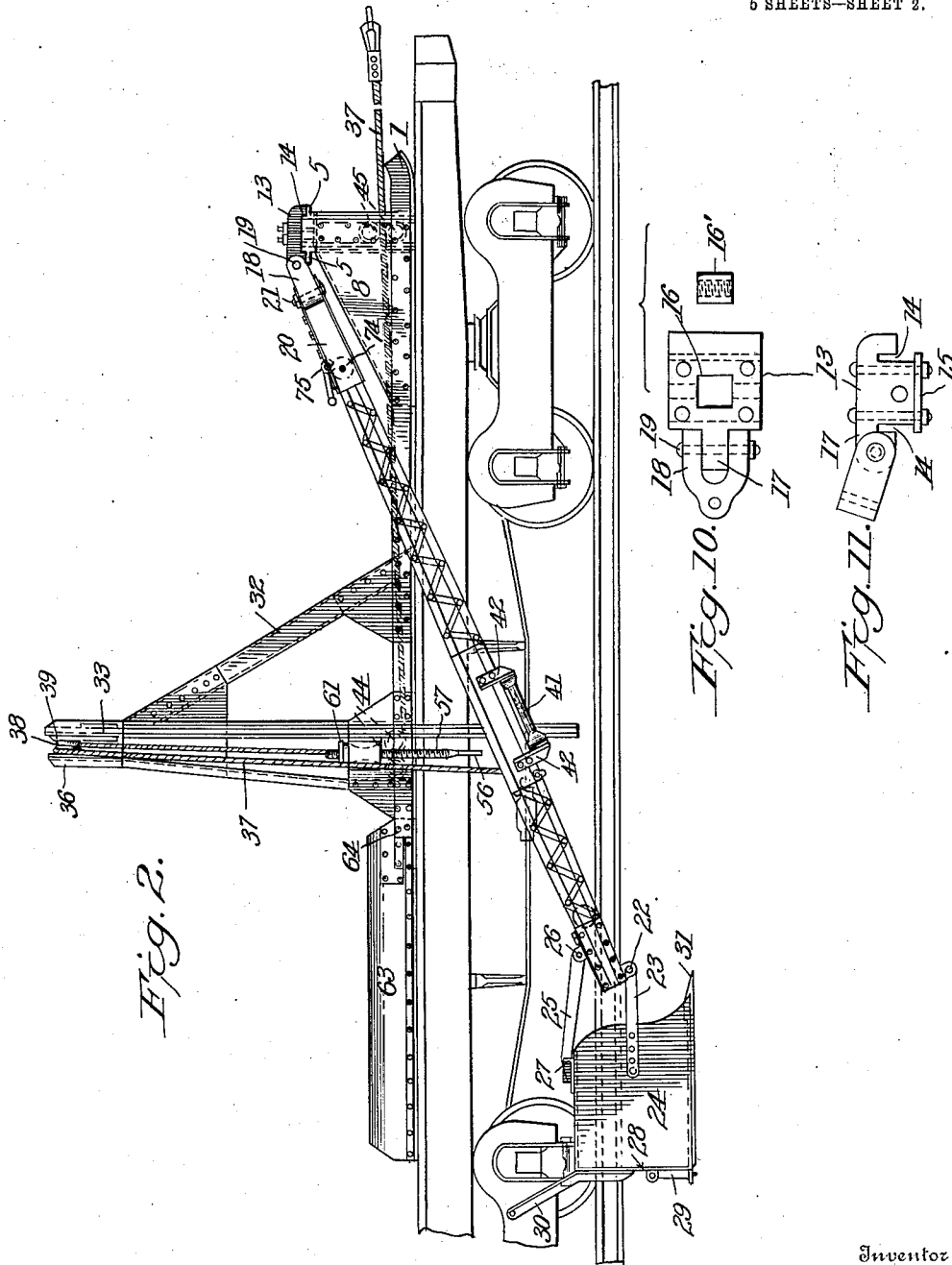
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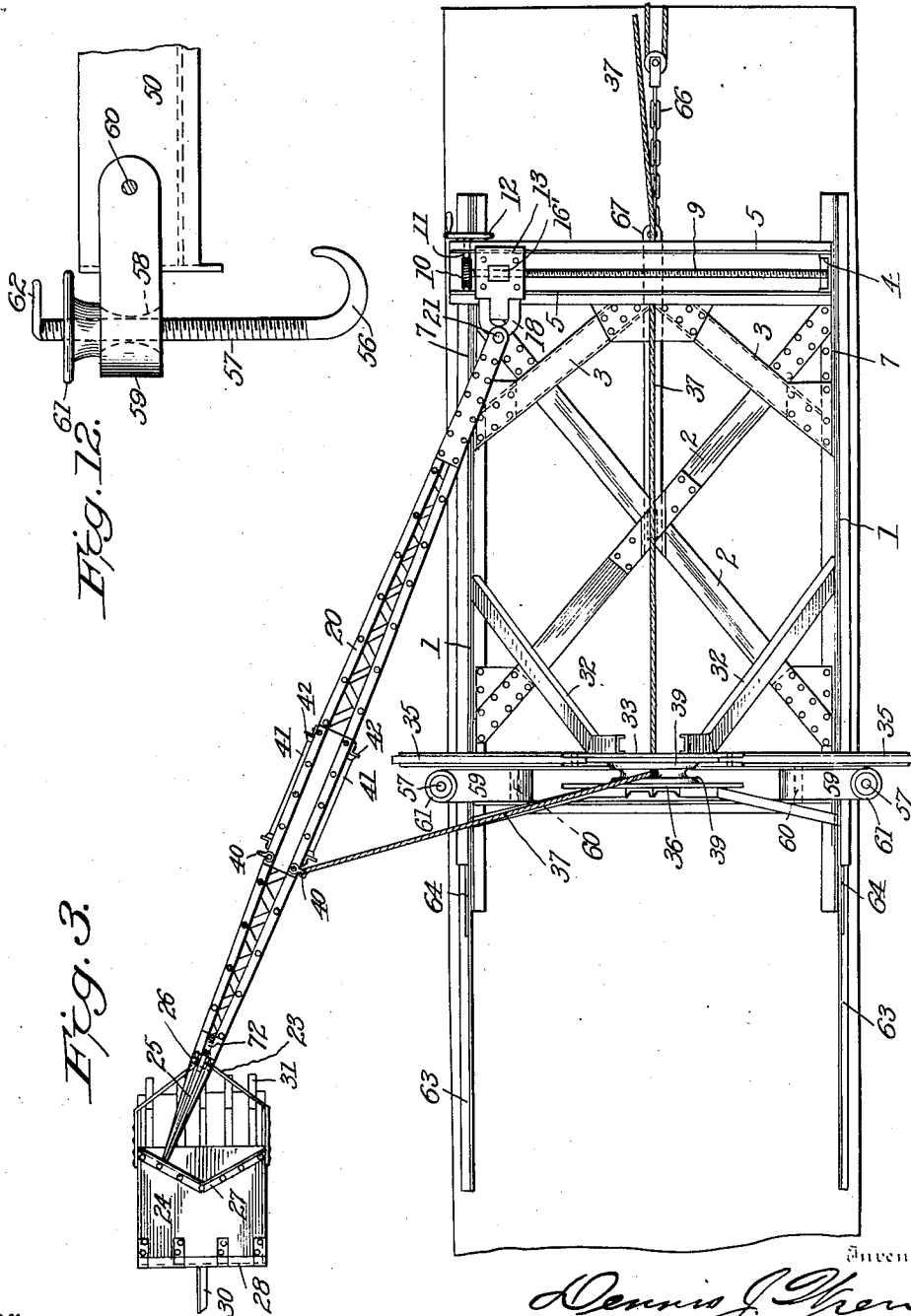
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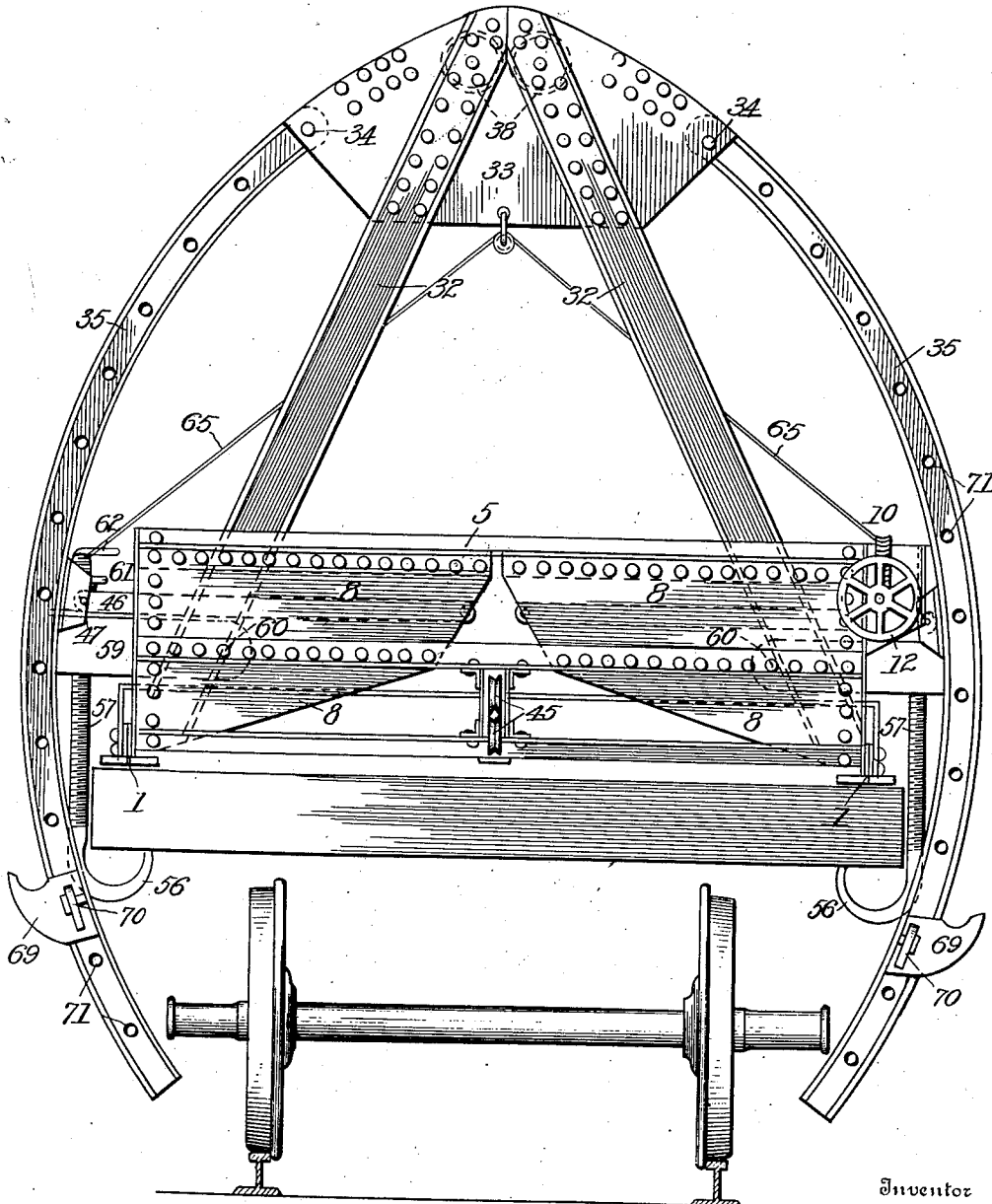
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Fig. 4.



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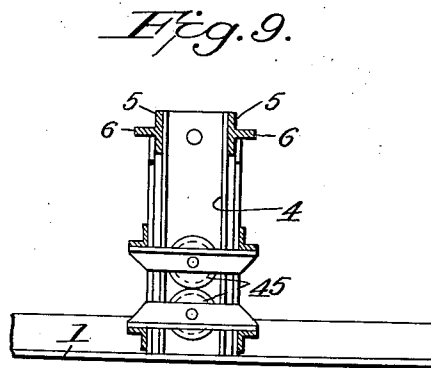
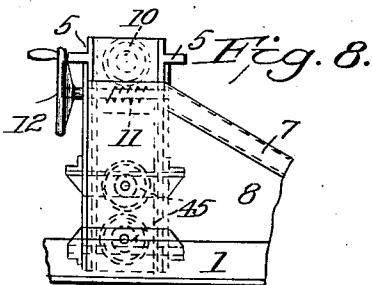
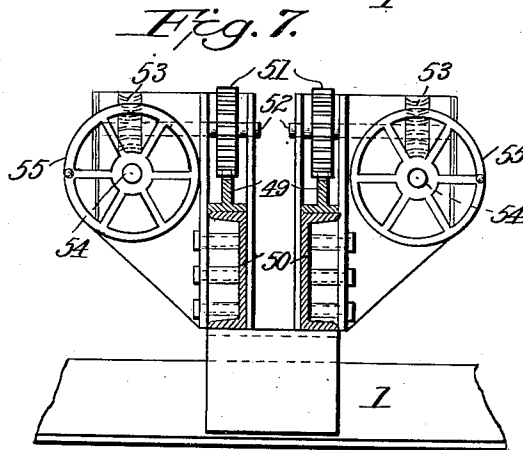
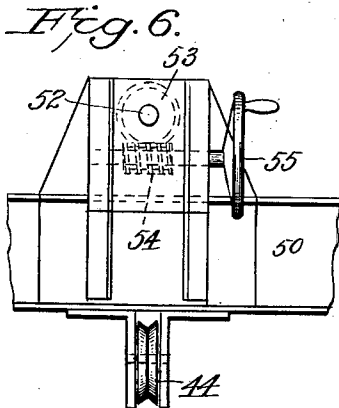
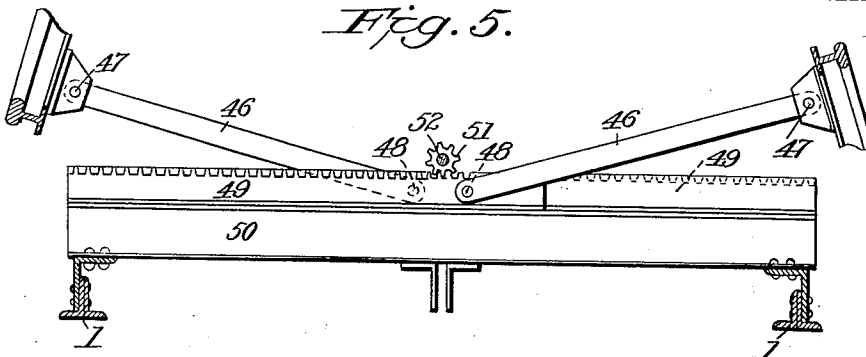
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5 SHEETS—SHEET 5.



Witnesses

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UNITED STATES PATENT OFFICE.

DENNIS J. WREN, OF INDIANAPOLIS, INDIANA; MARY E. WREN ADMINISTRATRIX OF SAID
DENNIS J. WREN, DECEASED.

DITCHING-MACHINE.

No. 910,256.

Specification of Letters Patent.

Patented Jan. 19, 1909.

Application filed January 14, 1908. Serial No. 410,741.

To all whom it may concern:

Be it known that I, DENNIS J. WREN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Ditching-Machines, of which the following is a specification.

My invention relates to improvements in ditching machines, and refers in particular to a machine for performing excavating operations along the line of railway tracks, the main object of the invention being the provision of a simple and effective device which may be mounted upon a railway car and used for digging the ditch or trench and loading the excavated material upon the car in a rapid and thorough manner, and which as each car is loaded, will be drawn along to the next empty car, so that the cars comprising the train will be loaded in succession, the mechanism being shifted in such way as to cause no appreciable delay in the operation of the same.

Another object of the invention is the provision of a ditching machine by means of which the earth or other material may be excavated from either side of the track as becomes necessary or desirable, the change of operations from one side to the other requiring but slight alterations in the adjustment of the device.

Other objects of the invention, are to provide inclined supports for supporting the boom carrying the excavating scoop on either side of the trackway; to provide means for adjusting the inclination of said guiding supports; to provide adjustable means for supporting the boom in any position with respect to the inclined guides; to provide means for shifting the inner end of the boom to adapt it for excavating on either side of the trackway; and a final object of the invention is to provide a device of the character set forth which will be efficient and practical in every particular.

With the above and other objects in view, my invention comprises a carrier adapted to be drawn to the place of operations, a boom and an excavating scoop carried thereby, and a support for the boom having inclined sides to guide the movements of the boom, the boom being adapted for operation on either side of the support.

The invention further consists of an exca-

vating machine embodying certain other novel features of construction, combination and arrangement of parts substantially as disclosed herein and as illustrated in the accompanying drawings, in which:

Figure 1, is a side elevation of the complete machine mounted upon and as in use in connection with an ordinary "flat car," the boom and excavating bucket or dipper being in the elevated position, as when ready for dumping the contents of the bucket upon the car. Fig. 2, is a like view of the same with the bucket lowered in the excavating position. Fig. 3, is a top plan view thereof. Fig. 4, is a rear end elevation of the machine. Fig. 5, is a broken detail view of the rack and pinion mechanism for spreading and adjusting the inclination of the guiding and supporting rails. Figs. 6 and 7, are like views of the hand wheel and worm gear devices for operating the spreading mechanism. Fig. 8, is a broken side elevation of the forward portion of the carrier frame and the adjustable mounting for the boom end. Fig. 9, is a broken sectional view of the shifting mechanism for the boom end. Figs. 10, and 11, are top and side views of the nut block to which the boom end is connected. Fig. 12, is a detail view of one of the anchoring hooks for holding the machine temporarily in place.

Referring now more particularly to the drawings: The numeral 1, designates the side members or sills of the carrier frame which may be in the form of I-beams or the like structure and which have their forward ends curved upwardly in the nature of runners. The sills are connected by cross braces 2, and diagonal corner braces 3, and if found necessary other braces may be added. Short upstanding posts 4, are mounted at the forward end of the carrier frame which support the pair of transversely arranged parallel supporting and guiding bars 5. These bars are preferably in the form of T-rails, the heads of the rails facing each other so as to provide the angular outstanding flanges 6, which form runways for the guidance and support of the nut block or head to which the base of the boom is connected. The posts are braced by angle braces 7, and in order to strengthen the joints between the braces and other members of the carrier, I find it advisable to employ angle plates 8, at such joints throughout the carrier, to provide a

more rigid and substantial structure. A screw rod 9, is journaled between the posts between the guiding bars or rails 5, upon one end of which is affixed a pinion 10, which is in mesh with the worm 11, a hand wheel 12, being provided upon the end of the worm shaft, so that by operating the hand wheel the screw rod is rotated. A head or nut block 13, is slidably engaged upon the guide rails the block being slotted or grooved at 14, so as to fit down over the edge of the rails with its ends bearing upon the angular flanges of the rails. A securing plate 15, is bolted to the underface of the boom head or nut block, the edges of the plate engaging the lower edge of the rails to slidably secure the head upon the rails. The head is provided with a seat or recess 16, in which is seated the steel nut 16', said nut being engaged upon the screw rod. Thus it will be understood that by operating the hand wheel, the screw shaft is rotated which causes the boom head to be shifted laterally on the guide rails.

The boom head-block is provided with an extension or lug 17, at its rear side, to which is pivotally connected the forked link 18, by means of the pin 19, and the foot of the derrick boom 20, is pivoted at 21, to the outer end of this link, the whole forming a universal joint to permit of the boom being swung either vertically or horizontally with respect to the nut block, or head. The boom is preferably of truss construction as shown, and to the outer free end of the boom is pivoted at 22, the bail 23, of the scoop or dumping bucket 24. This pivotal connection for the bucket is comparatively loose so as to allow the bucket to swing in parallelism with the traverse of the car or train, and in order to keep the bucket in proper position while excavating and to prevent tilting of the same, a guiding tongue or finger 25, is swiveled at 26, on the upper side at the end of the boom, which engages the V-shaped flanged guide 27, on the upper side of the bucket and serves to guide and hold the bucket in proper upright position. The bucket is provided with a hinged door 28, and a spring latch 29, to hold the door closed, the latch being operated to release the door for dumping the contents of the buckets by means of a trip rope (not shown), or by hand. An outstanding lever handle 30, is mounted on the door to assist in closing the same, and the bucket is further provided with the customary plow points 31.

The supporting and guiding means for the outer free end of the boom consists of a pair of angular converging posts 32, carrying the angular head plate 33, to the opposite upper corners of which are pivoted at 34, the angular or curved guide rails 35 which are curved on a gradual arc, the lines of curvature coinciding with the curvature

of the head plate so as to provide a smooth joint therewith. Secured in spaced relation to said head plate 33, is a corresponding member 36, the edge of which is slightly lower than the edge of the head plate, so as to allow the proper clearance for the hoisting cable 37. A pair of sheaves 38, are journaled in the head between the two spaced members to carry the hoisting cable, and the bevel-edged filler blocks 39, arranged on each side of the sheaves serve to properly guide the cable. A pair of eyes 40, are provided on the upper corners or edges of the boom, to the inner one of which the hoisting cable is attached, according as to which side of the support the boom is resting on, and spool rollers 41, journaled in brackets 42, on the lower corner edges of the boom, engage with the guide rails and serve to reduce the friction to a minimum. As will be readily understood from the drawings the boom may be shifted over the head of the support from one side to the other, and when so doing, the hoisting cable would be attached to the wide loop 43, on the lower side of the boom. The hoisting cable passes downward from the sheaves in the head of the support between the guiding pulleys 44, thence between the guiding pulleys 45, in the forward end of the frame, these last named pulleys giving a lift or rise to the cable as shown, so that when power is applied to the cable, a downward pressure will be exerted on the forward end of the carrier frame by reason of the upward inclination of the cable.

In order to adjust the inclination of the guiding and supporting rails when digging deeper or further away from the track, the rails may be distended or forced outward in the following manner: A pair of links 46, are pivoted at their outer ends to the guide bars at 47, and at their inner ends at 48, to the rack bars 49, which rack bars are slidably mounted on the transverse end members 50, of the carrier frame. These racks are actuated by pinions 51, on the shafts 52, gears 53, being affixed on the opposite ends of the shafts, which latter gears are in mesh with the worms 54. Hand wheels 55, on the extended ends of the worm shafts, serve as means for operating.

The usual operation of the device is as follows: The machine is placed upon the last flat car of the train of "empties" and a hoisting engine (not shown) is carried on the car next to the locomotive, and the hoisting cable of the machine is connected to the drum of the engine. The machine is secured upon the car by means of the anchor hooks 56, having the threaded shanks 57, which pass upward through the enlarged openings 58, in the anchor bars 59, which bars are pivoted to the frame of the machine at 60. The hand wheel 61, on the shank of the hook

acts as a nut and serves to clamp the hook in place, and a short handle 62, is provided on the upper end of the hook shank, by means of which the hook may be turned in engagement with the sill of the car. The boom is then lowered and the train proceeds until the bucket becomes filled. The boom is then elevated until the bucket swings over the car and the bottom of the bucket is opened to dump the contents on the car. If sideboards are not carried by the car, then a pair of auxiliary side boards 63, are employed which are removably bolted to the sills of the carrier at 64, and these sideboards serve to prevent any waste or spilling of the material. After one car has been loaded in this fashion, the anchor hooks are unclamped and hinged up out of the way by means of the hoist ropes 65. The tackle from the drum of the engine is connected to the chain 66, which is swiveled to the draw bar 67, the draw bar being securely fastened to the frame of the carrier. In this way the machine may be drawn from one car to the other by "sledding."

When it is desired to shift the boom for excavating on the opposite side of the trackway, the hand wheel at the forward end of the carrier is operated to shift the foot of the boom over toward the side where the excavating is to take place, then by giving the boom a rapid hoist, it swings over of its own momentum to the opposite side of the supporting head. When the boom is at rest it is supported on the guide rails by means of the stop blocks 69, said blocks being slidably adjustable on the guide rails and held in adjusted position by means of the spring latch bolts 70, which are adapted to interlock with any of the series of openings 71, in the guide rails.

In order to adapt the boom for ordinary lifting purposes, a pulley 72, is journaled near the end of the boom over which is passed hoist rope, the other end of the rope being wound on the drum 74, journaled near the base of the boom and operated by the crank handle 75.

From the foregoing description taken in connection with the drawings, it will be apparent that I have produced an excavating and loading machine which fully and satisfactorily accomplishes all the objects herein aimed at, and which is practical and generally useful.

I claim:

1. In combination with a carrier, of a boom having its one end adjustably secured to the carrier, means for adjusting said boom with respect to the carrier, a scoop carried by the boom, a support for the boom having inclined sides.

2. An excavating machine comprising a carrier, a boom having one end connected to the carrier, means for shifting said boom

end laterally with respect to the carrier, and a support for the boom.

3. An excavating and loading apparatus comprising a carrier, a boom having its one end adjustably mounted therein, and a support for the boom embodying a head having oppositely disposed inclined guide rails.

4. In combination with a carrier, a screw shaft journaled therein, means for rotating said shaft, a nut block adapted to be shifted laterally by operation of the screw shaft, and a boom having its end connected to said nut block.

5. In an excavating machine, the combination with a boom and a scoop carried thereby, a support for the boom having a rounded head and inclined sides, of means for spreading and adjusting the inclination of said sides.

6. In an excavating machine the combination with a boom and a scoop carried thereby, of a support for the boom having a rounded head and inclined sides, hoisting sheaves journaled in the head, and hoisting cable passing over said sheaves and connected to the boom.

7. The combination with a boom and a support for the same having inclined sides, of spool rollers having flanged inclined ends and mounted on the boom and adapted to ride over said support, said rollers preventing undue friction between the rollers and the inclined sides of the support.

8. A boom support comprising a head having rounded bearing edge to permit the boom to swing from one side to the other, and inclined guide rails extending downward from each side of the head.

9. A boom support comprising a head having a rounded upper bearing edge, inclined guide rails leading downward from each side of said head, and means for changing the inclination of said guide rails.

10. In combination with a carrier frame of an excavating machine, a screw shaft journaled transversely therein, means for operating said shaft, a nut block in connection with and adapted to be shifted by said screw shaft, and a boom having its end connected by universal joint to said nut block.

11. In an excavating machine the combination with the head of a boom support, of guide rails pivotally connected to said head, and rack and pinion connections for adjusting the inclination of said guide rails.

12. The combination with an excavating machine, of a boom support embodying a head and guide rails depending therefrom, and hoisting sheaves journaled in said head.

13. An excavating machine comprising a carrier, a boom connected thereto and capable of lateral adjustment at the point of connection, a scoop carried by the boom, a support for the boom including a rounded head and guide rails depending therefrom,

means for adjusting the inclination of the rails, and means for hoisting and lowering the boom.

14. In combination with a carrier, means for anchoring the carrier in place, a boom having one end adjustably connected to the carrier, and a support for the boom having a rounded head to allow the boom to swing from one side to the other and guides depending from said head.

15. An excavating and loading machine comprising a carrier, a support mounted on the carrier having adjustable sides, rack and pinion connections for adjusting said sides, a boom riding on said support, and means carried by the support for raising and lowering the boom.

16. An excavating machine comprising a boom support having adjustable sides, a boom adapted to bear against the sides of the support and ride over the head of the support from one side to the other, a scoop carried by the boom, and means in the support for raising and lowering the boom.

17. In combination with a boom, a boom support having sides upon which the boom is adapted to ride and a rounded head permitting the boom to be swung from one side of the support to the other, and means in the support for raising and lowering the boom.

18. In combination with a carrier, a boom support thereon having a rounded head to support a boom and to permit the boom to be swung from one side of the head to the other.

19. In combination with a carrier, a boom support thereon having a rounded head, a boom adapted to be supported thereon and to be swung from one side of the head to the other, means for adjustably securing one end of the boom to the carrier, and means for raising and lowering the boom.

20. A boom support having a rounded head and inclined sides depending therefrom, and rack and pinion connections for adjusting the inclination of said sides.

21. A boom support having a rounded head and inclined sides depending therefrom, rack and pinion connections for adjusting the inclination of said sides, and means for holding the boom in adjusted position on the sides.

22. In combination with a carrier, a transverse screw shaft at one end thereof, a boom having its one end connected to and adapted to be shifted by said screw shaft, a scoop carried by the boom, a boom support having a rounded head, hoisting means in the head for elevating the boom, inclined guides carried by the head, rack and pinion connections for adjusting said guides, means on the guides for supporting the boom when desired, and means for anchoring the whole upon a car or other device.

In testimony whereof I affix my signature, in presence of two witnesses.

DENNIS J. WREN.

Witnesses:

CHAS. E. RIORDAN,
WM. N. MOORE.