No. 830,090. PATENTED SEPT. 4, 1906.

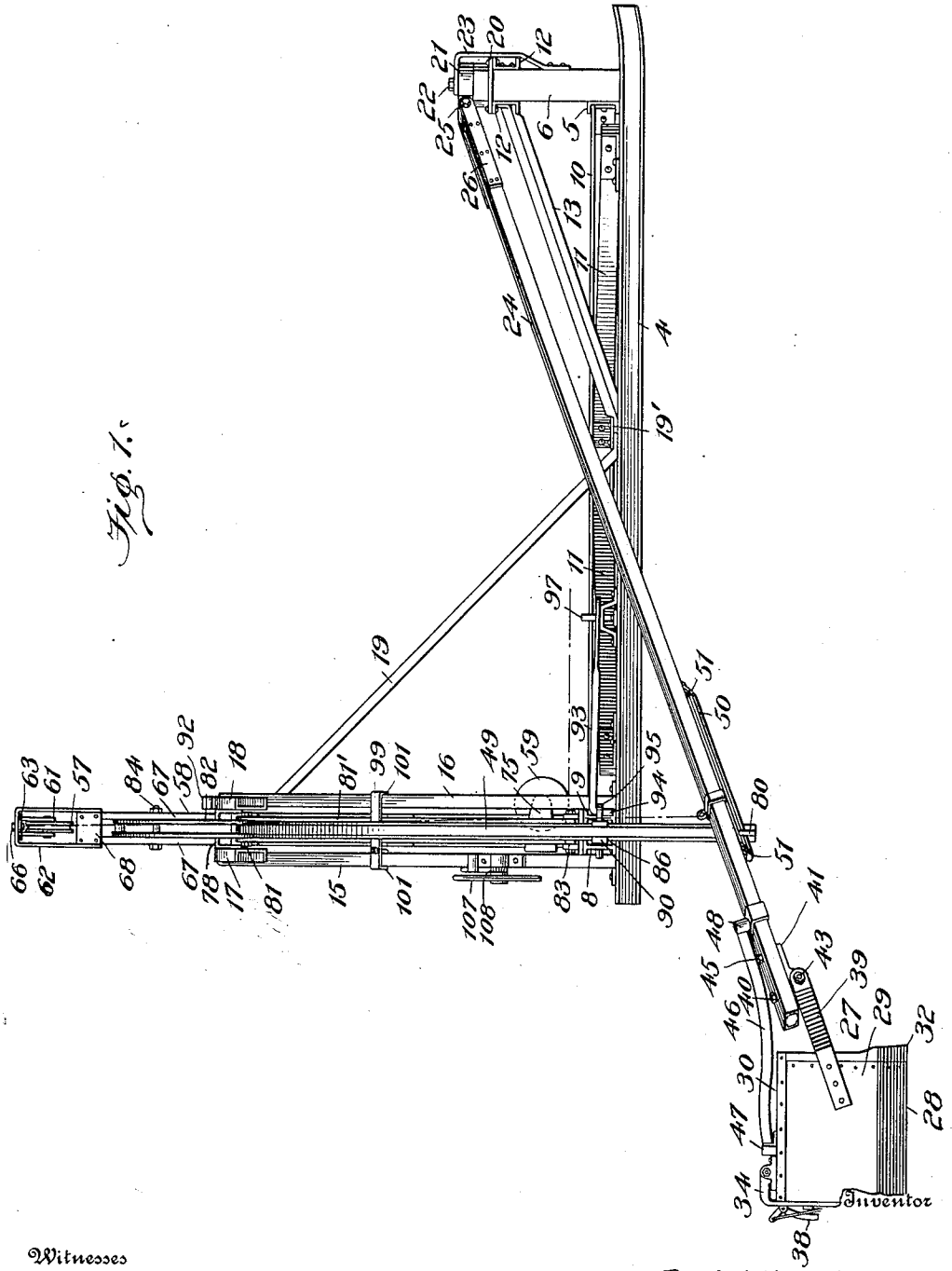
D. H. MAHONEY.

EXCAVATING AND LOADING MACHINE.

APPLICATION FILED FEB. 10, 1906.

7 SHEETS—SHEET 1.

Fig. 1.



Witnesses

Edwin L. Bradford

Ch. Whelpley

By Daniel H. Mahoney

Dudley, Brown & Norton

Attorneys

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7 SHEETS—SHEET 2.

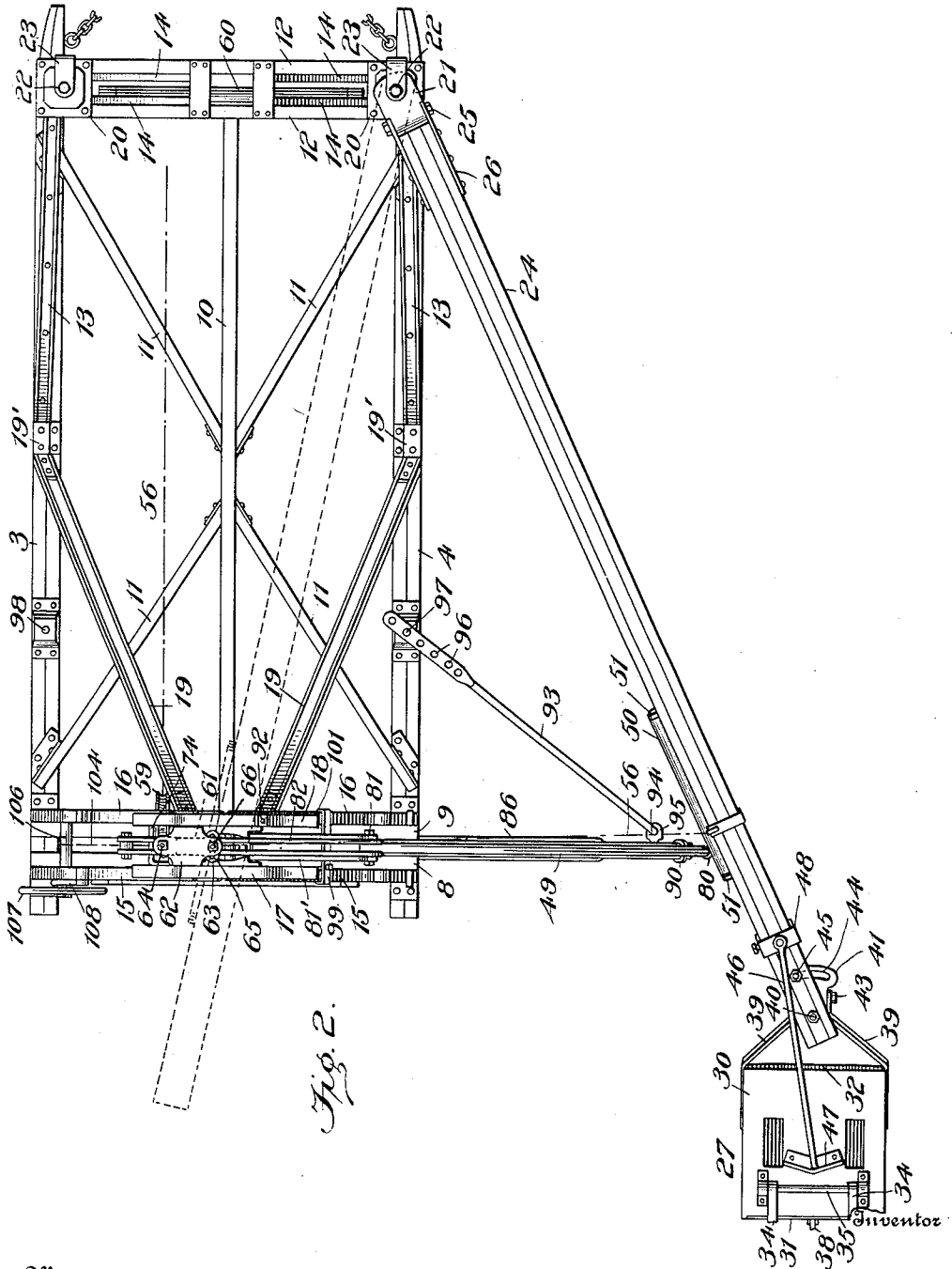


Fig. 2.

Witnesses

Edwin L. Bradford

C. Whelpley

Inventor

Daniel H. Mahoney

By Dudley, Brome & Norton

Attorneys

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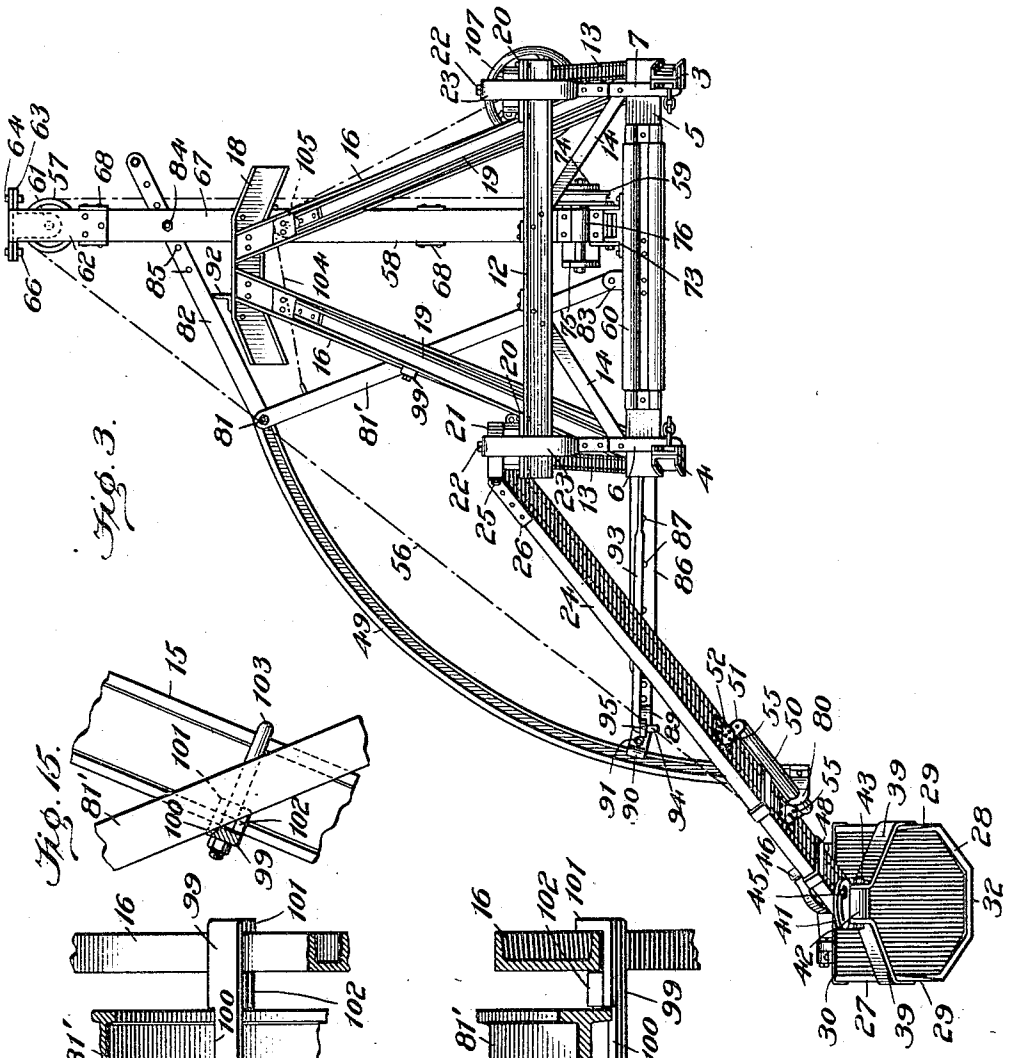


Fig. 3.

Fig. 15.

Fig. 13.

Fig. 14.

Witnesses

Edwin L. Bradford

C. A. Phelps

Inventor

Daniel H. Mahoney

By Dudley, Brome & Mahon

Attorneys

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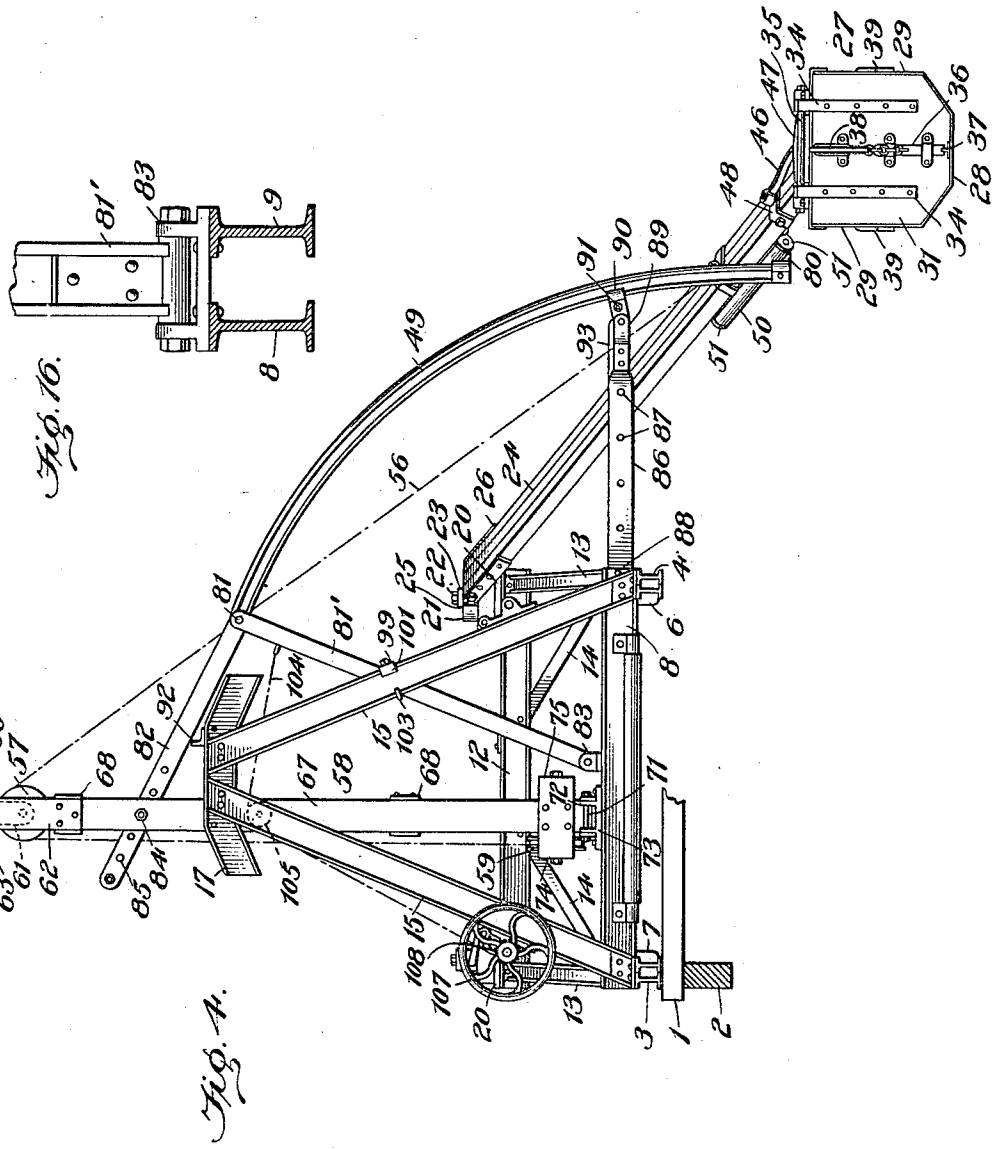


Fig. 4.

Fig. 16.

Witnesses

Edwin L. Bradford

C. Whelpley

Inventor

Daniel H Mahoney

By Dudley, Brome & Nutter

Attorneys

No. 830,090. PATENTED SEPT. 4, 1906.

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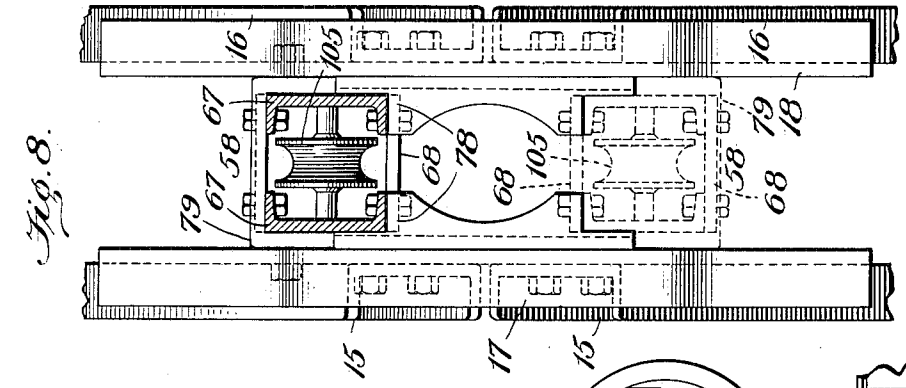


Fig. 8.

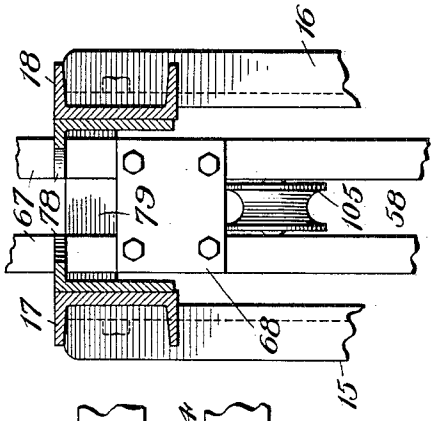


Fig. 5.

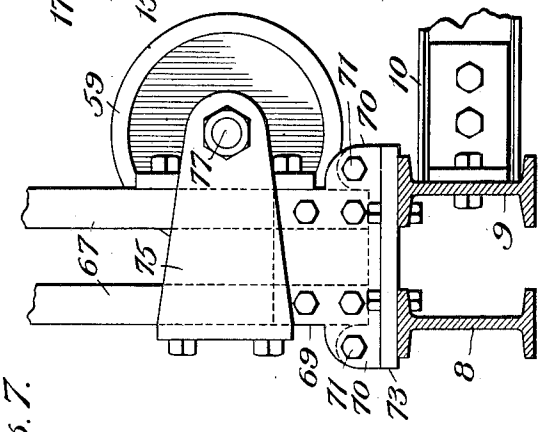


Fig. 7.

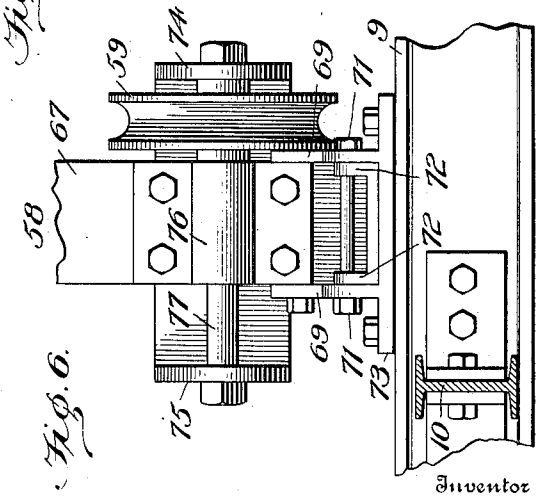


Fig. 6.

Witnesses

Edwin L. Bradford

C. W. Helpsey

Inventor

Daniel H. Mahoney

By Dudley, Browne & Norton

Attorneys

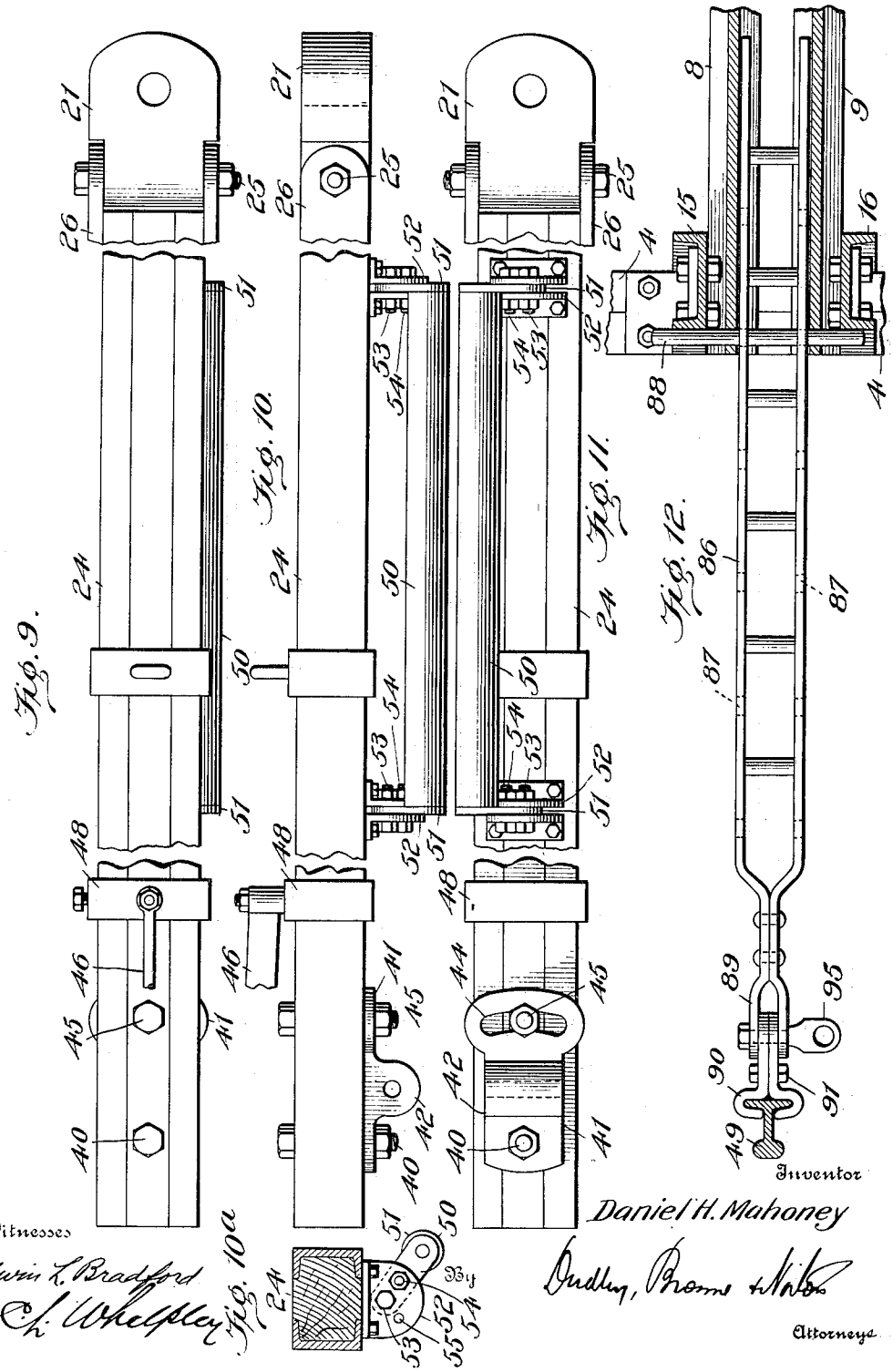
No. 830,090. PATENTED SEPT. 4, 1906.

D. H. MAHONEY.

EXCAVATING AND LOADING MACHINE.

APPLICATION FILED FEB. 10, 1906.

7 SHEETS—SHEET 6.



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D. H. MAHONEY.

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7 SHEETS—SHEET 7.

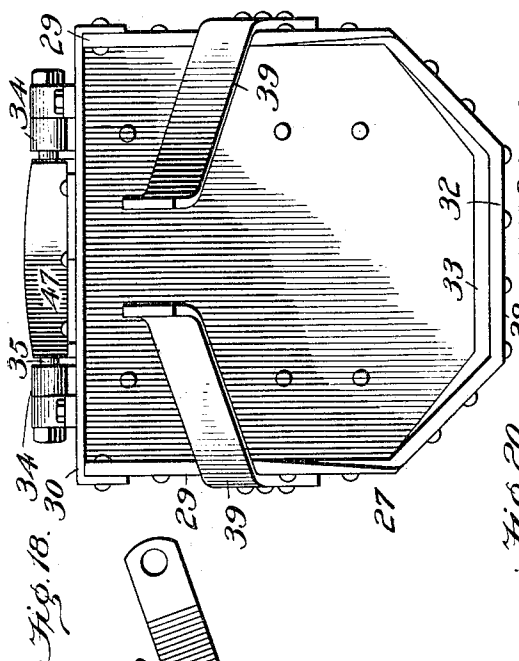


Fig. 18.

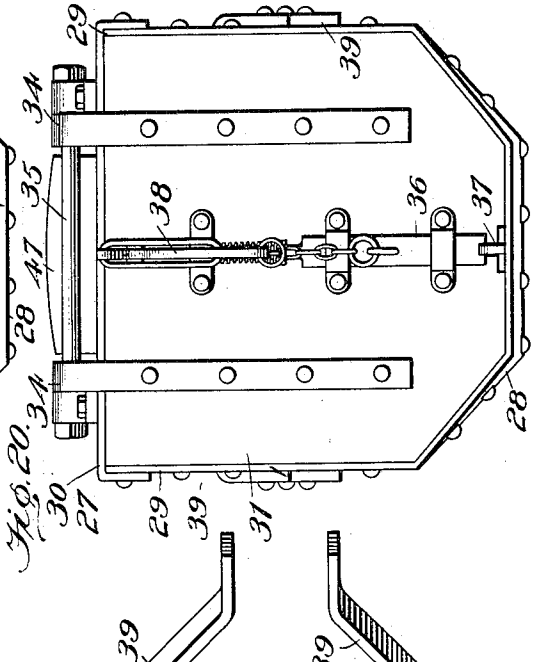


Fig. 20.

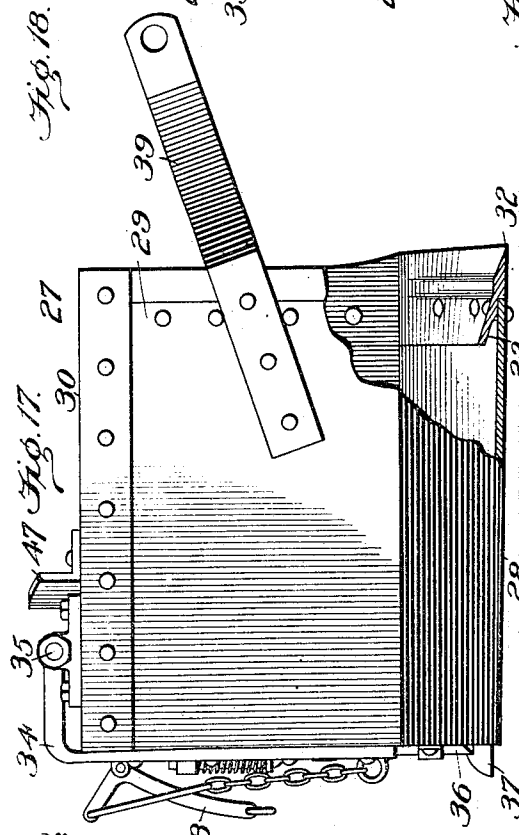


Fig. 17.

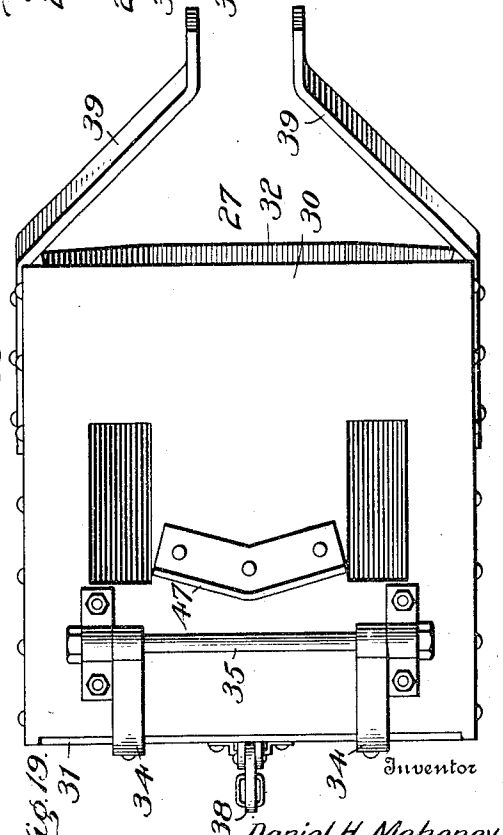


Fig. 19.

Witnesses

Edwin L. Bradford

L. Wheeler

Inventor

Daniel H. Mahoney

By

Dudley, Browne & Mason

Attorneys

UNITED STATES PATENT OFFICE.

DANIEL H. MAHONEY, OF VINCENNES, INDIANA, ASSIGNOR TO THE MAHONEY R. R. DITCHING MACHINE COMPANY.

EXCAVATING AND LOADING MACHINE.

No. 830,090. Specification of Letters Patent. Patented Sept. 4, 1906.

Application filed February 10, 1906. Serial No. 300,405.

To all whom it may concern:

Be it known that I, DANIEL H. MAHONEY, a citizen of the United States, residing at Vincennes, in the county of Knox and State of Indiana, have invented certain new and useful Improvements in Excavating and Loading Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to excavating and loading machines designed more especially for employment in connection with railroad construction and repair trains for the excavation and transportation of earth along the line of road and is an improvement on the excavating and loading machines patented to me June 3, 1902, and March 2, 1904, the Letters Patent being numbered, respectively, 701,593 and 753,282.

The objects and nature of the present improvements will be readily comprehended, reference being had to the following detailed description and to the accompanying drawings, illustrating the invention in its preferred form of embodiment, it being understood that various modifications may be made therein without exceeding the scope of the concluding claims.

In the drawings, Figure 1 is a side elevation of an excavating and loading machine embodying my invention. Fig. 2 is a top plan view. Fig. 3 is a front end elevation. Fig. 4 is a rear end elevation. Figs. 5, 6, 7, and 8 are detail views of the mast. Figs. 9, 10, 10ª, and 11 are detail views of the boom. Fig. 12 is a detail view of the guide and adjustable lower brace. Figs. 13, 14, 15, and 16 are detail views of the upper brace for the guide and the support for said brace. Figs. 17, 18, 19, and 20 are detail views of the dipper.

The machine, the construction of which will now be set forth in detail, is, as above stated, designed more especially for use in railroad excavating and repair work, and to this end is supported on and movable along a train composed of flat-cars in a manner similar to that shown in my hereinabove-referred-to patents. In view of the former disclosures complete illustration of the supporting and loading cars in connection with the present invention is unnecessary; but as an aid to the understanding of the construction there is shown in Fig. 4 a portion of a car-platform 1 and a cross-sectional view of one of the car-sills 2.

The carrier-frame, which is supported directly upon and is movable longitudinally over the car-platform 1, comprises side members or runners 3 4, each composed of two I-beams having their forward ends bent upwardly and inwardly or otherwise fashioned to ride over obstructions; a forward end member 5, composed of a channel fastened at its ends to channel corner-posts 6 7 and to the side members; a rearward end member consisting of two I-beams 8 9, spaced apart and fastened at their ends to the side members; a central longitudinal member 10, consisting of an I-beam fastened at its ends to the end members, and truss-channels 11 11, joined at their ends by standard connections to the side members and central member. The corner-posts 6 7 are connected together at their upper ends by flanking channels 12 12 and are rigidly supported by longitudinal braces 13 and lateral braces 14 of any desired construction.

Erected at the rearward end of the carrier-frame is a frame of A form, consisting of two members 5 16, composed of channels, the channels of each member being fastened at their lower ends by angle-pieces to the side members of the carrier-frame and at their upper ends to transversely-disposed supports 17 18 of channel-bar construction, the end portions of which supports are downwardly inclined, as shown more plainly in Figs. 3 and 4. The A-frame member 18 is braced by bars 19, fastened thereto, to the side members 3 4 and 13 to the braces 13 by strip extensions 19′.

The machine is designed for excavating at either side of the track or line of road, and to this end is equipped with means permitting the shifting, among other parts, of the dipper-carrying boom and the mast from one side of the carrier-frame to the other. Secured to the channels 12 12 above each corner-post is a plate 20, on which is pivoted to swing horizontally a head 21, having a central opening to receive the pivot-bolt 22, which passes through a strap 23 and the plate 20. The boom 24, which is preferably composed of a wooden beam flanked by side channels of metal, is pivoted to one or the other of the heads 21 by a bolt 25 passing

horizontally through said head and through straps 26 on the inner end of the boom. It will be understood that by the employment of the vertical pivot 22 and the horizontal pivot 25 the boom is permitted to swing both vertically and horizontally, or, in other words, its free end, which carries the dipper 27, may assume the lowered and elevated positions, (shown by the full lines and the dotted lines in Fig. 2,) and moves to assume these positions in an inclined plane after the manner set forth in the above-referred-to patents. By the peculiar construction of mounting, the boom is easily and quickly shifted from one side of the machine to the other, dependent upon the side of the track to be worked.

The means connecting the dipper 27 with the free end of the boom likewise allows of the necessary adjustments to obtain the proper operation of the dipper regardless of its location relatively to the right or left side of the machine. The dipper has a bottom 28, which conforms cross-sectionally to the form of ditch to be made, sides 29 29, a top 30, and a door 31, which when closed forms the back, the dipper being open at its front. In connection with the cutting edge 32 I may employ the usual teeth, showing of which is unnecessary. The cutting edge 32 is formed separately from the bottom and sides of the dipper and is fastened thereto, as shown in Fig. 17. Integral with said edge is a rearwardly-inclined flange or rib 33, the function of which is to prevent the excavated material from adhering to the bottom of the dipper. Inasmuch as the earth entering the dipper at its front is deflected above the bottom by the action of the inclined flange or rib, the lowermost portion of the earth contents is not compacted on the surface of the bottom, and free discharge of the contents is therefore obtained. The door 31 is pivoted by strap-hinges 34 to the dipper-top 30, the pintle 35, which is common to both hinges, being set back from the rear end, whereby the door in opening swings clear of said end to allow free dumping of the entire contents. The door is fastened in its closing position by a slidable spring-pressed bolt 36 thereon engaging a hook 37, projecting from the bottom 28, and is released by the raising of the bolt against spring action through manipulation of a bell-crank lever 38, having chain connection with the bolt. Secured to the sides of the dipper are bail members 39, which extend forwardly of the dipper at an inclination. To the under side of the free end of the boom is pivoted by a bolt 40 one end of a bracket 41, having a lug 42, apertured to receive a bolt 43, which is also passed through holes in the ends of the bail members. The bracket 41 is provided near its other end with a slot 44, curved in an arc of which the bolt 40 is the center, and through which extends a set-bolt 45. The dipper is thus vertically and horizontally pivoted to the free end of the boom and will assume a position approximately parallel with the side of the machine, regardless of whether the parts are located at the right or left of the line of road. The dipper when in excavating position has its bottom lowermost, but when elevated to dump its contents on the cars its rear end is brought lowermost, the dipper swinging on the pivot 43. When in proper position over a car, the door is released to allow the contents to dump, after which the door is closed and automatically refastened. As the dipper in lowering strikes the ground it is righted to the proper position for excavating, tilting during such excavation being prevented by the engagement of an arm 46, pivoted on the boom, with a stop-flange 47 on the top of the dipper, which flange is of V form to allow the free end of the arm to self-center. The arm is attached at its inner end to a sleeve 48, adjustable along the boom to determine the proper excavating position of the dipper.

The dipper is raised to dumping position over a car and lowered to excavating position at one side of the line of road by movement of the boom, which movement is controlled by an inclined guide 49, presently to be described. To minimize friction in the movement of the boom, the latter is equipped with a roller 50, which has end bearings in arms 51, pivoted between ears 52, secured to the boom on its under side. The inclined guide 49 is shiftable from one side of the carrier-frame to the other, dependent upon the side of the line of road to be worked, and to bring the roller 50 to the right or left of the boom, as the case may be, the arms 51 are rocked on their pivots 53, the adjusted position being maintained by a bolt 54, passed through holes in the arms and through holes 55, provided in the ears 52.

The boom-hoisting chain or cable 56 is attached at one end to an eye on the boom near the free end of the latter and passes around a sheave 57 at the upper end of a mast 58 and thence around a sheave 59 at the base of the mast, after which it is connected with the source of power, which may be an engine-driven drum. (Not shown.) The chain runs over a roller 60 at the forward end of the carrier-frame. To maintain alinement of the groove of sheave 57 with the chain 56 in the hoisting and lowering of the boom, said sheave is mounted to swing laterally, being supported in a housing 61, which is pivoted in a hood 62, secured on the top of the mast 58. The top plate 63 of the housing is pivoted toward one end to the hood by a bolt 64, which is in line with the vertical traverse of the cable, and said plate is provided toward its other end with a curved slot 65, loosely receiving a bolt 66, which is screwed or other-

wise fastened to the hood. Thus the housing and sheave may swing horizontally according to the change of angle of the inclined traverse of the chain, and the line of the sheave-groove and cable is maintained with the consequent minimum friction. In shifting the parts from one side of the machine to the other the position of the housing 61 is reversed and the bolt 66 becomes the pivot for the housing.

The mast 58 is composed of two channels 67, connected together at intervals by plates 68. The mast is shiftable from one side of the center of the carrier-frame to the other, and to this end is removably supported on the rearward frame member and in the **A**-frame. On the lower end of the mast are secured plates 69, from which project ears 70, having holes through which extend securing-bolts 71, the latter also passing through ears 72 on a plate 73, removably fastened on the rear frame member. To allow of the shifting of the sheave 59 from one side of the mast to the other, two ears 74 75 are provided on the mast, which ears, together with a central box 76, form the bearings for the shaft 77 of the sheave. By reference more particularly to Fig. 6 it will be obvious that the sheave may be readily shifted from one side of the mast to the other for the purpose hereinbefore stated. Toward its upper end the mast is removably fastened between the **A**-frame members and between shoulders 78 79, the shoulders 79 being shiftable, as indicated by the dotted lines in Fig. 8.

The inclined guide 49 consists of an **I** beam or rail, bent to curve form and having at its lower end a hook-shaped stop 80 to limit the lowering movement of the boom and dipper. To the upper end of the guide is pivoted by a bolt 81 a guide extension 82, composed of two bars secured together in separated relation. The guide is vertically supported by a brace-rod 81′ of **I** form, removably secured at its upper end by the bolt 81 to said guide and at its lower end to a shiftable bracket 83, fastened on the rear frame member. The guide folds at the pivot 81 when not in use, and in the folded condition the member 49 rests at its lower end adjacent to the side of the carrier-frame. This folding movement is permitted by disconnecting the guide member 82 from the mast, this being accomplished by withdrawing a pin 84, passed through holes in the mast and through holes 85 in said member 82, and also by moving inwardly a lower brace 86, which serves to hold the lower guide member at varying distances from the side of the machine. Said brace 86 consists of two bars secured together at intervals in separated relation and provided with a series of holes 87. The bars are slidable between the two **I**-beams of the rear frame member and are fastened thereto to project therefrom at any desired distance by a pin 88, passed through holes in the said beams and through any one of the holes 87 in said bars. The bars of the brace 86 are joined near their outer end and then separated to provide ears 89, between which are pivoted two clamping members 90, which hook freely over the inner flange of the **I**-guide and are secured together beyond the pivot by a bolt 91. The series of holes in the upper guide member and in the lower brace permit of different adjustments of the guide to conform to the requirements in the work to be performed. When the guide is folded, the elevated boom is held against falling by engaging a shoulder 92 on the top of the **A**-frame, whereas when the guide is in position for service the upper guide member is adjusted to cause the boom to swing clear of the shoulder.

To prevent lateral movement of the guide, a brace-rod 93 is provided to extend between the brace 86 and carrier-frame. Said rod has a hooked end 94, engaging with an eye 95 on the brace, and its other end has a series of holes 96 for adjustable engagement with a pin 97 on the side frame member. By this provision the guide is stoutly braced regardless of its adjusted position relative to the side of the machine, and a similar pin 98 is provided at the opposite side to be engaged when the parts are shifted. The guide is further braced by a bridge-piece 99 adjustable along the members of the **A**-frame and having a recess 100, receiving the brace 81′ and preventing lateral movement thereof. The bridge-piece is flanged at 101 102 to engage the **A**-frame members and is adjustably secured thereto by a hook-bolt and nut 103.

The guide members are raised to a new position or folded, as desired, by a cable 104, which is fastened at one end to the brace 81′ near the upper end of the latter and is intermediately passed around a sheave 105, mounted in the mast, and thence around a drum 106, journaled on the **A**-frame to be shiftable from one side to the other, as may become necessary, the drum having a hand-wheel 107 for its rotation and pawl-and-ratchet means 108 for locking it, as will be understood.

I claim—

1. In a machine of the class described, the combination of a carrier-frame comprising side members which constitute runners, end members, corner-posts at one end of the frame, a vertical frame at the other end of the frame, and braces for said posts and vertical frame each post-brace and frame-brace being connected together at their lower ends.

2. In a machine of the class described, the combination of a carrier-frame comprising side and end members, corner-posts at one end of the frame, rods connecting the upper ends of said posts, an **A**-frame at the other end of the frame, braces for the **A**-frame and

braces for the post each post-brace having a strip extension secured to the lower end of one of the A-frame braces.

3. In a machine of the class described, the combination of a support, an apertured plate thereon, a pin vertically confined in said aperture, a head pivoted on said pin and having recesses, a boom, strap extensions on the boom insertible in said recesses, and a horizontal bolt insertible in apertures in the head and strap extensions.

4. In a machine of the class described, the combination of a corner-post, an apertured plate thereon, a headed pin vertically confined in said aperture, a head pivoted on said pin and composed of a block and strap between which on opposite sides are recesses, a boom, strap extensions on the boom insertible in said recesses, and a horizontal bolt insertible in apertures in the boom, block and strap extensions.

5. In a machine of the class described, the combination of two corner-posts, an apertured plate on each post, a headed pin vertically confined in each plate-aperture, a head pivoted on each pin and provided with recesses and horizontal pivot-holes, a bracing-strap for the vertical pin, a boom having strap extensions insertible in the recesses of either head, and a horizontal pivot-bolt adapted to be passed through the head-holes and holes in said extensions.

6. In a machine of the class described, the combination of a carrier-frame, two posts at opposite corners of one end of the frame, a boom adapted to be universally joined to either post, a dipper at the free end of the boom said dipper having bails connected by a horizontal pivot to a vertically-pivoted plate on the under side of the boom, a concave shoulder on the top of the dipper, and a swinging stop-arm on the boom adapted to engage said shoulder.

7. In a machine of the class described, the combination of a carrier-frame, a boom adapted to be pivoted at either side of said frame, a dipper universally joined to the free end of the boom, a shoulder on the top of the dipper and an adjustable stop-arm for engagement with the shoulder.

8. In a machine of the class described, the combination of a carrier-frame a dipper-carrying boom shiftable from side to side of said frame, means for moving the boom, a shiftable inclined guide for the movement of the boom, and a friction-roller on the boom for engagement with the guide said roller being shiftable from side to side of the boom.

9. In a machine of the class described, the combination of a carrier-frame, a dipper-carrying boom shiftable from side to side of said frame, means for moving the boom, a shiftable inclined guide for the movement of the boom, a friction-roller journaled in arms pivoted to ears on the boom and permitting the shifting of the roller from one side of the boom to the other, and means for securing the roller in either position.

10. In a machine of the class described, the combination of a carrier-frame, a dipper-carrying boom shiftable from side to side of said frame, a mast carrying sheaves, a rope or cable passing around said sheaves and attached to the boom, a vertical support for the mast, and means permitting the shifting of the mast from side to side of the frame center.

11. In a machine of the class described, the combination of a carrier-frame, a vertical A-frame central of the carrier-frame, a support at the upper end of the A-frame, a dipper-carrying boom shiftable from side to side of the carrier-frame, a mast, sheaves on the mast, a rope or cable passed around said sheaves and attached to the boom, and means for removably fastening the mast toward its upper end to said support and at its lower end to the carrier-frame, whereby said mast is shiftable from one side of the frame center to the other.

12. In a machine of the class described, the combination of a carrier-frame, a vertical A-frame central of the carrier-frame, a support at the upper end of the A-frame, a dipper-carrying boom shiftable from side to side of the carrier-frame, a mast removably fastened to said support and to the carrier-frame to permit of its being shifted from one side of the center of the frame to the other, a sheave at the upper end of the mast, a sheave at the lower end of the mast, and a rope or cable passing around said sheaves and attached to the boom.

13. In a machine of the class described, the combination of a carrier-frame, a dipper-carrying boom shiftable from side to side of said frame, a mast carrying a sheave, a hoisting rope or cable passing around the sheave and attached to the boom, and an inclined guide for the movement of the boom carried by the mast, said mast and guide being shiftable to bring the latter at either side of the frame and the mast at either side of the frame center.

14. In a machine of the class described, the combination of a carrier-frame, a dipper-carrying boom shiftable from side to side of said frame, a mast carrying sheaves, a hoisting rope or cable passing around said sheaves and attached to the boom, a foldable inclined guide for the movement of the boom, and means for removably supporting the boom to permit the shifting of the latter and guide from side to side of the frame.

15. In a machine of the class described, the combination of a carrier-frame, a dipper-carrying boom, a mast carrying boom-hoisting means, a guide for the movement of the boom, said guide being formed of two foldable pivoted-together members, the upper

member being removably and adjustably fastened to the mast, and means for securing the guide in extended condition at its lower member.

16. In a machine of the class described, the combination of a carrier-frame, a dipper-carrying boom shiftable from side to side of said frame, a shiftable mast carrying boom-hoisting means, a foldable guide for the movement of the boom, the upper guide member being supported from the mast, and said guide being shiftable with the mast, an adjustable brace for the lower end of the guide, and means at each side of the frame for adjustably securing the inner end of the brace.

17. In a machine of the character described, the combination of a carrier-frame, a dipper-carrying boom, means for raising and lowering the boom, a guide for the movement of the boom consisting of two foldable sections, a sectional brace for the lower end of the guide, and a rigid adjustable brace for said lower end.

18. In a machine of the character described, the combination of a carrier-frame, a dipper-carrying boom, means for raising and lowering the boom, a guide for the movement of the boom and means for raising and lowering said guide.

19. In a machine of the character described, the combination of a carrier-frame, a dipper-carrying boom, a cable for raising and lowering said boom, a sheave around which said cable passes, and a swinging housing for the sheave having its pivot in line with the vertical traverse of the cable.

20. In a machine of the character described, the combination of a carrier-frame, a dipper-carrying boom, a cable for raising and lowering said boom, a sheave around which said cable passes, and a reversible swinging housing for the sheave having its pivot in line with the vertical traverse of the cable.

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

DANIEL H. MAHONEY.

Witnesses:
W. T. NORTON,
F. L. BROWNE.