M. M. SICKLER.

ROAD MACHINE.

APPLICATION FILED JULY 26, 1909.

975,295.

Patented Nov. 8, 1910.

6 SHEETS—SHEET 1.

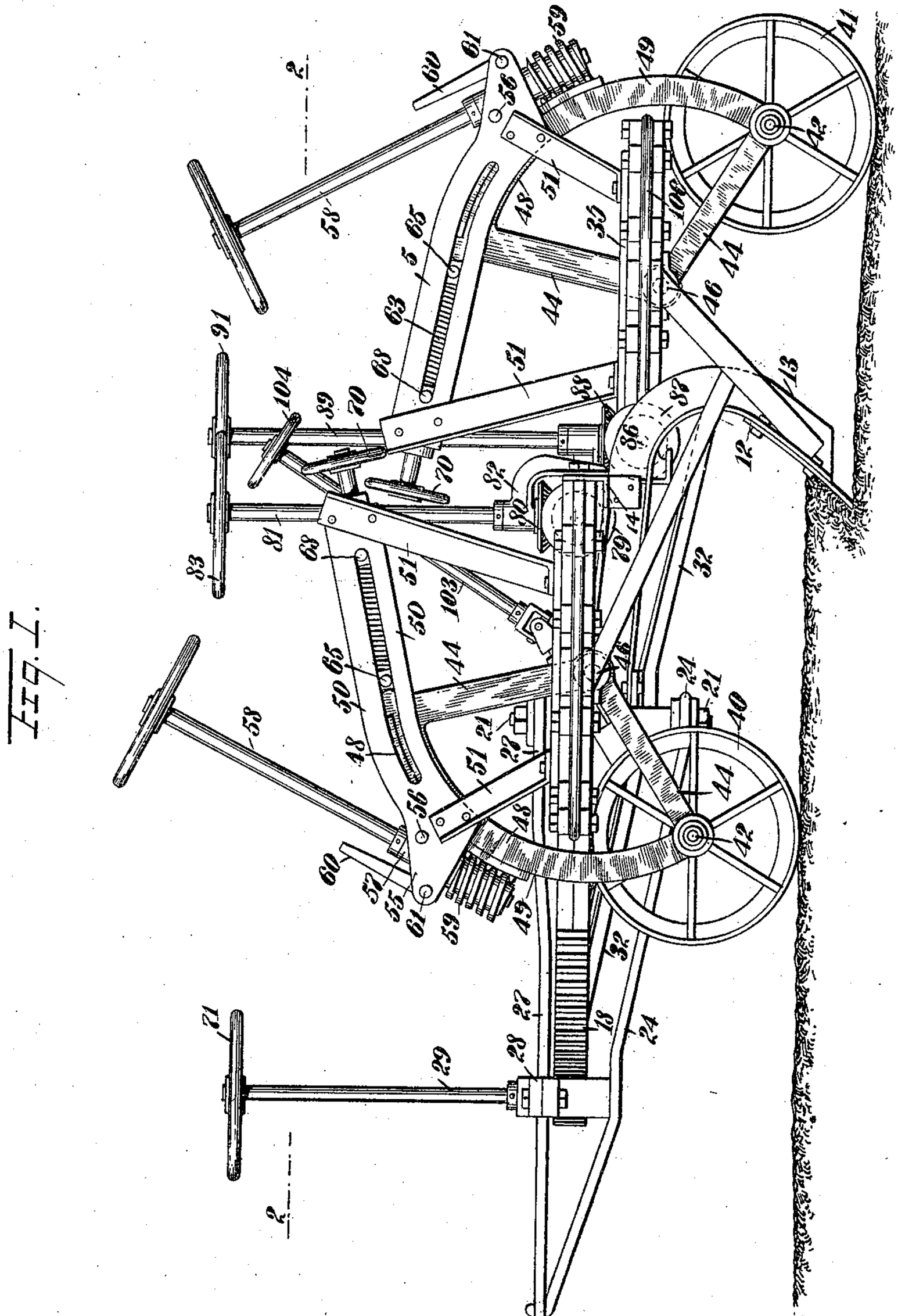

FIG. 1.

WITNESSES

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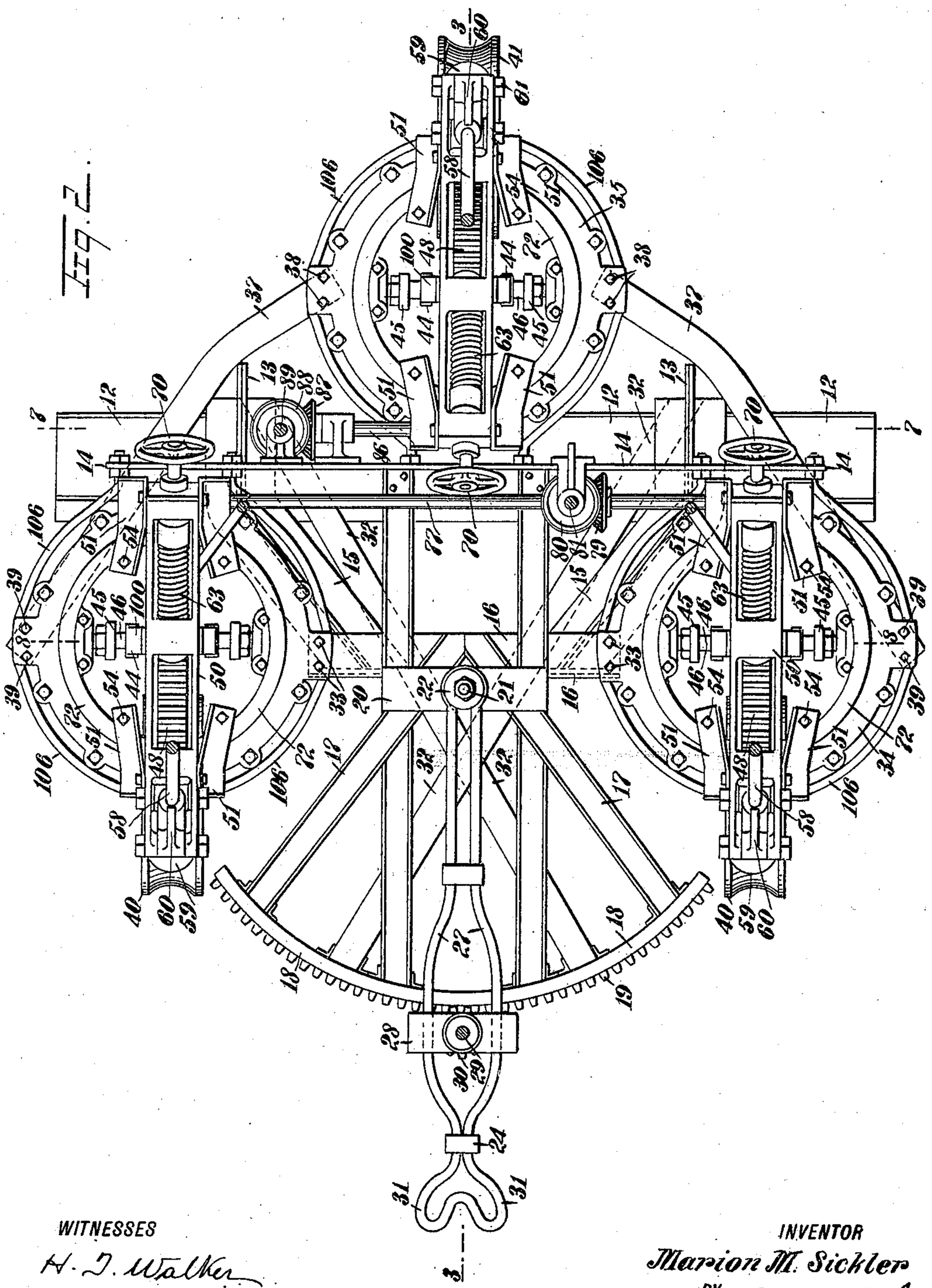
6 SHEETS—SHEET 2.

Fig. 2.



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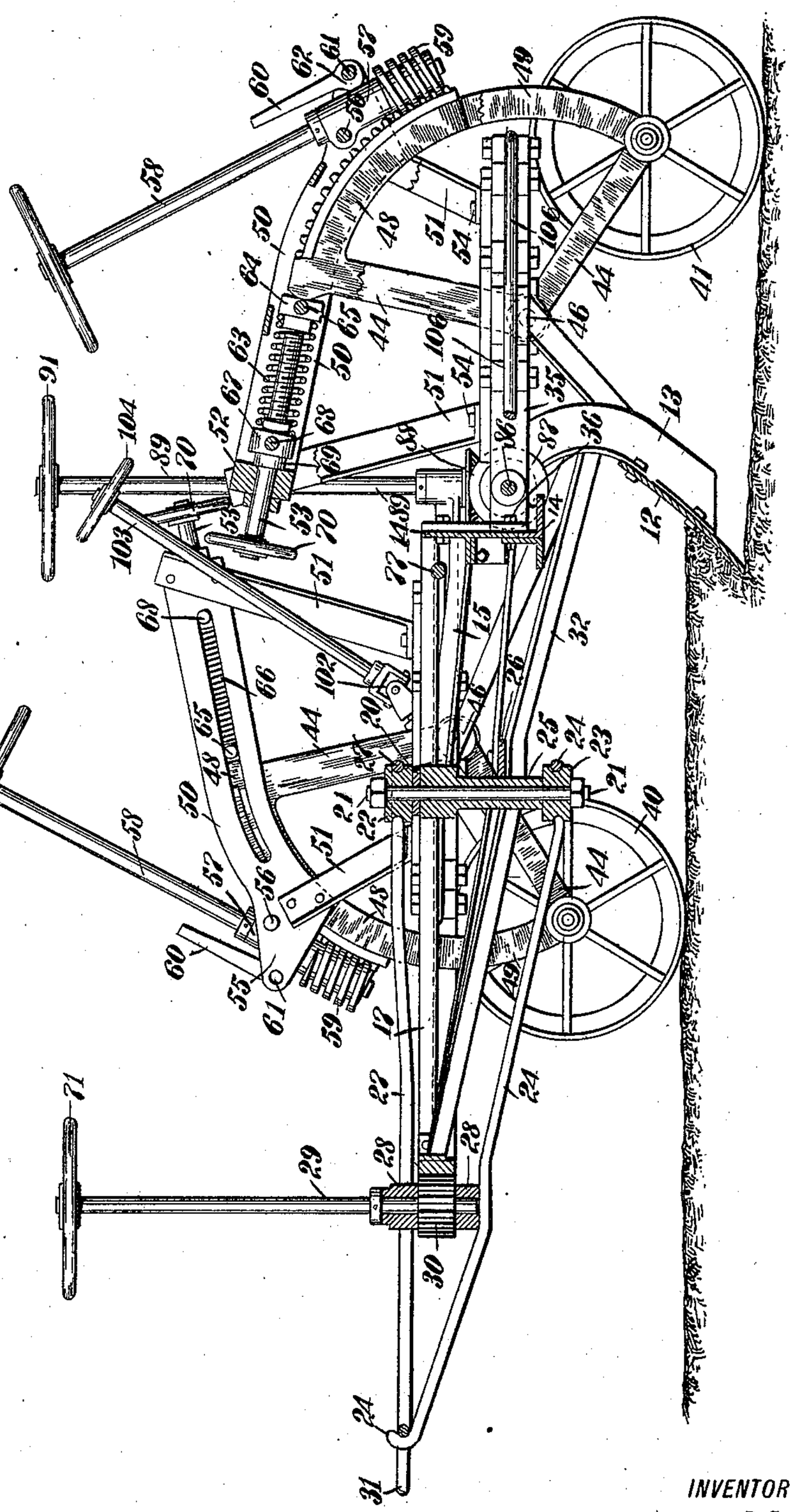

Fig. 3.

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Fig 4

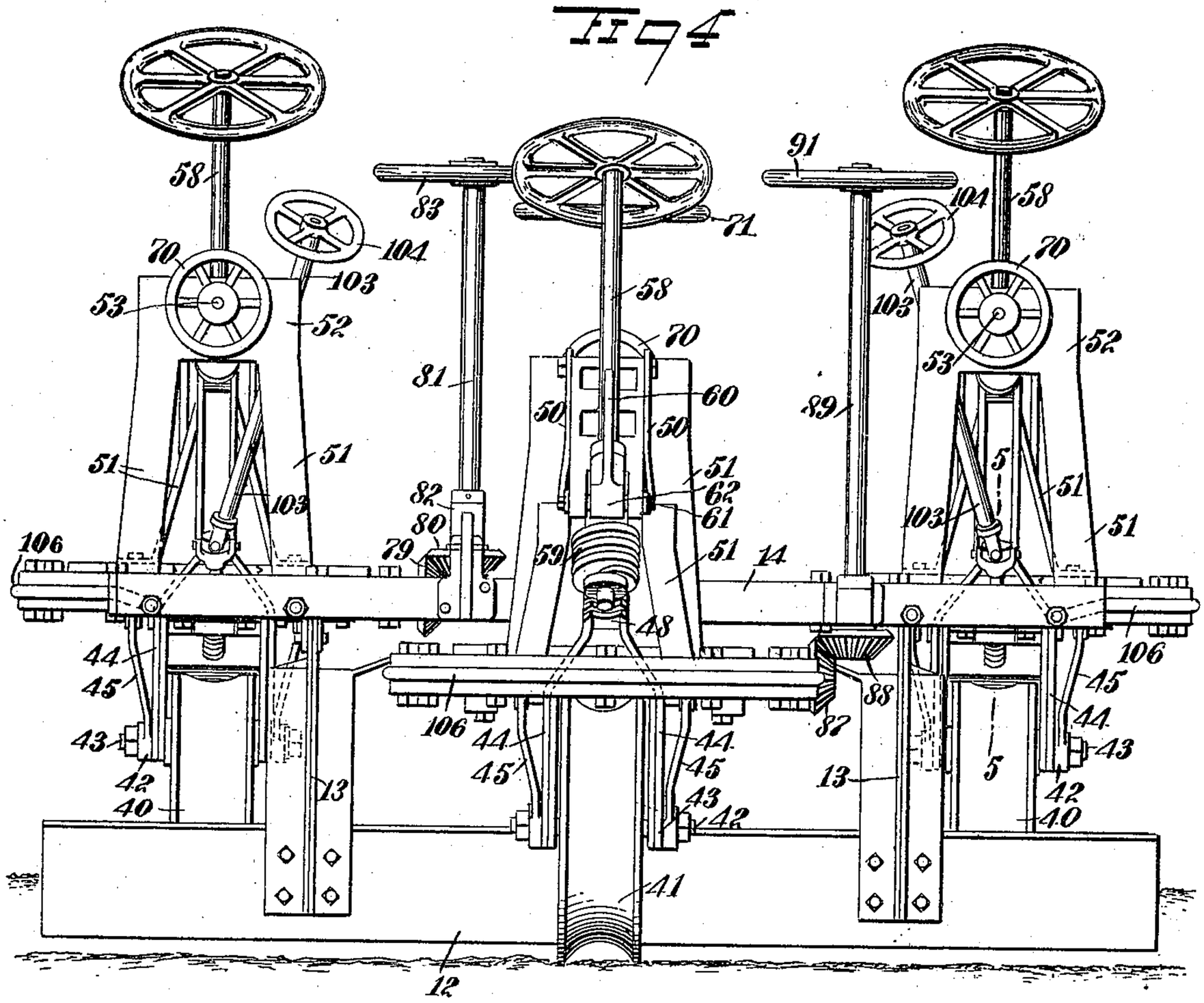


Fig. 5.

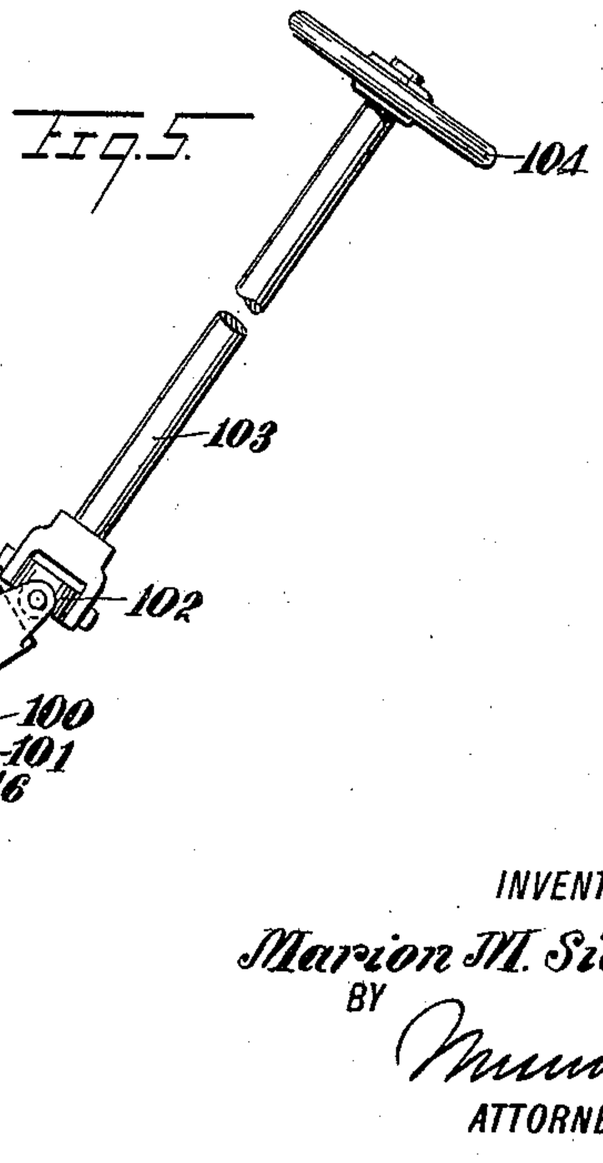
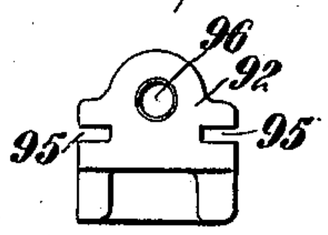


Fig. 6.



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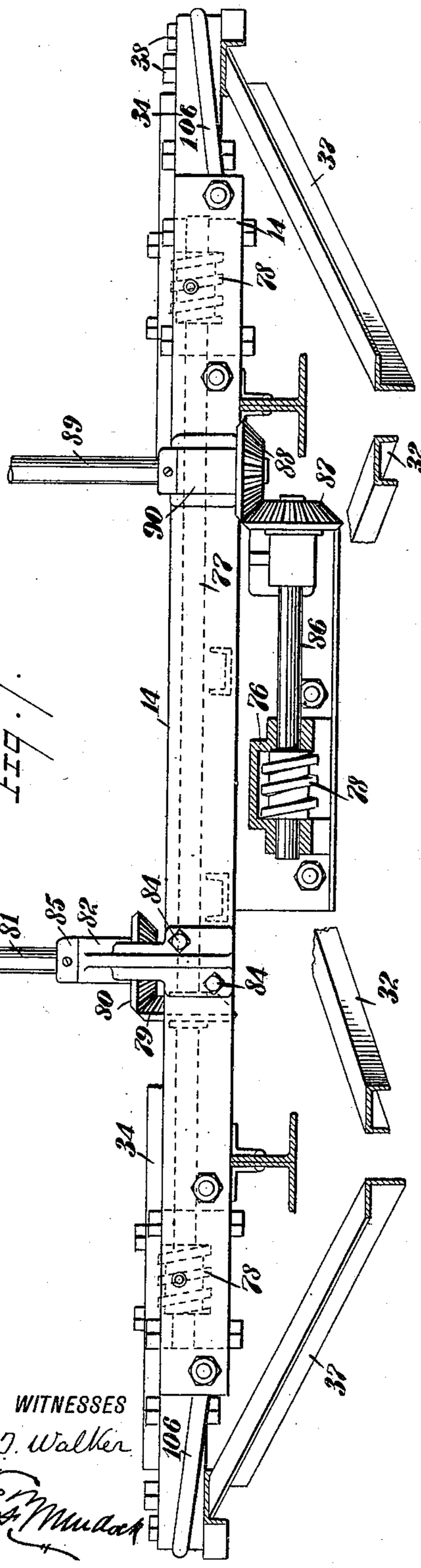
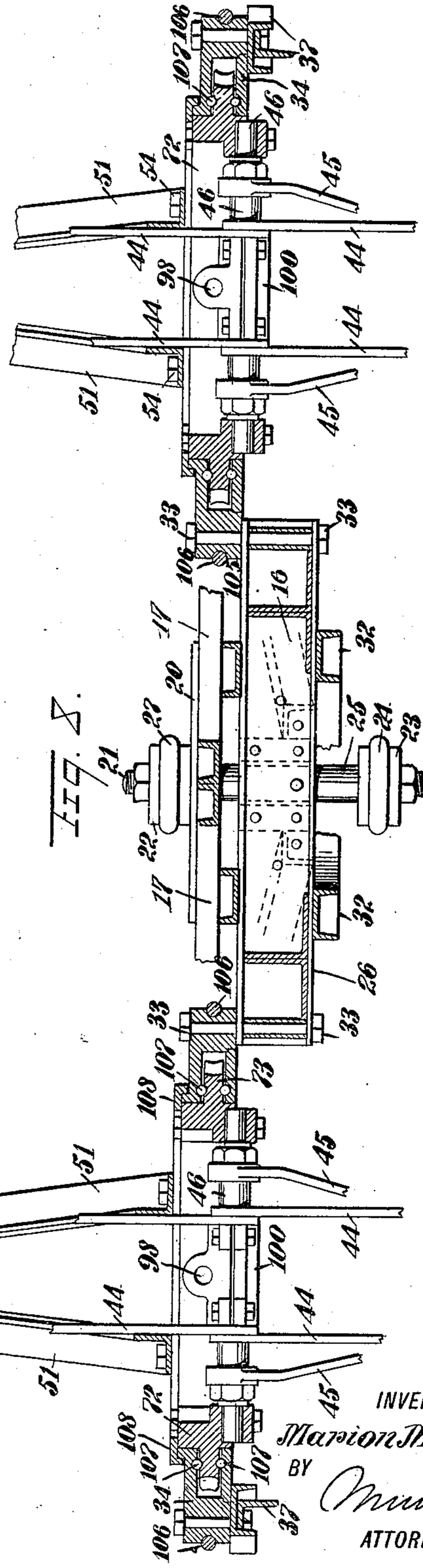
6 SHEETS—SHEET 5.





WITNESSES

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6 SHEETS—SHEET 6.

Fig. 9.

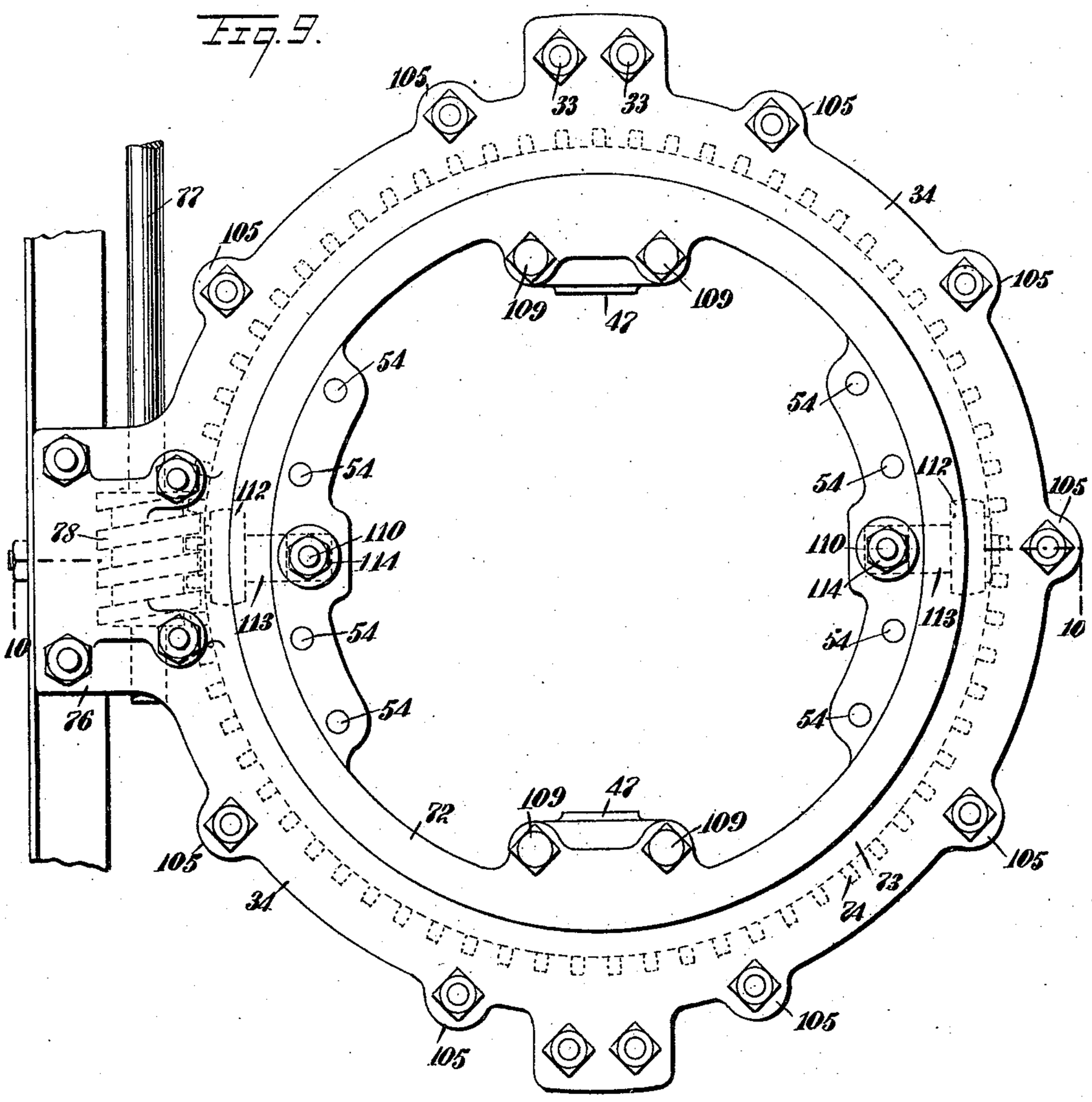
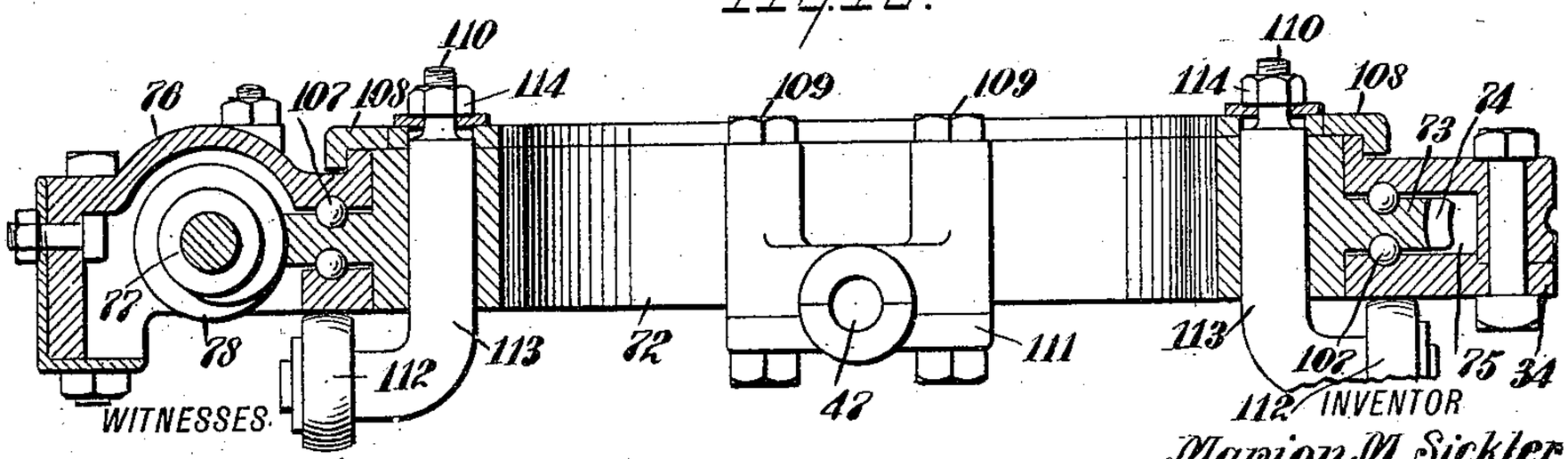


Fig. 10.



WITNESSES.

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UNITED STATES PATENT OFFICE.

MARION MARCELLUS SICKLER, OF LOS ANGELES, CALIFORNIA.

ROAD-MACHINE.

975,295. Specification of Letters Patent. Patented Nov. 8, 1910.

Application filed July 26, 1909. Serial No. 509,507.

To all whom it may concern:

Be it known that I, MARION M. SICKLER, a citizen of the United States, and a resident of Los Angeles, in the county of Los Angeles and State of California, have invented a new and Improved Road-Machine, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a machine of the character mentioned wherein the grading blade is mounted rigidly on the carrying frame; to provide carrying wheels for the said frame which are vertically adjustable to raise and lower the said frame, the adjustment being independent for each of the several carrying wheels; to provide resilient members for supporting the carrying wheels and for absorbing the traction shock; to provide means for laterally adjusting the line of draft; to provide means for altering the line of travel of the said wheels independently of the said carrying frame; and to provide a machine adapted to operate to transfer the dirt from the upper to the lower side of a steep incline while operating in a horizontal plane and without danger of overturning.

One embodiment of the present invention is disclosed in the structure illustrated in the accompanying drawings, in which like characters of reference denote corresponding parts in all the views, and in which—

Figure 1 is a side elevation of a machine constructed in conformity with the present invention. Fig. 2 is a plan view of the invention as shown in Fig. 1, the screw posts being shown in section, the section being taken on the line 2—2 in Fig. 1; Fig. 3 is a longitudinal section through the center of the machine, taken on the line 3—3 in Fig. 2; Fig. 4 is a rear elevation of the machine; Fig. 5 is a detail view in vertical section of the brake and mechanism for operating the machine, the section being taken on the line 5—5 in Fig. 4; Fig. 6 is a detail view in end elevation of the brake block; Fig. 7 is a cross section of the machine, taken on the line 7—7 in Fig. 2; Fig. 8 is a cross section of the machine, taken on the line 8—8 in Fig. 2; Fig. 9 is a detail view in plan of one of the turn-tables for the carrying wheels; and Fig. 10 is a cross section of the same, taken on the line 10—10 in Fig. 9.

The carrying frame upon which the grader blade 12 is rigidly supported by means of the curved bracket arm 13 consists primarily in a transverse beam 14. From this beam are extended the framing brace members 15, 15 to connect with a cross frame beam 16. The cross frame beam 16 is made of any suitable dimensions adapted to carry the weight of the frame and machine. To this beam 16 are secured radially disposed braces 17, 17, at the outer end whereof is fixedly mounted a segment 18, the teeth 19 whereof are vertically disposed. Mounted on the braces 17, 17 is a short plate 20 provided to receive and mount a king bolt 21. The king bolt 21 is extended through the said plate and through collars 22 and 23 and a pivot block 25, which is held in a vertical position by a plate 26 which is bolted to the beam 16 and is held by the bolts 33, 33. The collar 23 is connected to a draft rod 24. The collar 22 is connected to a draft rod 27. The draft rods 24 and 27 are arranged with parallel extensions upon which are mounted pivot blocks 28, 28 in which is provided a post 29 having fixedly mounted thereon a pinion 30. The pinion 30 is held in toothed engagement with the teeth 19 of the segment 18. In the forward end of the rod 27 is formed a draft clevis 31, preferably having a double annular extension, as shown particularly in Fig. 2 of the drawings.

Fixedly mounted upon the segment 18, and extended backward to be secured to the brackets 13 and in the lower section thereof to brace the same, are brace beams 32, 32. The brace beams 32, 32 are disposed triangularly on the frame to give the most effective bracing to the plate 12 in its lateral extension.

Securely bolted at each end of the cross frame beam 16 by bolts 33, 33 are heavy castings 34, 34, which constitute the stationary members of the turn tables for the laterally disposed carrying wheels. A similar casting 35 is bolted at 36 to the transverse beam 14, the casting 35 forming the stationary element in the turn table upon which the rear traction wheel is mounted. The relative positions of the three turn tables are maintained by braces 37, 37, which are suitably bolted at 38, 38 and 39, 39 to the rear turn table and the forward turn tables respectively.

By means of the construction thus far described we have a carrying frame having attached rigidly thereto a grading blade, and a draft bar held fixedly in position upon a gear toothed segment, and adapted to be moved about the arc of the said segment.

It is to support the carrying frame above described, and to adjust the grading blade thereon with reference to the depth of its operation, that I have provided carrying wheels 40, 40 and 41, the former being the wheels laterally disposed and the latter the wheel disposed in the rear of the frame. It is by means of the adjustable bearings of these wheels that I am enabled to extend the wheels downward from the frame, and in effect thus raise the frame from the surface of the ground. The wheels are primarily mounted in boxes 42, 42 which receive axles 43, 43 of the said wheels. These boxes 42 are carried by yoke arms 44, 44 and the braces 45, 45. The yoke arms 44, 44 are fixedly mounted to shafts 46, 46, which are mounted in bearings 47, 47 formed in the rotary member of the turn tables. The arms 44, 44 are converged above the shafts 46, 46 and united with gear toothed segments 48, 48 as more particularly shown at Fig. 3 of the drawings. The segments 48 are likewise connected to arms 49, 49, which also embrace the boxes 42, 42.

By throwing the arms 44, 44 about the shafts 46, 46 the wheels 40, 40 and 41 are raised and lowered with relation to the carrying frame. Within the design of the present machine it is necessary to change the traction angle of the said wheels, and it is for this purpose that the arms 49, 49 and the segment 48 are mounted within guides 50, 50, which are mounted at 54, 54 upon the movable element of the turn tables by supports 51, 51. The supports 51, 51 are four in number for each of the tables. The guides 50, 50 are provided with end plates 52, 52, through which are extended shafts 53, 53, which are extended through the said plates, as shown more particularly at Fig. 3 of the drawings. At the opposite ends of the guides there are provided wings 55, 55 in which are pivotally mounted at 56, 56 bearing boxes 57, 57. The bearing boxes 57 form a bearing for a post 58 at the end of which is fixedly mounted a worm 59 adapted to engage the teeth formed in the segment 48 when the worm is thrown into the operative position, such as shown at Fig. 3 of the drawings. The worm is thus thrown into position and therein held by a lever 60, which is pivoted at 61 in the wings 55, and is provided with an eccentric extension 62 adapted to impinge upon the bearing box 57 to throw the said worm into engagement with the said gear teeth. When the said lever 60 is raised to remove the said eccentric from the bearing box the post 58 may be thrown to one side to raise the worm out of engagement with the gear teeth of the same segments.

When the worm gears 59, 59 are raised out of engagement with the teeth of the segment 48 the weight of the machine is received through the upper end of the segment upon spiral expansion springs 63, 63. The said springs are provided with bearing blocks 64, 64, which have laterally extended pins 65, 65 adapted to be held in guided relation with slots 66, formed in the sides of the guides 50. At the opposite ends of the springs 63, 63 are provided bearing blocks, 67, 67, which also are provided with laterally extended pins 68, 68, being provided to extend within and be guided by the said slots 66. The shafts 53, 53 are screw threaded at their inner extensions to engage screw threaded perforations in the blocks 67, 67. The said shafts are provided with fixed collars 69, 69, which set the position of the said shafts within the guides 50, 50. By rotating the shafts 53, 53, for which hand wheels 70, 70 are provided, the blocks 67, 67 may be advanced to the end of the shafts 53, 53, gradually increasing the tension on the springs 63, or extending the blocks 64, 64 to a position to bear on and support the segments 48, 48 and thus accommodate the rise and fall of the wheels 40, 40 and 41 and the segments 48, 48 connected therewith, when the same are extended to lift the blade from the ground.

When the machine is being drawn over the road to and from the point of operation, and when the machine is working in risky ground having roots, boulders of rock and similar articles which might raise the machine or break some working part thereof the worm gears 59, 59 are drawn out of engagement with the segments 48, 48. The wheels 40, 40 and 41 then follow the ground and the springs absorb the shocks. In this position the weight of the machine is carried upon the springs 63, 63, and the racking or jarring due to the vibration of the machine passing over the road is thus avoided, as far as the elements of the machine are concerned, this vibration being cushioned by the said springs 63, 63.

With an implement constructed as thus far described we have the frame carrying the rigid plate to lightly but rigidly brace against all torsional strains. We also have a construction for the mounting of the carrying wheels whereby the frame may be raised and lowered from the ground, and whereby this raising may be independently operated upon each and every wheel. Thus, with an implement operating on the side of a hill, the transverse wheel 40 on the uphill side will be raised to permit the end of the

scraper to extend the desired depth into the ground, while at the same time, the wheel 40 on the opposite or downhill side could be extended to maintain the blade in a horizontal position, which might mean maintaining the blade on the downhill side of the machine out of engagement with the ground. This position of the carrying wheels would effect an insurance against the machine toppling over while operating under these conditions. These conditions are constantly arising where this machine is most adapted for use to operate in mountainous countries. Also, there is provided a machine wherein the line of draft or the location of a tug clevis may be shifted laterally to adjust the pulling strain of the team to the side to which the machine has a tendency to drift, if such be the case, thereby correcting any crab-life action on the part of the machine. This clevis may be shifted to meet any and all conditions of this character by turning the hand wheel 71 and by it the post 29 and pinion 30 which is in toothed engagement with the segment 18. While the movement of the draft rods 24 and 27 and clevis connected therewith is primarily for the purpose of correcting the drift, as stated, it also aids very materially in the turning of the machine, as will be hereinafter described.

The operation of the instrumentalities for adjusting the wheels 40, 40 and 41 vertically is limited to such action. It is, however, necessary that the wheels should be shifted as to their line of traction to aid in correcting the drift of the machine and also assist in turning the same. The guides 50, 50 are mounted as above stated upon the supports 51, 51 which are secured at 54, 54 to the movable elements of the turn tables. The movable elements 72 are rings having annular flanges 73, 73 whereon are formed the gear teeth 74, 74. These annular flanges 73, 73 are extended within an annular groove 75, 75 formed on the inner surface of the castings 34, 34. From one side of the castings 34 is provided an extension 76 wherein are formed bearings for a shaft 77 upon which is fixedly mounted a worm gear 78. The worm gear 78 is in toothed engagement with the rings 72. By reason of this engagement whenever the shaft 77 is rotated the rings 72 with the supports 51, 51 and the shafts 46, 46 are rotated about the center of the said rings 72.

The shaft 77 extends across the carrying frame and is mounted at the ends in the extensions 76, 76. Intermediate the ends the said shaft 77 is provided with a miter wheel 79 fixedly mounted thereon. The miter wheel 79 is in toothed engagement with a companion miter wheel 80, which is fixedly mounted upon a post 81 which is vertically mounted upon the frame by a bracketed bearing 82 and provided with a hand wheel 83. The bracketed bearing 82 is rigidly secured in position by bolts 84. A collar 85 fixedly mounted upon the post 81 maintains the same in its vertical position. When now the hand wheel 83 is turned, rotating the post 81 and the wheels 80 and 79 and the shaft 77, the worm gears 78, 78 are similarly rotated to revolve the movable elements 72 of the turn tables, and with the elements 72 the raising and lowering mechanism for adjusting the vertical operating positions of the wheels 40, 40, as well as the horizontal position thereof.

The wheel 41, and the elevating mechanism connected therewith, is operated from a shaft 86, which is mounted in bearings formed in the extensions 76 of the castings 34, wherein the movable elements 72 of the turn table upon which the rear wheel is mounted are contained. The shaft 86 is provided with a worm gear 78 in all respects similar to the worm gears mounted upon the shaft 77. The shaft 86 is rotated through the miter gear 87 which is fixedly mounted upon a post 89. The post 89 is mounted upon and has a bearing in a bracket 90, and is provided with a hand wheel 91. When now the post 89 and the miter wheels connected therewith is rotated by the operator through the hand wheel 91, the shaft 86 is rotated, causing the movable elements 72 by reason of the engagement with the worm gears 78, to revolve in the turn table carrying the rear wheel.

By the independent operating mechanisms for the wheels 40, 40 on the one hand, and the wheel 41 on the other, provision is made for shifting the wheel 41, as a caster, and thereby turning the machine upon either one or the other of the said wheels 40, 40. It will be seen that if the hand wheel 91 be operated to shift the turn table carrying the wheel 41 so that the said wheel is placed at a decided angle to the blade 12, and the hand wheel 71 be operated to throw the draft rods 24 and 27 to the proper side of the machine to coöperate with the wheel 41, the machine may be turned at a sharp angle, practically pivoting on one of the wheels 40, 40.

If the brake mechanism is operated to seat the brake block 92 on one of the wheels 40, 40 the pivoting action on that wheel may be insured. It is the purpose of the brakes to control the action of the machine, and incidentally to cause the operation above mentioned. The blocks 92, 92 are slidably mounted in the arms 44, 44, these having flanges 94, 94 to extend within grooves 95, 95 provided in the said blocks. The blocks are perforated and tapped as shown at 96, particularly in Fig. 6 of the drawings. In threaded engagement with

the perforation 96 is a square thread advancing screw 97. The screw 97 is provided with a cylindrical extension mounted within a box 98 and provided with collars 99, 99 fixedly secured on the said extension to either side of the said box. The box 98 is provided with a split bearing the cap 100 of which is bolted into position upon the shaft 46 by bolts 101, 101.

The cylindrical extension of the screw 97 is provided at the end with a stationary member of the universal joint 102. To the opposite fixed member of the said joint is fixedly attached a post 103 which is provided with a hand wheel 104 thereon. Any suitable means for supporting the post 103 may be provided.

The castings 34, 34 are provided with extensions 105, 105, which are grooved to receive tie rods 106, 106. These tie rods pass around the said castings and are suitably anchored on the frame of the machine. The rods 106 are intended as bracing rods.

The castings 34 are produced in two sections, the upper and lower sections. In each are provided grooves for the anti-friction balls 107, 107. Corresponding grooves are formed in the sides of the annular flanges 73. With these balls in place the operation of the rings 72, 72 is rendered exceedingly light and sensitive.

Extended over the joint between the rings 72 and the castings 34 are dust collars 108, 108. Incorporated with these collars are top plates provided to receive bolts 109, 109 and 110, 110. The bolts 109, 109 constitute the attaching means for holding the cups of the supply boxes 111, 111, which form the bearings for the shafts 46, 46.

It is to provide for taking up the wear on the balls 107, 107 that I have provided the rollers 112, 112. The rollers 112 are mounted on horizontal extensions or heavy bolts 113, 113, at the upper ends of which are formed the reduced sections constituting the bolts 110. On the bolts 110, 110 are secured the nuts 114, 114 whereby the bolts 113, 113 are raised to force the rollers 112, 112 against the lower portion of the casting 34. This raising of the lower portion of the casting draws the parts together to take up the wear in the anti-friction bearing. In some instances I may dispense with the lower ball bearing rollers 112, 112 performing the same function.

It will be observed that by manipulating the wheel 41 to assume various vertical positions the angle of operation of the blade 12 may be varied, as well as the depth of operation thereof be increased or decreased. Thus, raising the wheel 41 while lowering the wheels 40, 40, changes the angle of inclination of the blade 12 when striking the ground. Also, by reversing the operation of the two sets of wheels the angle of operation of the said blade is lessened or the blade is presented more bluntly to the dirt.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A road machine, comprising a carrying frame having fixedly mounted thereon a grading blade, carrying wheels disposed in triangular arrangement under said frame, three circular rotary members provided with gear teeth peripherally disposed and forming bearings for the wheel supports, anti-friction bearings for said circular members interposed between the same and said frame, rollers mounted on said circular bearings to carry same, said rollers being adjustable on said circular members, supporting frames for said wheels mounted on said circular members and extended above and below the same to form bearings for the said wheels at the lower end and attached to a gear operated shifting mechanism at the upper end, and a mechanism embodying worm gears mounted in a suitable frame upon said circular members to engage with the upper end of said supporting frames to reciprocate the same to raise and lower the wheel carrying ends of said frames.

2. A road machine, comprising a carrying frame having fixedly mounted thereon a grading blade, carrying wheels disposed in triangular arrangement under said frame, three circular rotary members provided with gear teeth peripherally disposed and forming bearings for the wheel supports, anti-friction bearings for said circular members embodying an upper and lower row of rotary members to bear on opposite sides of said circular member, and a plurality of rollers mounted on said circular members to bear under said carrying frame to support the same, said rollers being adjustable on said circular members.

3. A road machine, comprising a plurality of rotary platforms, carrying wheel supports embodying frames pivotally mounted on said platforms and having an upper extension provided with a gear toothed quadrant formed concentric with the bearings of said supporting frames, rotary shafts each having a worm gear in toothed engagement with said quadrants, said shafts mounted tangentially to said quadrants and pivoted to be rotated out of engagement therewith, a supporting frame for said shafts and said quadrants mounted on said platforms, a locking device adapted to hold the said shafts in toothed engagement with the said quadrants, said device being adapted to release the said shaft, a buffer spring located at the rear of each of said quadrants to receive the thrust of the wheel when the said shaft is released by said locking device, and

means for advancing and receding said springs to coincide with the adjustment of said quadrants.

4. A road machine, comprising a plurality of rotary platforms, carrying wheel supports embodying frames pivotally mounted on said platforms and having an upper extension provided with a gear toothed quadrant formed concentric with the bearings of said supporting frames, rotary shafts each having a worm gear in toothed engagement with said quadrants, said shafts mounted tangentially to said quadrants and pivoted to be rotated out of engagement therewith, a supporting frame for said shafts and said quadrants mounted on said platforms, a locking device adapted to hold the said shafts in toothed engagement with the said quadrants, said device being adapted to release the said shaft, a buffer spring located at the rear of each of said quadrants to receive the thrust of the wheel when the said shaft is released by the said locking device, and guide mountings for said spring guidedly mounted in the said frame and adjustable to move in unison with the said quadrants.

5. A road machine, comprising a plurality of rotary platforms, carrying wheel supports embodying frames pivotally mounted on said platforms and having an upper extension provided with a gear toothed quadrant formed concentric with the bearings of said supporting frames, rotary shafts each having a worm gear in toothed engagement with said quadrants, said shafts mounted tangentially to said quadrants and pivoted to be rotated out of engagement therewith, a supporting frame for said shafts and said quadrants mounted on said platforms, a locking device adapted to hold the said shafts in toothed engagement with the said quadrants, said device being adapted to release the said shaft, a buffer spring located at the rear of each of said quadrants to receive the thrust of the wheel when the said shaft is released by said locking device, mountings for said spring comprising an adjustable head adapted to bear against the said quadrant and held in guided relation with said frame, an elongated screw extended within said spring and rotatably mounted in said frame, a head threaded upon said screw and held in guided relation with said frame adapted to be moved by said screw to approach and recede from the first named head, and means for rotating the said screw.

6. In a road machine a mounting for the carrying wheels thereof comprising a pivot frame horizontally disposed in the carrying frame of said machine and adapted to be rotated about a vertical axis; a bifurcated quadrant pivotally connected to said frames; a pivot shaft for said quadrant extended across said frames and mounted in bearings thereon; a supporting frame raised above said pivot frame and fixedly connected thereto; a channeled guide member fixedly mounted on said supporting frame; a rack fixedly mounted on said quadrant; a screw pivotally mounted in said supporting frame and held in threaded engagement with said rack; means for releasing said screw from said rack; a buffer head slidably mounted in said channeled member to bear against the said quadrant; and a spiral buffer spring mounted in said channeled member.

7. In a road machine a mounting for the carrying wheels thereof comprising a pivot frame horizontally disposed in the carrying frame of said machine and adapted to be rotated about a vertical axis; a bifurcated quadrant pivotally connected to said frames; a pivot shaft for said quadrant extended across said frames and mounted in bearings thereon; a supporting frame raised above said pivot frame and fixedly connected thereto; a channeled guide member fixedly mounted on said supporting frame; a rack fixedly mounted on said quadrant; a screw pivotally mounted in said supporting frame and held in threaded engagement with said rack; means for releasing said screw from said rack; a buffer head slidably mounted in said channeled member to bear against the said quadrant; a spiral buffer spring mounted in said channeled member; and an advancing screw threaded in a perforation in the end of said channeled member for advancing the said buffer spring to increase the tension and extend the operative position of the said spring.

8. In a road machine a mounting for the carrying wheels thereof comprising a pivot frame horizontally disposed in the carrying frame of said machine and adapted to be rotated about a vertical axis; a bifurcated quadrant pivotally connected to said frames; a pivot shaft for said quadrant extended across said frames and mounted in bearings thereon; a supporting frame raised above said pivot frame and fixedly connected thereto; a channeled guide member fixedly mounted on said supporting frame; a rack fixedly mounted on said quadrant; a screw pivotally mounted in said supporting frame and held in threaded engagement with said rack; a cam lever pivotally mounted in said supporting frame and adapted to bear on the mounting for said screw to hold the same in toothed engagement with the said rack; a buffer head slidably mounted in said channeled member to bear against the said quadrant; and a spiral buffer spring mounted in said channeled member.

9. In a road machine a mounting for the carrying wheels thereof comprising a pivot frame horizontally disposed in the carrying

frame of said machine and adapted to be rotated about a vertical axis; a bifurcated quadrant pivotally connected to said frames; a pivot shaft for said quadrant extended across said frames and mounted in bearings thereon; a supporting frame raised above said pivot frame and fixedly connected thereto; a channeled guide member fixedly mounted on said supporting frame; a rack fixedly mounted on said quadrant; a screw pivotally mounted in said supporting frame and held in threaded engagement with said rack; a cam lever pivotally mounted in said supporting frame and adapted to bear on the mounting for said screw to hold the same in toothed engagement with the said rack; a buffer head slidably mounted in said channeled member to bear against the said quadrant; a spiral buffer spring mounted in said channeled member; and an advancing screw threaded in a perforation in the end of said channeled member for advancing the said buffer spring to increase the tension and extend the operative position of the said spring.

10. In a road machine a mounting for the carrying wheels thereof comprising a pivot frame; rotary bearings for said frame; a pivot shaft for the carrying wheels; and underhung bearing wheels suspended from said frame to support the body of said machine.

11. In a road machine a mounting for the carrying wheels thereof comprising a carrying frame; a plurality of horizontally arranged circular channeled members; rotary pivot frames disposed in said channeled members said frames forming pivotal bearings for the carrying wheels; rotary bearing members superimposed on said pivot frames; a cover plate for said channeled members; a depended hook secured to said cover plate and extended under the said channeled members; and rotary bearing devices mounted on said hook and adapted to bear against the stationary structure of said channeled members to support the frame of the machine.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MARION MARCELLUS SICKLER.

Witnesses:

ANNA E. NEUHART,

JUSTINE NEUHART.