No. 685,384. **Patented Oct. 29, 1901.**

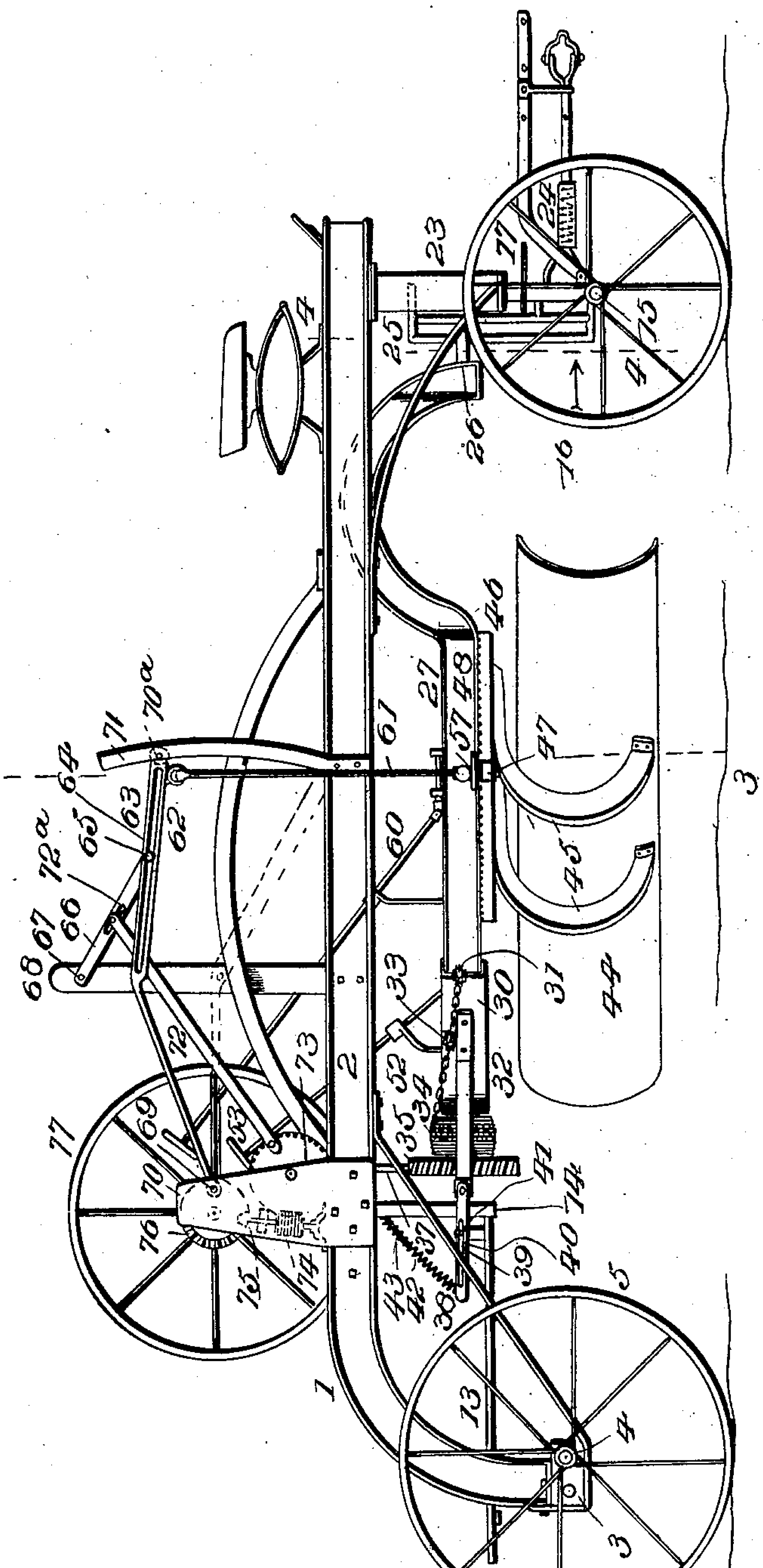
T. McDONALD.

ROAD GRADING MACHINE.

(Application filed Jan. 9, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1



Witnesses

Inventor

By

Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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4 Sheets—Sheet 2.

Fig. 2.

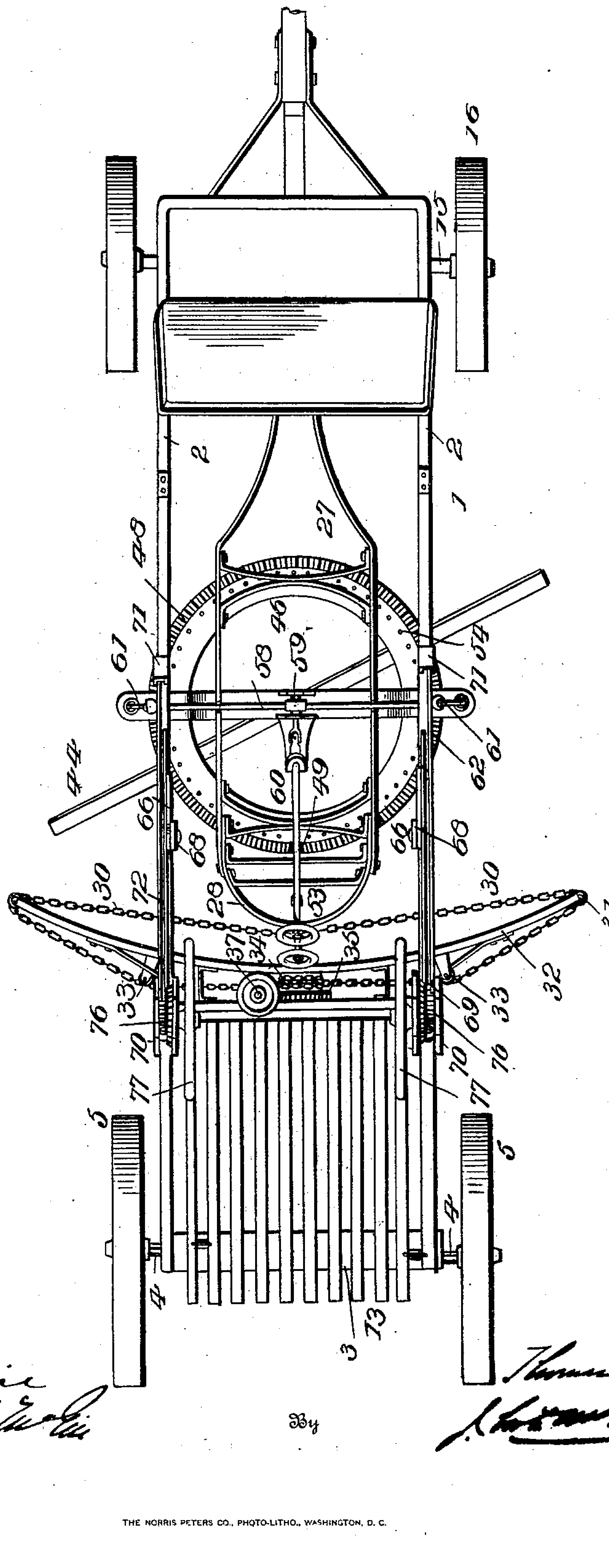

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Fig. 4.

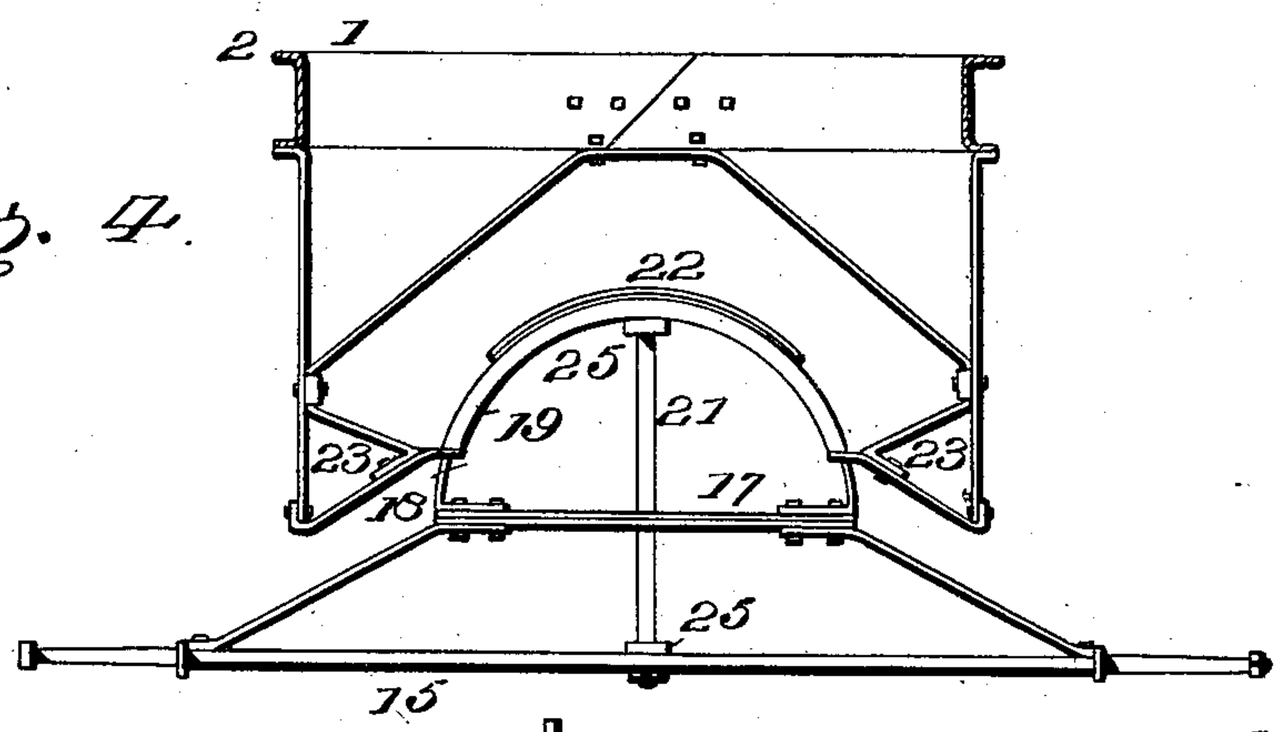


Fig. 5.

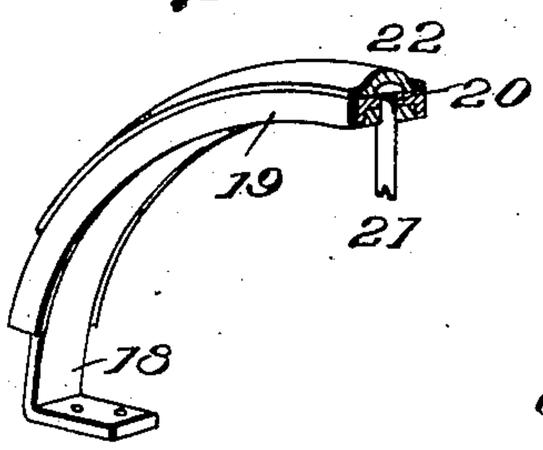


Fig. 3

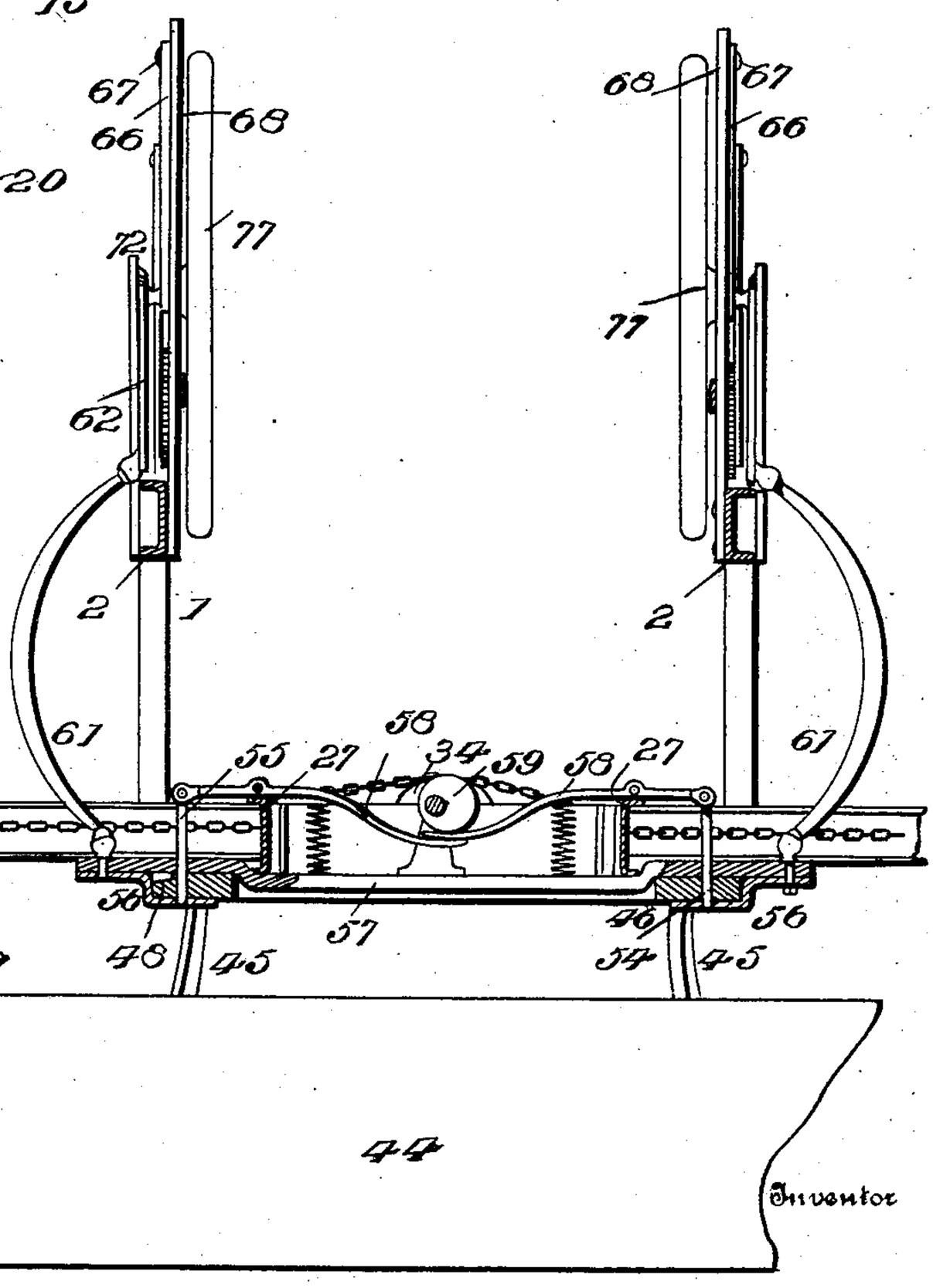
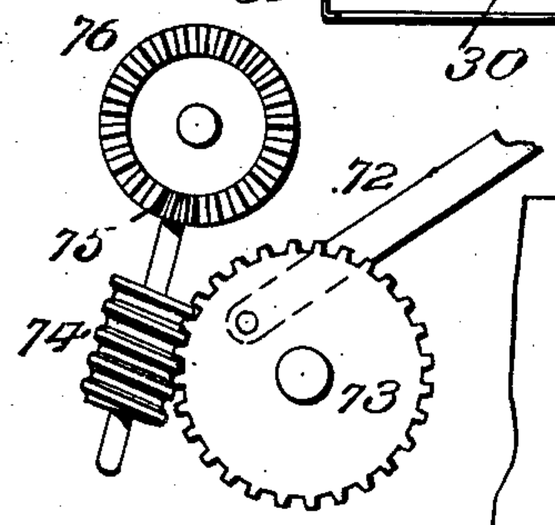


Fig. 8



Witnesses

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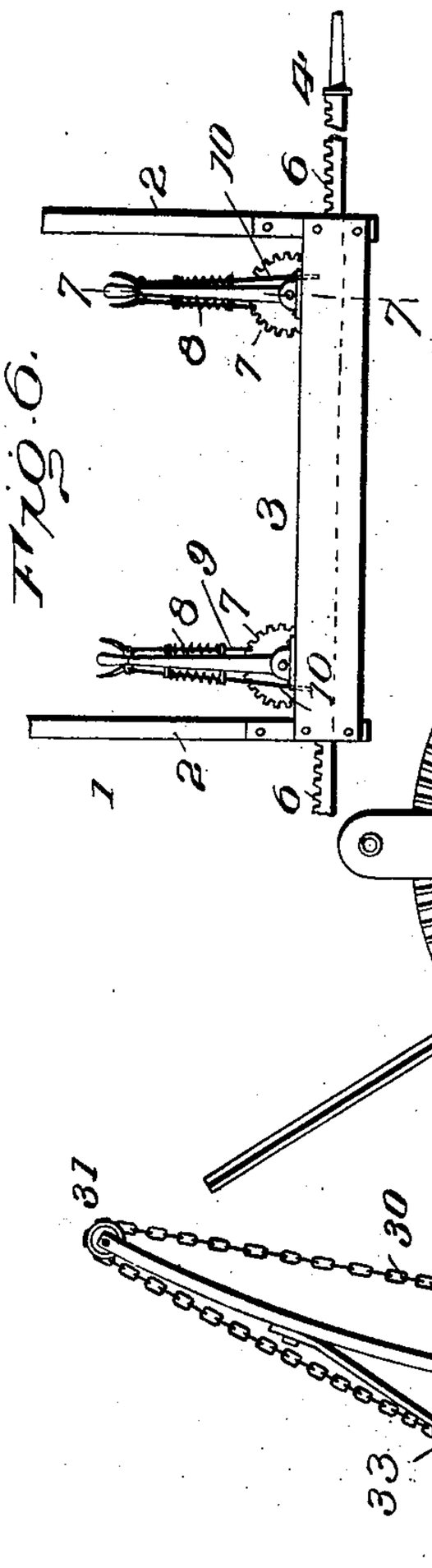

Fig. 6.

Fig. 9.

Fig. 7.

Witnesses:

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UNITED STATES PATENT OFFICE.

THOMAS McDONALD, OF LANCASTER, WISCONSIN.

ROAD-GRADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,384, dated October 29, 1901.

Application filed January 9, 1901. Serial No. 42,679. (No model.)

To all whom it may concern:

Be it known that I, THOMAS McDONALD, of Lancaster, in the county of Grant and State of Wisconsin, have invented certain new and useful Improvements in Road-Grading 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.

This invention contemplates certain new and useful improvements in road-grading machines.

The primary object is to provide a machine of this character especially constructed for grading along hillsides, the scraper having a maximum range of lateral adjustment, so that it may be held far out beyond the carrying-wheels.

A further object is to provide improved means for effecting the lateral adjustment in such manner that friction upon the parts will be reduced to a minimum and also to allow the support for such adjusting means to accommodate itself to the vertical adjustments of the scraper.

A further object is to provide improved mechanism for effecting the vertical adjustment of the scraper, which mechanism, aside from being simple in construction and composed of but few parts, will possess great leverage and be capable of being easily operated.

A further object is to provide improved means for adjusting the axle of the rear carrying-wheels.

The invention will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation. Fig. 2 is a plan view. Fig. 3 is an enlarged cross-sectional view on line 3 3, Fig. 1. Fig. 4 is a cross-sectional view on the line 4 4, Fig. 1, looking in the direction of the arrow, parts being omitted. Fig. 5 is an enlarged detail view of a portion of the parts of Fig. 4. Fig. 6 shows part of the axle of the rear wheels. Fig. 7 is a cross-sectional view on line 7 7, Fig. 6. Fig. 8 is an enlarged detail. Fig. 9 is an enlarged plan view with main frame and other parts removed.

Referring to the drawings, 1 designates the main frame, composed of two side bars 2, connected at their forward ends and downwardly curved at their rear ends, and to these latter ends is secured the housing 3 of the axle 4 of the rear carrying-wheels 5. This axle is composed of two overlapping sections equipped with rack-bars 6, with which engage toothed wheels 7, operated by levers 8, each lever carrying a catch 9 for engaging the wheel, and a bolt 10, by which it may be locked to the housing. By this means the rear wheels may be adjusted to permit the machine to work close up against a cut or hillside. Each axle-section at a point immediately below the adjusting mechanism bears upon a transversely-disposed roll 12, which serves to avoid friction in the adjustment of the sections. The operator's platform 13 is located between the rear carrying-wheels and is supported at its forward end by hangers 14.

The axle 15 of the front carrying-wheels 16 is provided with the ordinary fifth-wheel plates 17, to the upper one of which are secured the ends of a flat arched bar 18, which fits in a channel-bar 19, correspondingly arched and formed with a longitudinal slot 20, through which projects the king-bolt 21, the head of said bolt being inclosed by a removable plate 22. The channel-bar 19 is connected by the bars 23 to frame 1. This construction permits the front wheels to ride over obstructions and to accommodate themselves to any unevenness in the ground, the adjustment being transverse to the frame as well as laterally. The draft-bolt 24 is yieldingly connected to the king-pin, and to the latter is also connected a clevis 25, with which the eye 26 of the draw-bars 27 engages. These draw-bars are curved upwardly and inwardly and carried rearwardly on parallel lines, being braced by suitable cross-pieces and additionally connected at the rear by a bowed bar 28. To an eye 29 at the center of this bowed bar are connected chains 30, which are extended outwardly in opposite directions, and after being placed in engagement with rollers 31 in the ends of a longitudinally-curved bar 32 and then in engagement with idler-rolls 33 are wound upon a drum 34, with the gear-wheel 35 of which engages a worm 36 of a crank-shaft 37. The bar 32 has a greater radius than that of the bowed bar 28 and is extended outwardly beyond the latter. The

drum 34, which is in line with the longitudinal center of the machine, is divided into two sections oppositely tapered, one chain being secured to each section, so that as the chain is being fed out from one section it will be wound on the other. The bar 32 and drum 34 are mounted on a frame 38, which is pivotally or movably mounted, so as to move in unison with the draw-bars and scraper in the vertical adjustment thereof. For this purpose the frame 38 may be equipped with arms 39, formed with slots 40, through which project short stubs of posts 41, secured to the platform. The extended ends of these arms are constantly under the tension of springs 42, encircling curved rods 43, secured at one end to the hangers 14, so that the normal longitudinal position of the frame 38 will be maintained.

44 designates the scraper, secured by arms 45 to the under side of a turn-table 46, which latter is held to the draw-bars by depending flanged plates 47. This circular turn-table is provided with teeth 48 on its upper surface adjacent to its periphery, and with it engages a pinion 49 on a shaft 50, mounted in bearings 51 and having a universal-joint connection to a rod 52, equipped with a hand-wheel 53 in convenient relation to the operator on the platform, said rod being free to move longitudinally in its bearings. The turn-table is provided with circularly-arranged holes 54, designed to receive locking-pins 55, which project also through openings in the lower flanged portions of plates 56, secured to a cross-bar 57, the ends of which latter project beyond the periphery of the turn-table. Said bar is downwardly curved to pass beneath the draw-bars, and upon the latter are fulcrumed levers 58, to the outer ends of which the pins 55 are pivoted. The inner adjacent ends of these levers are engaged by a cam 59, the bearings for the shaft of which are mounted on the cross-bar 57, and said shaft has a flexible connection with a hand-wheel shaft 60. The operation of the cam will depress the inner ends of the levers and raise the locking-pins out of engagement with the turn-table.

61 61 designate two arms having at their lower ends a ball-and-socket connection with the cross-bar 57 and at their upper ends similar connections to two angular levers 62 of a compound-lever mechanism. The arm 63 of each lever is formed with a longitudinal slot 64, through which projects a stud 65 on the lower end of a swinging lever 66, pivotally hung at 67 to a post 68, secured to frame 1. Levers 62 at their rear ends are fulcrumed at 69 to bearing-plates 70 and at their forward ends are equipped with rolls 70^a, which engage curved bars 71, the curvature of which corresponds to the radius of movement of such end of the lever. To each of the levers 66 at a point about midway its length is pivotally connected one end of a pitman 72, said levers having slots 72^a for the pivot-pins of the pitmen to avoid dead-centers at any stage of movement of the adjusting mechanism. The other end of each pitman has a crank connection to a gear-wheel 73, with which engages a worm 74, on the shaft of which is a beveled pinion 75, engaged by a bevel gear-wheel 76, fast to an operating-wheel 77. By turning these wheels the swinging levers 66 may be moved the desired extent, and through the connection between levers 62 and the turn-table the latter may be adjusted vertically at each side of the machine. The arms 61 are outwardly bowed or curved, so as to clear the frame-bars and permit of the widest possible range of lateral adjustment effected through the winding and unwinding of the shifting chains. It will be noted that as the turn-table is raised or lowered through the adjustment of the controlling-levers 62 the chain-drum-carrying frame is free to have a corresponding movement, so as to avoid any undue strain or weight upon the side adjusting-chains.

The advantages of my invention are apparent to those skilled in the art. It will be especially noted that I have provided extremely simple, inexpensive, and highly efficient means for effecting the vertical adjustment of the scraper, that by reason of the curvature of the connecting-arms 61 and the means employed for shifting the draw-bars the widest possible range of lateral adjustment is obtainable, that the scraper can be thrown outwardly far beyond the hubs of the carrying-wheels, and that there is no undue strain upon the adjusting-chains. It will also be noted that the adjustment of the rear wheels is easily secured.

I claim as my invention—

1. In a road-grading machine the combination with the main frame, the draw-bars, and the scraper carried by the latter, of the adjusting-levers, connections between said levers and the scraper, bearings for said levers capable of being moved longitudinally thereof, and means for actuating said bearings, as set forth.

2. In a road-grading machine, the combination with the main frame, the draw-bars, and the scraper carried by the latter, of the adjusting-levers, connections between the same and the scraper, said levers being formed with slots, swinging levers having pins extended through such slots, and means for moving said swinging levers, as set forth.

3. In a road-grading machine, the combination with the main frame, the draw-bars, and the scraper, of the adjusting-levers, connections between said levers and the scraper, said levers having angular portions formed with slots, swinging levers having pins extended through said slots, pitmen connected to said swinging levers, and means for actuating said pitmen, as set forth.

4. The combination with the main frame having upright posts, the draw-bars, and the scraper carried by the latter, of the adjusting-levers, pivoted at one end and connected at

their other ends to the scraper, said levers having angular portions formed with slots, levers pivotally hung on said posts, pitmen connected to said latter levers intermediate the ends thereof, and mechanism for actuating said pitmen, substantially as set forth.

5. The combination with the main frame, the draw-bars and the scraper, of means for effecting the vertical adjustment of the scraper, and arms connecting said means to said scraper, said arms being arranged at each side of the main frame and bowed or curved outwardly therefrom, as and for the purpose set forth.

6. The combination with the main frame, the draw-bars and the scraper, of the adjusting-levers, means for operating the same, and the arms connecting said levers to the scraper, said arms being arranged at each side of the frame and bowed or curved outwardly therefrom, as and for the purpose set forth.

7. In a road-grading machine the combination with the main frame, the draw-bars, and the scraper carried by the latter, of a drum arranged in line with the longitudinal center of the machine near the rear thereof, chains connected to the draw-bars in line with the longitudinal center thereof and to said drum, outwardly-arranged rolls around which said chains are passed and a movable support for said drum, as set forth.

8. In a road-grading machine, the combination with the main frame, the draw-bars, and the scraper carried by the latter, of a drum arranged in line with the longitudinal center of the machine, a curved bar intermediate said drum and the draw-bars having its ends outwardly extended, chains connected to said draw-bars and carried around over the ends of said curved bar and connected to said drum, and means for operating the latter, substantially as set forth.

9. The combination with the main frame, the draw-bars and the scraper carried thereby, of means for vertically adjusting said scraper, means for effecting the lateral adjustment of the draw-bars and scraper comprising oppositely-extended chains, a drum therefor, and means for permitting the last-mentioned means to move in unison with the said vertical adjustment, as set forth.

10. The combination with the main frame, the draw-bars and the scraper carried thereby, of the frame having a pivotal support, springs acting on said frame for holding it in its normal position, a curved bar carried by said frame having its ends extended outwardly, rollers mounted on the said ends, a drum arranged centrally of said curved bar, and chains connected to said draw-bars and extended outwardly in opposite directions against said rollers and secured to said drum, and means for operating the latter, as set forth.

11. The combination with the draw-bars, and the outwardly-extended curved bar in rear of said draw-bars, of the chains connected to the center of the rear of said draw-bars and extended in opposite directions and carried around the ends of said curved bar, the drum formed with oppositely-tapered sections, to each of which sections one of the chains is connected, and means for operating said drum, substantially as set forth.

12. The combination with the main frame having a housing for the axle of the rear carrying-wheels, of said wheels, the axle-sections therefor having rack-bars located in said housing, rollers within the housing supporting said rack-bars, toothed wheels mounted on said housing engaging said rack-bars, and levers also mounted on said housing for operating said toothed wheels, substantially as set forth.

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

THOMAS McDONALD.

Witnesses:
GRAFTON L. McGILL,
FRANK S. MAGUIRE.