

No. 618,929.

Patented Feb. 7, 1899.

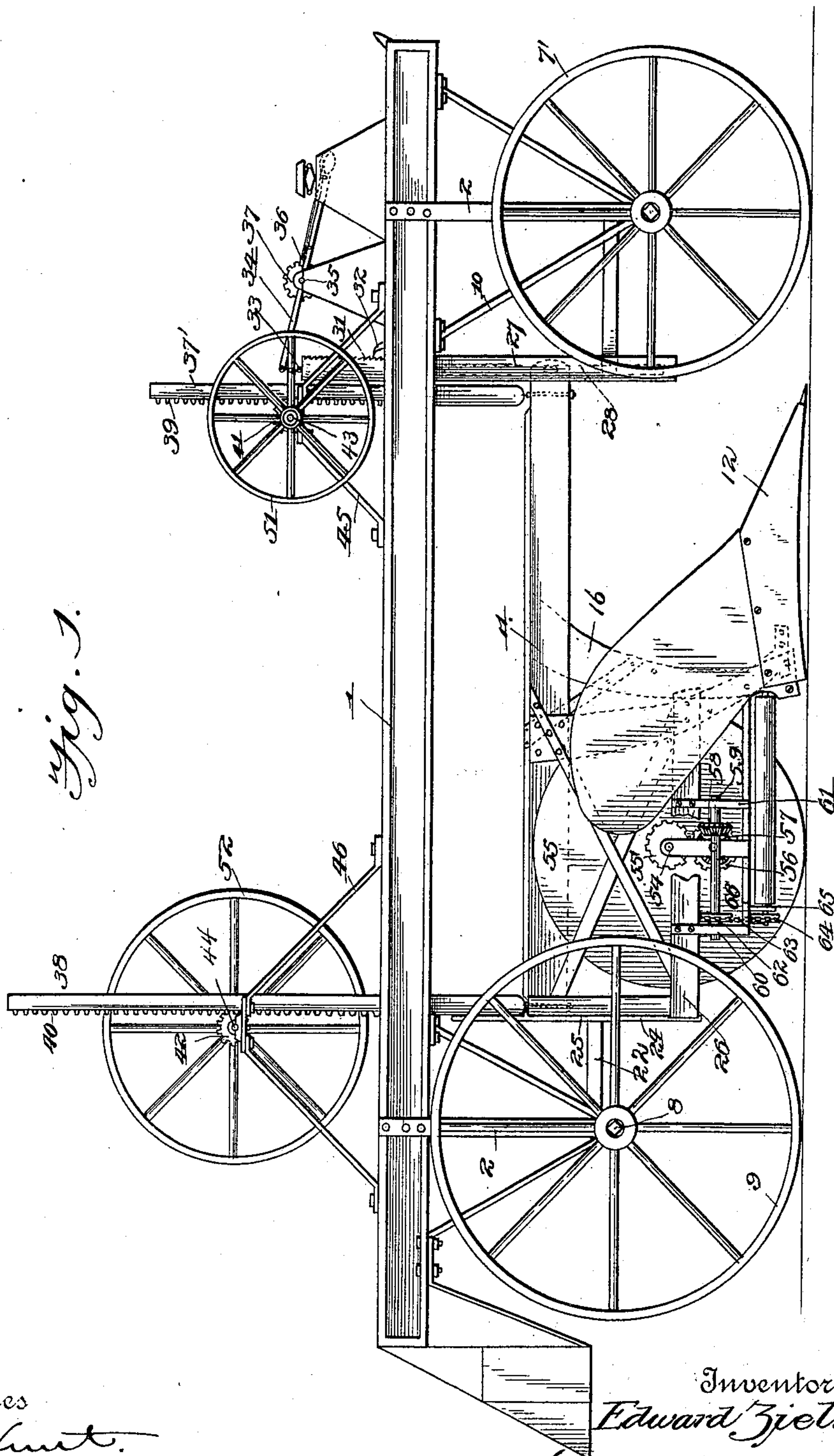
E. ZIELKE.

DITCHING AND GRADING MACHINE.

(Application filed Jan. 25, 1898.)

(No Model.)

4 Sheets—Sheet 1.



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Fig. 5.

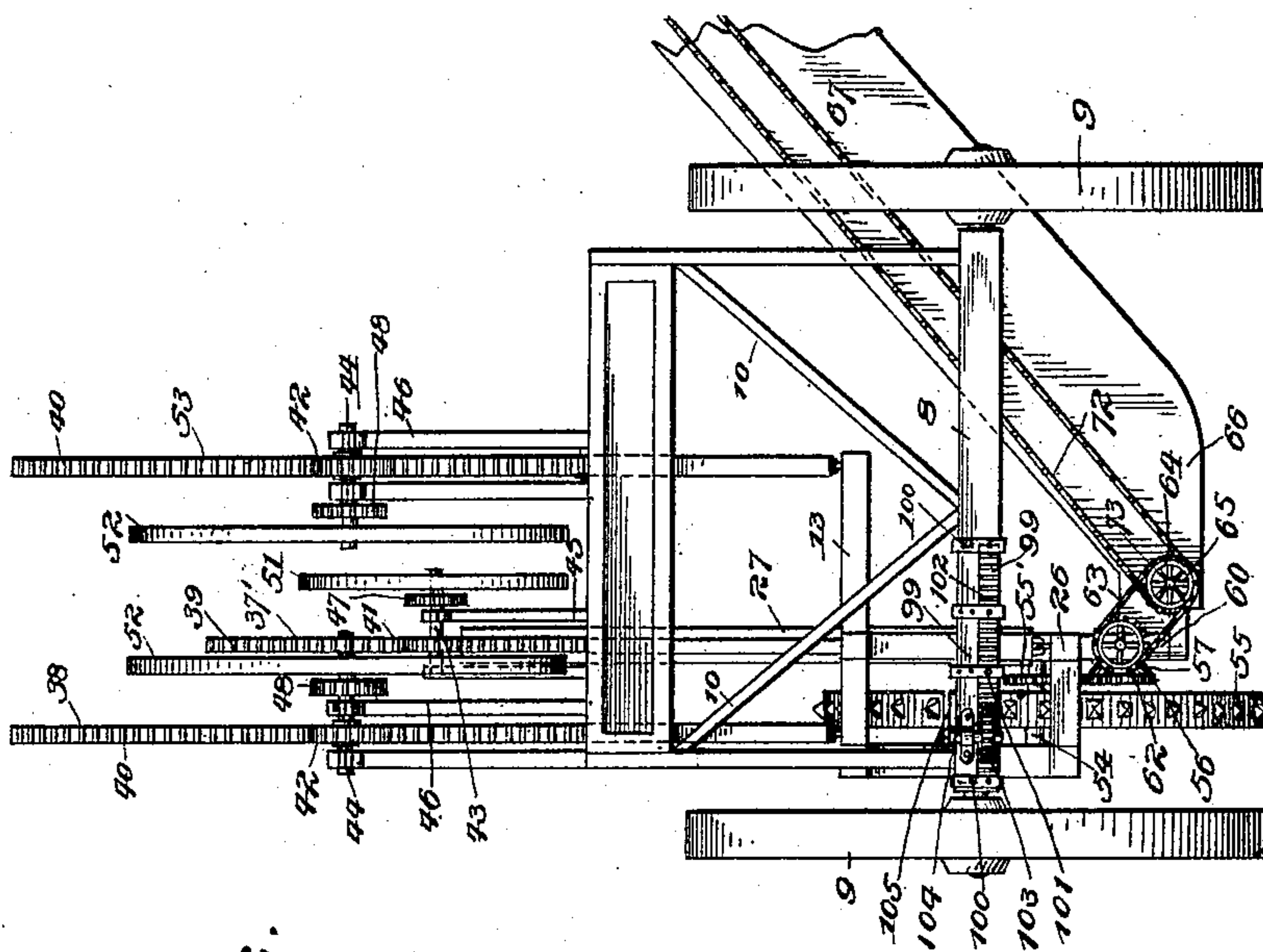
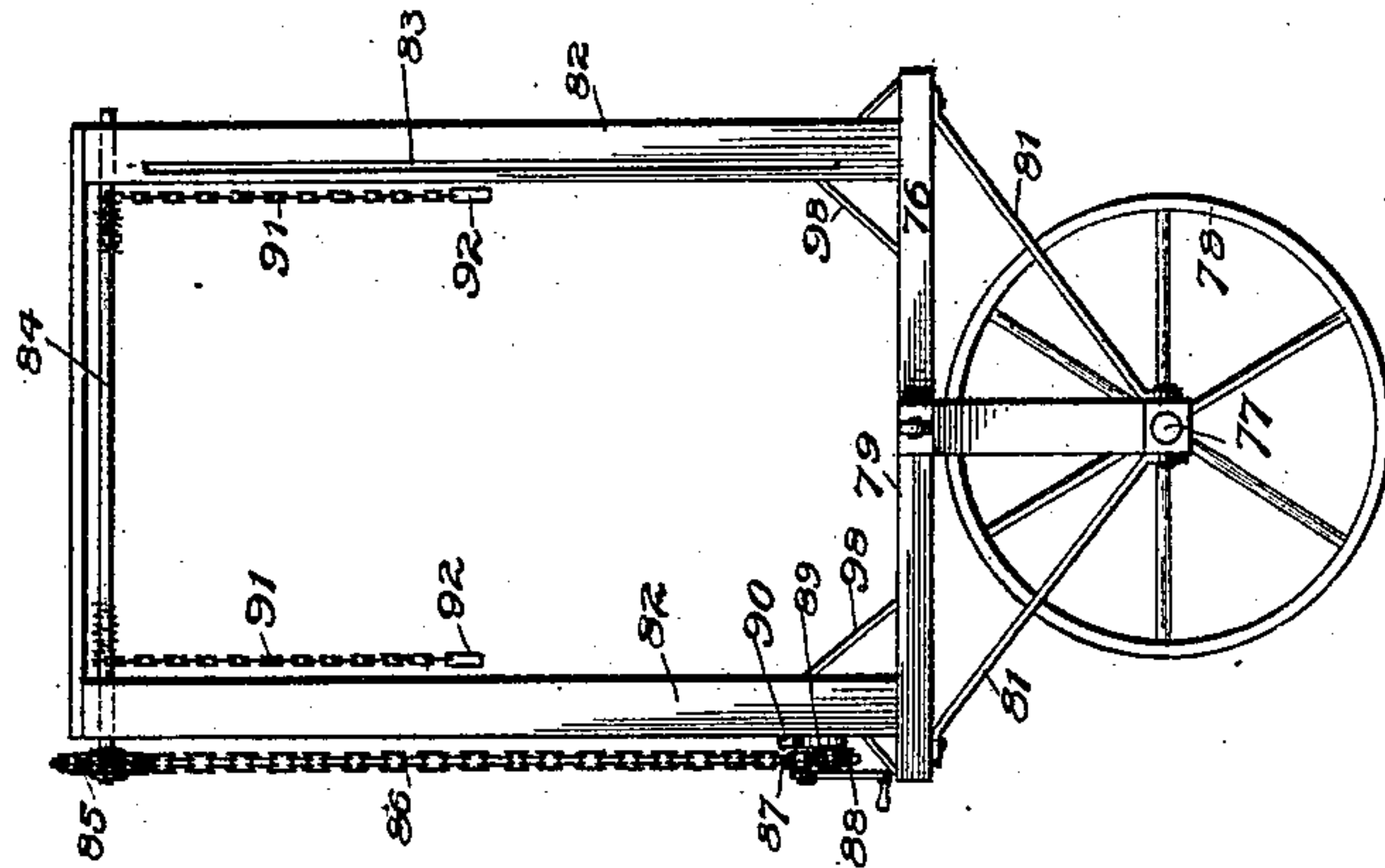


Fig. 6.

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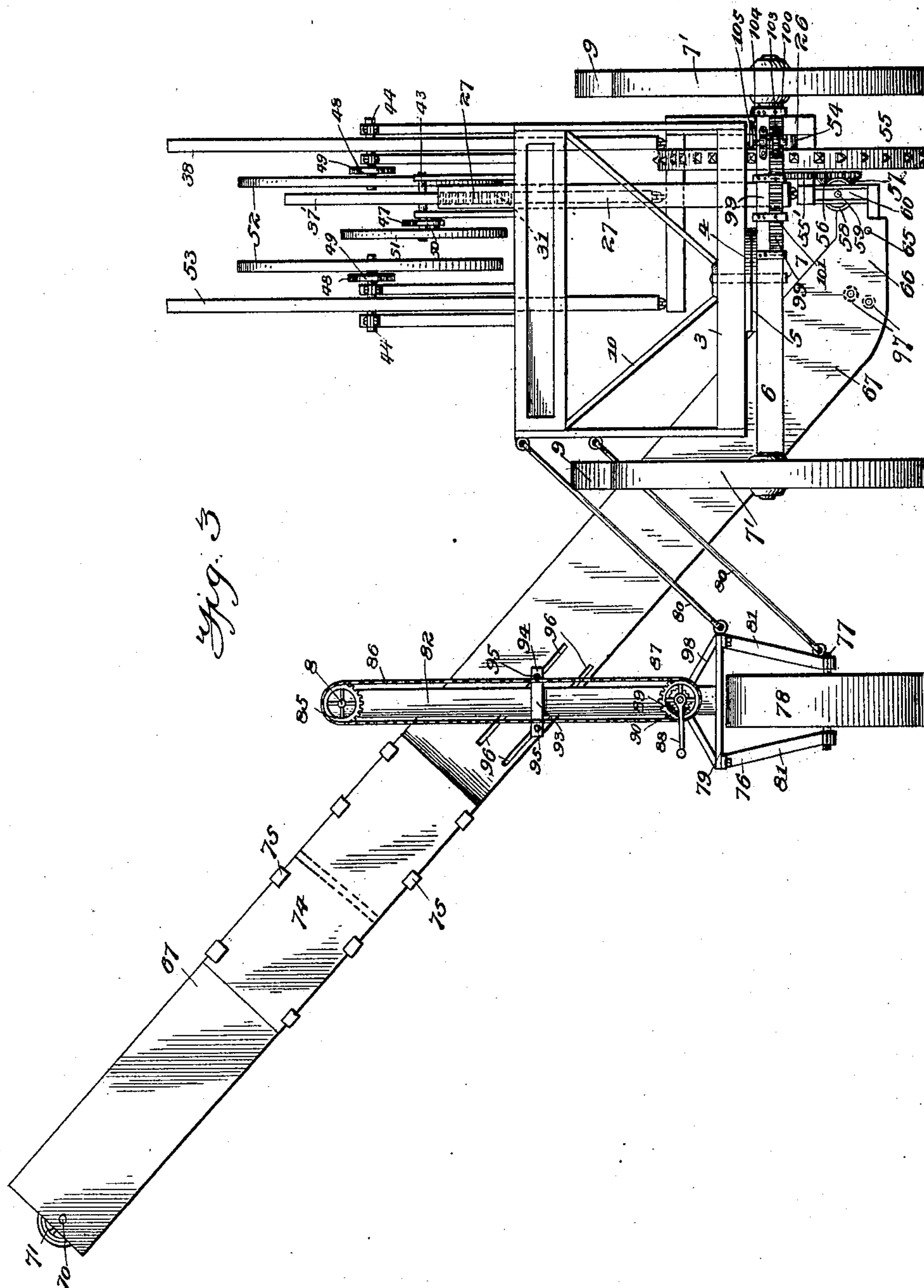
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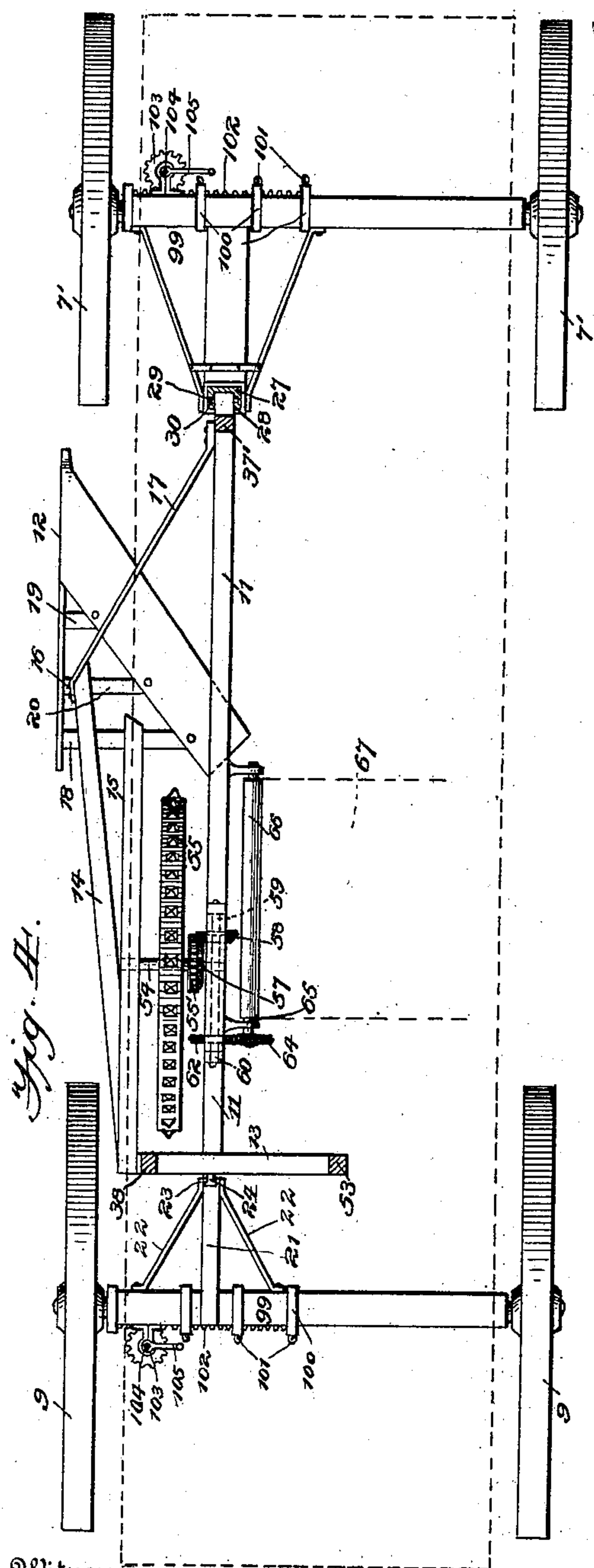
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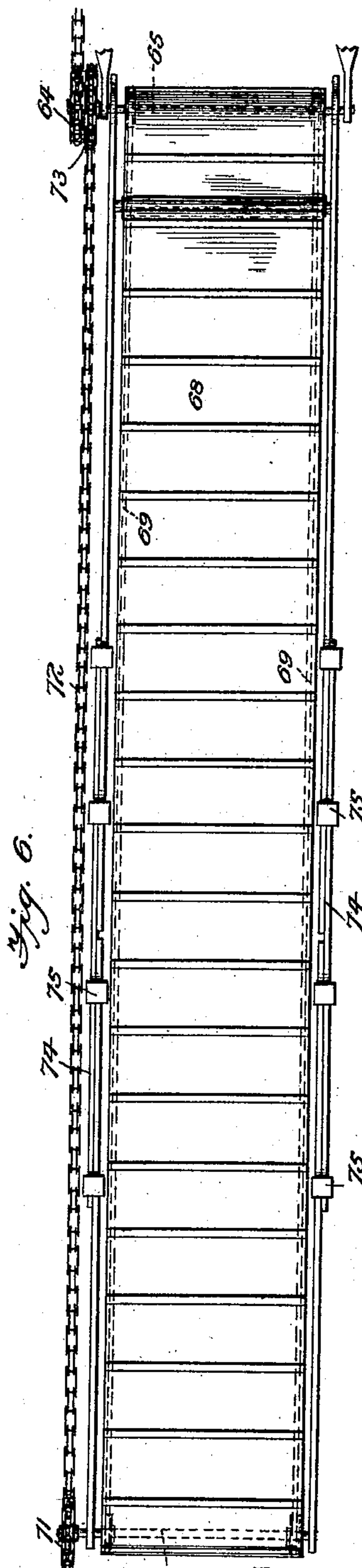
(No Model.)

4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

EDWARD ZIELKE, OF CARROLL, NEBRASKA.

DITCHING AND GRADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 618,929, dated February 7, 1899.

Application filed January 25, 1898. Serial No. 667,910. (No model.)

To all whom it may concern:

Be it known that I, EDWARD ZIELKE, a citizen of the United States, residing at Carroll, in the county of Wayne and State of Nebraska, have invented certain new and useful Improvements in Ditching and 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 relates to ditching and grading machines; and it consists in certain details of construction and arrangement of parts, which will be more fully hereinafter described and claimed.

The object of the invention is to facilitate the formation of ditches of various widths for draining or irrigating land and also in constructing railroad-beds or leveling ordinary road-beds by the arrangement of positively-acting mechanism of a comparatively simple nature which is strong and durable and easily and readily operated.

In the accompanying drawings, Figure 1 is a side elevation of the improved ditching and grading machine embodying the invention and showing a plow in connection therewith. Fig. 2 is a rear end elevation of the machine, broken away in parts. Fig. 3 is a front elevation, partially broken away. Fig. 4 is a horizontal section on a line below the main frame, the latter being indicated in dotted outline. Fig. 5 is a side elevation of the elevator-carrier. Fig. 6 is a top plan view of the elevator, broken away in part.

Referring to the drawings, wherein similar numerals of reference are employed to indicate corresponding parts in the several views, the numeral 1 designates the main frame, of any suitable material, preferably constructed of channel-iron, and having side bars 2 extending downwardly therefrom at the front and rear, and to the front bars is attached a steering-frame 3, with a fifth-wheel section 4 attached thereto and engaging a similar section 5, resting on the front axle 6, and the whole connected by a king-bolt 7. The axle 6 has road-wheels 7' thereon of any preferred form of construction and the required tread. The rear side bars 2 depend and are attached to the rear axle 8, having road-wheels 9 on

opposite ends thereof of larger diameter than the front wheels 7', so that the wheels may turn under the frame, as will be understood. Braces 10 are attached to the frame and the front and rear axles to reinforce the said parts, and these devices will be applied wherever found necessary.

To one side of the center of the frame and under the same a beam 11 is mounted and in the present instance is shown as supporting a plowshare 12, which may be replaced by a scraper, if desired. This construction is more clearly shown in Fig. 4. The said beam 11 has at its rear end a cross-beam 13, from which forwardly extends at an outward angle of inclination a supporting-beam 14 and a reinforce-beam 15, the beam 14 having a post 16 depending therefrom and attached to the plowshare 12, and the reinforce-beam 15 has its forward end secured to a cross-brace at the rear end of said share. The outer end of the beam 14 is continued by a diagonal extension 17 to the front part of the beam 11, where it is bolted, and by this means the plowshare is thrown to one side of the machine and has its point located outside the plane of the outer faces of the adjacent wheels 7 and 9. The plowshare is braced at different points by cross-strips 18 and 19 and from the outer portion of the beam 14 by means of a strip 20.

From the rear axle 8 forwardly extends a guide-beam 21, having angularly-disposed braces 22 attached to the outer end thereof and at the rear also connected to the said axle or to an adjacent portion of the frame, as may be found desirable. The outer end of the said beam 21 is formed or provided with a flanged groove 23, which is engaged by a flange 24, supported in part by the rear end of the beam 11 and a depending hanger 25 connected thereto, and at its lower end to a supplemental support 26. In like manner the front end of the said beam 11 adjustably engages a vertical bar 27, which has a channel or slot 28 therein with laterally-extending grooves 29, and the end of the said beam has outwardly-projecting guide-pins 30 engaging said grooves. The upper portion of this bar 27 on one edge, however, is provided with ratchet-teeth 31, which are engaged by a pawl 32, and connected to the upper end of said bar is a link 33, attached to the rear end

of a lever 34, fulcrumed on a support 35 and having a dog 36, coacting with a toothed segment 37 to sustain the adjustment of the said bar. By this means the bar 27 may be let
 5 down and the channel or groove consequently lowered for engagement by the end of the beam 11 at a lower point than might be permitted by a primary adjustment.

Movably attached to the front and rear of
 10 the beam 11 are adjusting-bars 37' and 38, which extend upwardly through the frame 1 and have rack-teeth 39 and 40 thereon, which engage pinions 41 and 42, respectively, mounted on shafts 43 and 44 at the front and
 15 rear portions of the machine and supported at an elevation by suitable arched frames 45 and 46. The shafts 43 and 44 also have ratchet-wheels 47 and 48 thereon, which are engaged by pawls 49 and 50 to sustain the ad-
 20 justment of the bars 37' and 38. On the shafts 43 and 44 are mounted suitable crank-wheels 51 and 52, by means of which the pinions 41 and 42 are operated and the beam 11 raised or lowered. The flange 24, engaging the guide-
 25 beam 21, prevents the beam 11 and the parts carried thereby from sliding to right or left, and still permits said beam to be raised or lowered, and by this means predetermined adjustment can be sustained without varia-
 30 tion.

The devices in connection with the bar 38 are duplicated at the rear of the machine and coact with a similar bar 53, which is attached to the inner end of the cross-beam 13, and by
 35 this means the beam 11 and its supporting parts are situated in their adjustment and the weight evenly distributed between the two bars 38 and 53. The bar 37' is located at the center of the front portion of the machine and
 40 controls the front end of the beam 11. On the supplemental support 26 a transverse shaft 54 has bearing and passes through a toothed wheel 55, which steadies the movement of the beam 11 and facilitates the action of the plow-
 45 share, as well as driving the mechanism connected thereto, and on the same shaft is mounted a gear-wheel 55', which meshes with another gear 56 below the same, having beveled teeth 57 on one face thereof, engaging a bev-
 50 eled pinion 58 on a shaft 59, carried by a depending frame 60, the said shaft 59 being mounted in a brace 61, connecting the depending frame to the supplemental frame. On the shaft 59 is also mounted a sprocket-
 55 wheel 62, having a chain belt 63 running therefrom and engaging a sprocket-wheel 64 on one end of a shaft 65 of the lower part 66 of an elevator 67, which projects outwardly and up-
 60 wardly from the lower portion of the machine adjacent to the plowshare and to any suitable lateral distance or elevation. The said elevator has a slatted belt or carrier 68 therein, connected to endless chain belts 69, traveling
 65 over sprocket-wheels on the shaft 65 and a similar shaft 70 at the upper outer ends of the elevator. The said shaft 70 also has a chain-

a chain belt 72 to a sprocket-wheel 73 on the shaft 65, adjacent to the gear-wheel 64. The
 said elevator is telescopic in its construction 70 and may thereby be lengthened or shortened in accordance with the required use, and on opposite sides thereof are slides 74, moving in guides 75. The guides 75 are attached to
 75 one of the sections of the elevator and the slides 74 to an adjustable section, and in changing the length of the elevator by this means the belt 68 and the devices for operat-
 80 ing the same will be correspondingly lengthened or shortened. The elevator is supported at one side of the machine by a truck consist-
 85 ing of a substantially triangular frame 76, supporting an axle 77, on which a wheel 78 is mounted. The upper part of the said frame 76 has a bed 79, and extending from the said
 90 triangular frame and its bed to the adjacent part of the machine are connecting-braces 80. The parts of the triangular frame 76 are further strengthened by braces 81, and rising from the bed 79 are uprights 82, which are
 95 spaced apart from each other, and between the same the said elevator extends. In one of the uprights 82 is an elongated slot 83 to permit the chain belt 72, for operating the ele-
 100 vator, to have intermediate movement there-through, and in the upper parts of the said uprights is a shaft 84, having at one end a chain or sprocket wheel 85, encircled by a
 chain belt 86, running down to and surround-
 105 ing a lower sprocket-wheel 87, provided with an operating crank-handle 88 and coacting with a ratchet-wheel 89, engaged by opposite
 110 pawls 90.

Winding upon the shaft 84 and depending therefrom are elevating-chains 91, having at-
 115 taching-links 92 at the lower ends thereof and adapted to be connected to a vertically-movable adjusting-slide 93, consisting of opposite end plates 94, connected by supporting-
 120 bolts 95, which movably engage slots 96 in the opposite sides of the frame of the elevator, and after the proper adjustment of the elevator has been attained by operating the
 125 shaft 84 to either raise or lower the said elevator the bolts 95 are clamped in the slots to hold the said elevator at the required height. The triangular frame 76 and its wheel 78 are caused to travel parallel with the machine, and to accommodate its adjustment the ele-
 130 vator is movable at its lower end under the bed of the machine, and the carrier therein dips under and runs for a short distance in a horizontal plane and adjacent to the mold-board of the plow, being caused to travel in
 135 this manner by opposite rollers 97 of any preferred form of construction. On the uprights 82 of the elevator-carriage are also suitable
 140 braces or analogous devices 98.

The front and rear axles 6 and 8 are made extensible by forming each with interlocking
 145 tongues 99, movable in encircling guides 100, which are secured to one of the tongues and movable over the other, the adjustment being retained by detachable keys 101, inserted

through openings in the guides and the tongues movable through said guides. The guides are closely arranged, so as to give a strong support to the parts of the axle when
 5 distended, and to prevent sagging or breaking down of the same. This adjustment is secured by means of a rack and pinion. The rack 102 is secured to one part of the axle and is engaged by an operating-pinion 103, sup-
 10 ported adjacently on the opposite part of the axle and actuated by a shaft 104, having a crank-handle 105. This adjustable feature of the axle is for the purpose of distending or spreading them apart and cutting a narrow
 15 ditch, so as not to crush the walls of the ditch inward by a too close engagement of the wheels with the edges thereof.

In forming a small ditch the adjustable features heretofore set forth permit the plow
 20 to be located three feet or more below the bottom of the wheels, and the outwardly-projecting arrangement of the plow provides means for cutting the soil or ground far enough away so as not to have the trucks in-
 25 terfere in digging a deep ditch with vertical walls.

In operating the machine it is especially useful in forming irrigating-ditches and will throw up an embankment on each side of the
 30 ditch, or the raised material can be caught by the elevator and the carrier therein convey it to wagons or other vehicles traveling under the outer end of said elevator, and this makes the device especially useful in street or road
 35 work by forming a ditch on the side and piling up a grade in the middle. The machine is also especially applicable for cutting roads through hills and also in building railroad-grades.

The size of the machine may be varied at will, and when of very large dimensions it can be drawn by a traction-engine. The form set forth in the accompanying drawings is adapted to be propelled by horse-power and has suit-
 40 able draft attachments for this purpose, which may be of any preferred form of construction.

The movement of the carriage of the elevator must always be parallel with the machine in view of the arrangement of the braces
 50 set forth, and it will be understood that other braces will be applied wherever found necessary, to give rigidity and strength to the several parts and mechanisms.

Having thus described the invention, what
 55 is claimed as new is—

1. In a grading and ditching machine, the combination with the main frame and carrying-wheels on which said frame is mounted, of a plow-beam adjustable at each end independently of the other relative to said frame, 60 a pendent frame connected to said beam, a traction-wheel journaled in said pendent frame, and an elevator connected to said frame and operatively connected with said traction-wheel, substantially as described. 65

2. In a grading and ditching machine, the main frame and carrying-wheels therefor, in combination with a plow-beam adjustable at each end independently of the other relative to said frame, a pendent frame connected to 70 and adjustable with said beam, an adjustable elevator connected with and extending laterally from said pendent frame, a traction-wheel journaled in said pendent frame, and gearing connecting said traction-wheel and 75 elevator for actuating the latter, substantially as described.

3. In a grading and ditching machine, the combination with the main frame and its carrying-wheels, of the adjustable plow-beam, 80 the pendent frame carried thereby, the traction-wheel journaled in said pendent frame and adjustable therewith, an adjustable elevator connected to said frame and geared to said traction-wheel to be operated thereby, 85 and a slotted carriage connected with the main frame upon which the elevator is adjustably supported, substantially as described.

4. In a grading and ditching machine, the combination of a plow-beam, adjusting de- 90 vices therefor, an adjustable guide engaging the front end of said plow-beam and parts carried thereby, and means for operating the several devices, substantially as and for the purposes specified. 95

5. In a grading and ditching machine, the combination of an adjustable plow, an elevator, gearing in connection with the plow-beam for operating the carrier of the elevator, a carriage for adjustably supporting the ele- 100 vator, a frame for carrying the plow-beam, and extensible axles to which the said frame is connected, substantially as and for the purposes specified.

In testimony whereof I affix my signature 105 in presence of two witnesses.

EDWARD ZIELKE.

Witnesses:

F. A. BERRY,
 JNO. P. WHITE.