

No. 620,725.

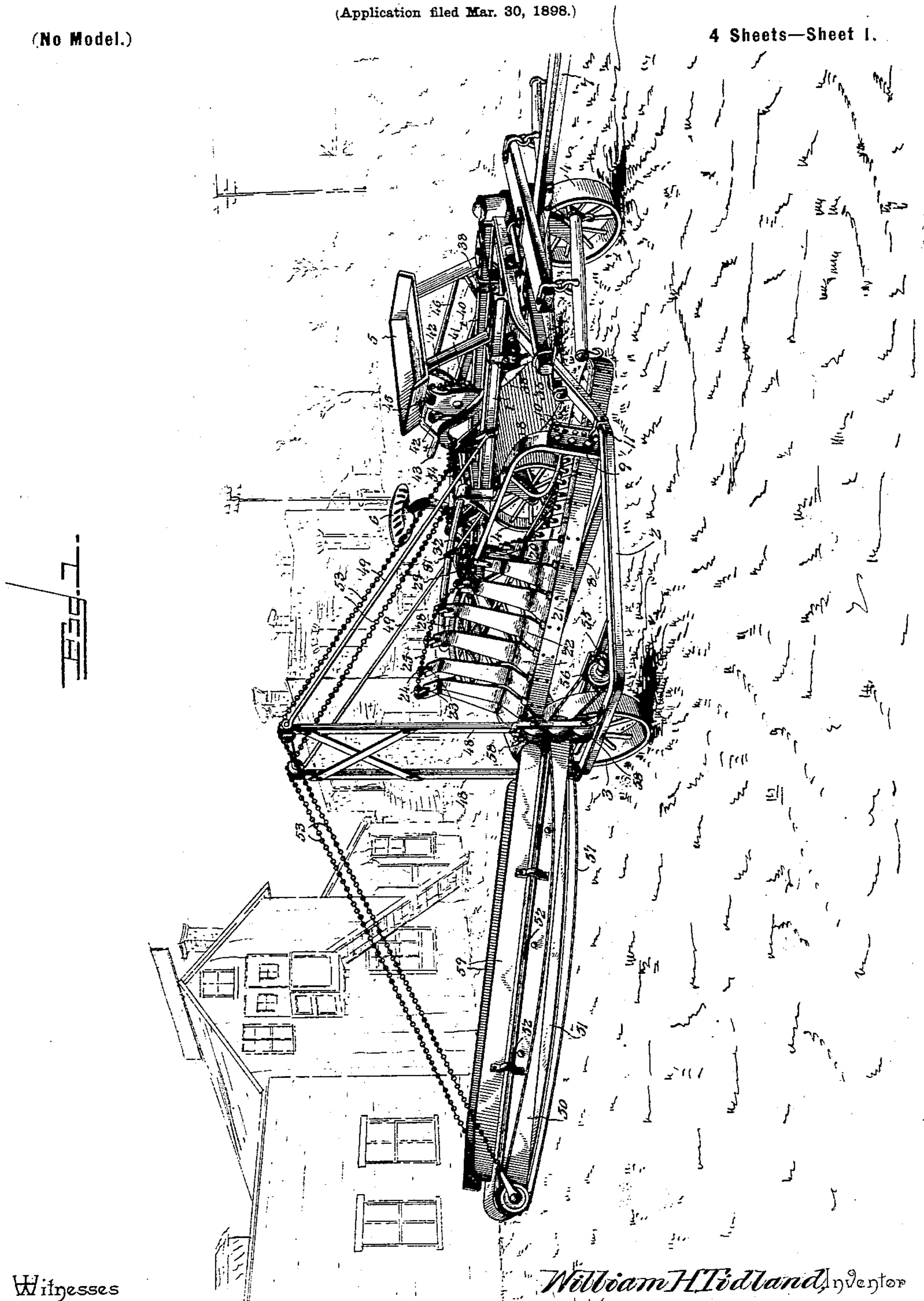
Patented Mar. 7, 1899.

W. H. TIDLAND.
GRADING AND DITCHING MACHINE.

(Application filed Mar. 30, 1898.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses
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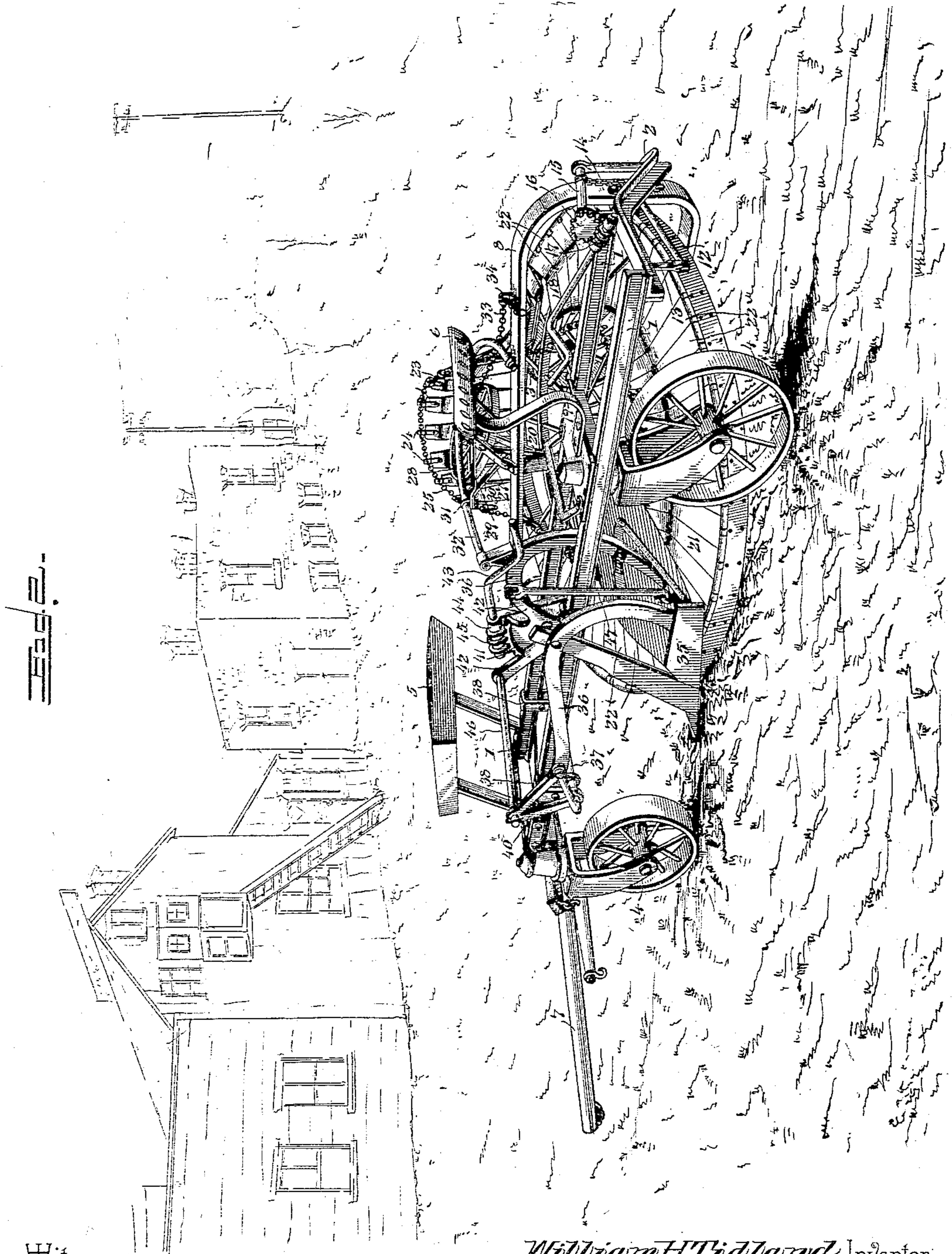
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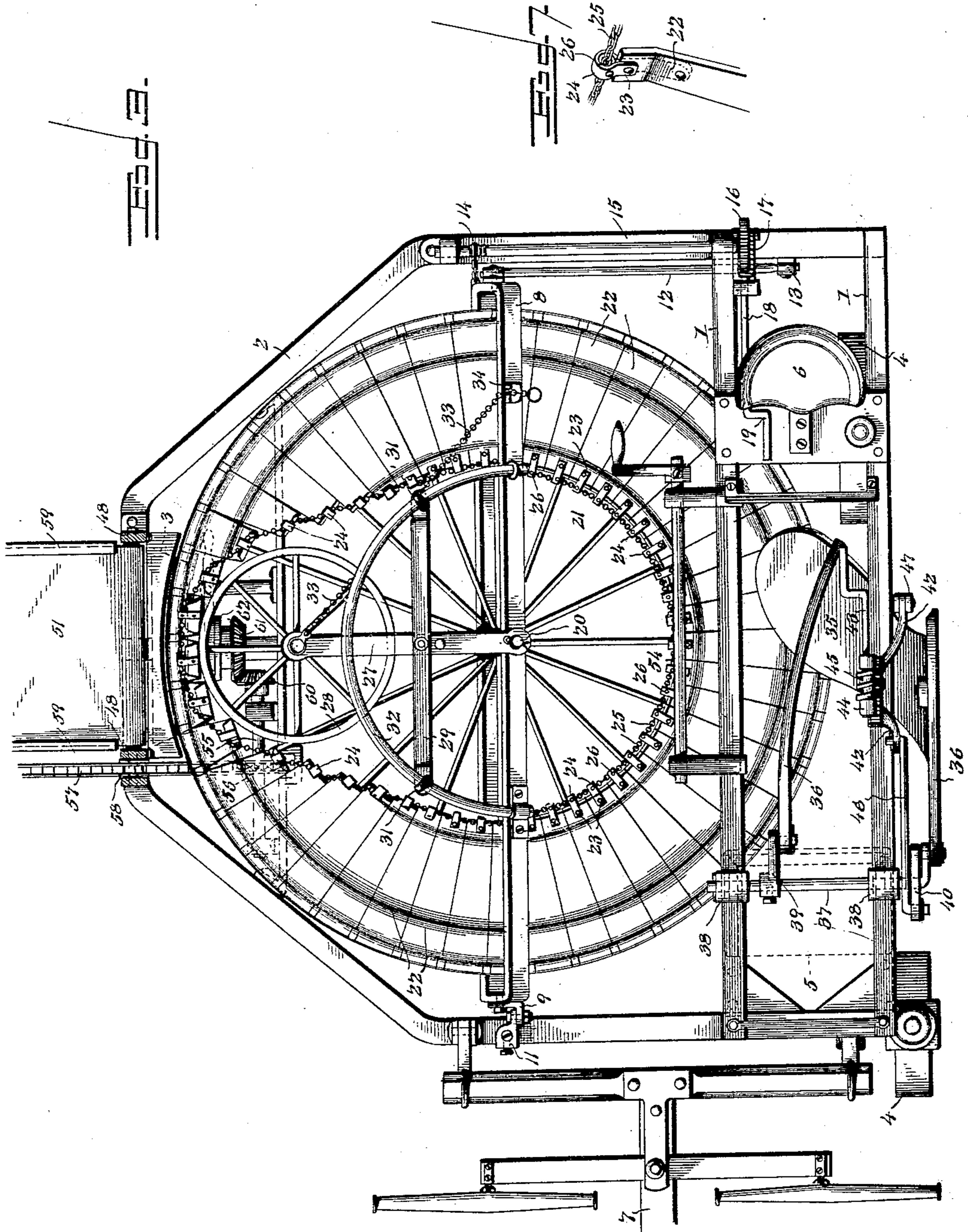
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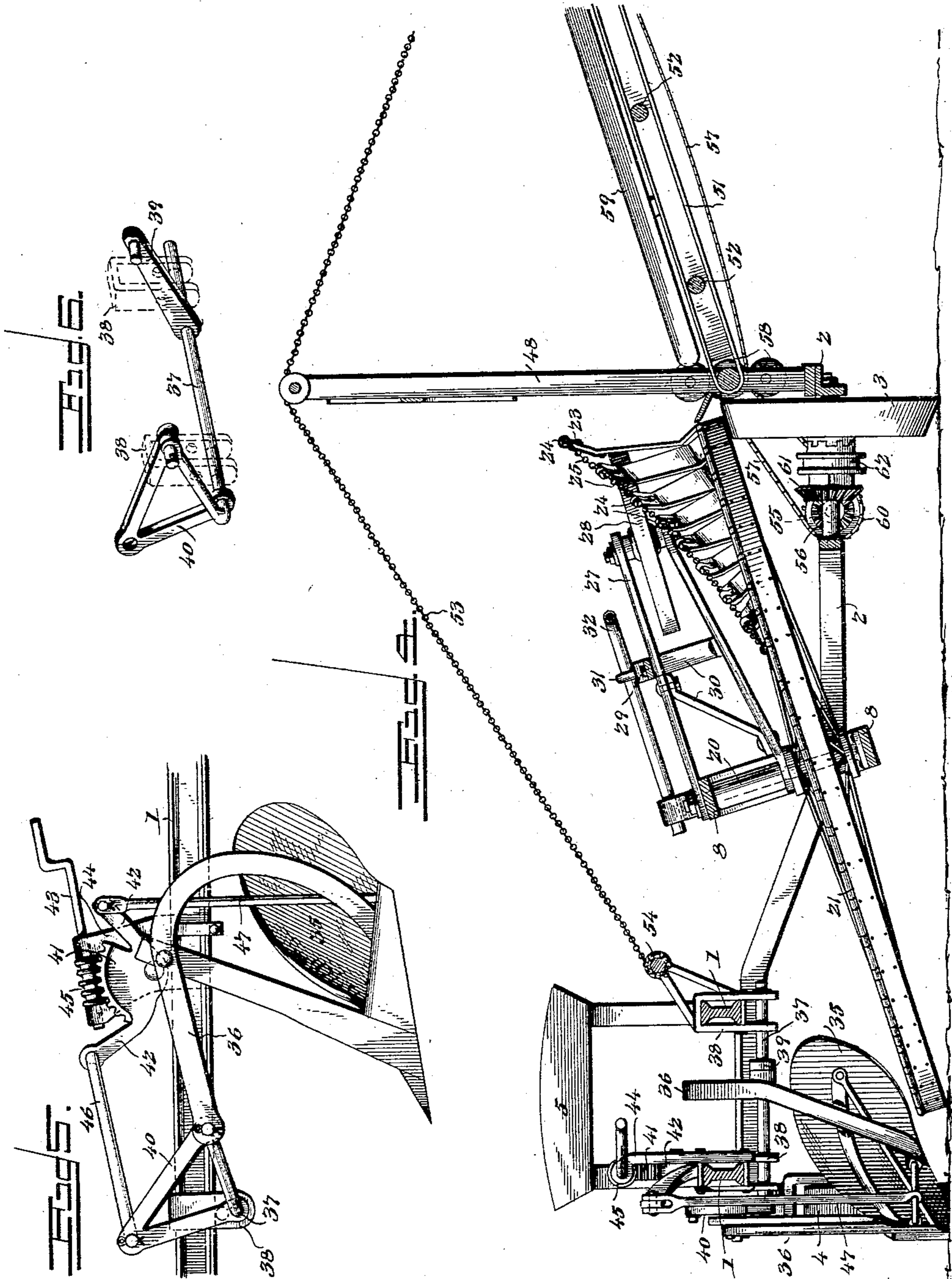
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UNITED STATES PATENT OFFICE.

WILLIAM H. TIDLAND, OF NICOLLET, MINNESOTA.

GRADING AND DITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 620,725, dated March 7, 1899.

Application filed March 30, 1898. Serial No. 675,769. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. TIDLAND, a citizen of the United States, residing at Nicollet, in the county of Nicollet and State of Minnesota, have invented a new and useful Grading and Ditching Machine, of which the following is a specification.

This invention is in its nature an improvement on the grading and ditching machine for which Letters Patent of the United States were granted me April 24, 1894, No. 518,905, and relates to novel and better means for connecting the inner ends of the cups of the elevator-wheel, means for mounting the dumping-wheel so as to admit of its adjustment, the hangings for the plow and the frame carrying the elevator-wheel, an attachment for loading the earth into a wagon for conveying it to a point distant from the part of the road being graded, and, lastly, to the improvement of the general construction, whereby the draft is lightened, the parts caused to work to better advantage, and the machine made more durable and effective.

For a full understanding of the merits and advantages of the invention reference is to be had to the accompanying drawings and the following description.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of the machine as seen from the front, the loading attachment being in position. Fig. 2 is a perspective view of the machine viewed from the rear, the loading attachment being omitted. Fig. 3 is a top plan view, the outer end portion of the carrier being omitted. Fig. 4 is a transverse section of the machine as seen in Fig. 3, looking toward the front. Fig. 5 is a detail view showing the means for raising and lowering the plow. Fig. 6 is a detail view of the shaft to which the front ends of the plow-beams are connected, the dotted lines showing the clips. Fig. 7 is a detail view of the outer end portion of a cup.

Corresponding and like parts are referred

to in the following description and indicated in the several views of the drawings by the same reference characters.

The framework for supporting the working parts comprises longitudinal beams 1, disposed in parallel relation, and a laterally-extending frame-bar 2, deflected outwardly between its ends and having its end portions rigidly connected to the extremities of the longitudinal beams 1. The end portions of the deflected frame-bar 2 are bent upwardly and secured to the lower side of the beams 1, and its outer deflected portion is in a lower plane than the said beams 1 and is supported by a ground-wheel 3, which also serves as a driver for the carrier-apron of the loading attachment. Front and rear caster-wheels 4 are applied to the longitudinal beams 1 and support the side of the frame opposite the ground-wheel 3. A seat 5 is provided at the front end of the frame for the accommodation of the driver, and a second seat 6 is located near the rear end of the machine for the convenience of the operator manipulating the several parts required to be adjusted. The pole or tongue 7 has connection with the front portion of the deflected frame-bar 2, and the team for drawing the machine is hitched thereto in any of the usual ways.

An oblong frame 8 extends longitudinally of the frame and has adjustable connection at its front end with the main frame by means of an angle-plate 9, securely bolted to the front end of the frame 8 and having its forwardly-extending flange provided with a vertical series of openings 10 and a lug 11, bolted or otherwise applied to the front portion of the bar 2, and having an opening to register with any one of the openings 10, and through which registering openings a bolt or pin passes to secure the front end of the frame 8 in an adjusted position. A lever 12 is pivotally connected at one end with a bifurcated hanger 13 near the outer rear corner of the main frame and is firmly secured at its opposite end to the frame 8, which is connected by a chain or cable 14 with a transverse shaft 15, journaled at its ends in bearings applied to the main frame, whereby the rear end of the frame 8 may be adjusted vertically by turning the shaft 15 in its bearings. A worm-wheel 16 is secured to one end of the shaft 15

and meshes with a worm-thread 17, provided at the rear end of a shaft 18, journaled to the main frame, and having a crank 19 at its front end within convenient reach of the operator's seat 6.

A shaft 20, constituting an axle or spindle for the elevating-wheel, is supported at its ends by means of the upper and lower bars of the oblong frame 8. The elevating-wheel 21 comprises a rim, spokes, and a hub and is mounted to rotate upon the axle 20. The cups 22 are hinged at their outer ends to the rim of the elevating-wheel and are adapted to move vertically at their inner ends, so as to dump the load at the proper point. Strap-irons 23, doubled upon themselves so as to form eyes 24, are bolted or otherwise secured to the inner ends of the cups 22 and receive the chain 25, by means of which the inner ends of the cups are connected and held at fixed distances apart when the machine is in active operation. This chain 25 passes through the eyes 24, and pins or bolts 26 pass through the eyes 24 and links of the chain 25 and positively connect these parts, so as to insure the inner ends of the cups maintaining a fixed relation when elevated by means of the dumping-wheel. The strap-irons 23 serve to stiffen and strengthen the inner ends of the cups and when worn can be easily and cheaply replaced.

An arm 27, comprising upper and lower bars and an intermediate brace, is pivotally mounted upon the axle 20 at its inner end, and its outer end is free to swing and supports the dumping-wheel 28, which is located so as to engage with the cups and elevate their inner or free ends, thereby effecting the dumping of the soil. A cross-bar 29 is secured to the arm 27, about midway thereof, and is strengthened at its extremities by means of a truss-brace 30, made fast at a middle point to the lower bar of the arm 27. Eyebolts 31 are located at the ends of the cross-bar 29 and are slidably mounted upon a curved rod or bar 32, which is secured at its ends to the upper portion of the oblong frame 8. The curved rod or bar 32 serves as a guide and brace for the swinging arm 27 forward. This forward tendency of the dumping-wheel is overcome by means of a chain or like connection 33, secured at its front end to the outer end of the arm 27, and steadies it when in an adjusted position. The strain upon the dumping-wheel is from the rear, thereby tending to move the dumping-wheel and the outer end of the arm 27 and having adjustable connection at its rear end with a notched lug 34, secured to the rear portion of the upper bar of the oblong frame 8. By adjusting the chain 33 so as to vary the distance between the lug 34 and the outer end of the swinging arm 27 the position of the dumping-wheel can be varied, thereby providing for dumping the load at any desired point.

The plow 35 has a pair of beams 36, which

are arranged to come upon opposite sides of the outer longitudinal beam 1, whereby it is possible to operate the machine close to a fence or ditch. A transverse shaft 37 is journaled at its ends to clips 38, which have adjustable connection with the front ends of the beams 1, so that the plow may be given any desired pitch. The inner end of the shaft 37 is provided with an arm 39, and its outer end has applied thereto a bell-crank lever 40. The front ends of the plow-beams 36 have pivotal connection with the arm 39 and the rear arm of the bell-crank lever 40. Upon turning the shaft 37 in its bearings the front ends of the plow-beams can be raised and lowered. A toothed segment 41 is pivoted to one of the longitudinal beams 1 and has oppositely-extending arms 42. A shaft 43, having a crank at its rear end accessible from the attendant's seat 6, is journaled in a bracket 44, secured to a beam 1, and this shaft has a worm-thread 45 in mesh with the toothed portion of the segment 41, whereby the latter can be turned so as to move the arms 42 for effecting a raising and lowering of the plow as required. The front arm is connected with the front arm of the bell-crank lever 40 by means of a rod 46, and the rear arm is connected by means of a vertical rod 47 with the plow 35. The train of connections between the plow and plow-beam are so proportioned and disposed that the plow and beams move so as to maintain a parallel relation, which is essential, so as not to disturb the pitch of the plow when once adjusted. The moldboard of the plow is arranged with reference to the elevating-wheel 21 so as to throw the earth thereon.

Standards 48 rise vertically from the outer portion of the deflected frame-bar 2 and are braced at their upper ends by guys 49, connecting with a longitudinal beam 1. A frame 50 has pivotal connection at its inner end with the lower ends of the standards 48 and supports a carrier belt or apron 51, of rubber, canvas, leather, or other suitable material. The upper portion of this carrier belt or apron is supported by rollers 52, applied to the side bars of the frame 50 and located intermediate of the extreme rollers, around which the carrier-belt passes. Chains or cables 53 connect at their outer ends with the outer extremity of the frame 50 and pass over direction-pulleys at the upper ends of the standards 48 and are secured at their inner ends to a windlass or shaft 54, journaled in bracket-bearings applied to the main frame. By operating the windlass or shaft 54 the outer end of the carrier can be raised or lowered, so as to discharge the earth into a wagon of greater or less height or whereby the earth may be dumped at any desired point situated at a distance from the road or surface being graded or level.

A shaft 55 is journaled longitudinally of the frame and in proximate relation to the ground-wheel 3 and is provided with a

sprocket-wheel 56, around which passes a drive-chain 57 for transmitting motion from the said shaft to the outer roller supporting the carrier belt or apron. A series of idle pulleys 58 receive between them the parts of the drive-chain, thereby preserving a uniformity of tension upon the drive-chain at the various adjusted positions of the conveyer. The middle pulley 58 is about in line with the pivotal connection of the frame 50 with the standards 48. Hence when moving the outer end of the frame 50 up or down the tension upon the drive-chain is not materially affected. Side pieces 59 are secured to the frame 50 and prevent the earth from falling laterally from the upper portion of the carrier-belt. The shaft 55 receives its motion from the ground-wheel 3 and is provided at its inner end with a bevel-gear 60, which intermeshes with a corresponding bevel-gear 61, mounted upon the hub of the ground-wheel 3. A clutch 62 is provided to secure engagement between the bevel-gear 61 and the hub of the ground-wheel 3, thereby admitting of the carrier being thrown into and out of gear. The tread of the ground-wheel 3 is inclined and corresponds with the inclination of the frame of the elevating-wheel.

When the machine is in operation and drawn over the road or surface to be graded or leveled, the earth loosened by the plow is thrown upon the lower portion of the elevating-wheel and is carried by the latter to the opposite side of the machine and is dumped by the rising of the cups. When it is required to load the earth into a wagon or convey it to a point remote from the surface being acted upon, the carrier is placed in position and thrown into gear and the earth from the elevating-wheel is delivered to the inner end of the carrier and is moved by it outward and away from the machine and dumped at the side of the road or into a wagon, as required.

It is to be understood that the several intermeshing gears are to be housed to protect them from the dust and dirt, said housings being omitted in order not to conceal and hide the operating parts.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is—

1. In a ditching and grading machine, the combination with the frame provided at one side with leveling mechanism, of an oblong frame longitudinally disposed and having adjustable connection at its front end with the main frame so as to be moved up or down, an elevating-wheel applied to the oblong frame for receiving the earth from the leveling mechanism and discharging it at the opposite side of the machine, and means for raising and lowering the rear end of the oblong frame, substantially as set forth.

2. In a grading and ditching machine, the combination with the frame provided with leveling mechanism, of an oblong frame longitudinally disposed and having loose connection

at its front end with the main frame, an elevating-wheel carried by the oblong frame and adapted to receive the earth from the leveling mechanism and discharging it at the opposite side of the machine, a lever pivotally connected at one end with the main frame and rigidly connected at its opposite end with the rear end of the oblong frame, and means applied to the main frame for raising and lowering the free end of said lever, substantially as set forth.

3. In a grading and ditching machine, the combination with the main frame provided with leveling mechanism, of a longitudinally-disposed oblong frame, means for vertically adjustably connecting the front end of the oblong frame with the front end of the main frame, a lever having pivotal connection at one end with the rear portion of the main frame and rigid connection at its opposite end with the rear portion of the oblong frame, a shaft journaled to the main frame, a flexible connection between the shaft and the rear portion of the oblong frame, means under the control of an attendant for turning the shaft to raise and lower the rear portion of the oblong frame, and an elevating-wheel applied to the oblong frame, substantially as and for the purpose set forth.

4. In a grading and ditching machine, the combination with the main frame, an oblong frame, and an elevating-wheel journaled to the oblong frame and comprising a connected series of cups, of a curved rod or bar secured to the oblong frame, a pivoted arm carrying a dumping-wheel, a cross-bar secured to the pivoted arm at a point between its ends and having loose connection at its extremities with the end portions of the aforesaid curved rod or bar, and an adjustable connection between the free end of the arm and the frame, substantially as and for the purpose set forth.

5. In a grading and ditching machine, the combination with the frame, an elevating-wheel journaled to the frame and comprising a connected series of cups, and a curved rod or bar secured to the frame, of an arm pivoted concentric with the axis of the elevating-wheel and provided at its outer end with a dumping-wheel, a cross-bar secured to the arm between its ends and having its extremities loosely connected with the opposite end portions of the aforesaid curved rod or bar, a chain having connection with the outer end of the pivoted arm, and a notched lug applied to the frame and adapted to engage with links of the chain to hold the outer end of the pivoted arm in an adjusted position, substantially as set forth.

6. In a grading and ditching machine, the combination with the frame, and a plow having parallel beams, of a transverse shaft having arms to which the front ends of the beams are pivotally connected, oppositely-extending arms, a rod connecting one of the latter arms to an arm of the aforescribed transverse shaft, a vertical rod connecting

the other arm with the plow, and means for simultaneously operating the oppositely-extending arms to raise and lower the plow and beams and have them maintain a parallel relation at all stages of their adjustment, substantially as set forth.

7. In a grader and ditcher, the combination with the frame and a plow, of a shaft having oppositely-extending arms a toothed segment having oppositely-extending arms, rods connecting the arms of the toothed segment with the plow and plow-beam respectively, and means for turning the toothed segment to effect the vertical adjustment of the plow, substantially as set forth.

8. In a grader and ditcher, the combination with the frame and a plow having corresponding beams, of a transverse shaft, an arm and a bell-crank lever applied to the said shaft and having the front ends of the plow-beams connected therewith, a toothed segment having oppositely-extending arms, connections between the arms of the toothed segment and the plow and the front arm of the bell-crank lever, and means for turning the toothed segment for raising and lowering the plow and beams, substantially as described.

9. In a grader and ditcher, the combination with the main frame, a leveling mechanism at one side of the main frame, an oblong frame supported by the main frame, and independ-

ent means for adjusting the leveling mechanism and said oblong frame, of an elevating-wheel journaled to the oblong frame and receiving the earth loosened by the leveling mechanism, a carrier pivotally connected with the opposite side of the main frame and extending laterally therefrom and receiving the earth from the elevating-wheel, and means between the main frame and the outer end of the carrier for raising and lowering the latter, substantially as set forth.

10. In combination, a frame having leveling mechanism at one side, an elevating-wheel, standards at the opposite side of the frame to the leveling mechanism, a carrier pivoted at its inner end to the lower ends of the standards, means for raising and lowering the outer ends of the carrier, a vertical series of pulleys, the middle pulley being about in line with the pivotal support of the carrier, and a drive-chain for transmitting motion to the carrier and passing between the series of pulleys and upon opposite sides of the middle pulley, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM H. TIDLAND.

Witnesses:

C. L. BENEDICT,
N. P. COFFIN.