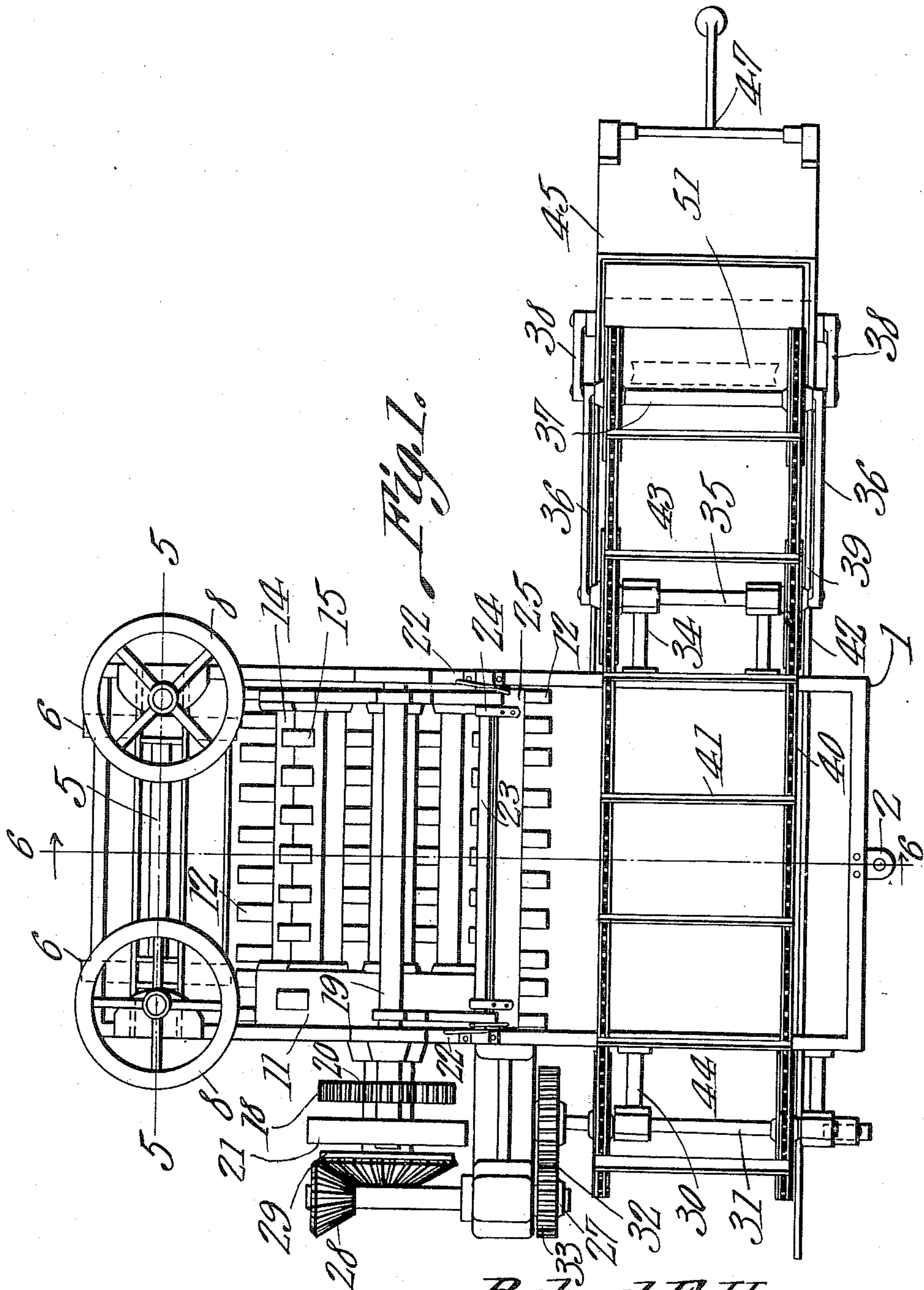


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DITCHER AND GRADER.  
APPLICATION FILED JUNE 8, 1910.

Patented June 13, 1911.

4 SHEETS—SHEET 1.



Witnesses.

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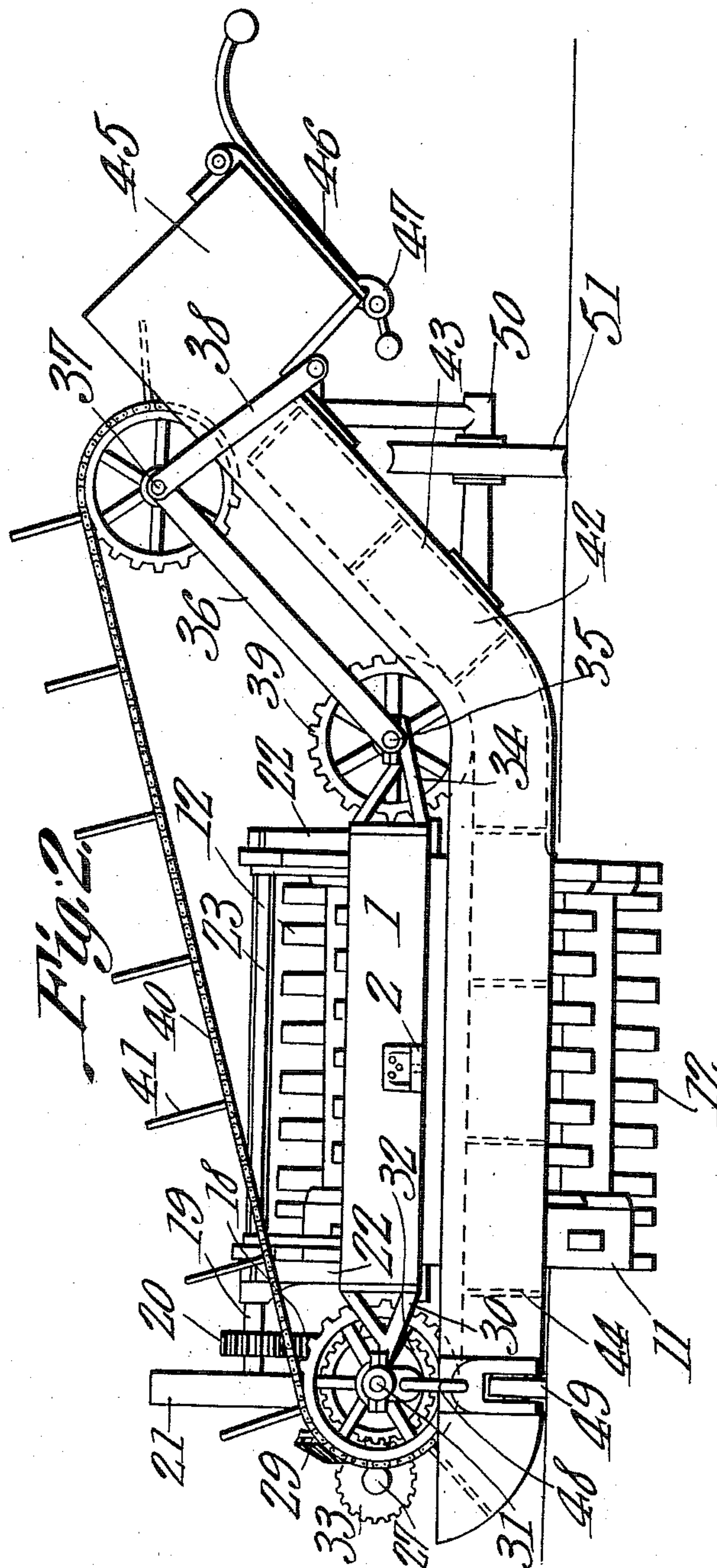
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4 SHEETS—SHEET 2.



Witnesses

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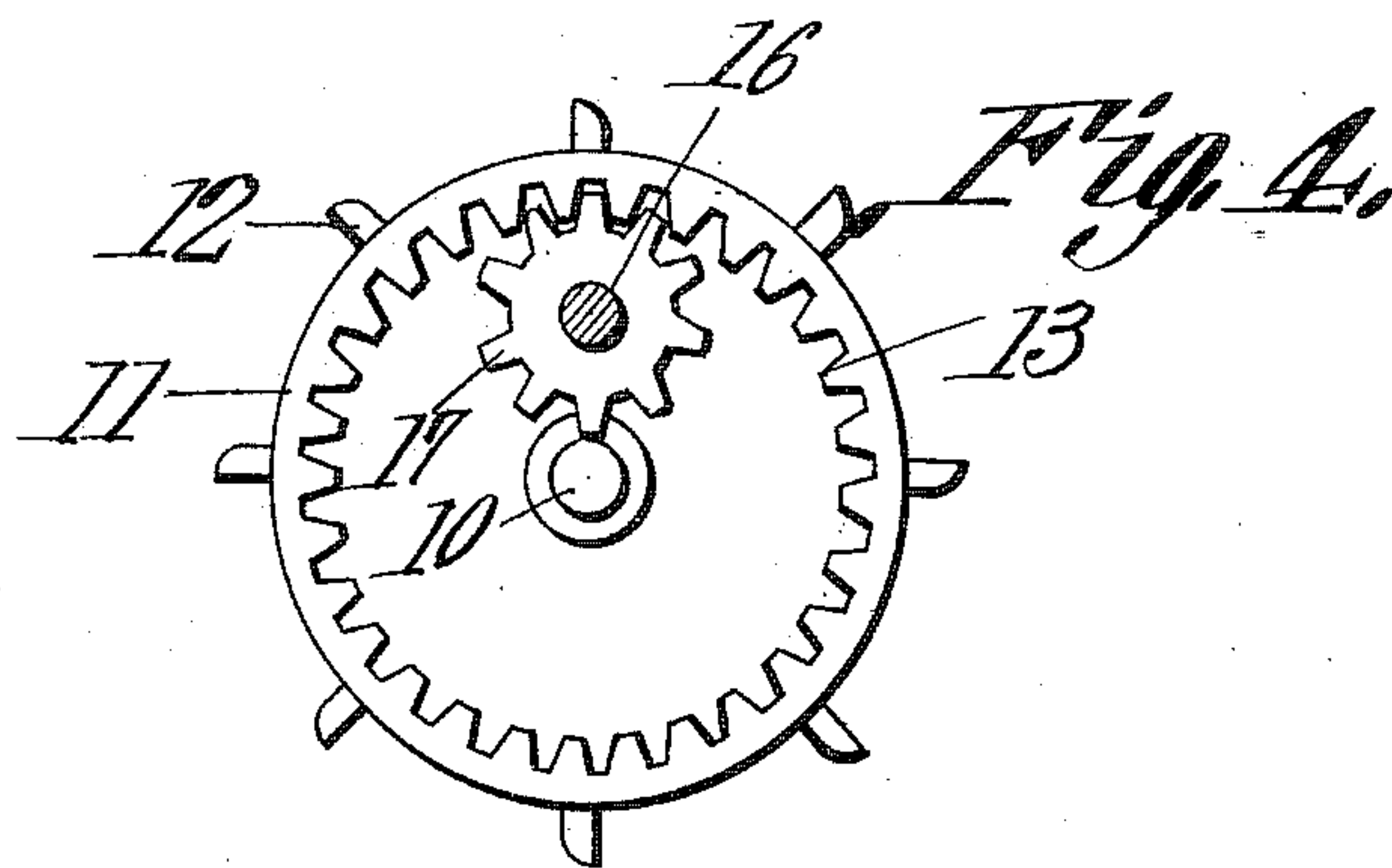
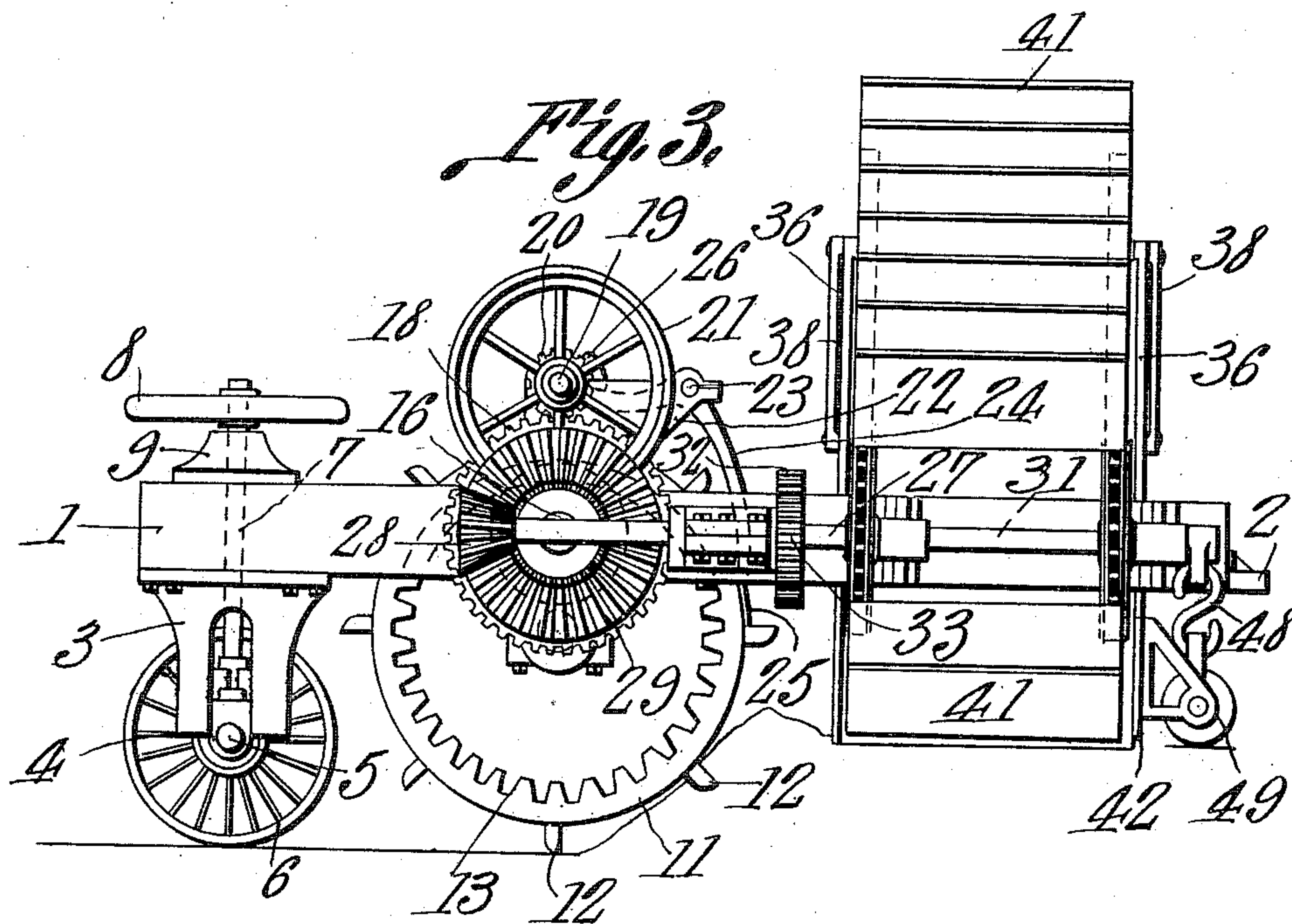
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Witnesses

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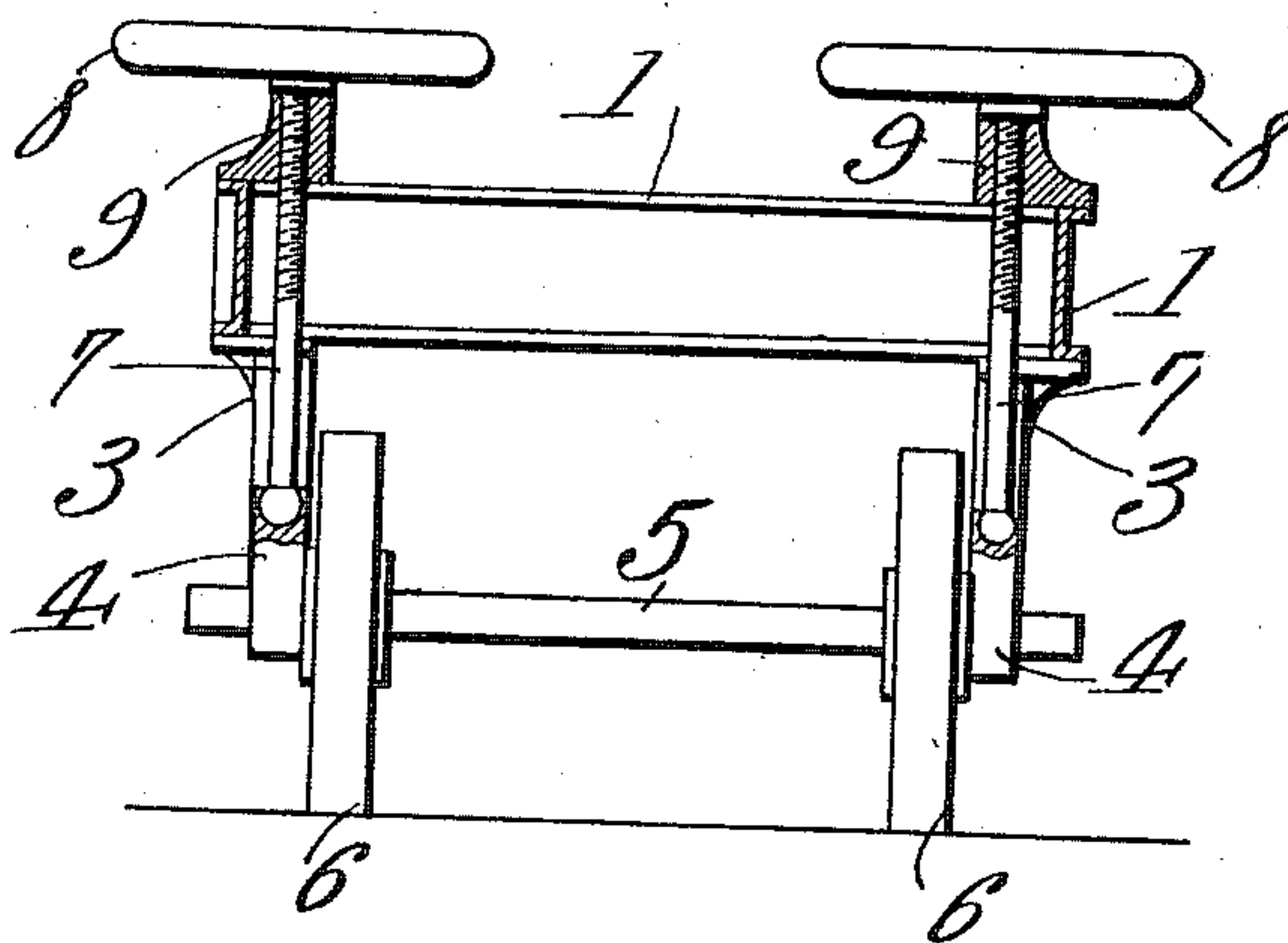
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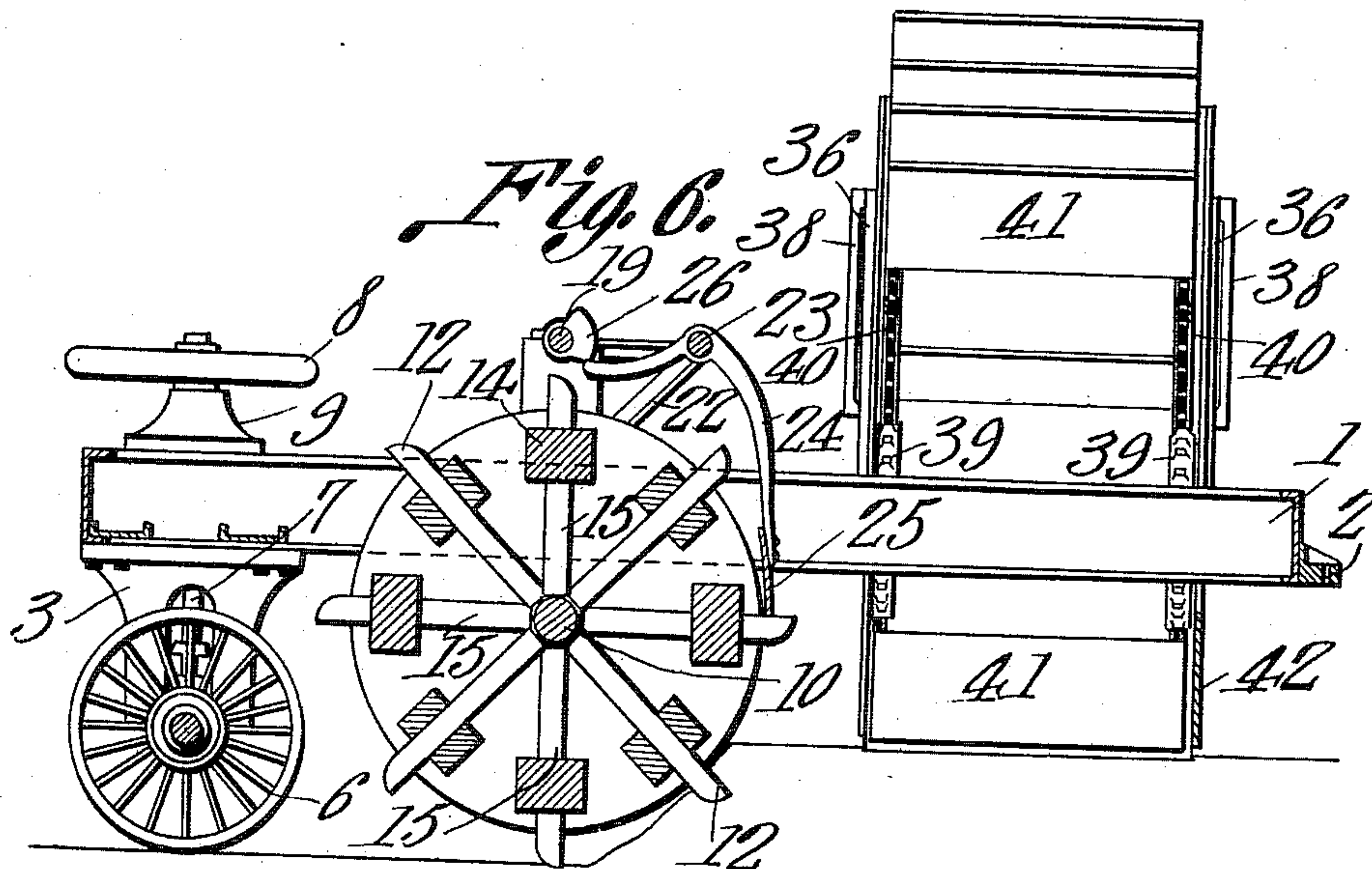
Patented June 13, 1911.

4 SHEETS—SHEET 4.

*Fig. 5.*



*Fig. 6.*



Witnesses

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# UNITED STATES PATENT OFFICE.

ROBERT E. HAYNES, OF SPENCER, NORTH CAROLINA.

## DITCHER AND GRADER.

994,746.

Specification of Letters Patent. Patented June 13, 1911.

Application filed June 8, 1910. Serial No. 565,793.

*To all whom it may concern.*

Be it known that I, ROBERT E. HAYNES, a citizen of the United States, residing at Spencer, in the county of Rowan and State of North Carolina, have invented a new and useful Ditcher and Grader, of which the following is a specification.

This invention relates to a ditcher and grader and consists in the novel construction and arrangement of its parts as hereinafter shown and described.

The object of the invention is to provide a machine of the character indicated especially adapted to be used in conjunction with a traction or other engine for the purpose of removing material from an excavation and conveying the same to a receptacle from which it may be dumped at suitable intervals. With this object in view the ditcher and grader includes a frame mounted at its rear end portion upon supporting wheels which may be independently located relatively near or remote from the said frame to raise or lower the same with relation to the surface of the ground. Means is provided for coupling said frame with a traction or other engine. A rotor is mounted upon the frame and is operatively connected with the engine and the said rotor is provided upon its periphery with several series of bits adapted to engage material in an excavation and lift the same. A scraping means is provided for removing the material from the said bits. A trunk is pivotally connected with the said frame and is supported upon ground wheels adapted to travel at the opposite sides of the excavation and an endless conveyer is mounted to move along the said trunk and the material which is passed up by the rotor is received in the said trunk and is operated upon by the said endless conveyer which carries the same along the trunk and deposits it in a receptacle provided for its reception.

In the drawings,—Figure 1 is a top plan view of the ditcher and grader. Fig. 2 is a front end elevation of the same. Fig. 3 is a side elevation of the same. Fig. 4 is a detail end elevation of a rotor used upon the ditcher and grader. Fig. 5 is a transverse sectional view through the rear portion of the ditcher and grader. Fig. 6 is a vertical longitudinal sectional view of ditcher and grader.

The ditcher and grader includes an approximately rectangular frame 1 provided

at its forward end with a clevis 2 by means of which it may be connected with a traction or other engine. Brackets 3 depend from the sides of the rear portion of the frame 1 and blocks 4 are slidably mounted in the said brackets. An axle 5 is journaled in the blocks 4 and is provided with ground wheels 6. Vertically disposed rods 7 extend upwardly through the rear portion of the frame 1 and at their lower ends having ball and socket connection with the blocks 4. Hand wheels 8 are screw-threaded upon the upper ends of the rods 7 and at their lower sides rest upon columns 9 through which said rods 7 pass. Therefore it will be seen that by turning the hand wheels 8 the rods 7 may be moved longitudinally through the columns 9 and thus the rear portion of the frame 1 may be raised or lowered or one of the rear corners of the said frame may be raised with relation to the other rear corner of the frame.

A shaft 10 is journaled in bearings provided upon the frame 1 and heads 11 are mounted on the end portions of the said shaft. The heads 11 are provided with radially disposed bits 12 and one of the said heads 11 is provided with an internal set of gear teeth 13. The heads 11 are connected together by means of bars 14 which are attached to the said heads in the vicinity of their peripheries and radially disposed bits 15 pass transversely through the bars 14 and at their inner ends are seated against the periphery of the shaft 10. A stub shaft 16 is journaled in one side of the frame 1 and is provided at its inner end with a pinion 17 which meshes with the internal gear 13 upon one of the heads 11. A gear wheel 18 is also mounted upon the said stub shaft 16. A shaft 19 is journaled upon the frame 1 and is located above the rotor of which the heads 11, bars 14 and bits 15 form component parts. A gear wheel 20 is fixed to the shaft 19 and meshes with the gear wheel 18. A belt pulley 21 is fixed to the shaft 19 and is adapted to be driven in the usual manner by means of a belt from a traction or other engine not shown. Thus it will be seen that as the shaft 19 is rotated that rotary movement is transmitted through the intermeshing gear wheels 20 and 18 to the stub shaft 16 which in turn through the pinion 17 will rotate the said rotor in a counter-clockwise direction.

Brackets 22 are mounted upon the frame



1 and a shaft 23 is journaled in the said brackets. Crank arms 24 are fixed at intermediate points to the end portions of the shaft 23 and the lower ends of the arms 24 support a blade 25 which at times is adapted to bear against the periphery of the said rotor. Cams 26 are mounted upon the shaft 19 and the upper ends of the arms 24 lie in the paths of movement of the said cams.

10 A stub shaft 27 is journaled for rotation at the side of the frame 1 and is provided at its rear end with a beveled gear wheel 28 which meshes with a beveled gear wheel 29 fixed to the end of the stub shaft 16 above described. Laterally disposed arms 30 are mounted upon the forward portion of the frame 1 and a shaft 31 is journaled for rotation in the said arms. A gear wheel 32 is fixed to the rear end of the shaft 31 and meshes with a gear wheel 33 fixed to the forward end of the stub shaft 27. Laterally disposed arms 34 are fixed to the side of the frame 1 opposite that side which carries the arm 30 and a shaft 35 is carried by the arms 34. Links 36 are pivotally connected at their inner end portions to the ends of the shaft 35 and the said links are upwardly inclined away from the frame 1. A shaft 37 is supported at the upper outer ends of the links 36 and links 38 are pivotally connected at their upper ends with the end portions of the said shaft 37 and support the outer portion of a trunk which will be described presently. Sprocket wheels 39 are mounted upon the shafts 31, 35 and 37 and sprocket chains 40 are arranged to move about the said sprocket wheels. The sprocket chains 40 are connected together by flights 41.

40 During the rotation of the shaft 19 the cams 36 are carried around with the same and when the cams come in contact with the upper ends of the arms 24, the said arms 24 are swung upon the shaft 23 whereby the plate 25 is moved in a forward direction along one of the sets of bits 12 carried by the rotor. Thus means is provided for removing material from the bits while they are rotating about the axis of the rotor.

50 The parts of the machine are so timed that as soon as the plate 25 moves beyond the path of the outer end of the bits 12, the cams 26 pass under the upper ends of the arms 24 and thus the lower portions of the said arms may fall and assume approximately vertical position and the plate 25 is carried back in the peripheries of the heads 11 of the rotor. Also during the rotation of the shaft 13 as above described, rotary movement is transmitted through the intermeshing gear wheels 29 and 28 to the stub shaft 27. From the said shaft 27 motion is transmitted through the intermeshing gear wheels 33 and 32 to the shaft 31 and inasmuch as the chains 40 pass around the

sprocket wheels 39 some of which are located upon the shaft 31, means is provided for moving the chains in orbits and the said chains carry with them the flights 41.

The trunk hereinbefore referred to is indicated in the drawings at 42 and is of peculiar contrivance. The said trunk consists of an inclined trough-shaped section 43 which at its lower end is continued into an approximately horizontal bottomless section 44. The section 44 is also devoid of a rear side and is located in front or abreast of the rotor mounted upon the shaft 10. The chains 40 and flights 41 are arranged to move along the length of both sections of the said trunk and the upper end of the trunk section 43 is provided with a receptacle 45 which in turn is provided with a hinged door 46 and a latch 47 for holding said door in closed position. A link 48 depends from one of the arms 30 and is connected with one end portion of the horizontal section of the said trunk and a supporting wheel or roller 49 is journaled at the lower edge portion of the section 44 of the said trunk. A bracket 50 is located under the inclined section 43 of the trunk 42 and a ground wheel 51 is journaled upon the said bracket and forms a support for the inclined portion of the said trunk together with the receptacle 45.

From the above description it will be seen that as the ditcher and grader is advanced and the parts are operated as indicated, the bits 12 will engage the material in an excavation and bring the same to the surface and cast the material toward the horizontal section 44 of the trunk 42. At the same time the material which has a tendency to cling to the said bits may be swept upon the same by the scraper plate 25 in the manner as hereinbefore described and said material is cast toward the horizontal section 44 of the said trunk. The material thus admitted to the horizontal section 44 of the trunk is engaged by the flights 41 carried by the chain 40 and is moved toward the lower end of the inclined section 43 of the said trunk 42. The flights carry the material up the said inclined section and deposit the same in the receptacle 45. When sufficient material has been collected in the said receptacle 45 it may be dumped by opening this door 46. In a machine of this kind the structure of the rotor is a matter of importance and in the present case it will be seen that the heads 11 constitute the ends of the rotor and are provided with bits 12. These heads are connected together by means of bars 14 which in turn are provided with bits 15, the inner ends of which bear directly against the periphery of the shaft 10. Inasmuch as the heads 11 are formed from solid material from their centers out to their peripheries the bits carried at the peripheries of the



said heads are firmly seated and are effectually braced whereby the said bits may be subjected to the additional strain of removing the material from the bottom corners of a ditch while the intermediate bits which remove the material from the intermediate portion of a ditch do not require such substantial bracing. By this arrangement it will be seen that the ditcher and grader may operate in an excavation while it is at rest or while it is being advanced in the line in which the excavation is to be extended.

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

1. In a ditching machine a journaled rotor having at its periphery radially disposed bits, a shaft journaled at the side of the rotor and operative from the same, a cam carried by said shaft, a pivoted arm at one end located in the path of movement of the cam, a scraper carried by said arm and at times located in the path of movement of the bits, the parts being so arranged that the cam engages the arm and swings the same so that the scraper is carried beyond the path of movement of the bits as the bits approach the same.

2. A ditching machine comprising a frame, a digger mounted upon the frame, a

trunk having an inclined trough-shaped portion and an approximately horizontal bottomless portion adapted to receive material from the digger, and a conveying means mounted for movement along the trunk.

3. A ditching machine comprising a frame, a digger mounted upon the frame, a trunk pendently connected with the frame and adapted to be supported upon the ground, said trunk having an inclined trough-shaped portion and an approximately horizontal bottomless portion adapted to receive material from the digger, and a conveying means mounted for movement along the trunk.

4. A ditching machine comprising a frame, a rotatable digger mounted upon the frame, a trunk connected with the frame and having an approximately trough-shaped inclined portion and an approximately horizontal bottomless portion adapted to receive material from the digger, and a conveying means mounted for movement along the trunk and operated from the digger.

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

ROBERT E. HAYNES.

Witnesses:

CHAS. O. CROWELL,

A. D. SMITH.