

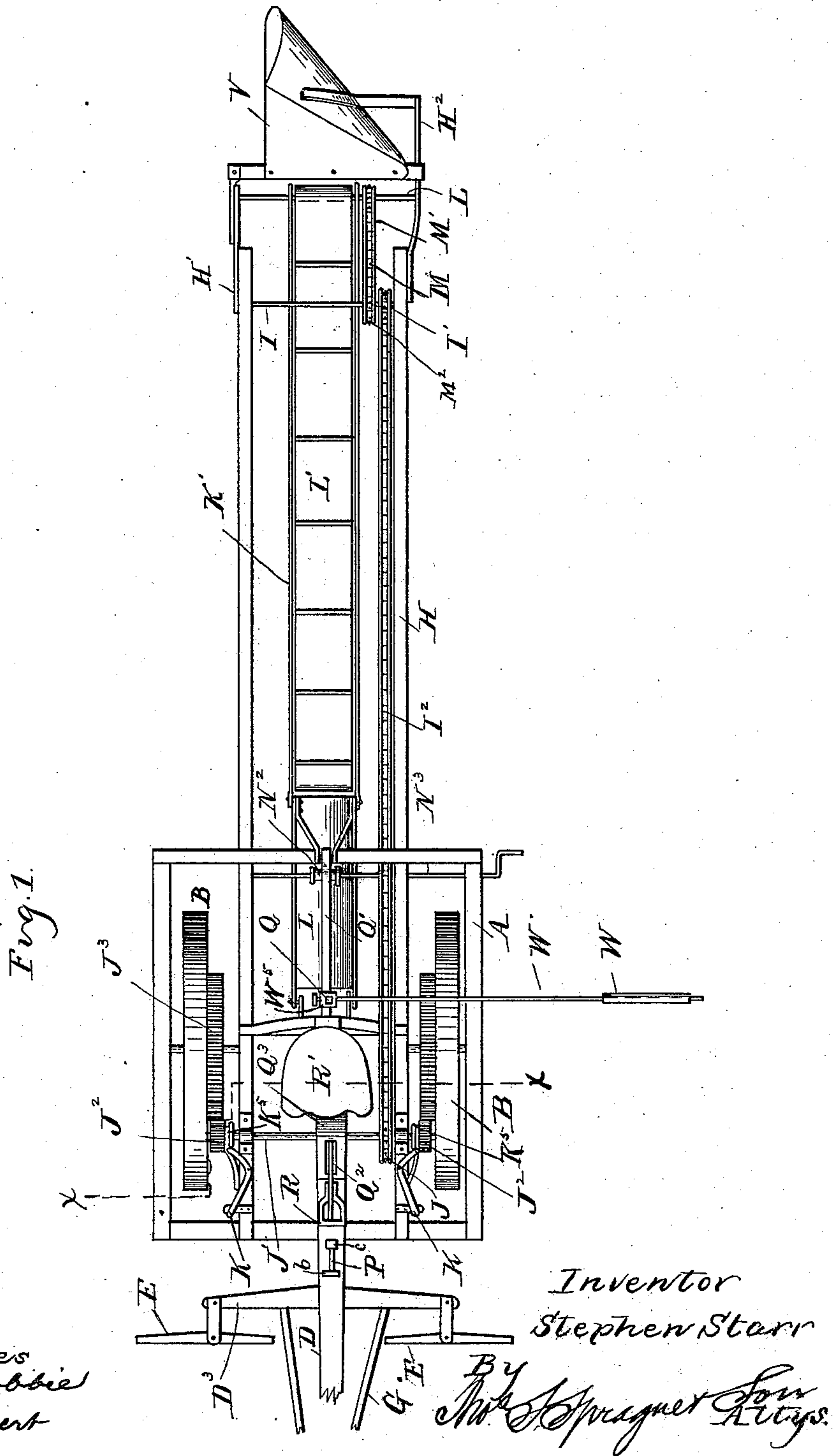
(No Model.)

3 Sheets—Sheet 1.

S. STARR.
DITCHING MACHINE.

No. 471,834.

Patented Mar. 29, 1892.



(No Model.)

3 Sheets—Sheet 2.

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Fig. 1.

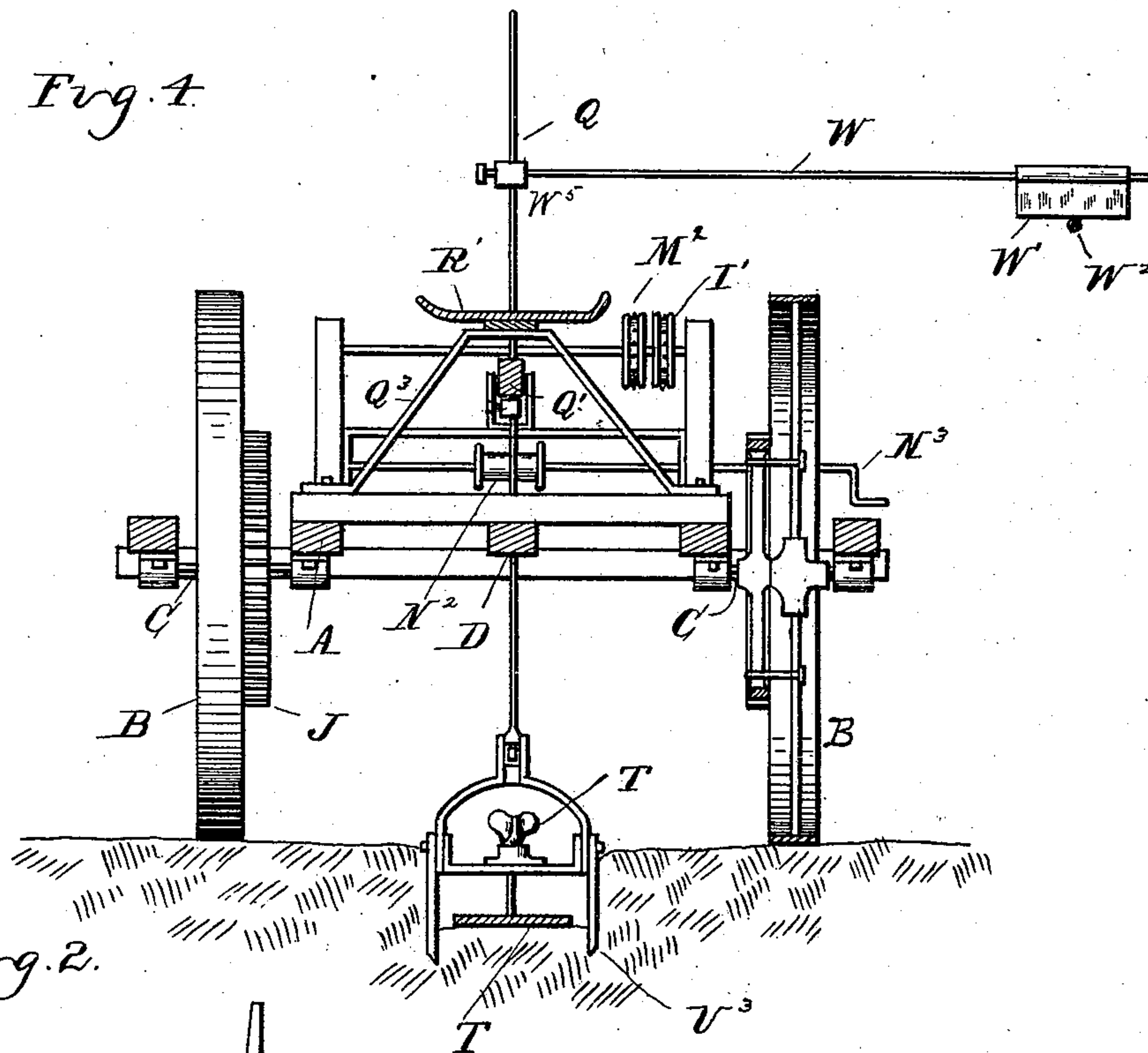
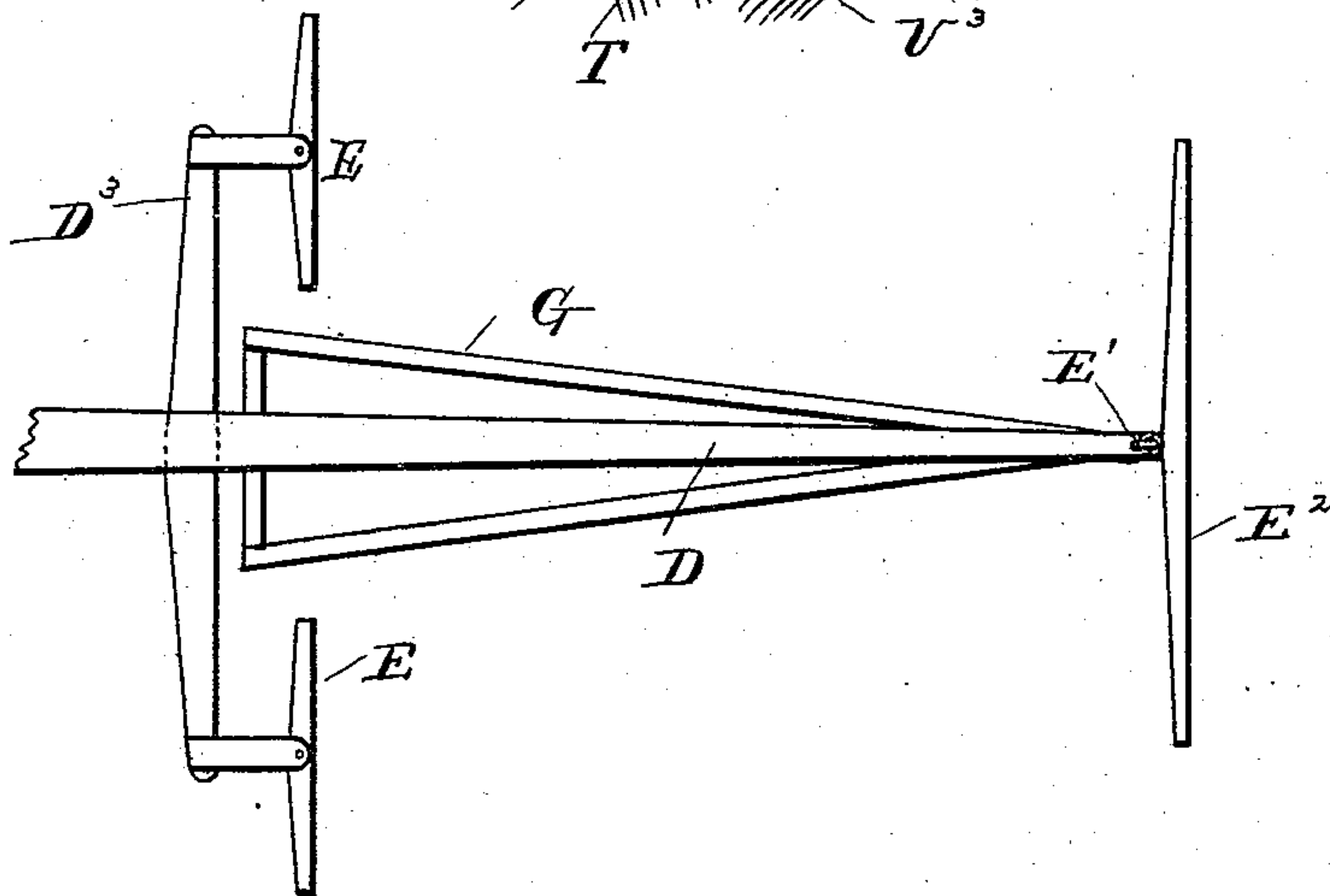


Fig. 2.



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(No Model.)

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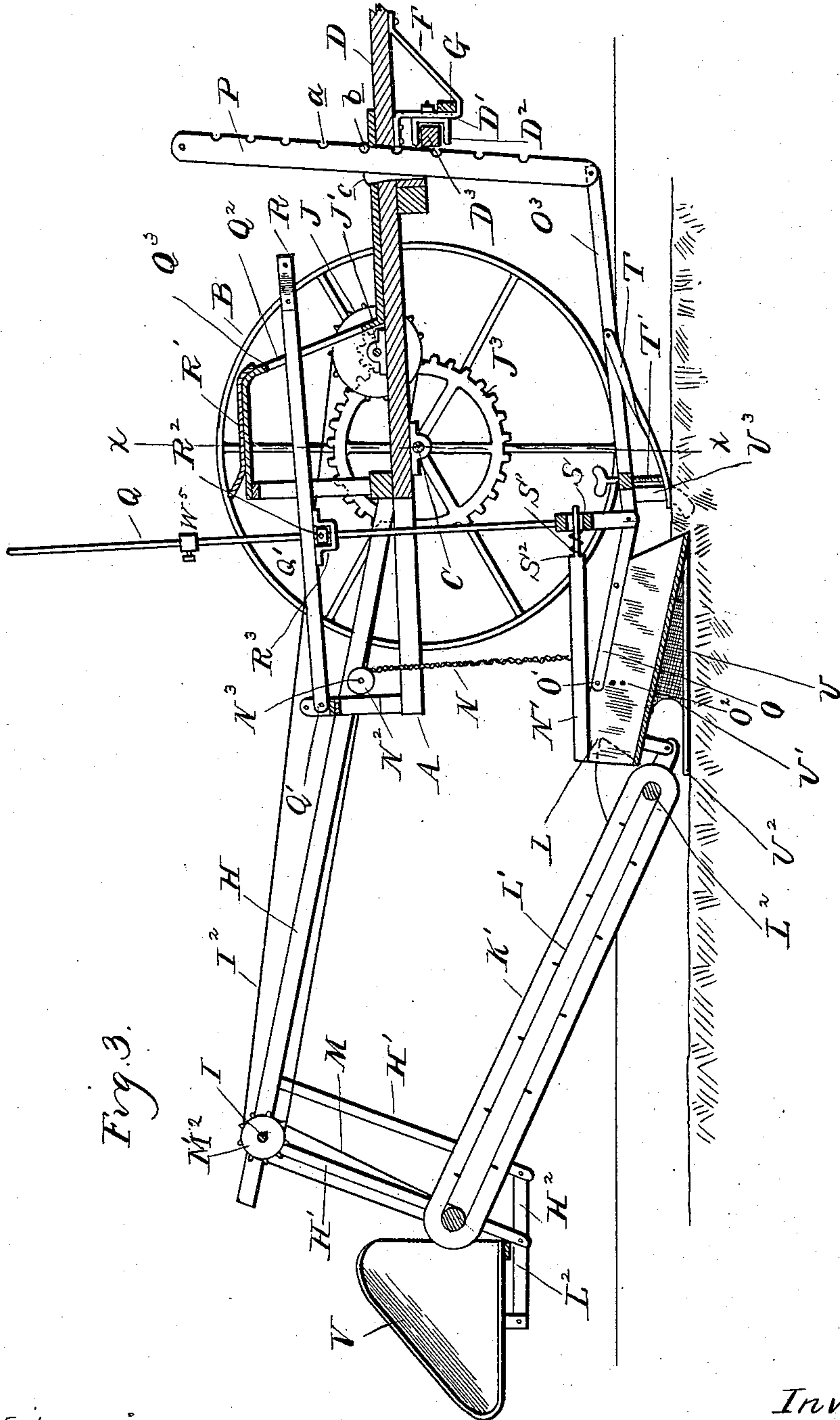


Fig. 3.

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UNITED STATES PATENT OFFICE.

STEPHEN STARR, OF WESTON, OHIO.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 471,834, dated March 29, 1892.

Application filed July 13, 1891. Serial No. 399,358. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN STARR, a citizen of the United States, residing at Weston, in the county of Wood and State of Ohio, have invented certain new and useful Improvements in Ditching-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in ditching - machines especially intended for tile-ditches; and the invention consists in the peculiar construction of the plow, the raising and lowering devices therefor, and the means for regulating the depth of cut thereof, and, further, in the peculiar construction of the elevator supporting frame and driving mechanism therefor, and, further, in the peculiar construction, arrangement, and combination of the various parts, as more fully hereinafter described.

In the drawings, Figure 1 is a plan view of my improved machine. Fig. 2 is an enlarged plan view of the draft-pole and attachment. Fig. 3 is a vertical central longitudinal section through my machine. Fig. 4 is a vertical cross-section thereof on line xx in Figs. 1 and 3, looking toward the rear, parts being omitted, and one wheel in elevation and one in section.

A is the rigid frame, B are the ground-wheels thereof, which are supported upon the axle C.

D is the tongue rigidly secured to the frame and extending forwardly therefrom. This tongue is provided at the rear end with the depending arm D', provided with adjusting-holes to receive the strap D², in which the doubletree D³ is journaled. The doubletree is provided at its end with suitable whiffletrees E. The pole at its forward end is provided with a suitable hook E' to receive the doubletree E². By this construction I am enabled to get the right inclination to the tongue and yet have the horses pull in the most direct manner. In order to brace the arm D', I preferably form the depending arm D' with a brace-arm F, as shown in Fig. 3, and with the bracing-frame G extended from the lower end of said arm to the forward end of the pole, so that the draft upon the arm D' is transmitted longitudinally of the pole.

Extending rearwardly from the frame A is the elevator-supporting frame H, consisting

of bars extending upon each side of the frame within the ground-wheels and carrying at their outer ends the parallel bars H', which are connected at the lower end by the cross-bars H².

I is a shaft journaled in the rear end of the elevator-frame, carrying a sprocket-wheel I', which is driven by means of a sprocket-chain I², passing over the said sprocket-wheel I' and over the sprocket-wheel J upon the shaft J' in the frame, as plainly shown in Figs. 1 and 3. This shaft carries at its ends the pinions J², which mesh with the gear-wheels J³, secured to the inner faces of the ground-wheels B. Suitable clutching devices K⁵ are provided to connect each pinion J² with the shaft J', and levers K are provided at each side of the machine to enable the driver to operate either clutch to disengage the shaft and pinions, so that in turning around no damage to the parts will occur.

K' is a frame pivotally connected at one end to the lower end of two of the bars H', and at the forward end to the rear end of a plow L. In this frame K' is a carrier-belt L', passing over end rollers L² at each end of the frame. The roller at the outer end of the frame is a live-roller, being driven from the shaft I by means of a sprocket-chain M engaging with the sprocket-wheels M' M² upon the shaft of said roller and the shaft I, respectively.

The plow L is of the type ordinarily known as a "scoop-plow," U-shaped in cross-section, and is suspended from the frame by means of a chain or cord N, which is centrally connected to the plow, preferably to an arm N', secured to the rear end thereof and extending forwardly. The chain N at its upper end engages over a winding-drum N² upon a crank-shaft N³, journaled in the frame.

O is a plow-beam, pivoted at its front end near the front end of the plow and adjustably secured by means of a bolt O' to the sides of the plow near the rear end thereof. The plow may be adjusted angularly in relation to the beam by placing the bolt O' in any one of the adjusting-apertures O².

The plow-beam O is provided with the forward extension O³, hinged to the forward end thereof, and this extension is supported at its front end by the gage-bar or standard P,

extending through a guide-bearing in the rear end of the tongue, in which it may be secured to any desired height by means of the notches *a* engaging with the cross-bars *b*, held in engagement therewith by means of the key *c*.

Q is a standard or a gage-bar pivotally connected to the forward end of the plow-beam *O* at the point at which the extension *O*³ is hinged to said beam. This standard *Q* passes through a suitable guide-bearing formed in the lever *Q'*, which is hinged at its rear end to the frame, and at its forward end projects through the guide *Q*², formed in the seat-standard *Q*³, and is there provided with a foot-piece *R*, by means of which it may be raised or lowered by the operator.

R' is a seat secured upon the seat-standard *Q*³. The standard *Q* is held in its adjusted position by means of a set-screw in the block *R*², through which it passes, said block being located within the stirrup *R*³.

The arm *N'* extends forward at an angle from the rear end of the plow, as plainly shown in Fig. 3, passing through the guide-bearing *S* in the standard *Q*.

S' is a spring upon the arm *N'* and located between the shoulder *S*² thereon and the rear face of the standard *Q*.

T is a gage-plate secured at its upper end to the plow, its securing-arm preferably being made of spring metal adapted to be adjusted vertically by means of the screw *T'*. This gage-plate is of nearly the width of the plow and bears with its under surface upon the ground slightly in advance thereof, determining the depth of the cut of the plow.

U is a block secured to the under face of the plow, and *U'* is a wearing-plate upon the under side thereof, having the rearward-extending heel *U*². This heel bears upon the bottom of the ditch.

*U*³ are side plows arranged in front of the scoop-plow and adapted to cut out the sides of the ditch in advance of the scoop.

The parts being thus constructed, their operation is as follows: To adjust the machine, the plow is lowered by uncoiling the chain from the drum *N*², the standard *Q* being carried with the plow in its downward movement. When the plow has reached the proper height to dig, the lever *Q'* is raised to about its central position, as shown in Fig. 3, so that it will be free to have a movement up and down, and a set-screw in the block *R*² is tightened, holding the lever in this position. The forward end of the extension *O*³ of the plow-beam is lowered by means of the gage-bar *P*, and the plate *T* is set to give the desired thickness of cut. As the ditcher is moved forward, motion will be imparted to the carrier through the connections described, and such earth as passes over the plow will fall upon the endless belt *L'*, and thereon be carried to the top of the carrier and fall upon the inclined chute *V*, which will deposit it upon one side of the ditch. When the ditcher has

completed one cut, the parts are lowered farther to make a second cut, and so on, until the ditch has been cut to the desired depth. Should the driver encounter stones or other obstacles which he desires to avoid, he can lift the forward end of the plow by raising on the lever *Q* and in hard ground can keep the points of the plow in the ground by pressing on the outer end of said lever. The plow is held naturally in its inclined position from the fact that it rides at its rear end upon the shoe *U*², and it may be turned to a greater or less angle by adjusting the plow-beam, as previously described. The lowering of the plow swings the bars *H'* forwardly in the arc of a circle, and thus maintains the same relation between the sprocket-wheels *M*², *M'*, and *L*². Thus, regardless of the depth of the ditch, the parts will operate satisfactorily. When the plow is depressed by the lever *Q'*, the spring *S'* is put under tension and tends to return the plow to its normal position. This spring prevents damage to the plow by yielding in case obstacles are struck, and helps to maintain a steady draft without shocks or jolts upon the horses. The gage-bar *P* enables me to arrange the plow-beam substantially in line with the plow or at any desired angle therewith, so that the draft may be transmitted as nearly direct as possible to the pole. The laterally-extending bar *W* is adjustably secured at *W*⁵ to the standard *Q* and carries at its outer end a sight *W'*, loosely hung thereto. This sight is preferably made of sheet metal of suitable size, and rests with its lower edge upon the wire *W*², stretched beside the ditch at the proper grade. In case the plow cuts unevenly the sight will be turned upon its pivot and indicate to the driver whether to press down or raise up upon the lever *Q'* to get the proper grade in the ditch.

What I claim as my invention is—

1. In a ditching-machine, the combination, with the frame and plow, of means for suspending the plow from the rear of the frame, a jointed beam pivotally connected with the plow and adjustably connected with the front of the frame, and an adjustable standard pivotally secured to the plow and beam at the pivotal union thereof, substantially as described.

2. In a ditching-plow, the combination, with the frame and plow, of means for suspending the plow from the rear of the frame, a jointed beam pivotally connected with the plow and adjustably connected with the front of the frame, an adjustable standard, and a lever on the frame for actuating the standard, substantially as described.

3. In a ditching-machine, the combination of the rigid wheeled frame, a depending cord or chain, a plow suspended at or near its middle by said chain, an adjustable standard, and an adjustable beam secured to the forward end of said plow, and to which the adjustable standard is pivoted, substantially as described.

4. In a ditching-machine, the combination, with the frame of a plow suspended from the rear thereof, of a jointed beam pivotally connected with the front of the plow, means for adjusting said beam, an adjustable standard connected with the front of the plow at the pivotal union between the beam and plow, means for adjusting the standard, and a spring engaging the standard and carried by the plow, substantially as described.

5. In a ditching-machine, the combination of the rigid wheeled frame, a depending chain or cord, a plow suspended at or near its middle by said chain, a standard for the forward end of the plow, extending below the connection between the chain and plow, an arm on the plow, a spring on the arm engaging the standard above the lowermost end thereof, and means for vertically adjusting said standard and chain, substantially as described.

6. In a ditching-machine, the combination of the frame, the suspended plow, the jointed plow-beam, and the adjustable bars Q and P, substantially as described.

7. In a ditching-machine, the combination, with the vertically-adjustable plow, of the rearwardly-extending bars H, secured to the frame, the bars H', depending from said bars, the elevator supported at one end by the plow

and at the other end by said bars H, and means for driving the elevator, substantially as described.

8. In a ditching-machine, the combination, with the vertically-adjustable plow, of the frame, the rearwardly-extending bars H, the bars H', depending from the outer ends of said bars, the elevator supported at one end by the plow and at the other end by said bars H', and the chute V, carried by the bars H', substantially as described.

9. In a ditching-machine, the combination, with the plow, of the plow-beam, the plate T, connected by a spring-arm with the plow-beam, and the adjusting-screw T', substantially as described.

10. In a ditching-machine, the combination, with the frame of a plow, of an adjustable standard for the plow, an independently-adjustable bar on the standard extending out horizontally beyond the frame, and a sight hinged to said bar, substantially as described.

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

STEPHEN STARR.

Witnesses:

M. B. O'DOHERTY,
A. L. HOBBIE.