No. 775,990. PATENTED NOV. 29, 1904.

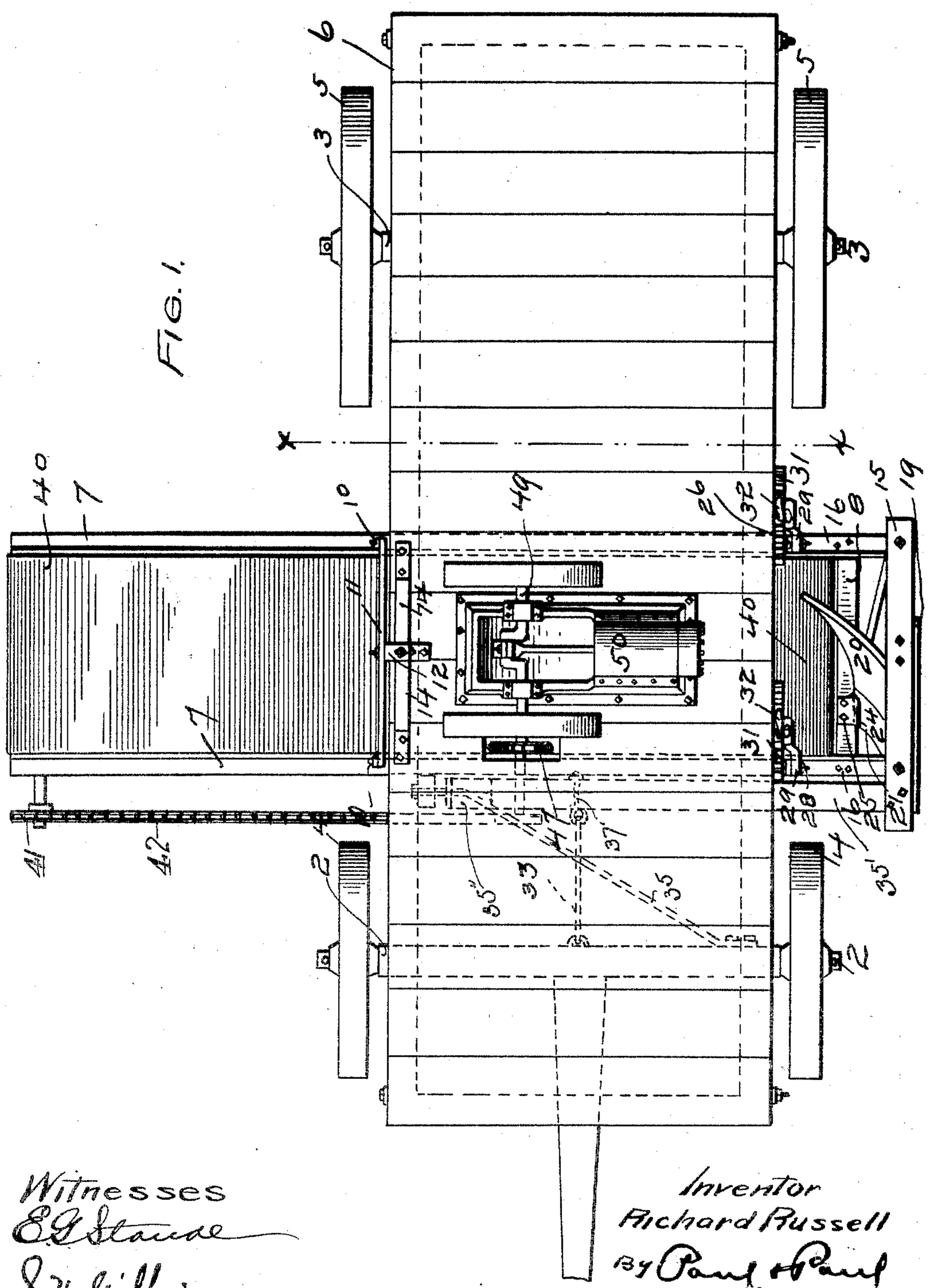
R. RUSSELL.

ROAD GRADING AND DITCHING MACHINE.

APPLICATION FILED JUNE 4, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

FIG. 1.



Witnesses
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NO MODEL. 4 SHEETS—SHEET 2.

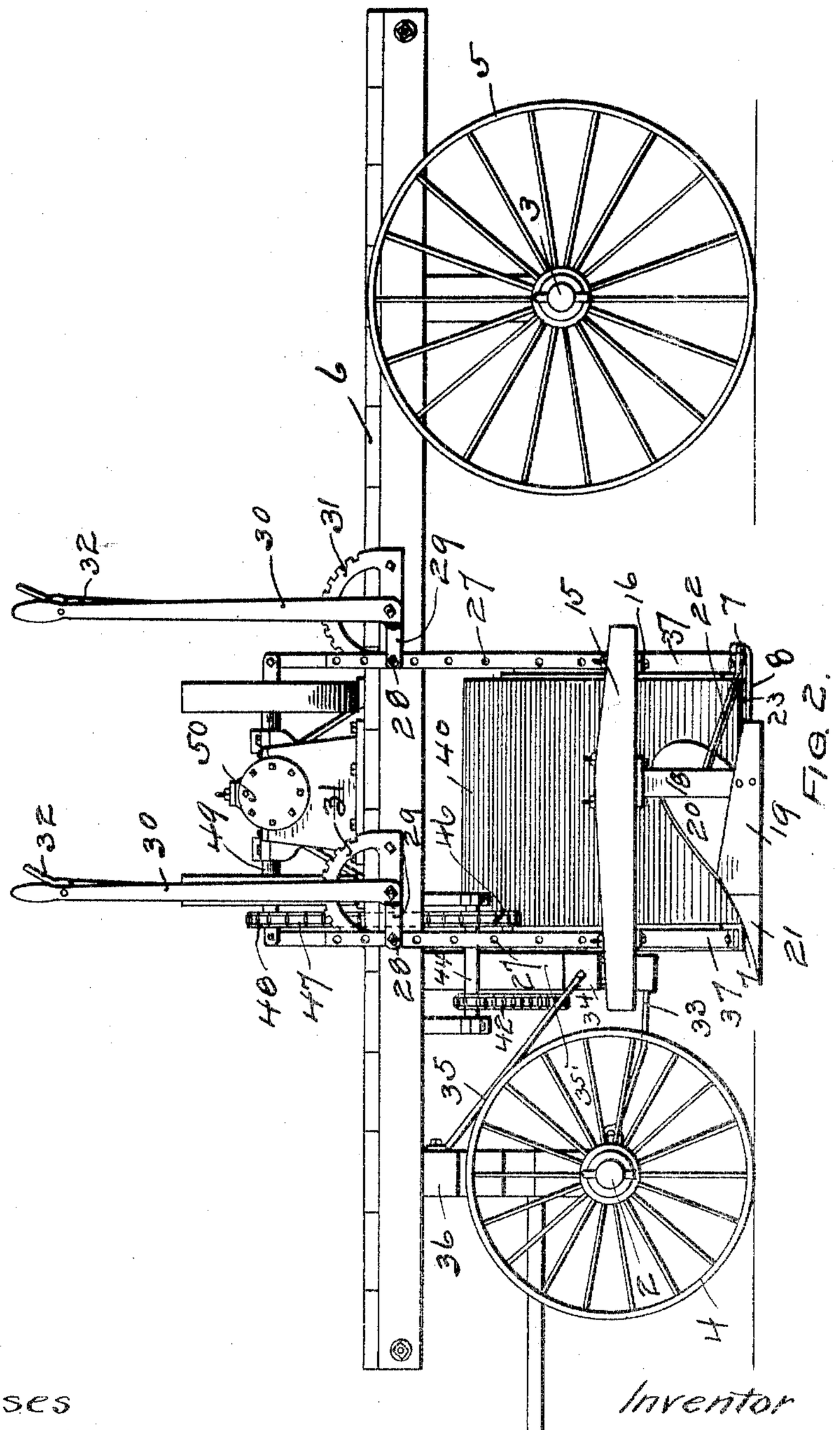

FIG. 2.

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NO MODEL. 4 SHEETS—SHEET 3.

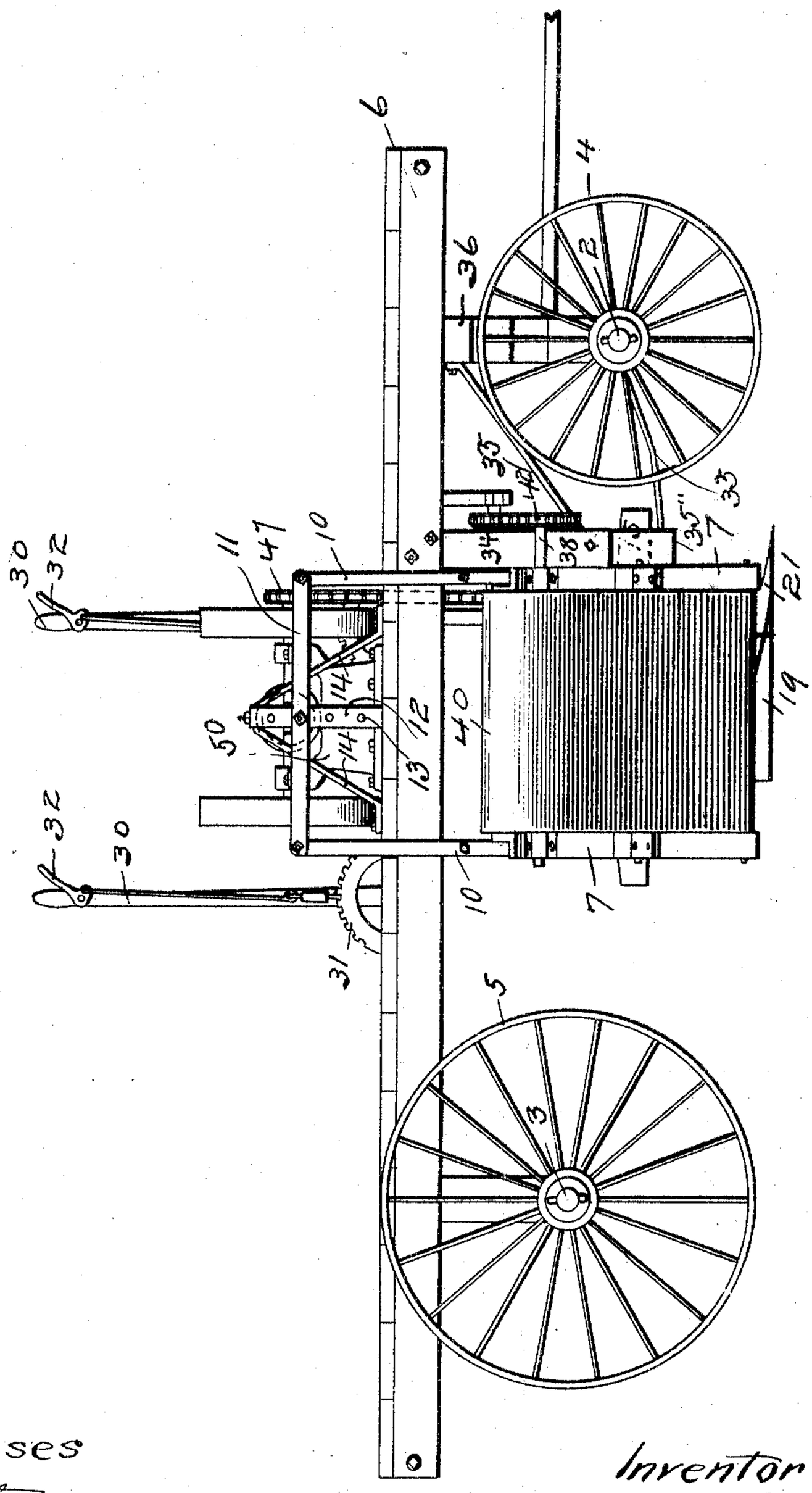

FIG. 3.

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NO MODEL. 4 SHEETS—SHEET 4.

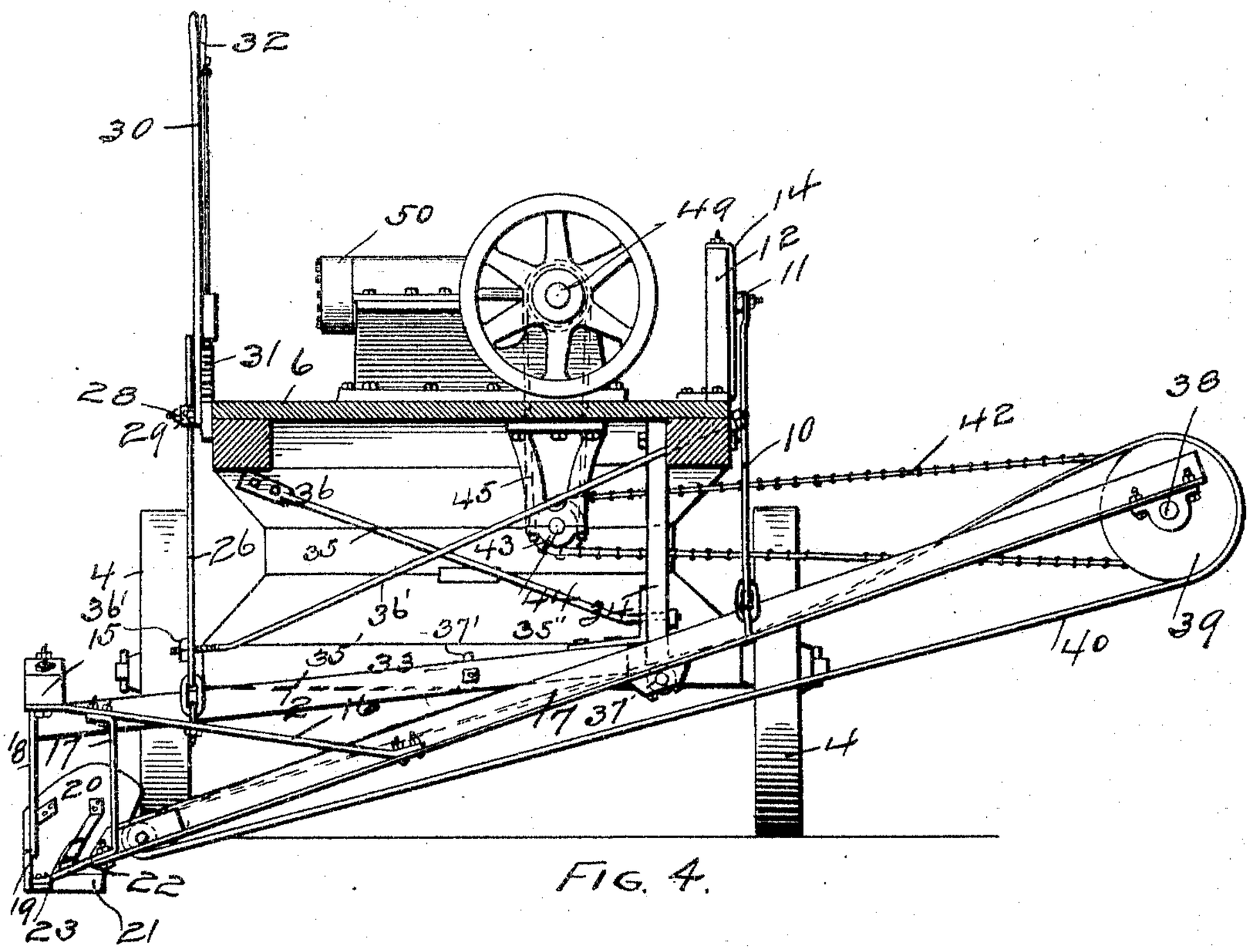

FIG. 4.

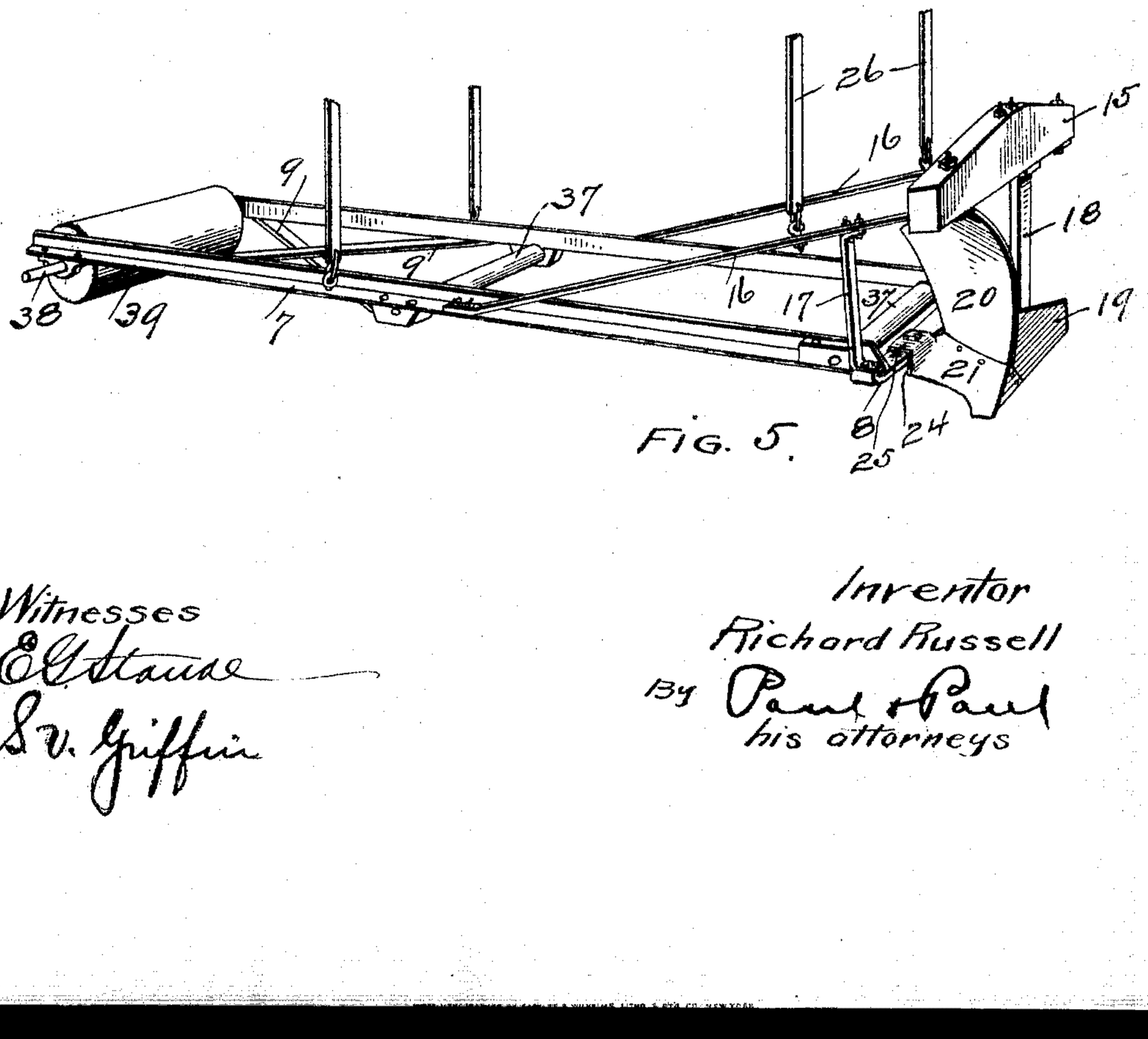

FIG. 5.

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No. 775,990. Patented November 29, 1904.

UNITED STATES PATENT OFFICE.

RICHARD RUSSELL, OF STEPHEN, MINNESOTA.

ROAD GRADING AND DITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 775,990, dated November 29, 1904.

Application filed June 4, 1903. Serial No. 160,006. (No model.)

To all whom it may concern:

Be it known that I, RICHARD RUSSELL, of Stephen, county of Marshall, State of Minnesota, have invented certain new and useful Improvements in Road Grading and Ditching Machines, of which the following is a specification.

My invention relates to that class of grading and ditching machines shown and described in Letters Patent of the United States issued to me May 12, 1903, No. 727,693.

The object of my invention is to simplify and improve the mechanism of the machine shown in the above-described patent.

A further object is to provide means for rigidly securing the ditching-plow and holding the same in place while the machine is in use.

A further object is to provide an improved construction of the frame whereon the plow is supported.

Other objects of the invention will appear from the following detailed description.

The invention consists generally in various constructions and combinations, all as hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of a grading and ditching machine embodying my invention. Fig. 2 is a side elevation of the machine on the side where the plow is located. Fig. 3 is a similar view of the opposite side of the machine. Fig. 4 is a transverse vertical section substantially on the line *x x* of Fig. 1. Fig. 5 is a perspective of the front of the plow and the frame whereto it is secured and whereon the traveling apron is also supported.

In the drawings, 2 and 3 represent, respectively, the forward and rear axles, having wheels 4 and 5 and supporting a horizontal platform 6. A rectangular frame is arranged transversely beneath the said platform, consisting of parallel angle-bars 7, connected at one end by a cross-bar 8 and rigidly secured against spreading or twisting at their other ends by the diagonally-arranged braces 9. The frame is arranged at an incline under the platform and is supported at its discharge side by pivoted links 10, that are connected to the bars 7, respectively, and to the ends of an oscillating bar 11, that is pivoted at a point intermediate to its ends upon an upright standard 12, provided with a series of holes 13. These holes render the bar 11 vertically adjustable on the said standards and permit the operator to elevate or depress the said frame at the discharge side of the machine. Braces 14 are preferably provided on the platform 6 and secured to the standards 12. Near the opposite end of the frame on the receiving side of the machine I provide a horizontal plow-beam 15, secured to the ends of braces 16, that are bolted to the bars 7 at a point near the middle thereof and are held at an incline by bracing-straps 17, that connect the braces 16 with the lower ends of the bars 7. A post 18 is secured to the under side of the beam 15 and at its lower end is bolted to a landside 19, in front of which is the moldboard 20 and the plowshare 21. The rear end of the plowshare 21 is rigidly secured to the adjacent rail 7 by a bar 22, and a strap 23 connects the moldboard with the bar 22 and serves to hold the board firmly in place. The plowshare 21 has an upwardly-turned flange portion 24, the edge 25 of which is turned over the cross-bar 8 and bolted thereto. The flange 24 serves two purposes. It guides the earth excavated by the plowshare up to the moldboard and to the traveling apron and allows the plow-point to enter the desired distance into the ground, but preventing the end of the apron-supporting frame from touching the ground. From the foregoing it will be noted that the working parts of the plow are rigidly secured and that there will be no possibility of their becoming twisted out of their proper position with respect to the frame and the traveling apron while the machine is in operation. Any suitable mechanism may be employed for raising and lowering the plow and the receiving side of said frame; but I prefer to provide bars 26, pivotally connected with the braces 16 and having a series of perforations 27, that are adapted to receive pins 28, provided on the arms 29, that are carried by the pivoted

levers 30. These levers are secured to one side of the frame 6 and are movable over toothed quadrants 31, that are engaged by locking devices 32, carried by said levers. By operating these levers the bars 26 can be raised or lowered to elevate the forward and rear edges of the apron-supporting frame simultaneously or to tilt one edge or side independently of the other, according to the character of the ground where the machine is used. If the operator desires to have the plow dig deeper into the soil, he will operate the rear lever and tilt the frame forward. A corresponding movement of the forward lever will cause a reverse movement of the frame. A depending post 34 is provided on the platform 6 in front of the apron-frame and acts as a guide therefor, and it also prevents the discharge end of said frame from swinging forward when the plow is forming the ditch. A brace-rod 35 connects the post 34 with a bolster 36, supported on the forward axle. A timber 35′ is bolted at one end to the plow-beam 15 and at its other end is provided with an angle-plate 35″, that is secured to the said timber and is slidably mounted on the brace-rod 35. A rod 36′ connects one of the bars 26 with the frame 6 and is provided with a threaded end and a bur 36″, by means of which the operator can move the suspended frame laterally with respect to said wheeled frame and take up the slack in the apron-driving chain or loosen the same. The timber 35′ serves to brace and strengthen the operating parts of the machine and aid in holding the plow rigidly while at work. A draft-link 37′ connects the timber 35′ with the forward axle. Mounted in bearings at the receiving end and near the middle of the apron-frame are idle rollers 37, and at the discharge end of said frame is a shaft 38, carrying a cylinder 39 of greater diameter than the rollers 37 and over which and said idle rollers an apron 40 travels. Any suitable means may be provided for moving said apron; but I prefer to provide a sprocket-wheel 41 on the shaft 38, connected by a chain 42 with a sprocket 43, that is mounted on a shaft 44, supported in bearings in hangers 45, suspended beneath the platform 6. A sprocket 46 on the shaft 44 is connected by a chain 47 with a similar sprocket 48 on a crank-shaft 49, that is operated by a gasolene-engine 50, mounted on the platform 6, preferably near the middle thereof.

The operation of the machine is as follows: The operator having adjusted the plow the desired height from the ground will start the engine and set the apron in motion, and the plow as the machine is moved forward will dig into the soil, and the gravel lifted up by the plowshare will be directed by the flange 24 and the moldboard 20 up onto the traveling apron, which will convey the material to the middle of the roadway. The flange 24, having a sharp forward edge, will act as a fin-colter and besides guiding the excavated material up to the moldboard will prevent the receiving end of the apron-frame from coming in contact with the ground.

The apparatus herein described is extremely simple in construction and at the same time is strong and durable. The traveling apron can be set at any desired angle, according to the slope of the roadway and the depth of the ditch, and the plow rigidly secured to the apron-frame cannot be twisted out of position and will cut a ditch of uniform depth and will be operable with a comparatively light draft.

I claim as my invention—

1. The combination, with a wheeled frame, of an apron-supporting frame suspended beneath the same, a traveling apron carried by said suspended frame, a plow provided at the receiving end of said apron and comprising a landside, a moldboard and a plowshare having an upwardly-turned edge secured to said suspended frame and forming a fin-colter, and means for raising and lowering said plow and frame.

2. The combination, with a wheeled frame, of a transversely-arranged apron-supporting frame suspended beneath the same, a traveling apron carried by said suspended frame, a bar supported on said wheeled frame and pivoted at a point intermediate to its ends, links connecting the ends of said bar with the discharge end of said suspended frame, a plow provided at the receiving end of said suspended frame, and means for supporting said plow and the receiving end of said frame.

3. The combination, with a wheeled frame, of an apron-supporting frame suspended beneath the same, a traveling apron carried by said suspended frame, a bar pivoted at points intermediate to its ends and vertically adjustable on said wheeled frame, links connecting the ends of said bar with the discharge end of said suspended frame, a plow provided at the receiving end of said suspended frame, and means supporting said receiving end.

4. The combination, with a wheeled frame, of an apron-supporting frame suspended beneath the same and comprising angle-bar side rails and cross bars and braces connecting the same, idle rollers provided at the receiving end and near the middle of said suspended frame, a driven roller at the discharge end of said suspended frame, an apron operating over said rollers, a plow provided at the receiving end of said frame, and pivoted supports connecting said suspended frame and said wheeled frame.

5. The combination, with a wheeled frame, of an apron-frame arranged transversely beneath the same, a traveling apron carried by said last-named frame, means pivotally supporting said apron-frame on said wheeled frame, a timber secured to the plow-beam, a

post whereto said timber is connected, a draft-link connecting said timber and the forward axle, and a plow provided at the receiving end of said apron-frame, substantially as described.

6. In a machine of the class described, the combination, with a traveling apron and its supporting-frame, of a plow provided at the receiving end of said frame, and a fin-colter provided between the plowshare and said apron and arranged to direct the material toward the moldboard, substantially as described.

7. The combination, with a frame and the traveling apron thereon, of a plow having a beam secured to the receiving end of said frame, and a fin-colter provided on the plowshare and having a vertical cutting edge and an inwardly-turned flange secured to said frame.

8. The combination, with an apron-frame, of a plowshare secured to the receiving end of said frame, a moldboard, a landside, a brace-bar connecting said landside and said frame, braces interposed between said bar and said moldboard, an upright post secured to said landside, a plow-beam secured to said post, braces connecting said plow-beam and the middle portion of said frame, and straps connecting said beam-braces and the receiving end of said frame.

9. The combination, with a wheeled frame, of an apron-frame suspended beneath the same, an apron, a plow provided at the receiving end of said apron, and having a beam, a brace connecting said beam and wheeled frame, and means for adjusting said brace to vary the position of said plow and apron-frame with respect to said wheeled frame.

10. The combination, with a wheeled frame, of an apron-frame supported beneath the same, an apron, a plow provided at the receiving end of said apron-frame, a post depending from said wheeled frame, a timber secured to said plow and slidably connected with said post, and a brace-rod connecting said apron-frame and said wheeled frame, for the purpose specified.

11. The combination, with a wheeled frame, of a transversely-arranged apron-frame and a traveling apron thereon, a plow provided at the receiving end of said apron-frame, means for raising and lowering the receiving end of said apron-frame, and means for adjusting said apron-frame laterally with respect to said wheeled frame.

12. The combination, with a wheeled frame, of an apron-frame transversely arranged beneath the same, an apron thereon, a plow secured to the receiving end of said apron-frame, means for raising and lowering the receiving end of said apron-frame, and a brace adjustably connecting said wheeled frame and said apron-frame.

13. The combination, with a wheeled frame, of an apron-frame transversely arranged beneath the same, an apron thereon, a plow provided at the receiving end of said apron-frame and having a suitable beam, and suitable braces connecting said plow-beam and said apron-frame, for the purpose specified.

14. The combination, with an apron-frame, of a plowshare secured to the receiving end thereof, a moldboard, a landside, a post provided on said landside, a plow-beam secured to said post, and braces connecting said plow-beam and said apron-frame, substantially as described.

15. The combination, with an apron-frame, of a plow secured to the receiving end thereof and comprising a moldboard, a landside and a beam supported thereon, braces connecting said plow-beam and the middle portion of said frame, and suitable straps connecting said beam-braces and the receiving end of said frame.

16. The combination, with a wheeled frame, of an apron-frame supported beneath the same, an apron thereon, a plow provided at the receiving end of said apron-frame, a brace secured to said plow and slidably connected with said wheeled frame, and an adjustable rod connecting said apron-frame and said wheeled frame.

17. The combination, with a wheeled frame, of a transversely-arranged apron-frame thereon, a plow secured to the receiving end of said apron-frame, and mechanism for adjusting said apron-frame lengthwise to vary the position of it and said plow with respect to the line of travel.

In witness whereof I have hereunto set my hand this 21st day of May, 1903.

RICHARD RUSSELL.

In presence of—
RICHARD PAUL,
S. V. GRIFFIN.