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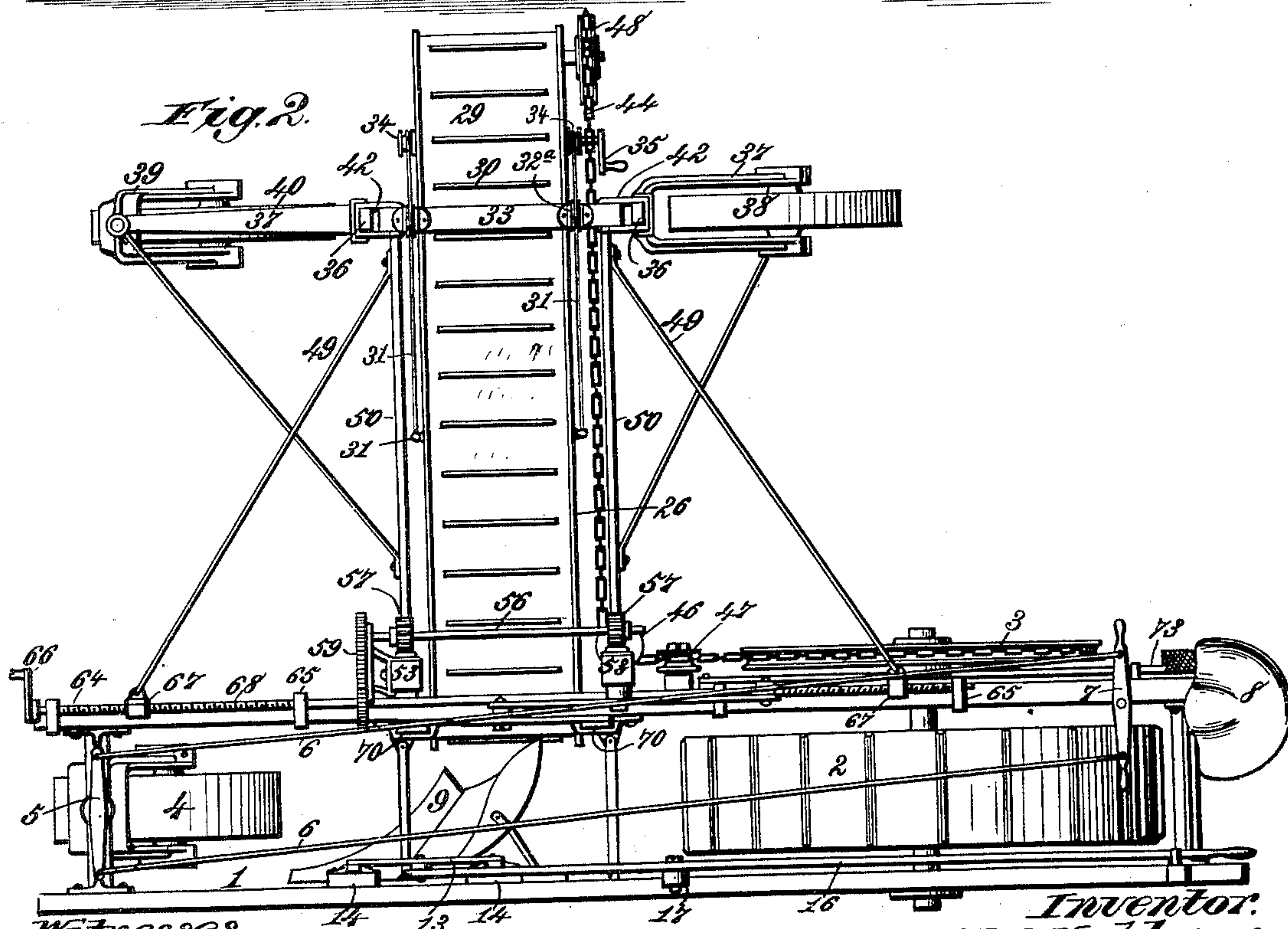
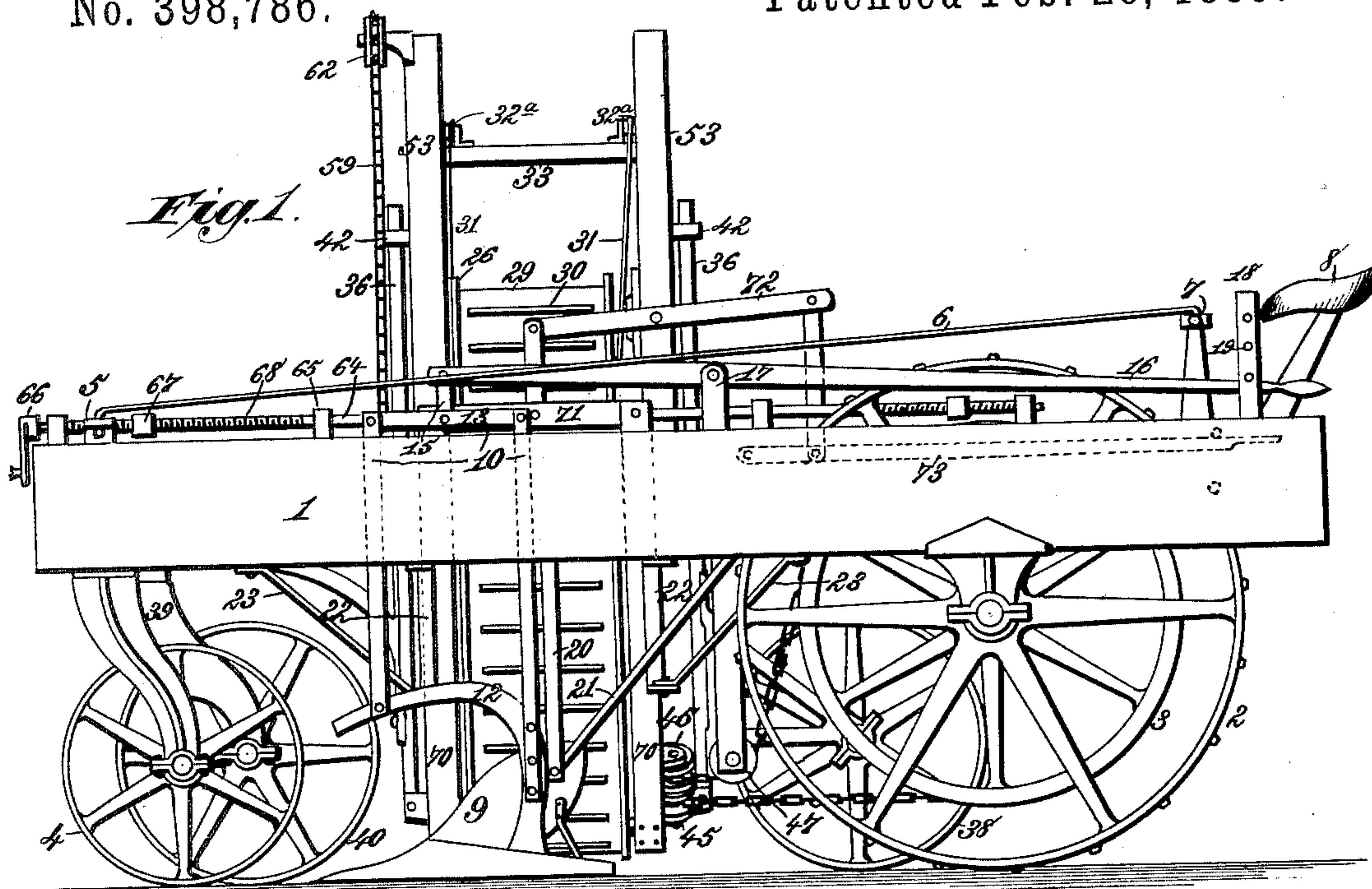
3 Sheets—Sheet 1.

D. D. KUHLMAN.

DITCHING AND GRADING MACHINE.

No. 398,786.

Patented Feb. 26, 1889.



Witnesses.
Phet Smith,
Geo. H. Rea.

Inventor.
David D. Kuhlman.
By James L. Norris,
Atty.

(No Model.)

3 Sheets—Sheet 2.

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Fig. 3.

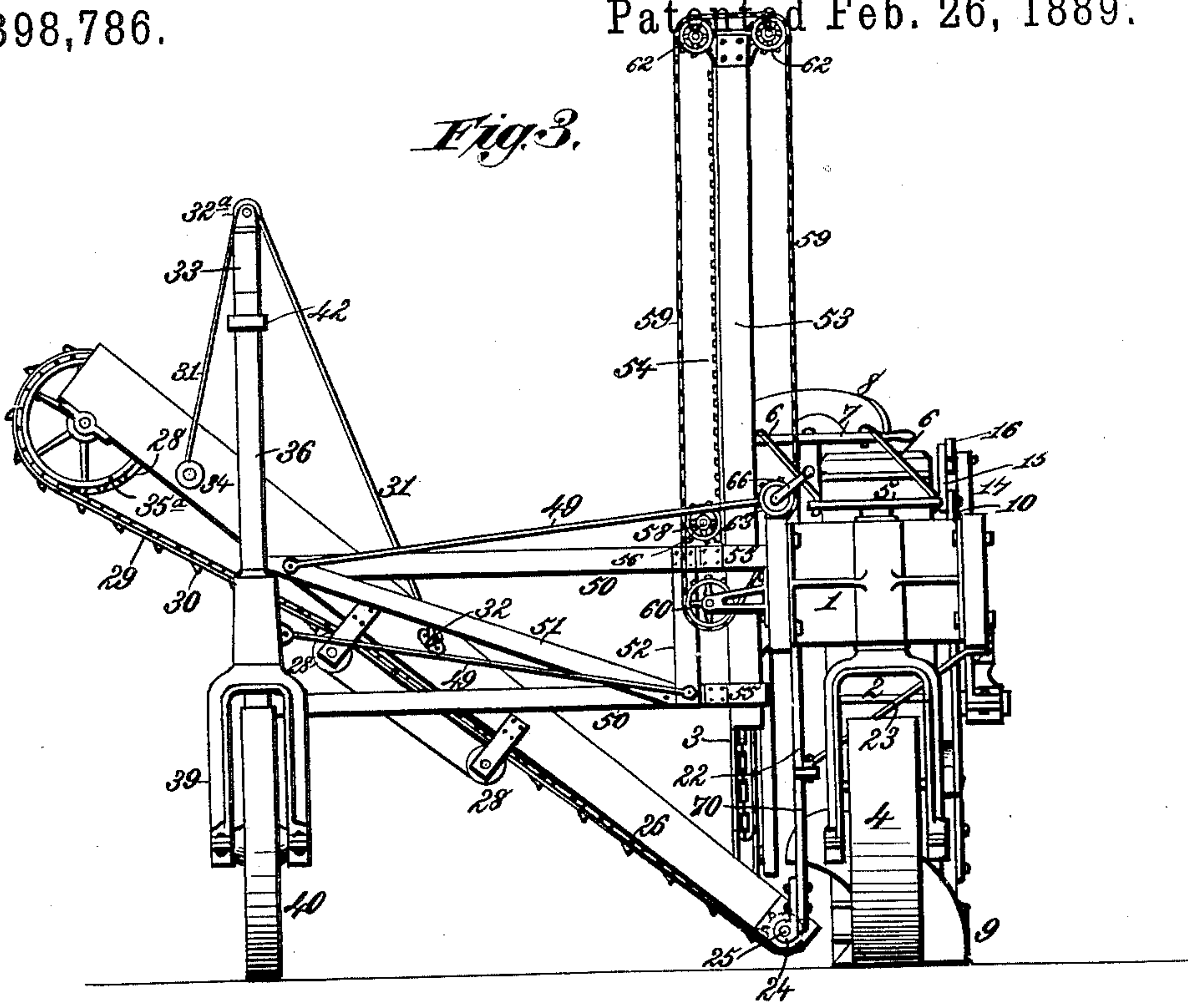
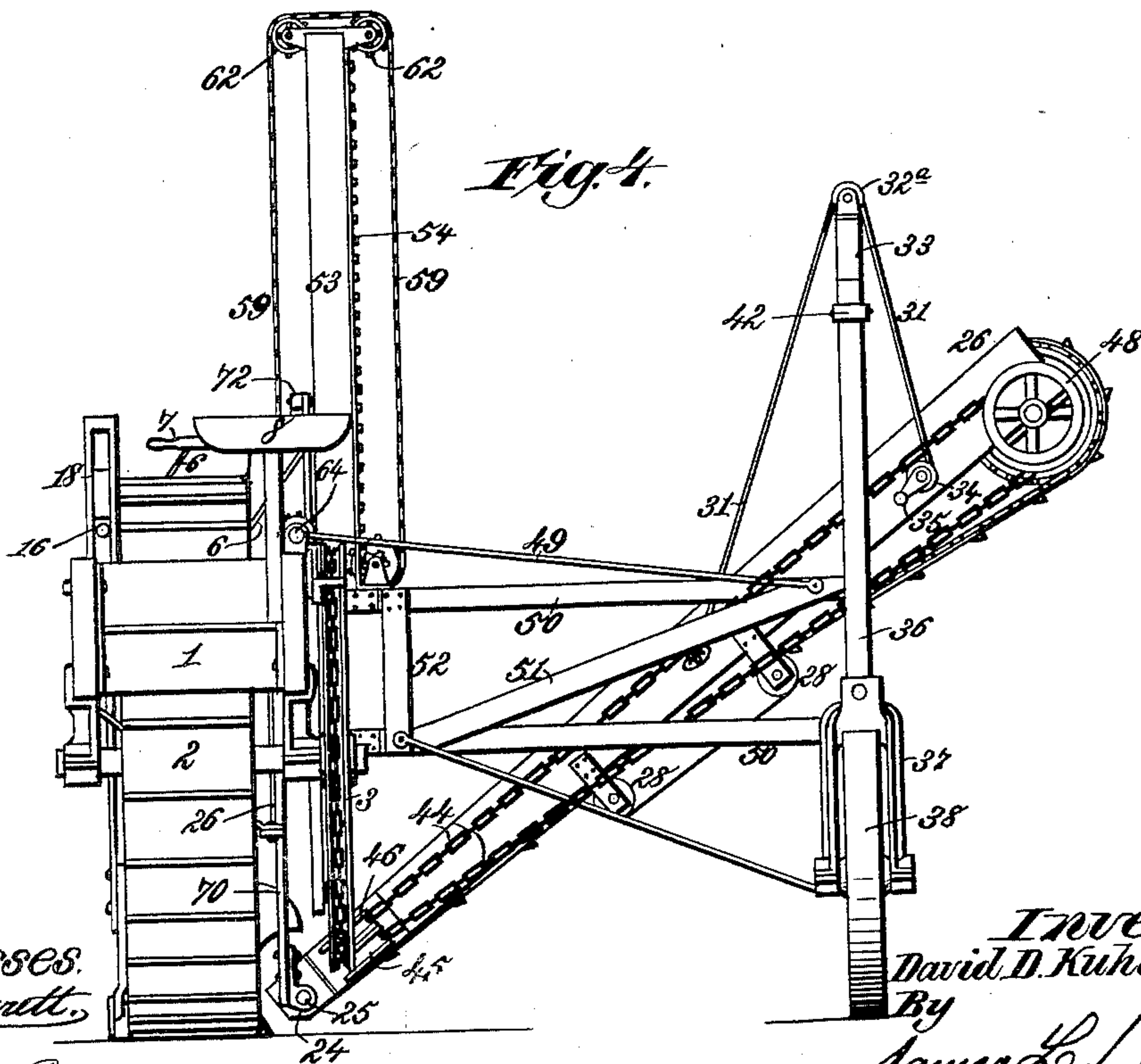


Fig. 4.



Witnesses:
Phil Smith,
Geo. W. Rea.

Inventor:
David D. Kuhlman.
By
James L. Norris,
Att'y.

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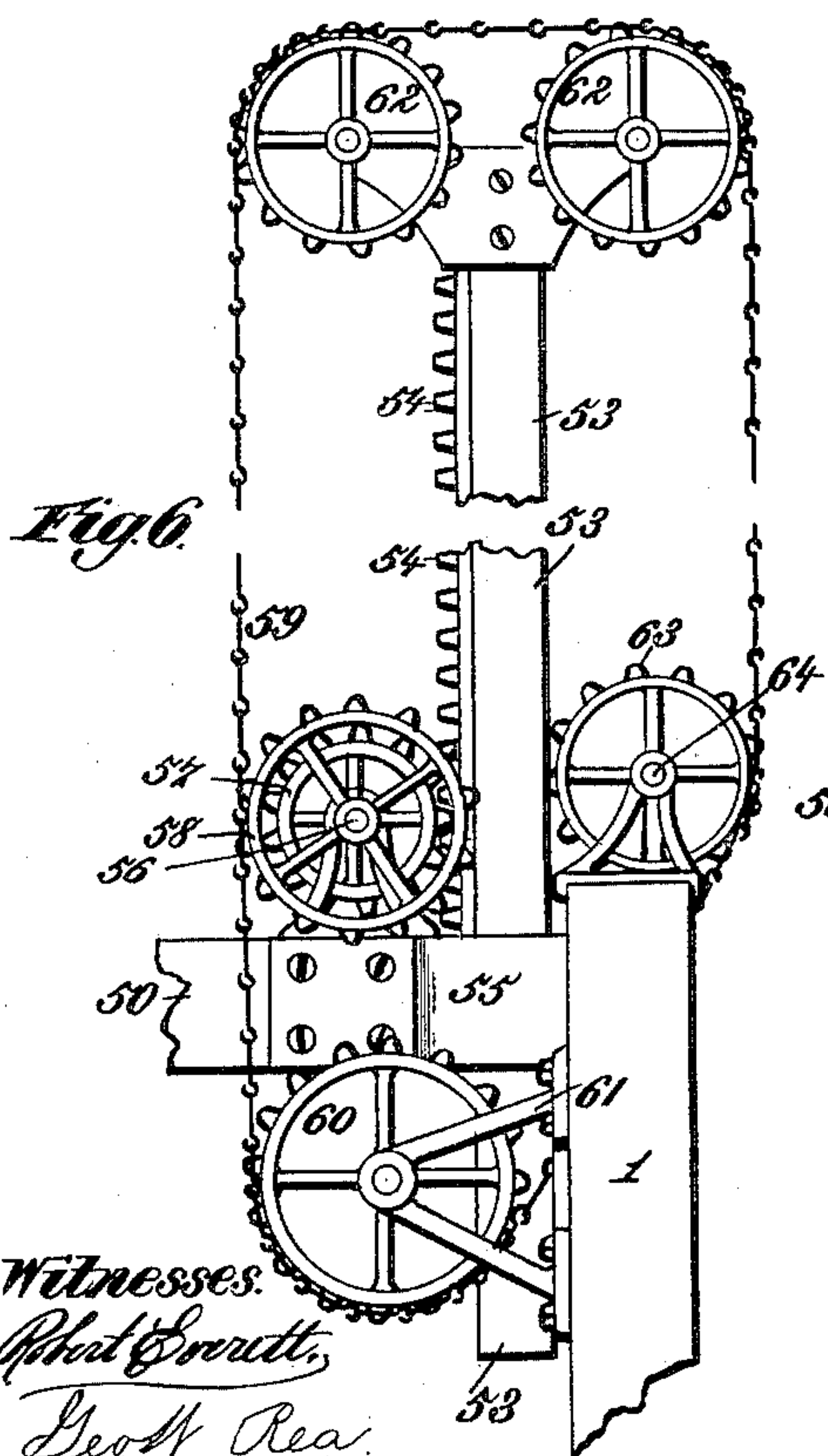
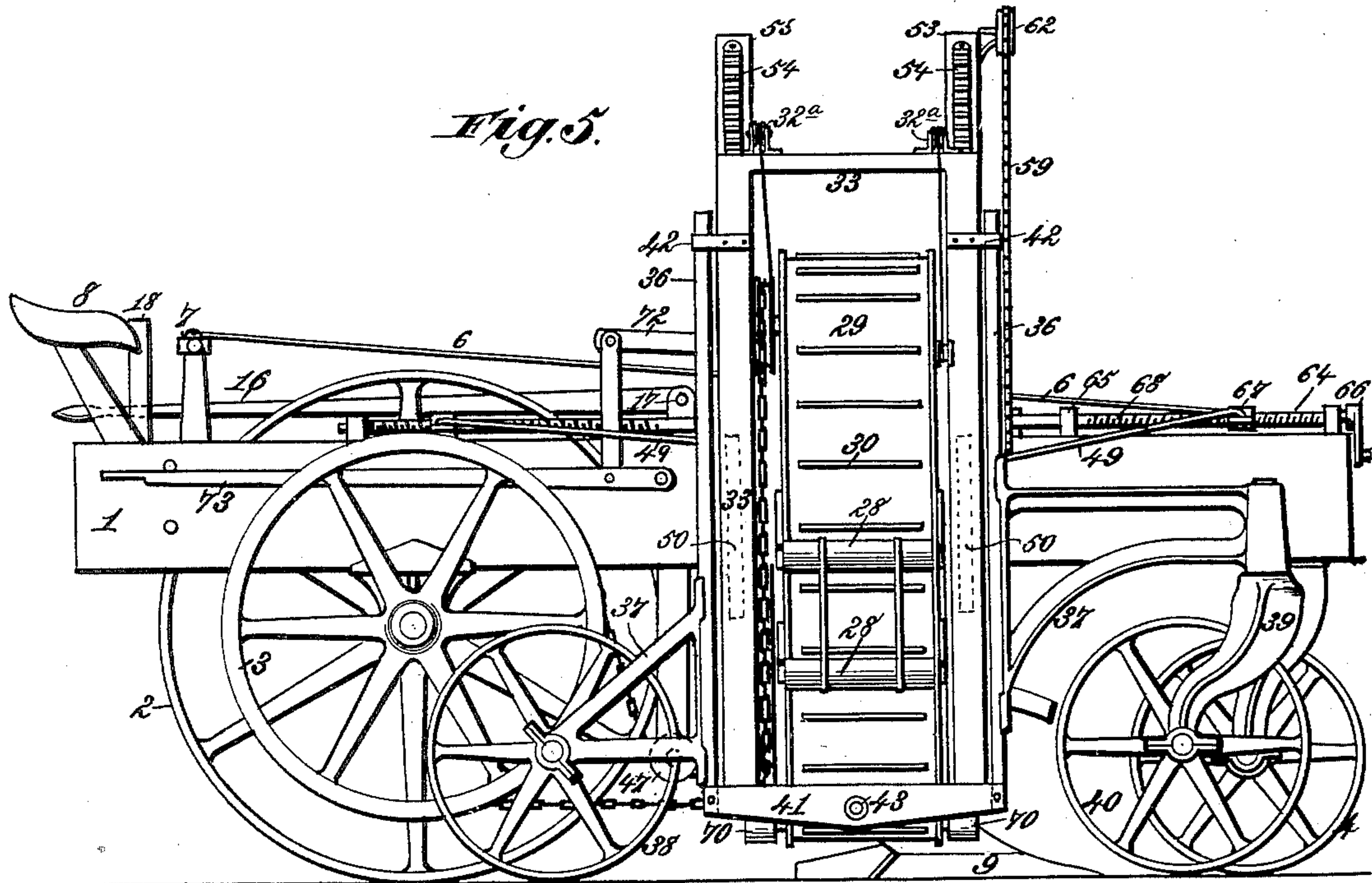
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D. D. KUHLMAN.

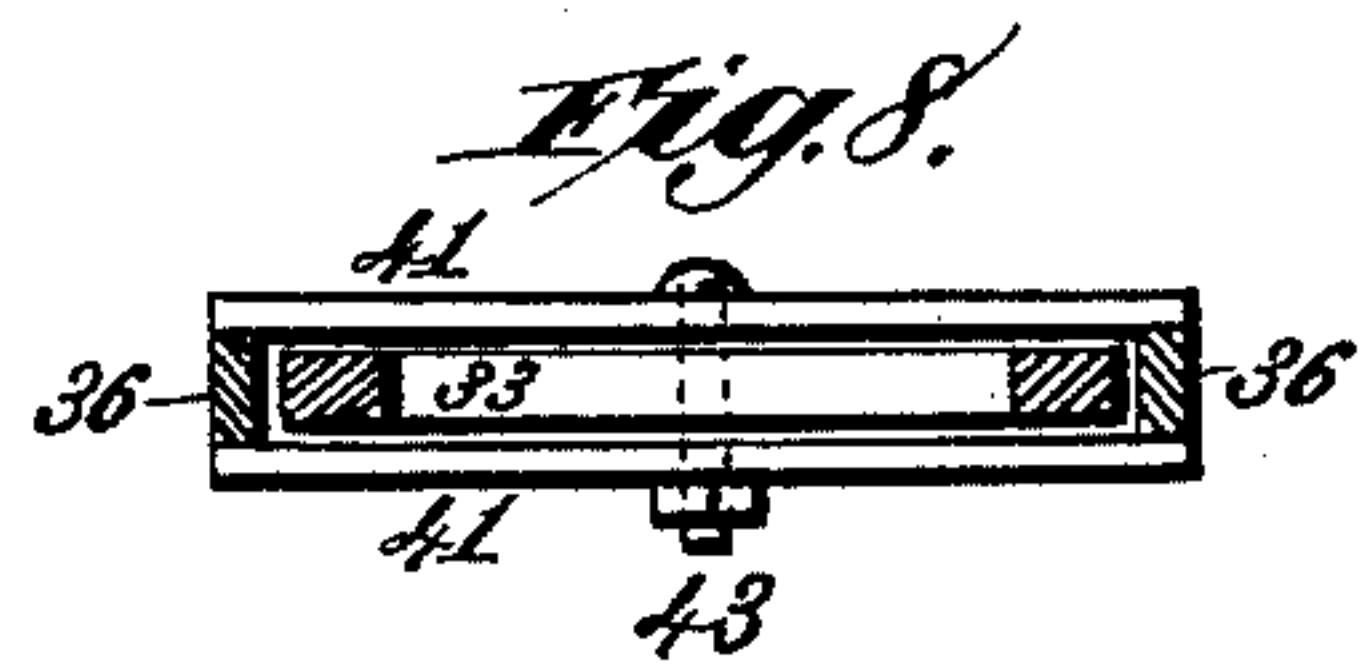
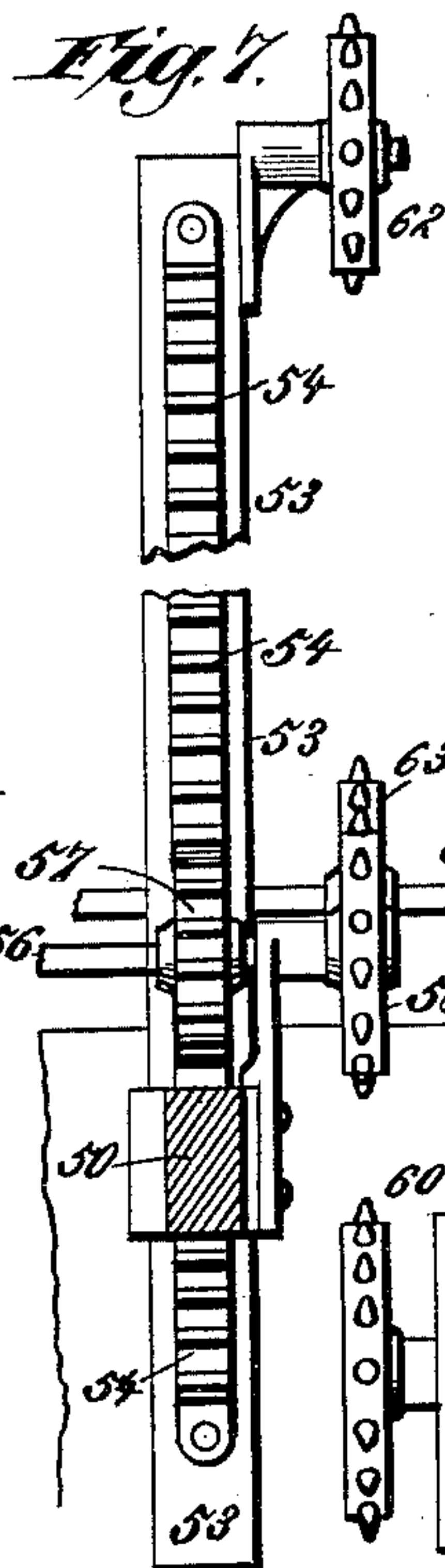
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UNITED STATES PATENT OFFICE.

DAVID D. KUHLMAN, OF KANSAS CITY, MISSOURI.

DITCHING AND GRADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 398,786, dated February 26, 1889.

Application filed April 9, 1888. Renewed January 28, 1889. Serial No. 297,828. (No model.)

To all whom it may concern:

Be it known that I, DAVID D. KUHLMAN, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented new and useful Improvements in Ditching and Grading Machines, of which the following is a specification.

My invention relates to that class of ditching and grading machines in which the earth is loosened or turned up by a plow and thrown upon an elevating mechanism, whereby it is carried from the ditch to one side, where it is either dumped or thrown into a suitable receiving-vehicle.

It is the purpose of my invention to simplify and improve the devices for raising and lowering the plow and for bracing the same, to provide means for readily raising and lowering the elevator at either end independently, and to combine with the elevating devices simple means for tightening the elevator-belt.

It is my purpose also to provide a ditching-machine of this kind with a simple system of braces, whereby the ground-wheel and the frame supporting the elevator are always kept in proper vertical position and in parallelism; to combine with said devices means for tightening the diagonal braces of the frame, and to provide simple devices for steering the machine and for raising and lowering the plow, both adapted to be operated from the driver's seat.

It is my purpose, finally, to simplify and improve the mechanism of this class of apparatus, whereby increased efficiency, strength, and convenience in operation are obtained.

These objects I attain by the several novel features of construction and new combinations of parts hereinafter fully set forth, and then specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a plan of the parts shown in Fig. 1. Fig. 3 is an end elevation taken from the left hand of Fig. 1. Fig. 4 is an end elevation taken from the right-hand end of Fig. 1. Fig. 5 is a side elevation taken from the elevator side of the machine. Fig. 6 is a detail elevation showing part of the mechanism for raising and lowering the adjustable

frame supporting the receiving end of the elevator. Fig. 7 is a detail side elevation of the parts shown in Fig. 6. Fig. 8 is a detail plan of the self-adjusting bolster of the elevator-frame.

In the drawings, the reference-numeral 1 denotes the frame of the machine, which is of substantially rectangular form, as shown in Fig. 2. Within this frame, near one end, is journaled a ground-wheel, 2, of the ordinary construction, having upon its shaft a sprocket-wheel, 3. The forward part of the frame is supported upon a steering-wheel, 4, having a tiller-head, 5, connected by wires 6 to a steering-bar, 7, pivotally mounted in front of the driver's seat 8 at the rear of the frame.

In front of the ground-wheel is the plow 9, mounted upon a vertically-adjustable frame, 10, the parallel arms of which are connected below to the plow-beam 12 and united above by a bar, 13, said arms moving in bracket-bearings 14 on the frame. The connecting-bar 13 is linked by a bar, 15, to the end of a lever, 16, fulcrumed upon a support, 17, and having its handle in easy reach of the driver. An upright, 18, having holding-hooks 19 at intervals, engages the lever and holds the plow at any point to which it has been adjusted. In rear of the plow-beam 12 is a vertical brace, 20, having its end connected by a diagonal brace, 21, to the frame of the machine, whereby the rearward strain on the plow-supports is resisted.

Upon the right-hand side of the machine-frame is arranged the elevator. Upon the side of the frame 1 are mounted depending supports 22, strengthened by braces 23, Fig. 3, and in suitable bearings, 24, at the lower ends of supports 22, are mounted the trunnions 25 of the elevator-frame. This frame consists of a pair of parallel supports, 26, inclined at a suitable and variable angle, and having pivotal connection at the lower end to the depending supports 22 on the frame, as described. At the lower end of the elevator-frame are journaled small sprockets, over which run chains gearing with sprockets 35^a at the other end of said frame. To these chains is riveted a web of canvas or similar flexible material, 29, having buckets 30 at proper intervals, the purpose of the chains being to relieve the canvas

or other flexible material of strain and to make the movement a positive one.

Beneath the lower section of the chains are placed rollers 28, which relieve the weight and tighten the elevator belt or web to prevent it from dragging on the ground at the lower end of the elevator-frame. The upper end of the frame is supported by cords 31, passing from eyes 32 on the supports 26 over grooved friction-rolls 32^a on a frame, 33, and to a windlass, 34, the shaft of which has a crank, 35. The frame 33, which is oblong and rectangular, is supported by side bars, 36, Fig. 5, to each of which is bolted a bracket, 37, one being provided with a supporting-wheel, 38, and the other with a swiveled frame, 39, having a supporting-wheel, 40. Upon the lower ends of the side bars are bolted parallel bolster-plates 41, the attachment being such that a pivotal movement is feasible at each point of attachment, the upper ends of the side bars having movement longitudinally in loops 42, projecting from the frame 33. The bolster-plates 41 are pivotally and centrally connected to the lower member of the frame 33 by a bolt, 43, and in this manner either bracket 37, with its wheel, is free to rise and fall without in any manner disturbing the position of the frame 33 and its connections or straining the attachments by which it is connected to the frame of the machine, the power end of the elevator-frame being connected to vertically-sliding supports 70, moving on the depending supports 22. Said supports are connected by a cross-bar, 71, which is linked to a foot-lever, 72, the latter being in turn connected to a foot-lever, 73, whereby the lower end of the elevator-frame may be raised and lowered by the driver.

The elevator-belt is driven from the sprocket 3 by means of a chain belt, 44, passing from the sprocket over guide-rolls 45 and 46, and upon its return over a guide-roller, 47. The chain gears the sprocket 3 to a sprocket, 48, on the shaft of the drum 28.

Diagonal braces 49 are secured to the frame 1 and to the outer ends of the supports of the elevator-frame. These last-named supports consist of bracing-frames 50, strengthened by diagonal bars 51 and vertical bars 52. At their outer ends these bracing-frames are connected to the vertical members of the frame 33, upon the lower member of which the bolster 41 is centrally pivoted. The diagonal braces 51 are connected to the outer end of the upper bar and the inner end of the lower bar of the bracing-frame 50, and by the construction described the constant parallelism of the parts 33 with the main frame is preserved. It is evident that as the machine-frame sinks or rises relatively to the supports of the outer end of the elevator-frame the diagonal braces must yield longitudinally, while at the same time the rigid frames must rise and fall in such manner as to preserve the perpendicularity of the frame 33. To these ends I bolt to the machine-frame a pair of up-

right beams, 53, each having upon its outer face a rack, 54. The inner ends of the bars 50 are connected to these uprights by slide-loops 55, bolted to the bars and movable upon the uprights 53. Upon the inner ends of the upper braces, 50, I mount a horizontal shaft, 56, carrying pinions 57, which mesh with the racks 54 of the uprights. Upon the end of the shaft 56 is a sprocket, 58, driven by a chain, 59, which passes over a sprocket, 60, journaled in a bracket, 61, below the shaft 56, and over sprockets 62, mounted on a double bracket at the top of the uprights and also in mesh with the driving-sprocket 63. The latter is carried by a shaft, 64, journaled in bracket-bearings 65 on the side of the machine and driven by a crank, 66. By revolving the shaft 64 movement will be imparted to the shaft 56, and the frames bracing the outer supports of the elevator will travel up and down upon the uprights 53.

The inner ends of the diagonal braces 49 are connected to travelers 67, which are practically nuts moving upon reversed threaded portions 68 of the shaft 64, Fig. 2. Thus, as the said shaft is revolved to raise and lower the connections of the elevator-frame the diagonal braces will be drawn in or yield to accommodate such adjustment.

What I claim is—

1. In a ditching and grading machine, the combination of a main frame, 1, having a ground-wheel, 2, the shaft of which is provided with a sprocket-wheel, 3, a rising-and-falling elevator-frame pivoted at its lower end and provided at its upper end with a drum-shaft having a sprocket, 48, the endless web passing around the drum-shaft, the guide-rolls 45 and 46 on the elevator-frame, and the drive-chain 44, extending from the sprocket on the ground-wheel shaft to and around the guide-rolls, and thence extending laterally along the elevator-frame to the sprocket on the said drum-shaft, substantially as described.

2. In a ditching and grading machine, the combination, with a machine-frame having a ground-wheel and a sprocket on the shaft of said wheel, of a laterally-inclined vertically-adjustable elevator-frame, an elevator-shaft on said frame geared to the sprocket, wheeled side bars or uprights pivotally connected to a pair of bolster-plates at their lower ends, and an upright frame connected by a central pivotal bearing to the bolster-plates and having loops in which the side bars may rise and fall, substantially as described.

3. In a ditching and grading machine, the combination, with a machine-frame supported by a ground-wheel, of an elevator-frame having its lower end pivotally connected to supports on said machine-frame, wheeled side bars supporting a frame within which the outer end of the elevator-frame lies, cords connected to the latter frame and passing over the friction-rolls on the inclosing-frame, and a windlass-shaft on the ele-

vator-frame to which the other ends of said cord are connected, substantially as described.

4. The combination of the main frame having a ground-wheel journaled therein and a laterally-extending elevator connected at its lower end with the main frame, a plow located in advance of the ground-wheel and beside the lower end of the elevator, a vertically-adjustable frame comprising upright parallel arms connected, respectively, at their lower ends with the front and rear portions of the plow-beam, a bar connecting the upper ends of said arms, and a lever pivoted on the main frame and pivoted to the connecting-bar to simultaneously raise or lower the parallel arms, substantially as described.

5. In a ditching and grading machine, the combination, with a machine-frame, of an elevator pivotally connected at its lower end to an adjustable frame on said machine-frame, a wheeled frame within which the outer end of the elevator is adjustable, bracing-frames connecting the wheeled frame to the machine and having slide-loops embracing racked uprights, and said braces having pinions meshing with racks on the uprights, and an actuating-shaft on the machine-frame, having a sprocket geared to a sprocket on the shaft carrying said pinions by a chain running over pulleys at the top of one of the uprights and over a pulley on the machine-frame, substantially as described.

6. In a ditching and grading machine, the combination, with a machine-frame, of an elevator mechanism having its supports pivotally connected at their lower ends to an adjustable frame on the machine-frame, a wheeled frame within which the outer ends of the elevator-supports are adjustable vertically, uprights on the machine-frame having racks, bracing-frames movable on said uprights and rigidly connected at their outer ends to the wheeled frame, a shaft on the machine-frame having reverse screw-threads and diagonal braces connected at one end to the outer ends of the bracing-frame and at the other ends to travelers moving on the reverse threads of the shaft, substantially as described.

sprocket, a chain running on pulleys above and below said sprocket and gearing with the latter, an actuating-shaft on the machine-frame having reverse screw-threads and carrying a sprocket moving said chain, diagonal braces connected at their outer ends to the bracing-frames, and travelers moving on the reverse threads of the actuating-shaft to which the inner ends of said braces are connected, substantially as described.

7. In a ditching and grading machine, the combination, with a machine-frame, of an elevator mechanism having its supports pivotally connected at their lower ends to supports on said frame, a vertical frame inclosing the outer end of the elevator-frame, cords connected at one end to the elevator-frame and passing over friction-rolls on the vertical frame, a windlass-shaft on the elevator-frame, to which the other ends of said cords are connected, a bolster-frame centrally pivoted to the lower end of the vertical frame, side bars pivoted to the ends of the bolster-frame and held by loops on the vertical frame, and wheels bracketed to the side bars and supporting the latter, substantially as described.

8. In a ditching and grading machine, the combination, with a machine-frame, of an elevator-frame having its lower end pivotally connected to an adjustable frame on the machine-frame, vertically-adjustable bracing-frames intermediate between the machine-frame and the wheeled supports carrying the outer end of the elevator-frame, and a shaft on the machine-frame having reverse screw-threads and diagonal braces connected at one end to the outer ends of the bracing-frame and at the other ends to travelers moving on the reverse threads of the shaft, substantially as described.

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

DAVID D. KUHLMAN.

Witnesses:

W. C. BARRY,
C. H. WARING.