

No. 702,147.

Patented June 10, 1902.

J. M. McHUGH.
MINING MACHINE.

(Application filed Jan. 17, 1901.)

3 Sheets—Sheet 1.

(No Model.)

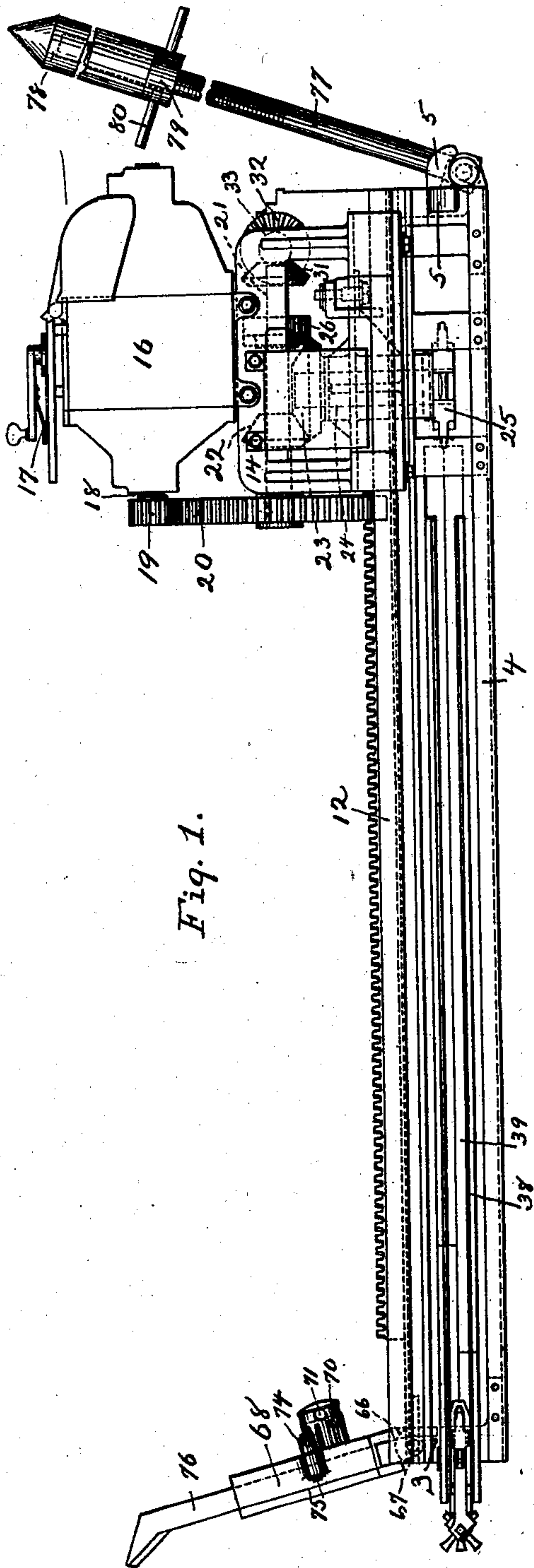


Fig. 1.

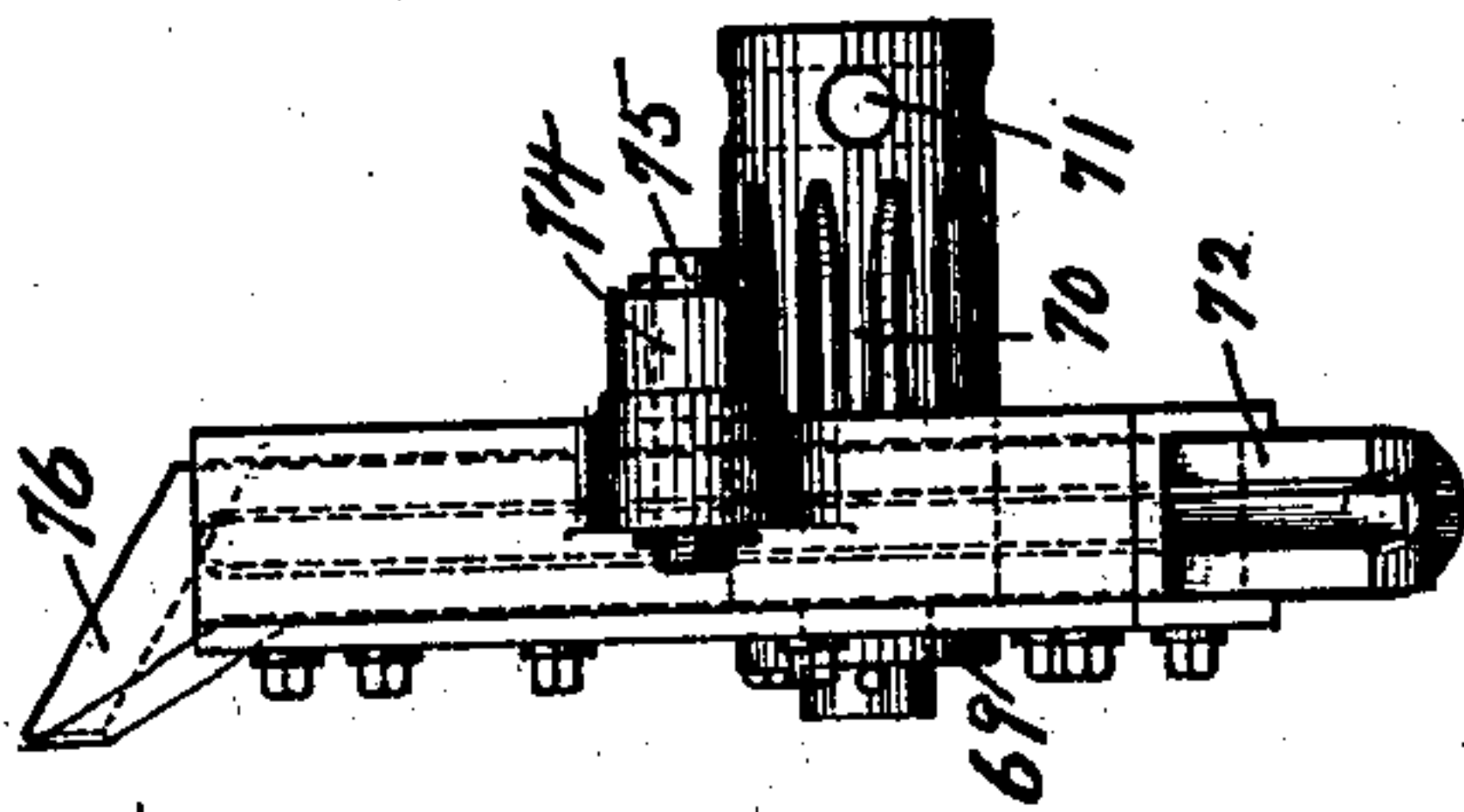


Fig. 9.

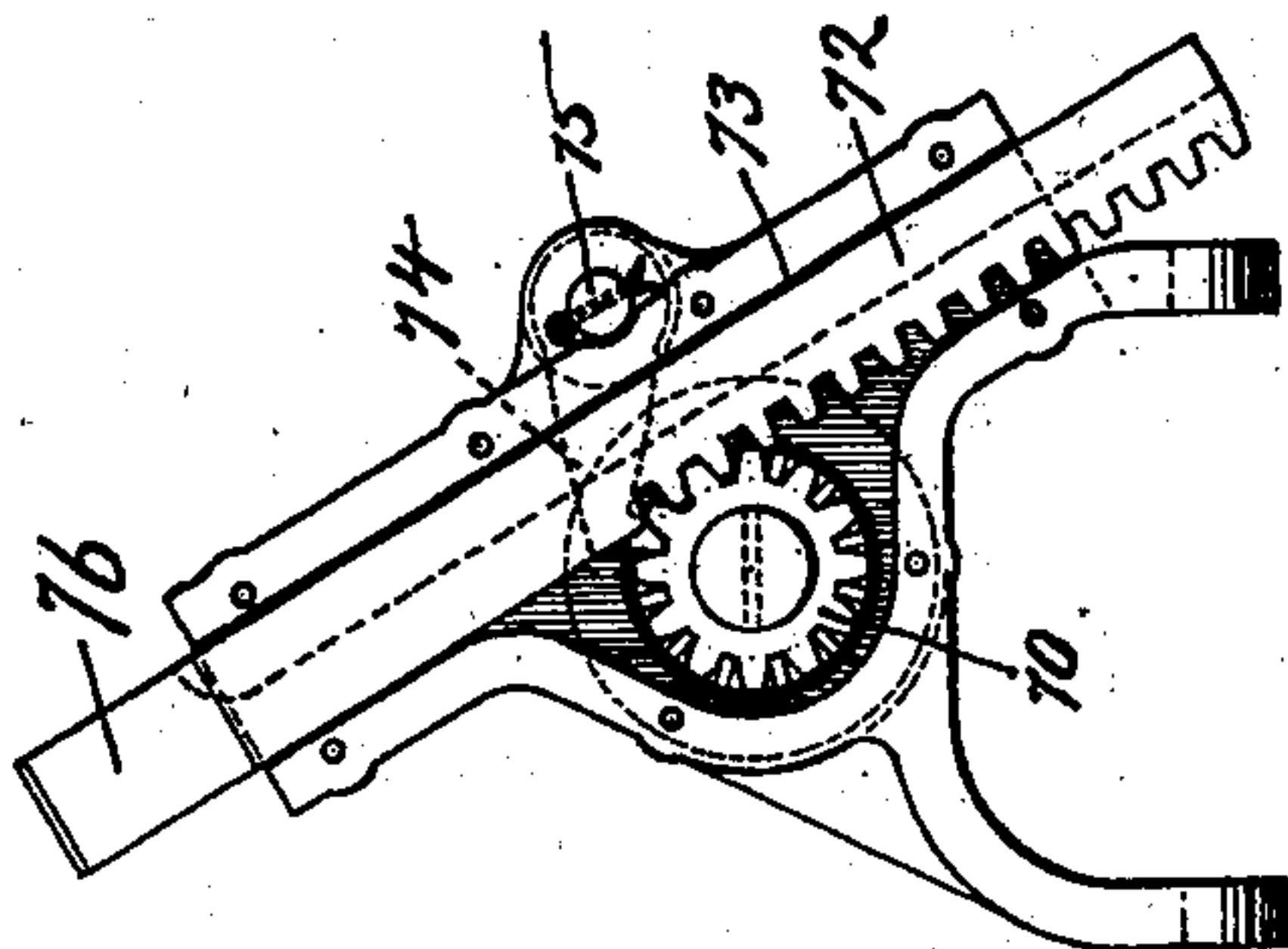


Fig. 8.

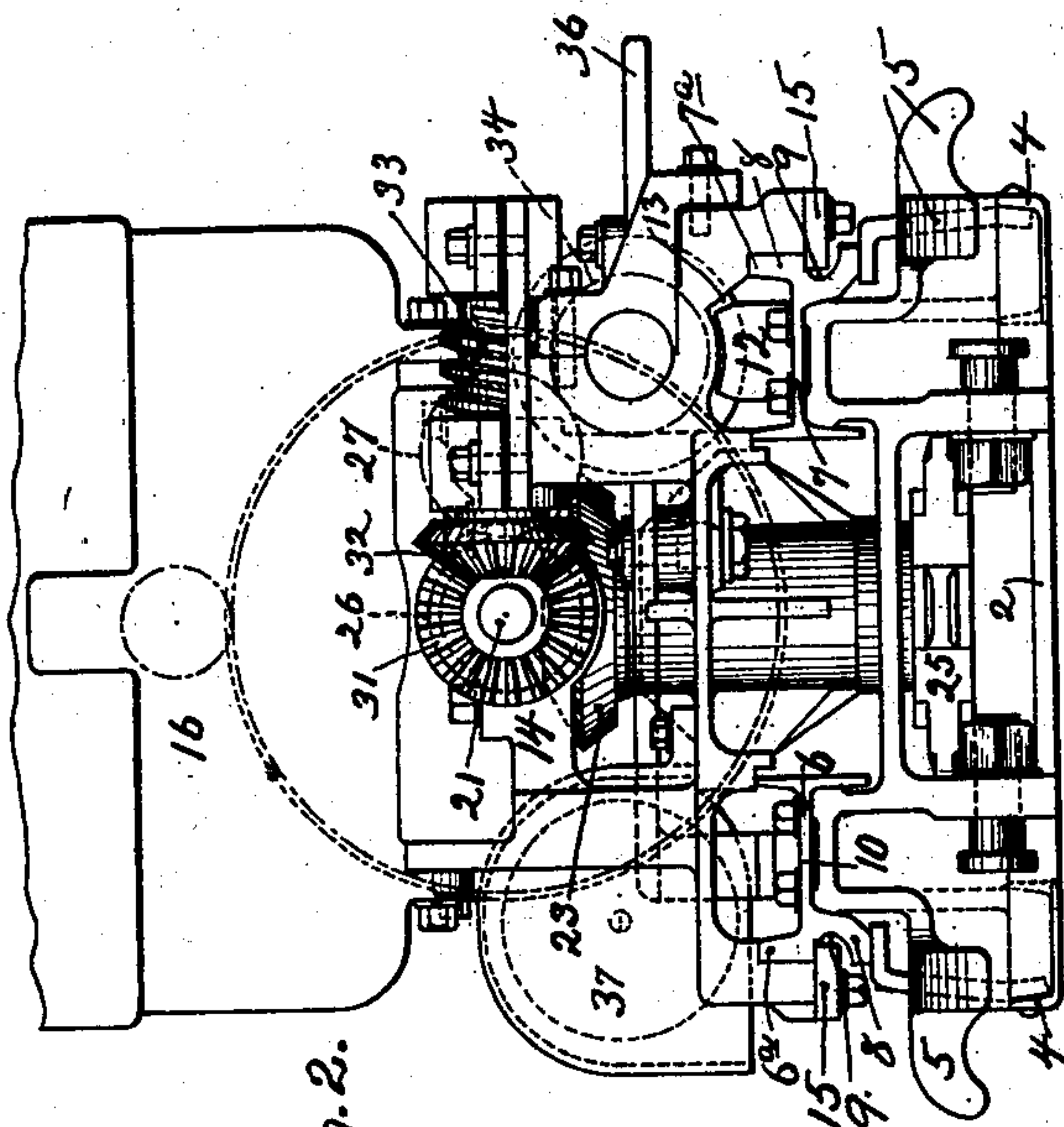


Fig. 2.

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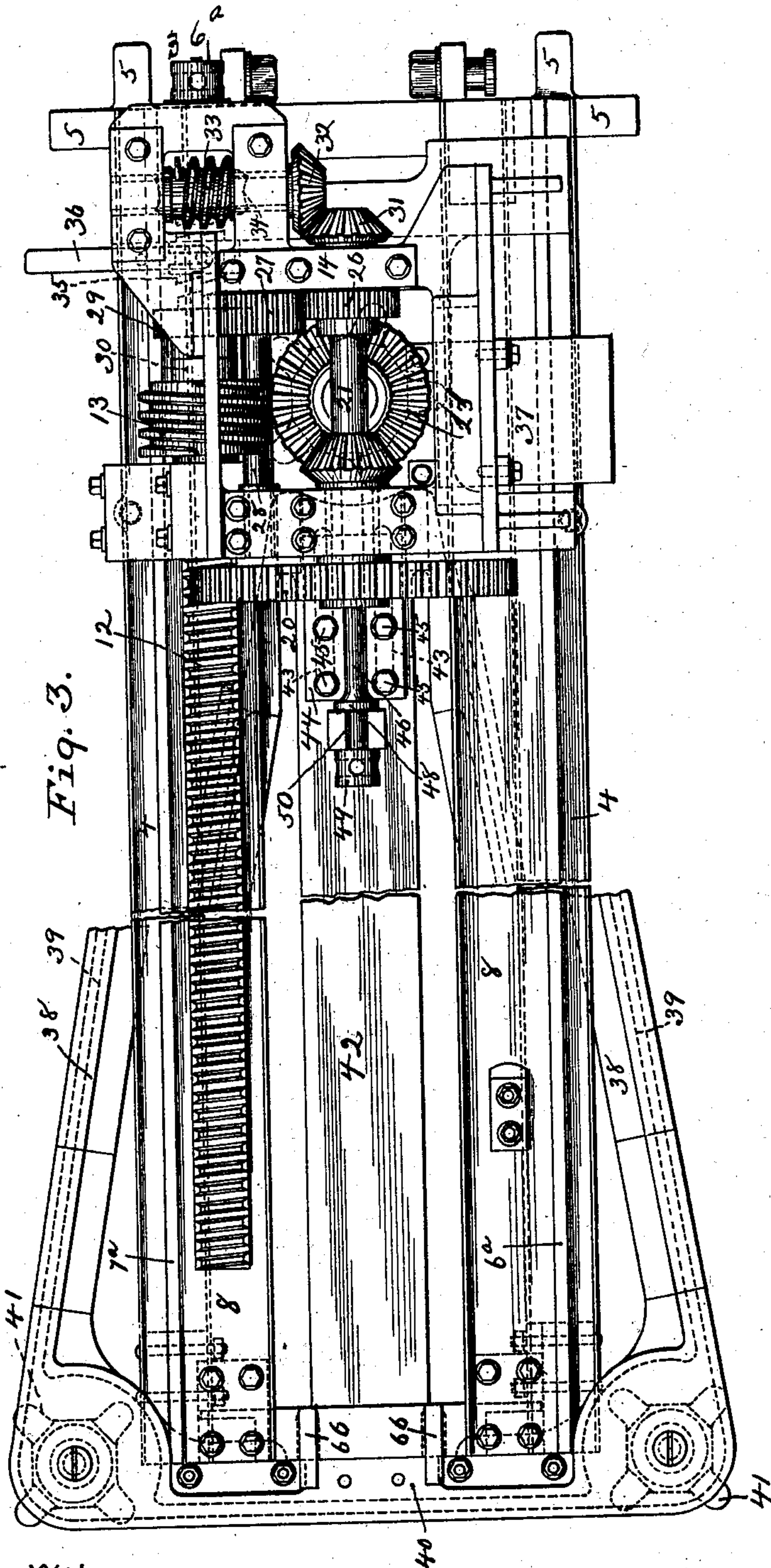
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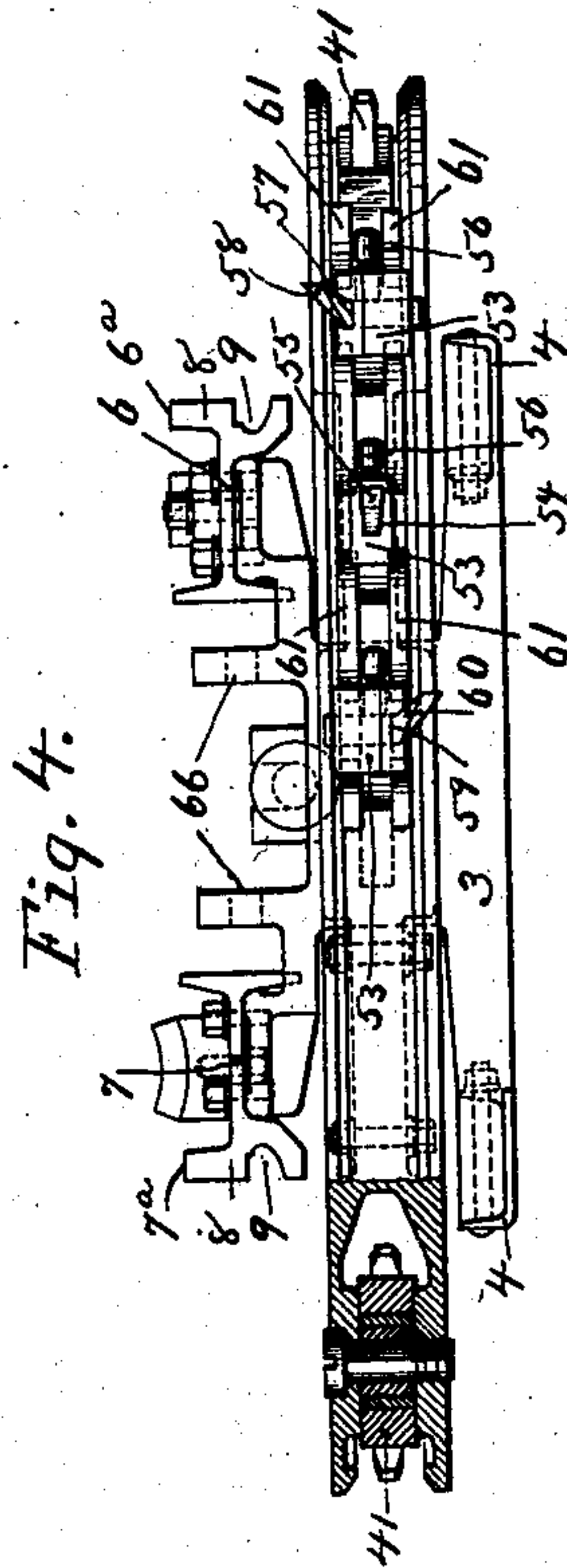
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3 Sheets—Sheet 2.



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(No Model.)

3 Sheets—Sheet 3.

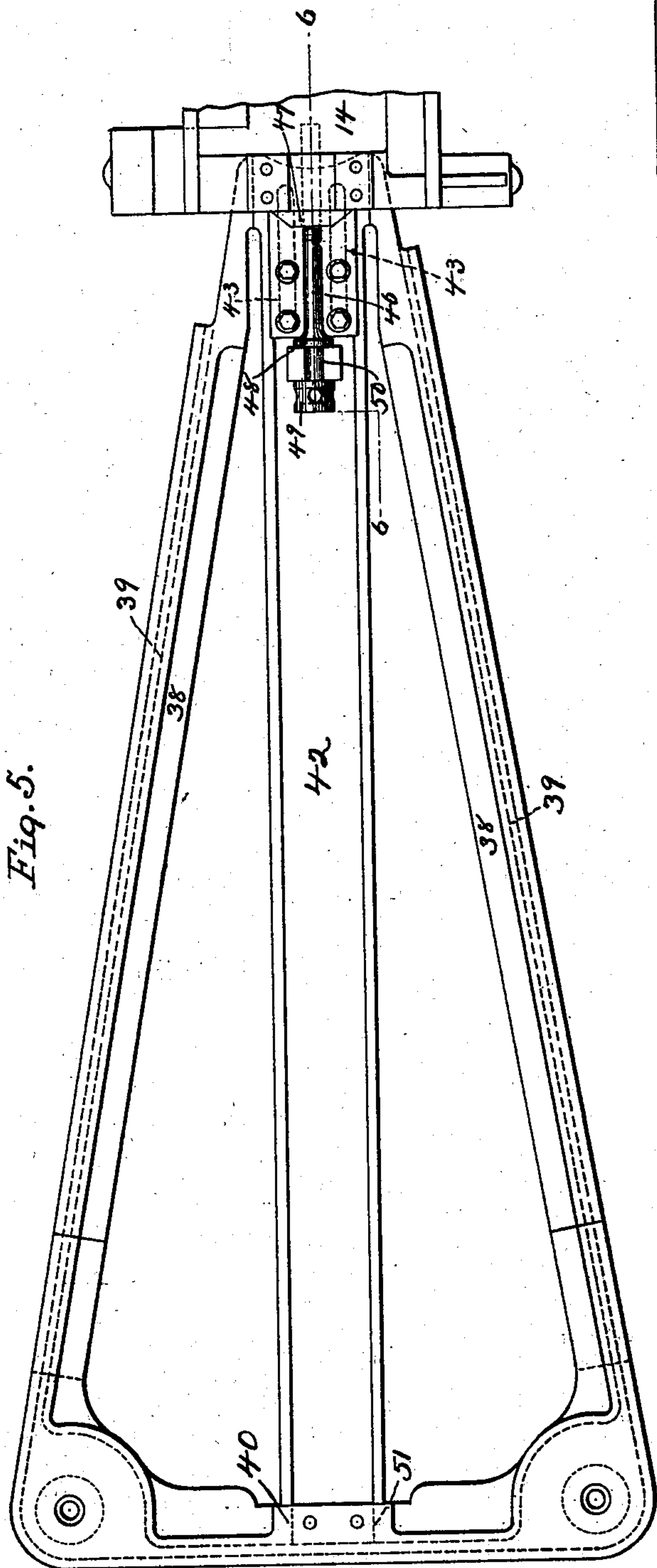


Fig. 5.

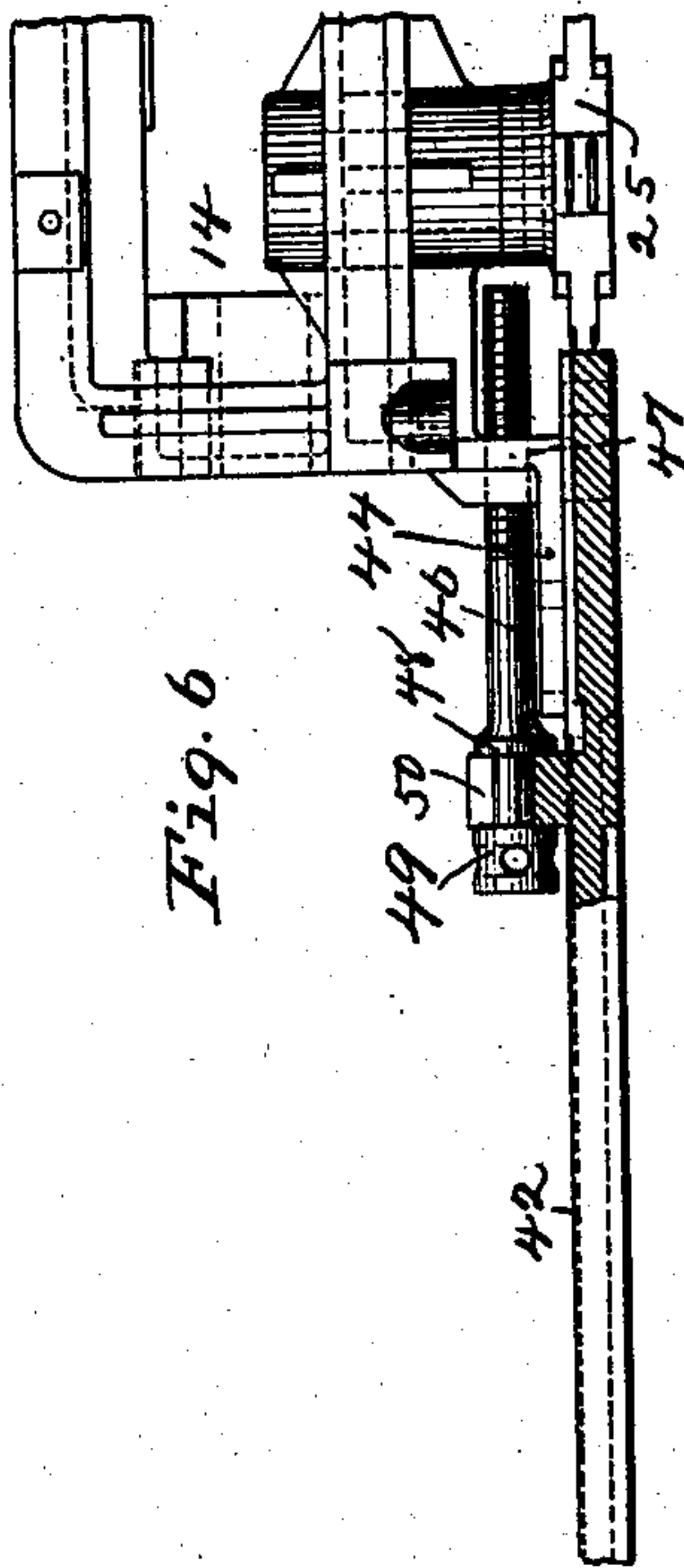


Fig. 6.

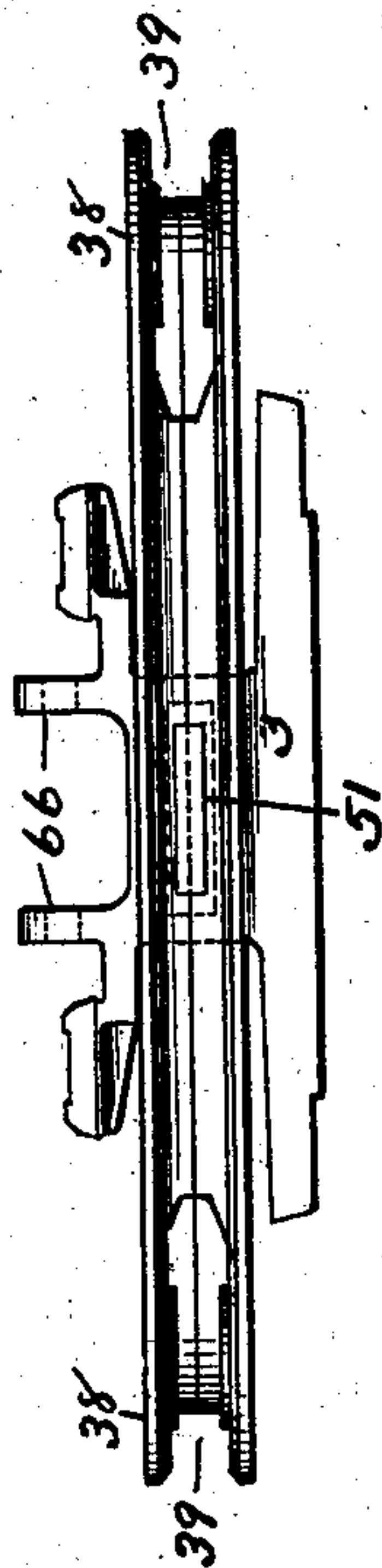


Fig. 7.

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UNITED STATES PATENT OFFICE.

JAMES M. MCHUGH, OF BOSTON, PENNSYLVANIA.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 702,147, dated June 10, 1902.

Application filed January 17, 1901. Serial No. 43,603. (No model.)

To all whom it may concern:

Be it known that I, JAMES M. MCHUGH, a resident of Boston, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Mining-Machines; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to mining-machines, and more particularly to that class of mining-machines in which the cutting is done by means of chains carrying suitable cutters.

The objects of my invention are to provide means for holding the machine rigidly in position when in operation, so as to keep the cutter-frame in a straight course and prevent it from swerving to one side, and to provide improved means for supporting and guiding the traveling carriage on the stationary frame of the machine. To these ends my invention comprises the novel features hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a side view of my improved mining-machine. Fig. 2 is a rear end view. Fig. 3 is a plan view, partly broken away. Fig. 4 is a front view of the stationary frame and cutter-frame, partly in section. Fig. 5 is an enlarged plan view of the cutter-frame. Fig. 6 is a section on line 6-6, Fig. 5. Fig. 7 is a front view of the cutter-frame and forward support therefor, and Figs. 8 and 9 are details of the forward jack.

The stationary frame of the machine, upon which the working parts are mounted, comprises the rear end portion 2 and the front end portion 3, connected by the channel-bars 4. The rear end portion 2 is provided with the horns 5, to be engaged by a crowbar when it is desired to change the position of the frame.

Bolted or otherwise secured to the frame are the rails 6, 7, of any suitable cross-section, those illustrated being the kind ordinarily used in street-railways, in which the upper flanges 8 have the grooves or depressions 9. The webs 10 of the rails rest in a horizontal position on the body of the frame, and the upper edges of the flanges form a guide for

the carriage, as will more fully hereinafter appear. A carriage 14 rests on and is adapted to move along the rails 6 and 7, the upper edges 6^a and 7^a of the flanges of said rails forming bearing-faces for said carriage. A worm 13 is journaled in suitable bearings in said carriage 14 and engages with a worm-rack 12, secured to the rail 7. The carriage 14 is provided with inwardly-projecting portions 15, which enter the grooves 9 of the rails and prevent the carriage from lifting or rising from the rails. When the worm 13 is rotated by the means hereinafter described, it feeds the carriage along the frame in either direction, depending upon the direction of the rotation of said worm, said carriage moving on the upturned flanges of the rails and being supported at different points.

Supported on the carriage 14 is the motor 16, of any suitable construction, provided with the circuit-controller 17. On the motor-shaft 18 is the pinion 19, which meshes with the large gear-wheel 20 on the shaft 21, journaled in the carriage 14. A bevel-pinion 22 on the shaft 21 meshes with the bevel-gear 23 on the vertical shaft 24, journaled in the carriage 14. At the lower end of said shaft 24 is the sprocket-wheel 25. A gear-wheel 26 on the shaft 21 meshes with a gear-wheel 27 on a counter-shaft 28, journaled in the carriage. This gear-wheel 27 in turn meshes with a gear-wheel 29, loosely mounted on the shaft 30, which carries the worm 13. A bevel-pinion 31 on the shaft 21 meshes with a bevel-pinion 32 on the worm-shaft 33. This worm-shaft 33 engages the worm-wheel 34, loosely mounted on the shaft 30. A clutch 35, fast on the shaft 30, is adapted to engage the worm-wheel 34 or the gear 29, according as it is desired to feed forward the cutter-frame or withdraw the same, and said clutch is operated by the lever 36. The outer end of the shaft 30 is provided with a head 36^a, in which are formed holes for receiving a spanner-wrench, or the end of said shaft is otherwise suitably formed for receiving a wrench, crank, or similar device, whereby said shaft may be rotated by hand.

A resistance-box 37 for the motor is shown in Figs. 2 and 3.

The cutter-frame, which is secured to the forward end of carriage 14, is triangular in

form and comprises the side portions 38, with the channel or groove 39 for the passage of the cutter-chain, and the end portion 40, with a like groove for said chain. At the corners 5 of the end portion 40 are journaled the idle sprocket-wheels 41, around which the chain passes.

Centrally of the cutter-frame is the guide-plate 42, secured at its forward end to the 10 end portion 40 and at its rear end to the carriage 14. The rear end of the cutter-frame is secured to the guide-plate 42. Said guide-plate 42 has the slots 43 (shown in dotted lines, Fig. 3) and is connected to the extension 44 15 of the carriage by the bolts 45, passing through openings in said extension and said slots in said guide-plate. By this construction any slack in the chain may be taken up, it only being necessary to loosen the bolts 45 and ad- 20 vance the guide-plate and with it the cutter-frame carried thereby. To provide for the adjustment of the guide-plate, I have provided a screw-feeding device consisting of the screw-bar 46, engaging a threaded open- 25 ing 47 in the carriage 14, said screw-bar having the shoulder 48 and the head 49. The portion of said bar between the shoulder 48 and head 49 rests in a seat 50 on the guide-plate. By turning the bar in the proper di- 30 rection the cutter-frame may be advanced to take up slack in chain or may be withdrawn, as desired.

The front end portion 3 of the stationary frame has the opening 51, through which the 35 guide-plate 42 passes.

A cutter-chain made up of links in the usual or any desired way is used, said chain passing around the sprocket-wheels 25 and 41 and being guided in the groove 39.

40 At the front end 3 of the stationary frame are the bearings 66, adapted to receive the shaft 67, on which is mounted the swinging frame 68. This frame 68 has a bearing 69 to receive a toothed stud 70, adapted to be 45 turned by inserting a suitable bar in the opening 71. This toothed stud 70 engages with the teeth of a rack-bar 72, inclosed within a guideway 73 in the frame 68. A pawl 74, carried by the pin 75, is secured to the frame 50 68, said pawl engaging the teeth of the stud 70. At the upper end of the rack-bar 72 is the tooth 76, which is forced into the face of the coal in the manner fully hereinafter set forth.

55 At the rear end of the machine are the swinging jacks 77, composed of the threaded bars having the pointed heads 78, adapted to be raised or lowered by means of the nut 79, having the handles 80.

60 When in use, my improved machine is placed in proper position with reference to the wall of coal to be cut, and when so located the stationary frame is jacked at its rear and forward ends to prevent displacement of 65 same when the machine is in operation. At the rear end the pointed heads 78 of the jacks 77 are forced into the roof, said jacks being

located at such an angle as to resist back thrust of the machine. At the forward end 70 of the stationary frame the tooth 76 is forced into the roof or wall of the mine by turning the toothed stud 70. The frame 68 is pivoted to the frame of the machine, and consequently may be fixed at any desired angle, and the bar 72 is mounted at an angle to the 75 longitudinal axis of the machine in this frame 68 and points in a direction opposite to that in which the cutter-chain travels. The cutter-chain is designed to travel from right to left, and the resistance of the coal against 80 the cutters has a tendency, therefore, to swing the front end of the machine toward the right; but the inclined bar 72 points in that direction, and therefore resists this tendency of the machine to swing and holds it rigidly in po- 85 sition, so as to keep the cutter-frame in a straight course. As power is applied to operate the machine the tendency of the cutter-chain traveling across the front of the coal from right to left is to throw the frame of the 90 machine out of line, so that the rear end of said frame would move to the right and prevent a straight cut into the coal. The rack-bar 72, however, prevents this tendency to swing the frame out of line, and a straight cut is 95 accomplished. Through the mechanism described the cutter-chain is driven, and the carriage advances at the same time to feed the cutter-frame into the cut, said carriage being moved by the action of the worm-wheel 13, 100 working in the worm-rack 12. The carriage moves readily over the rails 6 7, and the worm and worm-rack form a strong and durable feed with minimum amount of power. In case the cutters encounter a substance which 105 is harder than coal the machine will not be able to cut the same at the rate of feed provided by the automatic worm-feeding device, and the machine is liable to become stalled. In that event the clutch 35 will be moved to its neu- 110 tral position and the cutter-frame will be fed slowly forward by rotating the worm-shaft 30 by means of a spanner-wrench or similar device secured to the outer end of said shaft. By this means the cutter-frame can be fed 115 forward at just the rate which will permit the machine to cut through the hard substance. When the cut has been made, by reversing the clutch 35 the gear-wheel 29 is rotated through the idle gear 27 and gear 26, 120 which is operated by the motor through the mechanism described. This reverses the direction of rotation of the shaft 30, and consequently worm-wheel 13. In this manner the cutter-frame is withdrawn from the cut. 125

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a mining-machine, the combination of a frame, two standard I-rails secured to said frame in substantially the same horizon- 130 tal plane with their webs in a horizontal position and their flanges extending upward, the downwardly-extending flanges of said rails having grooves formed therein, a travel-

ing carriage resting on the edges of said
flanges, inwardly-extending lips on said car-
riage adapted to enter the grooves in the rails,
a cutter frame and chain supported by said
5 carriage, and mechanism for moving said car-
riage along said rails and for driving said
chain.

2. In a mining-machine, the combination
of a suitable frame, a traveling carriage, a
10 cutter-frame and cutter-chain, mechanism
for moving said carriage and driving said
chain, a swinging frame at the forward end
of said frame, said frame having an inclined
guideway therein, a jack-bar in said guide-
15 way, and means for raising and lowering said
bar.

3. In a mining-machine, the combination

of a suitable frame, a traveling carriage, a
cutter-frame and cutter-chain, mechanism
for moving said carriage and driving said 20
chain, a swinging frame at the forward end
of said frame, said frame having an inclined
guideway therein, a jack-bar in said guide-
way, said bar having teeth therein, a pinion
engaging said teeth, and a ratchet-and-pawl 25
device for holding said bar in its adjusted
position.

In testimony whereof I, the said JAMES M.
MCHUGH, have hereunto set my hand.

JAMES M. MCHUGH.

Witnesses:

J. D. BUCKLEY,
ROBT. D. TOTTEN.