

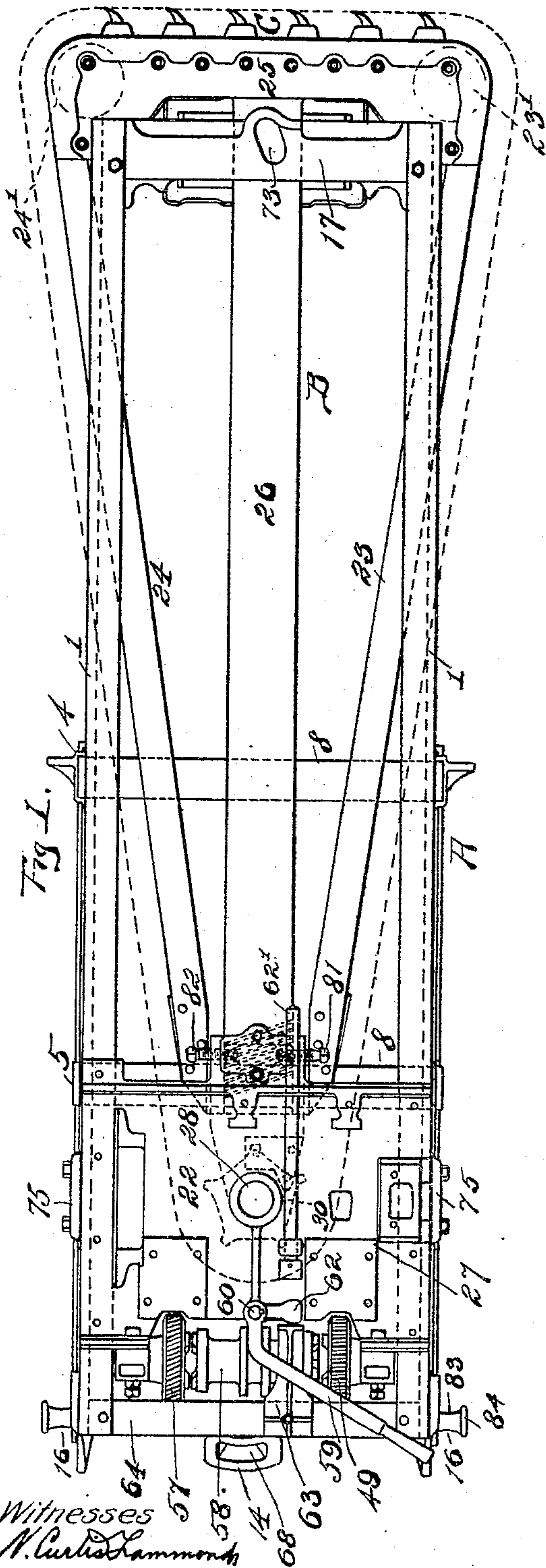
H. B. DIERDORFF.  
MINING MACHINE.

APPLICATION FILED DEC. 15, 1904.

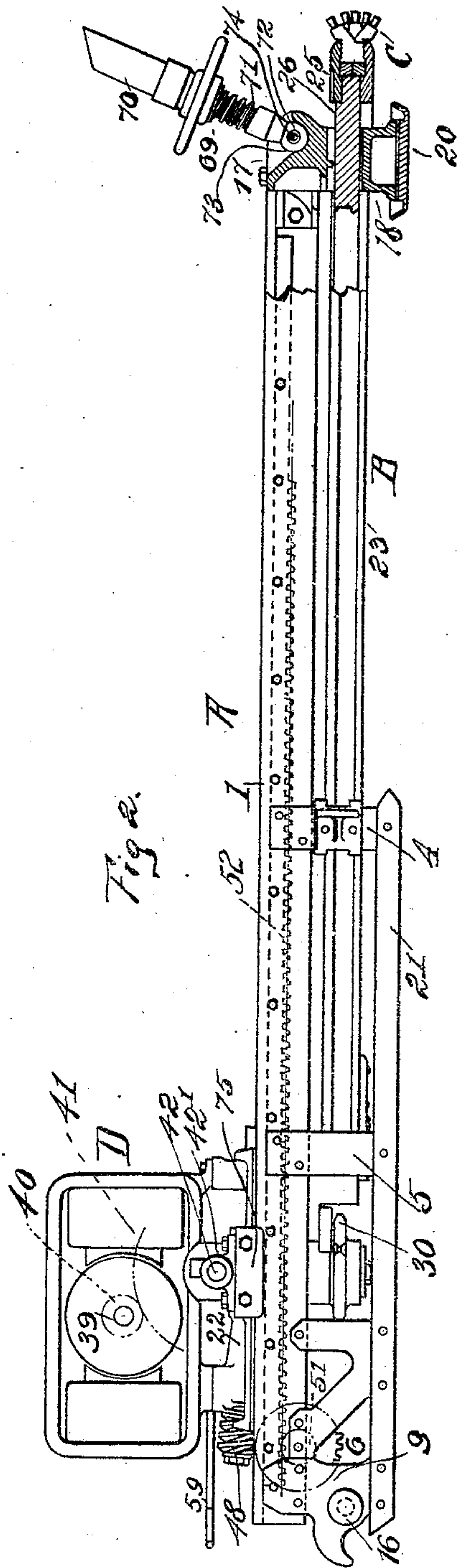
945,000.

Patented Dec. 28, 1909.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 3.

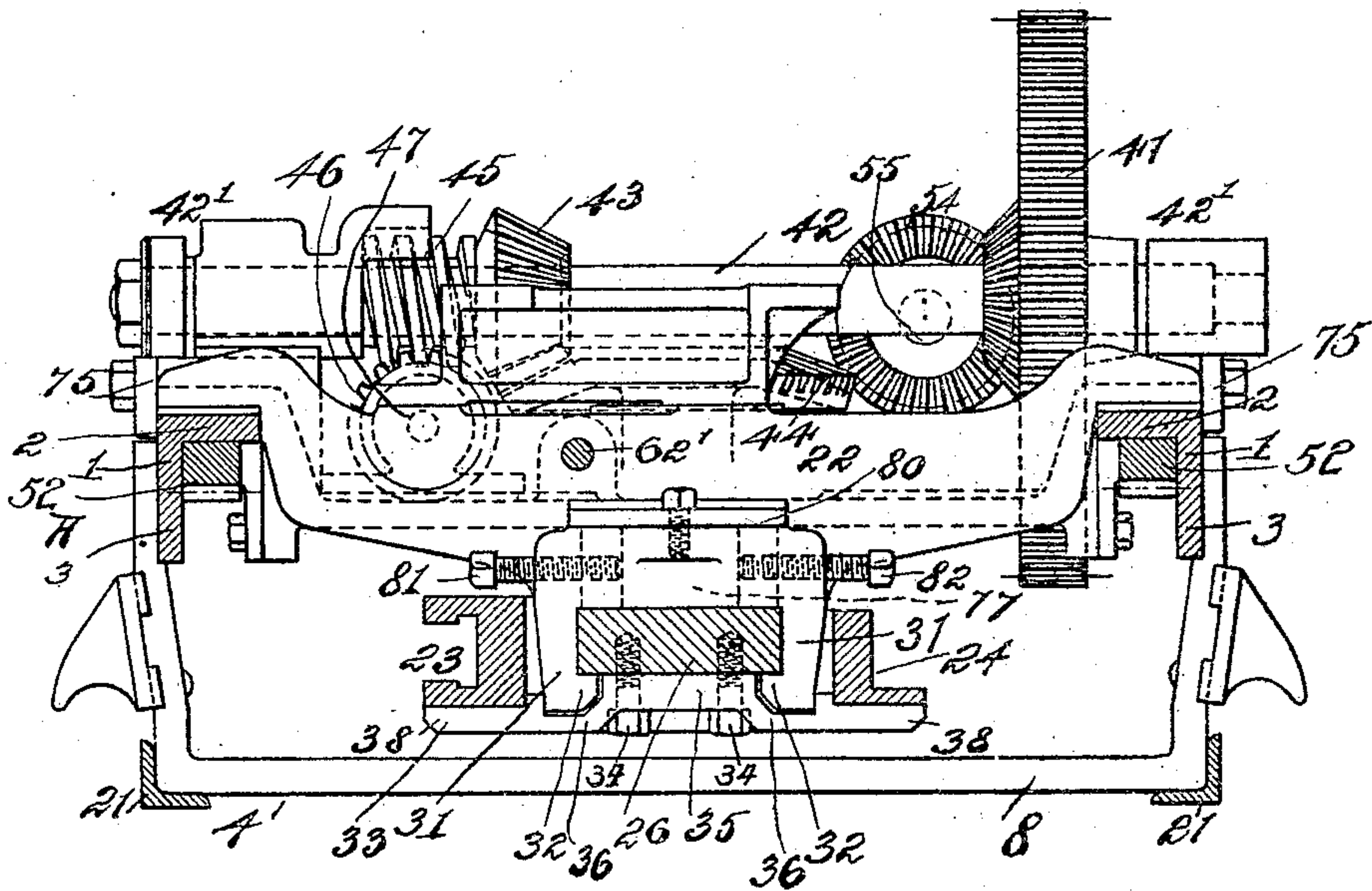
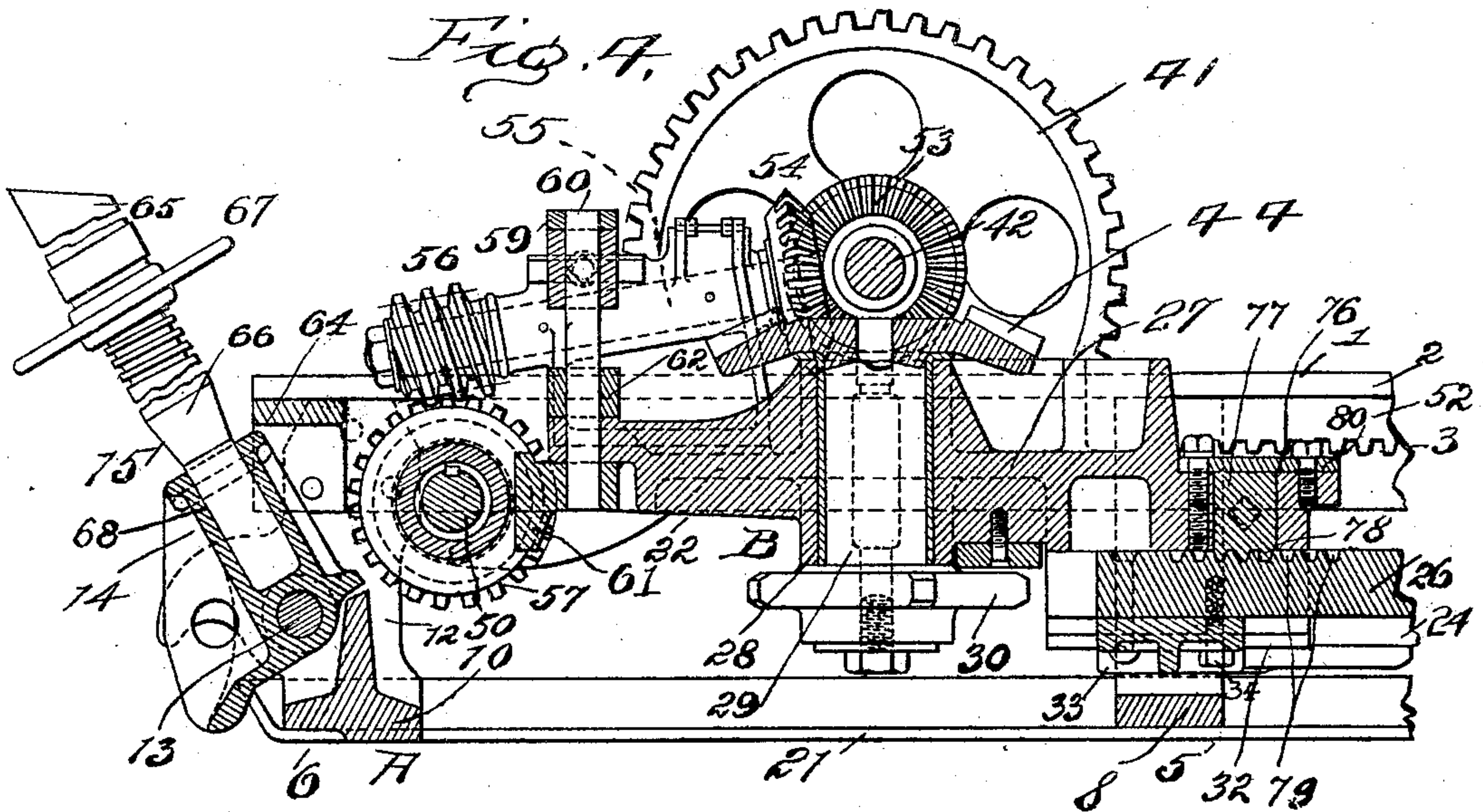


Fig. 4.



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3 SHEETS—SHEET 3.

Fig. 5.

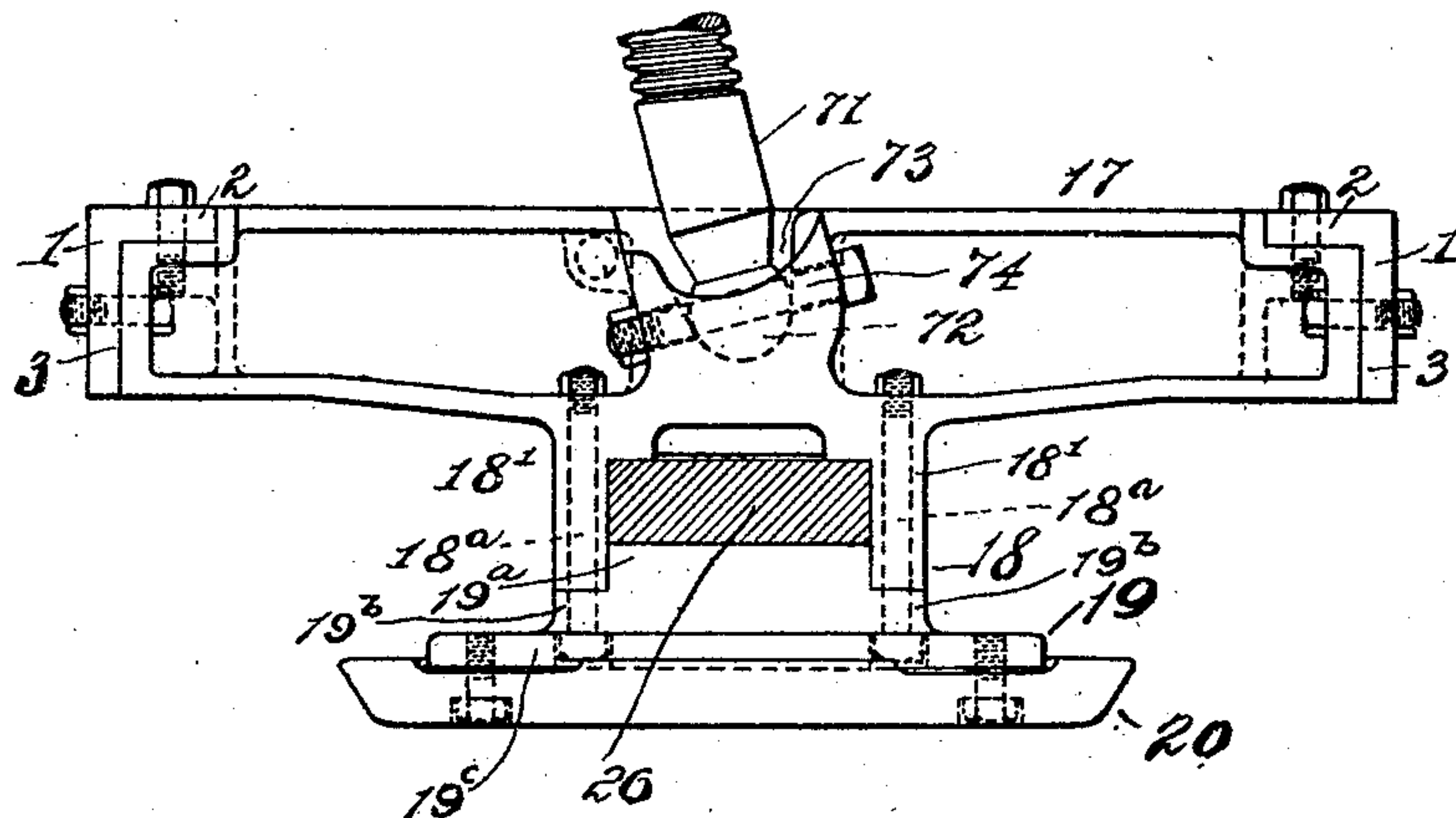


Fig. 6.

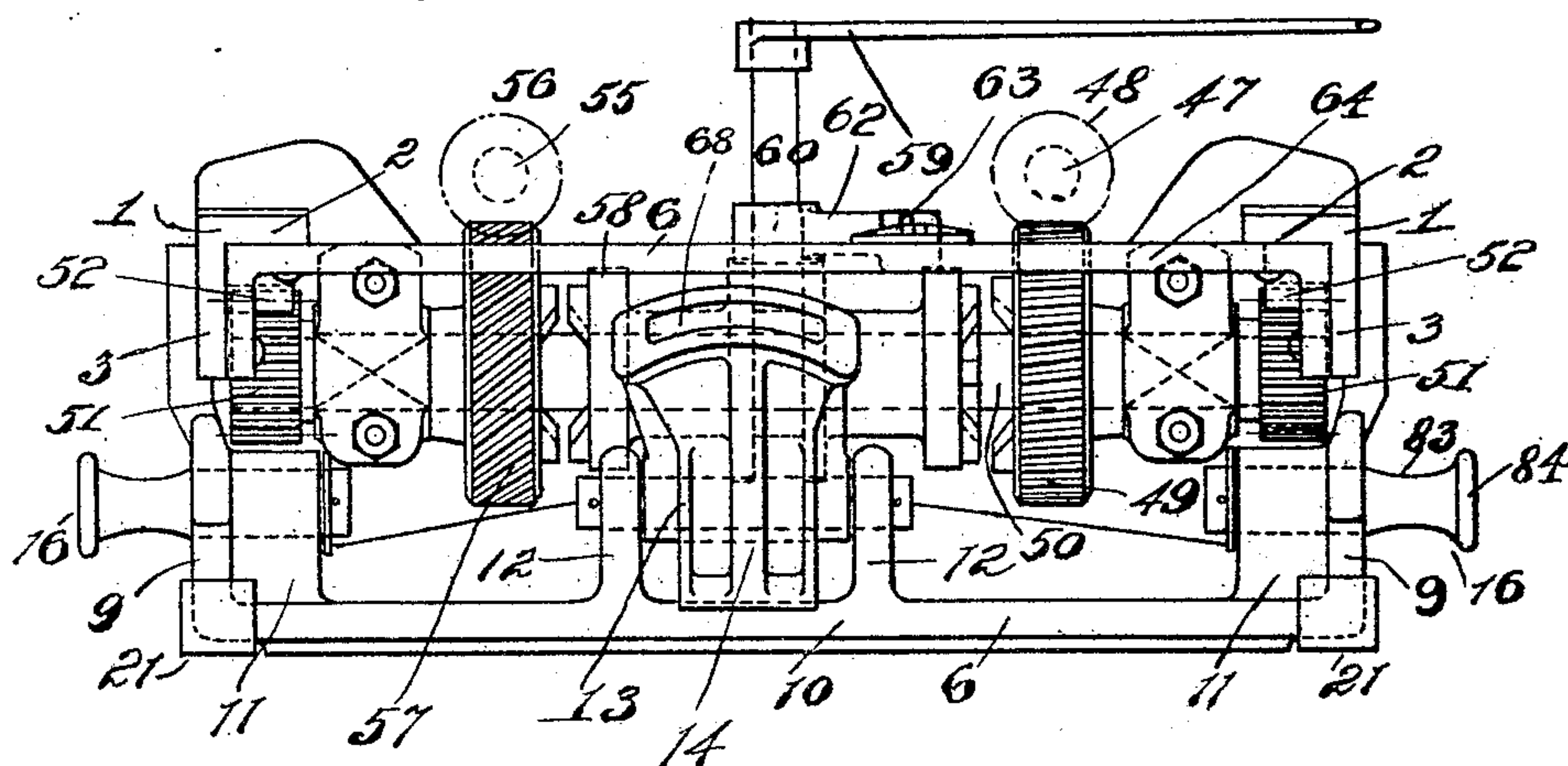


Fig. 7.

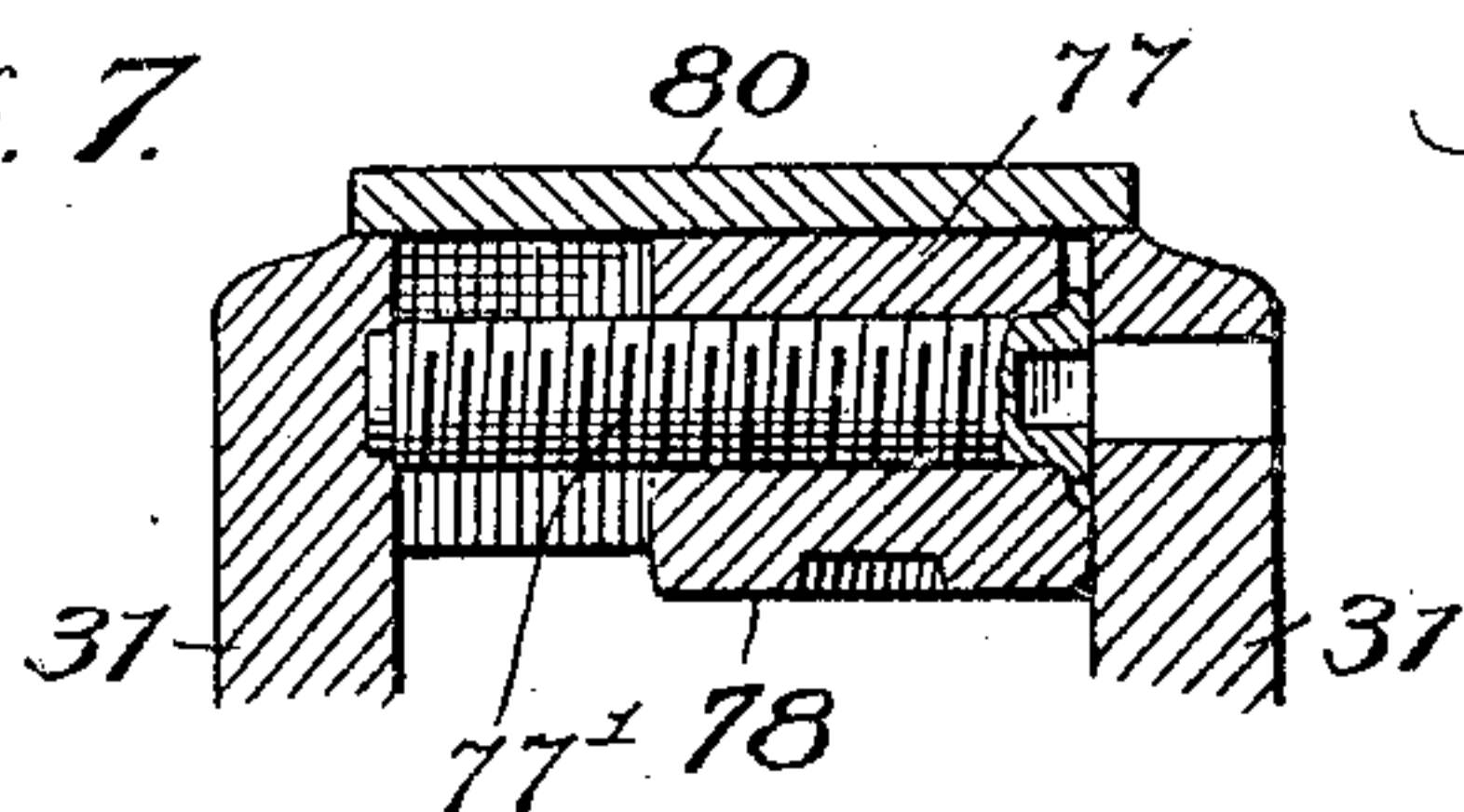
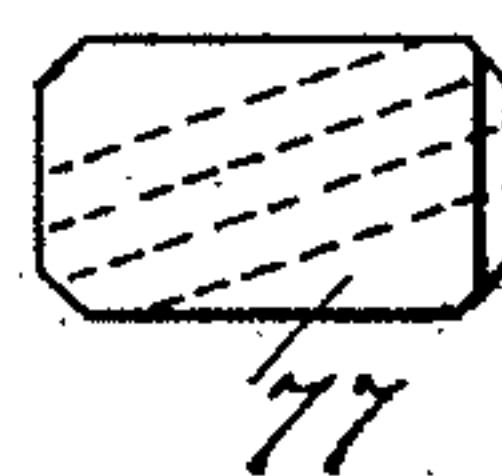


Fig. 8.



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# UNITED STATES PATENT OFFICE.

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MINING-MACHINE.

945,000.

Specification of Letters Patent.

Patented Dec. 28, 1909.

Application filed December 15, 1904. Serial No. 237,042.

*To all whom it may concern:*

Be it known that I, HENRY B. DIERDORFF, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Mining-Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

10 This invention relates to improvements in mining machines of the class in which use is made of endless chains, each provided with a series of cutters, the chains being mounted upon carriages with which they are moved bodily, while they are at the same time traveling endwise of the series of links.

15 The invention aims at the attaining of several important ends which will be described below and fully understood from the description of the accompanying drawings.

20 Figure 1 is a plan view of a mining machine embodying my improvements, the engine or motor being removed, but a fragment of the cutter chain being shown. Fig. 2 is a view partly in side elevation and partly in section of the machine. Fig. 3 shows in cross section the bed frame and part of the carriage and in elevation the platform part of the carriage which supports the engine or motor and also a part of the shafting and gearing. Fig. 4 is a central, vertical longitudinal section of the rear of the carriage and of the bed frame. Fig. 5 shows in front view the front cross connecting part of the bed, the carriage thrust bar being shown in section. Fig. 6 is a rear elevation, some of the parts being removed. Figs. 7 and 8 show a modified form of adjusting block.

30 The machine illustrated in the drawings comprises a bed frame indicated as an entirety by A, a carriage indicated by B, cutting apparatus C, and a motor D, these each being composed of several constituent parts, and having combined with them devices to be below described.

40 The bed frame A, has two main longitudinally arranged side bars 1. These are angle bars each having an inwardly turned horizontal flange 2 and a vertically disposed web 3. They are rigidly secured to cross connecting devices 4, 5 and 6. Those

at 4 and 5 are preferably bars, each bent to approximate a U shape, and having a vertical leg upon each side of the machine 55 and a bottom cross bar 8. That at 6 is at the rear of the machine and is peculiarly constructed so as to serve not only as a cross bracing and connecting device for the side parts of the frame, but also to assist 60 in fastening the machine, as a whole, in position when at work. It has the vertical leg parts 9 and the bottom cross bar 10, together with enlargements or thickened sections at 11 and lugs or uprights 12. These 65 lugs support a pin or shaft 13, which carries the base or support socket 14, in which rests the rear jack 15, used for fastening the machine as a whole in place when it is in operation, and which will be more fully 70 described below.

In the metal at 11 are formed bearing apertures for strong pins 16, which are used for moving the machine bodily by means of bars engaging with them and which will 75 be referred to hereinafter.

At their front ends the side bars 1 are secured to a cross connecting device, having the cross bar 17, which is in horizontal planes considerably above the bottom of 80 the machine, and which at the center has a downwardly projecting standard 18 with a base at 19. It is bolted to a detachable foot piece or runner 20. The cross connecting devices at the rear part of the machine, 85 namely, those at 4, 5 and 6, are at the bottom secured to long shoes or runners 21.

The carriage B is mounted in the bed frame above described in such way that it can be moved forward and backward 90 thereon. The carriage comprises the platform or frame 22 for the motor or engine, together with the shafting and gearing, a chain guiding frame having the side parts 23, 24 and the front cross head 25, together 95 with a thrusting bar 26. The carriage is formed with a horizontal plate part 27, which at the sides extends upward and is carried outward over the tops of the flanges 2 of the side bars 1. At the center it has 100 the bearing aperture 28 to receive the vertically arranged power shaft 29, which carries the chain driving sprocket wheel 30 at its lower end. The chain frame and thrust



frame or bar are secured to the motor platform 22 at points near its front edge. The motor plate or platform has downwardly projecting arms 31, with lugs 32, Fig. 3, which extend inwardly a short distance and provide a seat or chamber for the reception of the rear end of the thrust bar 26, which is held in place adjustably by devices to be described later.

33 is a cross bar secured by bolts 34 to the under side of the thrust bar 26. It has an upper part 35, bars 36, which are carried down and outward under the arms 31, and end parts 38. The chain guide bars 23, 24 rest upon and are secured to these end parts 38 of the cross bar or plate 33. These chain guiding bars 23, 24 are arranged on lines diverging outward from the driving sprocket wheel to the ends of the cross head 25. They are composed of grooved bars, and being secured to the cross bar 33 they are rigid with the center thrust bar 26 and with the cross head.

The motor D may be constructed in any preferred way. As shown, its armature 39 is connected by a pinion at 40 to the large gear wheel 41 on the cross shaft 42, which is mounted in bearings 42', 42' on the platform or plate 22.

43 is a bevel pinion engaging with the bevel wheel 44 on the vertical shaft 29 which, as aforesaid, carries the chain driving sprocket 30. The shaft 42 also drives the trains of devices which move the carriage first forward and then backward on the bed. The forward movement is caused by the worm 45 which engages with the worm wheel 46 on the shaft 47. This shaft extends backward and its rear end carrier a worm 48, which engages with the worm wheel 49 on the carriage moving shaft 50. On the ends of this shaft 50 are pinions 51, which engage respectively with the racks 52, secured to the side bars 1.

The power transmitting devices for withdrawing the carriage or moving it backward on the bed comprise the bevel wheel 53 on the shaft 42, the bevel wheel 54 on the longitudinally arranged inclined shaft 55, worm 56 on the rear end of the shaft, and the worm wheel 57 on the carriage moving shaft 50. The worm wheels 49 and 57 are loose on the shaft 50 but can be rigidly connected thereto by means of clutch 58 adapted to engage with either of the worm wheels alternately, or to occupy an inactive intermediate position. The clutch is movable longitudinally of the shaft 50 by means of the lever 59, which is secured to the vertical shaft 60, and which at its lower end carries the clutch shifting device 61. The lever can be automatically drawn in such direction as to disengage the clutch from the wheel 57 and stop the backward movement of the carriage by means of a short lever arm

62 secured to the shaft 60, and adapted to strike the projection 63 secured to the top cross bar 64 at the rear end of the machine.

When the operator, by means of the lever 59, throws the clutch 58 into engagement with the wheel 49 (which, it will be understood, is continuously moving slowly in one direction), the shaft 50 and its pinions 51 will turn along in engagement with the rack 52 in such way as to slowly advance the carriage. At the same time the chain with its cutters is being caused to revolve around the sprocket wheel 30, along the guide ways 23, 24, around the guide wheels 23', 24' at the ends of the cross head, and across the front of the latter. When the carriage reaches the front end of its travel, the operator throws the lever and the clutch in the opposite direction, disengaging the clutch from the wheel 49, and engaging it with the wheel 57, which is also constantly moving at a relatively high speed, and thereupon the pinions are reversed in their travel along the rack and the carriage pulled back, this continuing until the short lever 62 strikes the abutment at 63, which disengages the clutch from the pull-back wheel 57 and brings it to its neutral position. During the operation of cutting it is necessary to fasten the bed frame of the machine firmly in place upon the floor of the mine to prevent it from either moving backward longitudinally or laterally under the reaction of the cutters.

15 indicates the rear jack. It comprises the upper part 65 and the lower part 66, these being telescopically connected and adapted to be moved one upon the other by threaded devices, actuated by a hand wheel 67. The lower part 66 is flattened or made angular in cross section so that it can fit loosely in the laterally flaring socket at 68 in the part 14 above referred to. This base part 14 is pivotally connected to the bed frame so that it can be adjusted, as desired, to one position or another in vertical planes, longitudinally of the machines, and the part 66 is adapted to be adjusted laterally by rocking it in the socket at 68. At the front end there is a shorter screw jack 69, having the upper part 70, and the lower part 71. The latter terminates in a ball 72, fitted in the socket 73, the ball and the socket permitting the jack to be adjusted to any desired inclination. Disengagement of the parts is prevented by means of the pin or bolt 74, which passes through the walls of the socket and through the ball, the apertures in these parts, being elongated or enlarged if desired in relation to the bolt so that a free rocking movement can be obtained. I prefer, however, to so connect them that the jack shall at all times occupy approximately the same position of inclination as shown in Fig. 5.

In order to brace the carriage frame in relation to the bed and prevent torsional strain,



I employ plates or bars 75, which are fastened to the outwardly turned top parts of the motor platform and extend downward by the sides of the side bars 1, fitting snugly to the latter.

The cutter chain frequently requires tightening or adjustment. To accomplish this I employ the following devices. The motor platform is extended somewhat at the center of its front edge and in the extended plate there is formed an aperture 76. 77 is a relatively large block of metal fitted in the chamber just referred to. It is of such a width that it fits snugly against the walls of the aperture, but is of less dimensions than the aperture transversely of the machine. On its lower edge it has a series of inclined ribs 78. These fit in inclined sockets 79 formed in the upper face of the thrust bar 26. The block 77 is held firmly in place by means of a covered plate 80 which is bolted to the top of the extension of the platform. When the block is in position, the inclined teeth 78 serve as a holder and lock for the bar 26, preventing it from moving longitudinally in either direction. The transverse length of the block is less than the width of the bar 26. Consequently if it be forced in one direction or the other it will cause the bar 26 to slide forward and back in its supporting guide way. To thus force the block 77 in one direction or the other use is made of screw bolts 81—82. For instance, when the parts are made and shaped, as shown in Figs. 1 and 4, in order to tighten the chain the screw 82 is released somewhat and that at 81 is forced inward. This pushes the block 77 in such direction that its inclined ribs 78 force forward the bar 26, together with the other parts of the chain frame in relation to the motor platform and the chain is tightened. If, after a number of such operations the block has been pushed entirely across the bar 26, it is only necessary to remove the cap plate 80, lift the block 77 out and replace it at the other end of the chamber, fitting its ribs 78 into another set of grooves 79. As will be seen, the series of grooves 79 in the thrust bar is considerably longer than the series of ribs 78.

While the motor frame, and the chain-guiding frame are situated in different horizontal planes, the former being higher than the latter, it is possible, when a chain adjusting device, such as that just described, is employed to have it engage directly with the thrust bar, the inter-engaging parts of the adjusting device and the bar being in the horizontal planes of the latter, thus applying the force for moving the bar and adjusting the chain in the most advantageous manner.

The pins 16 are formed with concave projecting parts 83 and heads 84. By means of these the operators are enabled to move the

machine readily, use being made of bars or similar devices, which are placed under these projecting parts of the pins at 16. These pins are detachable so that they can be taken out when it is desired to remove them as obstructions, and also so that others can be substituted in case new ones are needed.

While hereinbefore I have referred to the manner in which the operator can control the forward movement of the carriage by shifting the hand lever 59, it will be understood that the forward feed of the carriage may be automatically controlled by any of the means well known in the art. For illustration I have shown the longitudinally arranged bar 62' mounted in suitable bearings and adapted to slide forward and back therein. The front end of this bar is arranged to engage with the cross-head 17, or a part thereof, as the carriage moves forward, thereby causing the said bar to move rearwardly and engage with the lever arm 62 and to throw the clutch 58 into its neutral position.

In Fig. 5 of the drawings the construction of the cross-head 17 is clearly shown. The relatively narrow downwardly extending standard 18 has the uprights 18' between which the thrust bar 26 is fitted and guided, this bar resting upon a block 19 having a reduced portion 19<sup>a</sup> fitted between the uprights 18', the shoulders 19<sup>b</sup> upon which the lower ends of the uprights rest and the relatively expanded base portion 19<sup>c</sup>. The shoe 20 is detachably secured to this base 19<sup>c</sup>. 18<sup>a</sup>, 18<sup>a</sup>, are bolts extending through the block 19 and the uprights 18' and adapted to secure these parts detachably together. This construction permits of the easy removal or insertion of the thrust bar whenever desired.

In Figs. 7 and 8 is shown a modified form of adjusting block and means for adjusting it. In this construction the block 77 having the downwardly projecting ribs 78 is formed with a screw threaded aperture therethrough into which is fitted an adjusting screw 77', one end of which may be seated in a recess in one of the arms 31, the other end having a head adapted to receive a wrench or tool by means of which the screw is turned, 31' being a hole through the other arm 31 adapted to permit access to the head end of said screw.

Various other ways of constructing an adjusting block embodying my invention will present themselves, and it is to be understood that I do not limit myself therefore to the construction which I have shown in the drawings for the sake of illustration.

What I claim is:

1. In a mining machine, the combination with a bed frame, a motor frame longitudinally movable thereon, a chain frame carried by the motor frame and adjustable relative thereto, an adjusting block slidably



mounted in ways formed in the motor frame and chain frame, said ways being arranged transverse to the longitudinal lines of the chain frame and at an angle to each other, and screw threaded means for moving the block in said ways.

2. In a mining machine, the combination with a bed frame, a motor frame longitudinally movable thereon, a chain frame carried by the motor frame, said chain frame being longitudinally adjustable relative to the motor frame and having a centrally arranged longitudinal thrust bar, ways formed in the motor frame in which the thrust bar is slidably mounted and by which it is laterally and vertically braced, an adjusting block slidably mounted in ways formed in the motor frame and the thrust bar, said ways being arranged transverse to the longitudinal lines of the thrust bar and at an angle to each other, and screw threaded means for moving the block in its ways.

3. In a mining machine, the combination with the bed frame, the cutter chain and the motor platform, of the longitudinally adjustable chain frame having a bar provided with vertical projections inclined to the longitudinal lines of the chain frame, an adjusting block having vertical projections engaging with those aforesaid and movably mounted on the engine platform, and means for moving said adjusting block transversely to adjust the chain frame substantially as set forth.

4. In a mining machine, the combination of a bed frame, a motor platform movable forward and back thereon, a cutter chain, a longitudinally adjustable chain frame having at its rear end a bar grooved diagonally to the longitudinal lines of the said frame, an adjusting block suitably mounted in said motor platform and having a tongue arranged to enter the groove in the bar at the rear end of said chain frame, and means for moving said adjusting block transversely of the motor platform to adjust the chain frame.

5. In a mining machine of the class described, the combination with a motor frame, of a longitudinally adjustable chain frame having at its end adjacent to the said motor frame a bar formed with a series of diagonally arranged grooves, an adjusting block having a plurality of tongues arranged to fit into said grooves, said block having a bearing against the motor frame, and means for moving the said adjusting block transversely of the machine to adjust the chain frame.

6. The combination with the cutting apparatus and the carriage, of the bed frame having a base skeleton structure at the rear end only, comprising the longitudinally arranged ground shoe bars 21 extending from the rear forward to the central part of the machine, the cross ground bars, the upright

bars 4, 5, 9, the elevated angle guide bars each having the horizontal flange 2 and the vertical flange 3 integral with each other, the front elevated cross bar 17 joined to the front ends of the angle guide bars, the shoe 20, the vertical uprights 18' extending between the said cross bar and shoe, and the centrally arranged thrust bar 26 between the uprights 18' and resting on the shoe, the rear shoe bars 21 and the central shoe 20 being arranged as set forth to provide open spaces between the ground and the upper guide bars at the front ends of the bed and around the shoe 20.

7. In a mining machine, the combination with the front thrust cutting apparatus, and a carriage supporting said apparatus, of a bed frame having elevated angle guide bars 2, 3, the ground support for said bars at the rear end of the machine, the cross bar 17 secured to the front ends of the angle bars, the shoe 20, the uprights 18' connecting the shoe to the cross bar 17, the central thrust bar 26 between the uprights 18', the shoe block 19 secured to the shoe 20 and having an upward extension between the uprights 18' and supporting the thrust bar 26.

8. The combination, in a mining machine, with the cutting apparatus and the carriage carrying said apparatus, of the bed frame having the centrally disposed shoe at the front end, the downwardly extending uprights 4, 5, 9, with bottom cross bars, the elongated ground shoes 21 at the sides extending forward from the rear ends to approximately the central part of the machine and lying on longitudinal lines, and the elevated angles guide bars 2, 3 supported by the said central front shoe and the uprights 4, 5, 9, said angle guide bars having guide-ways formed along their vertical outer faces and on their top surfaces for the cutter carriage.

9. In a mining machine, the combination with the cutting apparatus and the carriage, of the bed frame having top longitudinal bars 1, the ground support for the said bars at the rear end of the machine, and the front cross bar having the relatively wide portion to which the said top bars are secured, and the depending standards adapted to receive between them the thrust bar of the carriage, the shoe block detachably fitted to said standards and adapted to support the said thrust bar, and the shoe 20 secured to said block.

10. In a mining machine, the combination with the cutting apparatus and the carriage, of the bed frame, having the longitudinal top bars 1, the ground support for the said bars at the rear end of the machine, the cross-head having the relatively wide upper portion to which the said top bars are secured, and the relatively narrow depending portion comprising the uprights 18' between which the central thrust bar of the carriage



is guided, the shoe block 19 having the upward extension 19<sup>a</sup> fitted between said uprights, the shoulders 19<sup>b</sup> upon which the said uprights rest, the base 19<sup>c</sup> and the shoe 20 secured to said base.

11. In a mining machine, the combination with the cutting apparatus and the carriage, of the bed frame having the longitudinal top bars 1, the ground support for the said bars at the rear end of the machine, the cross-head having the relatively wide upper portion to which the front ends of said top bars are secured and the relatively narrow depending portion comprising the uprights 18' adapted to receive between them the central thrust bar of the carriage, the block 19 having the upward extension 19<sup>a</sup> fitted between said uprights and arranged to support said thrust bar, the shoulders 19<sup>b</sup> upon which the said uprights rest, the base 19<sup>c</sup>, and the bolts 18<sup>a</sup> for se-

curing said block to the said uprights, and a shoe 20 secured to said base.

12. In a mining machine, the combination of a bed frame having longitudinal bars, 25 relatively long ground supports for the said frame at the rear end thereof, a relatively short centrally disposed ground support for the front end of the frame, a motor and cutter chain frame supported by the bed frame 30 and movable longitudinally thereof, the said movable frame having a thrust bar, and the front ground support being provided with a seat for the thrust bar in which it moves longitudinally and by which it is laterally 35 braced and supported.

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

HENRY B. DIERDORFF.

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