

M. B. MILLER.
WELL DRILLING MACHINE.

No. 444,221.

Patented Jan. 6, 1891.

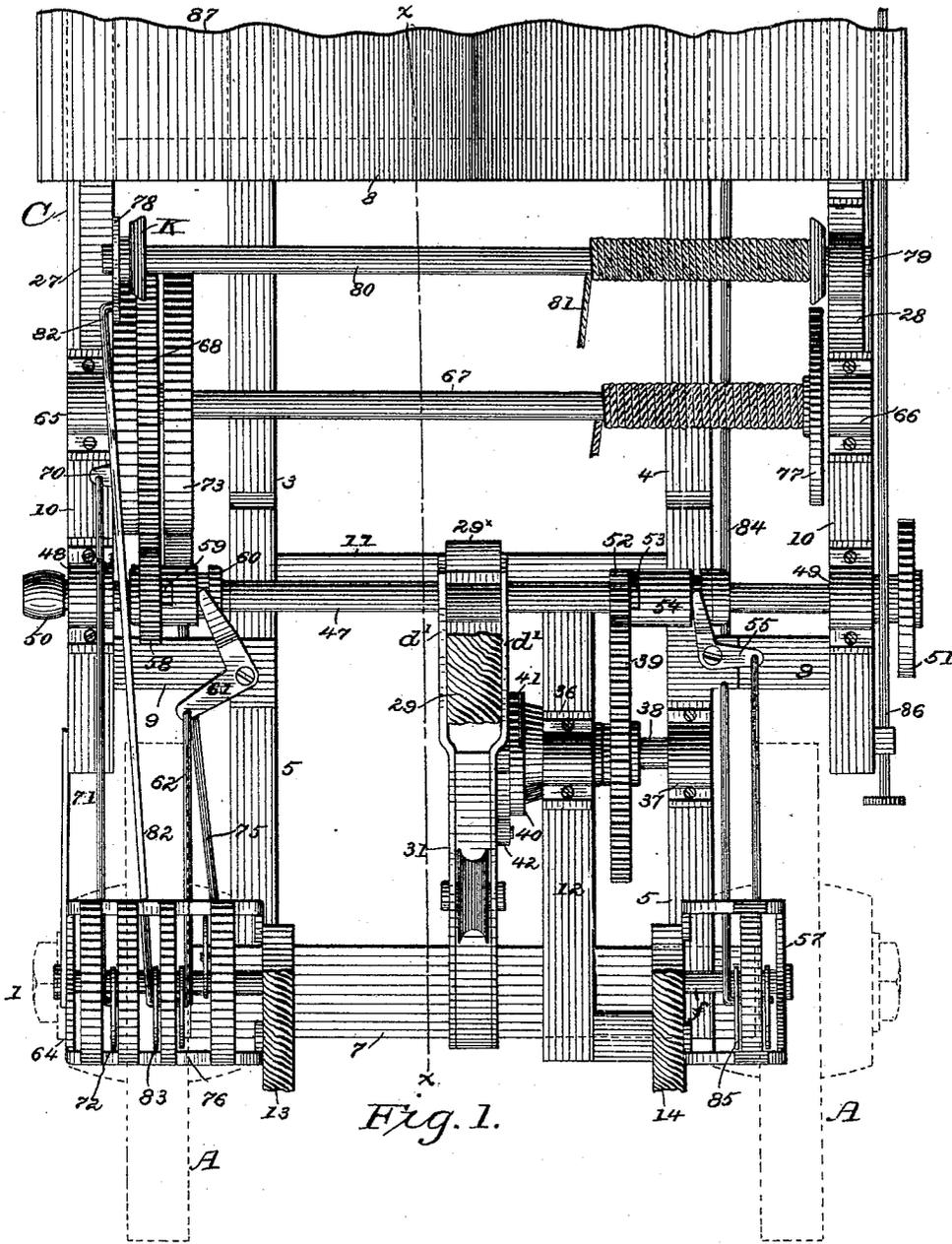


Fig. 1.

WITNESSES

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INVENTOR

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(No Model.)

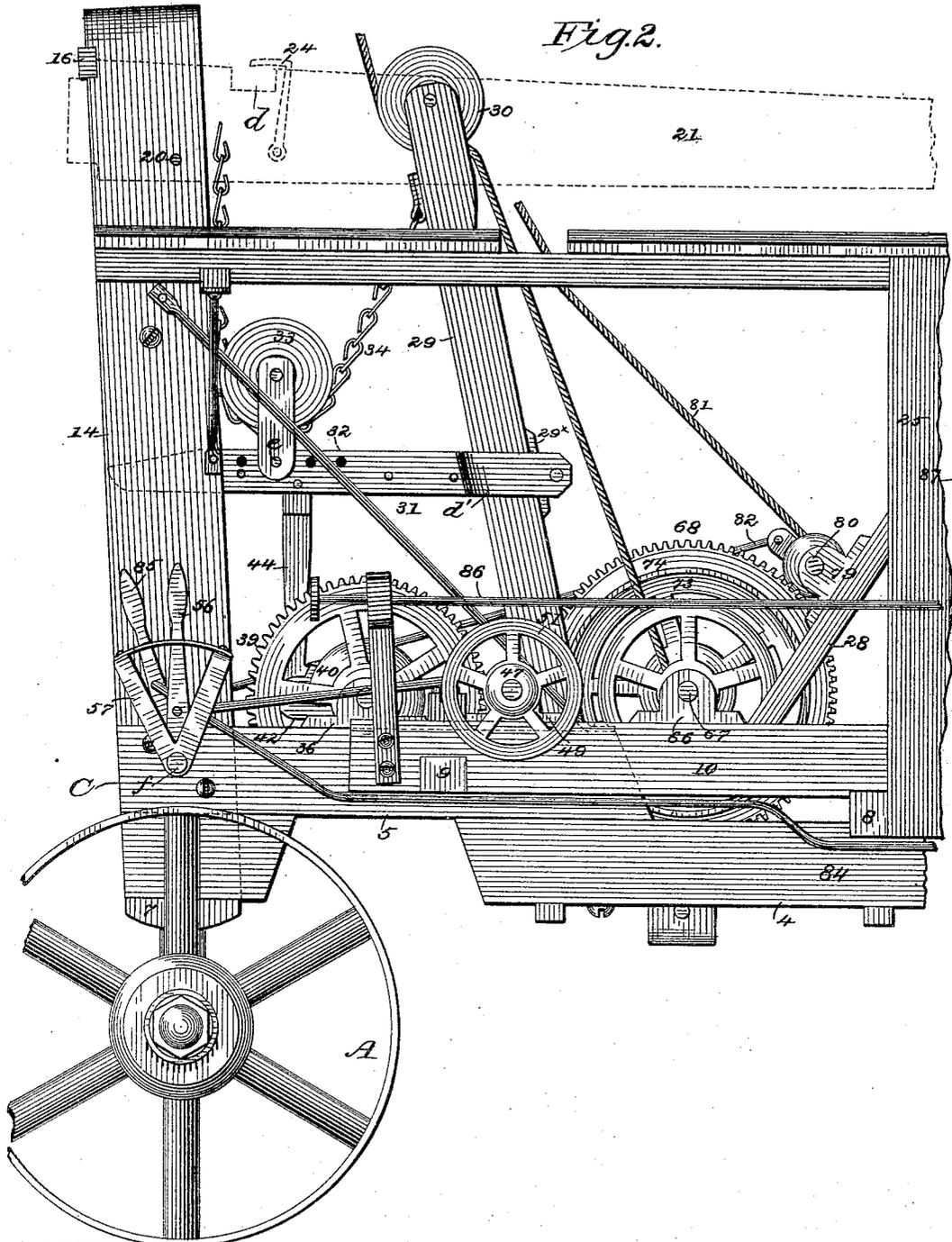
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Fig. 2.



WITNESSES

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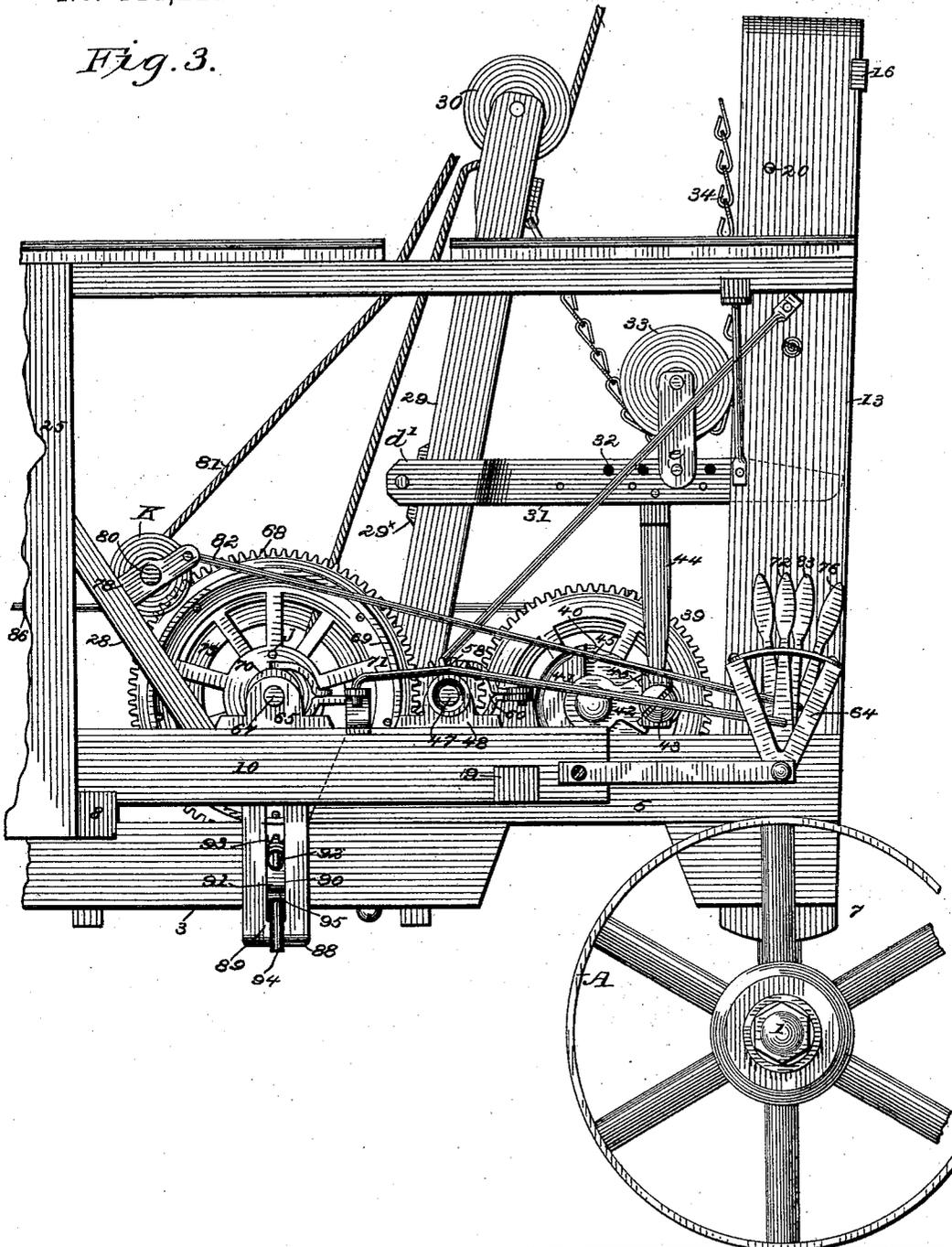
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Fig. 3.



WITNESSES

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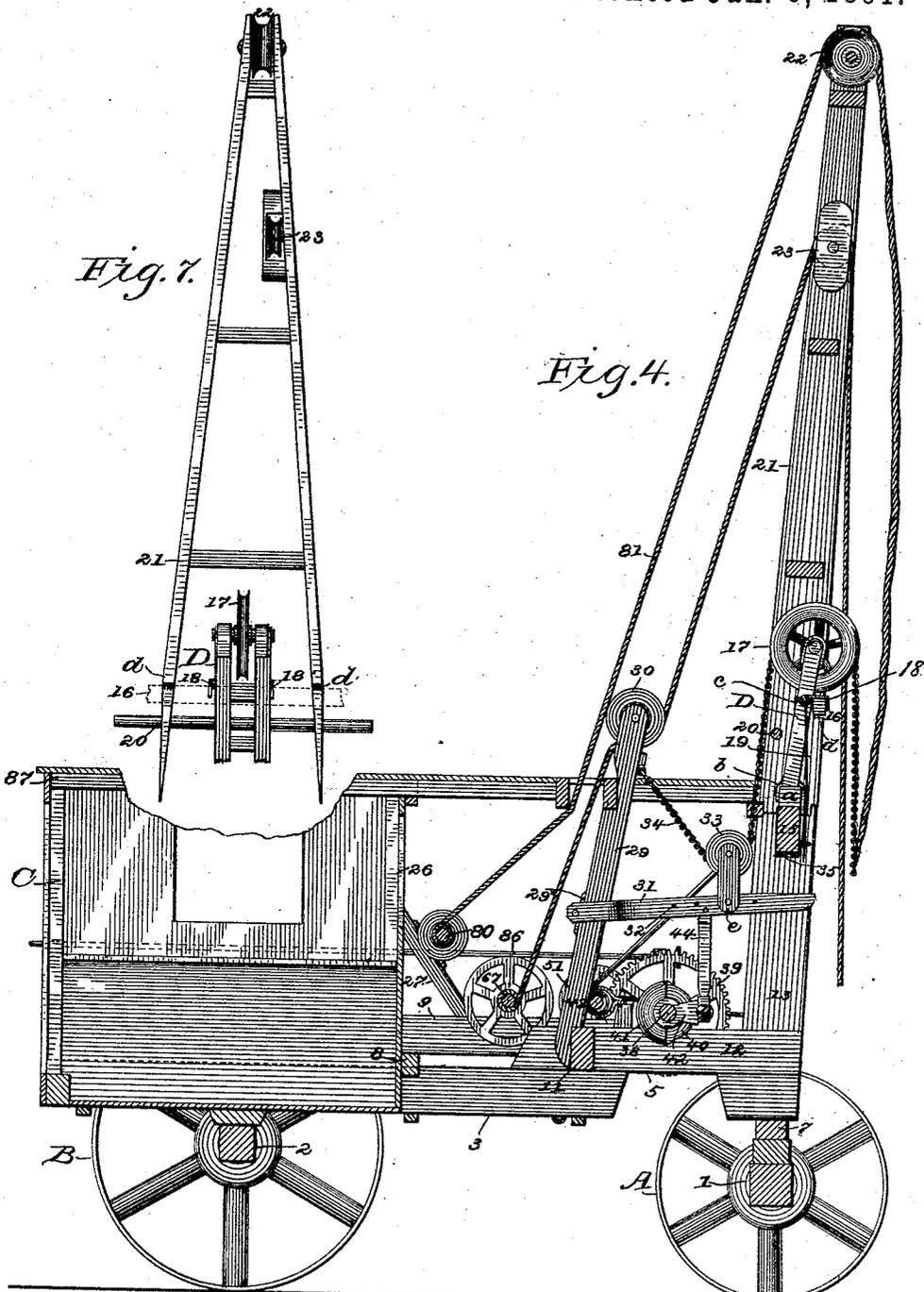
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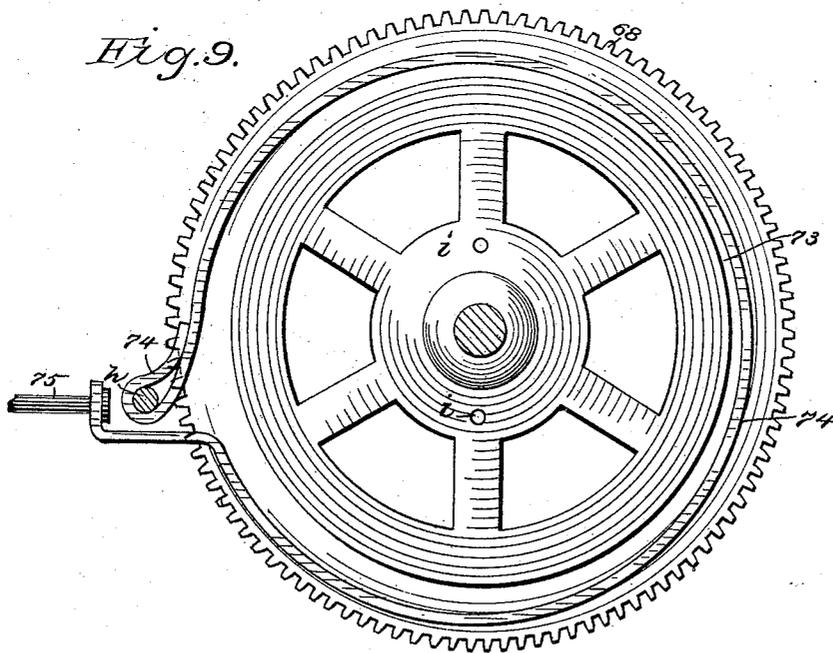
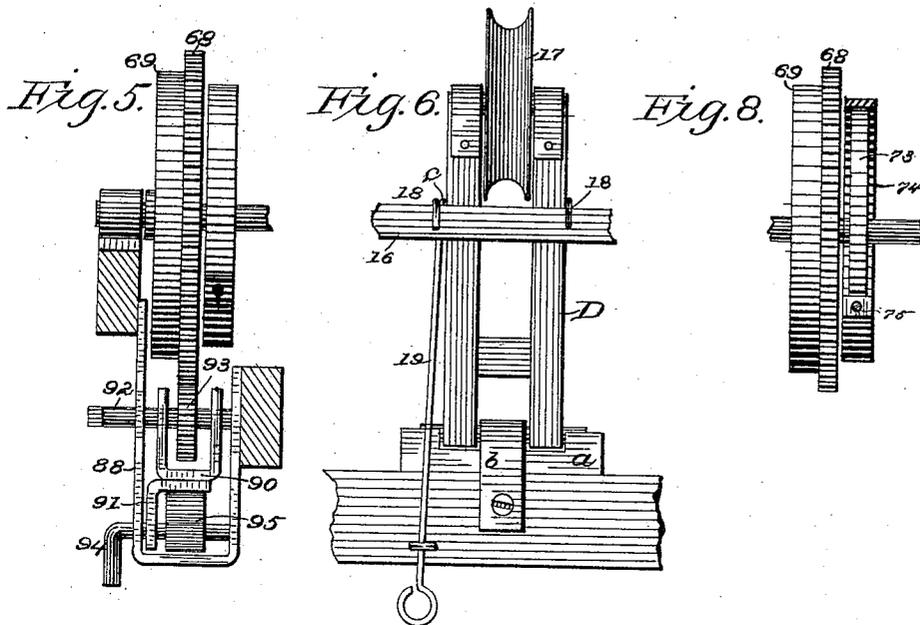
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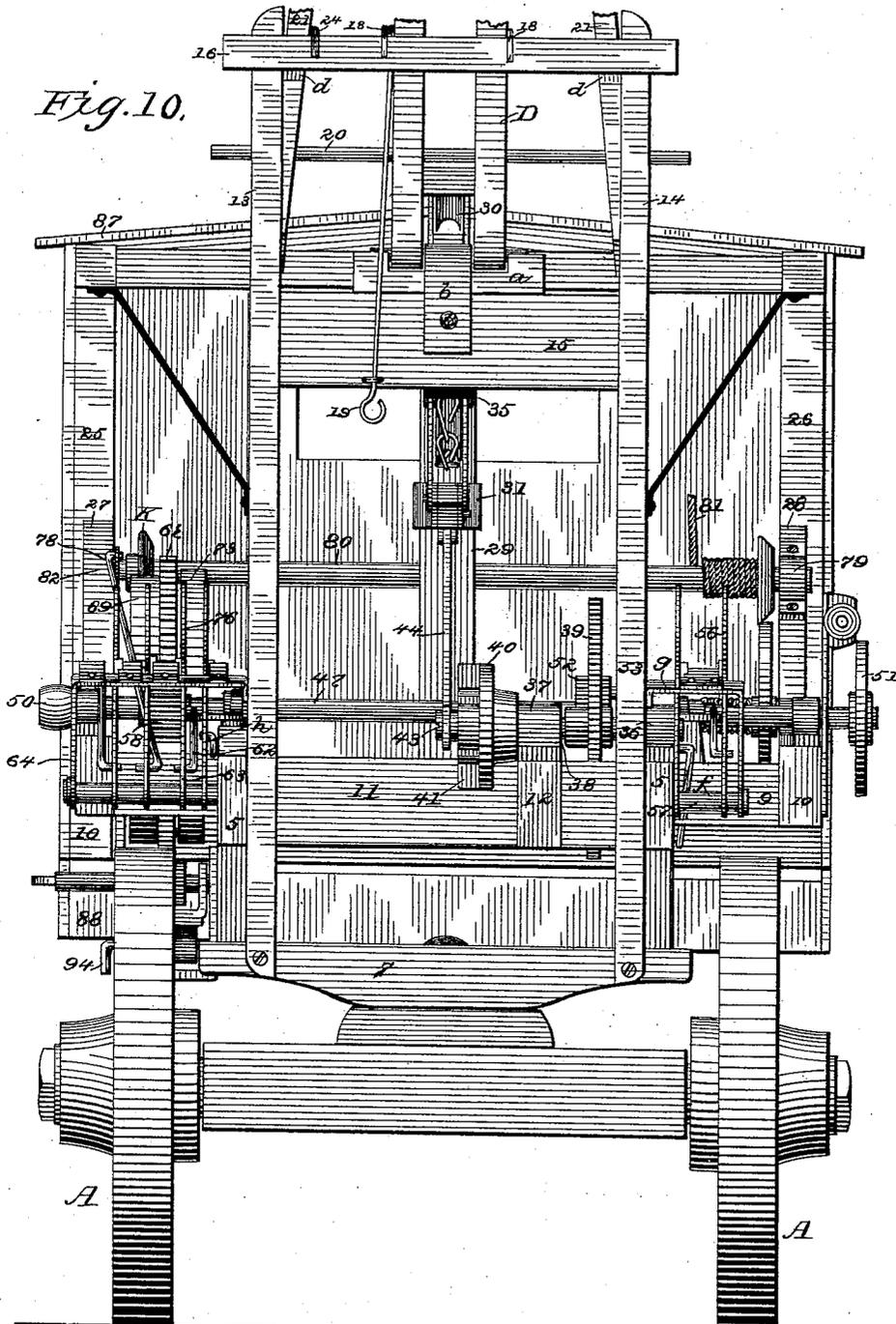
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WITNESSES

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UNITED STATES PATENT OFFICE.

MARTIN B. MILLER, OF CARLISLE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF
TO THEODORE CORNMAN, OF SAME PLACE.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 444,221, dated January 6, 1891.

Application filed October 24, 1889. Serial No. 327,986. (No model.)

To all whom it may concern:

Be it known that I, MARTIN B. MILLER, a citizen of the United States of America, residing at Carlisle, in the county of Cumberland and State of Pennsylvania, have invented certain new and useful Improvements in Well-Drilling Machines, of which the following is a specification.

My invention has relation to improvements in well boring or drilling machines of that class wherein the drill is operated through the reciprocations of a walking-beam; and the object is to improve and simplify existing mechanisms of the kind allied to my invention; and to this end my invention consists in the novel construction and combination of parts, as will be hereinafter fully described, and specially as the same is pointed out in the claims.

I have fully and clearly illustrated my invention in the accompanying drawings, wherein—

Figure 1 is a plan view of the machine, the derrick's supports being broken off. Fig. 2 is a side view, the derrick being laid back on the roof of the carriage. Fig. 3 is a side view taken from the reverse to that shown in Fig. 2, with the derrick elevated. Fig. 4 is a longitudinal vertical section on the line *xx* of Fig. 1. Fig. 5 is a detail view of the sliding box and hanger with gearing. Fig. 6 is a detail of the lower drill-sheave and frame. Fig. 7 is a view of the derrick. Fig. 8 is a detail of the bull-wheel and break-wheel. Fig. 9 is a side view of the brake-wheel in detail. Fig. 10 is an end view of the machine.

A designates the front wheels of the carriage, carrying the front axle 1, and B designates the hind wheels, carrying the axle 2. The wheels and axles are made of such substantialness as to meet the purposes intended of carrying and sustaining the carriage and the mechanism mounted thereon.

C designates the frame, composed of side pieces 3 4, sustained at their rear portions on the rear axle and rigidly and firmly secured thereto. These side pieces are extended well to the front and have rigidly connected to them the extension-pieces 5, the upper line of which is higher than the line of the other and rear pieces. The side timbers of the frame

are secured by cross-pieces 6, and at front are secured to the sides of the lower portions of the derrick-supports and rest on the extended ends of the cross-piece 7, which also constitutes the bolster of the front carriage, and for that purpose the cross-piece 7 is made deeper in the middle and tapered up on its under side toward the ends, as usual in this element on road-vehicles. At 8 is another cross-piece having its ends projected beyond the pieces on which it rests, and from the pieces 5 are projected girts 9, to which are secured side pieces 10, having their rear ends resting on the cross-piece 8, substantially as shown. Mortised in the pieces 5 is a stout piece 11, which sustains the standard carrying the rope-sheave and walking-beam. Parallel with one of the side pieces is a timber 12, on which is mounted one of the bearings of the crank-shaft which operates the walking-beam. On the front of this frame are vertical supports 13 14 of the derrick, bound together by a strong cross-piece 15, on which a swinging frame is supported, and at the top has a cross-bar 16, which also serves as keeper or catch-bar for hooks of the derrick and the swinging frame. On the cross-piece 15 is mounted a bearing *a*, in which is the bearing-piece of the swinging frame D, carrying in its upper end a sheave 17, which carries and guides a drill-chain. This frame D is held in its bearing by a box-strap *b*, substantially as shown. On the frame D is journaled a bar *c*, having hooks 18 on its ends to engage with the bar 16 and hold the swinging frame in the proper position when in use. The hooks are engaged and disengaged by means of a handle-bar 19, which extends down far enough to be conveniently manipulated. The frame D, when disengaged from its connection with the cross-bar, falls back and rests in an inclined position against a bar 20. This bar 20 also serves as the journal-support for the derrick.

21 designates the derrick having its lower ends journaled to the bar 20 and its side pieces gradually approaching each other toward the top, where the sheave 22 is journaled, to carry the drill-rope. On one of the timbers of the derrick is the sheave 23 for the sand-pump rope. At the lower front part of the derrick are formed rabbets *d*, which fit

over the cross-piece 16 when the derrick is in vertical position, and are fastened in such position by a hook 24, engaging the piece 16. When the derrick is not in use, it can be turned back and down until it lies horizontal and rests on the top or roof of the house. At the rear of the frame are erected two posts 25 26, braced by brace-pieces 27 28, carrying the bearings of the sand-rope shaft. On the cross-piece 11 is fixed the standard or post 29, inclined slightly forward and secured near its top by bars leading to the sides of the roof-rails and forward to the derrick-supports. On the upper end of this standard is a sheave 30, which guides the drill-rope.

31 designates the walking-beam, having its rear end jointed to the standard 29 by means of extensions of plates *l'*, fixed on its sides and carrying a journal-pin in a bearing 29^x on the rear face of the standard. The extensions of the plates serve as guides to keep the walking-beam steady. In the walking-beam is a number of holes 32, through which a bearing-pin *e* is projected. On this pin are mounted the bearing-pieces of the guide-sheave 33, which carries the drill-chain 34, and from which the chain leads upward and over the sheave 17 in the swinging frame, from which it drops down. This chain is attached to the drill-rope and thus serves to take the strain from that part of the drill-rope above their connection and relieve it and the machinery to which it is connected of the usual jars. On the under face of the cross-piece 15 is a bumper-block 35, made of some yielding or elastic material. This block receives the strokes of the walking-beam in its upward movements and, yielding slightly, relieves the walking-beam and frame from the consequences which would occur were the walking-beam to strike an unyielding object, and also imparts to the drill-chain a more elastic movement when the drill drops down. On the frame-pieces 5 and 12 are mounted bearings 36 37, in which is a shaft 38, carrying a large gear-wheel 39, meshing with a small gear-wheel, as shown, at its rear. On the end of the shaft 38 is a crank-head 40, having a cross-plate 41 on its face, the inner edge face of which serves to carry the crank after it has dropped down. On a journal projected from the crank head or shaft carrying it is loosely mounted the crank-arm 42, having its wrist-pin 43 connected to the pitman 44, which has its upper end in turn connected to the walking-beam. In the crank-head and crank-arm are registering holes 45, in which a pin (not shown) may be inserted to hold the crank fast to the head in a fixed position, and thus make the movement positive and adapt the movements to operate the tools with light strokes in work where it is necessary to use care and caution while drilling in or through open and soft material.

47 designates the driving-shaft, mounted in bearings 48 49 on the frame, carrying a band-pulley 50, on which a belt (not shown) may be

arranged leading to the power-shaft at the engine, and on the other end of the driving-shaft is a fly-wheel 51. On this driving-shaft is a small gear 52, its hub being loosely mounted thereon and formed with a clutch end 53, to be engaged by a clutch 54 on the driving-shaft. This clutch is splined on the driving-shaft and is shifted by a bell-crank lever 55, pivoted on the frame, having a pull-rod leading to a hand-lever 56, fulcrumed in a switch-stand 57, arranged and supported on the side of the frame. The small gear 52 meshes with the gear-wheel 38 on the crank-shaft, and by shifting the clutch the small gear is made fast to turn the crank-shaft or left loose on its shaft as an idler. This arrangement of gearing renders it most convenient to stop or start the drilling mechanism. The switch-stand 57 consists of a segmental frame mounted on a base-rod *f*, also serving as the fulcrum-rod for the lever and having bars *g* connecting the segments of the frame, having notches, as usual, in which the levers may be lodged and held. On the driving-shaft 47 is also loosely mounted a gear-wheel 58, having its hub formed with a clutch-piece 59, which is engaged by a sliding clutch 60, splined on the shaft. This clutch is shifted by a bell-crank lever 61, having a rod 62, leading to a hand-lever 63, fulcrumed in a switch-stand 64, mounted at the side of the machine-frame. This switch-stand consists of a supporting-bar projected from the frame serving as a fulcrum for the respective hand-levers and segmental frame having bars to hold the levers, substantially as shown. The gear 58 meshes with and drives the gear on the bull-wheel, as shown. In bearings 65 66 is the bull-wheel shaft 67, having loosely mounted thereon the bull-wheel 68, consisting of a gear-wheel having a broad plain flange 69 on it, which serves as a bearing for the pulley on the sand-rope shaft. The hub of the bull-wheel has a shifting-lever 70 arranged on it, which has a connecting-rod 71, attached at its outer end to a hand-lever 72, fulcrumed in the switch-stand 64. On the bull-wheel shaft 67 is fixedly mounted a brake-wheel 73, having a flat rim, about which is arranged a brake-strap 74, one end of which is attached to a bar *h* and the other end connected to a pull-bar 75, the outer end of which is fixed to a hand-lever 76, fulcrumed in the switch-stand 64. By shifting the lever the brake-wheel is locked in position by the brake-strap and the drill-rope kept from running out, and by shifting the lever in the opposite direction the brake-strap is loosened and the shaft may turn to pay out the drill-rope. In one of the arms of the brake-wheel is an outwardly-projecting pin *i*, which, when the bull-wheel is shifted toward the brake-wheel, engages a hole *j* in the frame of the former and holds the two wheels together, so as to turn in unison and wind up the drill-rope or pay it out, according to the motion of the mechanism. On the shaft 67 is a flange-wheel 77 to

keep the drill-rope from crowding too far in that direction. On the inclined brace-pieces 27 28 are arranged bearing-boxes 78 79, pivoted at one end to the brace-piece, and in these bearings is the sand-rope shaft 80, having attached thereto one end of the sand-rope 81, which is carried up over the sand-rope sheave on the derrick. To the free end of the bearing 78 is connected a rod 82, running to a hand-lever 83, fulcrumed in the switch-stand 64. On the sand-rope shaft is a pulley *k*, arranged to bear with its face on the flange of the bull-wheel. When it is required to wind up the sand-rope, the lever is shifted so as to cause the pulley *k* to bear on the flange of the bull-wheel, which communicates motion to the sand-rope shaft, and the rope is wound up, and by regulating the lever-pressure the rope may be paid out at such speed as may be desired.

84 designates a rod arranged to slide in bearings on the frame and having its inner end connected to the reversing-lever of the engine and its outer end fastened to a hand-lever 85, fulcrumed in the switch-stand 56. This lever and rod provide means for reversing the motion of the engine from the front of the machine.

86 designates a rod arranged to slide in bearings on the frame and having its inner end connected to the throttle of the engine and its outer end provided with a hand-grasp, as shown. By means of this rod the engine (not shown in the respect indicated) may be controlled.

87 designates the house covering and protecting the machine and also providing room for the operator of the engine. Under the side piece of the frame is a hanging housing 88, having a slot 89 in its outer arm. In this housing is arranged a vertically-sliding box 90, having a downward-projecting piece 91. In the sliding box is mounted a journal-rod 92, carrying a gear-wheel 93, which when the box is moved to its upper limit engages the gear of the bull-wheel. Below the sliding box is journaled a crank-rod 94, on which is mounted a crank-piece 95, so arranged thereon that when the cam is turned up it will lift the gear in the sliding box into engagement with the teeth of the bull-wheel. The journal-rod 92 is extended and shaped to take a crank by which it may be turned. The object of this mechanism is to provide independent means for operating the machine by hand if the work warrants it, and also for drawing up and paying out the drill-rope, as may be desired.

The operation of the machine may be stated as follows: To wind up the drill-rope preparatory to commencing the work, the bull-wheel is shifted by the proper lever, so that the engagement with the brake-wheel is effected, and then, if desired to wind it up by hand, the sliding box is raised until the gear carried by it engages the gear of the bull-wheel, when by means of the crank on the journal-rod of the gear in the sliding box

the bull-wheel shaft having the drill-rope connected thereto is turned and the rope wound up. If it is desired to wind up the drill-rope by the connected power, the clutch connection of the loose gear on the driving-shaft that meshes with the gear of the crank-shaft is shifted out of connection. The outer clutch on the main shaft is shifted into engagement with its gear on the main shaft. The bull-wheel is shifted into connection with the break-wheel, and on starting the machine the drill-rope will be wound up. By the same preliminary arrangements, together with the shifting of the lever to draw the pulley on the sand-rope shaft down on the flange of the bull-wheel, the sand-rope may be wound up. When the slack of the drill-rope is used up in the process of drilling, the brake-band being loosened and the gears left free, the rope will be paid out by its own weight with that of the tools on it, and the brake-band being tightened the rope will be stopped and held.

To operate the drill, the clutch on the main shaft is shifted into engagement with the gear meshing with the gear on the crank-shaft, the gear on the main shaft which is in engagement with the bull-wheel being left free on the shaft. Then the power being started the walking-beam is operated through the connected mechanism and the drilling proceeds. The drill-rope is arranged in its sheaves and then brought down and connected to the drill-chain, which connection, as stated, throws the strain off the upper pulley of the derrick and mechanism on the rear of the frame and brings it more directly and particularly on the drilling mechanism without in any way lessening the efficiency of the machine.

I am aware that it is not new, broadly considered, in well-drilling machinery to arrange a bumper against which the walking-beam or drill-rope lever may strike when such beam or lever is released and the tool falls; but I believe myself to be the first to have arranged a bumper for the walking-beam in that class of well-drilling machines which employ a permanent pitman connection between a loose crank and the walking-beam, and by this combination I save the crank and crank-shaft from the jars incident to the falling of the tool.

Having thus legally described my invention so as to enable those skilled in the art to make, construct, and use the same, and also explained the principle thereof and a preferred mode in which the principle may be applied, so as to distinguish it from other inventions, I proceed to particularly point out and distinctly claim the parts, improvements, and combinations I claim as my invention, as follows:

1. In a well-drilling machine, the combination of a driving-shaft, a gear-wheel loose thereon, a clutch for said gear-wheel, a crank-shaft carrying a gear-wheel meshing with the driving-shaft gear and provided with a crank-head having a cross-plate 41, forming a shoul-

der across its face, a crank loose on the crank-head, a walking-beam having a sheave bearing on the drill-rope, the pitman connecting the crank to the walking-beam, and a bumper against which the walking-beam strikes, substantially as described.

2. In a well-drilling machine, the combination of a vertically-arranged standard provided with a bearing on its rear face, a walking-beam having plates secured to its side faces and extended beyond the rear end thereof and against the sides of the standard and provided with a journal arranged in the bearing on the rear face of the standard, the rope or chain 34, having one end connected with the said standard, and the sheave 33, carried by the walking-beam and bearing on the said rope or chain, substantially as described.

3. In a well-drilling machine, the combination, with the derrick having a cross-bar 15 and the drill-rope proper passing over a pulley in the derrick, of the swinging frame on said cross-bar having the sheave 17, the vertical standard, the walking-beam connected thereto, the buffer-block 35 on the bar 15 and in the path of the walking-beam, the sheave 33, adjustable on the walking-beam, the rope or chain 34, attached to the vertical standard and passing under the sheave 33 and over the sheave 17 and connected to the drill-rope proper, and the crank connected to the walking-beam, all arranged substantially as described.

4. In a well-drilling machine, the combination, with the derrick, of the swinging frame D, mounted thereon and carrying a sheave, the rope or chain 34, fixed to some part of the machine and passing over the said sheave to the drill-rope proper, to which it is secured, and the walking-beam connected with the rope or chain 34 for operating the drill-rope, substantially as described.

5. In a well-drilling machine, the combination, with the bull-wheel, of a sliding box 90, a journal-rod therein carrying the gear and the hand-crank, and a crank-shaft 94, having a cam adapted to move the sliding box and thereby throw the gear into or out of mesh with the bull-wheel, substantially as and for the purpose specified.

6. In a well-drilling machine, the combination, with the bull-wheel, of a slotted housing, the vertically-movable box therein, the journal-rod therein having a gear and a hand-crank, and a crank-shaft journaled in the housing below the sliding box and having a cam to operate said box to throw the gear into or out of mesh with the bull-wheel, all substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand in the presence of two attesting witnesses.

MARTIN B. MILLER.

Attest:

ALEXANDER HOLSINGER,
J. T. WHITAKER.