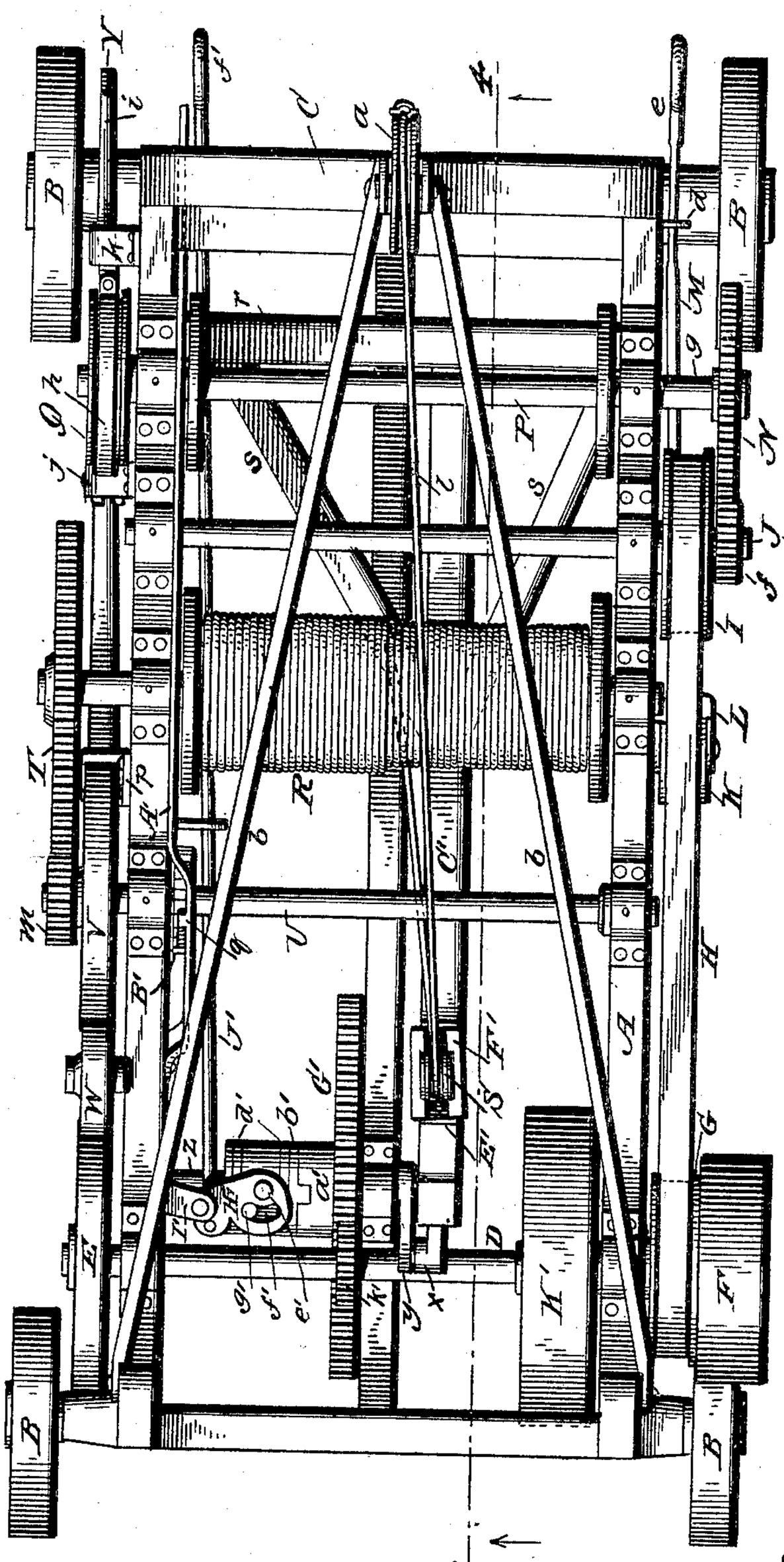
No. 682,287. Patented Sept. 10, 1901.

J. F. SISSON.

WELL DRILLING MACHINE.

(Application filed May 10, 1901.)

(No Model.) 4 Sheets—Sheet 1.



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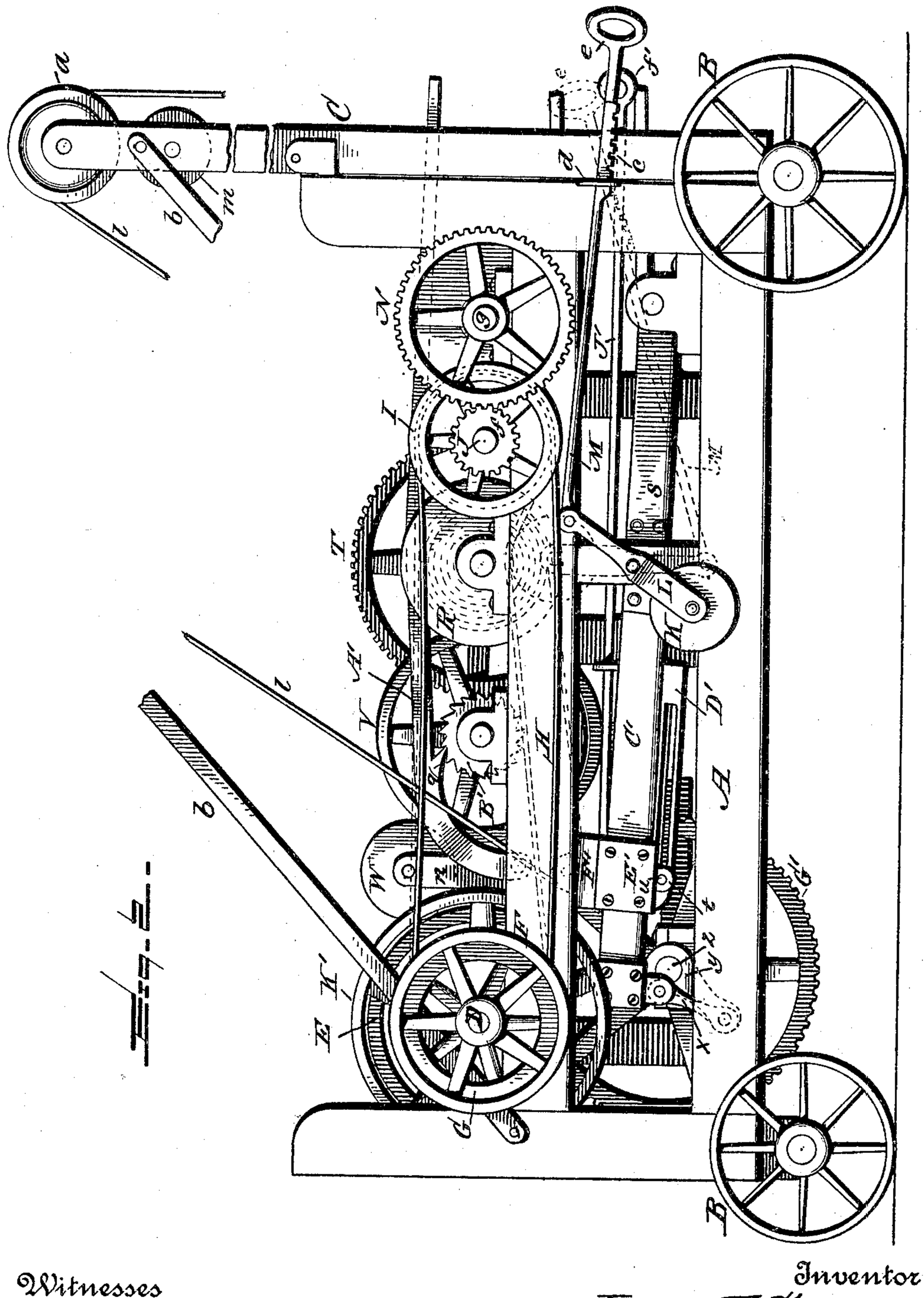

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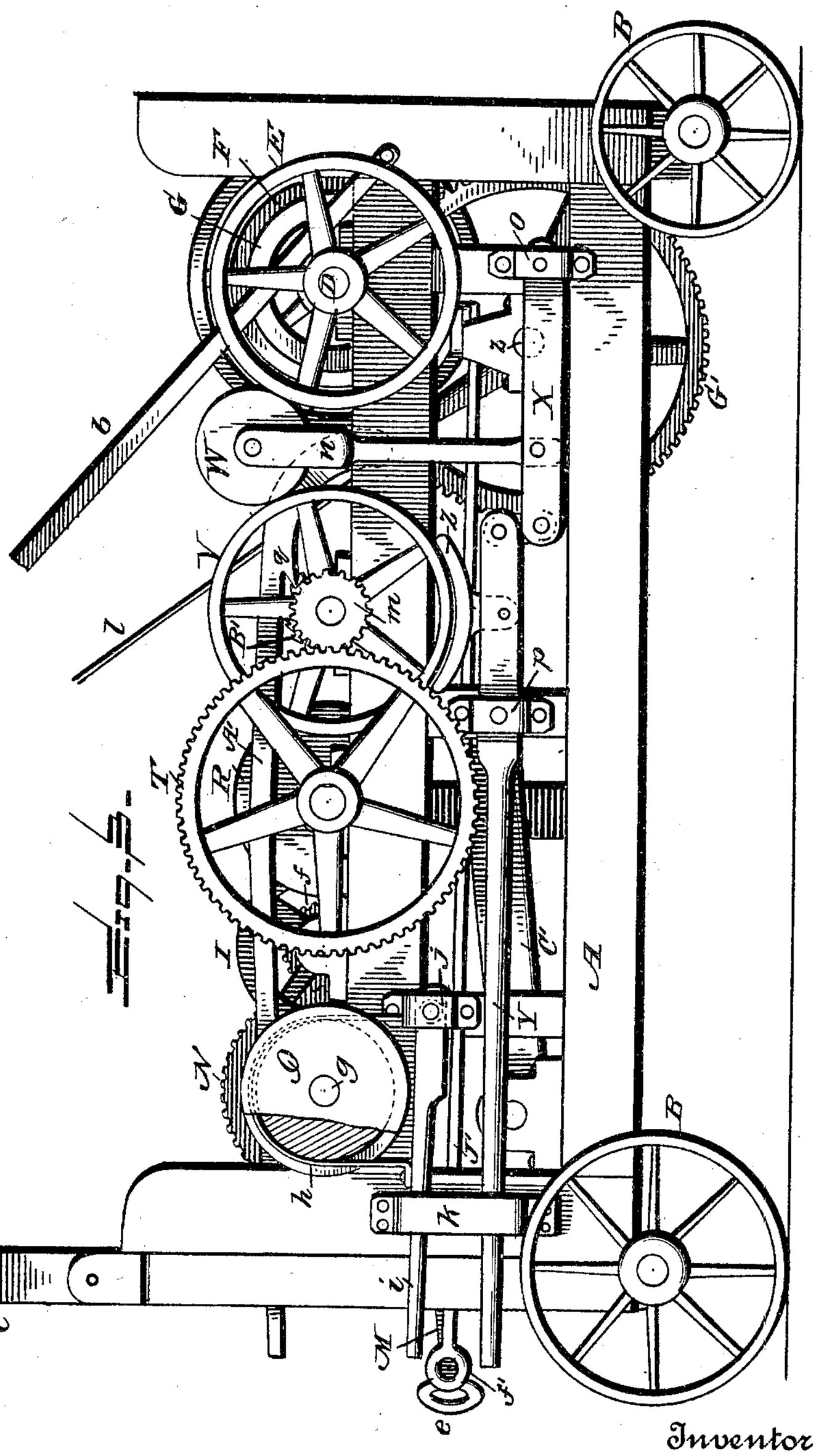
4 Sheets—Sheet 3.



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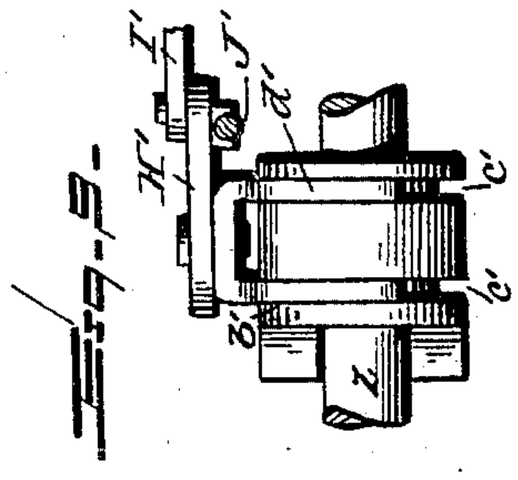

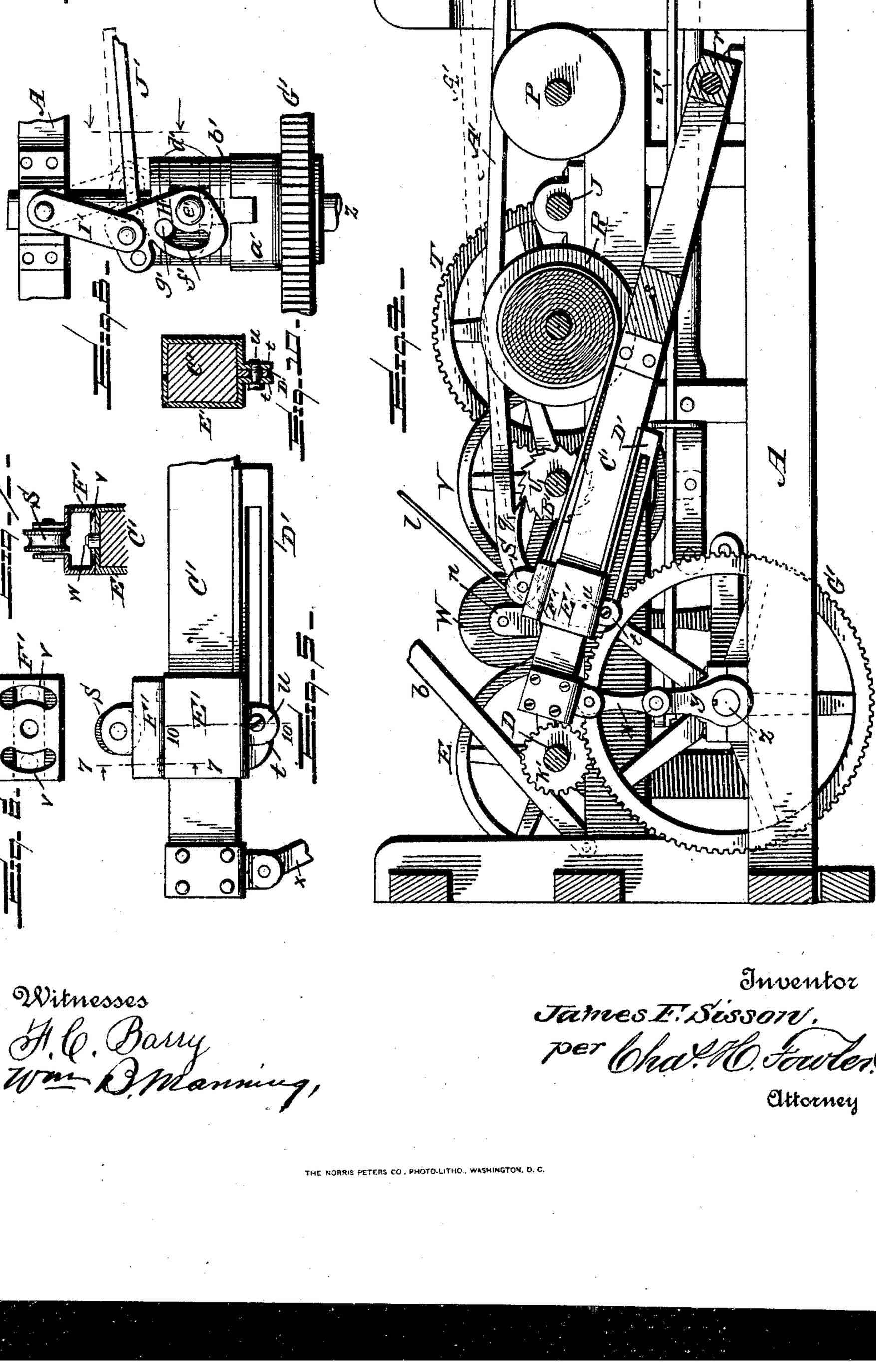

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UNITED STATES PATENT OFFICE.

JAMES F. SISSON, OF KAHOKA, MISSOURI.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 682,287, dated September 10, 1901.

Application filed May 10, 1901. Serial No. 59,576. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. SISSON, a citizen of the United States, residing at Kahoka, in the county of Clark and State of Missouri, have invented certain new and useful Improvements in Well-Drilling Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters of reference marked thereon.

The present invention has relation to that class of machines for operating drills in boring wells in which a suspended drilling-tool is alternately raised and lowered through the medium of a rope or cable and suitable mechanism connecting therewith; and the object thereof is to improve the machine in the several details of construction whereby greater strength and durability and increased effectiveness in operation are obtained, it being easily controlled in boring the well and the mechanism being simple and of few parts, and thereby not readily becoming out of order and inoperative by continued or hard usage.

The invention consists in a well-drilling machine constructed substantially as shown in the drawings and hereinafter described and claimed.

Figure 1 of the drawings is a top plan view of a well-drilling machine embodying my invention; Fig. 2, a side elevation thereof; Fig. 3, a similar view showing the reverse side of the machine; Fig. 4, a longitudinal sectional elevation taken on line 4 4 of Fig. 1 looking in the direction of the arrows; Fig. 5, a side elevation in detail of the adjustable pulley and its connections; Fig. 6, a bottom plan view of the adjustable bracket which supports the pulley; Fig. 7, a cross-section taken on line 7 7 of Fig. 5 looking in the direction of the arrows; Fig. 8, a top plan view in detail of the clutch and mechanism for operating it, the gear-wheel being shown as broken away; Fig. 9, a side elevation in detail of a portion of the clutch mechanism. Fig. 10 is a cross-section taken on line 10 10 of Fig. 5.

In the accompanying drawings, A represents a suitable frame of any preferred construction, which is mounted on wheels B, said frame at one end having the usual derrick C, with grooved pulley *a* at its upper end and supported in the usual manner by braces *b*.

To the frame A is suitably journaled a transverse shaft D, extending beyond the sides of the frame and provided at one end with a friction-wheel E and at its opposite end with a main drive-wheel F, to which the power is applied through the medium of a belt extending to the engine or other suitable driving power, as found most desirable. The friction-wheel and the drive-wheel are keyed or otherwise rigidly connected to the shaft, as well as the flanged pulley G, and over this pulley passes a suitable belt H, which engages a similar flanged pulley I, rigidly connected to one end of a transverse shaft J.

A belt-tightener is provided which comprises the idle wheel K, supported in a pivoted bracket L, to which is pivotally connected one end of a rod M, having teeth *c* to engage a keeper *d* to hold the rod stationary after being adjusted, said rod having a suitable handle *e* for operating it. In Fig. 2 of the drawings the idle wheel K is shown as out of contact with the belt H and in dotted lines in contact therewith, the dotted lines also showing the position of the lever-rod M when the idle wheel is against the belt to communicate motion from the shaft D to the shaft J when it is desired to operate the sand-pump. To the shaft J is keyed a pinion *f*, which engages the teeth of a gear-wheel N upon the end of the shaft *g* of the usual sand-reel P for containing the sand-pump line, said shaft having upon its opposite end a flanged brake-wheel Q, over which passes a metal brake-band *h*. This brake-band has its ends connected to a hand-lever *i*, which lever is pivoted to a suitable bracket *j* and its free end extending through a guide-plate *k*, as shown in Fig. 3 of the drawings. When the usual sand-line, with pump connected thereto, is required for use, the idle wheel K is brought up in frictional contact with the belt H by means of the lever-rod M, which will tighten the belt, and thereby communicate motion from the shaft D to the sand-reel P through the medium of the pinion *f* and gear-wheel N, thereby enabling the sand-pump to be elevated out of the well to discharge the contents of said pump. When

lowering the pump into the well, the idle wheel K is not brought into use, the weight of the pump itself unwinding line from sand-reel P, which is controlled in its rotation by means of the band-brake *h* on the periphery of the brake-wheel Q, which is brought into more or less frictional contact therewith by means of the hand-lever *i*. A second reel R is rotatably supported in the frame A and carries the rope or cable *l*, said rope or cable extending back and under a pulley S, thence up and over the pulley *a* upon the end of the derrick C, and has connected to its end a drill or other suitable tools. (Not shown in the drawings.) Below the pulley *a* is a pulley *m* for the purpose of receiving the sand-line hereinbefore described.

The shaft of the reel R is provided with a large gear-wheel T, with which engages a pinion *m* on a rotatable transverse shaft U, said shaft having upon the inner side of the pinion a friction-wheel V, and against the periphery of said wheel and that of the friction-wheel E is brought the friction-roller W, as shown more clearly in Fig. 1 of the drawings. The friction-roller W is connected to an upwardly-extending arm *n*, and the arm is pivoted to a supporting-bar X, which bar at one end is pivoted to a bracket *o*, and pivoted to the free end of this arm is a hand-lever Y. The hand-lever Y is pivoted to a bracket *p* and carries upon its upper side a segmental and pivoted brake-shoe Z, which shoe adjusts itself to the periphery of the friction-wheel V.

When the drill or tools on the rope or cable *l* are to be lowered in the well, their own weight alone will carry them down, the descent thereof being controlled by the shoe Z through the medium of the hand-lever Y, to which said shoe is pivotally connected. The brake-shoe Z is brought into more or less frictional contact with the periphery of the friction-wheel V, which will regulate its rotation, and thereby control the rotation of the reel R through the medium of the pinion *m* engaging the gear-wheel T. The rope or cable *l* may be stopped in its descent at any point desired or its descent regulated by means of the brake-shoe Z, and when stopped by said broke-shoe the reel R is held stationary by the pawl *q* on the pivoted lever A′, said pawl engaging the teeth of the ratchet-wheel B′ and holding the shaft U stationary and also the reel R against unwinding the rope or cable thereon. A very simple and effective means is thus provided for controlling the unwinding of the rope or cable or stopping it in its descent, and thereby remove the danger to the rope or cable from breaking or wearing or in any manner injuring the working parts of the machine by a too rapid descent of the rope or cable.

The ratchet-wheel and lever may be of any preferred construction that will effect the object sought, or any preferred and well-known means may be used that will effectually control the unwinding of the reel and also hold it against rotation.

A suitable walking-beam C′ is pivotally connected to the frame A of the machine in any desirable manner, but preferably by the bar *r*, pivoted to the frame and connecting with the walking-beam by the braces *s*, as shown in Fig. 1 of the drawings. Any suitable form of walking-beam may be substituted for that shown, and said beam may be pivoted to the frame of the machine in any preferred manner found best adapted to the purpose, the beam shown being one of many forms that may be used with success.

The free end of the walking-beam C′ has a slotted guide D′ upon its under side for the adjustability of a suitable sleeve E′, which sleeve is slidable upon the walking-beam and is held in its adjusted position by means of the ears *t* and clamping-screw *u*, said ears being clamped against the sides of the slotted guide by the set-screw, as shown in Fig. 10 of the drawings.

I do not wish to be confined to any special construction of sleeve or any manner of rendering it adjustable or the means for holding it in its adjusted position, as it will be immaterial, so long as the position of the pulley S is capable of being changed to bring it nearer to or farther from the end of the walking-beam for the purpose of regulating the stroke of the drill or tools. The nearer the pulley is to the end of the walking-beam the longer the stroke of the drill or tool will be, thereby removing the necessity of adjusting the walking-beam to regulate the stroke. The regulation of the stroke of the drill or tools is to adapt the same to the depth of the well, it being necessary as the well deepens to lengthen the stroke of the drill or tools in order to overcome the elasticity of the rope or cable, as the elasticity increases in proportion to the increase in the depth of the well. The longer the rope or cable the more elasticity it will possess, and consequently the stroke should be increased to enable the tool or drill to successfully work at any depth.

A bracket F′ is pivotally connected to the upper side of the sleeve E′ and has segmental guide-slots *v*, through which project guide-pins *w*, as shown in Figs. 6 and 7 of the drawings. The lateral adjustment of the bracket F′ is limited by the pins *w*, which form stops and prevent the bracket from turning completely around on its pivotal connection. The bracket adjusts itself automatically to adapt itself to the angle the rope or cable will assume when it is being wound on or unwound from the reel, thus removing the danger of the rope or cable being cut or worn by frictional contact with the pulley, the bracket assuming the same angle the rope or cable will assume as it is being wound or unwound, thereby providing a self or automatically adjustable bracket, with pulley, that enables the rope or cable to be more easily and perfectly operated.

The free end of the walking-beam C′ is connected by pitman *x* to the crank *y*, said crank extending from the end of a short shaft *z*, having its bearings in the frame A of the machine. The crank is keyed or otherwise rigidly connected to the end of shaft *z*, and the pitman *x* is pivoted to both the crank and the end of the walking-beam. The shaft *z* has loosely mounted thereon the gear-wheel G′, having integral therewith the hub *a*′, which forms one section of the usual clutch-box, as shown in detail in Fig. 8 of the drawings.

The slidable section *b*′ of the clutch-box, which is of the ordinary construction, is mounted upon the shaft *z* and has circumferential groove *c*′, with which engages the double yoke *d*′ for operating the slidable section of the clutch-box, as shown in Fig. 9 of the drawings. This clutch-box may be variously modified or changed in construction, or any suitable clutch-box may be substituted therefor, without in any manner affecting the essential features of the invention, and any suitable means may be employed for operating the clutch-box as found best adapted to the purpose.

The double yoke *d*′ has a slotted and pivoted plate H′, said plate being pivoted to the yoke by pin *e*′ and has a segmental slot *f*′, through which extends a pin *g*′ to form a guide for the plate in its movement and also a stop to limit the extent of its movement when operating the clutch-section *b*′. A link I′ is pivotally connected to the pivoted and slotted plate H′ and also pivotally connected to the frame of the machine or to any stationary object, such as the box or bearing of the shaft *z*, as shown in Fig. 8 of the drawings.

To the plate H′ is pivoted one end of a rod J′ for operating the same, said rod extending to the end of the frame, and has notches *h*′ to engage a suitable keeper *i*′ to hold the rod stationary, so that the clutch-box may be held engaged or disengaged with the gear-wheel C′, a suitable handle *j*′ being provided on the rod for convenience of operating it. A pinion *k*′ on the shaft D engages the gear-wheel G′, and on said shaft is a suitable balance-wheel K′.

In drilling the well the drill or tools are lowered by first raising the lever A′ to disengage the pawl *q* from engagement with the ratchet-wheel B′ and allowing the drill rope or cable *l* to unwind from the reel R. The descent of the drill or tools is regulated and controlled by the brake-shoe Z bearing with more or less friction against the periphery of the friction-wheel V, the brake-shoe being operated by the hand-lever Y. When the brake-shoe is up against the periphery of the friction-wheel V, the friction-roller W is raised out of contact with the friction-wheel above referred to and also the friction-wheel E. The revolution of the friction-wheel V being controlled by the brake-shoe Z will in like manner control the revolution of the reel R through the medium of the pinion *m* and gear-wheel T. When it is desired to stop the unwinding of the reel R by holding it stationary, the lever A′ is allowed to drop to its normal position, when the pawl *q* will again engage the ratchet-wheel B′, and thus prevent the shaft U from rotating and also the reel. In operating the drill or tools when the same have reached their limit of descent the clutch-box is brought into position, as indicated in Fig. 8 of the drawings, by means of the rod J′, which will cause the short shaft *z* to rotate and impart to the walking-beam an up-and-down motion, necessary in drilling, spudding, and pipe-driving, enabling the machine to make more strokes to the minute than the machines in ordinary use and also a longer stroke without jar or friction to the machine. When the friction-roller W is brought into contact with the friction-wheels E and V, it will cause the reel to rotate through the medium of the pinion *m* and gear-wheel T and the drill or tools elevated.

The lever Y being pivotally connected to the supporting-bar X and the brake-shoe Z and the friction-roller W connecting with the lever and supporting-bar, respectively, enables the lever to serve a double function in operating the brake-shoe and operating the friction-roller. This feature I consider of material importance in adding to the simplicity of the machine by rendering it less complex and enabling it to do its work with greater accuracy and effectiveness, also materially improving the general construction of the machine.

The automatically-adjustable bracket F, with pulley S, and also the adjustable sleeve E′, in connection with the walking-beam, are considered of much value in this class of machines, as any strain on the rope or cable is removed by the bracket and pulley adapting themselves to the angle of the rope or cable as it is being wound or unwound.

The clutch-box connections, comprising the slotted and pivoted plate H′ and the pivoted link I′, are deemed of value in the perfect operation of the box, as well as the many features in the details of construction which together provide a well-drilling machine of superior effectiveness, easily operated, and possessing the requisite strength and durability required in this class of machines.

In describing the machine I wish it understood that many changes or modifications in the several details of construction may be resorted to without in any manner affecting the essential features of the invention, and any such changes as would come within ordinary mechanical judgment may be made without departing from the principle of the invention.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a well-drilling machine, a walking-

beam having a slotted guide upon its under side, a sleeve slidable upon the beam and provided with clamping-ears and clamping-screw for holding the sleeve in its adjusted position, said clamping-screw passing through the slot of the guide on the beam, and a suitable pulley carried by the sleeve for the drill rope or cable, substantially as and for the purpose described.

2. In a well-drilling machine, a walking-beam, a sleeve slidable thereon, and means for holding the sleeve in its adjusted position, and a bracket carrying the pulley for the drill rope or cable, said bracket being pivotally connected to the sleeve and having segmental slots and guide-pins projecting up from the sleeve and engaging the slots to form stops to limit the lateral movement of the bracket, substantially as and for the purpose specified.

3. A well-drilling machine comprising a suitable frame, a derrick connected thereto, a reel provided with gear-wheel, a rotatable friction-wheel having pinion adapted to engage the gear-wheel, a shaft connecting with the driving power and provided with a friction-wheel, a friction-roller located between the friction-wheels, a pivoted supporting-bar, a pivoted arm thereon to which the roller is connected, a pivoted hand-lever carrying a brake-shoe to operate in connection with one of the friction-wheels, said lever being pivoted at its extremity to the end of the supporting-bar, substantially as and for the purpose described.

4. A well-drilling machine, comprising a suitable frame, a derrick connected thereto, rotatable reels for the drill rope or cable and the sand-line, suitable means for operating said reels, suitable friction-brakes for controlling the rotation of the reels, a walking-beam, a shaft connecting with the walking-beam, a clutch-box upon the shaft and means for operating the box consisting of a double yoke engaging the box, a segmentally-slotted plate pivoted to the yoke, a pin extending through the slot to limit its motion, a link pivotally connected to the slotted plate and to the frame of the machine, and a rod connected to the plate for operating it, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JAMES F. SISSON.

Witnesses:
Y. D. CRAIN,
GEORGE M. BOND.