

(No Model.)

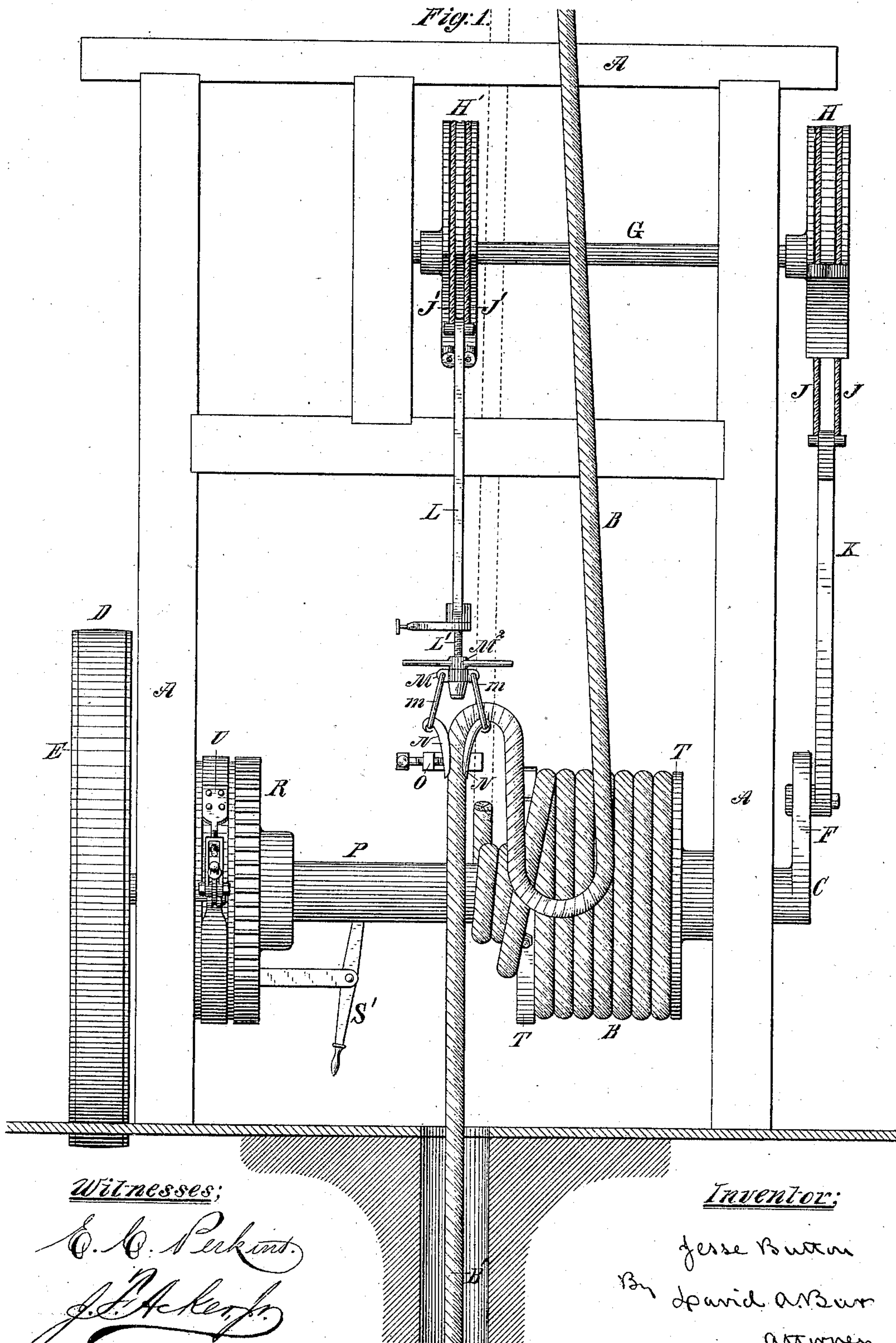
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J. BUTTON.

ROCK DRILLING MACHINE FOR ARTESIAN WELLS.
No. 314,793.

Patented Mar. 31, 1885.

Fig. 1.



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(No Model.)

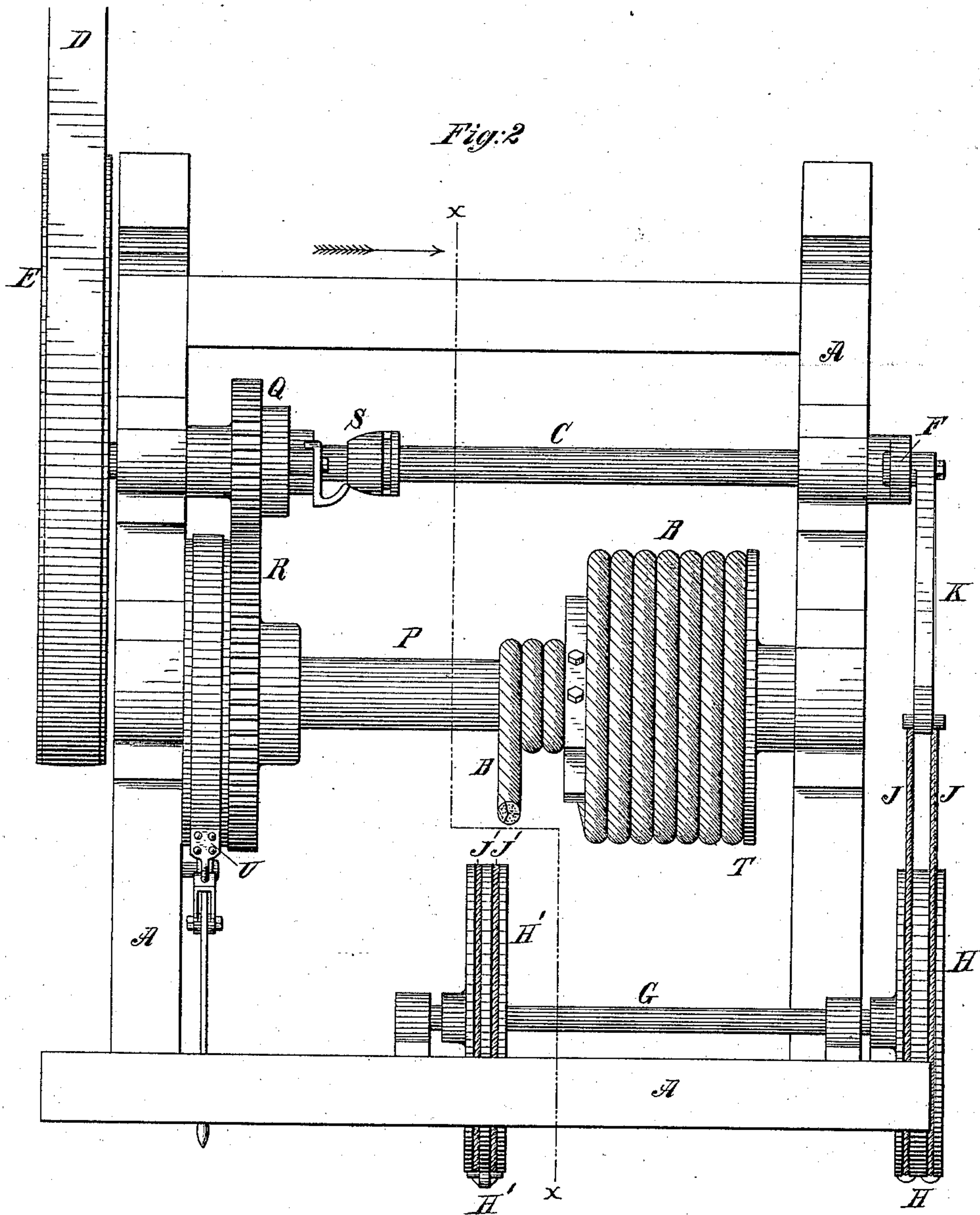
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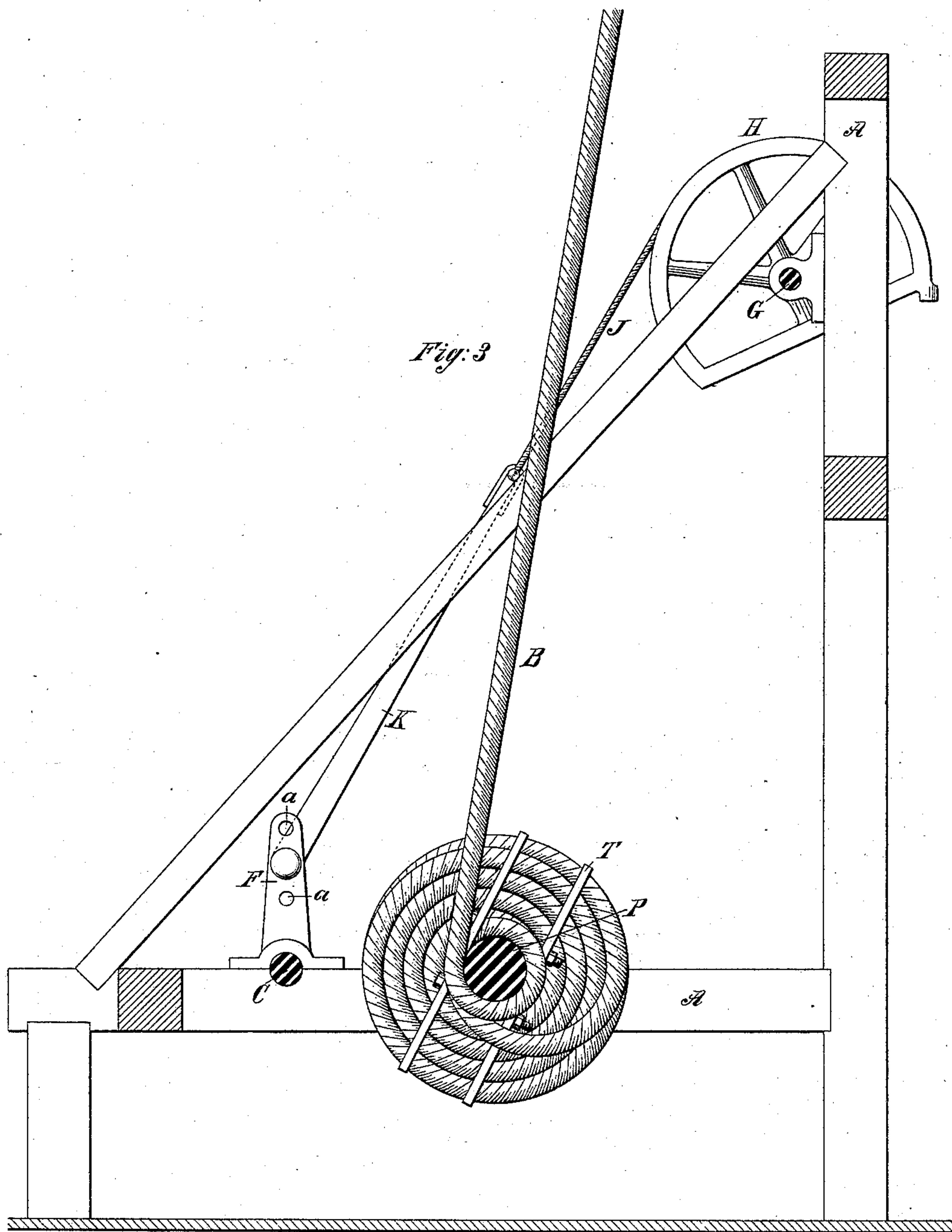
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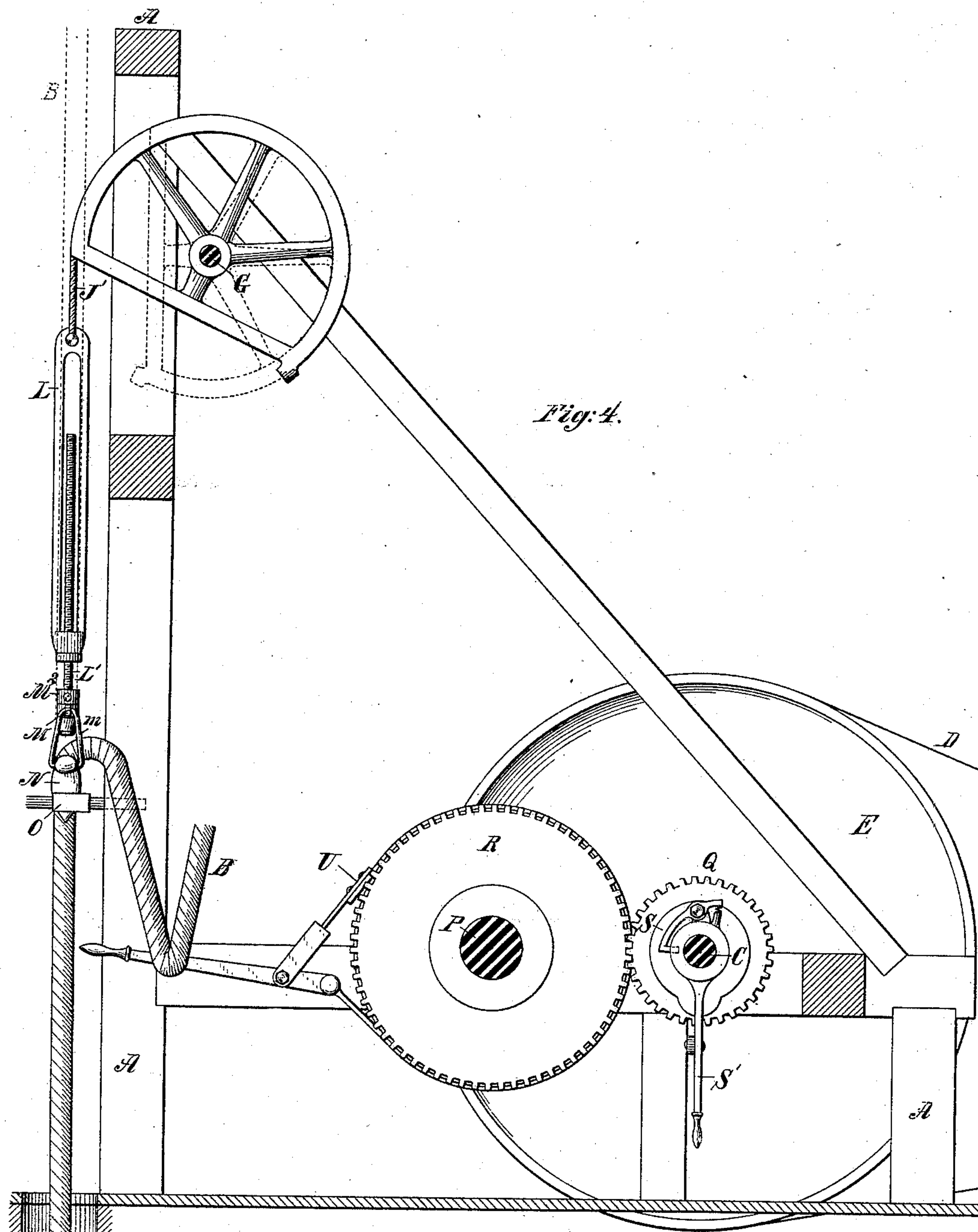
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UNITED STATES PATENT OFFICE.

JESSE BUTTON, OF NEW YORK, N. Y.

ROCK-DRILLING MACHINE FOR ARTESIAN WELLS.

SPECIFICATION forming part of Letters Patent No. 314,793, dated March 31, 1885.

Application filed July 25, 1884. (No model.)

To all whom it may concern:

Be it known that I, JESSE BUTTON, of the city, county, and State of New York, have invented a new and useful Improvement in Rock-Drilling Machines for Artesian Wells; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

My invention relates to rock-drilling machines for boring Artesian wells, and has for its object a compact and efficient form of apparatus for actuating and handling the drill, and in which the cumbersome walking-beam heretofore employed is dispensed with.

It consists in a novel arrangement and combination of devices for actuating the drilling-tool, as hereinafter fully described.

In the accompanying drawings, Figure 1 is a front elevation of my improved rock-drilling machine, the upper pulley over which the rope is led not being shown; Fig. 2, a plan view thereof; Fig. 3, an irregular vertical section in line *x x* of Fig. 2, looking to the right in the direction indicated by the arrow; and Fig. 4, a section in same line looking in the opposite direction.

A A is the frame-work supporting the operative parts of my machine. This frame-work is carried up to a height above the base greater than the length of the longest drilling rods or tools to be used with the machine, and a pulley (not shown in the drawings) is supported upon the top thereof, over which is carried the rope B, by which the tools are suspended. A driving-shaft, C, Figs. 2 and 4, is mounted in suitable bearings in the lower portion of the frame, and is rotated continuously by an engine, to which it is connected by a belt, D, led over a driving-pulley, E, on the end of the shaft, (see Figs. 2 and 4,) or by other suitable form of gearing. The opposite end of the shaft C is fitted with a crank, F. (See Figs. 1, 2, and 3.) A shaft, G, is mounted to oscillate in suitable bearings in the frame-work above and in front of the driving-shaft and parallel therewith, and a wheel or segment of a wheel, H, (see Figs. 1, 2, and 3,) is fitted thereon in the same vertical plane as the crank F. A rope or band, or preferably a pair of wire cords, J J, are secured at one

end to the periphery of this wheel H, and being made fast are led from their point of attachment over one-half or more of the periphery, preferably in grooves formed therein for their reception, (see Figs. 1 and 2,) and are made fast at their opposite ends to the end of the crank F, or preferably to the end of an interposed link, K, Figs. 1, 2, and 3, pivoted to the crank. The pivotal connection of the link K with the crank is made adjustable, so so as to allow of its approach more or less to the axis of the crank by means of a series of pivot-holes, *a a*, as shown in Fig. 3 of the drawings, or by means of a pivot-block sliding in ways upon the crank to and from its axis, and to which the link K is pivoted. A segmental wheel or pulley, H', is secured to the oscillating shaft G, at or near its opposite end, and a rope or band, or preferably a pair of wire cords, J' J', are made fast at one end to its periphery, so as to admit of being led over its semi-circumference in a direction the opposite of that in which the cords J J are led. The opposite ends of these cords J' J' are secured to the upper end of a link, L, (see Figs. 1 and 4,) whose lower end serves as a nut for the threaded bolt or pin L' of a swivel, M, which is thus suspended by said cords from the oscillating segmental pulley H'. A pair of clamping jaws or plates, N N, are suspended from the swivel M by means of links *m m*, and a lock-nut, M², is led upon the screw-bolt L' above the swivel, so as to lock the latter at pleasure and prevent its movement. The outer end of the drill-rope B, depending from the pulley at the top of the frame, and to which the drilling-tool is attached, passes in close proximity to the periphery of the segmental pulley, and is led between the jaws N N, and they are closed thereon, so as to hold the rope tightly, by means of a screw-clamp, O, (see Fig. 1,) adapted to embrace the jaws, and by the operation of its screw force them together. The swivel M, dependent from the segmental pulley H', is thus made to uphold the lower end, B', of the rope B and the tool attached thereto, the portion of the rope above the clamp being left loose and slack, as illustrated in Fig. 1. An additional shaft, P, is mounted to rotate in the frame in line parallel with the driving-shaft C, and it is geared thereto at pleasure by means of a pinion, Q, mounted

loosely upon said shaft C, and meshing with a toothed wheel, R, upon the shaft P. The loose pinion Q is made fast to the shaft B when desired, so as to rotate therewith, by means of a clutch, S, Fig. 2, of any approved construction, sliding upon the shaft C and adapted to engage the hub of the pinion Q, its movement being readily effected by means of a lever, S'. (See Figs. 1 and 4.) The inner end of the rope B, led from the jaws N N of the clamp Q by the segmental pulley H', and thence up over the top pulley, is carried down to the shaft P and made fast to a drum, T, thereon, so as to be wound up by the rotation of the shaft in one direction and unwound by its reversal. The free rotation of the shaft is controlled by means of a friction-band, U, upon a drum or pulley, W, fixed to the toothed wheel R of the shaft P. When the tool, instead of being suspended by the rope from the segment H' by means of the link L and its swiveled jaws N N, is to be lifted by the rope as it passes over the upper pulley directly to the drum, the segmental pulley H' is reversed and its flat face is brought parallel with the rope, as shown in dotted lines, Fig. 4, so that both the segmental pulley and the link L and swiveled jaws N N will clear the rope wholly as it is drawn up or down to raise or lower the tool.

In the operation of the machine, the rope B, being disengaged from the clamping jaws N N, is wound upon the drum T by a rotation of the shaft P, the movement of said shaft being produced by throwing the same into gear with the shaft C by means of the clutch S engaging the pinion Q. By this rotation of the drum-shaft P the outer lower end, B', of the rope B and the tool attached thereto are lifted until the tool is suspended thereby above ground and in position to be adjusted, removed, or replaced. When the proper tool is properly secured to the end B' of the rope B, the rope and tool are lowered to place the tool in its operative position by releasing the clutch S and allowing the drum-shaft P to rotate freely, its too rapid movement being controlled by means of the brake-band U. The lifting or lowering of the drilling-tool is thus quickly and easily effected, as required, by the movements of the drum-shaft P in connection with the main shaft and motor, the power of the motor being utilized thereby in winding the rope and lifting the tools. The segmental pulley H' during these operations is reversed with its flat face toward the rope, so as not to interfere therewith, and the link, swivel, and clamp dependent from the segment are also thereby swung back clear of the rope. When the drilling-tool has been lowered to rest upon the rock to be drilled, the segmental pulley H' is turned over so as to bring the swivel M against the rope, to which it is then made fast by means of the clamp N N. The portion of the rope B above the clamp is then loosened and left free and the drilling-tool is left suspended from the oscillating segmental pulley

H' upon the end B' of the rope below the swivel M. If, now, the shaft C be made to rotate continuously, the revolution of the crank F will operate to produce a reciprocating movement of the link K, pivoted thereto, and, by means of the connecting-ropes J J, this reciprocating movement will be transmitted to the segment-wheel H and its shaft G, so as to cause a reciprocating movement of the counterpart segmental pulley H', and consequently of the link L, swivel M, and of the drilling-tool suspended therefrom by the rope end B'. This lift and drop of the tool may be very rapid, as the shaft C admits of a rotation at a high speed without undue jar or strain upon the connections by which its rotation is converted into the required reciprocating movement of the suspension-link L, carrying the tool. As the tool is thus lifted and dropped upon the rock it may be turned about by means of the bar on the clamp O, which, in the hand of the operator, affords sufficient leverage to permit the rope to be turned with ease at each up-and-down movement thereof.

My improved machine thus constructed is very compact, all of its working parts being included within a frame-work, A A, of moderate dimensions, so that it may be set up in a very contracted space, if need be.

I claim as my invention—

1. The combination, in a rock-drilling machine, with an oscillating segmental pulley secured to a rock-shaft in line with the drill-rope and its suspension-pulley, and adapted to be reversed to clear the rope and permit a withdrawal thereby of the drill-tool, of one or more flexible bands or cords led over and secured to the periphery of the segmental pulley and adapted for attachment to the drill-rope, for the purpose of lifting and dropping the drill-tool by the movement of the rock-shaft, substantially in the manner and for the purpose herein set forth.

2. In a rock-drilling machine, the combination, with an oscillating segmental pulley fixed upon a rock-shaft actuated by a prime motor, of a swivel suspended from one or more cords or bands led over and secured to the periphery of said segmental pulley, and a device for attaching the drill-rope to the swivel, substantially in the manner and for the purpose herein set forth.

3. The combination, in a rock-drilling machine, with a rope carrying the drill-tool, of a cord or cords suspended from the periphery of a segmental pulley and adapted for attachment to the drill-rope, a rock-shaft to which the pulley is secured, a driving-shaft geared to said rock-shaft to produce its oscillation, and an independent drum or shaft adapted to be thrown into gear with the driving-shaft by a clutch and to wind by its rotation the drill-rope led thereto over suitable pulleys, all substantially in the manner and for the purpose herein set forth.

4. A rock-drilling machine constructed of the segment wheels or sectors H H', secured

upon a common axial shaft mounted in a suitable frame, A A, a link, L, and swiveled clamp N N, suspended by a flexible connection, J', from the periphery of the sector H' 5 upon one side of the shaft G, a link, K, attached by a flexible connection, J, to the periphery of the sector H and upon the other side of said shaft G, a rotating shaft, C, mounted in the frame A A parallel with the shaft G, 10 and driven by a prime motor, and a crank, F,

upon said shaft C, to which the link K is pivoted, all substantially in the manner and for the purpose herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 15

JESSE BUTTON.

Witnesses:

E. C. PERKINS,
WM. H. DRAKE.