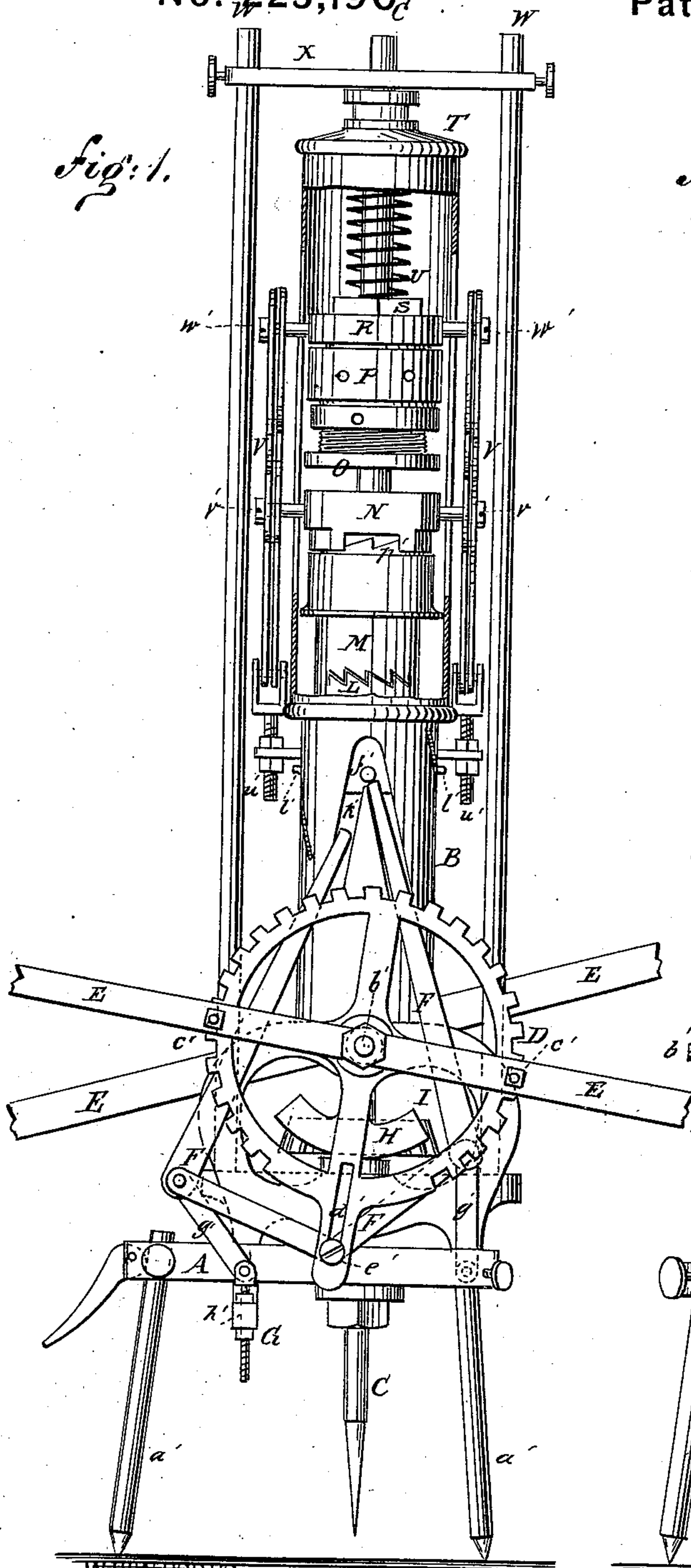


A. W. WHITE.
Rock-Drill.

No. 225,190

Patented Mar. 2, 1880.

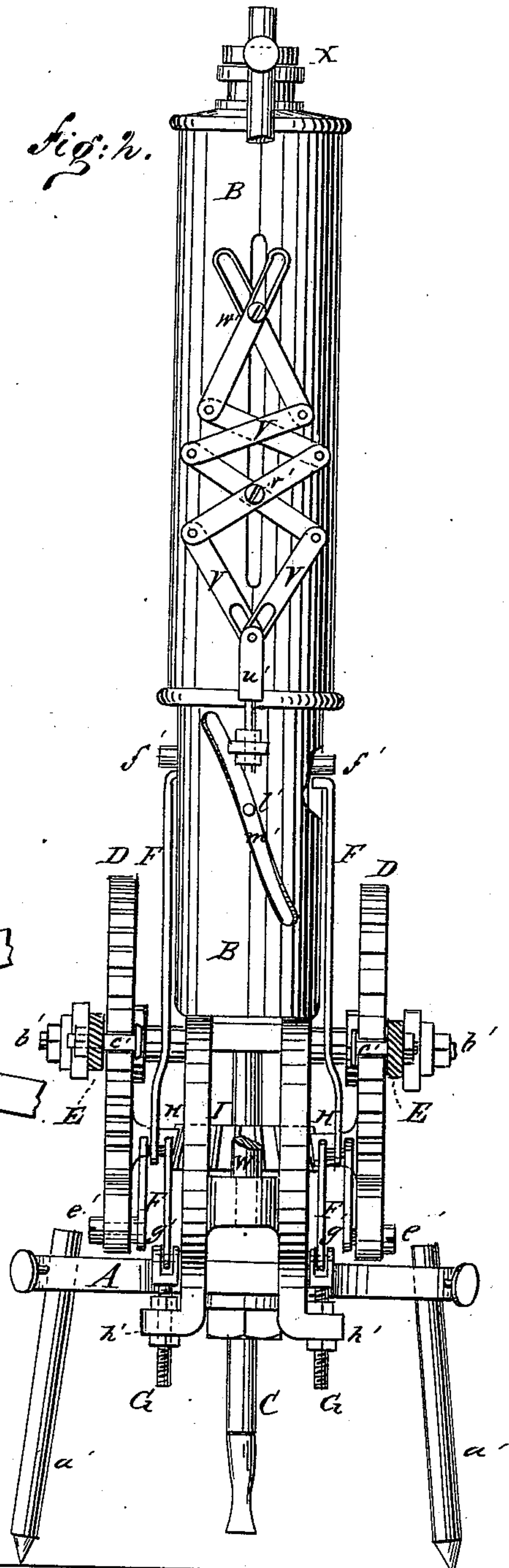
Fig: 1.



WITNESSES:

Chas. N. A. A.
C. Sedgwick

Fig: 2.



INVENTOR:

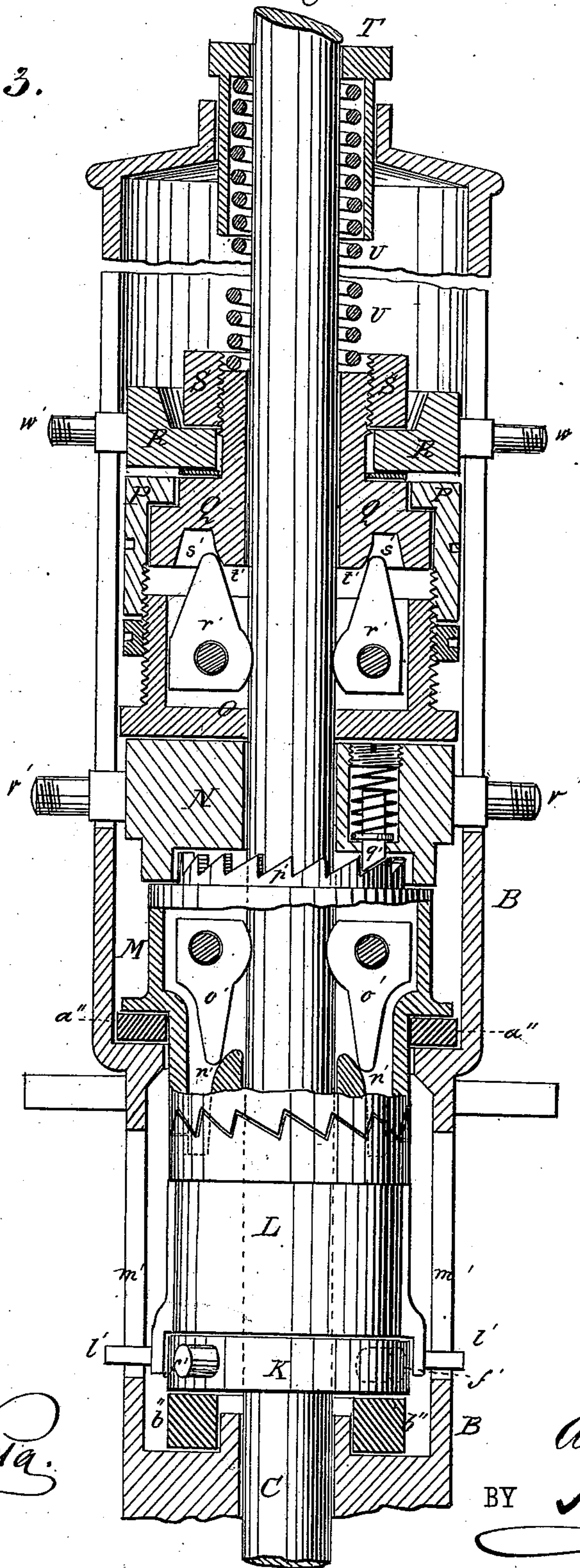
A. W. White
BY *Munn & Co.*
ATTORNEYS.

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Fig: 3.



WITNESSES:

Chas. Nida.
C. Sutgwick

INVENTOR:

A. W. White

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

ARTHUR W. WHITE, OF BUFFALO, NEW YORK.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 225,190, dated March 2, 1880.

Application filed July 7, 1879.

To all whom it may concern:

Be it known that I, ARTHUR W. WHITE, of Buffalo, in the county of Erie and State of New York, have invented a new and Improved Rock-Drill, of which the following is a specification.

Figure 1 is a front elevation of the device, partly in section. Fig. 2 is a side elevation of the same. Fig. 3 is an enlarged sectional elevation of a portion of the device.

Similar letters of reference indicate corresponding parts.

The object of this invention is to provide a novel and efficient rock-drill wherein the drill is fed and turned automatically, and is operated in delivering a blow by the full force of the propelling-power.

The invention consists in combining an arm, lug, and adjusting-screw; also, in combining a lever-pin and a slotted wheel, and in a lifting-block having pawl and screws combined with lazy-tongs, all as hereinafter described.

In the drawings, A represents the tripod-frame, with adjustable legs a' , and rigidly secured in a vertical position on this frame is the drill-case B, the lower part of which is open and arched and the upper portion tubular. Down through the center of both case and frame passes the drill-rod C.

On the two studs b' , projecting from opposite sides of the drill-case, are fixed the toothed wheels D, and on the same studs, outside the wheels, are the double levers E, from which the pins c' project at right angles to engage in the teeth of the wheels, so that the rocking of the levers shall impart to the wheels a reciprocating motion.

The curved lines of the rims of the wheels are broken at their lowest points by the projection of a slotted arm of each, and through these slots d' set the pins e' , on the inner ends of which are pivoted the knuckle-jointed levers F, whose free ends project upward, and alternately, when the device is operating, bear against the studs f' , and to the side joints of these levers are pivoted the downward-projecting arms g' , by which the reach of the lever-arms can be regulated, whose lower ends are engaged with adjusting-screws G, that are set in the depending lugs h' of the drill-case.

Rigidly secured to the inner faces of the

slotted wheel-arms are the crescent-shaped racks H, that engage with the gear-wheel I, which loosely revolves on a sleeve surrounding the drill-shaft, and serves to correct and equalize the movement of the above-described operating-levers and toothed wheels.

Set loosely over the drill-shaft is the lifting-block K, provided with two opposite studs, f' , that project through the V-shaped slots k' . Just above this lifting-block, and fitting loosely around the drill-shaft, is the cylindrical block L, toothed on its upper surface or rim, and provided with two opposite studs, l' , that project laterally through the spiral slots m' in the sides of the drill-case, and this block is further provided (internally) with a conical ring, n' , that fits around the drill-shaft and projects upward into the bottom of the toothed clutch-head M, and, engaging or wedging between the shaft and the pointed ends of the eccentric-dogs o' , that are pivoted within the clutch-head, forces the heads of the dogs to firmly clutch and hold the said shaft and lift it. The upper face of this clutch-block is also provided with a ring, p' , toothed in correspondence with its lower face, and this ring projects upward into the rectangular lifting-block N, that has within it an upright pawl, q' , actuated by a spiral spring. Next above this lifting-block N is the cylindrical clutch-block O, that screws into a shouldered ring, P, above it. This clutch-block has pivoted within it two or more eccentric-dogs, r' , whose heads are turned downward, and whose pointed ends are directed upward into the conical recesses s' in the block Q, which recesses form the shoulders or cone t' , that engage with and operate the dogs.

The upper part of this block Q is reduced in size, and, projecting upward through the ring P, has fitted around it a lifting-collar, R, that is held in place by the nut S, while above this, put around the drill-shaft, with one end resting on the nut and the other pressing upward against the cap T of the drill-case, is the helical spring U, whose function is to give the descending strokes to the drill.

On the outside of the drill-case, and on sides opposite to each other, are fixed the lazy-tongs V, whose lower ends are slotted and held by the adjusting-screws w' . The screws

v' connect these tongs to two sides of the rectangular lifting-block N, and the screws w' connect its upper slotted arms with the lifting-ring R.

5 This device is further provided with two vertical rods, W, that are socketed into the lower part of the drill-case, and extend upward on either side of the case and parallel with the drill-rod, and are held together at
10 their upper ends by a plate, X, through the center of which the drill-rod passes.

This machine is operated by one or more persons taking hold of the levers E and moving them up and down, or by giving equivalent motion with other power, when the arms
15 of the levers F engage alternately with the studs f' and raise the lifting-block K and all the moving parts above it, and when the studs f' are raised in either side of the slot k' to its
20 apex they are forced down the other side by the action of the spiral spring U, that forces the drill down at the same time. As the block L moves upward, its teeth engage with those on the lower rim of the clutch-head M, and
25 the engagement of its stud l' in the spiral slots causes it to revolve the distance of one tooth at a time, so that it forces the block M to make a corresponding movement, that turns the drill for another stroke, and as this block
30 moves upward its ring or cone n' is forced upward between the drill-shaft and the ends of the dogs O, spreading them apart, so that their heads are made to firmly gripe the drill shaft or rod and raise it with them in their
35 upward movement.

The engagement of the pawl q' in the toothed ring p' prevents the reverse turning of the block M and the drill-rod on the downward stroke.

40 The upward movement of the clutch-block O and ring P is caused by and corresponds with the movement of the parts below; but the movement of the block Q, lifting-collar R, and nut S is accelerated by the action of the
45 lazy-tongs V, that are connected with the collar R, and at the end of the upward stroke they are in advance of the other parts. So, also, on the downward return stroke the collar R and nut S move faster than the other
50 parts, and consequently the shoulders or cone t' are forced between the drill-rod and the ends of the dogs v' , and cause them to firmly clutch the rod and hold it until the downward stroke of the drill is completed and the upward
55 stroke commenced, thus advancing or feeding the drill-bar to the rock, which is given with the full force or power of the spring U.

At various points—as, for instance, under
60 the blocks K, M, and R—elastic packing is placed, to lessen the strain and wear upon the parts and to facilitate the working of the device. On the downward movement, as just described, the block M reaches and strikes upon
65 the packing-ring a'' before the blocks L and K reach the packing-ring b'' , and hence the one

block stopping before the other causes the release of the dogs O' from the conical ring n' and the correspondent releasing of the gripe of the dogs upon the drill-shaft before or simultaneously with the delivery of the blow by the drill. 70

A strong pressure of the spring upon the upper gripe previous to any movement of the levers will cause the said upper gripe to retain
75 its hold upon the drill-bar after a stroke is made, and it consequently remains up on the drill-bar at the point to which it was advanced by the action of the lazy-tongs upon the last lift of the levers. 80

The upper gripe will, by the action of the lazy-tongs, loosen in the upstroke and move up on the drill-bar just the distance that the drill cut in the rock at the previous blow; then it will gripe again on the downstroke, thus giving a perfect automatic feed of the drill-bar to the rock. 85

The distance which the upper gripe moves upon the drill-rod is perfectly regulated by the adjusting device at the bottom of the lazy-tongs. 90

Two gripping-clutches, it will be seen, are used in this device with great advantage, while I know of no hand rock-drill provided with more than one. 95

On the downstroke the lower gripe is entirely loosened, thus giving the drill-bar free access to the rock.

The upper gripe is tightly gripping the drill-bar at all times, except for an instant while
100 the upward stroke is being made, and the lower gripe gripes the bar only when there is a downward pressure on the levers E.

The drill-bar may be easily lifted and removed from the device by screwing upward
105 the ring P against the lifting-block R until the pressure of the spring is removed from or ceases to operate the block Q and is transferred to the ring P and block O, thus loosening the gripe of the dogs r' . 110

The slots d' in the arms of the wheels D regulate the length of the sweep of the levers E as the pins in the slots are moved either up or down, and power can be more or less advantageously applied to the levers as the fulcrum is brought nearer or removed from them. 115

I am aware that it is not new to propel a drill by a spring and two compressing-levers operated by hand and geared together so as to move in opposite directions, and carrying
120 pawls which alternately lift the drill.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the arm g' , the lug h' ,
125 and the screw G, for adjusting the reach of the knuckle-jointed lever F, as and for the purpose described.

2. The combination of the lever F, having pin e' , and the wheel D, having slot d' , for regulating the sweep and power of the levers E, as
130 and for the purpose set forth.

3. The lifting-block N, provided with pawl q' and screws $v' v'$, in combination with the lazy-tongs V, as and for the purpose specified.

4. The toothed cylindrical block L, provided with studs l' and conical ring n' , in combination with the spiral slots m' in the drill-case, substantially as herein shown and described.

5. The combination of the ring or cone n' with the dogs o' in the clutch-head M, substantially as herein shown and described.

6. The combination of the clutch-block O, provided with eccentric-dogs r' , ring P, block

Q, provided with recesses s' and shoulders t' , lifting-collar R, provided with screws w' , nut S, and lazy-tongs V, substantially as and for the purpose described.

7. The combination of the block Q, collar R, nut S, cap T, and spring U, substantially as herein shown and described.

ARTHUR WELLSLEY WHITE.

Witnesses:

I. I. STORER,
C. SEDGWICK.