(No Model.)

2 Sheets—Sheet 1.

F. KNOWLAN.

Drilling Machine for Artesian and Oil Wells.

No. 234,586. Patented Nov. 16, 1880.

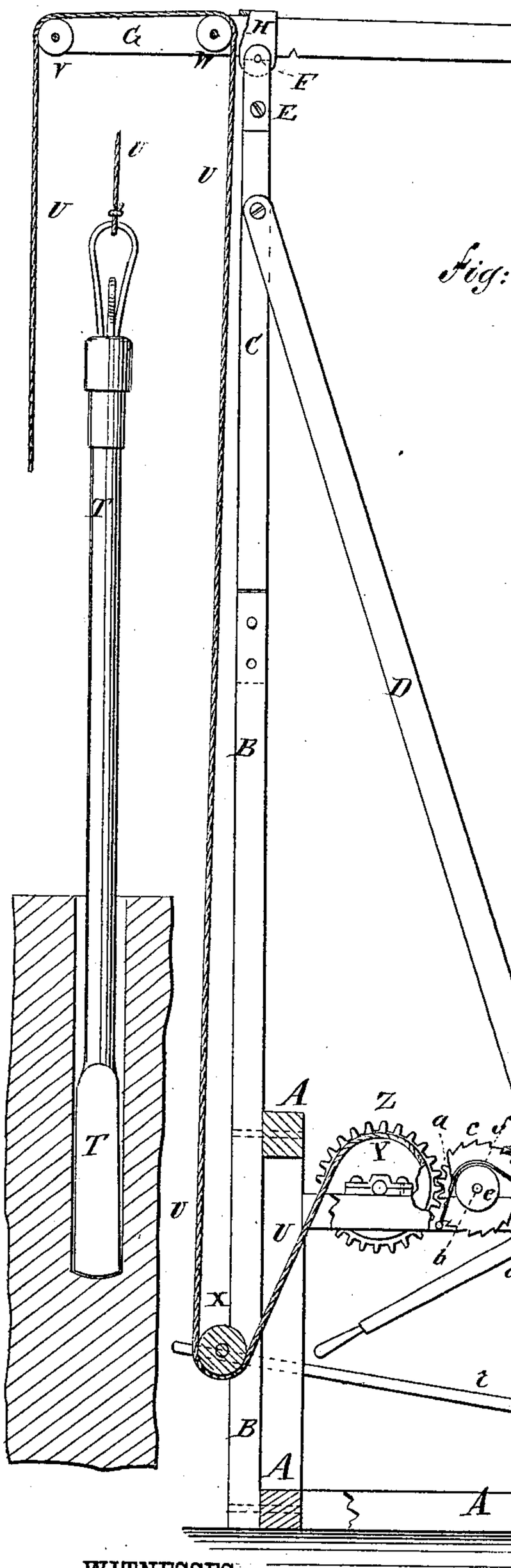

Fig: 1.

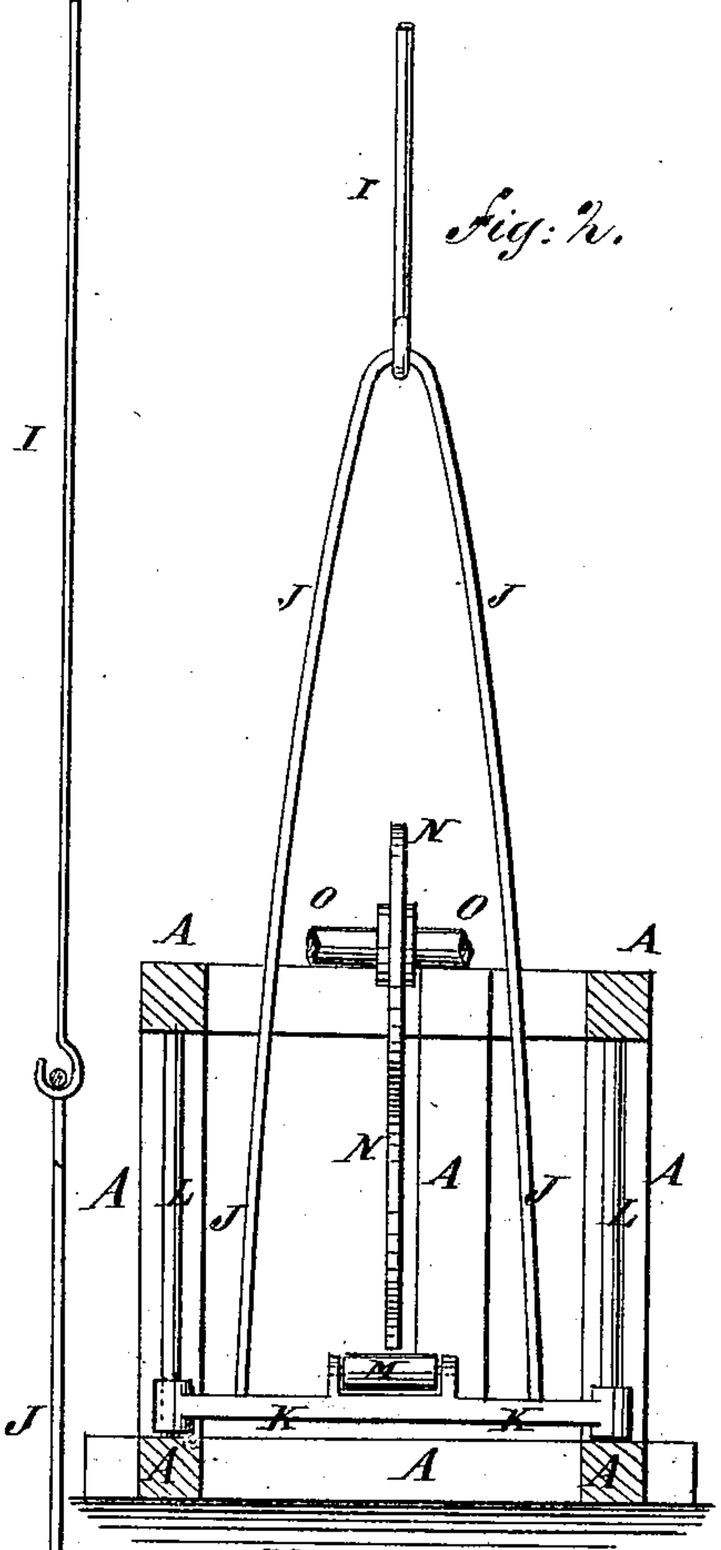

Fig: 2.

WITNESSES:

Chas. Nida.
C. Sedgwick

INVENTOR:

F. Knowlan

BY Munn & Co

ATTORNEYS.

(No Model.) 2 Sheets—Sheet 2.

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Fig: 3.

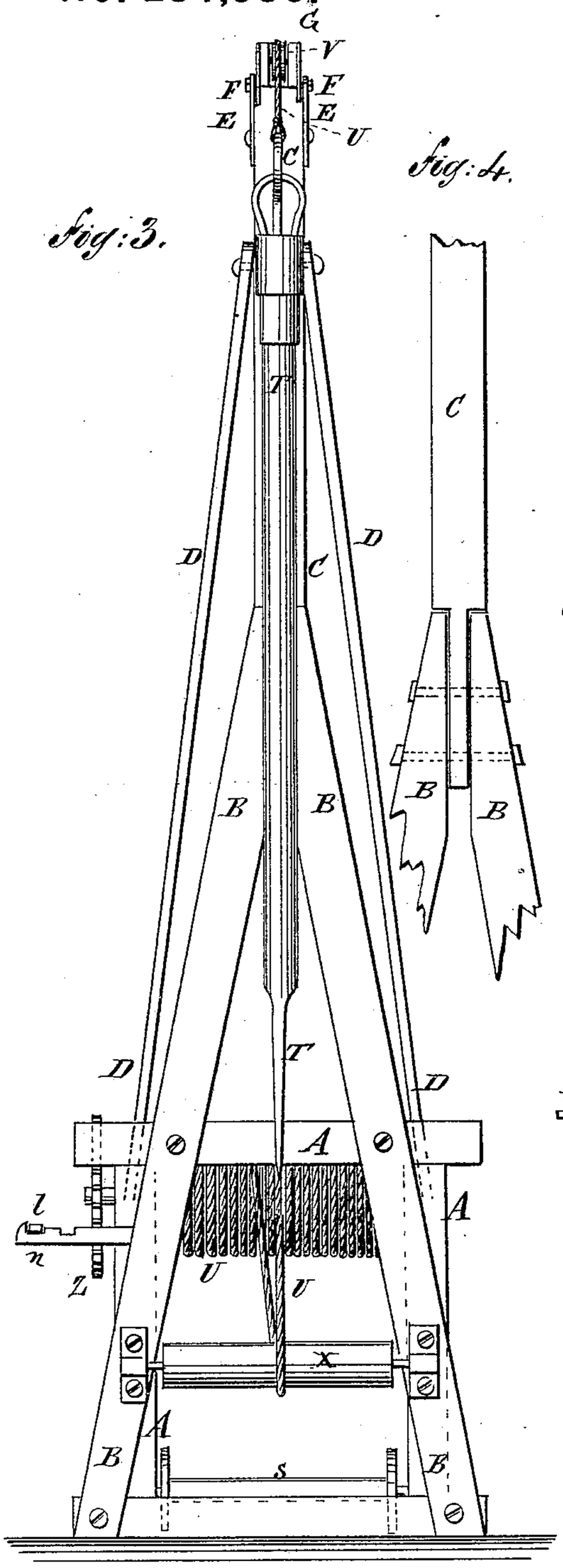
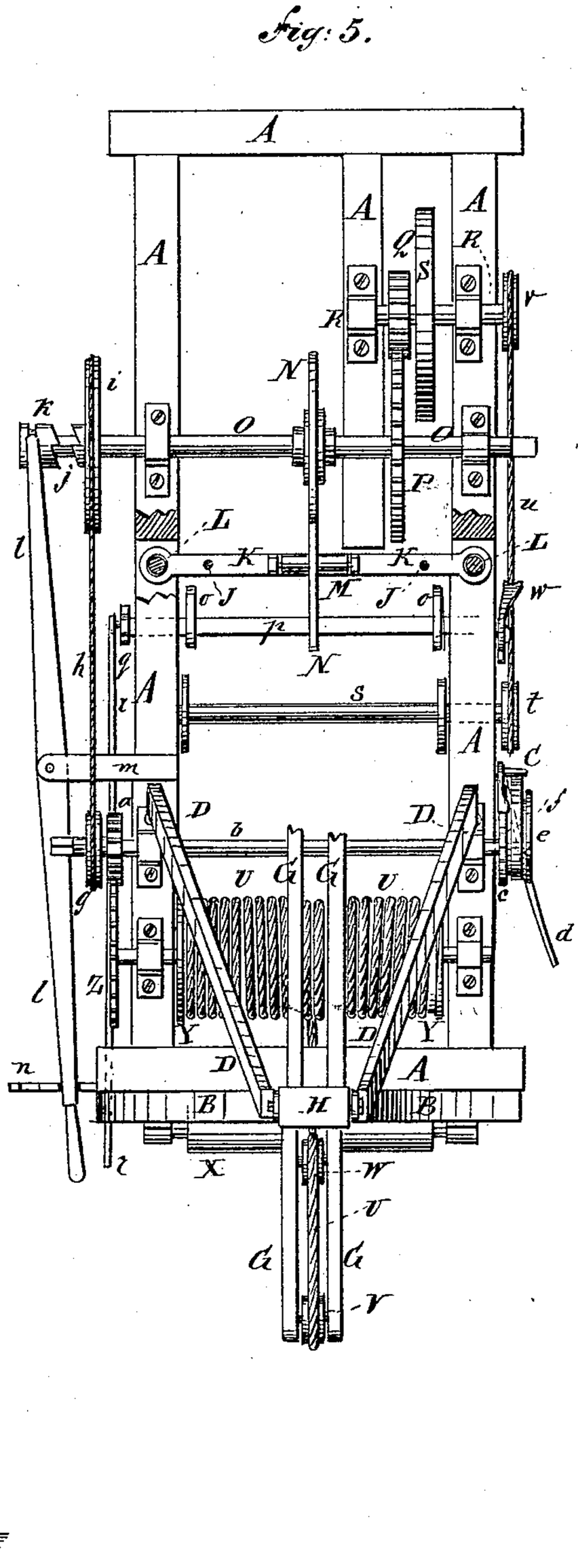


Fig: 4.

Fig: 5.



WITNESSES:

Chas. Nida.

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INVENTOR:

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ATTORNEYS.

UNITED STATES PATENT OFFICE.

FRANK KNOWLAN, OF NEW YORK, N. Y.

DRILLING-MACHINE FOR ARTESIAN AND OIL WELLS.

SPECIFICATION forming part of Letters Patent No. 234,586, dated November 16, 1880.

Application filed August 21, 1880. (No model.)

To all whom it may concern:

Be it known that I, FRANK KNOWLAN, of the city, county, and State of New York, have invented a new and useful Improvement in Drilling-Machines for Artesian and Oil Wells, of which the following is a specification.

Figure 1, Sheet 1, is a side elevation, partly in section, of the improvement. Fig. 2, Sheet 1, is a sectional elevation taken through the line *x x*, Fig. 1. Fig. 3, Sheet 2, is a front elevation. Fig. 4, Sheet 2, is a front elevation of the middle part of the derrick-post. Fig. 5, Sheet 2, is a plan view, parts being broken away.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish machines for drilling vertical holes in rocks which shall be simple in construction, reliable in operation, and readily controlled and operated.

A represents the frame of the machine, to the forward end of which are attached the lower parts of two bars, B. The upper ends of the bars B incline toward each other, and to and between the said upper ends is bolted the lower end of a bar, C, or a tenon formed upon the said lower end. The bars B B C form the derrick-post, and by taking out the bolts that secure the upper bar, C, to the lower bars, B B, the said upper bar can be detached for convenience in transportation.

To the opposite sides of the upper part of the bar C are attached the upper ends of the braces D, the lower ends of which are attached to the upper side bars of the frame A, to strengthen the derrick-post when in use.

To the opposite sides of the upper end of the bar C are attached two plates, E, the upper ends of which project above the upper end of the said bar C, and have a hole formed through them to receive the bolt F, which enters a notch in the lower side of the derrick-lever G and forms the fulcrum of the said lever. Several notches are formed in the lower side of the lever G, so that the said lever can be adjusted to give a longer or shorter drop to the drill, as circumstances may require. The derrick-lever G is secured in place upon the fulcrum-bolt F by a U-strap, H, which passes over the said lever G and has holes in its ends to receive the said bolt F, as shown in Fig. 1. The lever G is placed longitudinally with the frame A, with its rear arm over the said frame and its forward arm projecting in front of the said frame. The lever G is formed of two parallel bars bolted together and kept at the proper distance apart by blocks interposed between them. This construction forms a slot or opening along the central line of the lever G, to receive the drill-rope and its pulleys, as will be hereinafter described.

To the lower side of the rear end of the derrick-lever G is hinged the upper end of a rod, I, the lower end of which is hooked into or otherwise hinged to the loop or bow of the bail J. The ends of the bail J are attached to a cross-bar, K, which is made of such a length that its ends can rest upon the lower side bars of the frame A. In the ends of the cross-bar K are formed holes to receive the guide-rods L, upon which the said cross-bar K slides up and down, and the ends of which are attached to the upper and lower side bars of the frame A.

To the upper side of the cross-bar K, upon the opposite sides of its center, are attached lugs, to and between which is pivoted a roller, M, to lessen the friction of the cam N, by which the cross-bar K is forced downward to operate the derrick-lever G and raise the drill. The cam N is attached to a shaft, O, which revolves in bearings attached to the top side bars of the frame A.

To the shaft O is attached a large gear-wheel, P, the teeth of which mesh into the teeth of a smaller gear-wheel, Q, attached to the shaft R. The shaft R revolves in bearings attached to the top side bars of the frame A, and to it is attached a fly-wheel, S, to give momentum and steadiness of motion to the machine. To the shaft R is also attached a pulley to receive the driving-belt, which pulley is not shown in the drawings.

T is the drill, the upper end of which is attached to the end of a rope, U. The rope U passes over a pulley, V, pivoted in the slotted forward end of the derrick-lever G, and over a pulley, W, pivoted in the slot of the said lever G a little in front of the derrick-post B C. The rope U passes down in front of the derrick-post B C around a roller, X, pivoted to

supports attached to the lower parts of the bars B B of the derrick-post, and its other end is attached to and wound around the drum Y, the journals of which revolve in bearings attached to the top side bars of the frame A a little in the rear of the derrick-post B C. With this construction the drill is raised by the action of the cam N upon the stirrup J K, and drops by its own weight as the said cam passes off the said stirrup, the drill being fed down as it cuts its way into the rock by allowing the rope U to unwind from the drum Y, as will be hereinafter described.

One of the journals of the drum Y projects, and to it is attached a large gear-wheel, Z, the teeth of which mesh into the teeth of a smaller gear-wheel, *a*, attached to the end of the shaft *b*. The shaft *b* is placed parallel with the drum Y and revolves in bearings attached to the top side bars of the frame A. To the other end of the shaft *b* is attached a ratchet-wheel, *c*, with the teeth of which engages the pawl *d*, which is pivoted to the top side bar of the frame A, and is provided with a lever-handle projecting downward and forward into such a position that it can be conveniently operated to raise the pawl from the ratchet-wheel *c*, and that its weight will hold the said pawl against the said ratchet-wheel.

To the ratchet-wheel *c*, or to the shaft *b*, is rigidly attached a pulley, *e*, over which passes a brake-strap, *f*. One end of the brake-strap *f* is attached to the top side bar of the frame A, and its other end is attached to the pawl *d* in such a position that the brake will be applied by moving the pawl *d* away from the ratchet-wheel *c*. With this construction, when the pawl *d* is raised from the ratchet-wheel *c* the drill T is fed down by its own weight for the space of one or more of the teeth of the ratchet-wheel *c*, as desired, the rapidity of its descent being controlled by the brake *e f*.

To the gear-wheel *a*, or to the end of the shaft *b*, is rigidly attached a pulley, *g*, around which passes a belt, *h*. The belt *h* also passes around a larger pulley, *i*, which runs loosely upon the shaft O, that carries the cam N.

Upon the outer end of the hub of the pulley *i* are formed clutch-teeth *j*, to engage with the teeth of the sliding clutch *k*, placed upon the end of the shaft O, and cause the pulley *i* to be revolved by the revolution of the said shaft O.

The clutch *k* has a ring-groove formed upon it to receive the forked end of a lever, *l*, which is pivoted to a bar or bracket, *m*, attached to the frame A. With this construction, by operating the lever *l* the drum Y will be thrown into gear with the shaft O, so that the revolution of the said shaft O will revolve the drum Y to wind up the rope U and raise the drill T out of the hole drilled in the rock.

The free end of the clutch-lever *l* rests upon an arm or bar, *n*, attached to the frame A, and which has notches formed in it to receive the said lever *l*, and thus lock the clutch *k* in place when in gear with the pulley *i* and when out of gear with the said pulley.

The stirrup J K can be locked in place when lowered by turning the fingers or hooks *o* down upon the cross-bar K.

The fingers *o* are attached to a bar or shaft, *p*, which works in bearings attached to the lower side bars of the frame A.

To one end of the bar or shaft *p* is attached a crank, *q*, to the crank-pin of which is pivoted the end of a bar, *r*. The other end of the bar *r* passes through a keeper attached to the frame A or bar B, to keep the said bar *r* in such a position that it can be quickly reached and operated by the attendant when required.

s is a drum to receive the sand-pump rope, which rope is not shown in the drawings.

To one of the journals of the drum *s* is attached a pulley, *t*, around which passes a belt, *u*. The belt *u* also passes around a pulley, *v*, attached to the end of the shaft R, and is tightened, when it is desired to work the sand-pump, by a lever, *w*, pivoted to the frame A in such position that its end can be turned down upon the said belt *u* when desired.

I am aware that it is not new to use a cam on a horizontal shaft to operate upon a lever connected with a walking-beam in the upper part of derrick; also, that a derrick has been composed of two inclined and hinged bars, between which are pivoted a vertical bar; also, that a drill-rope has been passed over a pulley in the upright, thence carried down, and then attached to a drum; also, that a clutch and lever have been employed for throwing the cam out of gear with the drill-lever; also, that the walking-beam has been adjustably pivoted to a forked upright; but

What I claim as new and of my invention is—

1. The combination, with the frame, derrick, and derrick-lever, of the hook-rod I, bail J, sliding cross-bar K, rods L, roller M, and cam N, substantially as and for the purpose specified.

2. In a drilling-machine, the combination, with the drum Y, that carries the feed and hoisting rope U, of the gear-wheels Z *a*, the shaft *b*, the ratchet-wheel *c*, the lever-pawl *d*, and the pulley *e*, and brake-strap *f*, substantially as herein shown and described, whereby the drill can be fed down, as set forth.

FRANK KNOWLAN.

Witnesses:
JAMES T. GRAHAM,
C. SEDGWICK.