G. Downing,

Stone Drill.

No. 70,978. Patented Nov. 19, 1867.

Fig. 1.

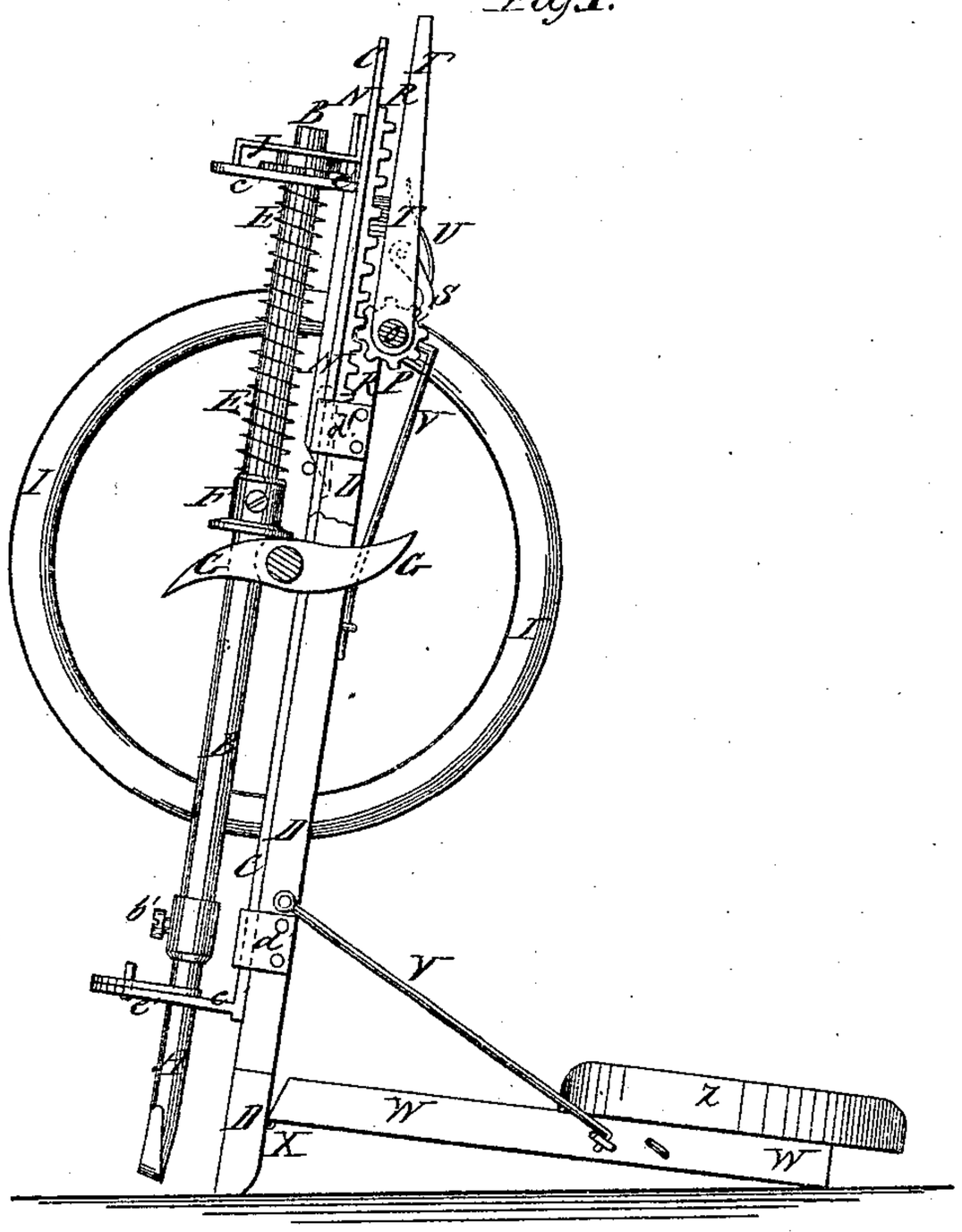
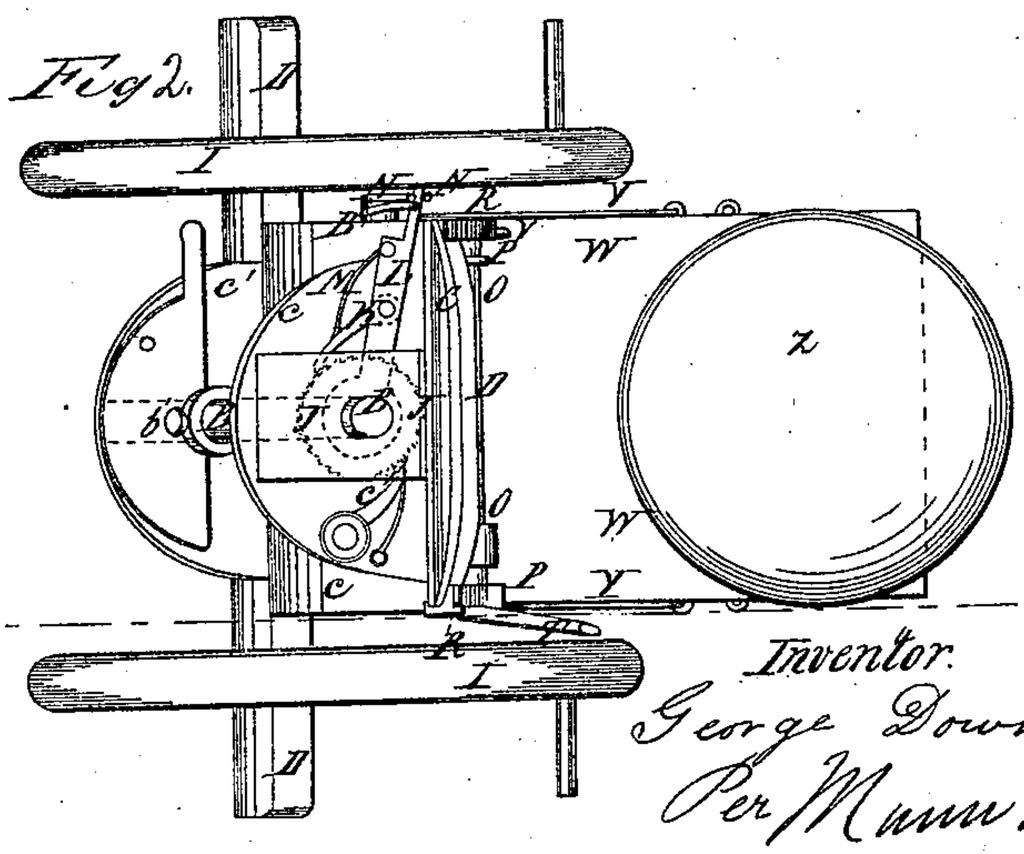


Fig. 3

Fig 2.



Witnesses.
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GEORGE DOWNING, OF SCHUYLERVILLE, NEW YORK, ASSIGNOR TO HIMSELF AND ROBERT HERMANCE, OF THE SAME PLACE.

Letters Patent No. 70,978, *dated November* 19, 1867.

IMPROVED ROCK-DRILLING MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, GEORGE DOWNING, of Schuylerville, in the county of Saratoga, and State of New York, have invented a new and useful Improvement in Drilling Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical longitudinal section of my improved machine, taken through the line *x x*, fig. 2.

Figure 2 is a top view of the same.

Figure 3 is a detail view of a modification of the drill.

Similar letters of reference indicate like parts.

My invention has for its object to furnish an improved drilling machine, simple in construction, easy to be operated, which can be so adjusted that the full force of the blow may be effective whether drilling a shallow or deep hole, and which will drill vertical or inclined holes with equal facility; and it consists in the combination of the crank-wheels, shaft, double cams, drill-spindle, and sliding plate, with each other and with the upright part of the frame; in the combination of the lever, spring-arm, pawls, and ratchet-wheel, with each other and with the drill-spindle, sliding plate, and crank-wheel; in the combination of the shaft, toothed wheels, pawls, arms, and racks, with each other and with the sliding plate and upright part of the frame; and in connecting the upright part of the frame to the horizontal part with hinges and adjustable hooks, the whole being constructed and arranged as hereinafter more fully descured.

A is an ordinary drill, secured to the drill-spindle B by a set-screw, *b'*, in the usual manner. The spindle B works up and down in holes in the flanges *c'*, projecting from the upper and lower parts of the sliding plate C, which slides up and down along the forward side of the upright D, being kept in place by the guides *d'*. The blow is given by the coiled wire spring E, assisted by the weight of the drill-spindle. The upper end of the spring E rests against the under side of the upper flange *e'*, and its lower end against the flanged ring F, adjustably secured to the spindle B by a set-screw. The drill-spindle B is raised by the double cams G, acting upon the flanged ring F upon both sides of the said spindle. The cams G are attached to the middle part of the shaft H, and work in a vertical slot formed in the sliding plate C and upright D. The shaft H revolves in bearings attached to the sliding plate C, so as to be raised and lowered with said plate, and to its ends are attached the crank-wheels I, which are made heavy, so as to act as balance-wheels. J is a ratchet-wheel, placed upon the spindle B, just above the upper flange *c'*, and made to carry the said spindle with it, by having a tongue formed upon it entering a longitudinal groove formed in the said spindle. K is a pawl, pivoted to the arm L, and held forward against the teeth of the ratchet-wheel J by the spring M. The arm L is operated to revolve the ratchet-wheel J and spindle B, by the lever N, into a slot in the upper end of which the free end of the arm L enters. The lever N is pivoted to the sliding plate C, and its lower end is acted upon by stop-pins or projections formed upon or attached to the inner side of the crank-wheel I, so that the spindle and drill may be partially revolved after each blow. B' is a spring, the free end of which rests against the arm L, to draw it back as soon as the lower end of the lever N is released from the wheel I. C' is a pawl, taking hold of the ratchet-wheel J to hold it stationary while the pawl K is being drawn back to take another hold. O is a shaft, revolving in bearings upon the rear side of the upright D, and having toothed wheels P attached to its ends, the teeth of which mesh into the teeth of the racks R, attached to the rear sides of the edges of the sliding plate C. The wheels P and shaft O are revolved to raise sliding-plate C by the pawl S, pivoted to the arm or lever T, and held down against the teeth of one of the wheels P by the spring U. The sliding plate is held in place, while the machine is being operated, by the pawl V taking hold of the teeth of the other wheel P, and which must be removed from the said teeth before the said plate C can be lowered. The lower end of the upright D is connected to the horizontal part W of the frame of the machine by the hinges X, so that the upright D may be set vertical, or inclined at any angle, according to the direction in which the hole is to be drilled. Y are hooks, pivoted to the edges of the upright D, and hooking into one or the other of the staples or eyes attached to the edges of the horizontal frame W, according to the angle at which the upright D is set. Z represents a weight, placed upon the rear end of

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