

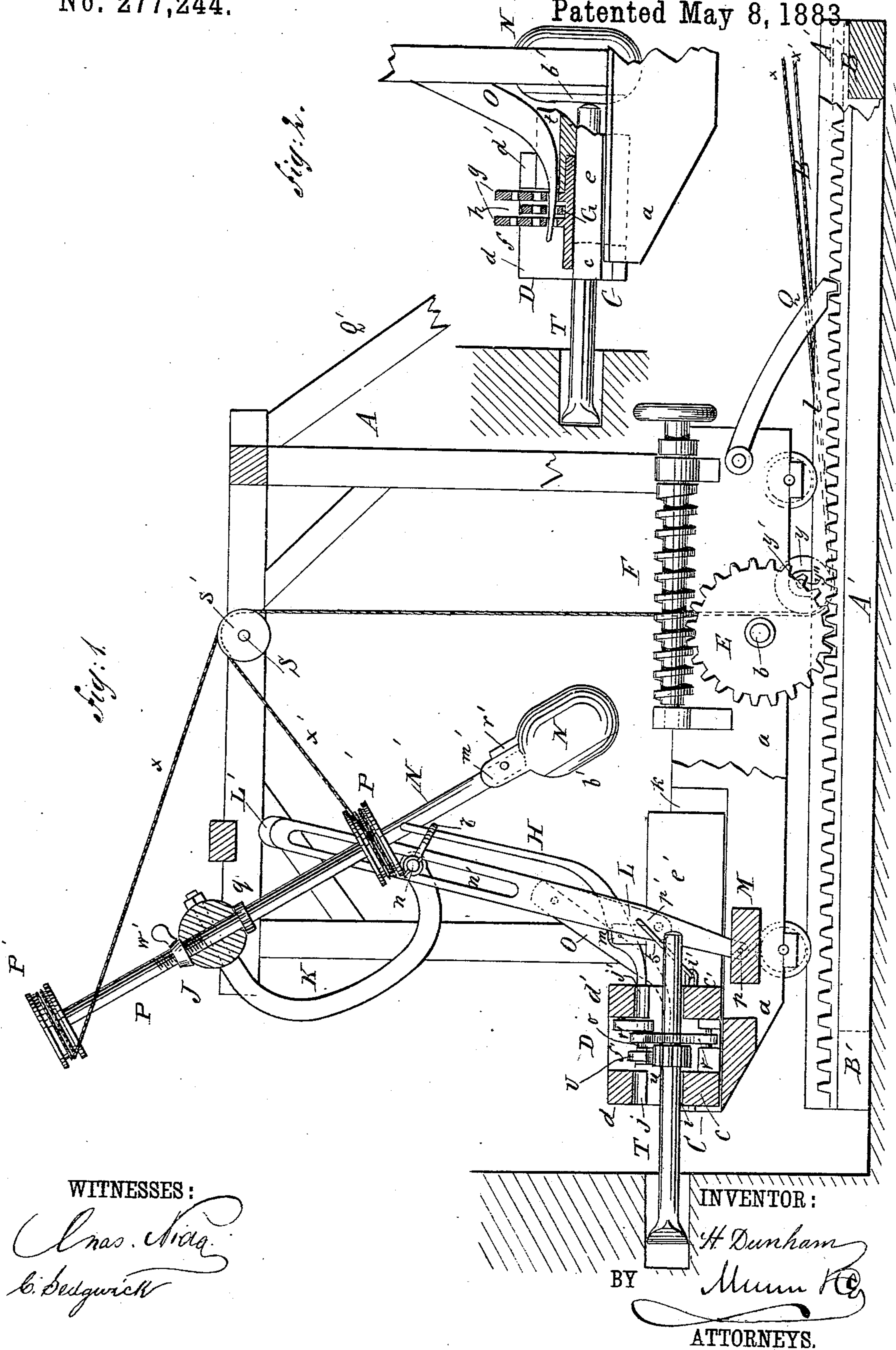
(No Model.)

2 Sheets—Sheet 1.

H. DUNHAM.  
ROCK DRILLING MACHINE.

No. 277,244.

Patented May 8, 1883



WITNESSES:

*Chas. A. ...*  
*C. Sedgwick*

INVENTOR:

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BY

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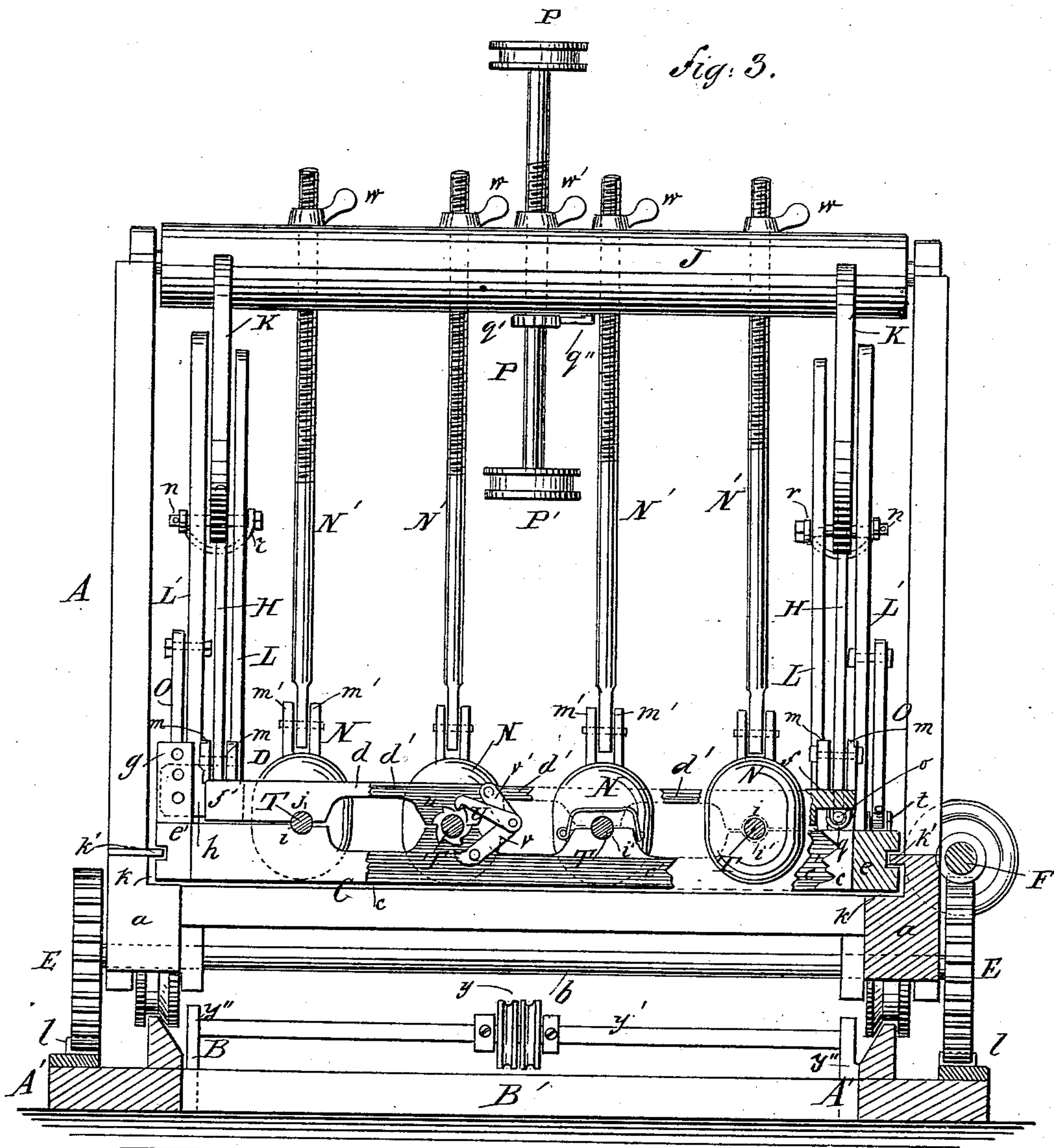
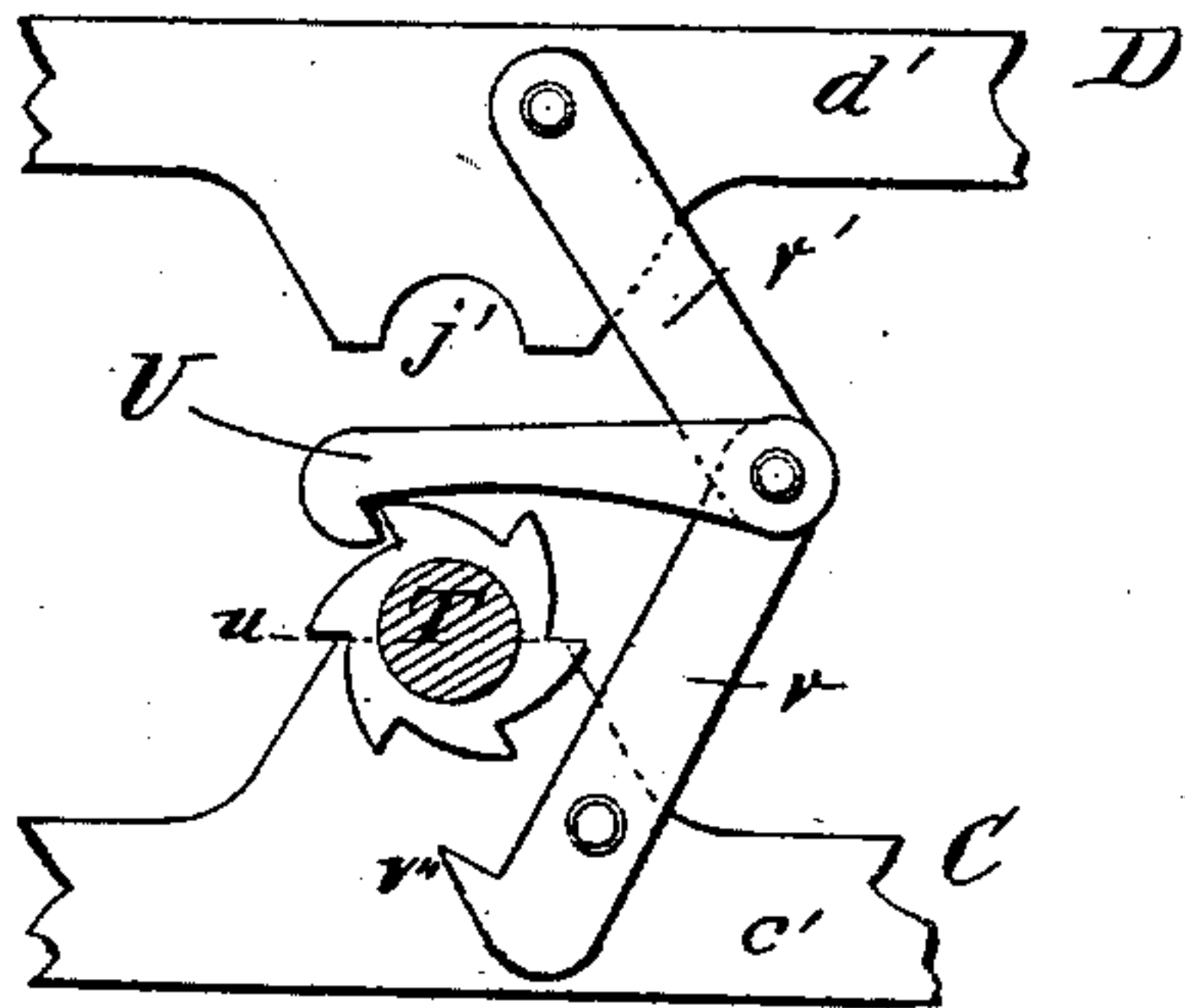


Fig. 4.



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# UNITED STATES PATENT OFFICE.

HENRY DUNHAM, OF GLEN AUBREY, NEW YORK.

## ROCK-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 277,244, dated May 8, 1883.

Application filed July 3, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY DUNHAM, of Glen Aubrey, in the county of Broome and State of New York, have invented certain new and useful Improvements in Rock-Drilling Machines, of which the following is a full, clear, and exact description.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of my new and improved rock-drilling machine arranged for drilling a horizontal hole. Fig. 2 is a detailed sectional elevation, showing the means for bolting and releasing the drill-holding clamp D. Fig. 3 is a sectional and broken front elevation of the machine; and Fig. 4 is a detailed elevation of the drill-holder C and clamp D, showing the means for rotating the drills.

The frame A, in which the operative parts of this drilling-machine are held, is supported by the supporting-frame B, composed of the bed-pieces A' A' and suitable end cross-pieces, B' B', and the frame A is adapted to be moved backward and forward upon the supporting-frame B—for setting, feeding up, and removing the drills—by means of the cog-wheels E E, meshing with the racks l l, formed upon the bed-pieces A' A' the said wheels being both fixed upon the axle b, and one of them being adapted to be turned by the worm F, journaled at one side of the frame A, as shown clearly in Fig. 1. The forward ends of the parallel bottom pieces a a of the frame A are recessed, as shown at k k, and formed with the tongues k' k', as shown in Fig. 3, which recesses and tongues form ways for the movement of the drill-holder C, in which the series of drills T are placed and held by the drill-clamp D, except when the clamp is raised for turning the drills, as hereinafter described.

The drill-holder C is composed of the parallel side bars c c', fitted a suitable distance apart in the end bars e e', which are extended backward to run in the recesses k k, as shown clearly in Fig. 1, and the outer sides of the end bars e e' are guttered to fit upon the tongues k' k' of the side pieces a a of the frame, as shown in Fig. 3. The parallel bars c c' are correspondingly recessed, as shown at

i i' in Figs. 1 and 3, to form seats for receiving and holding the drill.

The drill-clamp D is composed of the parallel side bars d d' and the end bars f f', which hold the said side bars the same distance apart that the side pieces c c' of the drill-holder are held apart in the side bars e e', leaving the same width of space between them as shown in Fig. 1, and the bars d d' are recessed, as shown at j j', to correspond with the recesses in the bars c c', to fit over the drills, as will be understood from Figs. 1, 3, and 4.

To the upper side of the drill-holder C, at the ends thereof, are secured the plates G G, which are formed with the projecting plates or uprights g g, which are perforated with a corresponding series of holes, as shown clearly in Figs. 2 and 3.

To the outer ends of the drill-clamp D are secured the outwardly-projecting plates h h, which are perforated with holes which are the same distance apart that the holes in the plates g g are, as shown clearly in Figs. 2 and 3, and these plates h h fit between the said perforated plates g g, as shown in said figures, and the plates g g thus serve as guides for the movement of the clamp D to and from the drill-holder, and said plates and the plates h h form means for locking the clamp D in place upon the drill-holder for holding the drills while being struck. This movement of the drill-clamp D to and from the drill-holder is obtained from the bent and pointed levers H H, which are pivoted in the upright plates m m, formed upon or secured to the upper side of the end pieces e e' of the drill-holder. These levers are so arranged that their pointed forward ends o o reach under the drill-clamp D and pass through the staples q q, secured in the under side of the clamp, as shown in Fig. 1. These levers receive oscillating motion from the driving-power of the machine through the rocking sledge-carrying beam J, curved arms K K, secured to the said beam, and the sets of drill-operating levers L L and I' L', (or either of them,) which are attached to the ends of the curved arms K K by means of the pins n n, passing through the slots n' n' of the levers and the ends of the arms, as shown in Fig. 1, and these levers are pivoted at their lower ends, the former at p p in the cross-piece M of the frame A, (shown in Fig. 1,) the latter at p' p' upon the end pieces



*e e'* of the drill-holder C, as shown in Fig. 1. The upper ends of the levers H H are attached to the levers L L and L' L' and to the curved arms K K by means of the clevis-like attachment *r*, placed upon the pin *n*, as shown in Fig. 1; or any other suitable means may be used. The backward-and-forward movement of the levers H H, and the consequent up-and-down movement of the pointed lower ends *o* of the levers, will raise and lower the clamp D with a positive motion, and this motion imparts, through certain clutch mechanism hereinafter described, partial rotary motion to the drills.

15 The drill-holder C is attached to the levers L L by the connecting rods or links *s s*, (shown in Fig. 1,) and by this means the oscillating motion of the levers imparts reciprocating motion to the drill-holder, drill-clamp, and drills, and also to the lower ends of the levers L' L'.

20 O O represent bent and pointed pawls or bolts, which are pivoted at their upper ends to the levers L' L', as shown clearly in Figs. 1 and 2. The lower ends of these pawls rest in the gutters *t t*, as shown in Figs. 2 and 3, and

25 they are moved backward and forward in the

attached to the lower ends of the rods N', and with the back plate, *r'*, against which the ends of the rods come in raising the sledges and cause them to be raised parallel with the rods N', as will be understood from Fig. 1. There are as many of these sledges N and rods N' as there are drills, and the rods pass up through the rocking beam J, and are held firmly therein by the nuts *w w*, so that when the beam is rocked the sledges will be raised and brought down forcibly against the outer ends of the drills T for drilling the holes, as clearly illustrated in Figs. 1 and 2.

80 P represents the arm or double-acting lever by which (through the wire or cord *x x'*) the beam J is rocked. This arm or lever is by preference passed through the beam, at or near its center, in the same plane with the rods N' N'. The ends of the lever P are provided with the fixed drums or guttered wheels P' P', around which the cords or wires *x x'* are passed, as shown in Fig. 1. From the drums or guttered wheels the cords *x x'* pass over suitable pulleys, *s' s'*, placed upon the shaft S, journaled in the upper part of the frame A, and from these pulleys they pass under



When the frame A is moved forward upon the frame B for drilling, the same is held against backward movement by the dogs Q Q', which are pivoted to the frame A, and are adapted to drop into the racks l l of the frame B, as shown in Fig. 1. The frame B may be set in various positions for drilling the holes at any angle or pitch as desired.

The ratchets u are by preference cast of malleable iron and placed upon the drills while hot, so that when cool they will shrink upon the drills, and may be removed by heating.

The action of the sledges is such that when the drills are forced home to the bottom of the holes by the forward movement of the drill-holder, and firmly grasped by the drill-clamp, while being thus held the sledges will be brought heavily against them, and will remain, by reason of not being rigidly attached to the bars, and the lower ends of the bars being slightly in advance of the sledges for a short space of time against them, until the jar and vibration of the drill incident to the blow cease. This action causes the drill to cut more rapidly than it would if allowed to rebound immediately upon the delivery of the blow. After the holes have been drilled the desired depth the drills may be removed, and wedges may be put in their place and driven into the holes by the sledges for splitting the rock.

A single wedge may be driven by this machine; or they may be driven in gangs, as the drills are; and by it wedges may be driven in seams or crevices for splitting flag-stones; and when driving wedges the drill-holder, drill-clamp, and levers L, L', and H may be taken out of the machine, so that the wedges may be driven at any place desired, according to the crevice, the sledges being raised or lowered to suit the wedges.

Instead of using a single gang of drills or wedges in the machine, the drill holder and clamp may be duplicated, so that the machine will carry two or more gangs of drills or wedges, if desired, and not depart from the spirit of my invention.

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

1. The drill-clamp having parallel side bars d d', recessed at j j', and held apart by end bars f f', in combination with the drill-holder having correspondingly-recessed side pieces e e', held apart by the side bars e e', as and for the purpose specified.

2. The combination, with the holder and

clamp-bars c' d', the drill-ratchets u, and dogs U, of the toggle-plates v v', pivoted at their outer ends to said bars c' d', and provided with projections v'', whereby the dogs will turn the drills, and then the toggle projections hold them while being struck by the sledges, as described.

3. The combination, with the drill-holder and the clamp D, having staples q, of the bent and pointed levers H, pivoted in the drill-holder plates m, and having their ends o reaching under the clamp D, as and for the purpose set forth.

4. The combination, with the drill-holder C, the clamp D, and levers H, of the rocking beam J, curved arms K, and levers L L', whereby the levers H may be operated, as described.

5. The combination of the drill-holder C, the clamp D, the oscillating levers L', having pivoted pawls O, resting in gutters t, and the perforated clamp-plates g h, whereby the drills are held when the drills are struck by the sledge, as described.

6. The combination, with the ratchets u and dogs U, of the toggles v v', bars c' d', and clamp D, having an up-and-down movement, whereby the drills will be turned between the sledge blows, as described.

7. The arm P, carrying pulleys P', the cords k k', the pulleys s' on shaft s, the pulleys y on shaft y', and an actuating crank-shaft, whereby the beam J is rocked, as described.

8. The combination, with the levers L', provided with pawls or bolts O, of the drill-holder C and the drill-clamp D, the former being provided with the perforated plates g g g g, the latter with the plates h h, substantially as and for the purposes set forth.

9. The levers L, pivoted in the cross-piece M, or other permanent part of the frame A, in combination with the drill-holder C, beam J, and arms K for reciprocating the drills, as set forth.

10. The frame A, carrying rock-lever P, and beam J, having sledges N, operated by cords or chains x x', substantially as described, and the drill-actuating devices removably connected to frame A, whereby holes may be drilled and the drilling devices removed to admit of driving wedges by the sledges N, substantially as set forth.

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Witnesses:

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