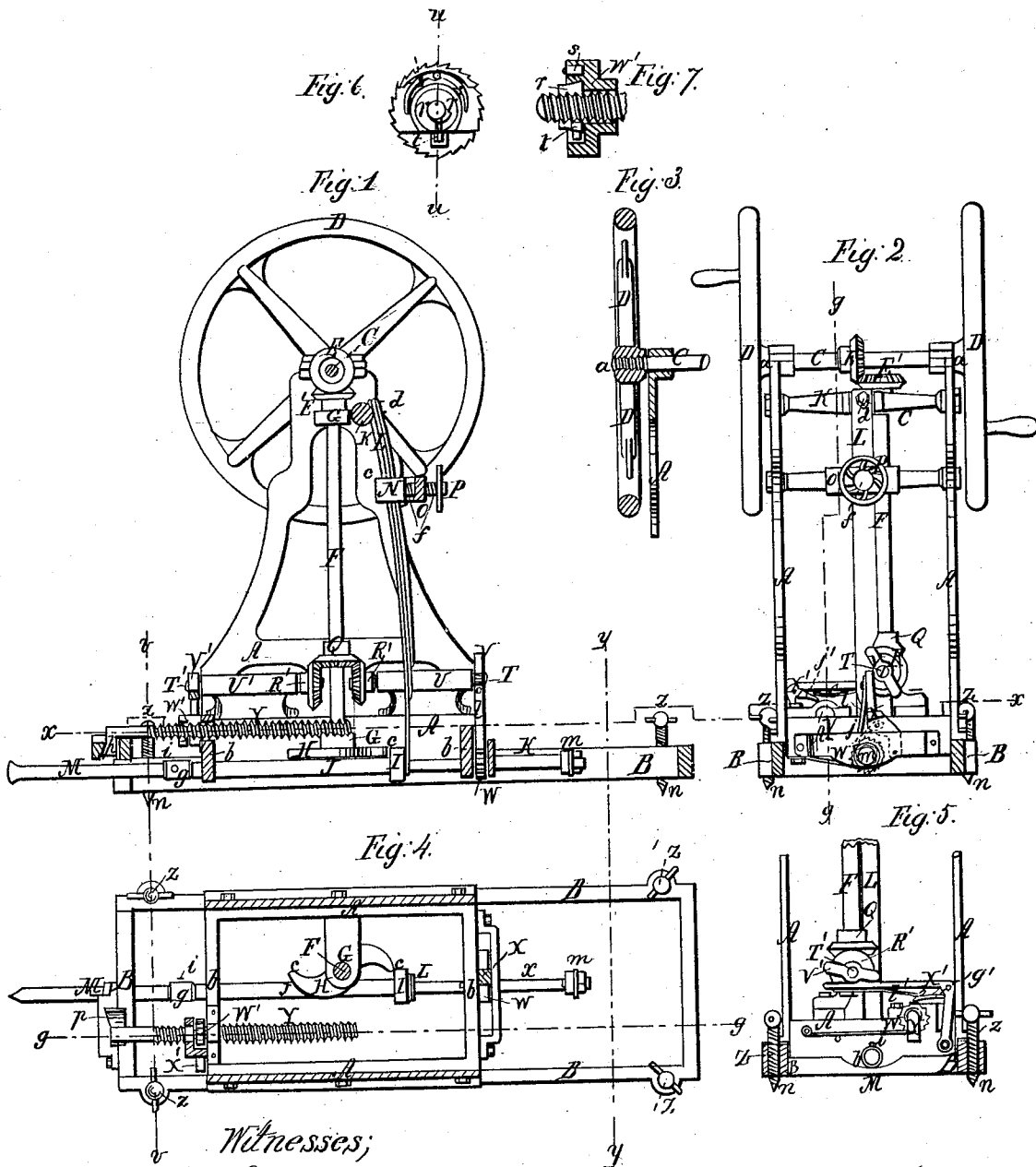


C. H. Davis.

Rock Drill.

Nº 95,569.

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Witnesses;

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CHARLTON H. DAVIS, OF SAN FRANCISCO, CALIFORNIA.

Letters Patent No. 95,569, dated October 5, 1869.

IMPROVED ROCK-DRILL.

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, CHARLTON H. DAVIS, of San Francisco, in the county of San Francisco, and State of California, have invented a new and improved Rock-Drill; 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 section taken through the line *z z*, figs. 2 and 4.

Figure 2 is a right-end elevation of figs. 1 and 4, with the bed-frame B, sectioned by the line *y y*.

Figure 3 is a vertical central section of the hand-wheel D, in figs. 1 and 2.

Figure 4 is a horizontal section, showing those parts below the line *x x*, figs. 1 and 2.

Figure 5 is an end view, taken opposite to that of fig. 2, with the upper portion of the machine broken away, and the bed-frame B sectioned through the line *v v*, figs. 1 and 4.

Figure 6 is a plan view of the feeding-ratchet W, figs. 1, 4, and 5, on an enlarged scale.

Figure 7 is a section of fig. 6, taken through the line *u u*.

Similar letters of reference indicate corresponding parts.

My invention consists in improved arrangements of operating-devices for working rock-drills horizontally, whereby it is designed to furnish such drills, which may be conveniently and rapidly worked by hand, and which will occupy but little space on the ground, thereby requiring less labor in removing rock to provide space for commencing work than those now in use.

The invention comprises a compact arrangement of sliding-frame operating devices mounted thereon, and adjustable bed-frame. Also, an arrangement with the retracting-cam and drill-spindle of an adjustable flat spring for actuating the drill in the forward or cutting-movement. Also, an arrangement for rotating and feeding the drill-rod, and also an arrangement of devices for releasing the feed-screw, for moving the drill-rod carriage back rapidly.

A is the frame of the carriage, which is so constructed as to move or slide upon the ways or sides of the bed-frame B, in the direction of its length.

Across the top of carriage-frame A extends the driving-shaft C, which shaft is turned by means of the winches or hand-wheels D attached to the ends thereof, by means of screw-threads *a* turned on the ends of the shaft C, to correspond with those on the inside of hubs of the hand-wheels D. By turning the hand-wheels D in the direction contrary to that of operating the machine, they will turn or screw off the ends

of the shaft C, thus preventing injury being done the working-parts thereof by turning backward.

On the driving-shaft C is a bevel, or mitre-gear, E, that works with a similar gear, E', on the upper end of vertical shaft F, giving it a rotary motion at right angles to that of shaft C.

The vertical shaft F is supported on its place by means of the journal-boxes G, in which it revolves.

To the lower end of the shaft F is, in a suitable and substantial manner, attached the cam H, which, in revolving with the shaft F, presses with its outer edge against the collar I, on the drill-shaft J, forcing the same back twice in every revolution of said cam.

The drill-shaft J is supported in its place, in the under side of the carriage-frame A, by the journal-boxes *b* attached to the said carriage-frame. The boxes *b* admit of the drill-shaft J revolving therein; also of sliding back and forth therein in the direction of its length.

To the shaft, or cross-piece K, near the top of the sliding carriage, is attached one end of the spring L, which spring is composed of strips, or leaves *c*, so that by adding to or removing from the spring L one or more leaves *c*, the elastic force of the spring can be increased or diminished, as may be desired.

The leaves *c* may be held together, and the spring itself fastened to the stationary shaft K, by a bolt, or rivet, *d*.

The lower end of the spring L is made to press against the back of the collar I, so that the instant that the end of the cam H, at *e*, passes the collar I, the pressure of spring L drives the drill-shaft J forward with great rapidity and force.

In order to regulate the striking-force communicated to the drill M, the spring L is provided with a clamp-dog, N, connected with the box-nut O (which is firmly attached to the carriage-frame A) by the screw *f*.

By turning the small hand-wheel P, the screw *f*, in the box-nut O, forces the dog N forward or draws it back, thus augmenting or diminishing the pressure of the spring L against the collar I.

The back end of the drill-shaft is provided with a buffer, *m*, made of rubber or other suitable material, the object of which is, that when the machine is in operation, and the drill M is not striking against anything, the buffer *m* receives and dissipates the force of the blow.

The stock of the drill M is inserted in the socket, or chuck formed in the end of the drill-shaft J, at *g*, and held in its place by the set-screw *i*.

The stock of the drill M is turned to a degree of taper to correspond with the tapering recess in the chuck *g*, in which it fits, so that the drill-stock touches on all sides, and prevents the drill from moving laterally therein.

To the body of the vertical shaft F is firmly attached the bevel, or mitre-gear Q, which, in turning with the shaft F, works with and turns the bevel, or mitre-gear R on the end of the shaft T, which shaft revolves in the box or boxes U.

On the outer end of the shaft T is the cam V, which, in turning, works the ratchet-lever X, causing the ratchet-claw j to work in the teeth of the ratchet-wheel W, feathered on the drill-shaft, thus giving the drill-shaft a rotary motion.

The ratchet-wheel W is prevented from turning around the shaft J, to which it is attached by the feather k, which, with the shaft, slides through the wheel W, in the back and forward working of the said shaft.

On the ratchet-lever X is attached, securely, one end of the spring l, which presses with the other end against the ratchet-claw j, thus keeping the lever X constantly in contact with the cam V during every revolution of the same.

Owing to the arrangement of the pawl-lever X on an axis at one side of that of the ratchet-wheel, this spring has the double function of keeping the pawl j down on the ratchet-wheel, and of restoring the pawl-lever X, after being operated on by the cam.

By the device for turning the shaft J, as above described, it is obvious that the annular position of the point of the drill M is changed at every blow struck by it, which changing of position is necessary, in order that the drill M should successfully perform its work.

As the depth of the hole in the face of the rock which the drill M is sinking increases, it is necessary that the carriage-frame A, to which the drill-shaft J is attached, should advance fast enough to allow the drill M to strike the rock with its full force at every blow.

In order to accomplish this object, at the lower and forward portion of the carriage-frame A is arranged a feed-screw, Y, whereon is the ratchet-wheel W, in one side of which are inserted, in a dovetail groove, the jaws r, the same being held together by the spring s, as shown in figs. 6 and 7, and, on the inside surface of said jaws r, screw-threads are provided to correspond with and turn upon the thread of the feed-screw Y.

By means of the ratchet-claw j, ratchet-lever X, spring l, cam V, shaft T, and bevel-gear R, arranged similarly to those above described for turning the drill-shaft, the ratchet-wheel W is caused to turn upon the feed-screw Y for feeding it forward while the drill is working.

The end of this feed-screw Y, at p, is formed with a side projection, made wedge-shaped, with the narrower end of the wedge at the junction with the screw. The projection p fits in a slot, or recess at the head or end of bed-frame B. (See figs. 1 and 4.)

The groove, or recess at p, being of the same shape as the projection, the feed-screw Y is prevented from becoming detached from the bed-frame B, at p, while

the machine is in operation, by jarring or otherwise. It is not, however, essential that this projection and recess be made wedge-shaped.

By the devices as above described, it is obvious, that while the machine is in operation, the carriage-frame A is caused to traverse gradually forward upon the ways of the bed-frame B, but in order to draw the carriage A back upon its ways, with as little loss of time as possible, the jaws r, on the ratchet-wheel W, are spread apart, by means of a wedge, key, or similar device, inserted at t, (see figs. 6 and 7,) in such a manner as to force the jaws apart, to allow the thread in said jaws r to clear the thread on the feed-screw Y, thereby allowing the carriage A to be drawn back without impediments.

At or near the corners of the bed-frame B are inserted, in a vertical position, the hand-adjusting screws Z, for the purpose of raising, levelling, or inclining the machine.

The lower ends of these screws, which screw into bed-frame B, are furnished with sharpened points n, which keep the machine from changing its position or shifting about on the floor of the quarry while in operation.

Though the above description is that of working but one drill, still the same principle can be carried out in operating a gang of two or more drills working parallel and horizontally with each other, in which case only one set of feeding-devices is required, the said gang being mounted on the same carriage.

Having thus described my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. The arrangement of the sliding frame A, bed B, operating-wheels D, shafts C E, and rotating and feeding-shafts T T', substantially as specified.

2. The combination of the spring l, arranged as specified, for adding or removing leaves or plates for varying the power; the clamp N, adjusting-screw, and the drill-rod, all substantially as specified.

3. The ratchet-wheel W, lever X, pawl J, and spring l, when constructed and arranged as described, with reference to the cam V, all operating together, as and for the purpose set forth.

4. The arrangement of the pawl-levers X X', relatively to the ratchet-wheels, the springs l l', and pawls j j', whereby the said springs have the effect to keep the pawls in contact with the wheels, and to restore the pawl-levers, substantially as specified.

5. The arrangement, with the ratchet-wheel W and feed-screw, of the jaws r and springs, substantially as specified.

The above specification of my invention signed by me, this 15th day of June, 1869.

CHARLTON H. DAVIS.

Witnesses:

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ALEX. F. ROBERTS.