

(No Model.)

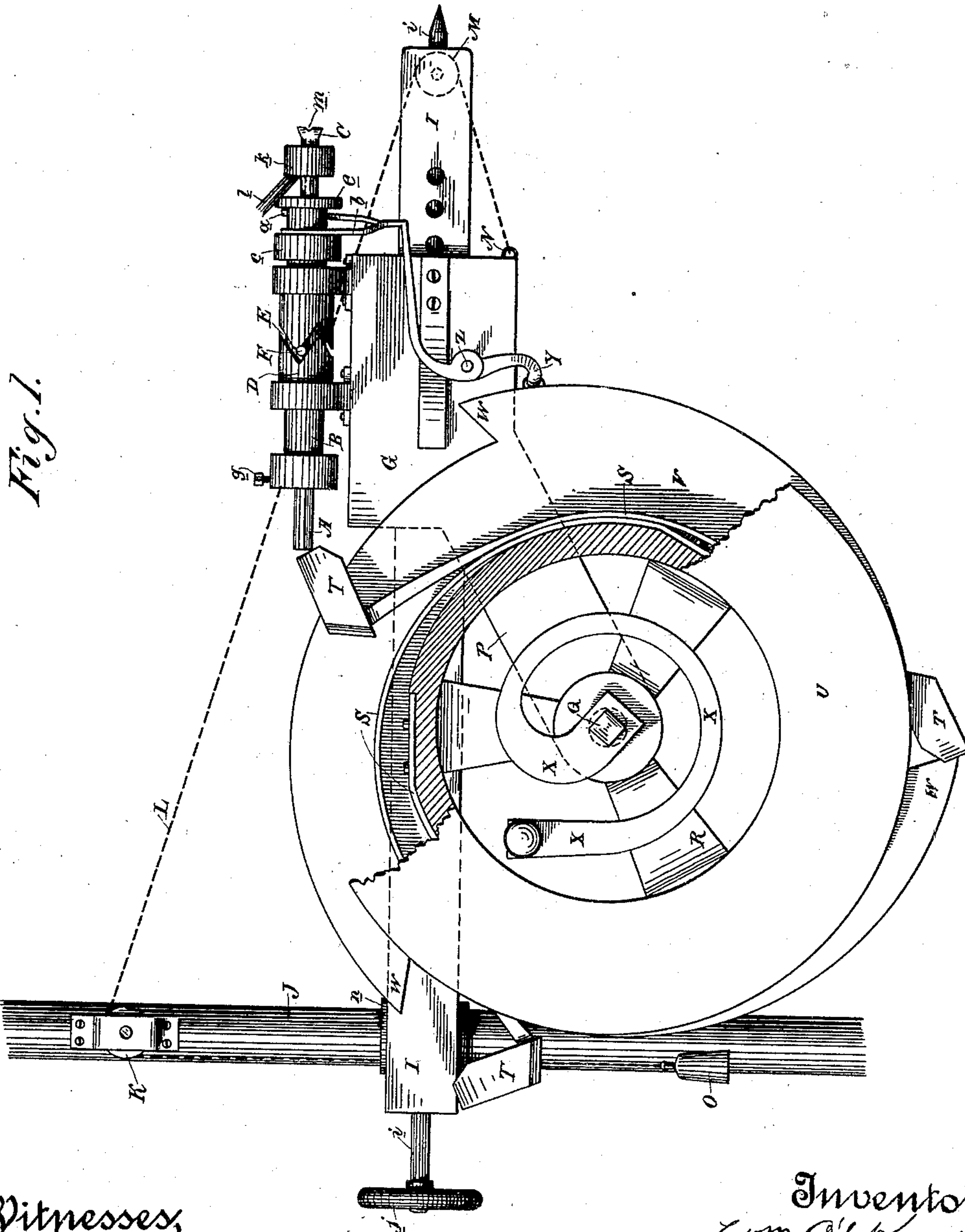
2 Sheets—Sheet 1.

W. O'KEEFE.

ROCK DRILL.

No. 382,895.

Patented May 15, 1888.



Witnesses,
Geo. H. Strong
J. H. Strong

Inventor,
Wm. O'Keefe.
By Dewey & Co.
attys

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

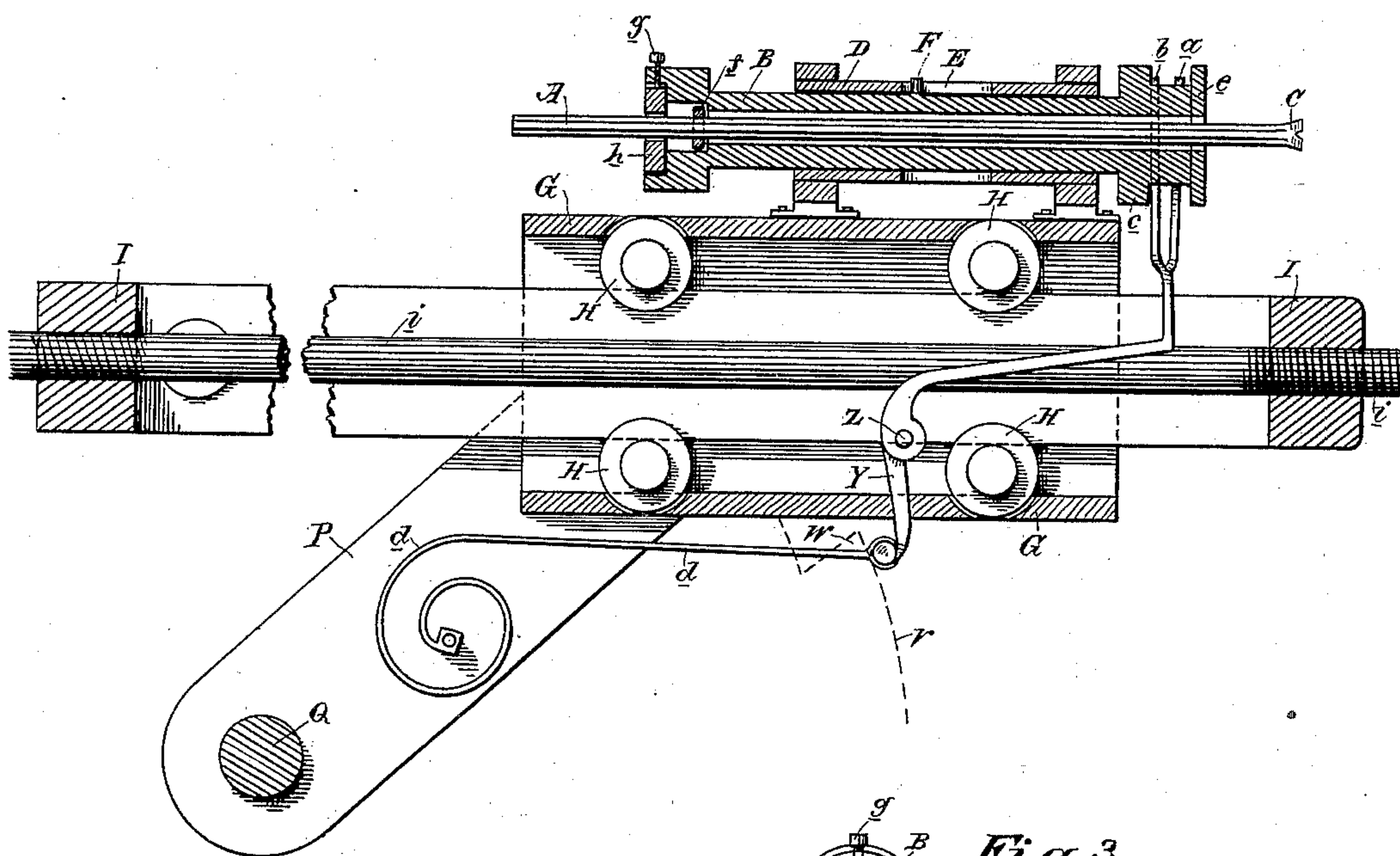
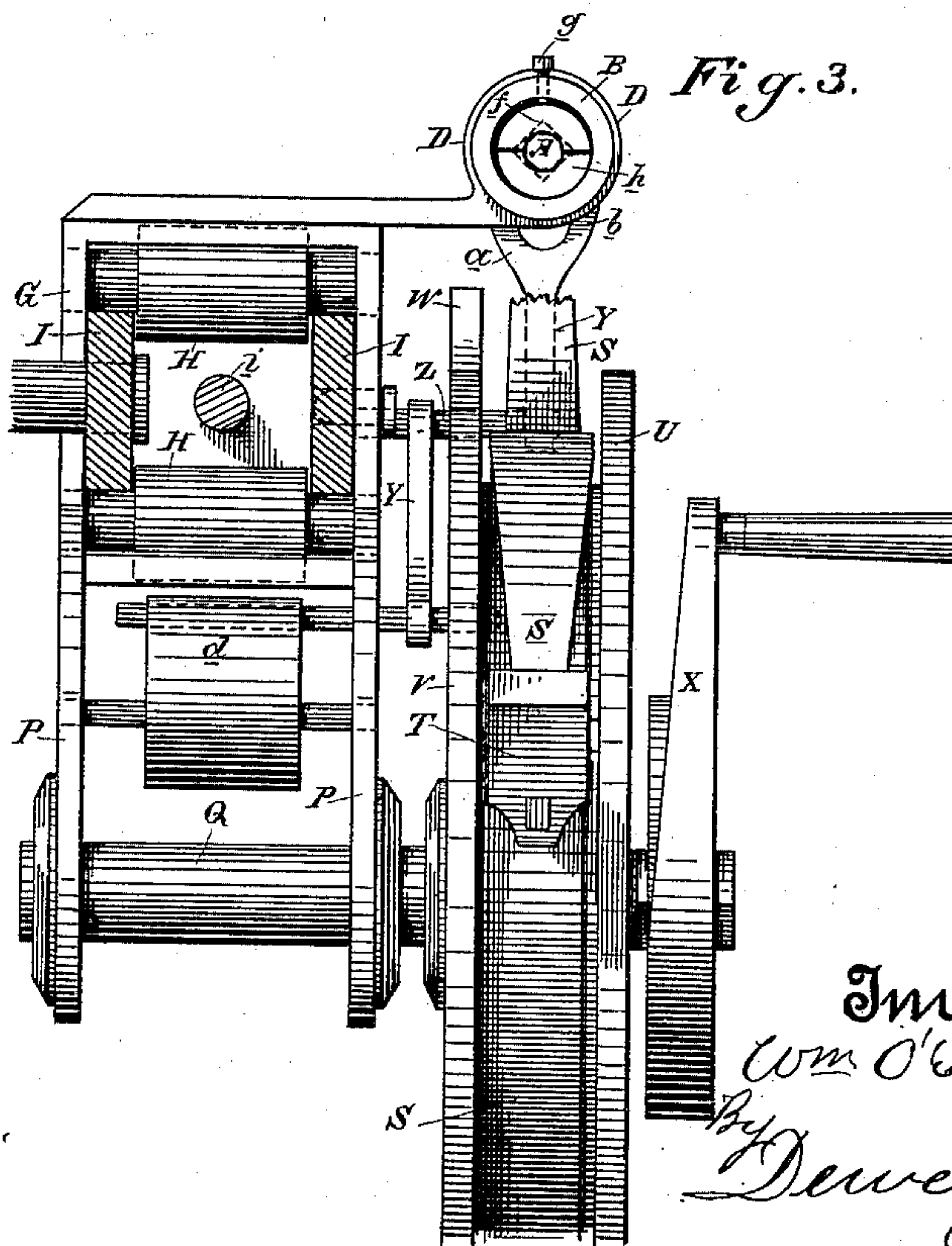


Fig. 3.



Witnesses,
Geo. H. Strong,
J. H. Housh,

Inventor,
Wm. O'Keefe,
By
Dewey & Co
attys

UNITED STATES PATENT OFFICE.

WILLIAM O'KEEFE, OF ELLISTON, MONTANA TERRITORY.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 382,895, dated May 15, 1888.

Application filed July 27, 1887. Serial No. 245,468. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM O'KEEFE, of Elliston, Deer Lodge county, Montana Territory, have invented an Improvement in Rock-Drills; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in rock-drills.

It consists of a drill supported in a cylindrical sleeve with mechanism by which it may be rotated, a carriage upon which the drill and this mechanism is supported, and guides upon which the carriage moves forward as the drill enters the rock, a series of spring-handled hammers connected with a rotary wheel, so that their power may be applied to the end of the drill, and an elastic crank by which the wheel is turned, together with certain details of construction, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my apparatus with a part of the outer flange of the hammer-carrying wheel broken away. Fig. 2 is a sectional view taken through the drill-carriage and the supporting arm or frame. Fig. 3 is an end view showing the rear of the drill and the square collar which is secured to it.

A is the drill-shank, which extends through a sleeve, B, the point C projecting at the opposite end. This sleeve passes through a supporting cylindrical box, D, which has a zigzag groove, E, made in it, and a pin, F, projecting from the sleeve B, extends outwardly into this groove or channel, so that when the sleeve B is turned around the pin must follow in the groove or channel E. The box D is supported upon the carriage G, having the rollers H, which travel upon the guide-bar I, thus allowing the carriage and the drill to be moved forward whenever desired. The bar I is secured to the post J, which is set up in the drift or at the point near where the hole is to be drilled, this post having the usual screw or other means by which it is fixed between the roof and the floor of the drift or other place. Upon the side of this post is a pulley, K, and a cord passes round this pulley, thence leads forward around another pulley, M, at the front of the guide I, and is carried back and attached

to the front of the carriage, as shown at N, Fig. 1. Upon the opposite end of the cord or rope L is fixed a weight, O, and its action is to draw the carriage forward so that the point C of the drill may be kept in contact with the bottom of the hole and the carriage advanced as fast as the hole progresses.

From the carriage G a frame, P, extends downward and backward, and the shaft Q is journaled in this frame. Upon this shaft is fixed the wheel or disk R, which carries the elastic or spring arms S, having the hammers T fixed to their outer ends, as shown. Upon the outer side of this disk is a plane flange, U, and upon the inner side is a flange, V, having the projecting teeth or cams W formed upon it, as shown, and between these flanges the hammers and their elastic handles are retained and protected.

Upon the outer end of the shaft Q is fixed an elastic coil-spring and handle, X, by which the wheel is turned. The object of this spring is to allow the wheel to be turned continuously and to take away any jar arising from the blows of the hammer upon the end of the drill, and the momentum of the wheel, which is temporarily checked by each blow upon the head of the drill, is stored up by the continuous action of the crank winding up its spring-connection, so that the impulse is imparted to the next hammer, and the movement is very regular and continuous.

The action of the hammers T, it will be seen, will be to strike a blow upon the end of the drill-shank A, and the continued movement of the wheel draws them toward the center by partially coiling up the spring-handles S until they pass the head of the drill, and the next hammer is brought in contact with it in the same manner. After each blow of the drill it is necessary to raise it from the bottom of the hole and rotate it slightly. It is raised by the action of the cams W upon the arm Y of a lever which is fulcrumed to the side of the carriage G, as shown at Z. The other end of the lever is divided into two arms or forks, a and b, which extend up one upon each side of the cylindrical sleeve B, through which the drill-shank passes. These arms do not stand in the same transverse plane, but the arm b is a little farther back than the arm a, and as it presses

against the enlargement or collar *c* it forces the sleeve B backward, and thus causes the pin F to travel backward in the inclined or zigzag slot E, which causes the drill and cylinder to be turned.

When the cam W has passed the end Y of the lever, a spring, *d*, which is secured to the frame P and connected with the arm Y, acts to draw the lever forward, and this causes the forked arm *a* of the lever to act against the collar *e* at the front of the sleeve B, and this causes the pin F to travel forward again in the inclined groove or channel E, so as to complete the necessary turn which is to be given to the drill and at the same time press its point against the bottom of the hole ready to receive the blow of the next hammer. By being thus held firmly in contact with the bottom of the hole the whole force of the blow of the hammer is brought upon the drill, so as to produce the greatest effect.

In order to cause the drill to turn when the sleeve or cylinder B is turned, I have fixed a square collar, *f*, upon the drill-shank, and this fits within a correspondingly-shaped chamber at the rear end of the sleeve B, as shown plainly in Figs. 2 and 3.

Whenever it is necessary to remove the drill, the set-screw *g* is loosened and the disk *h* may be removed from the rear, thus allowing the drill to be drawn out backward from the sleeve, within which it is loosely fitted, and a new one can be introduced at once without any delay or removal of the machine from its place.

Through the guide I a screw-shank, *i*, passes longitudinally, the front end having a point which may rest against the rock, and the rear end a hand-wheel, *j*, by which it can be turned. The front end is screw-threaded and passes through a nut with similar threads in the front end of the guide I, so that by means of this support and that of the post J the whole frame is held very solidly in place.

It will be manifest that, by reason of the carriage G and the rollers H traveling upon the guide I, the whole of the frame-work, with the drill and the disk or wheel carrying the hammers, will advance together as fast as the drill enters the hole.

Around the front of the drill is a collar, *k*, into which water is introduced through a pipe, *l*, from a suitable tank, and this water enters the hole around a point of the drill, keeping it supplied, so that it will work more easily. This collar or water-supply thus acts as a washer for the hole. The point of the drill is made with a notch or notches, as shown at *m*, forming what I term a "division-drill," the outer angles of which are thus made to act upon the outer diameter of the bottom of the hole, and by this construction the work is much more efficient than with the single point, in which the tendency is to crowd toward the center and make the hole smaller as it advances.

With my drill the hole is enlarged toward

the bottom, which allows the giant-powder to be placed where it will do the most good.

This drill is adjusted upon the supporting-post J by means of a collar, as shown at N, and a locking screw or key, which is not shown in the drawings, and it may be set at any desired angle or position for the work to be done.

All of the machinery of the drill is set behind it, so that it can be easily worked by one man in a hole or place which is too small to admit of more than one person and too small to be worked in any other way.

It takes less time to set this drill and the work is very much more rapid than any I have been able to accomplish with any other drill.

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

1. The standard and guide adjustably fixed and having the traveling carriage moving upon the guide, in combination with the drill, the sleeve through which it passes, and the rotating mechanism, and the wheel or disk having the spring-handled hammers attached thereto, and the spring or elastic turning-crank, substantially as herein described.

2. The adjustable guide, the drill-carriage traveling thereon, and the cylindrical box supported on the carriage and having a zigzag or cam groove around it, in combination with the cylindrical drill-carrying sleeve within the box, having a pin projecting outwardly into the cam-slot, and a centrally-fulcrumed lever, Y, one end of which acts to reciprocate the drill-carrying sleeve, and the cam W upon the hammer-carrying disk, and a retracting-spring, *d*, acting upon the opposite end of the lever, substantially as herein described.

3. The cylindrical drill-carrying sleeve B, loosely fitting into the stationary box or holder D, and a pin projecting from the sleeve through a zigzag or cam slot in the box or holder, in combination with a lever, Y, by which the sleeve is reciprocated within the holder, said lever having the arms *a* and *b* standing diagonally, so that one will strike the front and the other the rear of the circumferential groove in the drill-sleeve to reciprocate it and cause the pin to travel in the cam-groove, substantially as herein described.

4. The cylindrical sleeve B, having the exterior pin projecting into a zigzag slot in the box or holder D, within which it is reciprocated and rotated, and having an axial hole through its center, with a square or polygonal chamber at the rear end, in combination with a drill-shank loosely fitting the hole in the sleeve, and a square or polygonal collar secured to the drill-shank and fitting the chamber, substantially as herein described.

5. The drill-carrying sleeve B, box or holder D, and the forked reciprocating lever

supported upon the traveling carriage, in
combination with the rotary disk having
plane and cam flanges, the shaft of which is
journaled in extensions or supports from the
5 carriage, and the hammers having the curved
elastic handles secured to the periphery of the
disk between the projecting flanges, substan-
tially as herein described.

In witness whereof I have hereunto set my
hand.

WILLIAM O'KEEFE.

Witnesses:

HENRY HAUPT,
F. C. MARTIN.