(No Model.)

C. O. BARLOW.

ROCK DRILL.

No. 344,892. Patented July 6, 1886.

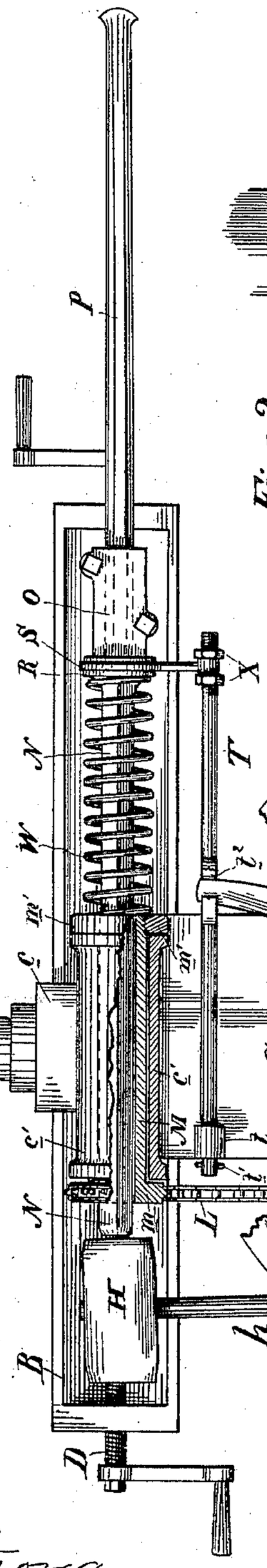


Fig. 1.

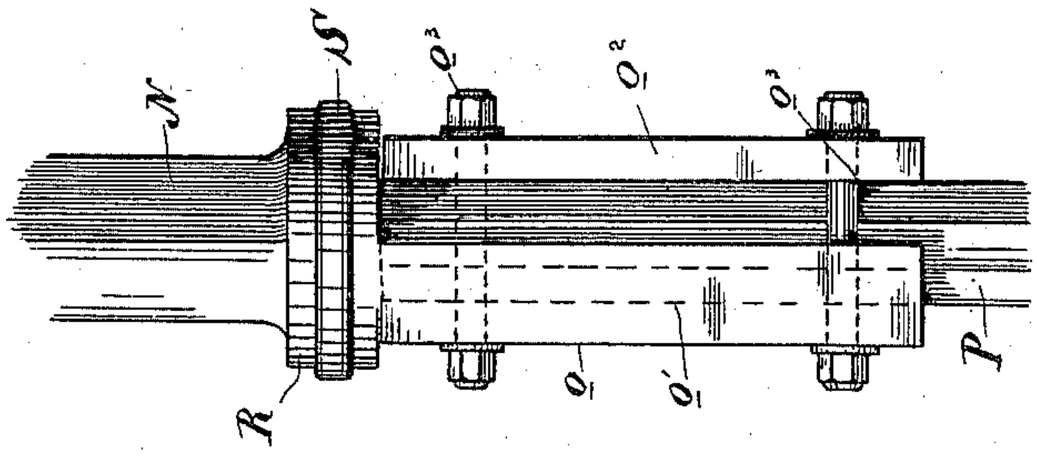
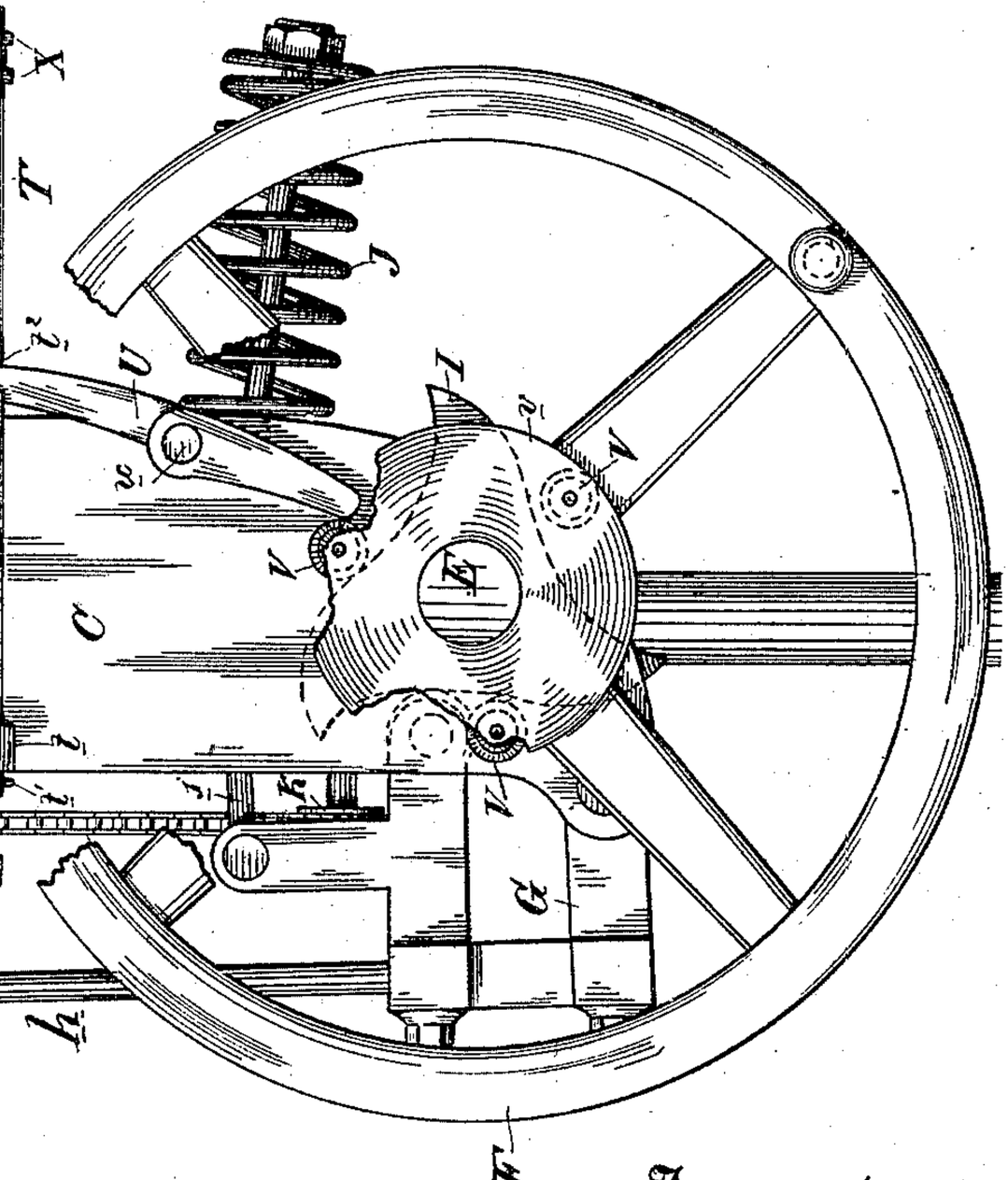


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHARLES O. BARLOW, OF SAN FRANCISCO, CALIFORNIA.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 344,892, dated July 6, 1886.

Application filed October 7, 1885. Serial No. 179,266. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O. BARLOW, of the city and county of San Francisco, State of California, 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 the class of rock-drills; and my invention consists in a novel means by which the drill-bit is positively retracted from the bottom of the hole, and allowed to spring forward again between the intervals of the blows.

It consists, further, in the peculiar means for mounting the drill, whereby it is adapted to be thus retracted without interfering with its rotary movement or its position when receiving the blow; in a peculiar chuck in which the drill is mounted, and in the general combination of operative parts, all of which I shall hereinafter fully describe by reference to the accompanying drawings, in which—

Figure 1 is an elevation of my rock-drill, the lower portion of the tubular socket *c'* and the hollow arbor M being in section. Fig. 2 is a view of the chuck O.

It is usual in machine or power drills to hold the drill constantly to the base of the hole. Where the rock is seamy, the drill has a tendency to go off at an angle, and thus cramp or bind itself. This is caused by the seam, which makes the rock immediately adjacent to or in front of it break off at an angle, and the end of the drill-bit, being always against the base of the hole, has no opportunity to correct this and to straighten the hole, its ordinary rebound not being sufficient for this purpose; but by positively retracting the drill it is enabled to come back in contact with the high point of the hole just behind, and thus to straighten it. Again, where a downhole is being made, if the drill remains in the base of the hole, it is very difficult to reduce the pulverized and broken pieces of rock to a pulp; but by positively withdrawing the drill a short distance between blows it will permit the water which is poured into the hole to get to the bottom, and reduce the débris to a pulp of such consistency that it can readily be discharged.

I have herein shown my invention in connection with the parts of a rock-drill now in use, and which will need but a brief description.

A is the supporting column or pillar, to which the cross-bar B is connected by a suitable swivel-joint.

C is the body-bar of the drill, provided with a cross-head, *c*, and moved forward or back by means of a screw, D. In the lower portion of the body-bar is the driving-shaft E, to which is secured the crank-wheel F. In the lower back portion of the body-bar is pivoted the hammer-holder G, in the socket of which is secured the handle *h* of the hammer H. On the shaft E is secured a cam, I, which bears against the pivoted hammer-holder and forces the hammer back. The blow of the hammer is delivered, under the influence of the spring J, on the rod *j*, pivoted to the hammer-holder. On the other end of the shaft E is a worm, which meshes with a gear on a short counter-shaft carrying a chain-pulley, K. The worm-gear and the counter-shaft I have not deemed it necessary to show. From the pulley K extends an endless chain, L, to a pulley, *m*, above. These are all parts of a machine now in use.

The cross-head *c* of the body-bar is formed with a tubular socket, *c'*, in which is seated and adapted to rotate a hollow arbor, M, which is held in its seat by a nut, *m'*, on its forward end, and has on its rear end the chain-pulley *m*, hereinbefore described, and by which said arbor is rotated. The arbor has an angular hole through it, in which is seated and adapted to slide a spindle, N, the rear end of which extends behind the arbor and is adapted to receive the blow of the hammer. As the hole in the arbor is angular in cross-section, the spindle is made likewise in cross-section, so that by the rotation of the former the latter is also rotated, though still adapted to have its longitudinal movement. This might be accomplished also by a spline or feather, or other well-known mechanical expedients. At the forward end of the spindle is formed or secured a chuck, O, the peculiarity of the construction of which I shall presently describe. In this chuck is secured the drill-bit P. On the spindle N is formed or secured a grooved flange, R, in which is seated a strap, S.

T is a rod, the rear end of which is guided loosely in a socket, *t*, on the body-bar, and is limited by a pin, *t'*. The forward end of the rod is connected with the strap S, and its body is provided with a slot, t^2.

Pivoted on a short shaft, *u*, is a lever, U, the upper end of which engages the slot t^2 in the rod T. Its lower end is engaged by small anti-friction rollers V on the disk *v*, secured to the crank-wheel F.

Around the spindle N, between the flange R and the end or nut of the arbor, is a spring, W.

The operation of the drill, as far as described, is as follows: The rotation of the crank-wheel F forces back, through the cam I and the pivoted hammer-holder G, the hammer H, which, when relieved by the cam, is thrown forward to deliver its blow under the influence of the spring J. The rotation of the power-shaft E, through the devices described, rotates the arbor M, in which the spindle N is seated, and consequently rotates said spindle and drill. The small anti-friction rollers V on the crank-wheel, coming successively in contact with the lower end of the lever U, cause said lever to draw back the rod T, which, through the strap S, draws back the spindle N and the drill-bit. When the lever U is relieved from the roller, the spring W throws the spindle and drill forward again. This movement of retracting and throwing the drill forward again takes place in the intervals between the blows of the hammer. To regulate the amount of retraction of the drill-bit I may make, as shown in Fig. 1, the connection between the rod T and the strap S an adjustable one by threading the end of said rod, passing it loosely through the lower end of the strap, and fitting on the threaded end of the rod, on each side of the strap, the nuts X. By adjusting these nuts the rod T may be moved forward or moved back farther, which movement alters the position of the lever U, causing the rollers V to come to their engagement with it sooner, and to thereby move it farther, or the reverse of this operation.

The chuck O consists of two plates, one of which, *o*, has an angular groove, *o'*, corresponding to the shape of the drill-bit. The other plate, o^2, is flat, and is secured to the first plate by bolts o^3, thereby binding the drill-bit between the two plates, as shown in Fig. 2.

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

1. In a rock-drill, the rotating arbor M, having an angular hole or socket through it, the spindle N, mounted in said arbor and adapted to have a longitudinal movement therein and to be rotated thereby, and a chuck on the spindle for holding the drill-bit, in combination with the pivoted lever U, the crank or power wheel F, having rollers V, engaging said lever, the sliding rod T, engaged and operated by the lever, a connection between the rod and the spindle, whereby the spindle is retracted, and a spring on said spindle for throwing it forward again, all arranged and adapted to operate substantially as herein described.

2. In a rock drill, the rotating hollow arbor M, the spindle N, seated in said arbor and rotated thereby, said spindle having a longitudinal movement in the arbor and adapted to receive the blow, a chuck on the spindle for holding the drill-bit, and a grooved flange on said spindle, in combination with the crank or power wheel F, having rollers V, the pivoted lever U, engaged by said rollers, the sliding rod T, engaged by the lever, and the strap S, connected with the rod and seated on the grooved flange, and the spring W around the spindle, substantially as herein described.

3. In a rock-drill, the body-bar C, having a socket, *c'*, in its top, the driving-shaft E in the bottom of the body-bar, having a crank-wheel, F, the vibrating hammer H, the endless chain L, and mechanism by which the hammer and chain are operated from the driving-shaft, in combination with the hollow arbor M in the socket *c'*, and having a pulley, *m*, through which it is rotated, the spindle N, mounted and adapted to slide in said arbor, to be rotated thereby, and to receive the blow of the hammer, the grooved flange R and the chuck O on the spindle, the rollers V on the wheel F, and the pivoted lever U, engaged by the rollers, the sliding rod T, engaged by the lever, the strap S, secured to the sliding rod and seated on the grooved flange of the spindle, and the spring W upon the spindle, all arranged and adapted to operate substantially as herein described.

4. In a rock-drill, the longitudinally-moving and rotating drill-carrying spindle N, having a grooved flange, R, and a spring, W, in combination with the pivoted lever U, the rollers V on the driving-wheel, engaging said lever, the sliding rod T, engaged by said lever, the strap S, seated in the grooved flange, and an adjustable connection between said strap and the sliding rod, whereby the longitudinal movement of the spindle is regulated, substantially as herein described.

5. In a rock-drill, the longitudinally-moving and rotating drill-carrying spindle N and the hollow arbor M in the socket *c'*, in combination with the chuck O, comprising the plate *o*, having an annular groove corresponding to the angularity of the drill-bit, and the flat plate o^2, bolted to the plate *o*, and clamping the drill-bit in the groove of said plate, substantially as herein described.

In witness whereof I have hereunto set my hand.

CHARLES O. BARLOW.

Witnesses:
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J. H. BLOOD.