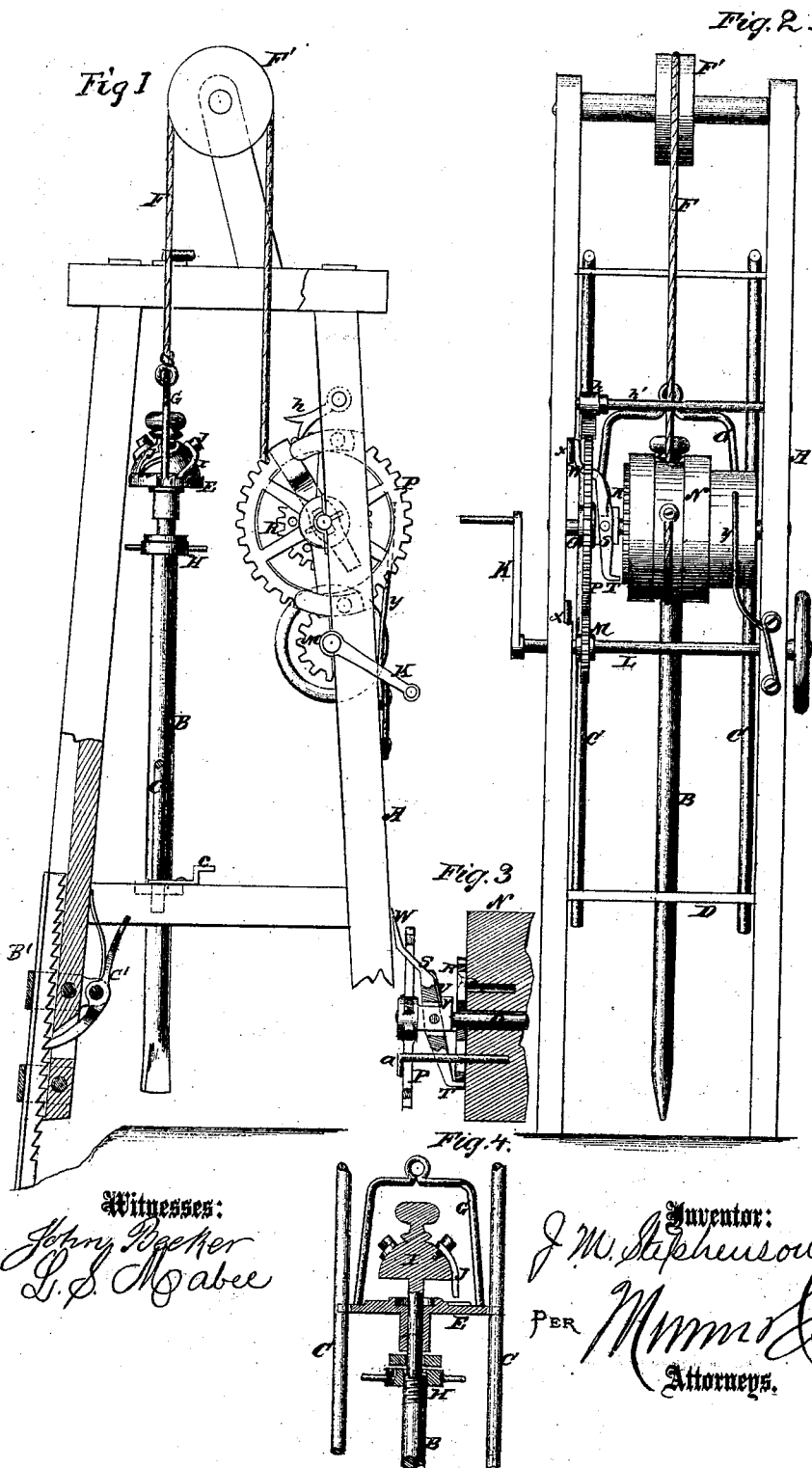


J. M. Stephenson,

Rock Drill.

No. 113,107.

Patented Mar. 28, 1871.



United States Patent Office.

JAMES M. STEPHENSON, OF PENDLETON, INDIANA.

Letters Patent No. 113,107, dated March 28, 1871.

IMPROVEMENT IN ROCK-DRILLS.

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, JAMES M. STEPHENSON, of Pendleton, in the county of Madison and State of Indiana, have invented a new and useful Improvement in Rock-Drills; 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 drawing forming part of this specification.

My invention relates to rock-drills, and the principle thereof consists in giving a slight turn to the drill after each blow upon the rock, in the manner hereinafter set forth.

I will now first proceed to describe a rock-drilling apparatus to which my improvement is preferably applied, and then clearly point out in the claim the means which embody my invention.

In the accompanying drawing—

Figure 1 represents a side elevation of the drill partly in section.

Figure 2 is a rear elevation.

Figure 3 is a detail view of the releasing-pawl lever and of the bolt, by means of which the loose-pulley or drum is converted into a windlass.

Figure 4 is a sectional detail of the ratchet-and-pawl devices, by means of which the drill is revolved when in operation.

Similar letters of reference indicate corresponding parts.

This drill and the apparatus by which it is operated are mounted on an upright frame, A.

B is the drill.

C C are vertical rods, which act as ways for guiding the drill.

D is a stationary bar attached to the frame, through which the drill passes.

E is a ratchet-plate, which slides up and down on the rods C C.

This plate is suspended by the lifting-rope F and ball G.

H is a collar on the drill-shaft.

I is a hemispherical collar on the drill-shaft, above the ratchet-plate E.

To the side of this hemisphere one or more ratchet-pawls, J, are attached, so that they hang loosely and engage with the teeth of the ratchet-plate E.

As the drill strikes the rock in the act of drilling, the ratchet-plate E separates from the hemisphere a little space, which causes the ends of the pawls J to drop down; but they are still engaged with the teeth of the ratchet-plate, and, standing at an angle as they do, the effect when the ratchet-plate is raised is to revolve the drill, giving it a slight turn, so as to change

the position of the cutting edge at each stroke, or every time the drill is raised.

K is the crank, and

L the crank-shaft, by means of which the drill is operated.

M is a driving-gear wheel on the crank-shaft.

N is the drum.

O is the drum-shaft.

P is a gear-wheel on the drum-shaft, with which the gear-wheel M engages.

R is a side-toothed gear-wheel, which is fast to the end of the drum.

The drum, with the gear-wheel R, is loose, and revolves freely on the shaft O when the drill drops.

The drum is revolved (with the shaft) for raising the drill by means of the pawl-lever S, which has its fulcrum on the drum-shaft O, and revolves with that shaft and the wheel P.

T is a toe on the end of this pawl-lever, which engages with the teeth of the side-toothed gear R.

U is a spring attached to the pawl, the end of which bears against the collar V with a constant pressure, and serves to force the toe of the lever to engage with the teeth of the gear R, as seen in fig. 3.

The other end, W, of the pawl-lever passes through the gear-wheel P, between the arms, and as it is revolved it comes in contact with the fixed cams x x, each of which forces the end inward and disengages the toe T from the drum-gear R, as seen in fig. 2.

The drill being suspended by the cord F, which passes over the pulley F', and attached to and wound around the drum, drops, as the drum is thus liberated from the pawl-lever, twice for each revolution of the drum-shaft. This, it will be seen, is done by a continuous motion of the crank in one direction.

The fall of the drill gives the drum a slight backward movement at each stroke.

The disengagement of the pawl-lever from the drum is but momentary, or just time enough to allow the drill to drop, and that is only while the end of the lever is engaged with the cam.

On the back of the drum there is a spring, Y, which bears with a constant pressure so as to counteract, by the friction thus produced, the momentum of the drum in its backward movement.

Z is a pawl on the transverse shaft z', for preventing any back movement in the gear-wheel P, and for locking that wheel on either side, or preventing it from being turned except in one direction.

a is a bolt, (see fig. 3,) which is inserted through the wheel P and into the drum, for converting the drum into a windlass by thus locking the wheel and drum together.

In this case the drill is detached and the windlass thus formed is used for lifting stones or for other purposes.

c represents clamps at each end of the bar D, for keeping that bar in place.

It will thus be seen that the drill makes two strokes at each revolution of the drum-shaft, and that it is given a revolving motion at each stroke, for changing the position of the cutting edge.

The advantage of liberating and rotating a rock-drill in the manner described must be obvious to all who are acquainted with this class of machines.

Connected with one of the uprights of the frame A is a ratchet-bar B' and a spring-pawl C', by means of which the frame may be adjusted so as to stand steady

on an uneven surface. This adjusting-arm may be connected with one or more of the uprights of the frame, as may be desired.

Having thus described my invention,

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

The suspended sliding ratchet-plate E and the loosely-pawled collar I J, combined, as described, with the drill, for the purpose of giving a slight turn after each blow upon the rock, as described.

JAMES M. STEPHENSON.

Witnesses:

T. G. MITCHELL,

W. C. FRAMPTON.