2 Sheets--Sheet 1.

J. F. DITTMAN.

Improvement in Rock-Drilling Machines.

No. 130,703. Patented Aug. 20, 1872.

Fig 1.

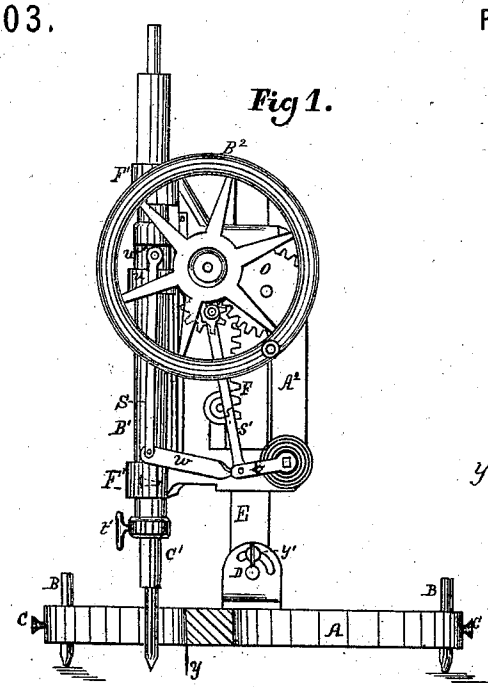


Fig 3.

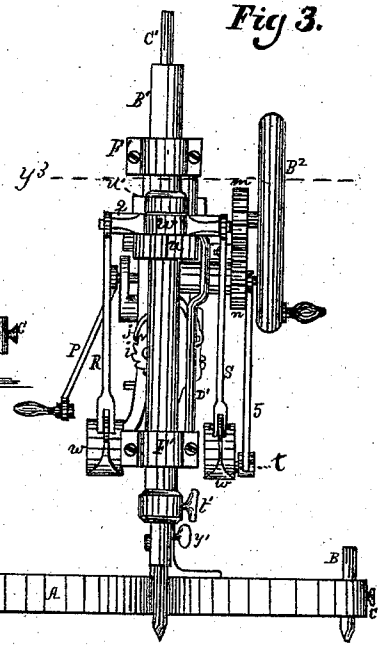
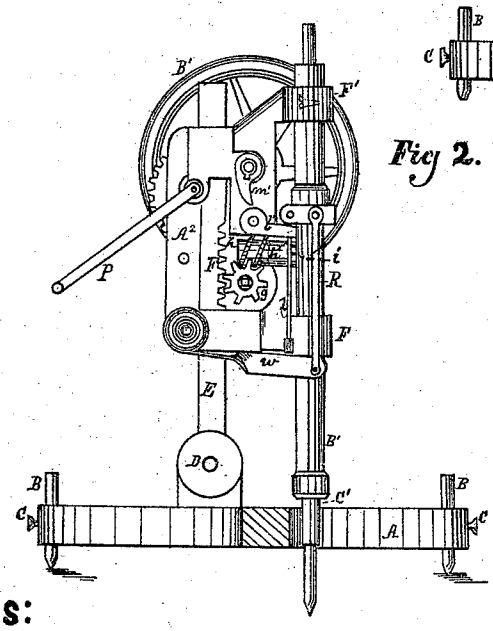


Fig 2.



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2 Sheets--Sheet 2.

J. F. DITTMAN.

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Fig 4.

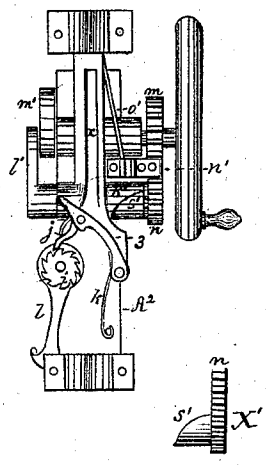


Fig 5.

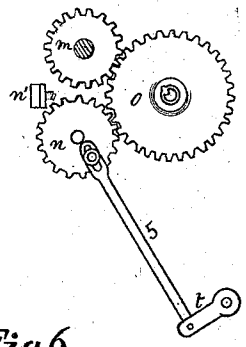


Fig 6.

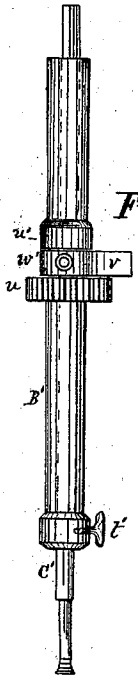


Fig 7.

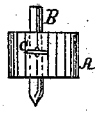


Fig 8.

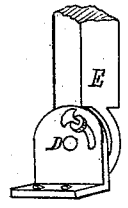


Fig 9.

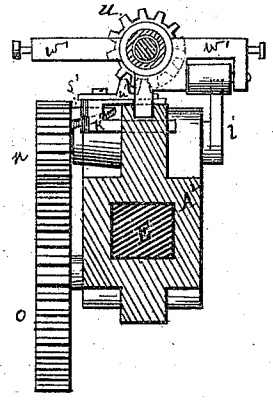
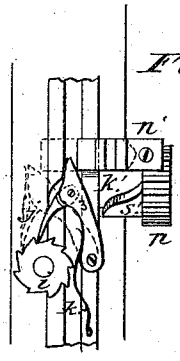


Fig 10.



Witnesses.
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D. P. Lowe

Inventor.
Joseph F. Dittman.
By J. Johnston & Bro
his attorneys

UNITED STATES PATENT OFFICE.

JOSEPH F. DITTMAN, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN ROCK-DRILLING MACHINES.

Specification forming part of Letters Patent No. **130,703**, dated August 20, 1872.

To all whom it may concern:

Be it known that I, JOSEPH F. DITTMAN, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Apparatus for Drilling Rock; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

The nature of my invention consists in the combination and arrangement of the several parts hereinafter described for lifting and dropping a drill, susceptible of being adjusted in its bearing or mandrel, which is rotated at each stroke of the drill.

In the accompanping drawing, which forms part of my specification, Figures 1 and 2 are side elevations of my improvement in apparatus for drilling rock. Fig. 3 is a front elevation of the same. Fig. 4 is a detached view, and represents a part of the mechanism used for feeding down the drill. Fig. 5 is a detached view, representing the driving-gear. Fig. 6 is a detached view, and represents the drill and its bearing or mandrel. Fig. 7 is a section of the base at line *y* of Fig. 1. Fig. 8 is a detached view of the lower end of the column upon which the several parts of the drilling apparatus are supported. Fig. 9 is a horizontal section of Fig. 3 at line y^3. Fig. 10 is a front elevation of the frame, the drill being removed.

In the accompanying drawing, A represents the base, which is provided with adjustable feet B held in a fixed position by set-screws C. To the base A is hinged, at D, the column E, which is provided with rack F, into which gears the wheel *g*, which is rotated by the endless screw *h*, on one end of which is a ratchet-wheel, *i*, which is rotated through the medium of the pall *j*, which is thrown back by a spring, *k*, and forward by a rack, *n'*, which has imparted to it a reciprocating motion through the medium of a spring, *o'*, and a curved projection, *s'*, on the inner face of the wheel *n*, as indicated at X', which operates against a projection on the back of the rack *n'*. The shaft in the sleeve *k'* is provided with a lifter, *l'*, and a cog-wheel, *n*, which mesh into a wheel, *o*, which meshes into a wheel, *m*, on the axis of which is a lifter, *m'*. The hollow mandrel B^1 moves in bearings F', and is provided with a collar, *u'*, and cog-wheel *u*, between which is placed, at right angle to the mandrel B^1, a cross-head, *w'*, to the outer ends of which are secured rods R and S, and to the lower ends of these rods are attached springs *w*. On the back of the cross-head *w'* is a projection, *v*, which is fitted to a groove, *x*, in the frame A^2, which moves up and down on the column E by the operations of the wheel *g*. The axis of the endless screw *h* has its bearing in a tubular bearing, *h'*, the opening for the axis of the endless screw *h* being eccentric to the axis of the tubular bearing *h'*, which has its bearing in the frame A^2, and is provided with a lever, *l*, for rotating it for the purpose of throwing the endless screw in and out of gear with relation to the wheel *g*. The drill C' is held in the mandrel B^1 through the medium of a set-screw, *t'*. By this arrangement of the drill, hollow mandrel, and set-screw, the drill may be lowered for the purpose of drilling any desired depth of hole in the rock for reception of the blast. By pivoting the column E to the base A, as indicated at D, the drill and its operating mechanism may be set at any desired angle and held in position through the medium of the set-screw y^1. The base A may be set firmly upon an uneven surface through the medium of the adjustable feet B and set-screws C. The mandrel B^1 and its drill C' are prevented from turning in their downward movement by the rod D', two of the cogs always straddling the rod. To the wheel *n* is pivoted the upper end of a rod, 5, the lower end of which is connected to an arm, *t*, which is secured on one end of the shaft, to which the springs *w* are attached and around which they are coiled. By thus connecting the axis of the coils of the springs *w* with the wheel *n* an increased force is imparted to the drill in its descent.

As the construction and arrangement of the several parts of my improvement in "rock-drill" will be readily understood from the foregoing description and by reference to the accompanying drawing, I will therefore proceed to describe the operation of the several parts, which is as follows: By turning the wheel B^2 the wheel *m* will revolve the wheel *o*, which will revolve the wheel *n*, which will revolve the shaft and lifter *l'*, and the projection *s'*

coming in contact with the projection on the back of the reciprocating rack n' at the moment the lifter l' comes in contact with the limb 2 of the piece w', the projection s' will move the rack n' forward, and its teeth or cogs will rotate the mandrel B^1 and drill C′ while the lifter l' is elevating them; the rack n' will also force forward the arm 3, to which the pall j is pivoted, and thereby rotate the ratchet-wheel i, which will rotate the endless screw h', which will turn the wheel g, which will cause the frame A^2 to move slowly down on the column E. The lifter l' having done its office in elevating the mandrel B^1 and drill C, the lifter m' comes in contact with the limb 2 of the piece w' and elevates the mandrel and drill to their greatest height; and as soon as the lifter m' has passed from under the limb 2 the springs w, drawing on the rods R and S, attached to the piece w', will cause the mandrel and drill to descend, whereby the drill will cut into the rock. When the frame A^2 has been lowered down on the column E as low as the teeth or rack F will allow, the operator raises up the lever l, which will unship the threads of the endless screw h from the cogs of the wheel g; he then, by means of a crank, P, placed on the axis of the wheel g, elevates the frame A^2 on the column E, after which he lowers the lever l, thereby shipping the endless screw h into gear with the wheel g; he then lowers the drill C′ in the mandrel B^1, and the drilling apparatus is then ready for a second drilling operation, the several parts operating as before described.

Having thus described the nature, construction, and operation of my improvement, what I claim as of my invention is—

1. The combination and arrangement of the pivoted column E having a rack, F, frame A^2, wheel g, endless screw h, wheel i, pawl j, arm 3, rack n', driving-wheels m n o, hollow mandrel B^1, wheel u, crosshead w', lifters l' m', rods R S, and springs w, all constructed and operating substantially as herein described, and for the purpose set forth.

2. The hollow mandrel B^1 provided with a wheel, u, combined with the reciprocating rack n', projections s', and guide-rod D′, substantially as herein described, and for the purpose set forth.

3. The arm t, rod 5, and wheel n, combined with the springs w and the axis to which they are attached and around which they are coiled, substantially as herein described, and for the purpose set forth.

JOSEPH F. DITTMAN.

Witnesses:

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J. G. THOMPSON.