(No Model.)

D. HILT.

ROCK DRILL.

No. 464,612. Patented Dec. 8, 1891.

Fig. 1.

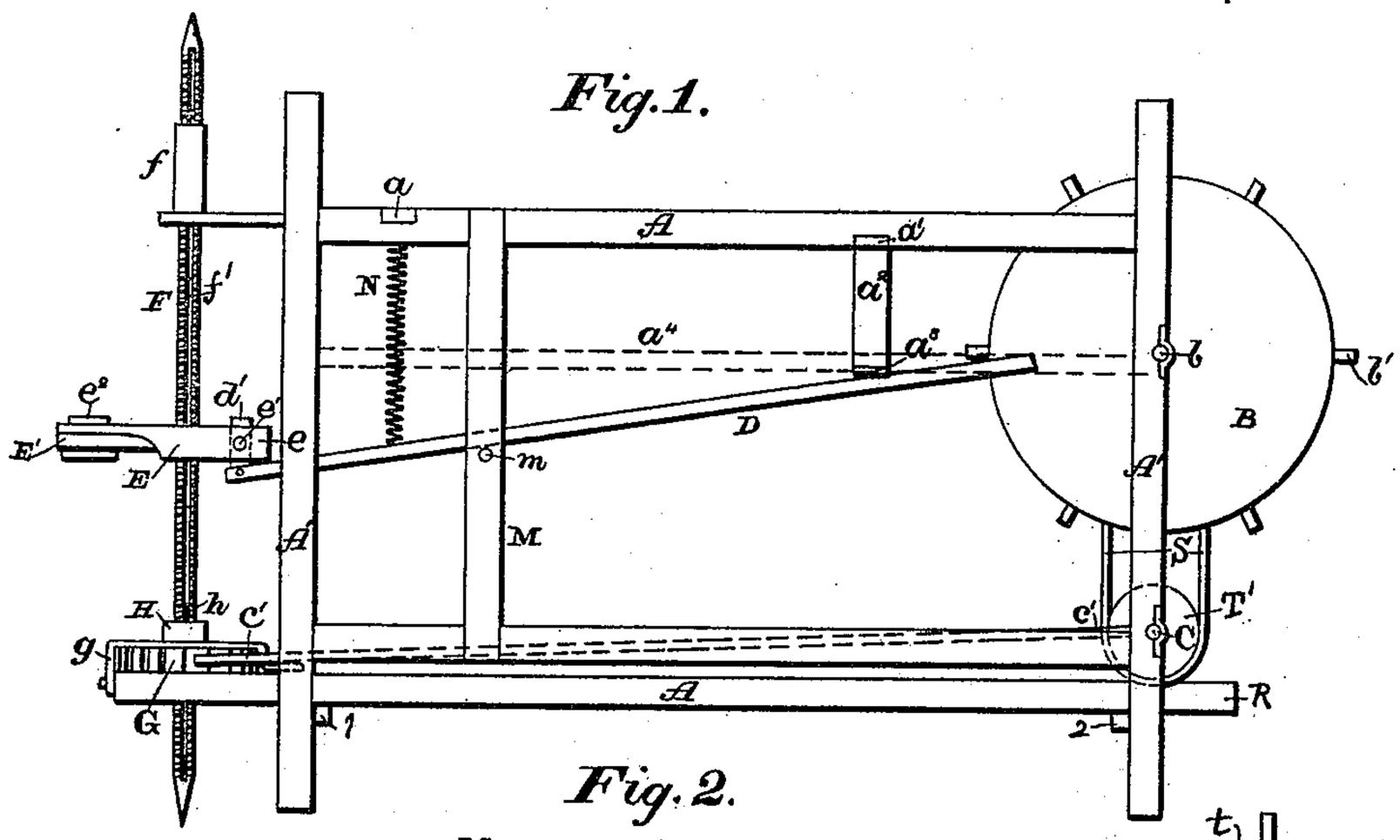


Fig. 2.

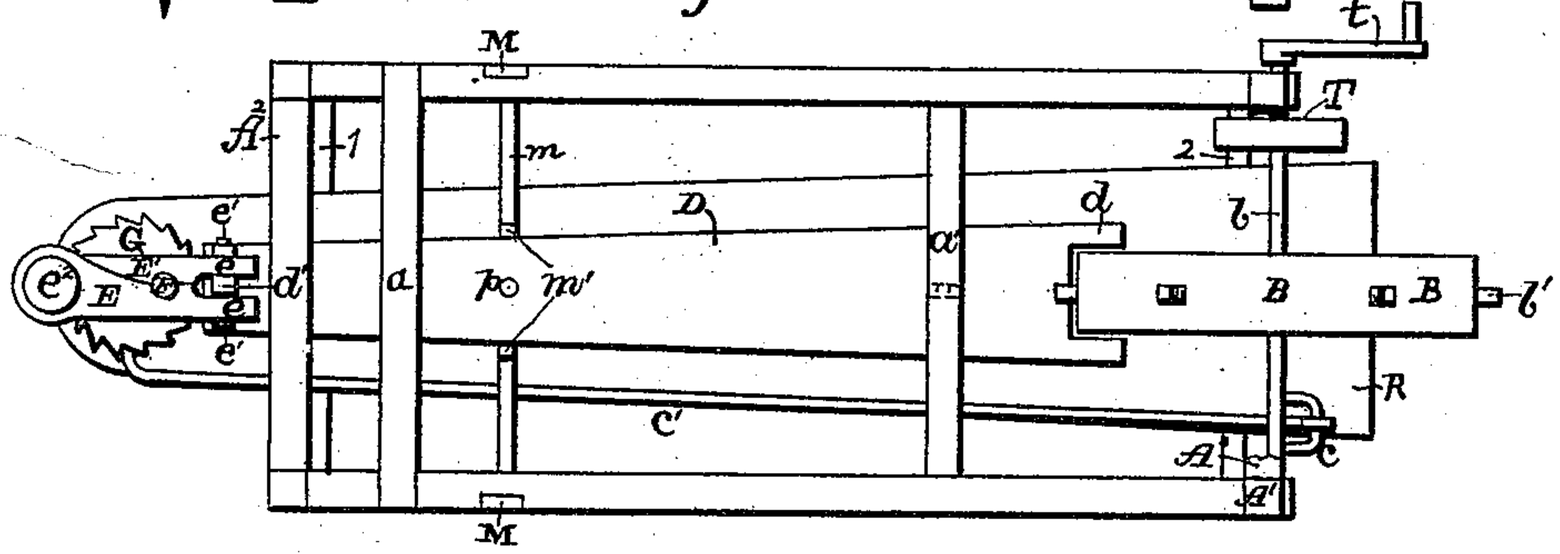


Fig. 3.

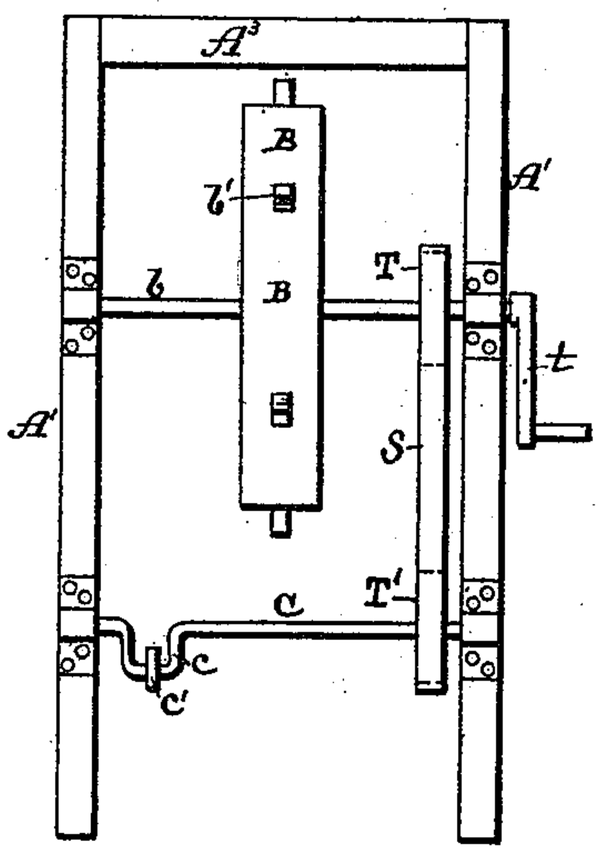


Fig. 4.

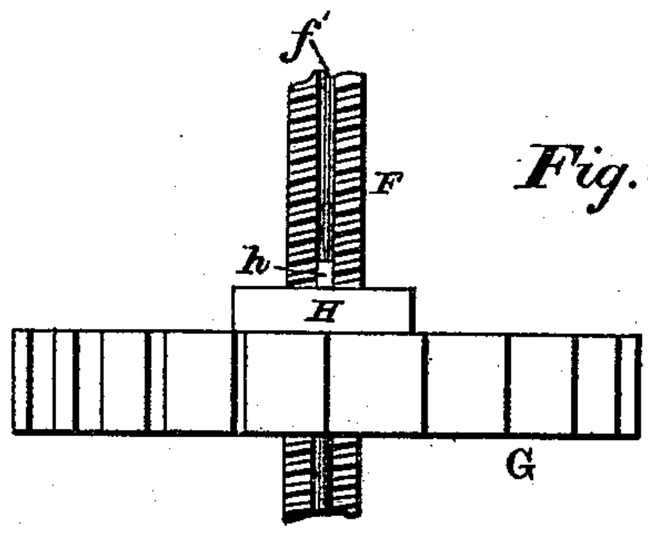
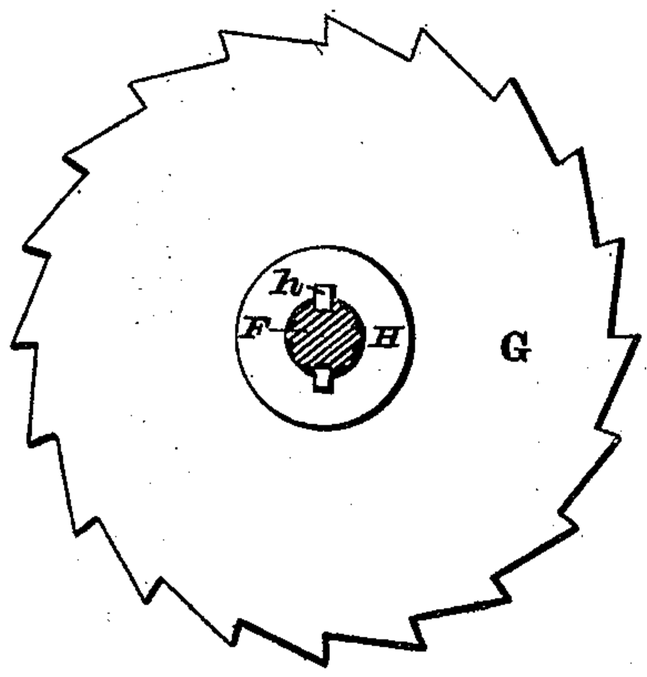


Fig. 5.



Witnesses:
E. P. Ellis,
Geo. A. Lane.

Inventor:
Daniel Hilt
By Wm. R. Gerhard
His Atty.

UNITED STATES PATENT OFFICE.

DANIEL HILT, OF HELAM, PENNSYLVANIA.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 464,612, dated December 8, 1891.

Application filed December 10, 1890. Serial No. 374,157. (No model.)

To all whom it may concern:

Be it known that I, DANIEL HILT, a citizen of the United States, residing at Helam, in the county of York and State of Pennsylvania, have invented certain Improvements in Rock-Drills, of which the following is a specification.

This invention relates to improvements in that class of rock-drills known as "churn-drills," in which the drill is partially rotated with each stroke as it is driven against or into the rock; and it consists in the construction and combination of parts hereinafter described, and specifically pointed out in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 is a side elevation of my invention. Fig. 2 is a top or plan view of the same, the cross-bar A^3 of the frame, the guide-tube *f*, with its supporting-arm, and the screw-guide E E′ being removed. Fig. 3 is an end elevation of that end of the frame in which the tappet-wheel is journaled. Fig. 4 is an enlarged side elevation of the ratchet-wheel and a portion of the drill; and Fig. 5, a plan view of the same, the drill being shown in section.

Similar letters indicate like parts throughout the several views.

Referring to the details of the drawings, A′ indicates the posts of the frame; A, the horizontal side bars, and A^2 and A^3 the horizontal end bars.

a is a top cross-piece gained into the top of the side bars A near the front posts, and *a′* a similar cross-piece gained into the under side of the same side bars near and in front of the tappet-wheel B.

M represents uprights gained into the outside faces of the side bars A between the cross-pieces *a a′*, and R a longitudinal plate supported by bars 1 and 2, connected with the posts A′.

m is a rock-shaft journaled in the uprights M, the upper side being flattened at the center, as shown at *m′*, Fig. 2, to afford a good bearing for the lever D, which rests upon it. Extending upward from the center of the bearing *m′* there is a pin *p*, which passes through a perforation in the lever and serves to hold it in place on the rock-shaft.

B is a tappet-wheel, mounted on a shaft *b*, journaled in bearings secured to the rear posts A′. Located on the periphery of the wheel B are tappets *b′*.

D is a lever fulcrumed on the rock-shaft *m*. The rear end of the lever is provided with jaws *d*, which embrace the periphery of the tappet-wheel B. The other end of the lever extends forward somewhat beyond the front posts A′ and passes beneath the inner end of a screw-guide E E′, through which the shank of the drill passes. A link *d′* is pivotally connected with the front end of the lever and passes upward through jaws *e*, formed by the inner ends of the sections E E′ of the screw-guide, where it is pivoted to a bolt *e′*, passing through it and the said jaws, as shown in Figs. 1 and 2.

E E′ are two sections of the screw-guide, which are halved together at their outer ends and pivotally connected by a bolt e^2. In the inner face of the body of each of these sections there is formed a semicircular recess, which, when the sections are closed together, register with each other and form a circular opening. Both recesses have threads cut therein, so that when the sections are closed together, as stated, they form a female screw.

F represents a drill, the shank of which has screw-threads cut therein adapted to engage the female screw in the screw-guide E E′, and on opposite sides of said shank there is formed a groove *f′*, extending longitudinally of the shank, as shown in Figs. 1 and 4. The upper end of the shank passes through a cylindrical guide *f*, supported by an arm projecting from the front of the frame.

G is a ratchet-wheel pivoted on the forward end of the plate R and having a hub H formed on the upper surface thereof. The ratchet-wheel is held down on the plate by a metallic strap *g*. Both the ratchet-wheel and hub have a vertical opening through the center, through which the lower end of the shank of the drill passes. In opposite sides of the opening through the hub are fixed vertical ribs *h*, which register with and engage the grooves *f′* in the opposite sides of the shank of the drill.

Below the main shaft there is a crank-shaft C, journaled in the posts A′, and on the right side of the frame, inside of the post A′, there is a pulley T, keyed to the shaft *b*, and imme-

diately beneath it there is a similar pulley T′, keyed to the crank-shaft, and around these pulleys there passes an endless belt S.

c′ represents a driving-rod, having its rear end engaging the crank *c* of the crank-shaft C. On its front end is formed a prong bent inward and adapted to engage the teeth of the ratchet-wheel G.

N is a spiral spring connecting the cross-piece *a* and the lever, being attached to the latter between the rock-shaft and screw-guide E E′.

Depending from the cross-piece *a′* there is a post a^2, having a transverse bar a^3 secured to its lower end, adapted to limit the upward movement of the rear end of the lever D. If preferable, the upper horizontal bars A may be lowered, as shown by the dotted lines *a″*, Fig. 1, so that the cross-piece *a′* itself may prevent a too-extended upward movement of the inner end of the lever. To the one end of the shaft *b* there is a crank-handle *t* attached, by which motion is imparted thereto.

In operating the tappet-wheel is revolved by turning the crank-handle *t*. The tappets *b′* successively depress the inner end of the lever D as they are brought into contact with it, the coiled spring N in each instance returning the lever to its normal position. This movement of the lever communicates a reciprocating motion to the screw-guide E E′, which raises and lowers the drill by reason of their screw connection. At the same time motion is imparted to the crank-shaft C through the medium of the pulleys T T′ and the endless belt S. This produces a reciprocating movement of the driving-rod *c*, which causes the prong on the forward end thereof to successively engage the teeth of the ratchet-wheel G and impart an intermittent rotary motion thereto. Each of the intermittent movements of the ratchet-wheel G partially turns the drill about its axis between the delivery of its blows, and by reason of the manner of its connection therewith lowers it in the screw-guide E E′. To raise the drill in the screw-guide E E′, the jaws *e* thereof are opened by removing the nut shown in Fig. 2 from the end of the bolt *e′*. By the movements just described the drill is raised and lowered so as to make it strike with force, and at the same time it is turned about its axis to enable each succeeding blow to be delivered on a different spot.

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

1. In a drilling device, the combination, with a guide provided with a screw-threaded opening, a drill having a screw-threaded shank adapted to engage the threaded opening through the guide and provided with longitudinal grooves, a ratchet-wheel having an opening through which the drill passes, and ribs located in the opening through the ratchet-wheel, constructed to engage the longitudinal grooves in the drill, of a tappet-wheel mounted on a shaft *b*, a rock-shaft located between said guide and the tappet-wheel, a lever having its fulcrum in the rock-shaft, the said lever having a link connection with said guide and being adapted to be actuated by the tappet-wheel, a crank-shaft journaled below the shaft *b*, a gearing connecting the shaft *b* and the crank-shaft, and a driving-rod having one end connected with the crank of the crank-shaft and the other constructed to engage the teeth of the ratchet-wheel, substantially as and for the purpose specified.

2. In a drilling device, the combination, with a guide provided with a screw-threaded opening, a drill having a screw-threaded shank adapted to engage the threaded opening through the guide and provided with longitudinal grooves, a ratchet-wheel having an opening through which the drill passes, and ribs located in the opening through the ratchet-wheel, constructed to engage the longitudinal grooves in the drill, of a tappet-wheel mounted on a shaft *b*, a rock-shaft located between said guide and the tappet-wheel, a lever having its fulcrum in the rock-shaft, the said lever having a link connection with said guide and being adapted to be actuated by the tappet-wheel, a spring located between the said guide and the rock-shaft and constructed to depress the forward end of said lever, a stop to limit the upward movement of the rear end of said lever, a crank-shaft journaled below the shaft *b*, a gearing connecting the shaft *b* and the crank-shaft, and a driving-rod having one end connected with the crank of the crank-shaft and the other constructed to engage the teeth of the ratchet-wheel, all constructed and operating substantially as and for the purpose specified.

DANIEL HILT.

Witnesses:
WALTER B. WHITE,
WILLIAM BEITZEL.