(No Model.) 2 Sheets—Sheet 1.

E. A. ARMSTRONG.

ROCK DRILL.

No. 258,623. Patented May 30, 1882.

Fig. 1

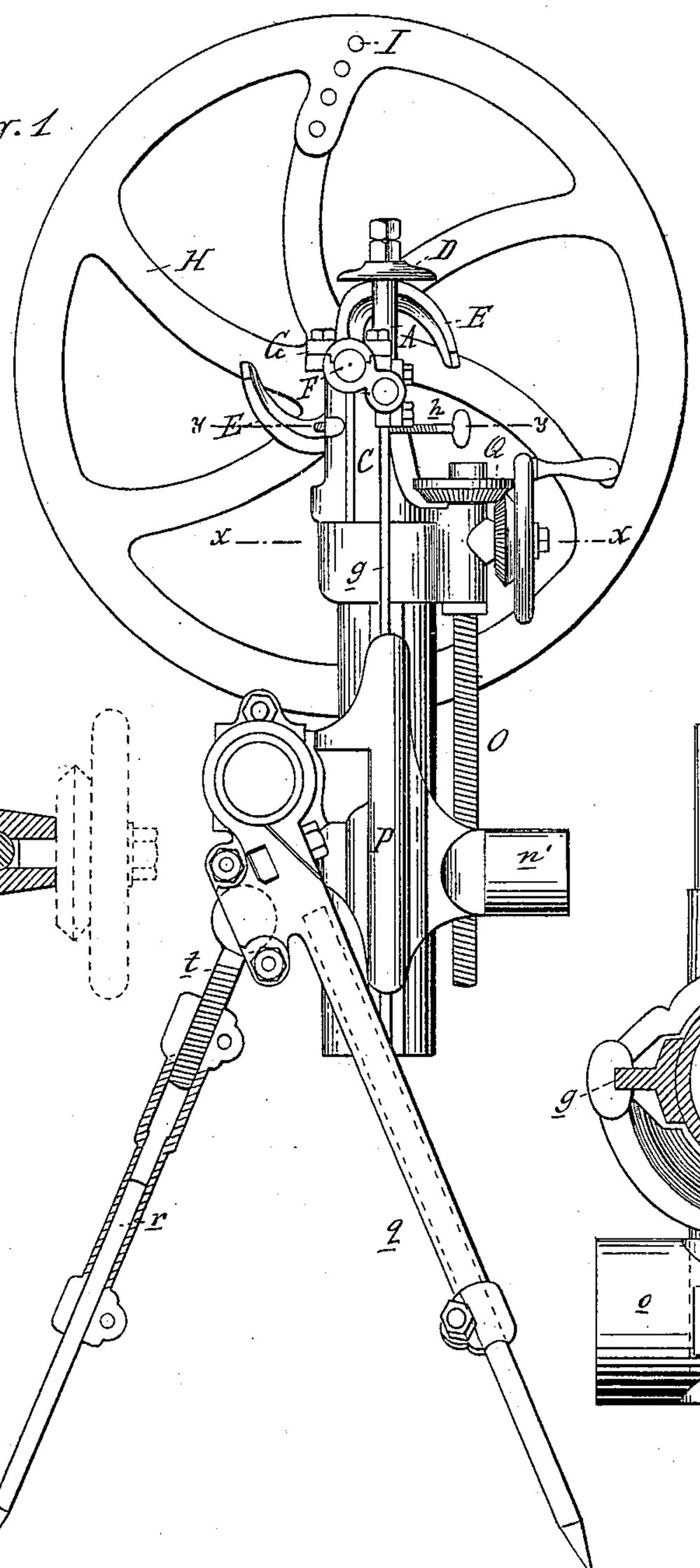


Fig. 4

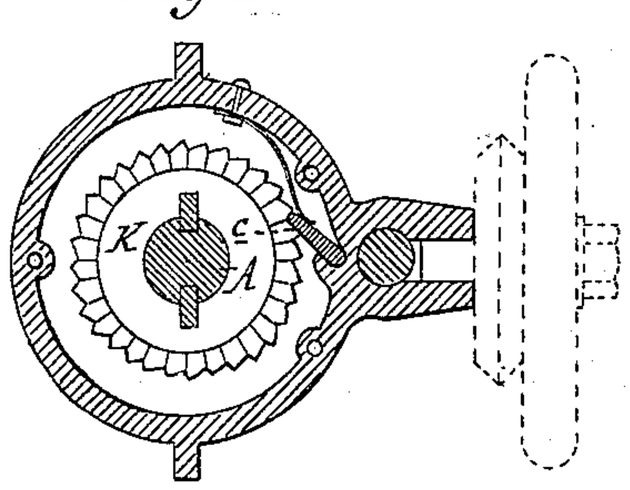
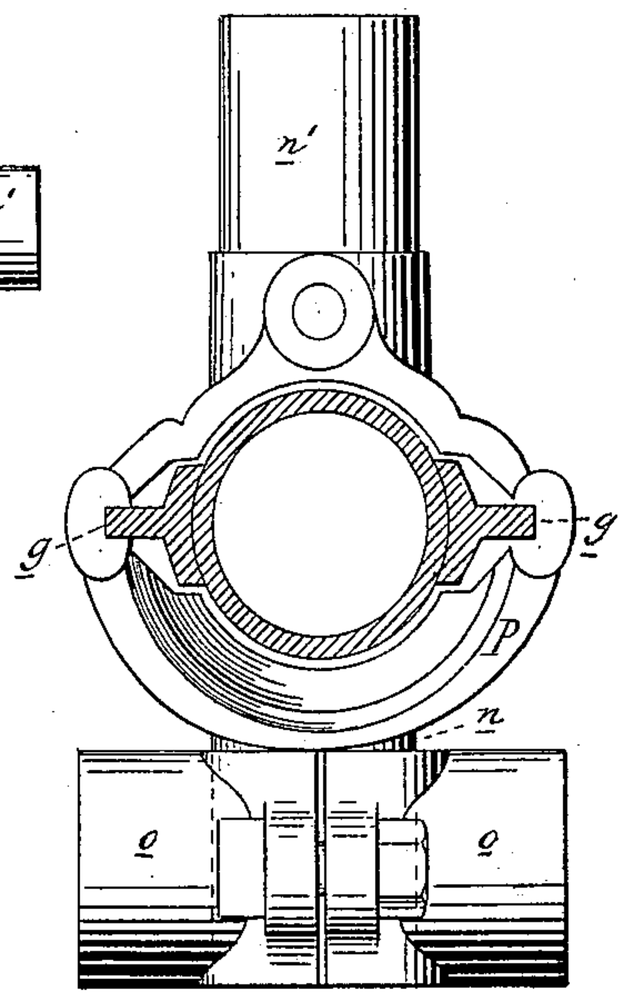


Fig. 6



Attest:
A. Barthel
C. Scully.

Inventor:
E. A. Armstrong
per Thos. S. Sprague
Att'y

(No Model.) 2 Sheets—Sheet 2.

E. A. ARMSTRONG.

ROCK DRILL.

No. 258,623. Patented May 30, 1882.

Fig. 2

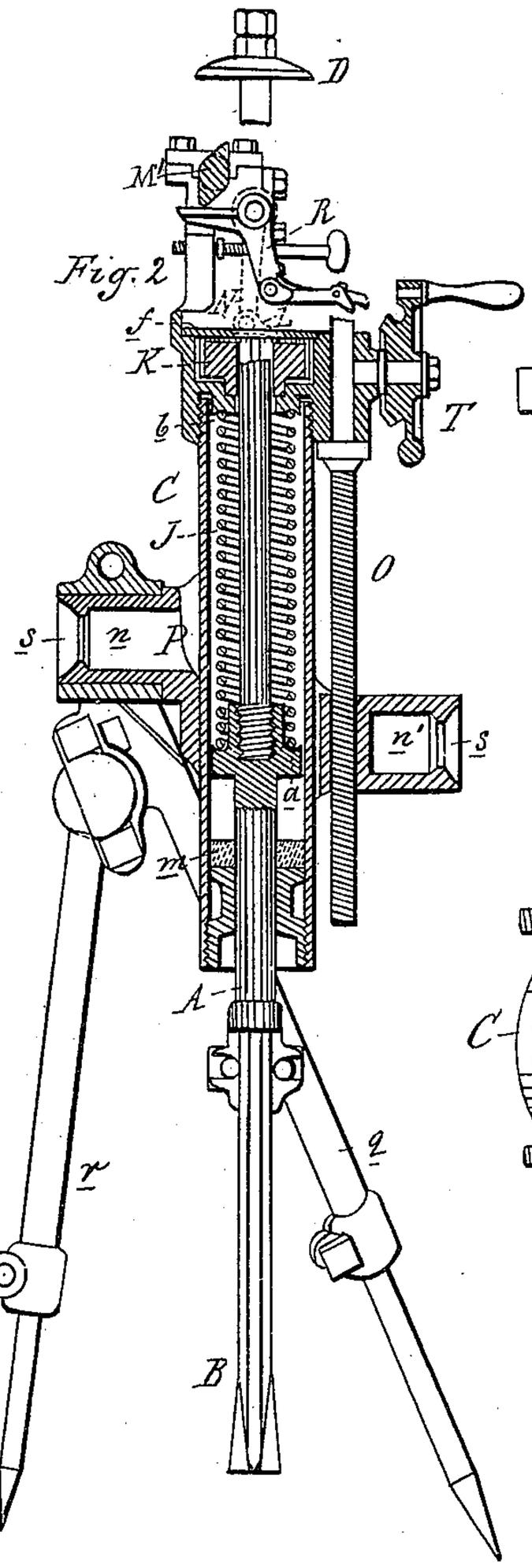


Fig. 3

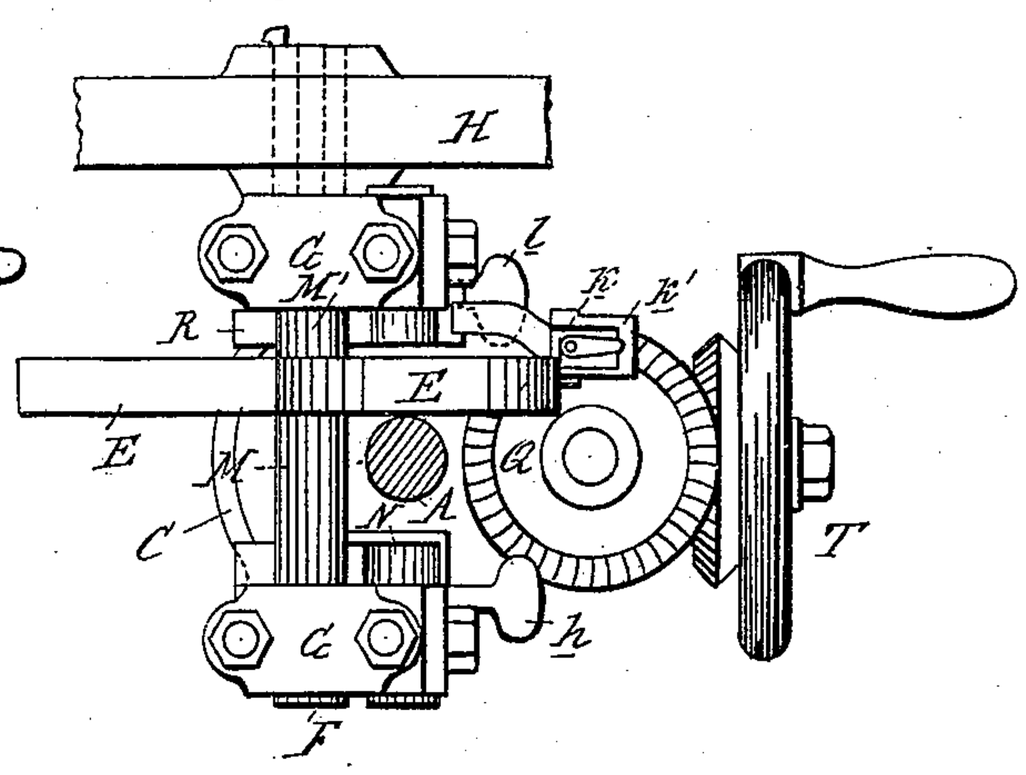


Fig. 5

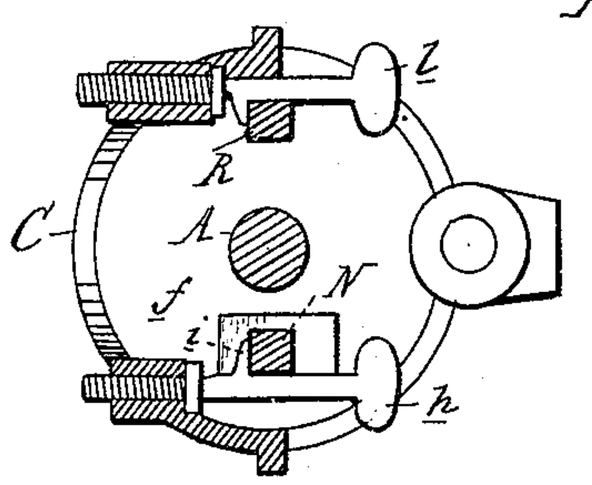


Fig. 7

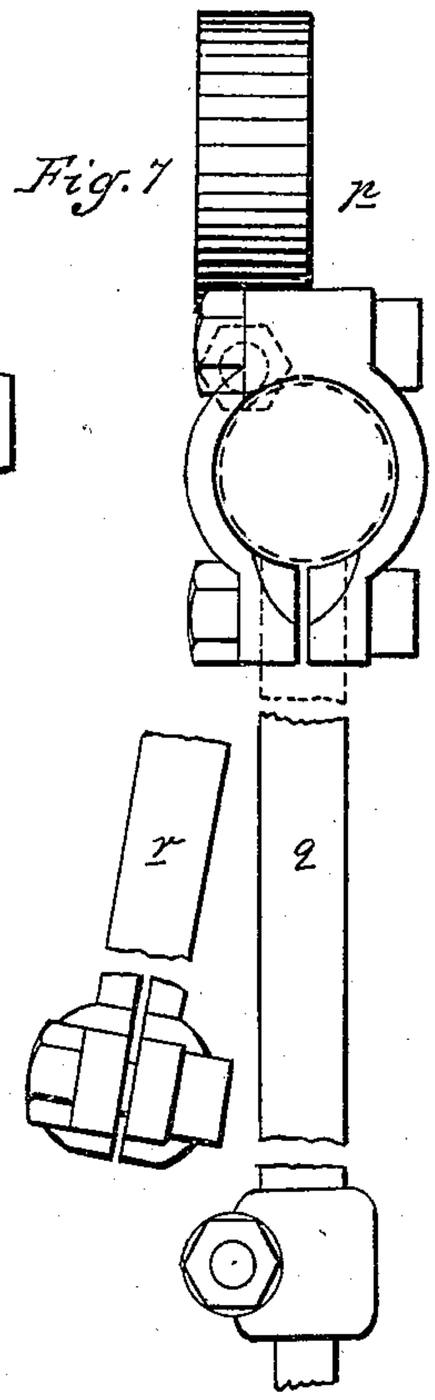
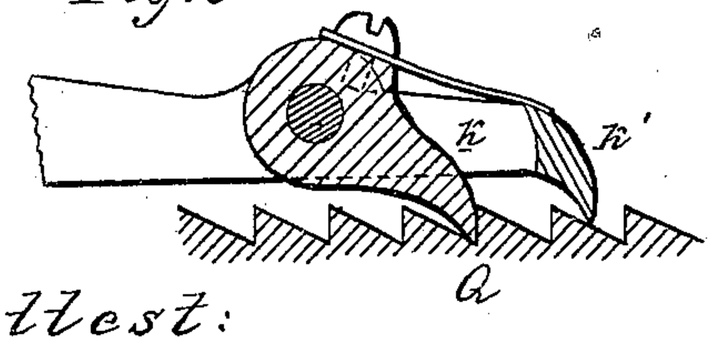


Fig. 8



Attest:
A. Barthel
E. Scully.

Inventor:
E. A. Armstrong
per Thos. S. Sprague
Atty

UNITED STATES PATENT OFFICE.

EDWIN A. ARMSTRONG, OF DETROIT, MICHIGAN.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 258,623, dated May 30, 1882.

Application filed September 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWIN A. ARMSTRONG, of Detroit, Wayne county, Michigan, have invented an Improvement in Rock-Drills, of which the following is a specification.

The nature of this invention relates to certain new and useful improvements in the construction of rock-drills which are operated by hand; and the invention consists in the construction, arrangement, and combinations of the various parts, all as more fully hereinafter described.

Figure 1 is an elevation. Fig. 2 is a vertical central section. Fig. 3 is a plan view. Fig. 4 is a horizontal section on line *x x*, Fig. 1. Fig. 5 is a horizontal section on line *y y*, Fig. 1. Fig. 6 is a plan of trunnion-head. Fig. 7 is a detached elevation of one tripod head and leg. Fig. 8 is a detail of double feed-pawl.

In the accompanying drawings, which form a part of this specification, A represents the drill-stock, in the lower end of which is removably secured the drill B, which may be of any of the known constructions. This drill-stock is adapted to have a vertical reciprocating motion in the line of the axis of the frame C, and terminates at the upper end in a head, D, by which the drill receives its upward impulse through the medium of the cams E. These cams are secured upon the shaft F, journaled in proper bearings G on top of the frame C, and are actuated by means of the hand-wheel H, which is provided with an adjustable crank-handle, I. The downward impulse or stroke of the drill-stock is produced by a spring, J, coiled around the drill-stock in the lower tubular portion of the frame C, and is confined therein by the projecting shoulder *a* on the drill-stock and the shoulder *b* on the head of the frame. The drill is partially rotated by the rotation of the drill-stock in the desired degree by means of the ratchet-wheel, K, pawl L, and cam M. The ratchet-wheel is feathered upon the drill-stock A, is confined in a recess in the head of the frame C, and is provided with ratchet-teeth upon its face and upper side, a pawl, *c*, preventing its retrograde movement, while its advance is effected by the pawl L, attached to the bell-crank lever N, which in turn is actuated by the double cam M, which for mechanical reasons is formed as an integral part of the shaft F. The pawl L operates through a slot in plate *f*, which incloses the ratchet-wheel in its recess. A thumb-screw, *h*, (shown in Fig. 5,) threaded through the upper portion of the frame, is provided with a stop, *i*, which comes in contact with the pawl-bearing arm of the bell-crank lever and admits of an adjustment to such lever, so that the drill-stock may be rotated in any desired degree.

The feed of the drill is effected by means of the screw O, tapped through the tripod-head P. The frame C, which carries all the operating parts of the device, is enabled to have the necessary reciprocating movement through the head P, and to guide it properly two opposite sides thereof are provided with the vertical feathers *g''*, which slide in corresponding grooves in the head. (See Fig. 6.) Thus, the turning of the screw O will raise or lower the frame C with its attachments.

The feeding mechanism consists of the ratchet-wheel Q, pawls *k k'*, bell-crank lever R, and cam M', operating in substantially the same manner as the mechanism described for turning the drill-stock. A thumb-screw, *l*, arranged and operating in the same manner as thumb-screw *h*, before described, allows of the desired adjustment of the feed, which is still brought to a finer degree of adjustment by using double pawls *k k'*, arranged as in Fig. 8. To reverse the feed, a hand-wheel, T, is made to engage by proper gearing with the wheel Q, which also allows the feeding to be done by hand, if desired. Should the feed not be effected in the necessary degree, the shoulder *a* will come in contact with the rubber cushion *m* and indicate that more feed is required.

The tripod-head P, which guides and carries the frame C and its operating parts, is provided with trunnions *n n'*. Clamped upon one of these trunnions are the secondary trunnions *o*, upon each of which a tripod-leg is removably secured. One of these legs is shown in elevation, Fig. 7, and consists of the head *p* and two telescopic legs, *q r*, the latter of which is removably attached to the head by a ball-and-socket joint. Three of the four legs thus obtained are used as an ordinary tripod, while the other may be employed, when necessary, for steadying the drill laterally; or when the drill

is used in a horizontal position its ball is made to enter one of the sockets *s* of the trunnions *n* or *n'* to brace the drill against the roof, and it is for that purpose provided with a screw-extension, *t*, which allows of its being firmly adjusted to place.

It will be seen that the tripod can be used interchangeably upon either of the trunnions *n* or *n'*, as the case may require.

What I claim as my invention is—

1. In a rock-drill, the frame C, in combination with the drill-stock A, the spring J, adapted to give said drill-stock its downward movement, the ratchet-wheels K Q, screw O, driving-shaft F, and connections, substantially as described, between the driving-shaft and the ratchet-wheels, as and for the purpose specified.

2. In a rock-drilling machine, the main shaft F and cam M', rotating with said shaft, in combination with the pawl and lever L N and the ratchet-wheel K and the drill-stock, for the purpose of automatically and intermittently rotating said drill-stock, substantially as described.

3. In a rock-drilling machine, the main shaft F and cam M, rotating with said shaft, in combination with the pawl-lever R, the ratchet-wheel Q, and the screw O, for the purpose of automatically and intermittently advancing the frame supporting the operating parts, substantially as described.

4. In a rock-drill, a tripod-head provided with trunnions *n n'*, in combination with the secondary trunnions *o*, adapted to be clamped upon either of the trunnions *n n'*, and the adjustable legs *q r*, substantially as described.

5. In a rock-drill, a tripod-head provided with two trunnions, *n n'*, each having an end socket, *s*, in combination with the leg *r*, having an adjustable ball-head, *t*, whereby the tripod-head can be clamped in a horizontal position, substantially as and for the purpose specified.

6. In a rock-drill, the case C, supported on the trunnions *n n'* and legs *q r*, and the drill-stock A and spring J, operating in said case, in combination with the head D, the cams E M M', arms R N, pawls *k* L, ratchet-wheels K Q, and the screw O, as and for the purpose specified.

7. In a rock-drill, the shaft F, provided with the cam E for retracting the drill-stocks, and with cams M M' for feeding and rotating said drill stock, in combination with intermediate mechanism, substantially as described, between the cams and the drill-stock and drill-frame, as set forth.

In testimony that I claim the above I hereunto set my hand.

EDWIN A. ARMSTRONG.

In presence of—

H. S. SPRAGUE,

E. I. SCULLY.