

No. 617,407.

Patented Jan. 10, 1899.

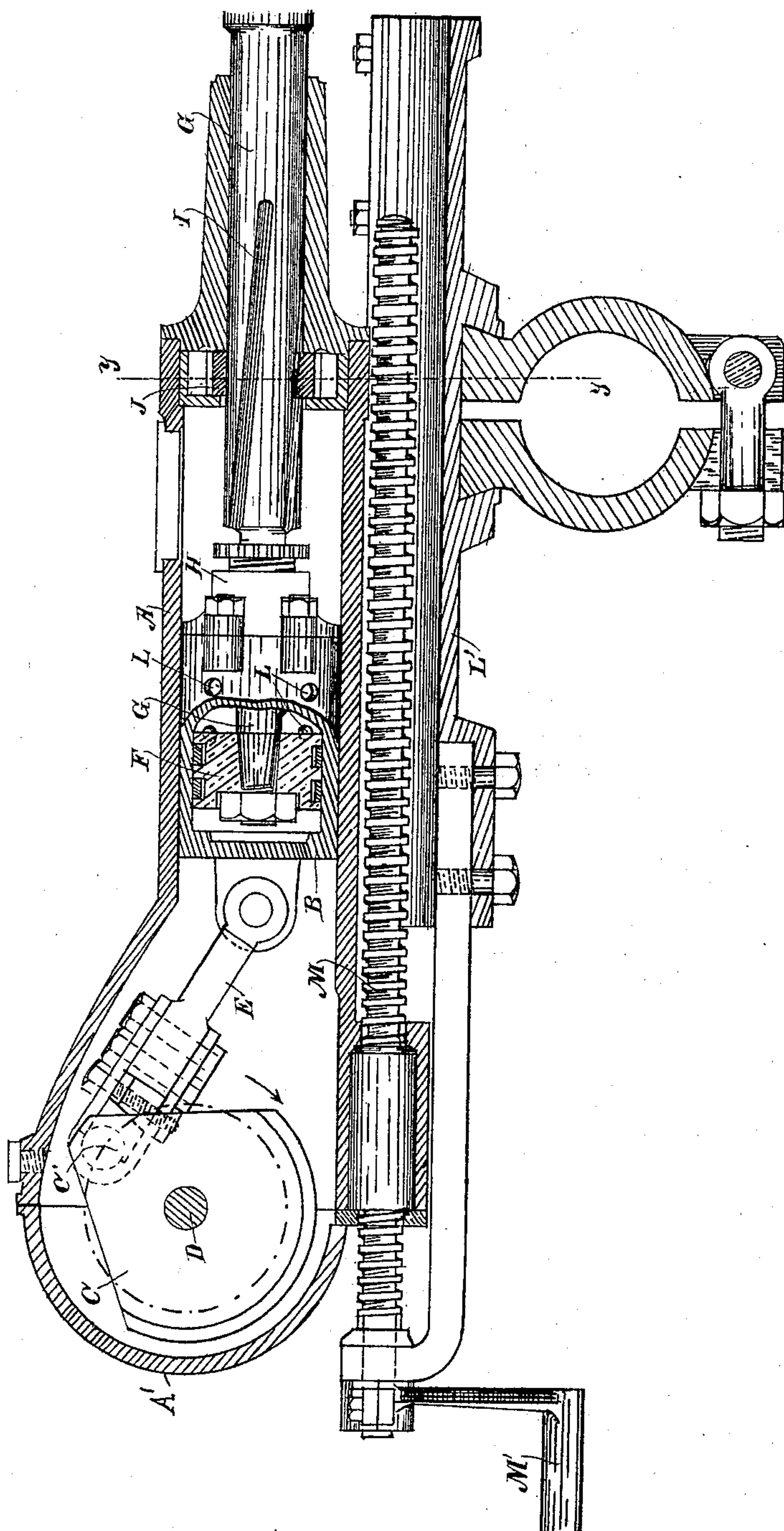
A. ROSENHOLZ.
ROCK DRILL.

(Application filed Nov. 11, 1897.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses,
J. H. Morse
J. F. Oscheck

Inventor
Alfred Rosenholz
By *Duway Co.*

No. 617,407.

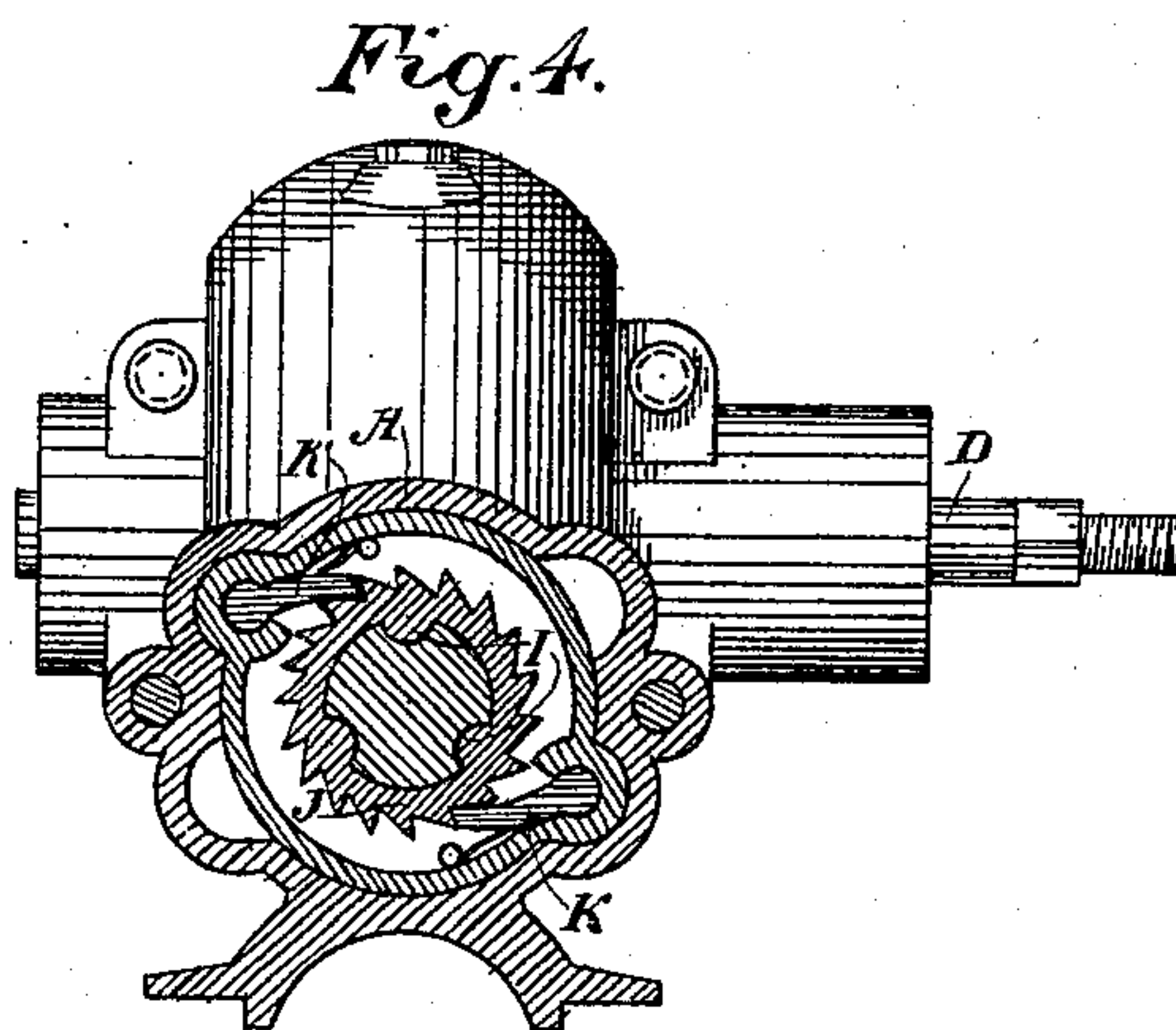
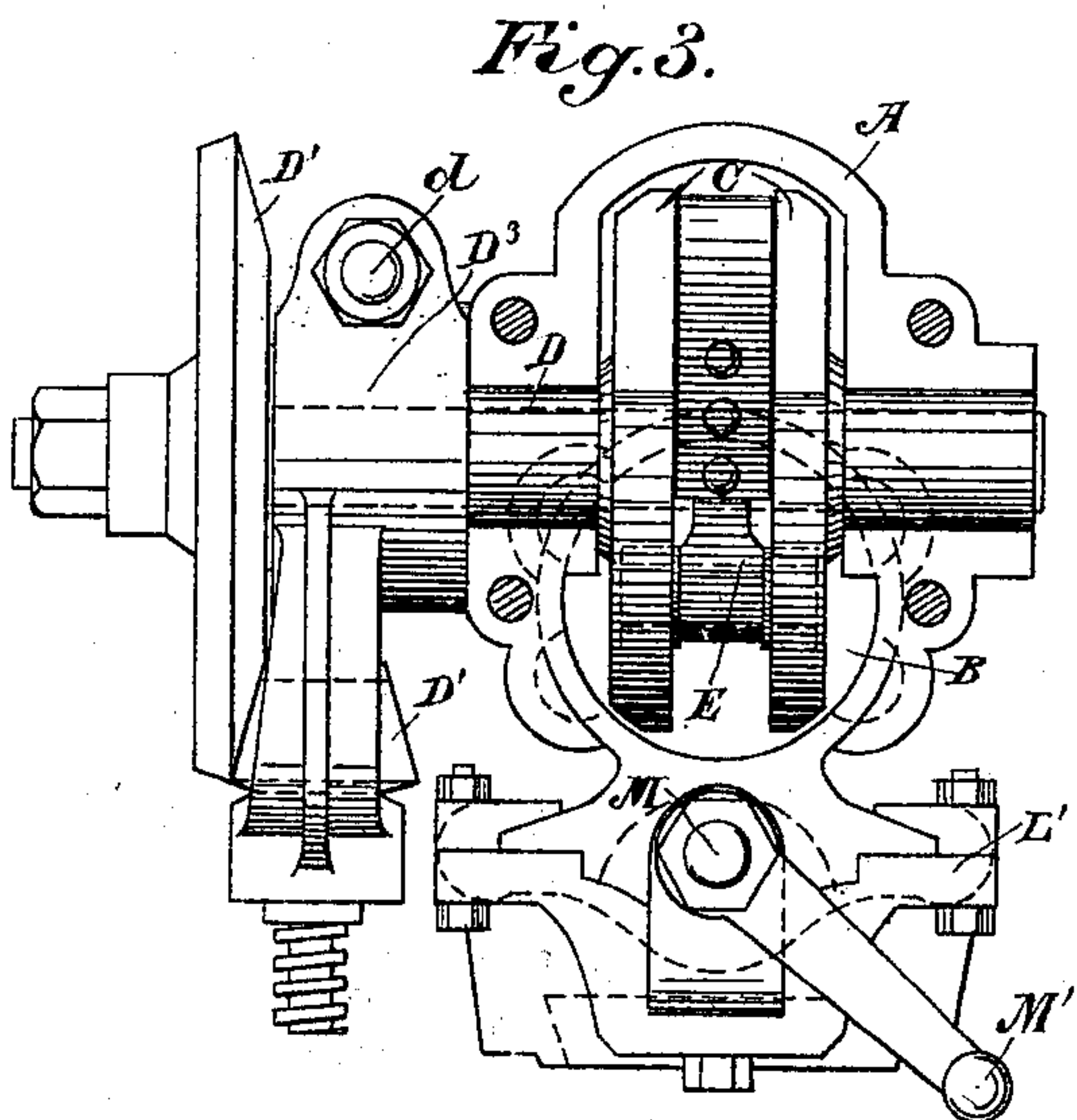
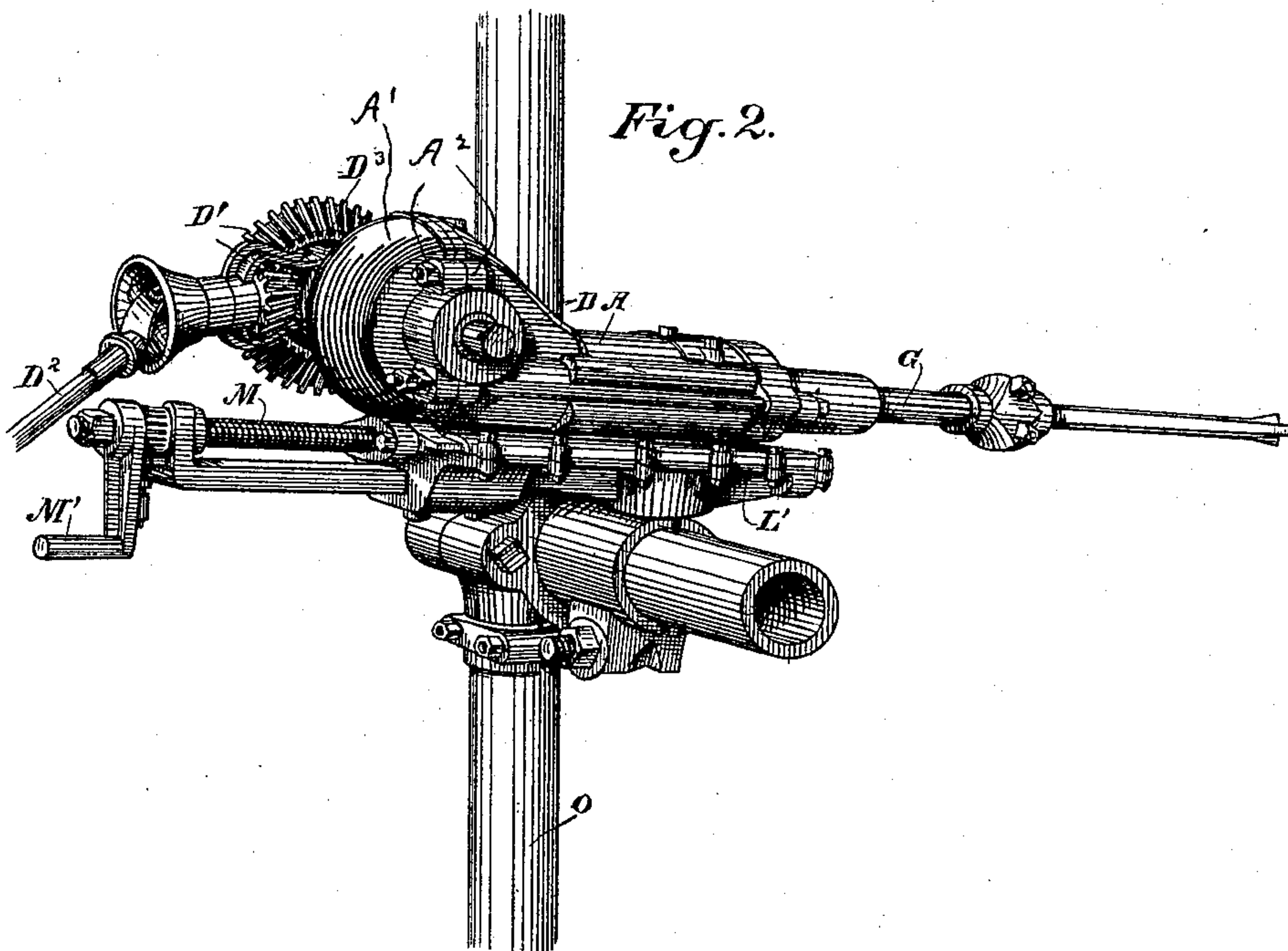
Patented Jan. 10, 1899.

A. ROSENHOLZ.
ROCK DRILL.

(Application filed Nov. 11, 1897.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses,
J. H. Source
J. E. Aschbeck

Inventor,
Alfred Rosenholz
By Dewey & Co. atty

UNITED STATES PATENT OFFICE.

ALFRED ROSENHOLZ, OF SAN FRANCISCO, CALIFORNIA.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 617,407, dated January 10, 1899.

Application filed November 11, 1897. Serial No. 658,152. (No model.)

To all whom it may concern:

Be it known that I, ALFRED ROSENHOLZ, a citizen of the United States, residing in 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 drills of that class which are specially adapted for perforating rock and other hard substances by a series of blows delivered by the point of the drill upon the substance to be penetrated.

It consists of the parts and the construction and combination of parts hereinafter described and claimed.

Figure 1 is a vertical longitudinal section of the drill. Fig. 2 is an external view of the same. Fig. 3 is a rear end view, the rear end plate of casing being removed. Fig. 4 is a cross-section on line *y y* of Fig. 1.

The object of my invention is to provide for the simplification of parts, with a more rapid and accurate working of the drill and a protection against shocks which may be caused by rapid reciprocation or if the drill is not fed forward fast enough to always strike the bottom of the drill-hole.

In the present case I have shown my apparatus as consisting of an inclosed casing A, having a hollow plunger B adapted to reciprocate within it. This plunger is actuated by means of a crank C, fixed upon a shaft D, and a connecting-rod or pitman E unites the crank with the plunger B. Power to drive the shaft D is communicated through bevel-gears D' and a tumbling-rod D² with a universal-joint connection, as shown. The rod D² is driven by an electro or other motor, and the universal joint allows the drill to be directed to any desired point.

The apparatus is adjustably fixed to a post or standard O of the usual description.

The casing A is curved and enlarged at the rear end, so as to contain the crank and give sufficient room for it to revolve around the axis, and this enlarged end of the casing is closed by a cap-plate A' and is removably attached by bolts engaging ears or lugs A² on the cap-plate and casing, as shown in Fig. 2, whereby the cap-plate is removable to give access to the crank and to facilitate the re-

moval and replacement of the plunger and its adjuncts.

Within the plunger B is fitted a piston F, and the drill-shank G enters the plunger-chamber B through a stuffing-box, as shown at H, and is connected with the piston F. This piston has suitable packing-rings and is movable essentially air-tight within the plunger, having a motion independent of the motion of the plunger for a purpose to be hereinafter described. The drill-shank extends outwardly through the front end of the casing and has spirally-disposed grooves I formed at one portion of its length, these grooves fitting correspondingly-shaped lugs or projections made within the ratchet-wheel J. This ratchet-wheel is turnable within a chamber near the front end of the casing, and spring-pressed pawls K are adapted to engage it, so that it will be held at any point to which it may be turned in one direction and prevented from returning.

When the drill-shank is reciprocated through the ratchet, the spirals of the drill-shank act to move the ratchet forward one or more teeth, and when the drill-shank is withdrawn the ratchet, being held stationary, acts through the spiral grooves to give it a spiral rotation upon its axis, thus continually changing the point of the drill in the hole and preventing it from sticking or becoming set.

The crank-shaft D is set out of line with the drill-shank, as shown, and the rotation of the shaft is such that the drill is drawn back by the connecting-rod E very nearly in line with the drill itself. The crank passing over the upper part of its path will be carried very much out of line with the drill-shank, so that when it is forced forward the movement of the crank will produce a much more rapid forward movement of the drill than is produced when it is drawn backward, so as to give the most forcible blow possible. When the crank is moving backward, the inertia of the drill-shank and the piston F and the attached parts is such that the piston F will be forced forward toward the front of the plunger B, and the air which is contained within the plunger will be compressed and will thus serve as a cushion to prevent the piston F from striking the forward head of the plunger and will thus relieve the shock of the parts

as they are withdrawn by the action of the crank. When the crank passes over the top of its arc, moving as shown by the arrow, the plunger B will be forced forward, and by reason of the greater angle between the crank-pin C' and the connection of the rod E with the plunger the forward movement of the latter will be more rapid than the movement of retraction. This forward movement of the plunger, added to the inertia of the drill-shank and connected parts, immediately forces the piston F back to the rear part of the plunger and compresses the air contained between the piston and the rear end of the plunger, so that it forms a cushion to prevent the metallic parts from striking violently by the sudden change of direction. At the same time the compression of this air is so considerable that when the forward movement of the drill is nearly terminated the air adds its own elastic pressure to increase the force of the blow upon the surface which is to be drilled. Suitable openings are made in the sides of the plunger at L, so as to connect with the rear part of the plunger B, behind the piston F, to admit air when the piston moves forward, these openings being cut off when the piston moves toward the rear, so as to allow the contained air to be properly compressed.

The casing is slidable on a support and guide L', upon which it is advanced by means of a feed-screw M, actuated by a handle M', as fast as the drill penetrates the rock. The guide is also adjustably fixed to a post or standard O, upon which its position may be changed as the work requires.

In order to apply the power from any direc-

tion with relation to the direction in which the drill is working, the driving-pinion at D' has its bearing and support connected with a sleeve D³, which is turnable about the hub through which the shaft D passes. This sleeve may be turned to any desired position without disturbing the mesh of the pinion and gear and clamped by a locking-bolt d.

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

The combination, in the organized rock-drill of the character described, of an adjustably-supported casing and guides; a post or standard and mechanism by which the casing and guides are supported, and advanced; a hollow plunger guided and slidable in the casing; a piston fitting and independently movable within the plunger; said casing being enlarged at one end and having a shaft journaled in this portion out of line with the axis of the plunger; a removable cap at the end of the enlarged portion of the casing and adapted to expose the plunger-chamber in the line of its length, and permitting the ready removal of the operative parts; a drill-shank connected with the piston and means for rotating the same; a crank on the drive-shaft and a rod connecting the same with the plunger; and means for operating the shaft.

In witness whereof I have hereunto set my hand.

ALFRED ROSENHOLZ.

Witnesses:

S. H. NOURSE,
JESSIE C. BRODIE.