

(No Model.)

C. E. BALL.
ELECTRIC ROCK DRILL.

No. 362,053.

Patented May 3, 1887.

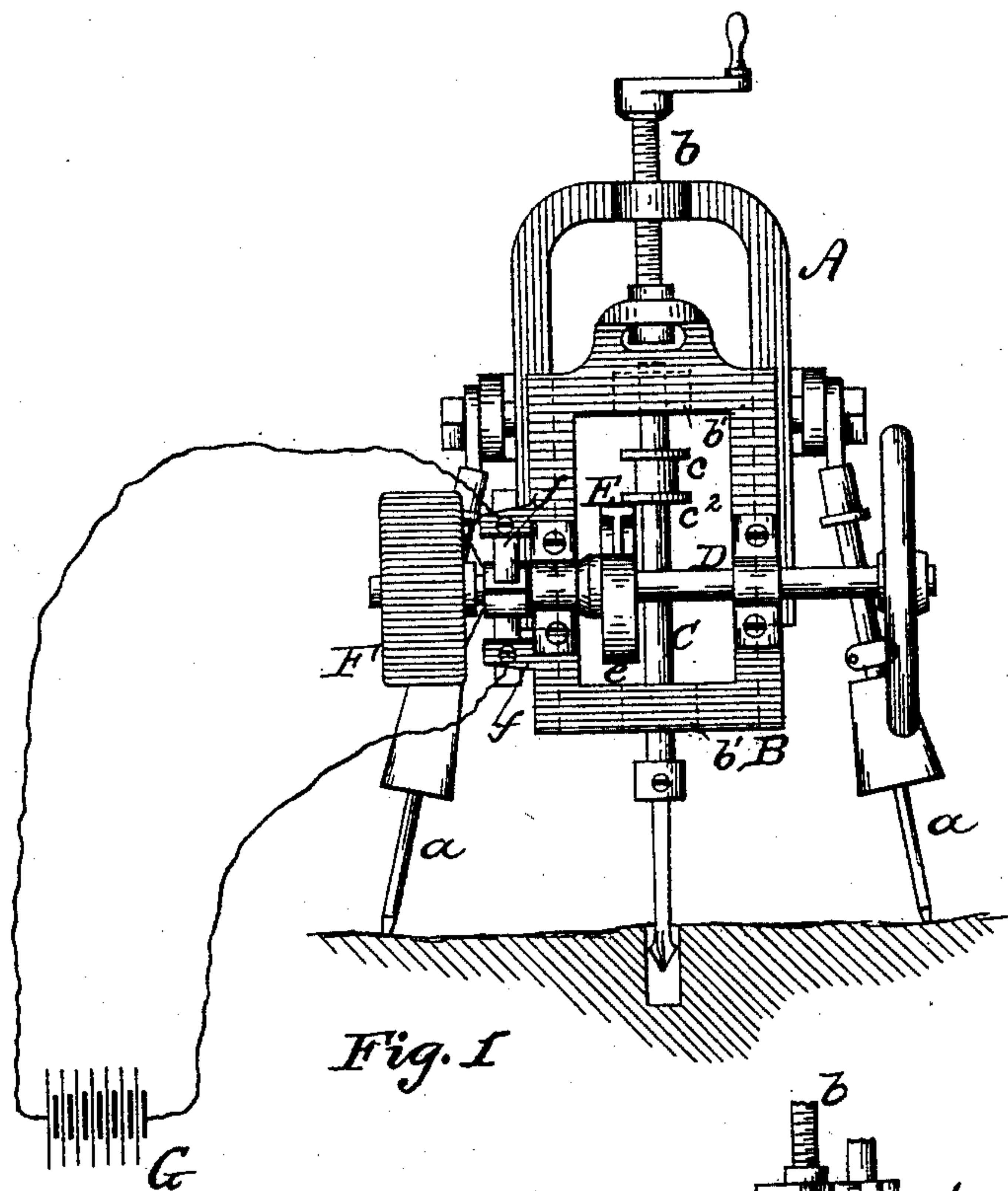


Fig. 1

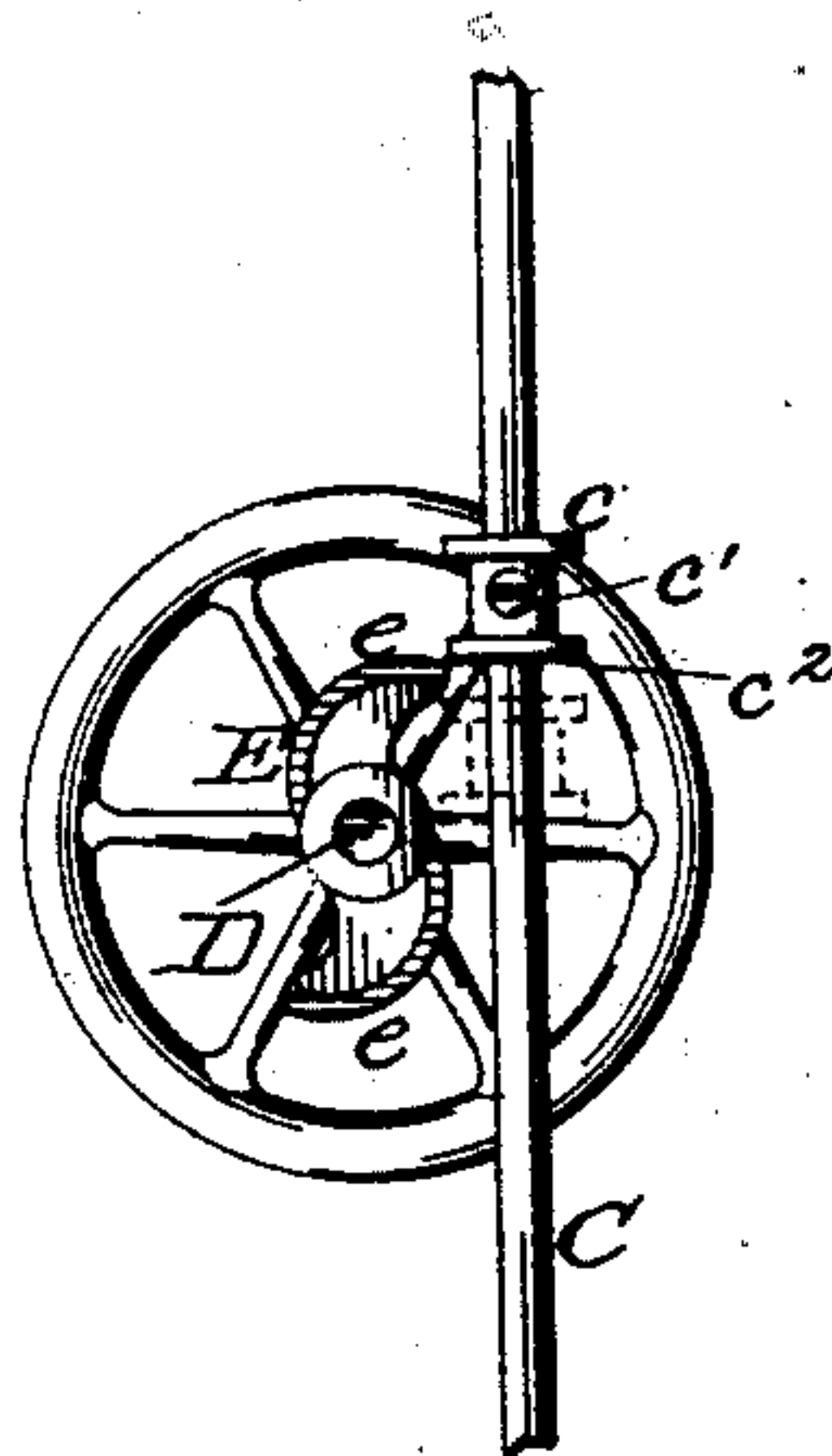


Fig. 2

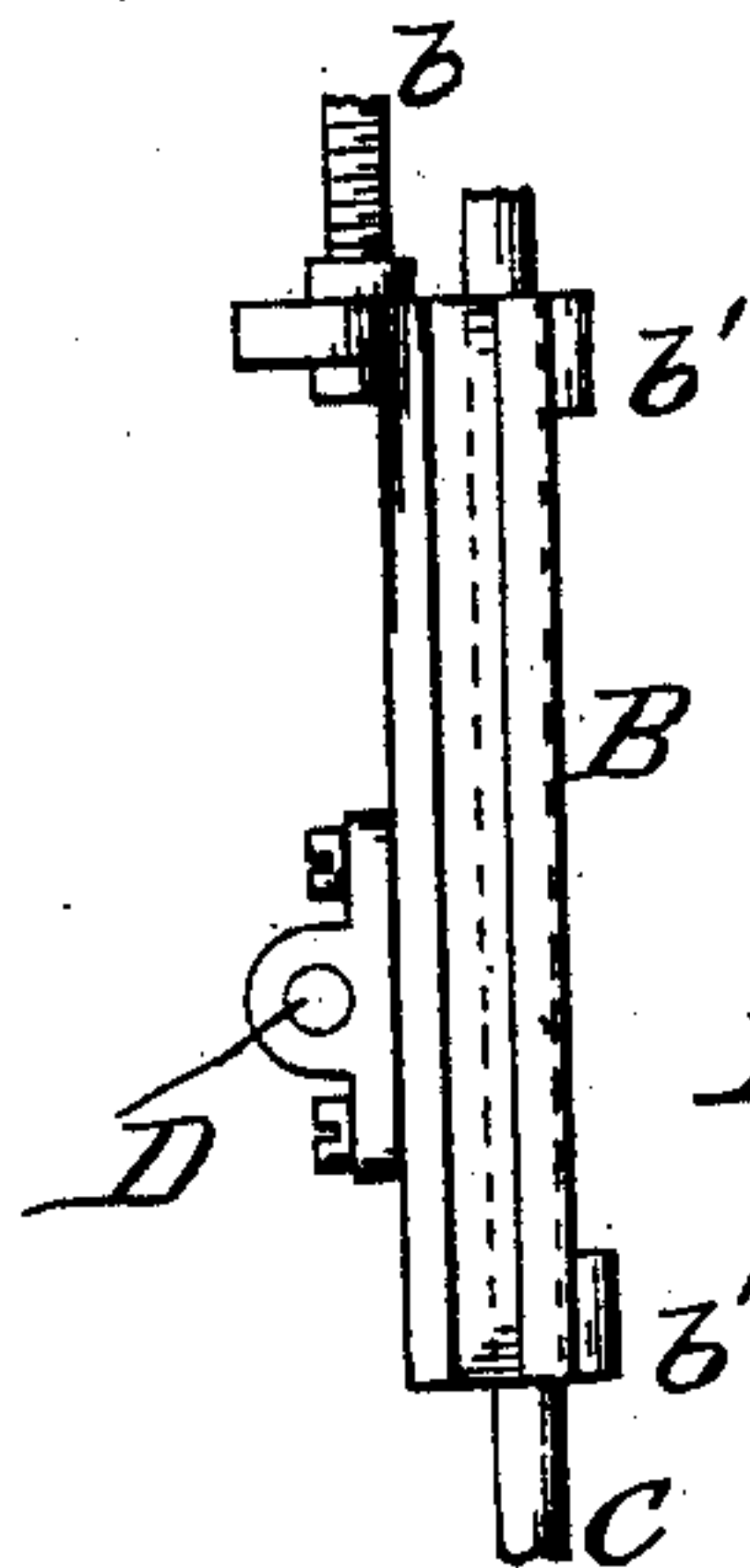


Fig. 3

Witnesses:
James Young.
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UNITED STATES PATENT OFFICE.

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ELECTRIC ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 362,053, dated May 3, 1887.

Application filed September 11, 1882. Serial No. 71,611. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. BALL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electric Rock-Drills, of which the following is a specification, reference being had therein to the accompanying drawings, wherein—

Figure 1 is an elevation of a rock-drill embodying my invention, and Figs. 2 and 3 are detail views of the same.

The object of my invention is to provide for the operation of a rock-drill by means of an electromotor.

Heretofore, when the ordinary motors for rock-drills—such as steam-engines, hydraulic and pneumatic apparatus, &c.—have been employed, great expense has necessarily been incurred in connecting the drills with the motors and in providing for accommodating the frequent changes of position of the drills and their distance from the prime motors, because of the costly and cumbersome appliances necessary to transmit the power from the motors to the operative parts of the drills. By my invention all such difficulties are done away with, and I am enabled to place the power at any required distance—it may be thousands of feet—from the rock-drill, and, the power being transmitted by means of flexible and extensible conductors, all the movements of the drill are conveniently and economically accommodated. Hence the great practical and economical utility of my invention will be apparent.

My invention accordingly consists of the combination, with a rock-drill having a reciprocating and rotating drill-rod and an operating-cam therefor, of an electro-motive apparatus for rotating said cam.

My invention further consists of the novel combination and arrangement of parts, as hereinafter specifically described and claimed.

Referring to the accompanying drawings, A represents a yoke or the main frame of the drill, provided with the usual or any other desired or suitable supports, *a a*.

B represents the secondary or sliding frame,

arranged upon the main frame in any suitable manner to permit of an adjustment or feed for the drill-rod by means of the screw *b*, or other desired form of feeding mechanism.

The frame B carries the drill-rod C and shaft D. The rod C has its bearings at *b' b'* in frame B, and is provided with a tappet or lifter, *c*, which, if desired, may be made adjustable thereon by means of one or more screws, *c'*. Upon the shaft D is placed a cam, E, which is designed to be so arranged that its arms *e e* will contact with the lower edge, *c'*, of the tappet *c* to lift the drill-rod B, and then pass out of contact therewith, to permit the drill-rod to fall by gravity to deliver the blow.

The shaft D is rotated by means of an electromotor, F, placed thereon, as shown in Fig. 1, which is in circuit by way of brushes *ff* with a battery or generator, G. Said motor may be of any suitable or desired construction, and may be placed in circuit with battery G in the usual or other known manner. The particular construction of the motor I do not herein claim, and it need not, therefore, be more particularly described.

The parts of the drill being assembled substantially as shown in Fig. 1, the operation is obvious. The motor F rotates shaft D and cam E, and the arms of the latter lift the drill-rod C, which falls by gravity to strike a succession of quick sharp blows upon the material to be drilled. As the arms of the cam revolve across the edge *c'* of tappet *c* during the lifting of rod C, the latter is partially rotated by said arms. The drill C is fed forward or downward by turning the screw *b* to advance or lower frame B. It is apparent that such a construction affords a simple and inexpensive drill, the blow of which is delivered by the falling drill-rod. The impact of the blow may be enhanced by securing a weight to the drill-rod, or by the reaction of a spring placed thereon and compressed thereby as it is raised.

I have shown the cam E as being provided with two arms; but, if desired, it may be constructed with only one arm, or more than two may be formed thereon, if desired.

What I claim as my invention is—

As an improvement in rock-drills, the combination of the main supporting-frame, the adjustable frame carrying the cam-shaft, cam,
5 and drill-rod, and the electromotor on the cam-shaft, constructed and arranged substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

CHAS. E. BALL.

Witnesses:

W. L. CANDEE,

ROBERT J. CUMMINGS, Jr.