(No Model.)

I. E. STOREY.

ROCK DRILL.

No. 545,109. Patented Aug. 27, 1895.

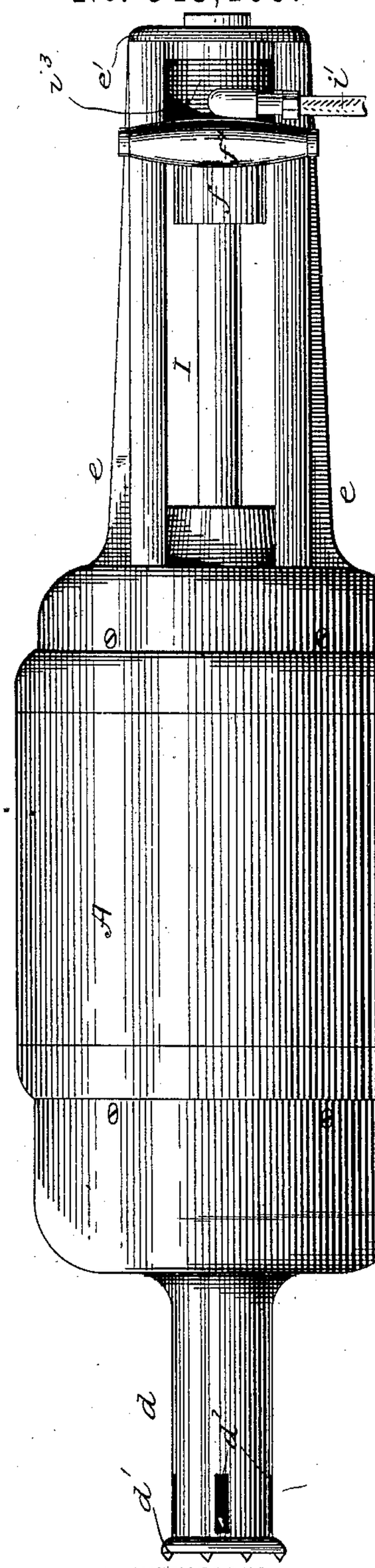

Fig. 1.

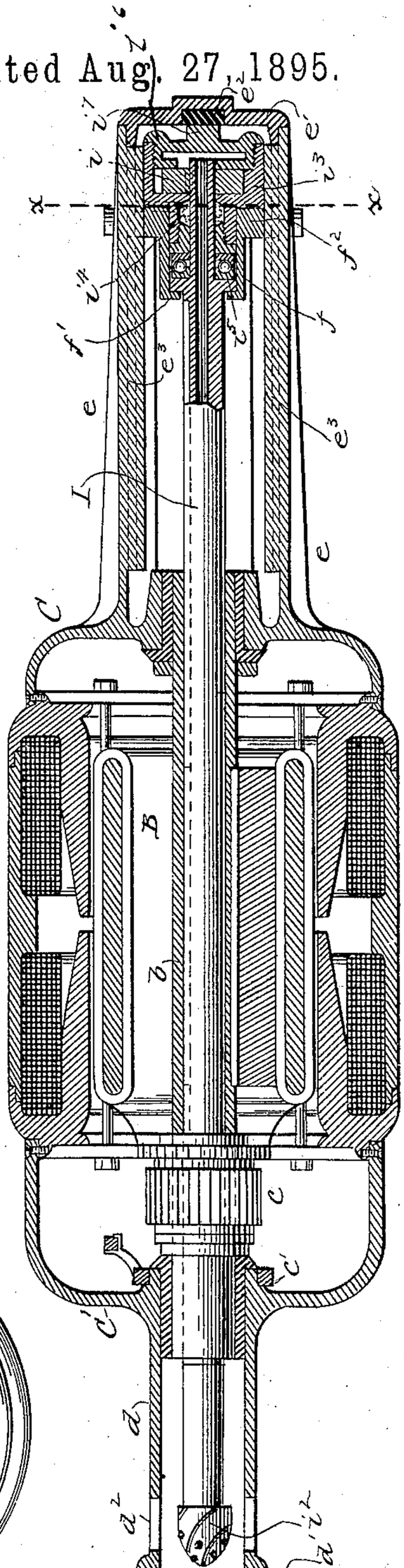

Fig. 2.

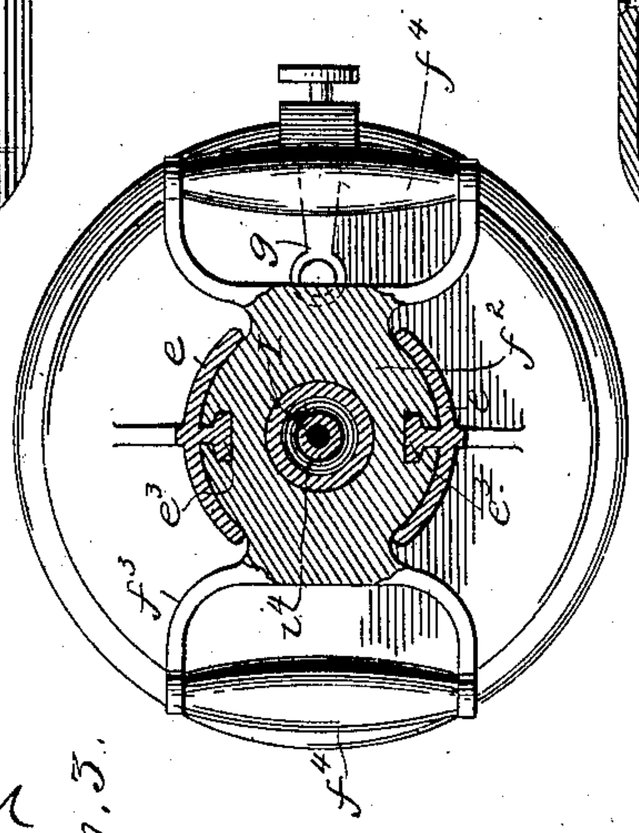

Fig. 3.

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ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 545,109, dated August 27, 1895.

Application filed February 24, 1892. Serial No. 422,634. (No model.)

To all whom it may concern:

Be it known that I, IMLE E. STOREY, a citizen of the United States, residing in Boulder, in the county of Boulder and State of Colorado, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification.

My invention relates to rock-drills, the object being to provide a small portable drill adapted to bore short holes, and therefore specially useful in the work known as "plug and feathering."

My improved drill is operated by an electric motor, and the invention consists in the details of construction, which will hereinafter be pointed out and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of the drill; Fig. 2, a longitudinal section of the same, and Fig. 3 a section taken on line $x\ x$ of Fig. 2.

Referring to the drawings by letter, A represents an iron cylinder constituting a portion of the field-magnet of an electric motor, the pole-pieces of which are formed as described in my patent, No. 488,041, dated December 13, 1892.

B represents the armature of this electric motor, which is supported by a spider keyed to the sleeve b, constituting the armature-shaft. This sleeve has its bearings in closed cylindrical heads C C′ at each end.

c represents the commutator, and c' the brush-holder.

The forward head C′ has a tubular extension d, concentric with the axis of the motor. The forward end of this extension is open and its edges armed with teeth d'. Near the forward end openings d^2 are provided, for purposes which will hereinafter appear. The rear head C has two segmental rearward extensions $e\ e$, parallel to each other and forming parts of a cylinder the axis of which coincides with the axial line of the motor. The other ends of these extensions are connected by a disk-head e', having a central socket on its inner side containing a cushion e^2 of rubber or other suitable material. The adjacent or inner faces of the extensions $e\ e$ are provided with central longitudinal tracks or guides e^3, extending their full length.

I represents the drill-rod. It is tubular and located inside of the hollow armature-shaft b and connected thereto by means of a spline or feather running loosely in the groove in the rod, whereby the rod must rotate with the shaft, but is free to slide longitudinally within it. The rear end of the drill-rod carries a small pump i, which takes water in through the flexible tube i' and forces it through the tubular drill-rod to its forward end or bit i^2 for the purpose of lubricating the bit and preventing the hole from becoming clogged. The pump-shell i^3 contains a stuffing-box i^4. It remains stationary while the drill-rod turns, the connection between them being through ball-bearings i^5. The pump-shell is provided with grooves at opposite points, which embrace the tracks e^3, and thus form a support for the rear end of the drill-rod. The pump-shell and ball-bearings are surrounded by a cylinder f, the forward end of which has a flange f' formed upon it, which embraces a shoulder formed on the drill-rod. The rear end of the cylinder has formed upon it a radial circular plate f^2, which fits the inner faces of the extensions e and is provided with two grooves at opposite points which embrace the tracks e^3. This plate also has two yokes f^3, which extend out through the openings between the extensions e and carry handles f^4, which may be grasped in the hands of the operator. The cap i^6, inclosing the pump, has a central lug i^7, which strikes the cushion e^2 when the drill-rod is brought back its full distance. The length of the drill-rod is such that when the pump is back against the cushion the bit or point i^2 is just inside of the tube d and is protected thereby.

The operation of plug and feathering consists in drilling a series of shallow holes along a line to predetermine where the rock will break when the wedges are driven. This drill has been specially designed to perform this work, and to that end has been made small and light. In using my drill the operator grasps the handles f^3, one in each hand, and lifting the drill bodily places the end of the tube d upon the line along which the holes are to be drilled. He then starts the motor by turning the switch-handle g. Then by pushing upon the handles toward the rock he forces the drill-point against and into the

rock. He feeds the point in with any variation of pressure which the hardness of the rock demands until the hole has been bored deep enough or the forward end of the pump is stopped by abutting against the rear bearings of the motor-shaft. The handles are then pulled backward until the pump strikes the cushion e^2, when the drill is bodily lifted and the end of the tube d is located at the point where the next hole is to be drilled, and the same operation is again performed. The drill may be run continuously or be stopped after each hole is bored; but it will be observed that when the point of the drill is out of the rock it cannot come in contact with any other object and nothing can come in contact with it because of the protection which the tube affords. The water is started at about the same time that the motor is and keeps the drill-point cool, and at the same time washes the loose material which is cut by the point out through the hole and through the openings d^2 in the tube. A full-sized drill will weigh about one hundred pounds, and may be operated by one man. The electrical current will be conducted through the motor by flexible wires, which will permit of a wide range of movement. The flexible hose conveying the water to the pump will also be made so as to permit of the varying and wide movement of the drill.

Having thus described my invention, I claim—

In a drill, the combination of a motor, a drill rod driven thereby but capable of independent longitudinal motion, a forwardly extended housing frame through which the drill rod passes and upon which the drill rests when in operation, a handle or handles attached to the drill rod by which it may be manually fed forward or withdrawn, and a back stop for the drill rod, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

IMLE E. STOREY.

Witnesses:
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