

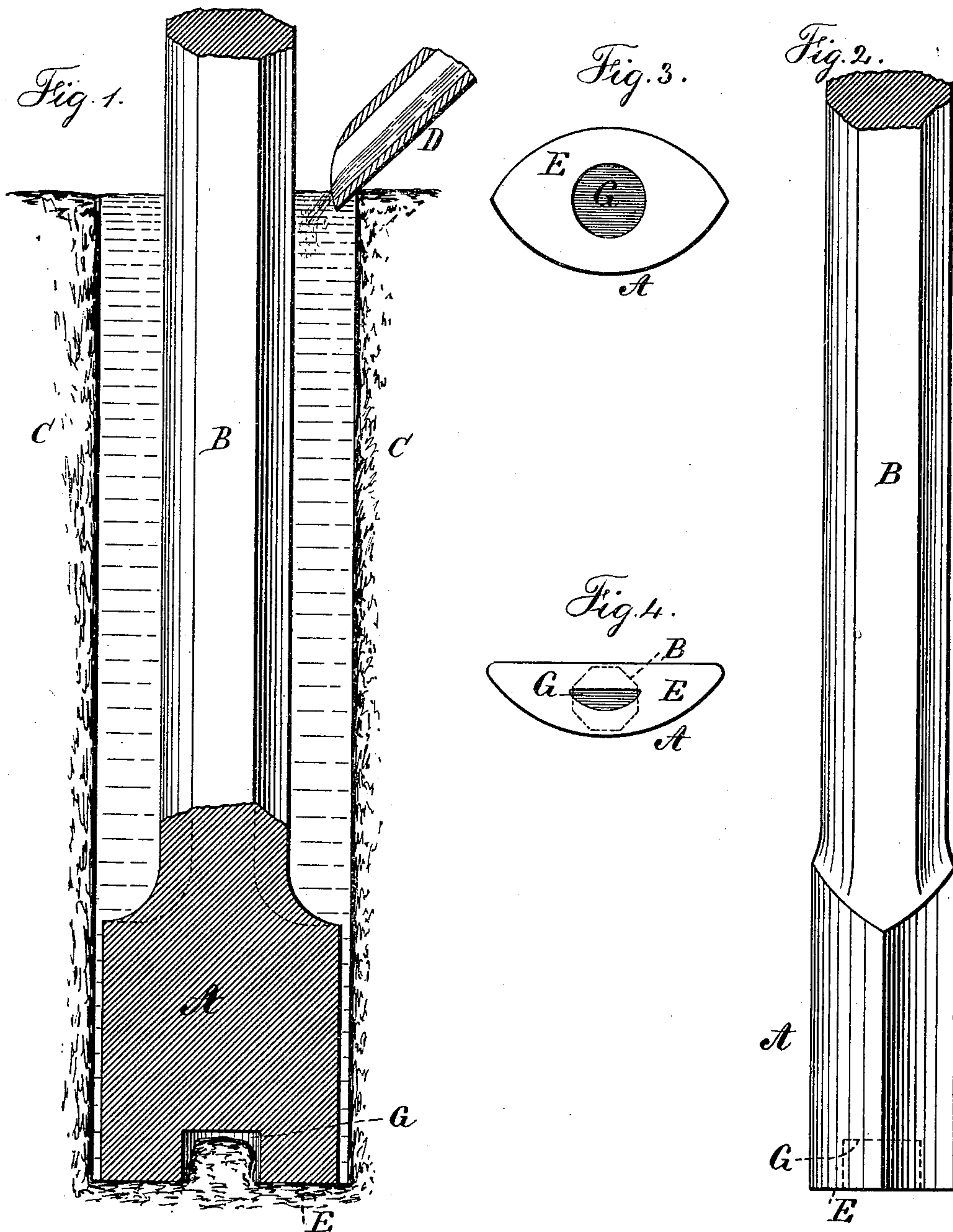
(No Model.)

G. M. GITHENS.

METHOD OF AND TOOL FOR DRILLING ROCK.

No. 371,679.

Patented Oct. 18, 1887.



Witnesses:
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UNITED STATES PATENT OFFICE.

GEORGE M. GITHENS, OF BROOKLYN, NEW YORK.

METHOD OF AND TOOL FOR DRILLING ROCK.

SPECIFICATION forming part of Letters Patent No. 371,679, dated October 18, 1887.

Application filed May 25, 1887. Serial No. 239,296. (No model.)

To all whom it may concern:

Be it known that I, GEORGE M. GITHENS, of Brooklyn, in the county of Kings and State of New York, have invented an Improved Method of and Tool for Drilling Rocks, of which the following is a specification.

In drilling rocks for blasting several different methods have been adopted to obtain a straight crack in splitting off the face of the rock. For instance, large holes have been drilled, into which have been inserted flattened cans containing the explosive material, the longest diameters of the cans being in line with each other, and the spaces between the cans and the interior surfaces of the holes being filled with sand. In this instance considerable stone is lost in consequence of the long semi-cylindrical recesses formed in the surfaces of the stone. Smaller holes have been bored in line with each other and channels formed in the opposite surfaces of such holes and in the line in which the stone is to be split; but this renders it necessary to perform two separate operations, and it is difficult to align the channels.

My present improvements are, primarily, for preventing the drill wearing smaller in diameter by contact with the sides of the bore; secondly, for preventing the hole or bore becoming filled with the disintegrated rock, and thereby avoiding the necessity of removing such disintegrated rock by a sand-pump; and, thirdly, for giving to the hole an elongated form sectionally, so that in the act of drilling the hole it may be channeled or formed with its longest diameter in the plane in which it is desired to split the rock.

In the drawings, Figure 1 is a vertical section showing a portion of rock and a sectional elevation of the drill. Fig. 2 is an elevation at right angles to Fig. 1; and Figs. 3 and 4 are end views of the drill, showing some of the forms in which the same may be made.

The drill is to be operated either by hand or by any rock-drilling engine; but the drill is not to be rotated when used for boring an elliptical or channeled hole.

The head A of the drill is made with parallel sides, or nearly so, and it is to be of larger diameter than the shank or body B of such drill, so that said head A acts as a piston to

pump water up and down within the hole in the rock C as the boring progresses. Water is to be supplied into such hole through a hose or nozzle, D, or otherwise, and hence the sand or pulverized rock is washed out of the hole progressively, because the pumping action of the head of the drill keeps the water in a constant state of violent agitation; but there is comparatively little resistance by the water to the movement of the drill, because the head portion A is comparatively short and the water passes from one side to the other thereof as the drill is reciprocated.

The face or operative end E of the drill is substantially flat instead of being chisel-shaped, as heretofore usual. In ordinary rock-drills, with either straight or crossing chisel-shaped ends, the concussion upon the rock renders the cutting edge or edges blunt, and they require to be sharpened, and the sides of the drill come in contact with the sides of the bore, and hence the end part of the drill is lessened in diameter, and the hole that is bored becomes smaller unless the drill is frequently heated and upset to enlarge the same and then sharpened. By my improvement all these difficulties are avoided, because the wear is entirely upon the face E of the drill, for the following reasons: As the drill is reciprocated the water flows backward and forward between the sides of the head portion A and the surface of the rock, and in so doing centers the drill within the bore and keeps the sides thereof from contact with the rock, and when the face E of the drill strikes the rock at the bottom of the hole it disintegrates the rock by a blow similar to the blow of a flat-faced hammer, and the concussion and the action of the water and the gritty material suspended in the water cause the hole that is bored to be larger than the drill, usually about one sixteenth of an inch larger in measurement all around the drill, and the disintegrated rock is reduced to such a fine powder that it is continuously washed out of the hole by the agitation and the current of water, and, although the drilling operation in itself may not be as rapid as it is with chisel-shaped drills, there is a great saving, because it is unnecessary to sharpen the drill or to stop the drilling operation for removing the disintegrated rock by the sand-pump.

I find it advantageous with circular or elliptical drills to form a recess, G, in the face E of the drill, so that in drilling there is a small teat or projection left upon the rock, and this
5 breaks off from time to time and is pulverized by the action of the drill.

For drilling rock with ranges of holes in line with each other, so as to split the rock in a straight line, it is preferable to make the drill
10 with the head A corresponding in shape to one of the forms shown in Fig. 3 or 4, so that the longest diameter of the hole will be in the line of the split.

It will be apparent that each hole is formed
15 complete by one operation, and that the hole is uniform in size throughout, and when a drill is worn so that the head is too short, then a new head may be welded upon a shank or stem, and except for this purpose the services of a
20 blacksmith are unnecessary.

I claim as my invention—

1. The method herein specified of boring holes in rock, consisting in reciprocating within the hole a drill having a parallel-sided head
25 with a flat end and supplying into the hole water, whereby the pulverized rock is removed

progressively by the pumping action of the drill-head as the rock is disintegrated by the blow of the flat head and the drill is kept central by the surrounding water, substantially as
30 set forth.

2. The drill for rock, composed of a shank or stem, a head at the end of the same, with parallel sides and a flat end, without cutting-edges, for disintegrating the rock by the blow of such
35 flat end, substantially as set forth.

3. The rock-drill composed of a stem and an enlarged head, with parallel sides and a flat end, without cutting edges, with a central recess therein, substantially as and for the purposes
40 set forth.

4. A rock-drill having a shank or stem and an enlarged head, with parallel sides and a flat end, without cutting edges, the head being
45 longer in diameter in one direction than the other to form an elongated or channeled hole, substantially as set forth.

Signed by me this 23d day of May, A. D. 1887.

GEO. M. GITHENS.

Witnesses:

GEO. T. PINCKNEY,
WILLIAM G. MOTT.