

*T. J. Lovegrove,
Artesian Well Drill.*

N^o 46,757.

Patented Mar. 7, 1865.

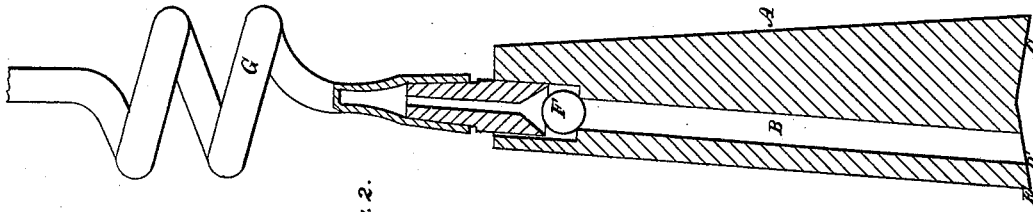


Fig. 2.

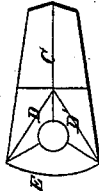


Fig. 3.

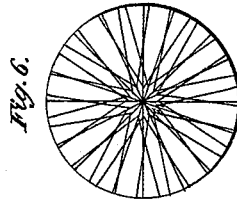


Fig. 6.

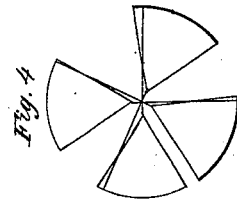


Fig. 4.

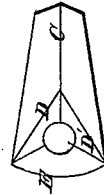


Fig. 5.

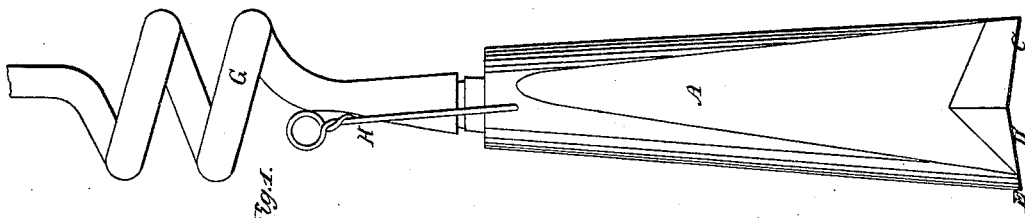


Fig. 1.

Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS J. LOVEGROVE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND HENRY BALDWIN, JR., OF SAME PLACE.

IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. 46,757, dated March 7, 1865.

To all whom it may concern:

Be it known that I, THOMAS J. LOVEGROVE, of the city and county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Rock-Drills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which make part of this specification, and in which—

Figure 1 represents a view in elevation of my improved rock-drill. Fig. 2 represents a vertical central section through the same. Fig. 3 represents a view of the face or bottom of the same. Fig. 4 is a diagram showing the action of the cutting-edges of the drill. Fig. 5 represents an outline of a modified form of the drill, and Fig. 6 is a diagram showing the cuts made by the same.

In boring artesian or oil wells by the drills heretofore used much delay is caused by the sticking of the drill. Now, it is the object of my invention to obviate this objection by causing the drill to make a hole larger than itself, and to this end the invention herein claimed consists, first, in a rock-drill having its cutting-edges sloped from the center to the circumference, (so as to form a concave edge,) and with more or all of the cutting-edges (or a larger cutting surface) on one side of the drill than on the other, so that the stroke of the drill will tend to force it toward one side, and thus make a hole larger than itself; second, in a rock-drill having a chamber or concavity in its face and bounded by cutting-edges, so as to cut lines transverse to the circle described by the drill and bisecting each other; third, in a rock-drill having one cutting-edge on one side of its center, and three or more cutting-edges on the opposite side, whereby I am enabled to cut in lines radial to the center and in lines transverse thereto; fourth, in a rock-drill having a chamber on its face surrounded by cutting-edges, and with a channel leading from the face to the head of the drill, to receive the chips and remove them as made, so that a clean surface will be constantly presented to the action of the drill; fifth, in combining with a perforated rock-drill a flexible and extensible discharge-pipe to conduct away the debris and accommodate itself

to the vertical movements of the drill; sixth, in combining a perforated rock-drill and a valve with a flexible discharge-pipe.

In the accompanying drawings, my improved drill is shown as consisting of a body, A, of suitable form and dimension and having a channel, B, leading from its bottom or face to its upper end. The drill is made concave or V-shaped on its cutting-edge, which edge, instead of being continuous, as heretofore, is divided into distinct portions. The edge C extends radially across the circle described by the drill in revolving, and projects somewhat on one side of the center, where it is joined by the cutting-edges D D', projecting transversely to the circumference where they are connected by the cutting-edge E, which is curved in the arc of a circle of the size of the drill. This edge may be made straight also, if desired, but I prefer the circular form, as the other would throw too much work on the corners of the drill. The effect of this construction of the cutting-edge is that as the drill is operated, being turned at each stroke by the operator, the edge C cuts in radial lines, while the edges D D' cut in transverse lines, crossing the cuts previously made. This mode of operation is clearly shown in Figs. 4 and 6, where the blue lines represent the cuts after the radial edge, and the red ones those of the transverse ones.

As the drill slopes outward from the center and has more cutting-surface on one side than the other, the greater resistance encountered on that side will tend to crowd the drill outward to that side and thus chip out the diameter of the hole. This action being repeated at every stroke of the drill, it follows that the hole will be so much larger than the drill as the distance to which the drill is drawn to each side—that is, if the drill cut one-eighth of an inch more on one side than the other, the hole would be a quarter of an inch larger than the drill. The value and importance of this enlargement of the hole will be readily appreciated by those familiar with the difficulties caused by the sticking of the drill. Many valuable wells have in fact to be at times abandoned or rebored on this account. My drill could be used with good effect even

were the edge C entirely removed, but the cutting action is more rapid when constructed as herein described.

The chips and dust cut up by the drill pass up through the channel B into the flexible discharge hose-pipe G, a ball-valve, F, being placed in the channel to prevent its return.

The drill is operated in the usual way by a rope or chain attached to a suitable fastening, H. The pipe or hose may be made of any suitable material—such as gutta-percha, leather, or canvas. As the drill is constantly varying its position vertically, the importance of having the hose flexible and elastic is obvious. If a metallic tube were used, its entire weight would have to be lifted at every stroke of the drill, which in deep wells would be a very serious objection, and the jar would injure both the drill and tubing.

What I claim as my invention, and desire to secure by Letters Patent of the United States, is—

1. A rock-drill having its cutting-edges sloped from the center to the circumference, and with more cutting-edges on one side than on the other, so that the stroke of the drill will tend to force the drill to one side and thus make a hole larger than the drill, substantially in the manner described.

2. A rock-drill having a chamber or concavity on its face surrounded by polygonal cutting-edges, substantially in the manner described, for the purpose set forth.

3. A rock-drill having one cutting-edge on one side and three or more cutting-edges on the other, substantially in the manner described, for the purpose of cutting both radial and transverse lines, as set forth.

4. A rock-drill having a chamber on its face surrounded by cutting-edges, substantially as described, and a channel leading therefrom to the head of the drill, for the purpose of cleaning away the chips at every stroke of the drill and thus leaving a clear surface to operate upon.

5. The combination of a perforated drill with a flexible hose or discharge pipe, substantially as and for the purpose set forth.

6. The combination of a perforated drill, a valve, and a flexible hose, substantially in the manner and for the purpose described.

In testimony whereof I have hereunto subscribed my name.

T. J. LOVEGROVE.

Witnesses:

WM. D. BALDWIN,
HENRY BALDWIN.