

E. J. Graham, *Rock Drill.*

N^o 50,576.

Patented Oct. 24, 1865.

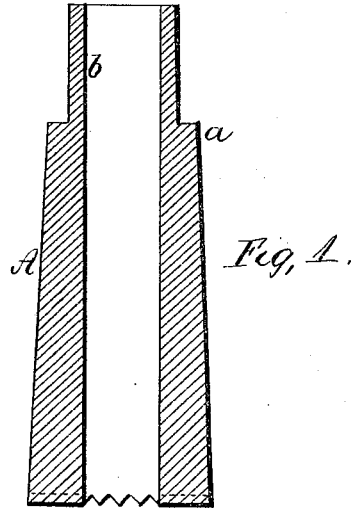


Fig. 1.

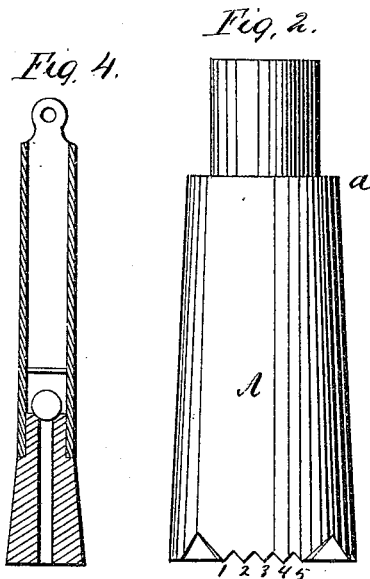


Fig. 2.

Fig. 4.

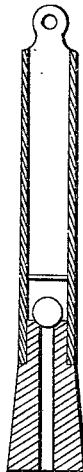


Fig. 5.

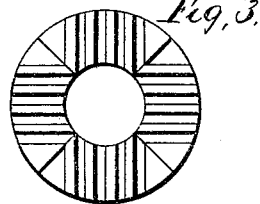
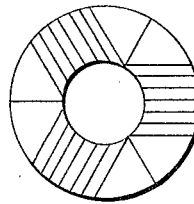


Fig. 3.

*Witnesses,
Wm. Albert Seed,
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E. J. Graham,
by his Attorney,
Henry Howson*

UNITED STATES PATENT OFFICE.

EDWARD J. GRAHAM, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. **50,576**, dated October 24, 1865; antedated October 6, 1865.

To all whom it may concern:

Be it known that I, EDWARD J. GRAHAM, of Philadelphia, Pennsylvania, have invented an Improved Rock-Drill; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My improved rock-drill is of tubular form, and has on its face sets of cutting-edges, arranged substantially as described hereinafter, so that the edges of one set may strike the rock across the incisions made by the edges of the adjacent set, and so that a rapid penetration of the rock may be insured.

In order to enable others to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is vertical section of my improved rock-drill; Fig. 2, an exterior view; Fig. 3, a view of the cutting end of the drill; Fig. 4, a view showing the combination of the drill with a sand-pump; Fig. 5, a modification of the cutting-edges of the drill.

The drill A is made of steel or of iron with a steel cutting end, and is of the tubular form represented in the drawings, the exterior being largest in diameter at the lower end, and gradually tapering to the shoulder *a*, and the portion *b* above the latter being reduced in diameter for attachment to the boring-bar; which may be screwed into or otherwise secured to the drill.

In the annular face of the drill, which will be best observed on reference to Fig. 3, are cut a series of V-shaped grooves in such a manner as to form four sets of V-shaped cutting-edges, there being in the present instance five such edges, numbered 1, 2, 3, 4, and 5, in each set.

The cutting-edges of each set are arranged parallel to each other and to a radial line drawn from the center of the face of the drill to the edge of the same, and the cutting-edges of one set are arranged at right angles to those of the adjacent set.

Rock-drills with V-shaped cutting-edges have been heretofore made; but the edges have been so arranged as to coincide with a series

of radial lines, in consequence of which the cutting-edges, as the tool was turned, invariably struck the rock in the same lines—a defect which my arrangement of cutting-edges has been designed to obviate.

It will be evident that one set of cutting-edges cannot strike the rock in the incisions previously made by another set of the cutting-edges unless the rod be turned exactly one-quarter round, which must be avoided in the use of my improved drill, the turning of the latter being such that one set of cutting-edges will strike the rock in lines crossing previous incisions made by another set. By this action of the cutting-edges a more rapid chipping away of the rock is insured than when the edges are arranged radially.

I have found in practice that in the use of my improved rock-drill no central core of rock coinciding with the central opening of the drill remains, the jar of the drill and the inner corners of the cutting-edges tending to shatter this central portion of the rock into small pieces.

The drill may be used in the simple form illustrated in the drawings, in which case the detritus may be removed from time to time after the withdrawal of the drill by the usual sand-pump; or the said pump may be attached to and combined with the drill, the detritus passing upward through the interior of the drill and through the valve of the pump, as will be readily understood on reference to the view Fig. 4.

It will be evident that three sets only of cutting-edges, Fig. 5, may be used, and that for boring large holes there may be five, or even more, sets of cutting-edges.

I claim as my invention and desire to secure by Letters Patent—

The within-described tubular drill, having on its face sets of cutting-edges, arranged substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD J. GRAHAM.

Witnesses:

CHARLES E. FOSTER,
HENRY HOWSON.