G. L. WILLIAMS.

ROCK DRILL.

No. 111,025. Patented Jan. 17, 1871.

Fig. 1.

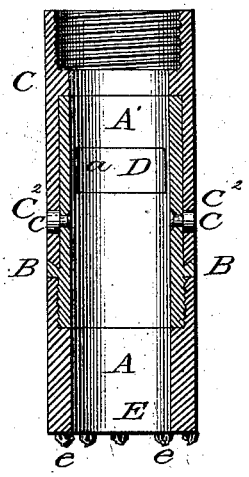


Fig. 2.

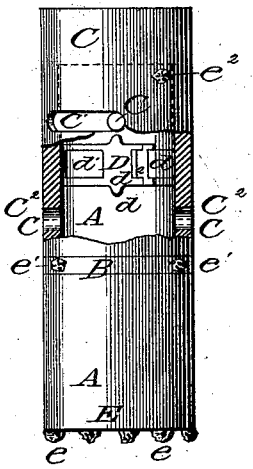


Fig. 6.

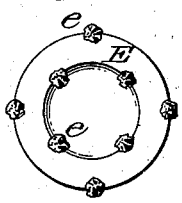


Fig. 3.

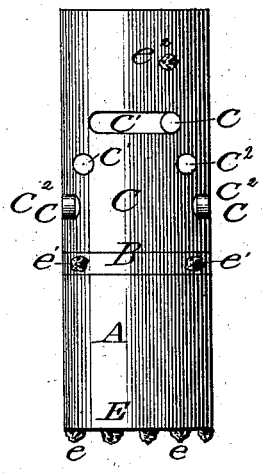


Fig. 4.

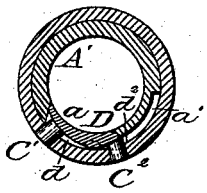
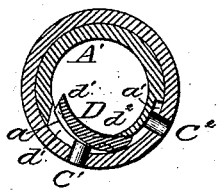


Fig. 5.



Witnesses:

J. W. Northcott

Robert Burns

Inventor:

George L. Williams

by his Attys

Northcott & Co

United States Patent Office.

GEORGE L. WILLIAMS, OF MINE LA MOTTE, MISSOURI, ASSIGNOR TO HIMSELF, RADCLIFFE B. LOCKWOOD, AND WILLIAM A. SCOTT, OF SAME PLACE.

Letters Patent No. 111,025, dated January 17, 1871.

IMPROVEMENT IN ROCK-DRILLS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, GEORGE L. WILLIAMS, of Mine La Motte, in the county of Madison and State of Missouri, have made certain new and useful Improvements in Rock-Drills; and I do hereby declare the following to be a full and correct description thereof, reference being had to the accompanying drawing and to the letters of reference marked thereon.

This invention relates to diamond-pointed drills adapted to be used for all kinds of rock-drilling, well-boring, prospecting, and similar purposes; and

The nature of this improvement consists—

First, in the peculiar construction of a "core-lifter" fitted to revolve with an annular cutter, and forming, in conjunction with said cutter, a tubular boring-head, to cut an annular orifice as the drill passes into the rock.

Secondly, said invention relates to the construction of a pawl device within the core-lifter that shall clutch or cut into that part of the stone encircled by the drill when the reverse motion is given the drill-shaft, preparatory to withdrawing the drill out of its annular channel.

Thirdly, said invention relates to certain detail construction of parts, hereinafter to be more fully described.

To enable those skilled in the art to make and use my said invention, I will now more fully describe the same, referring to—

Figure 1 as a sectional elevation; to

Figure 2 as a front elevation, with the housing partly removed, showing the pawl;

Figure 3 as a front or side elevation; to

Figures 4 and 5 as sections at lines x and y; and to

Figure 6 as a bottom plan of cutter.

The drill-head proper, for boring rock or other hard substances, is made out of solid steel, and constructed in the usual tubular form.

Said drill I construct in sectional parts, consisting of a cutter, A, fitted by its screw-joint to connect with a coupling-shoulder, B, which supports and fits within a socket-housing, C, as shown in fig. 1.

The core-lifter A′, forming part of the shoulder B, has a rectangular slot, a, cut with beveled ends, and communicating with a groove, a'.

This groove receives the pin c^2 fixed in the socket-housing C, and thus allows the rotation of the parts.

The pawl D, by its pivot ends d engaging in corresponding notches, is fitted to move within the slot a of the core-lifter, and to be acted upon by the motion of the socket C, for the purposes specified in the nature of my invention.

The socket C is fitted to form a housing for the core-lifter A′, and is secured to the same by any required number of pins or stops, c, placed in the respective slots C^1 and C^2.

I prefer to arrange two or more of said slots in said socket, to add strength and durability to the connection of the same with the core-lifter. Said slots will then be arranged to run parallel with each other, but placed at such different positions or intervals that said socket may freely rotate in accordance with the "progressive" as well as "reverse" motions of the drills.

I furthermore arrange the pins c^1 and c^2 in the socket in such positions that they impinge against the pawl D, and cause the same, by their action, to follow up the movements of said socket C.

For this purpose said pawl has part of its outer periphery beveled to an incline, as clearly shown at d^1 and d^2, in figs. 2, 4, and 5. Said pawl is thus made thinner at its face than at its pivot-point.

When, therefore, a reverse motion is given to the socket C, said pawl D, acting by impulse of the pin c^1 against its incline d^1, is forced to open within the core-lifter A′, as shown in fig. 5, and *vice versa*, by the forward motion of the drill, said pawl, acting by impulse of the pin c^2 against its incline d^2, is forced back to its original position flush with the core-face A′.

The cutter A, at its lower face or edge E, I provide with a series of diamonds, e. Said diamonds are firmly imbedded in said edge in such a manner that the edges of those in one row project from the outer edge, while those of the other row project from the inner edge of said face E.

Furthermore, I arrange three or more diamonds, e^1, on the outer face of the coupling-shoulder B, between the core-lifter and cutter, in conjunction with the same number of diamonds, e^2, imbedded in the socket C. Said diamonds prevent wear on the part of the drill-head proper, serving as reamers, and preventing any part of the socket-housing from wabbling and coming in contact with the rock.

The operation of these parts is, therefore, as follows:

The drill-head proper, by its screw-threads is connected to the tubular boring-bar, and operated in the usual manner of drills of this nature.

The diamonds e of the cutter tool cut the path of the drill in its forward progress, forming an annular channel encircling the stone-core. The pawl device D, being flush with the inner face of the core-lifter, allows said stone-core to pass up into the drill without hindrance. When the required depth has been cut, it is plain that, by a reverse action of the drill, the pawl D, simultaneously following up the movement of its socket C, impinges upon and holds fast to the

stone-core, breaks it off within the core-lifter, and brings it to the surface when the drill is withdrawn.

Having thus fully described my said invention,

What I claim, and desire to secure by Letters Patent, is—

1. The shoulder B on the core-lifter A′, and the socket C secured to the core-lifter A′ by any number of pins *c*, in combination with the annular cutter A, substantially as set forth.

2. The socket C, having slots C^1 and C^2 to rotate in accordance with the movements of the drill, and, by means of pins c^1 c^2, operate a pawl, D, within the core A′, said parts, in conjunction with each other, forming a core-lifter that shall operate substantially as and for the purpose set forth.

In testimony of said invention I have hereunto set my hand in presence of witnesses.

GEO. L. WILLIAMS.

Witnesses :

R. B. LOCKWOOD,

C. M. SERVICE.