W. Tingley,

Rock Drill.

No. 63,338. Patented Mar. 26, 1867.

Fig. 1.

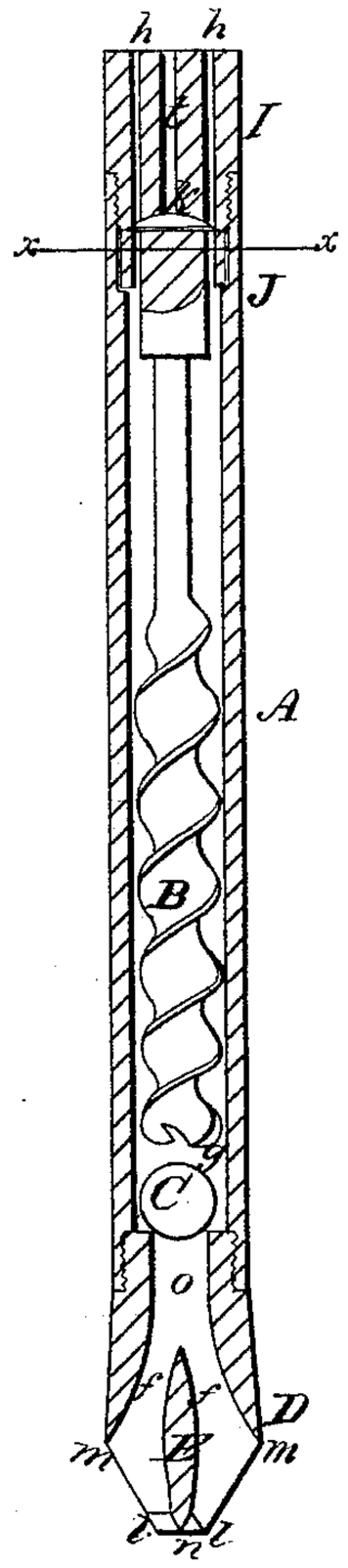


Fig. 5.

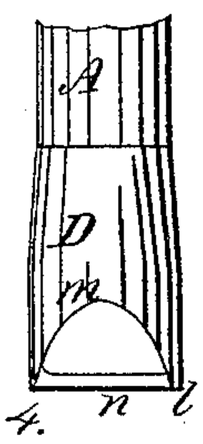


Fig. 3.

Fig. 4.

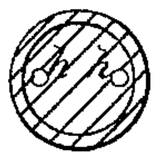
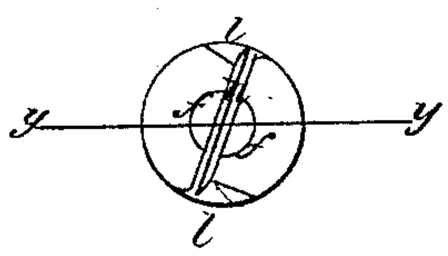


Fig. 2.



Witnesses.

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WASHINGTON TINGLEY, OF NEW YORK, N. Y.

Letters Patent No. 63,338, *dated March* 26, 1867.

IMPROVEMENT IN DRILLS FOR WELLS.

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, WASHINGTON TINGLEY, of the city, county, and State of New York, have invented a new and useful Improvement in Drills for Oil and other Wells; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the acompanying drawing, forming part of this specification, in which—

Figure 1 is an axial section of a drill, made according to my invention, the plane of section being seen at *y*, fig. 2.

Figure 2 is an end view, looking at the face of the drill.

Figure 3 is a view of the inside of the cap or top, I, of the drill-stock.

Figure 4 is a top view, with the cap I removed.

Figure 5 is a side view.

The object of this invention is to improve the construction of drills for oil and other wells, so that they will penetrate the rock with ease and rapidity, ream out the bore as the drill advances into the rock, and keep the bore at its full diameter, and also gather within itself the detritus produced by the action of the drill, after the manner of a sand-pump.

A designates the stock, and D the cutting part of a drill for boring a deep well. The stock is hollow, and is provided with a shaft, B, which extends from near its joint with the cutter or drill up to its top, the greater part of the length of said shaft, that is to say, from its lower end nearly to its top, being made with a spiral course, after the manner of a screw. The top of this shaft is fitted within the stock, and is suspended therein by means of a shoulder, J, formed on the shaft, which meets a like shoulder within the stock, and it is held down by means of a cap, I, whose inner end is made concave, so as to form a cavity, K, between it and the top of the shaft, from which cavity a passage, *t*, extends centrally through the cap to its top. *h h* are also passages through the cap, which coincide with like passages made through the head or top of the shaft B, and which passages *h*, together with the passages *t* before mentioned, establish communications between the hollow space, *g*, of the hollow drill-stock and the outside of the drill.

The drill itself is cylindrical in form, like the stock, and also hollow, its hollow space O being shut off from the space *g* of the stock by a valve, C, which is allowed to play between the lower end of the shaft B, and the upper end of the drill. It may be guided to its seat by making the face of the seat concave, or by any other suitable means. The central space O of the drill is divided, as it nears the cutting surface, into two channels *f f*, seen in cross-section in fig. 1, and in plan in the inverted view given by fig. 2. These channels are separated from each other by the diametrical cutter *n*, which extends clear across the drill. This cutter *n* is connected at its ends with short lateral cutters *l l*, which join it on opposite sides. These cutters *l* are curved, being part of the circumference of the drill. They form, in connection with the cutter *n*, a Z-shaped drill. The cylindrical sides of the drill, between the ends of the cutter *n* on alternate sides and the beginning of the cutters *l* on each side, are cut away so as to form curved cutting edges *m*, resembling a parabolic curve. It will be observed that the diameter of the drill is greater at the top of the curved cutting edges, *m*, than it is above that point, its diameter at that place being equal to its diameter in the plane of the cutter *n*. The cutters *m* act as reamers at each descent of the tool, and keep the bore at its full diameter. It will be observed that the curves of the cutting edges *m* do not extend from end to end of the diametrical cutter *n*, but from alternate ends to the beginning of the wing cutters *l*. The radii of their curves are shorter on the edge towards the cutters *l* than on the edge which extends to the end of cutter *n*. This is true of each cutter *m*, but at alternate edges, and the effect of this construction is to make alternate halves or parts of each cutter *m* descend towards the wing cutters *l* in an oblique direction, whereby they will give a drawing stroke, as compared with that part of their edges which meets the ends of the straight cutter *n*. The effect of this construction will be to cause the drill to be rotated at each descent, so that it will strike in a new spot. The detritus will be forced upwards, through the side channels *f*, into the space *g* of the stock, where it will be kept by the valve C. At each stroke additions will be made to the mass so held in the stock, and the mass will be forced up the spiral sides of the shaft B, the shape of which will prevent the mass from falling back rapidly towards the mouth of the stock.

The water received in the stock is free to escape through the passages *h h* and *t* above. When the space *g* is full of solid matter, the drill is hauled up, and it can be emptied by removing the cap I and the shaft R.

I claim as new, and desire to secure by Letters Patent—

In combination, the Z shaped cutting surface composed of the parts *n l l* and the curved reaming cutters *m*, whose edges on alternate sides are made oblique, so as to effect a drawing cut on the sides of the bore, substantially as shown.

WASHINGTON TINGLEY.

Witnesses:
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