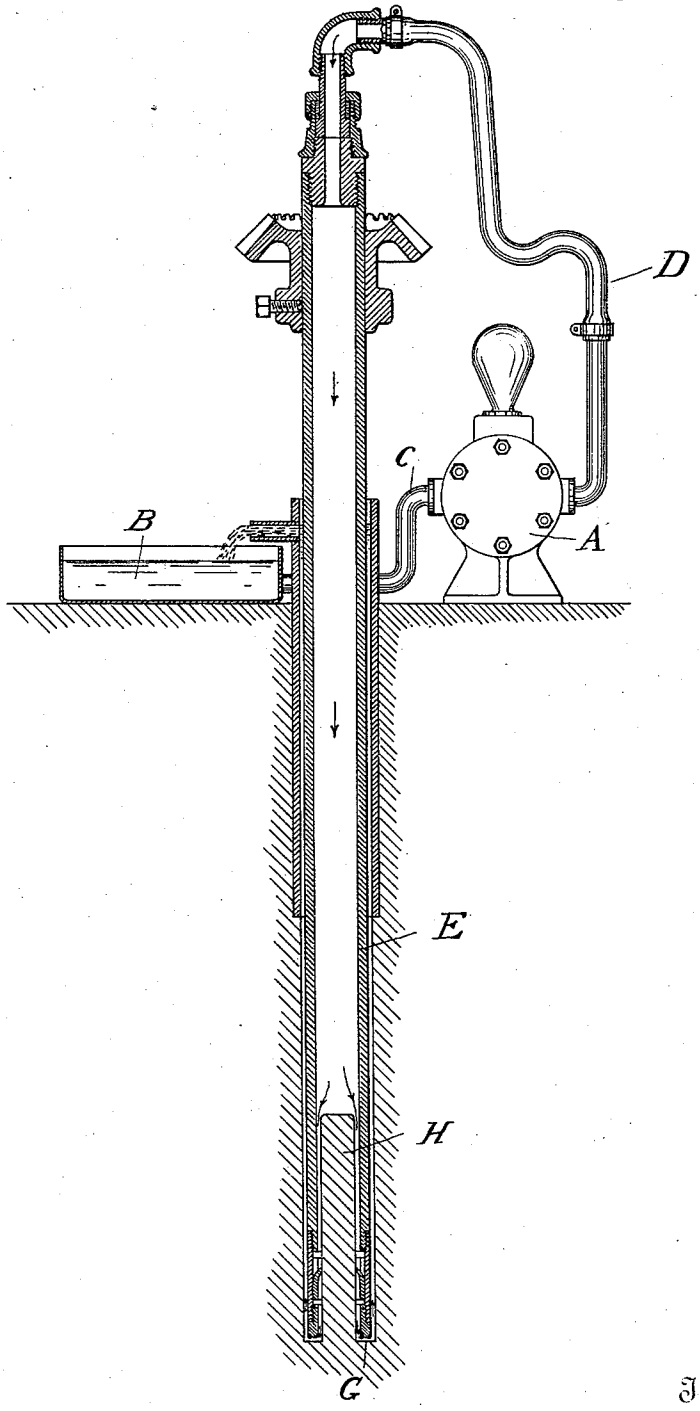
(No Model.)

G. R. JARVIS.

METHOD OF DRILLING FOR MINERALS.

No. 475,319. Patented May 24, 1892.



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UNITED STATES PATENT OFFICE.

GEORGE R. JARVIS, OF CHICAGO, ILLINOIS.

METHOD OF DRILLING FOR MINERALS.

SPECIFICATION forming part of Letters Patent No. 475,319, dated May 24, 1892.

Application filed February 6, 1891. Serial No. 380,491. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. JARVIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Method of Drilling for Minerals; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, which shows the drilling apparatus of a diamond core-drill and pump (the former in section) with which my method may be practiced, and in which—

A is the pump for pumping liquid to and from the drilling-tools; B, the tank containing the liquid to be pumped; C, the supply-pipe to the pump; D, the conducting-pipe carrying the liquid to the tubular drill; G, the diamond-studded cutting end of the drill, and H the core left by the drilling-tool.

In the method of prospecting by the use of a revolving diamond core-drill the drilling-diamonds are so set in the end of a tube that they project slightly outside of the outer wall and inside of the inner wall of the tube for the purpose of giving clearance-way to the tool. When the tubular drill is rotated rapidly and directed against the rock or mineral, the latter is rapidly perforated by the drilling-tool, which leaves a core or undisturbed portion of the rock or mineral within the center of the tool. In practical prospecting this core is broken and drawn out in sections after a certain number of feet of progress in the descent, and the integrity of this core is the great object of prospecting, as it furnishes to the prospector samples of the actual material existing in the earth.

In practical work it is customary to conduct a stream of water through the tubular drill to cool the same and for the further purpose of removing from the drilling-tool and carrying to the earth's surface or to the beginning of the drill-hole the cuttings made by the friction or abrasion of the drilling-tool on the rock or mineral.

In prospecting for mineral of a friable nature or for one readily soluble in fluid and particularly in mining or drilling through rock-salt it has been found that the action of the necessary stream of water dissolves the core and in other drilling dissolves the cuttings, and thus destroys the evidence from which the record of the prospecting is deduced. In order to overcome this difficulty and secure, in prospecting with the core or other drills, a solid core or undissolved cuttings when the drill is perforating a soluble mineral substance, I direct into the drill or to the cutting-surface of the same water charged with or holding in solution the same kind of mineral as that which is being perforated. The result of this method is that the fluid, being thus already loaded with the mineral in solution, does not in its passage or in its use dissolve or take up the mineral core or cuttings; but allows them to remain substantially intact. Thus in boring through rock-salt with the said rotary diamond drill I direct into the drill water in which salt has been dissolved, and said fluid so charged having then less or no tendency to take up further salt in its progress through the drill, the rock-salt core in the center of the drill remains unimpaired and may be withdrawn in solid sections for inspection or other purpose. It is immaterial whether this stream of water so loaded or charged, as aforesaid, passes to the cutting-face of the drilling-tool through the tubular drill, returning through the hole outside of the tubular drill, or whether it passes first through the hole outside of the tubular drill, returning through the inside of the drill, or otherwise, my process applying to any method of conducting the stream of water to and from the drilling-tool or applying the solution to the mineral being penetrated, as aforesaid. This process applies to any method of prospecting or mining in which the mineral is required to be extracted in its entirety, or substantially so, either in the form of a core or of drill chips or cuttings, to serve as a test of the extent and quality of the mineral deposit or stratum, and where it is desired to prevent the erosion of the core or cuttings thrown off by the action of the drilling mechanism.

I do not claim the mere removing of chips and cuttings from a mining-tool by means of a stream of water, as that is old; nor do I claim any effect from the use of the closed circuit merely.

I do not claim any effect from the use of

sand held in suspension by the water merely; but

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

1. In mining through a soluble geological stratum with core-drills requiring a stream of liquid to lift the cuttings of the drill, the process of lifting the cuttings by directing into the cavity made by the drill and withdrawing therefrom a fluid medicated or saturated to prevent erosion of the core or cuttings.

2. In prospecting with core-drills through a soluble mineral deposit, the process of directing into the cavity made by the drill and withdrawing therefrom an impregnated fluid to remove the drill-cuttings, said fluid being impregnated, charged, or saturated to prevent the erosion by the fluid of the core or cuttings, substantially as described, and for the purposes specified.

3. In mining with core-drills through a soluble geological stratum, the process of moving the drill-cuttings by directing into the cavity made by the drill and withdrawing therefrom a saturated fluid holding in solution the mineral which is being perforated to prevent erosion of the core.

4. The process described of preserving the integrity of the core or cuttings produced by a drill in mining through a soluble mineral deposit from being dissolved by the action of the water applied to move the chips or cuttings, consisting of applying at the point of contact of the drill with the mineral a saturated fluid charged or saturated with the mineral in solution which is being perforated.

5. The process described of preserving the integrity of the core or cuttings produced by a drill in mining through a soluble mineral deposit or stratum from being dissolved by the action of the water applied to cool the drill, consisting of applying at the point of contact of the drill with the mineral a saturated fluid saturated with the mineral in solution which is being perforated.

GEORGE R JARVIS.

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