(No Model.) 2 Sheets—Sheet 1.

O. TERP.

ROCK DRILL.

No. 458,601. Patented Sept. 1, 1891.

Fig. 1.

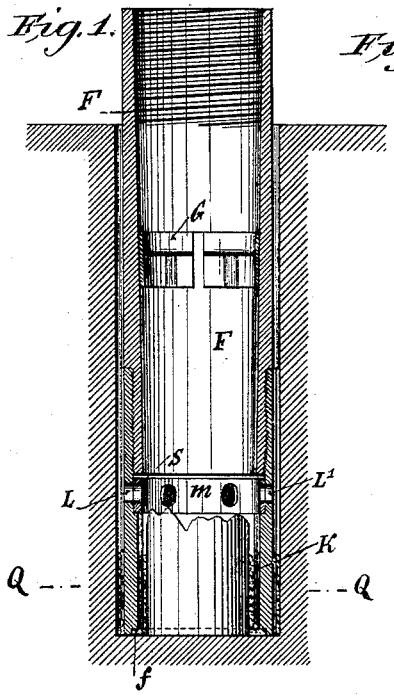


Fig. 3.

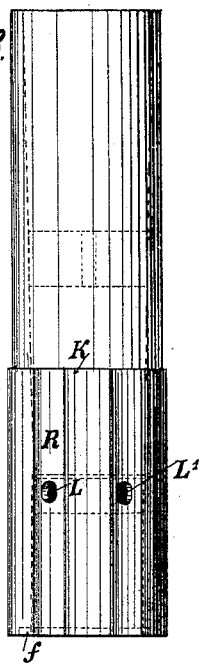


Fig. 2.

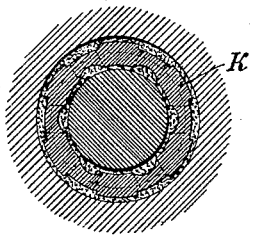


Fig. 4.

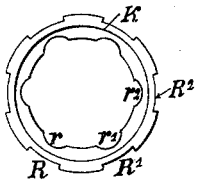


Fig. 5.

Fig. 7.

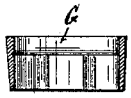


Fig. 6.

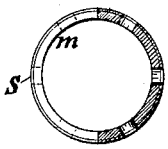
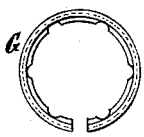


Fig. 8.



Witnesses:
Wm. Wagner.
A. Longlmans

Inventor:
O. Terp
by his attorneys
Poeter & Breesen

(No Model.)

2 Sheets—Sheet 2.

O. TERP.

ROCK DRILL.

No. 458,601. Patented Sept. 1, 1891.

Fig. 9.

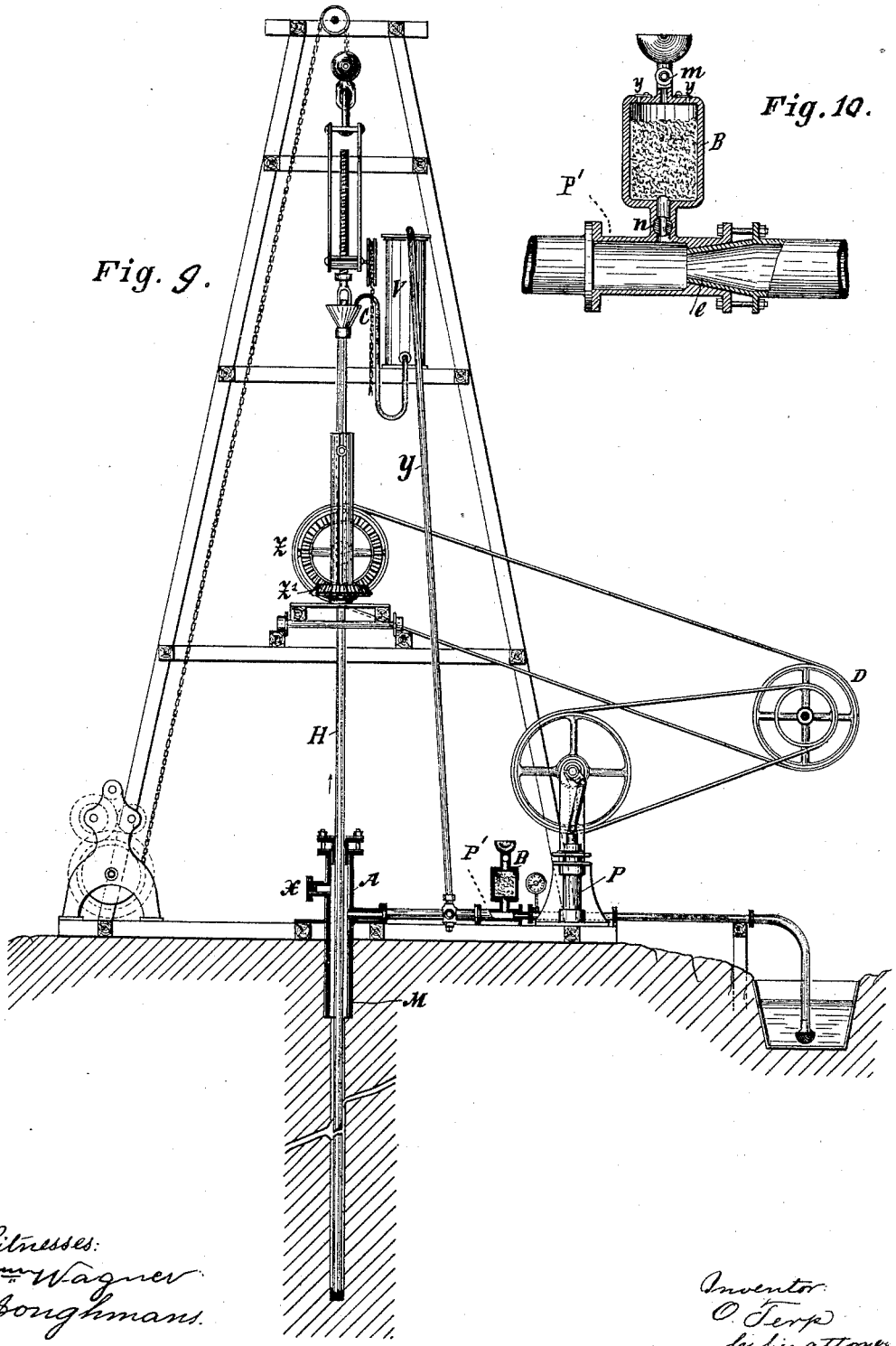


Fig. 10.

Witnesses:
Wm. Wagner
A. Longhmans.

Inventor:
O. Terp
by his attorney
Procter & Briesen

UNITED STATES PATENT OFFICE.

OLAF TERP, OF BRESLAU, GERMANY.

ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 458,601, dated September 1, 1891.

Application filed September 15, 1890. Serial No. 364,959. (No model.) Patented in Belgium December 30, 1889, No. 89,018, and in France January 10, 1890, No. 203,069.

To all whom it may concern:

Be it known that I, OLAF TERP, a subject of the King of Prussia, residing at Breslau, Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Rock-Drills, (for which I have obtained a patent in Belgium, No. 89,018, dated December 30, 1889, and in France, No. 203,069, dated January 10, 1890,) of which the following is a specification.

This invention relates to a rock-drill that is adapted to employ emery as the boring medium.

It consists in the various features of improvement more fully pointed out in the claim.

In the accompanying drawings, Figure 1 is a vertical longitudinal section of my improved rock-drill; Fig. 2, a cross-section on line Q Q, Fig. 1; Fig. 3, an elevation of the drill; Fig. 4, an end view of ring K; Fig. 5, a side view of sieve S; Fig. 6, an end view, partly in section, thereof; Fig. 7, a cross-section through ring G; Fig. 8, an end view thereof. Fig. 9 is a perspective view of the drill and its operating mechanism, and Fig. 10 a longitudinal section through the emery-cup B on an enlarged scale.

The boring-crown consists of a strong hollow cylinder K, of soft iron, copper, zinc, lead, or other metal, or of ebonite, vulcanite, or similar material. In the outer as well as in the inner surface of this cylinder 6 8 longitudinal flutes R R′ R^2 and r r' r^2 are formed. Within these flutes the emery enters while the crown is being rotated. The best emery for the purpose in view is Naxos emery, in grains of a size slightly exceeding that of a pin-head.

Preferably in the upper part of cylinder K apertures L L′ are formed, extending through the flutes of the cylinder. These apertures are covered within the cylinder by a circular wire sieve S, as shown in Figs. 5 and 6. The meshes of the sieve are sufficiently fine to allow the free passage of water, fine stone, and emery-dust produced by boring, but are not wide enough to let those grains of emery pass which are still useful.

To better secure the sieve within the cylinder K in its proper position, the sieve is mounted on a strong metal ring m, having apertures corresponding to the apertures L L′ of the cylinder K. The ring m is supported by shoulders on the inside of cylinder K, and it is further held and secured in position by the core-extracting tube F, to the lower end of which the crown or cylinder K is screwed. The inner face of the core-extracting tube F is tapered downwardly, as usual, and within it a slotted springy ring G is placed. When the boring-rods are being lifted, this ring passes down to firmly grasp the core of rock around which the circular groove has been worked. As the boring-rods are lifted further up, the core of rock is broken off at its base by the ring.

In use a sufficient quantity of emery is fed to the bottom of the boring-hole to fill the inner and outer flutes of the crown to about half their height. Recesses f at the lower end of the boring-crown are also filled by the emery, and the lower end or edge of the crown closes tightly up against the bottom.

As a considerable amount of friction is produced by the action of the revolving crown and the emery grinding into the rock, it is necessary to cool the working parts and also to carry off the boring and emery dust. This double effect is obtained by a current of water fed down between the hollow boring-rods and the inner surface of the boring-hole, and thence between the surface of said hole and the core-extracting pipe F. This current then enters through the apertures L L′ and the sieve S into the hollow boring-crown, in which the water rises until it flows out at the top of said rods. The useful emery-grains at the bottom of the boring groove or hole and below the apertures L L′ are not brought into contact with the current of water. They rest within what might be called a "dead stratum" of water, the temperature of which is kept low, as the surplus of heat produced by friction is communicated to and carried off by the current of water entering above said stratum and rising to flow out at the top. The rinsing-current accordingly will only carry off the fine boring-dust produced between the boring-crown and the core of rock around which the circular groove is being worked. This dust, as well as the fine powder of emery

produced by the wear of the emery-grains, passes through the meshes of the sieve, and both dust and powder are carried off by the rising water as soon as they pass up beyond the apertures L L′ through which the current enters.

Fig. 9 represents a boring-platform with all the apparatus required for sinking a boring-hole into a rock and for rinsing it by a current of water. Rotary motion is imparted to the boring-rods by a belt from a pulley D of an engine and by bevel-gearing Z Z′, driving the hollow boring-rods H. A pump P supplies water under sufficient pressure for rinsing the boring-hole. This water enters through pipe P′, the hole at A, and escapes from the hollow rods at C. On the second story of the platform a small tank V is provided, which is filled by a pipe Y. From this tank a current of water is from time to time fed down in an opposite direction from that of the main current. The auxiliary current serves to wash out and carry away the boring-dust and fine emery-powder that may have remained on the bottom. To effect this washing or rinsing, the boring-rods are lifted from the bottom of the hole to the height of a few millimeters.

To compensate for the loss of emery-grains which in the course of working are reduced to powder, fresh quantities of emery-grains must be fed down to the working-faces of the boring-crown. The inner flutes of the crown may be supplied by simply pouring the emery-grains directly into the hollow boring-rods H; but for the outer flutes of the crown another way of feeding the grains must be provided. To effect this, I provide a cup or casing B, Fig. 10, communicating with the pipe P′, that comes from the pump P. This cup may be tightly closed by cocks *m* and *n* against the entrance of air and of water. The cup is filled with the emery that is to be fed down to the outer flutes of the crown K. The upper cock *m* is then closed and the lower cock *n* opened. The jet of water injected into pipe P′ from pump P through a conical nozzle *e* will carry the emery off from the cup B and will feed it down to the bottom of the groove. Small apertures *y* in the cup B, and having suitable lids, admit the air while the emery is passing down, and thus prevent the formation of a vacuum, which would interfere with the proper action of the parts.

The rinsing operation may as well be carried out by following the opposite direction from that before described—*i. e.*, the current of water may be fed down through the hollow boring-rods and rise from the core-extracting tube F. In such case the end of pipe Y should be joined to the hollow rods H by a ball-joint and the screw-plug removed from the branch *x* of the stuffing-box pipe M. The feeding of the emery should then of course take place in a direction opposite to that before described.

What I claim is—

A tubular rock-drill provided with a series of grooves on its inner and outer surfaces and with openings L, in combination with a sieve S, covering said openings, substantially as specified.

In testimony whereof I hereunto sign my name, in the presence of two subscribing witnesses, this 1st day of August, 1890.

OLAF TERP.

Witnesses:
H. J. DUNLAP,
N. H. MUSSELMAN.