A. AVERY.

ROCK DRILL.

APPLICATION FILED NOV. 16, 1907.

945,209.

Patented Jan. 4, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

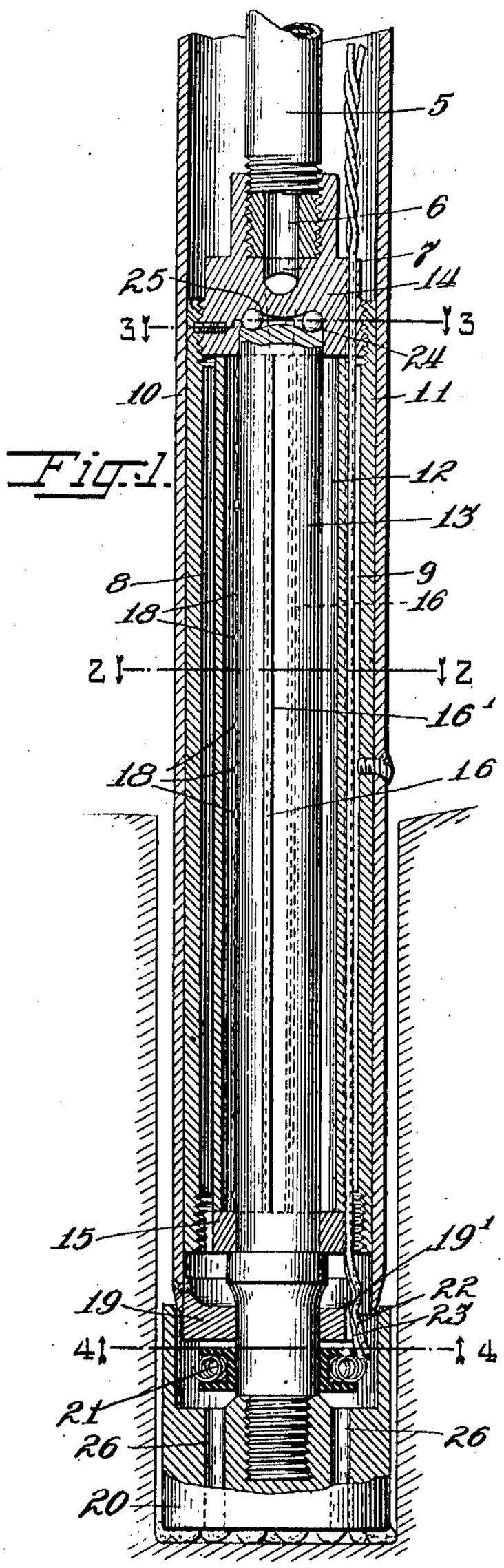
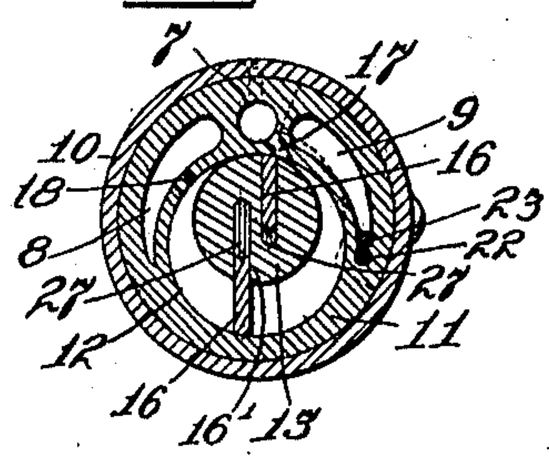


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 5.

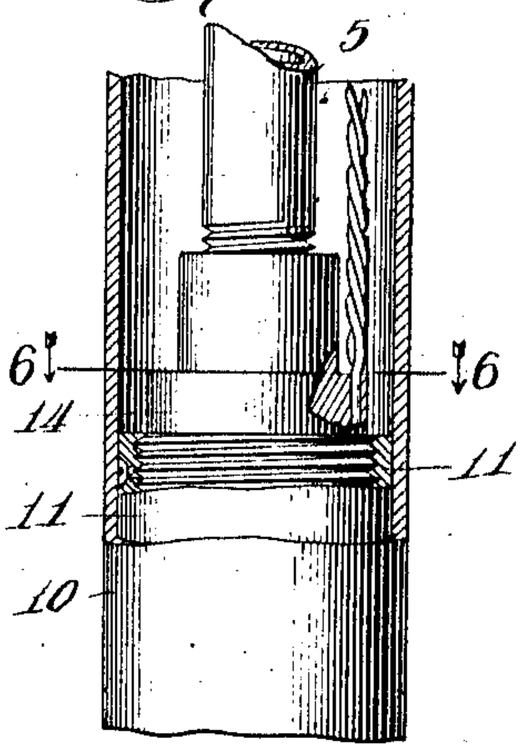


Fig. 6.

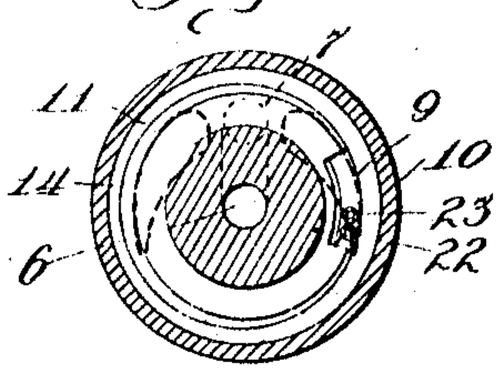


Fig. 3.

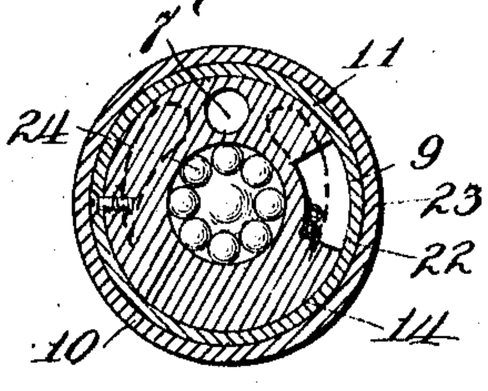
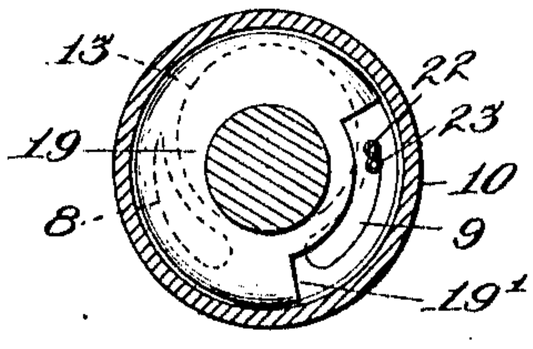


Fig. 4.



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UNITED STATES PATENT OFFICE.

ADDISON AVERY, OF CHICAGO, ILLINOIS.

ROCK-DRILL.

945,209. Specification of Letters Patent. Patented Jan. 4, 1910.

Application filed November 16, 1907. Serial No. 402,535.

To all whom it may concern:

Be it known that I, ADDISON AVERY, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification.

My invention is an improvement in rock drills, and the objects of my improvement are, first, to increase the efficiency of existing devices; and, second, to provide electrical means for applying heat in the locality of the cutter-head.

An important feature of my improvement consists in a fluid deflector at one end of the engine to deflect the fluid outwardly.

With the above and other objects in view, this invention consists in the novel features and in the combination and arrangement of parts hereinafter more specifically described, illustrated in the drawings, and particularly pointed out in the claims hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings forming a part of this specification wherein like numerals of reference indicate corresponding parts throughout the several views, and in which—

Figure 1 is a vertical central section partly in elevation. Fig. 2 is a cross section on line 2—2 of Fig. 1. Fig. 3 is a section on line 3—3 of Fig. 1. Fig. 4 is a section on line 4—4 of Fig. 1. Fig. 5 is an elevation partly broken away of the upper portion of the device shown in Fig. 1, and Fig. 6 is a section on line 6—6 of Fig. 5.

One embodiment of my invention will now be described.

The reference numeral 5 denotes a supply pipe or drill rod made of pipe which serves as a fluid inlet to conduct the power fluid to the fluid-pressure motor through fluid passage 6 into the interjacent passage 7, situated between the exhaust chamber 8, and the dust passage 9. A rotary motor is secured to the lower end of the casing 10 with its piston drum preferably disposed axially of the casing. The motor shown consists of a shell 11, with a cylinder 12 eccentric therein. The piston drum 13 is mounted in bearings in the upper head 14, and the lower head 15, axially of the shell. The piston drum is fitted with a plurality of piston blades 16, in slots 16′ (shown in Fig. 2). By disposing the slots 16′ on opposite sides of the longitudinal axis of the piston drum and extending them past the axis of the drum a greater exposure of blade to the power fluid is possible. This construction gives a greater power than is otherwise obtainable from an engine of small diameter. The upper and lower cylinder heads are secured to the cylinder by screw threaded connection. The upper head 14 is secured to the lower end of the supply pipe 5 by means of screw threads. A segment of the upper head is cut away to provide a continuation upward or outward of the dust chamber, and the lower head is correspondingly cut away to permit the fluid to pass out at the lower end of the exhaust chamber and pass upward or outward through the dust chamber. There is a series of apertures, as shown at 17 (in Fig. 2), extending longitudinally of the cylinder to afford passage for the fluid from the interjacent passage into the cylinder. A corresponding series of apertures 18, but preferably somewhat larger in diameter, permits the fluid to discharge from the cylinder into the exhaust chamber 8. At the lower end of the casing is secured a non-rotatable fluid deflector 19, with a concave upper surface to turn the fluid outwardly. The deflector is secured to the casing preferably by means of a screw, shown in Fig. 1. In the region of the cutter-head 20 there is provided a heating element 21 which may be of any suitable or desired construction. The form shown in Fig. 1 is a coil of high-resistance wire connected at each end with a suitable conductor of electricity 22 and 23, thus giving an all metallic circuit for the current of electricity. Should the material at the drill head become frozen by the expansion of compresed air or otherwise, it is desirable to have means available to thaw the same.

Anti-friction balls 24 are placed between recessed bearing 25 of the upper head 14 and the upper end of the piston drum. The cutter-head is provided with a plurality of openings 26 longitudinally therethrough for the purpose of withdrawing the dust and cuttings from the path of the head. This is effected by the suction of the outrushing fluid through the dust passage. As indicated, the cutter-head is tubular and is actuated by the fluid pressure motor. The cutting surface carries carborundum points or

other material of a sufficient degree of hardness. The piston blades are urged outwardly by a length of wire curved lengthwise and placed in the radial slot before the blade is inserted, shown at 27 (Fig. 2).

The reference character 19′ indicates the cut away portion of the deflector to permit the dust to pass back through the dust passage.

In operation, the fluid, under pressure, is delivered into the pipe 5 passing to the motor, and effects the rapid rotation of the cutter-head in a manner well known. The dust and cuttings are withdrawn by the outward current induced by the outrushing fluid through the dust passage of the motor. The casing may be fed downwardly as required by the progress of the work.

Manifestly, changes in the form and arrangement of parts may be resorted to without departing from the spirit and scope of my invention. Therefore, I do not limit myself to the exact construction shown and described in the preferred form of my improvement.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters-Patent, is—

1. In an engine of the class described, the combination of a piston cylinder positioned eccentrically therein, a piston drum disposed axially of the engine and carrying a reciprocating blade, a fluid deflector near one end of the engine cylinder, and an electrical heat element near the fluid deflector.

2. In a rock drill, a casing, a fluid pressure motor secured in the casing, and an apertured cutter-head rotated by the motor, in combination with an electrical heat element in the region of the cutter-head.

3. In a rock drill, a fluid pressure motor, and an apertured cutter-head rotated by the motor, in combination with an electrical heat element in the region of the cutter-head.

4. In a rock drill, a fluid pressure motor, a fluid deflector near one end of the motor, and an apertured cutter-head rotated by the motor, in combination with an electrical heat element in the region of the cutter-head.

In testimony whereof I affix my signature in presence of two witnesses.

ADDISON AVERY.

Witnesses:
S. Elva Kellogg,
Walter Wagner.