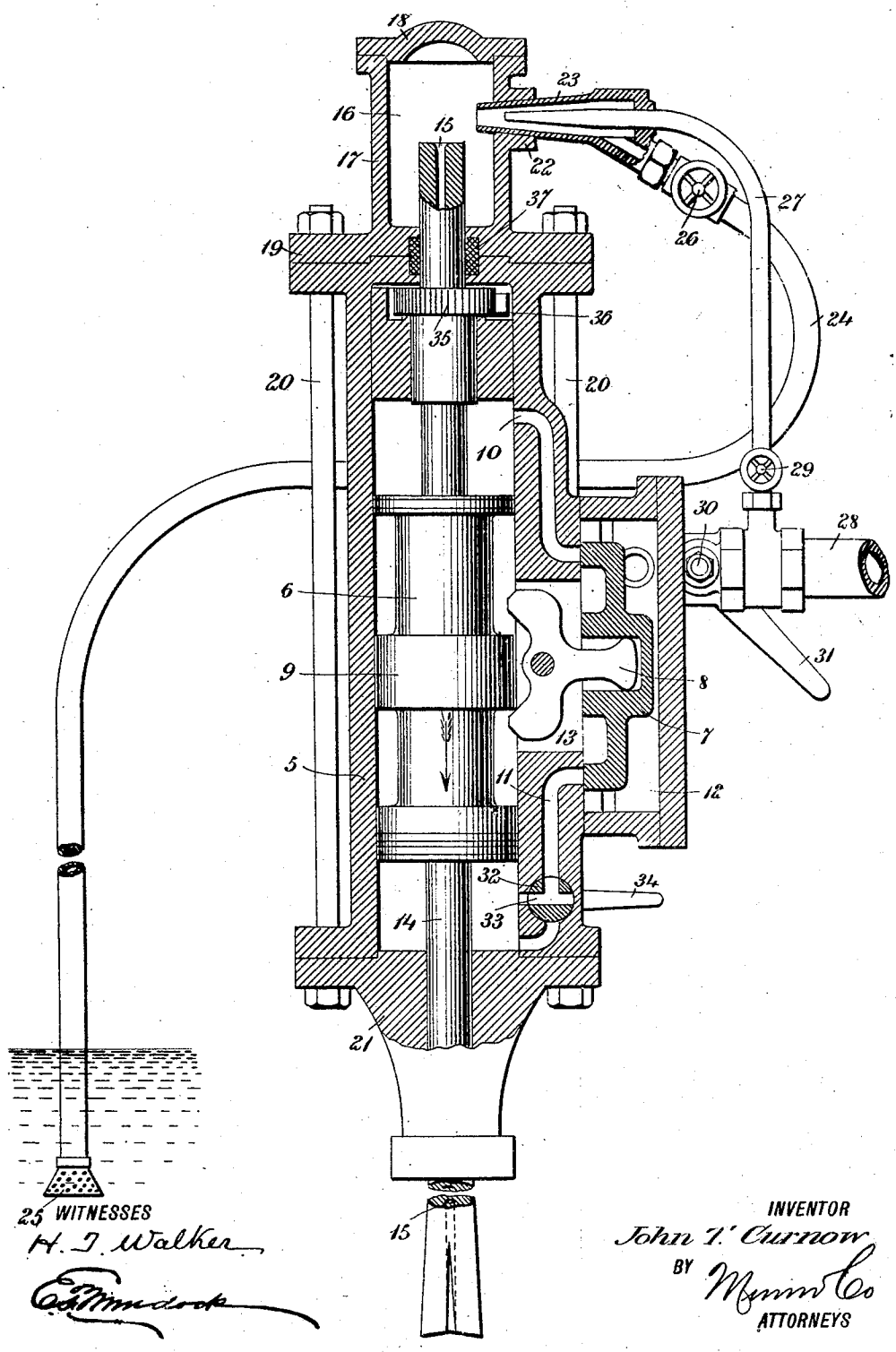
J. T. CURNOW.

ROCK DRILL.

APPLICATION FILED OCT. 16, 1913.

1,102,012. Patented June 30, 1914.



WITNESSES

H. T. Walker

INVENTOR

John T. Curnow

BY Munn & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHN THOMAS CURNOW, OF PALATKA, MICHIGAN, ASSIGNOR OF ONE-HALF TO ARNOLD GIESEN, OF PALATKA, MICHIGAN.

ROCK-DRILL.

1,102,012. Specification of Letters Patent. Patented June 30, 1914.

Application filed October 16, 1913. Serial No. 795,483.

To all whom it may concern:

Be it known that I, JOHN T. CURNOW, a citizen of the United States, and a resident of Palatka, in the county of Iron and State of Michigan, have invented a new and Improved Rock-Drill, of which the following is a full, clear, and exact description.

Among the principal objects which the present invention has in view are: to provide a drill and means for operating the same, adapted to introduce an aerated water-jet at the point of application of the drill head; to provide simple and efficient means for controlling the volume and aeration of the water-jet; and to provide manually-operated means for cushioning the blow of a drill, to avoid breaking the same.

The drawing is a vertical section taken on the median line of a rock drill and jetting attachment constructed and arranged in accordance with the present invention.

The cylinder 5, the double-headed piston 6, the valve 7, and the rocking tappet arm 8 are of conventional construction and arrangement. As in other drills, the tappet collar 9 affects the tappet arm 8 to move the valve 7 to alternately and successively establish communication between passages 10 and 11 with a pressure-fluid chest 12 and an exhaust chamber 13, whereby the pressure-fluid is alternately introduced, to expand against the opposite ends of said piston 6.

The drill rod 14 is bored to provide a circular passage 15, said passage extending lengthwise through said rod, and opening between the bits at the point thereof and from the opposite end, into the chamber 16. The chamber 16 is formed in a head 17, having a cover 18 suitably secured to close said chamber. The head 17 is provided with a bolting flange 19 to receive tie rods 20, which are employed to hold a head 21 in position on the cylinder 5, to close the lower end thereof and to form a runway for the drill rod 14.

The head 17 is provided in the side wall thereof with a bored boss 22. The boss 22 holds in service relation a nozzle 23 which extends to within the chamber 16. The nozzle 23 is suitably coupled to a flexible hose-pipe 24, at the end whereof a sieve 25 is mounted for immersion in a suitable supply of water, to prevent the passage within the hose-pipe, of detritus or rubbish, which would clog passage 15. Water is drawn from the supply through the pipe 24, in quantities regulated by a valve 26 which is disposed adjacent the nozzle 23. The force moving the water is produced by a steam or compressed-air jet thrown from the end of a gooseneck 27 through the nozzle 23 and the contracted end thereof. As in similar apparatuses, the force of the steam or compressed air passing from a supply pipe 28 through the gooseneck 27, rarefies the air in the nozzle 23, to cause a partial vacuum to lift the water from the supply to said nozzle. The water so lifted is then emitted from said nozzle into the chamber 16, the expanding fluid operating to break up or aerate said water as delivered, and to charge the water with a supply of vapor under pressure. This vapor passes from the chamber 16 downward through the passage 15 to the bit or operating point of the drill. The quantity of fluid permitted to pass from the supply pipe 28 to the gooseneck 27 is regulated by a hand-operated valve 29, which is disposed, as shown in the drawings, adjacent the valve 26, so that the attendant of the drill may conveniently operate either valve, to vary the proportion of air and water held in the vapor in the chamber 16. The expansive fluid employed to operate the piston 6 and to lift the water through the pipe 24, may be either steam or compressed air. Either fluid is admitted by manipulating a throttle valve 30 to permit said fluid to pass into the chest 12. It will be noted that a throttle lever 31, and the valves 26 and 29 are disposed in relatively close arrangement, for the convenience of the operator, who may thereby vary the speed of operation of the drill, the quantity of water delivered to the chamber 16 and operating point of the rod 14, or the amount of expansive fluid employed to lift and mix with the water, when delivered from the pipe 24.

To provide against accidental damage, when operating the drill, I provide a valve 32 having a three-way passage 33 and an operating handle 34. By manipulating the valve 32, with the handle 34, an operator can at any time divert the fluid passing through the passage 11 to enter the chamber of the cylinder 5 at a point higher than the normal inlet of said passage 11. The height of the piston, when passing the temporary inlet provided by the valve 32, would operate to trap the fluid in the cylinder below

said opening. The quantity of fluid thus trapped being thus relatively large, the insurance for cushioning the blow of the drill and the piston 6 connected therewith is materially increased.

In operation, the water and expansive fluid enters the chamber 16, and from thence is conveyed through the passage 15 for delivery at the inner end of the hole which is being bored. The saturated expansive fluid thus introduced into the hole operates to effectively clean the hole, by blowing the debris therefrom, and to moisten and cool the tool point, when in operation.

The rod 14 is extended through, and operatively connected with, a ratchet wheel 35, to rotate the same retroactively on the fall of the rod, and to be engaged in like manner by said wheel when said rod is lifted, said wheel and said rod being alternately rotated on their axes. To hold the wheel against retractive rotation, a pawl 36 is provided. The construction and arrangement of the ratchet wheel 35 and pawl 36 is conventional.

Intermediate the cylinder 5 and the chamber 16, a suitable stuffing box to hold packing 37, is provided. The packing 37 serves to prevent the leakage of the expansion fluid from the cylinder 5 to the chamber 16.

It will be understood that by mounting the drill rods in bearings in the head 21, and in the division wall separating the cylinder 5 and the head 17, any tendency to cant, and consequent cramping of said rod, are prevented.

Claims:

1. A rock drill, comprising an engine having a power cylinder, a reciprocating piston mounted therein, and a valve-actuating mechanism; a chamber disposed in line with said cylinder; an open-ended hollow drill rod operatively connected with said piston to extend through said cylinder and into said chamber; means for connecting said chamber and a water supply, said means embodying a nozzle; and means, embodying a relatively small delivery nozzle operatively mounted within said first-mentioned nozzle, to rarefy the air in said first-mentioned nozzle, to draw a supply of water into said nozzle.

2. A rock drill, comprising an engine having a power cylinder, a reciprocating piston mounted therein, and a valve-actuating mechanism; a chamber disposed in line with said cylinder; an open-ended hollow drill rod operatively connected with said piston to extend through said cylinder and into said chamber; means for connecting said chamber and a water supply, said means embodying a nozzle; means embodying a relatively small delivery nozzle operatively mounted within said first-mentioned nozzle to rarefy the air in said first-mentioned nozzle, to draw a supply of water into said nozzle; and valves suitably disposed intermediate the water-supply and said nozzles, to regulate the supply of water thereto.

3. A rock drill, comprising an engine having a power cylinder, a reciprocating piston mounted therein, and a valve-actuating mechanism; a chamber disposed in line with said cylinder; an open-ended hollow drill rod operatively connected with said piston to extend through said cylinder and into said chamber; means for connecting said chamber and a water supply, said means embodying a nozzle; means, embodying a relatively small delivery nozzle operatively mounted within said first-mentioned nozzle, to rarefy the air in said first-mentioned nozzle, to draw a supply of water into said nozzle; valves suitably disposed intermediate the water supply and said nozzles, to regulate the supply of water thereto; and a valve to regulate the supply of expansive fluid to said nozzles.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN THOMAS CURNOW.

Witnesses:

AUGUST J. WAFFEN,

CAROLINE A. LUND.