L. L. SCOTT.

INTERNAL COMBUSTION ROCK DRILL.

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915,893. Patented Mar. 23, 1909.

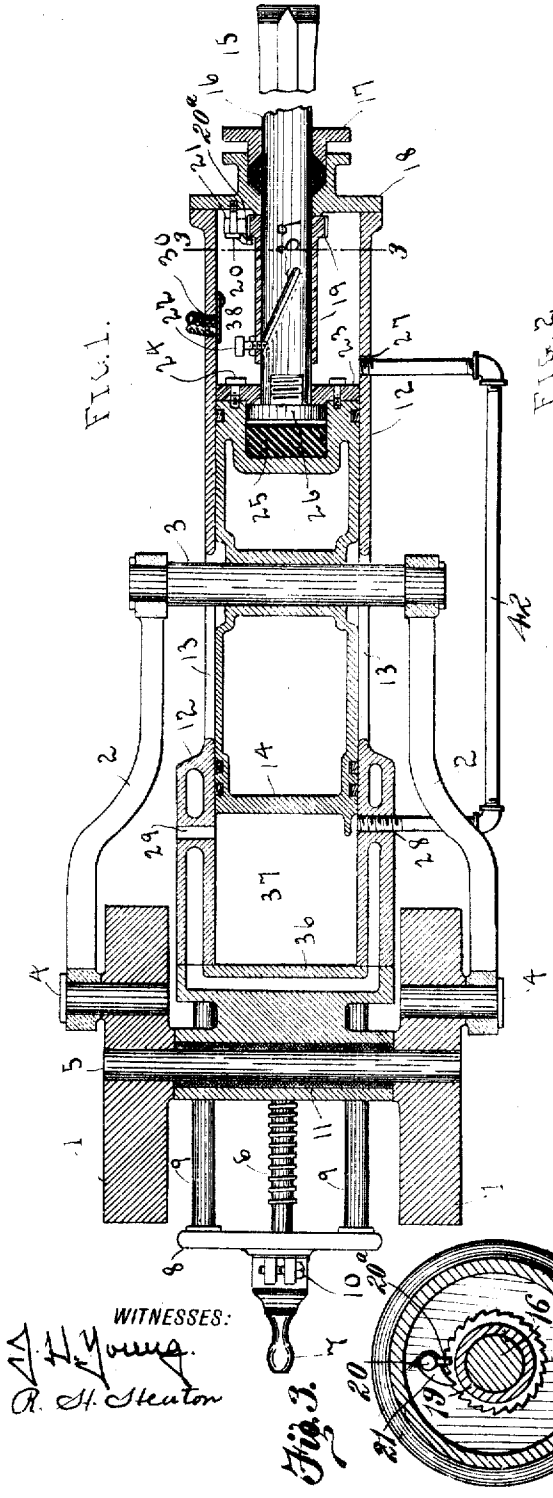


Fig. 1.

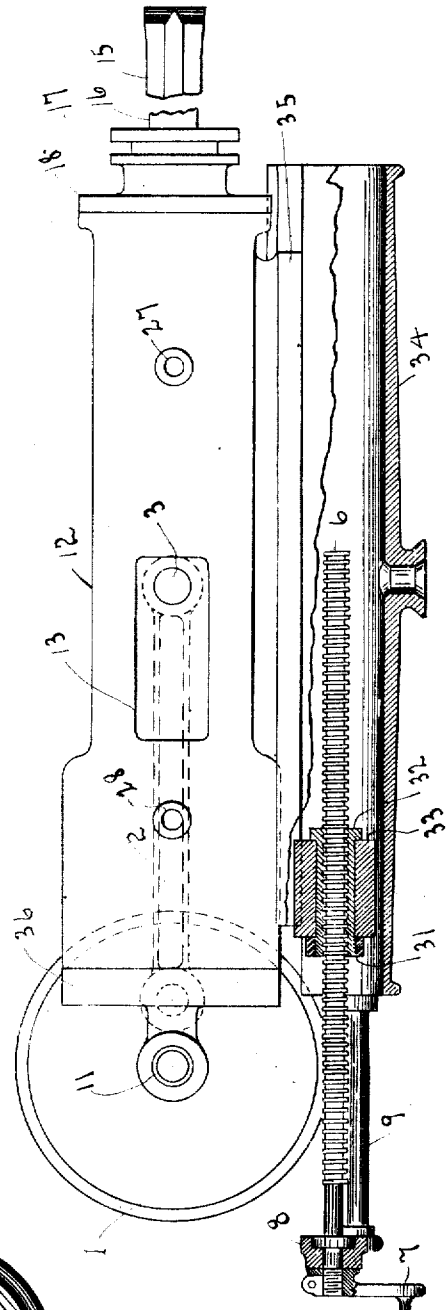


Fig. 2.

Fig. 3.

WITNESSES:

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INTERNAL-COMBUSTION ROCK-DRILL.

No. 915,893. Specification of Letters Patent. Patented March 23, 1909.

Application filed May 11, 1907. Serial No. 373,173.

To all whom it may concern:

Be it known that I, LEWIS L. SCOTT, a citizen of the United States, residing at Joplin, in the county of Jasper and the State of Missouri, have invented new and useful Improvements in Internal-Combustion Rock-Drills, of which the following is a specification.

My invention relates to an improvement in gas actuated rock drills, and more particularly to the method of attaching the drill rod to the source of power, and the method of rotating the drill bit.

The objects of my invention are; 1st, to provide a gas rock drill that will be strong and able to stand the racket that it is required to stand; 2nd, to have the fewest number of parts, which will therefore simplify the drill; 3rd, to provide a new and novel construction for connecting the drill rod to the source of power, and also a cushion for relieving the blow of the drill rod against the main body of the drill; 4th, to provide a simple, durable and efficient means for rotating the rock drill bit of my rock drilling engine. I attain these objects by the mechanism illustrated in the accompanying drawings, in which,

Figure 1 represents a top plan view (shown in section), of my rock drilling engine. Fig. 2 represents a side elevation (shown partly in section), of my improved rock drilling engine. Fig. 3 is a section on the line 3—3 of Fig. 1.

Similar numerals of reference refer to similar parts through all drawings.

In constructing my internal combustion rock drill I provide a specially constructed two cycle gas engine, which has a cylinder 12, closed at both ends. The explosive chamber 37 being in one end of the cylinder 12, and the chamber 38 (which receives the charge of gas and air), being in the other. The explosive end of the cylinder 12 is closed by the head 36, which also serves to support the bearing 11 which carries a shaft 5. The fly wheels 1, are keyed to the shaft 5, and are connected to one of the ends of connecting rods 2, by means of the pins 4. The other ends of the connecting rods 2 are connected to the piston 14 by means of the pin 3. The cylinder 12 is provided with an exhaust port 29, and an inlet port 28, also with an inlet port 30, and an exhaust port 27. The ports 27 and 28 are connected together by any suitable means (such as a hose or a pipe 42), for a purpose to be more fully described.

The cylinder 12 has the slots 13 cored out of opposite sides, so as to allow the piston pin 3 to move back and forth. The drill rod 16 is connected at one end to the drill bit 15, (by any suitable chucking device), and at the other end to the piston 14. The drill rod 16 is drilled and tapped at its inner end to receive the disk 26.

A plate 23 is fixed to the piston 14, by means of cap screws 24, and bears against the disk 26, said disk 26 being fixed to the drill rod 16. The piston 14 is bored out to receive a rubber disk 25 which fits between the piston and the disk 26; said disk 25 serves the purpose of cushioning the blow against the main body of the drill, when the drill bit strikes the rock. The chamber 38 is closed by the cylinder head 18, which also serves as a stuffing box around the reciprocating drill rod 16. A casting 19 fits loosely over the drill rod 16; one end of said casting 19 is made larger in diameter than its other end, and on the large diameter end, teeth 19^a are cut around the circumference, making it into a common ratchet wheel. This end of the casting 19 bears on the inner side of the cylinder head 18, and also against a projection 20^a on the screw 20. By this construction the casting 19 is free to revolve around the drill rod 16, but cannot move back and forth, on account of the head 18 on one side and the projecting screw on the other. The screw 20 is secured to the cylinder head 18, and carries the pawl 21, which works in the ratchet formed on the casting 19. The drill rod 16 has a spiral groove 39 milled partly around its circumference; the set screw 22, is secured to the casting 19, and works in the spiral groove 39, for a purpose to be more fully described. The arms 35 and the lug 33 form a part of the casting 12. The cylinder 12 and connected parts are carried by some suitable supporting frame, such as 34, on which they are adjustable by a screw 6 or by some other equivalent and convenient device, in connection with which the usual tripod support may be utilized.

The operation of my internal combustion rock drill is as follows: The mixture of gas and air is drawn in (through any suitable check valve), at the port 30; on the downward stroke of the piston 14 the gas and air is compressed, so that when the piston 14, uncovers the port 28, the mixture of gas and air rush into the chamber 37; the ports 27 and 28 being connected together by any suit-

able pipe or hose connection 42 as aforesaid. On the upward stroke of the piston 14, the mixture of gas and air in the chamber 37 is compressed and exploded (the explosion being caused by an electric spark in the chamber 37, commonly used on gas engines), at the same time a new charge is drawn in the chamber 38. By this arrangement we get an explosion on each downward stroke of the piston 14. After the engine is in motion the drill can be fed down to the rock by means of the screw 6. On each upward stroke of the piston 14 the drill rod 16 is rotated, *i. e.*, when the drill rod 16 moves upward, the casting 19 (which is fixed in the spiral groove 39 of the drill rod 16, by means of the set screw 22), is held firm by the pawl 21, working in the ratchet end of the casting 19, and the drill rod 16 is forced to revolve; on the downward stroke of the drill rod 16 the pawl 21 releases the ratchet of the casting 19 and the said casting 19 revolves so that the pawl 21 takes a new hold on the ratchet 19.

It will also be noted that each time the drill bit 15 strikes the rock, that the jar of the blow is relieved from the body of the drill, by means of the rubber cushion 25.

The casting 19 forms an extension of the ratchet hub, which extension incloses the spirally arranged groove 39. By means of this extension an extra long stuffing box is avoided which would be necessary to avoid leakage if the pin 22 was located near the ratchet.

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

In a device of the kind described, a cylinder, a piston, a drill rod carried by the piston and working through an end of the cylinder, a ratchet rotatable loosely upon said drill rod and within the cylinder, a screw carried by the cylinder head and extending inwardly beyond said ratchet, a projection carried by said screw loosely engaging the inner face of the ratchet, a pawl pivoted by said screw and engaging the ratchet teeth, a casting forming an extension of the hub of the ratchet and extending inwardly toward the piston and inclosing a portion of the drill rod, said rod having a spirally arranged groove formed on the portion inclosed by said extension and at a distance from the ratchet, and means carried by said extension for engagement with said groove, said means being arranged adjacent the inner end of the said extension and at a distance from the said ratchet, as and for the purpose set forth.

In testimony whereof I have hereunto set my hand this 26th day of March, A. D. 1907.

LEWIS L. SCOTT.

Witnesses:
R. H. HEATON,
MRS. GEO. DORFELD.