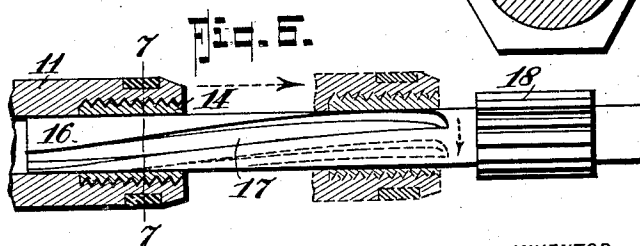
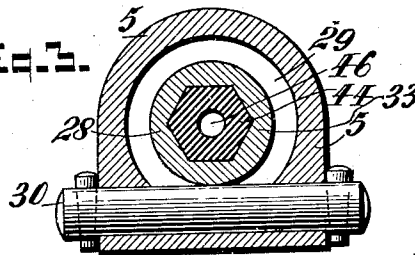
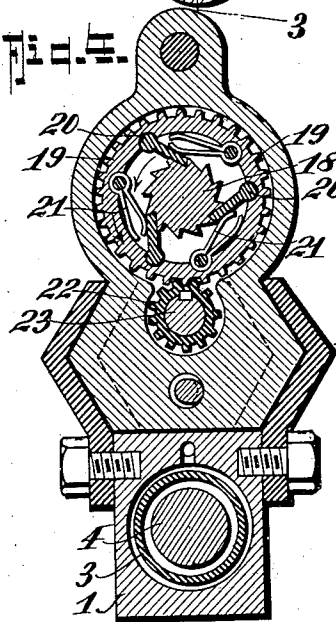
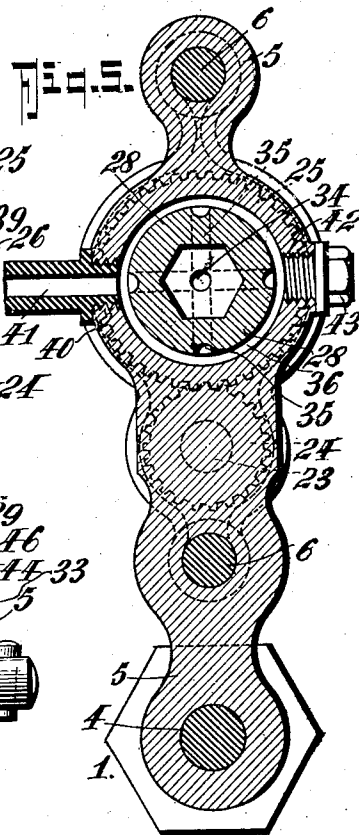
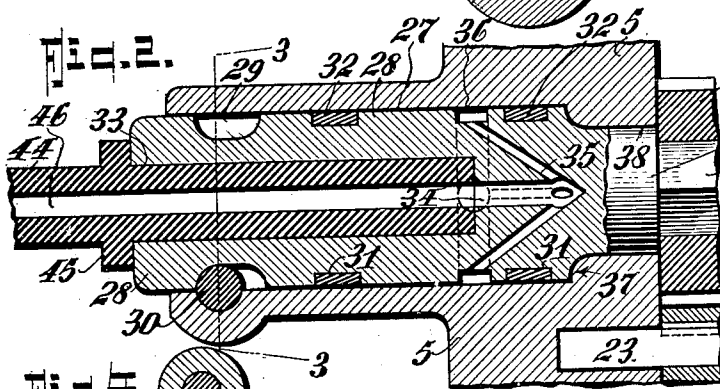
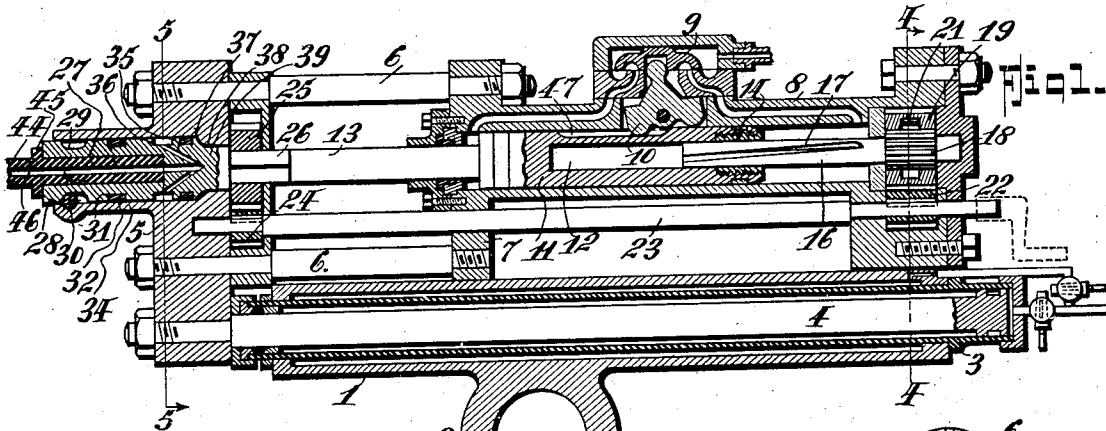


C. J. SMITH.
 ROTATING MECHANISM FOR ROCK DRILLS.
 APPLICATION FILED JULY 22, 1912.

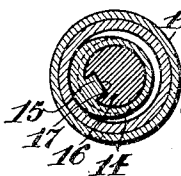
Patented May 13, 1913.

1,061,788.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ROTATING MECHANISM FOR ROCK-DRILLS.

1,061,788.

Specification of Letters Patent.

Patented May 13, 1913.

Original application filed February 26, 1912, Serial No. 679,956. Divided and this application filed July 22, 1912. Serial No. 710,773.

To all whom it may concern:

Be it known that I, CLARK J. SMITH, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented certain new and useful Improvements in Rotating Mechanism for Rock-Drills, of which the following is a specification.

My invention relates to certain new and useful improvements in rock drills of the reciprocating hammer type, and the present invention particularly has for its object to provide a drilling engine with an improved drill chuck through the medium of which the drill tool may be turned on its longitudinal axis, and a scavenging fluid may be forced through the chuck and drill to blow out or wash out the dirt from the cuttings of the hole being bored.

Generally, the invention comprises a drilling engine having a front supporting member or body in which the chuck is rotatably mounted, the chuck having a stem to co-operate with the hammer of the engine proper, and means are provided for effecting a turning moving of the chuck, preferably coöperative with the action of the hammer.

More subordinately, the invention resides in those novel details of construction, combination and arrangement of parts, all of which will be fully described, and then be specifically pointed out in the appended claims, reference being had to the accompanying drawings, in which:—

Figure 1, is a central vertical longitudinal section of the machine embodying the invention. Fig. 2, is an enlarged detail section of the support and chuck showing the manner of mounting the chuck in the support, and the manner of delivering the scavenging agent to the tool. Fig. 3, is a cross section on the line 3—3 of Fig. 2. Fig. 4, is a cross section on the line 4—4 of Fig. 1. Fig. 5, is a cross section on the line 5—5 of Fig. 1. Fig. 6, is a detail view of a part of the chuck rotating mechanism. Fig. 7, is a cross section on the line 7—7 of Fig. 6.

Referring now to the accompanying drawings, in which like numerals and letters of reference indicate like parts in all the figures, 1 is the main supporting body, which has a member 2, through the medium of which the machine may be mounted on a suitable column, tripod or other device, for

sustaining the same in position for work, the sustaining device not being shown in the drawing. The support 1 holds the telescoping feeding mechanism 3—4, which may be of any approved type, and on the front of the movable feeding piston rod 4, the chuck holding support or casting 5, is mounted.

8 designates the drilling engine proper, which has a projection 7, at its front, to which the spacing rods 6 are secured, the rods 6 being secured to the front chuck holding support 5, as indicated best in Fig. 1 of the drawings. The drilling engine proper 8 has the valve chest in which the controlling valve 9 is located, the valve 9 being of the slide type, and automatically operated by the rocker 10, that projects into a groove 47, in the hammer piston 11, thereby holding the hammer piston from turning on its longitudinal axis.

The construction of the engine proper *per se* may be of any approved type and a detail description thereof is thought to be unnecessary.

The hammer piston 11 in my invention is bored at 12 to receive the stub shaft 16 that has a spiral keyway 17 to receive the key 15 on the plug sleeve 14, that is secured to the hammer piston 11 whereby when the hammer piston 11 reciprocates, a rocking motion will be imparted to the stub shaft 16. The stub shaft 16 carries a ratchet 18, which, through the medium of pawls 20, imparts a uni-directional rotation to the gear 19, which meshes with the pinion 22 on the turning shaft 23, hereinafter again referred to. The pawls 20 are held in contact with the ratchet 18 by light springs 21.

The rotatable shaft 23 at the end opposite the pinion 22 carries another pinion 24 that meshes with a gear 25 on the squared end 26 of the chuck 28, so that the chuck 28 may be turned on its longitudinal axis as the piston 11 moves backwardly, but will not be turned during the forward movement of the piston 11. The piston 11 includes the ram 13 which is adapted to impact the shank 26, of the chuck 28, to drive the drill into the cut. The supporting member 5 has a chuck chamber 27, in which the chuck 28 is rotatably mounted, the chamber 27 merging with a reduced portion 38 to receive the re-

duced portion 39, of the chuck 28, and thereby form a shoulder 37 to prevent movement of the chuck beyond a predetermined position in the direction of the engine proper.

5 The chuck 28 has a wide circumferential groove 29 near its front end to cooperate with the key 30, whereby the chuck will be held from coming out of the support 5, and by reason of the groove being wider than

10 the pin 30, a slight longitudinal movement may be imparted to the chuck when the ram 13 impacts the shank 26. The chuck 28 is provided with two annular grooves 31 spaced apart and containing packing rings

15 32, and between these grooves 31 another annular groove 36 is provided. The groove 36 communicates with the recess 34 in the chuck by means of ducts 35, and the recess 34 delivers axially into the drill bore 33 of

20 the chuck, so as to convey the scavenging agent into the longitudinal bore 46 of the drill tool 44, when it is in position in the chuck as best indicated in Fig. 2 of the drawings. The drill tool 44 has a shoulder

25 45 to abut the front end of the chuck 28 and prevent the leakage of the scavenging agent. The scavenging agent employed may be either compressed air, water, or steam, or

30 compressed air and water, and steam may be used simultaneously. The support 5 is provided with bores 40 and 42, through which the scavenging agent or agents may be admitted. When it is desired to use compressed air or water alone, as the scavenging

35 agent, the pipe 41, which conveys the agent, is tapped into one or the other of the holes in the member 5 (see hole 40), while the other hole 42 is plugged up as at 43, but when two different scavenging agents, such

40 as water and compressed air, are to be employed, both the holes 40 and 42 may be used, one for the air, and one for the water.

In the practical operation of the invention, the scavenging agent is fed into the

45 groove 36, where it travels through the ducts 35 into the recess 34, and is delivered into the bore 46 of the drill tool 44, by which it is conveyed to the cutting end (not shown) of the drill to blow out the debris. On the

50 forward reciprocation of the piston 11, the same will impact the shank 26, and force the tool 44 to make a cut, while on the rearward reciprocation of the piston 11, a partial turn will be given to the shaft 16 in a counter-

55 clock-wise direction in Fig. 4 to correspondingly turn the gear 19 and thereby impart a partial rotation through the gear 22 to the shaft 23 which shaft, in turn, through the gears 24 and 25, imparts a partial rotation to the chuck 28. Inasmuch as the tool bore 33 of the chuck and the tool itself, where it enters the chuck, is of angular form, in cross

60 section, the rotation of the chuck will effect the rotation of the tool.

65 The foregoing described matter is a di-

visional part of my copending application, filed Feb. 26, 1912; Serial No. 879,956.

The turning shaft 23 is projected at the rear end of the machine, (see Fig. 1), so it may be provided with a crank, (see dotted lines Fig. 1), in case the bit should stick in the hole and stop the rotation. By the aid of the crank the rotation of the shaft 23 can be assisted to complete the hole or if the automatic means for rotating the shaft for any cause gets out of operative condition, the shaft 23 may be rotated by hand.

From the foregoing description, taken in connection with the accompanying drawing, it is thought the complete construction, operation and advantages of the invention will be apparent to those skilled in the art to which the invention appertains.

What I claim is:

1. A fluid actuated drilling engine, including a reciprocating hammer piston and means for holding said piston from rotation combined with a drill chuck and means for turning the same, said last named means including a power transmitting shaft and power transmitting and translating connections between said piston and said shaft, and power transmitting connections between said shaft and said chuck.

2. In a drilling apparatus, a drilling engine proper including a reciprocating piston, and means for holding said piston from rotation, a chuck holder carried by said engine, a chuck rotatably mounted in said holder and having a shank to be impacted by said piston, a drill held in said chuck and power transmitting and translating devices connecting said chuck with said engine piston for imparting rotary movement to said chuck as said piston moves in one direction, said power transmitting and translating devices including a power transmitting shaft, and means cooperative with said shaft for effecting the turning operation of said chuck without affecting the action of said piston.

3. In a drilling apparatus, a drilling engine proper including a reciprocating piston, means for holding the piston from rotating within its working chamber, a chuck holder carried by the said engine, a chuck rotatably mounted in said holder and having a shank to be impacted by the said piston, a drill held in said chuck, and power transmitting and translating devices connecting said chuck with said engine piston for imparting rotary movement to the said chuck as the piston moves in one direction, said power transmitting and translating devices including a power transmitting shaft having independent rotary movement and a crank receiving extension.

4. A fluid pressure actuated drilling engine including a reciprocating hammer piston combined with a drill chuck having a shank to be impacted by the piston when

moving in one direction, and means for turning the chuck as the piston moves in a direction reversely to the direction of impacting movement, the said means including a power transmitting shaft including means for rotating the shaft operated by the return movement of the piston, the said shaft being

rotatable independently of the said actuating means, and having a crank receiving extension.

CLARK J. SMITH.

Witnesses:

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HARRY B. SCOTT.