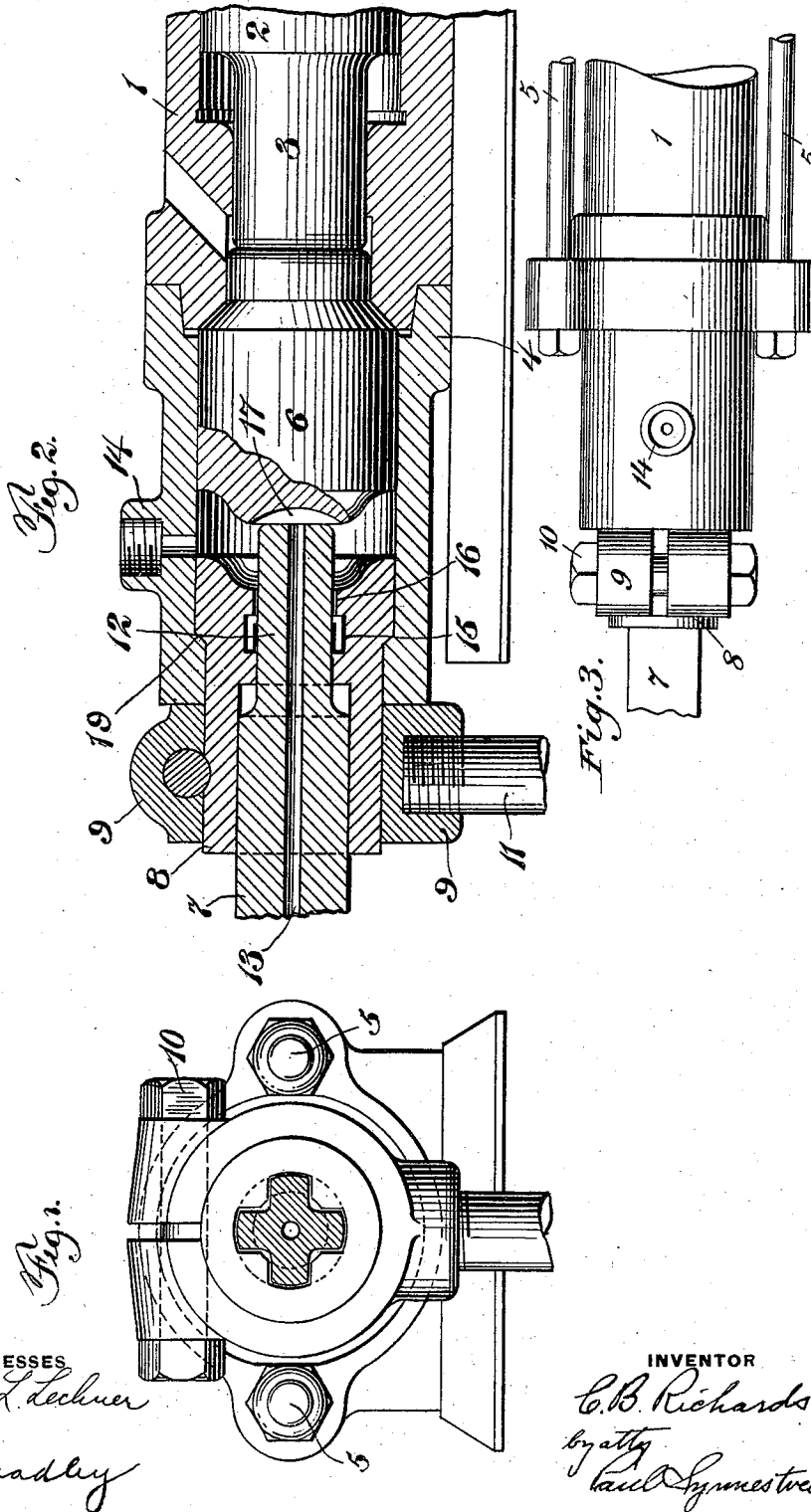


C. B. RICHARDS.
 DRILLING MACHINE.
 APPLICATION FILED NOV. 20, 1908.

966,600.

Patented Aug. 9, 1910.



WITNESSES
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UNITED STATES PATENT OFFICE.

CHARLES B. RICHARDS, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO THE CLEVELAND ROCK DRILL COMPANY, OF CLEVELAND, OHIO, A CORPORATION
OF OHIO.

DRILLING-MACHINE.

963,600.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed November 20, 1908. Serial No. 463,663.

To all whom it may concern:

Be it known that I, CHARLES B. RICHARDS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Drilling-Machines, of which the following is a specification.

The invention relates to drilling machines and particularly to fluid operated rock drills. The invention has for its primary objects: the provision of an improved arrangement of the drill steel and cooperating parts whereby fluid may be supplied to clean the cavity being formed by the drill; and the provision of an arrangement of the character specified wherein the pressure of the cleaning fluid is utilized for forcing the chuck in which the steel reciprocates, tightly against its taper seat in the head. One embodiment of the invention is illustrated in the accompanying drawing, wherein:—

Figure 1 is an end elevation of the machine with the drill steel in section, and

Figure 2 is a partial longitudinal section through the end of the machine, and, Figure 3 is a plan view on a reduced scale of the front portion of the machine.

Only so much of the machine is illustrated as is necessary to make clear the invention to which this application particularly relates. The general construction of the cooperating machine parts and the manner of mounting the machine proper is shown in my copending application, Serial Number 463,662 and is immaterial insofar as the invention of this application is concerned.

The principal parts of the construction may be enumerated as follows: 1 is the cylinder which carries the valve and feed mechanism, not shown; 2 is the hammer piston provided with a reduced forward end 3 fitting a corresponding reduced portion in the end of the cylinder 1, 4 is the front head of the machine secured in place by means of the tie rods 5—5; 6 is the striking anvil; 7 is the drill steel; 8 is a block or chuck in which the drill steel is mounted for reciprocation, which block is mounted in the head 4; 9 is a collar encircling the block 8 and held in position by means of the bolt 10; and 11 is a handle mounted in the collar 9 by means of which the block 8 and drill steel 7 carried thereby, may be

oscillated back and forth as the drilling progresses.

The rear portion 12 of the drill steel 7 is circular in cross section, but the front portion thereof is cruciform in cross section as indicated in Figure 1, and the inner surface of the block 8 is formed to fit such cruciform section so that the steel is oscillated by the oscillation of the block 8. The bolt 10 securely clamps the collar 9 about the block 8, and its shank cuts into the periphery of the block as indicated in Figure 2, thus adding additional security against relative movement of the collar and chuck. The steel 7 is provided with the longitudinally extending passage 13 to permit fluid to be forced through the steel for cleansing the cavity in which the steel is working, fluid being supplied to the rear end of the passage 13 by means of a pipe connected at 14 to the chamber at the rear of the drill steel and leading to a source of fluid supply, which source preferably furnishes a mixture of air and water as illustrated in my co-pending application heretofore referred to. In order to prevent the passage of fluid along the exterior of the drill shank, the rubber packing ring 15 is supplied, which packing ring is preferably of the U shape cross section indicated in Figure 2, pressure being admitted between the sides of the U to make tight contact thereof with the drill shank and block 8 by virtue of the annular passage 16 leading to the chamber at the rear of the block. A slot 17 is provided in the front end of the anvil in order that fluid may be supplied to the passage 13 when the end of the anvil is in contact with the steel. A taper fit is made at 19 between the block 8 and head 4 so that the pressure in the chamber at the rear of the block 8 tends to make the fit between the parts still more perfect. The collar 9 serves the double function of providing a means for rotating the drill steel, and of preventing any rearward movement of the block 8 with respect to the head 4 in which it is mounted.

Having thus described my invention and illustrated its use, what I claim as new and desire to secure by Letters Patent is the following

1. In combination in a drilling machine, a cylinder, a head secured detachably to the cylinder and having the forward end of its bore reduced in diameter, a chuck extending

through the head with its rear portion enlarged and held against forward movement by the reduced portion of the said bore, and means detachably secured to the front portion of the chuck and bearing against the head for preventing its rearward movement.

2. In combination in a drilling machine, a removable head having its outer end reduced internally, a block in the head fitting against the reduced end portion and removable rearwardly, a steel mounted for reciprocation through the block and provided with a longitudinal passage therethrough, a chamber to the rear of the drill steel, a striking anvil mounted for reciprocation in the chamber, means whereby fluid pressure may be supplied to the chamber at the front of the anvil and to the rear of the block thus holding the block forward and the anvil rearward, and a hammer at the rear of the anvil.

3. In combination in a drilling machine, a removable head having its outer end reduced internally, a block extending through the head and fitting against the reduced portion, a collar secured against longitudinal movement on the outer end of the block and fit-

ting against the end of the head, a steel mounted for reciprocation through the block and provided with a longitudinal passage therethrough, a chamber to the rear of the drill steel, a striking anvil mounted for reciprocation in the chamber, means whereby fluid pressure may be supplied to the chamber at the front of the anvil, and a hammer at the rear of the anvil.

4. In combination in a drilling machine, a removable head having its bore tapered forwardly, a block fitting in the bore and having its surface tapered to fit the taper of the bore, a steel mounted for reciprocation through the block and provided with a longitudinal passage therethrough, a chamber to the rear of the drill steel, an anvil therein, means whereby fluid pressure may be supplied to the chamber at the front of the anvil, and a hammer at the rear of the anvil.

In testimony whereof I have hereunto signed my name in the presence of the two subscribed witnesses.

CHARLES B. RICHARDS.

Witnesses:

GEO. H. HALL,
F. J. CONNELLY.