April 1, 1924. 1,488,538

C. C. HANSEN

ROTATION MOTOR FOR ROCK DRILLS

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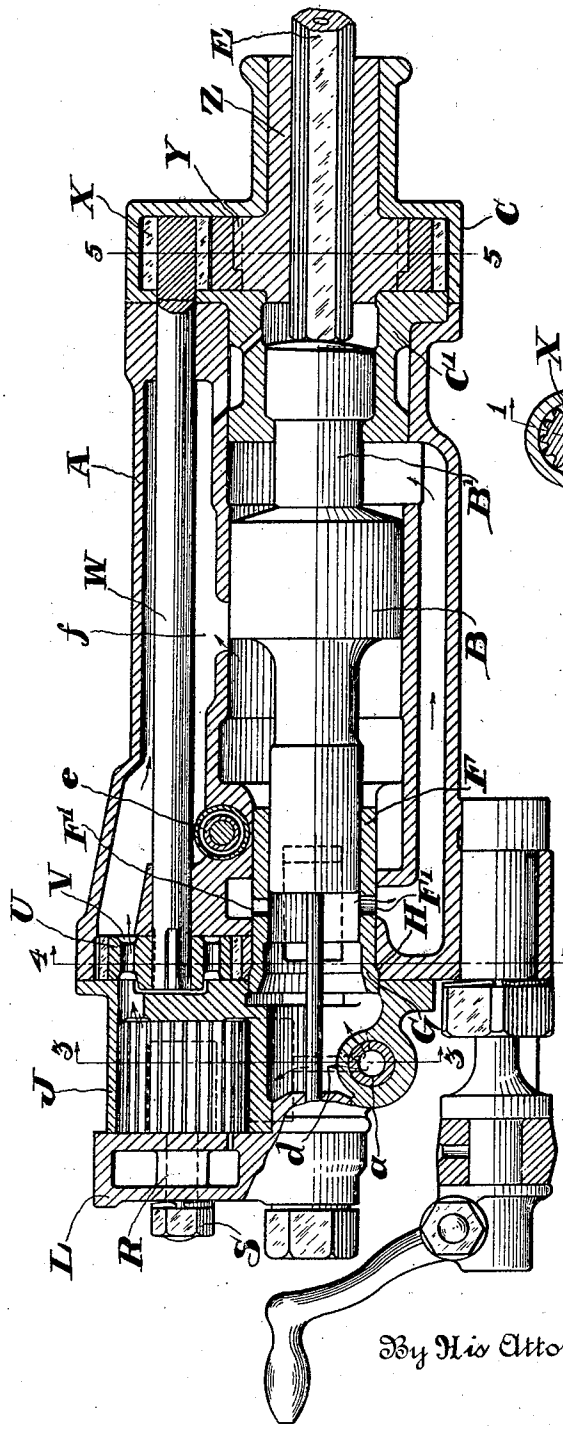


Fig. 1

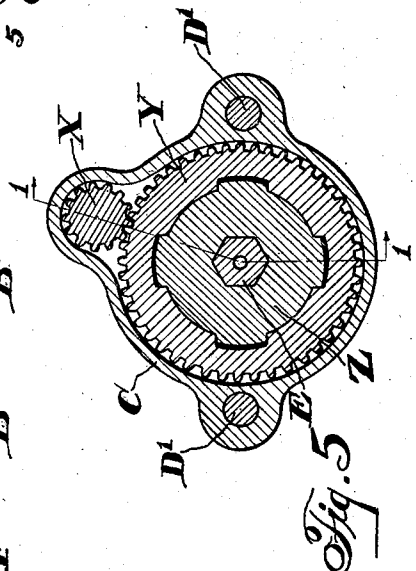


Fig. 5

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Fig. 2

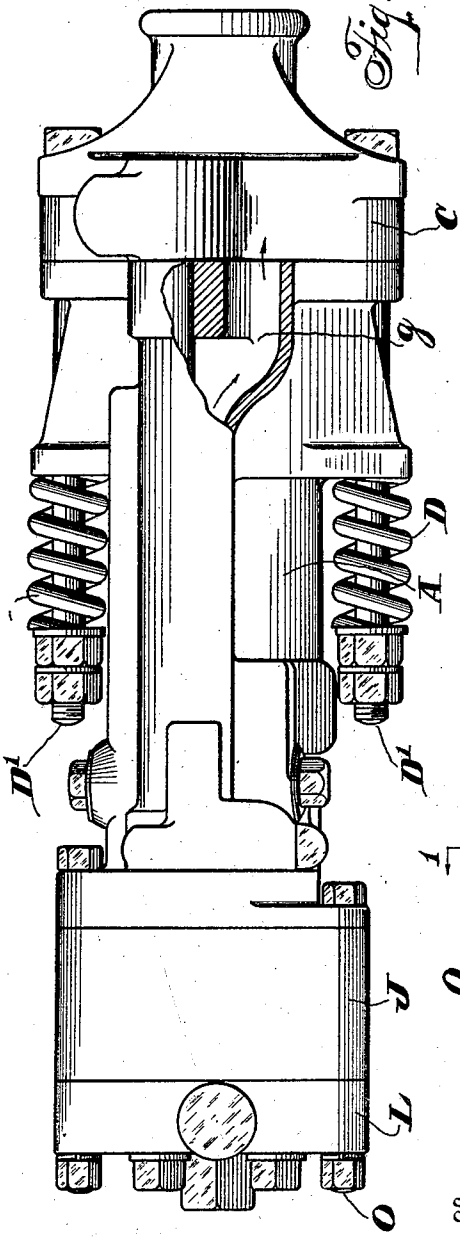


Fig. 3

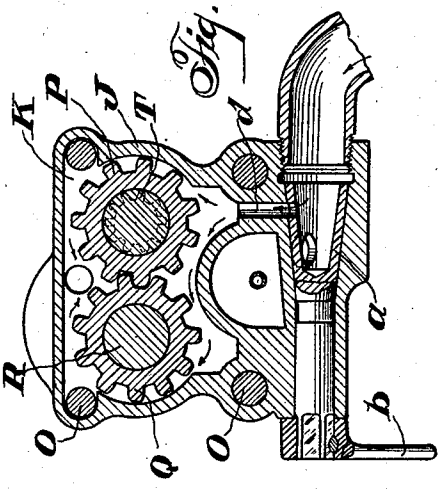
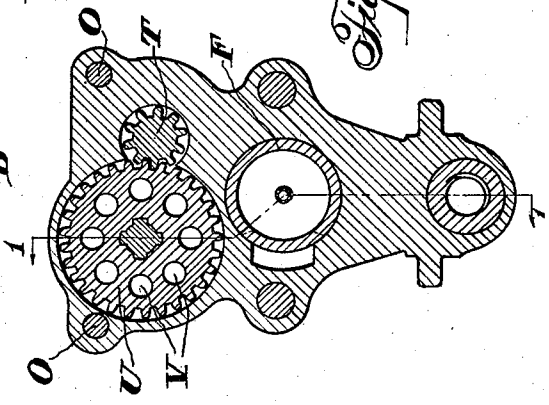


Fig. 4



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UNITED STATES PATENT OFFICE.

CHARLES C. HANSEN, OF EASTON, PENNSYLVANIA, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ROTATION MOTOR FOR ROCK DRILLS.

Application filed May 14, 1923. Serial No. 638,793.

To all whom it may concern:

Be it known that I, CHARLES C. HANSEN, a citizen of the United States, and a resident of Easton, county of Northampton, and State of Pennsylvania, have invented a certain Rotation Motor for Rock Drills, of which the following is a specification, accompanied by drawings.

This invention relates to fluid actuated rock drills of the hammer type having an independent motor for rotating the drill steel, but more particularly to the back cylinder construction.

The primary object of this invention is to simplify and cheapen the back cylinder construction of a rock drill by producing a back cylinder bushing, forming the smaller rearward bore of the cylinder, which may readily be removed and which serves to center the motor casing.

A further object of this invention is to improve and strengthen the rotation of the drill steel.

To these and other ends, which will hereinafter appear, the invention consists of the features of construction and combination of elements, substantially as described and claimed in this specification, and shown in the accompanying drawings, in which—

Figure 1 is a longitudinal section taken on the line 1—1 of Figures 4 and 5 looking in the direction of the arrows.

Figure 2 is a top plan view of a rock drill embodying my invention.

Figure 3 is a transverse sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 1, and

Figure 5 is a transverse sectional view taken on the line 5—5 of Figure 1.

Referring to the drawings, the cylinder A in which the differential piston B reciprocates, is provided with the front head C which is held by the usual side bolts D′ and coil springs D and into which front head the drill steel E extends in position to receive the impact blows of the piston. In this instance, I have shown an anvil block B′ in the front cylinder bushing C′ located between the drill steel E and the piston B.

A back cylinder bushing F forming the smaller rearward bore of the cylinder, projects outwardly beyond the back end of the cylinder, and is provided with a shoulder G which cooperates with the recessed portion H of the cylinder to form a stop or seat. One of the advantages of this construction resides in the fact that as wear occurs, the bushing F may be renewed and the bushing at all times forms a ready and convenient means for seating and centering the motor casing.

The means for distributing the motive fluid to the cylinder and piston forms no part of the present invention and the various ports and passages need not be described further to point out that constant pressure is maintained in the back end of the cylinder and the piston controls the supply of motive fluid to the remaining portions of the cylinder. The supply of motive fluid to the machine is controlled by a throttle valve *a* having a handle *b* and motive fluid passes to the cylinder A and also to the motor casing through the passage *d*. In this instance, a valve *e* controls the exhaust of motive fluid from the cylinder, which passes through the chamber *f* surrounding the shaft W and to atmosphere through the exhaust outlet *g* as shown in Figure 2. The back cylinder bushing F as shown, is formed with ports F′ for the passage of motive fluid in the operation of the machine.

The drill steel E is adapted to be rotated by an independent rotation motor, preferably a gear motor of the fluid actuated type. The motor casing J is open at the front and back ends, and forms a chamber K for the motor. The lower portion of the motor casing J is adapted to be centered on the back cylinder bushing F, so that the casing may be quickly and readily assembled and dis-assembled from the cylinder A. A back head L fitted to the motor casing, as indicated in Figure 1, forms a common head for both the smaller rearward bore of the cylinder and the motor chamber K in the motor casing J. The back head L and the motor casing J are connected to the cylinder A by bolts O forming a common connecting means.

The motor comprises the rotary gears P and Q of which the gear Q is mounted on the stud R held in the back head L by the nut S. The gear P is operatively connected to the pinion T which meshes with the larger gear U, provided with a plurality of holes V, through which the exhaust from the gear motor passes. The gear U, is suitably secured to the shaft W to which is connected

a pinion X at the opposite end thereof. The pinion X meshes with the gear Y on the rotating chuck Z. By means of this train of gearing, a powerful rotation is transmitted to the drill steel E.

I claim:

An independently rotated fluid actuated rock drill of the hammer type comprising a cylinder and reciprocating piston, a cylindrical back cylinder bushing provided with lateral ports through which motive fluid passes, said bushing forming the smaller rearward bore of the cylinder, a shoulder on said bushing cooperating with a recessed portion of the cylinder to form a stop, a motor casing centered over the said projecting end of the back cylinder bushing, and a common back head for both the cylinder bore and motor casing.

In testimony whereof I have signed this specification.

CHARLES C. HANSEN.