H. A. GUILEY.

ROTATION MEANS FOR PERCUSSIVE TOOLS.

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1,384,661. Patented July 12, 1921.

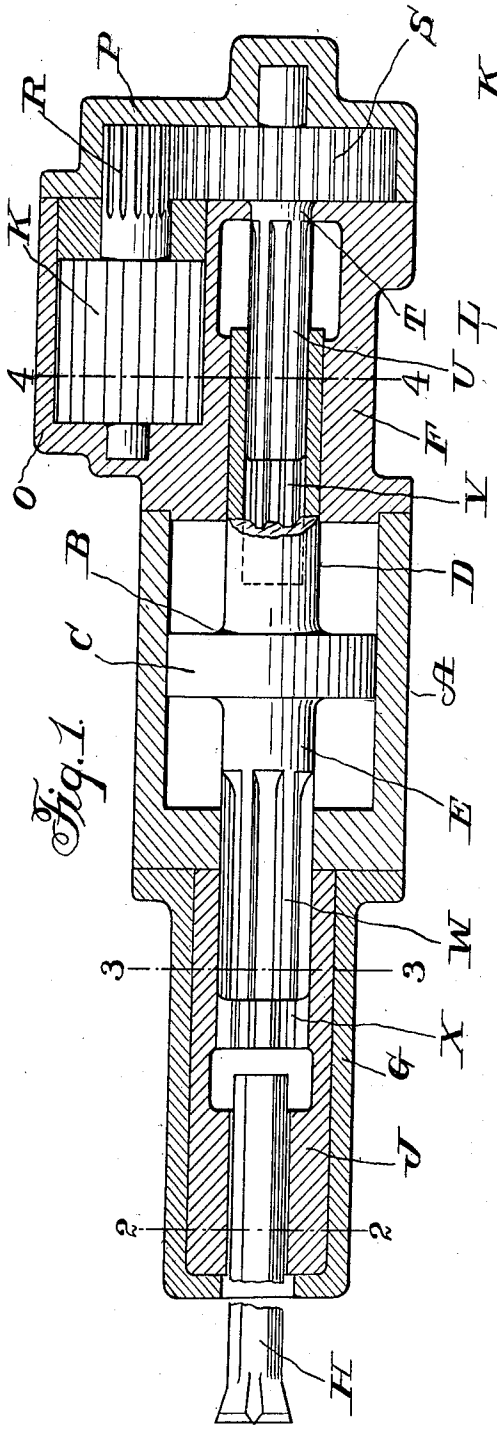


Fig. 1.

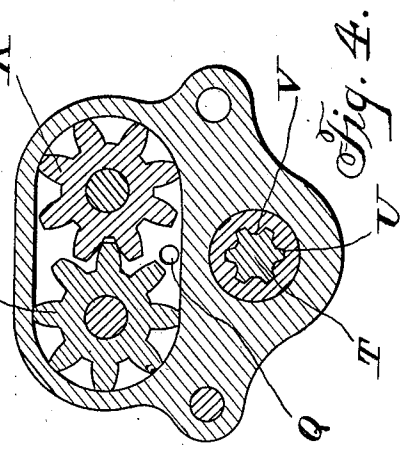


Fig. 4.

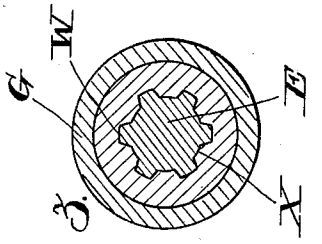


Fig. 3.

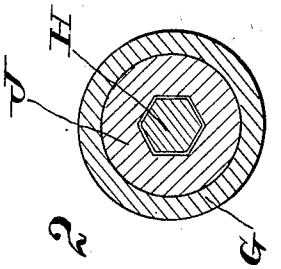


Fig. 2

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UNITED STATES PATENT OFFICE.

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ROTATION MEANS FOR PERCUSSIVE TOOLS.

1,384,661. Specification of Letters Patent. Patented July 12, 1921.

Application filed March 22, 1920. Serial No. 367,943.

To all whom it may concern:

Be it known that I, HENRI AUGUSTUS GUILEY, a citizen of the United States, residing at Easton, in the county of Northampton and State of Pennsylvania, have invented a certain new and useful Improvement in Rotation Means for Percussive Tools, of which the following is a specification.

This invention relates to percussive tools of the hammer drill type, but more particularly to mechanism for imparting rotation to the drill bit by means of an independent rotation motor.

The primary object of the invention is to utilize the reciprocating piston as an element of the train of operative driving mechanism between the motor and the drill bit for rotating the bit, thus simplifying a tool of this character having independent rotation means and avoiding counter shafts and driving connections externally to the cylinder chambers.

Another object of the invention is to produce a self contained tool having independent rotation, in which the motor may conveniently be located at the back end of the tool, which is the preferable arrangement in many cases.

Further objects will hereinafter appear and the invention is illustrated in one of its preferred forms in the accompanying drawings in which—

Figure 1 is a longitudinal sectional view partly broken away of a tool illustrating the invention,

Fig. 2 is a transverse sectional view on the line 2—2 of Fig. 1,

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1, and

Fig. 4 is a transverse sectional view through the motor on the line 4—4 of Fig. 1.

Referring to the drawings, A represents the cylinder casing of a fluid operated hammer drill having a piston B reciprocating therein. In this instance the piston is shown provided with the main head C and the shanks or extensions D and E extending therefrom in opposite directions.

It is to be understood that any suitable ports and passages or valve mechanism may be provided for controlling the distribution of motive fluid to the cylinder chambers, but these are not shown as forming no part of the present invention.

The tool is provided with a back cylinder extension F and a front head G of any suitable or usual construction and the drill bit or steel H is non-rotatably held in the rotation sleeve J within the front head G.

Any suitable motor may be provided for imparting rotation to the sleeve J and drill bit H, in this instance a rotary motor of the gear type being illustrated comprising the spur gears K and L arranged within the motor casing O preferably formed integrally with the back cylinder extension F. The back head P of the machine also forms the back head for the motor and motive fluid is supplied to the motor through an inlet Q, the exhaust passing out at any suitable point not shown.

In accordance with this invention, rotation is imparted to the drill bit through a train of driving mechanism which includes the reciprocating piston B as an element. As shown, one of the gears K is provided with a pinion R meshing with the driven gear S carried by the back cylinder extension in axial alinement with the piston and having a spindle T in slidable but relatively non-rotatable engagement with the shank or piston extension D in contradistinction to riflebar rotation for instance as disclosed in U. S. Patent No. 1,289,285 granted Dec. 23, 1918, to F. M. Slater, in which the piston and riflebar are relatively rotatable. In this instance the spindle T is provided with straight flutes U and forms a male member slidably engaging the straight flutes V of the shank D formed as a female member, but either the spindle T or the shank D may be formed as the female member and the other as the male member. Other suitable forms of mechanical arrangements may also be devised for providing slidable and relatively non-rotatable engagement between the gear S and the piston shank D without departing from the spirit of my invention.

Slidable and relatively non-rotatable engagement is also provided between the rotation sleeve J and the piston shank E, in this instance the straight flutes W on the shank engaging straight flutes X on the sleeve as a convenient construction although other forms of mechanical devices may be devised for such slidable and non-rotatable engagement.

In the operation of the tool, continuous rotation is imparted to the reciprocating piston both on the forward and on the rearward

stroke and also continuously imparted to the rotation sleeve J and drill bit through the agency of the reciprocating and continuously rotating piston. The tool is self contained, simple in construction, not liable to get out of order and the number of parts for producing continuous rotation from an independent rotary motor is reduced to a minimum.

I claim—

A fluid actuated rock drill of the hammer type having independent rotation for the drill bit and comprising a cylinder casing, a reciprocating hammer piston therein having a main head and a forwardly extending reduced shank, said shank being provided with straight longitudinally extending flutes, a front head for the cylinder casing, a rotation sleeve therein adapted to receive and hold a drill steel in sliding but non-rotatable engagement, the rotation sleeve having internal straight flutes coöperating with the flutes on the piston shank thereby affording slidable but relatively non-rotatable engagement between the rotation sleeve and the forwardly extending piston shank, a removable back cylinder extension for the cylinder casing, a driven spur gear carried by the back cylinder extension in axial alinement with the piston, a spindle for said spur gear having straight longitudinal flutes, a rearward portion of the piston also being provided with straight flutes coöperating with the flutes on the said spindle, thereby affording slidable but relatively non-rotatable engagement between the spindle and piston, a motor casing located at the side of the back cylinder extension, an independent rotary fluid actuated gear motor in said motor casing, one of the gears of said motor being geared to the driven gear for imparting continuous rotation thereto, whereby continuous rotation is imparted to the reciprocating piston both on the forward and on the rearward stroke and also continuously imparted to the rotation sleeve and drill steel, the back cylinder extension having a back head inclosing the driven gear and also forming a back head for the motor casing.

In testimony whereof, I have hereunto set my hand.

HENRI AUGUSTUS GUILEY.