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E. G. GARTIN

ROTATING MECHANISM FOR PERCUSSIVE TOOLS

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Fig. 1.

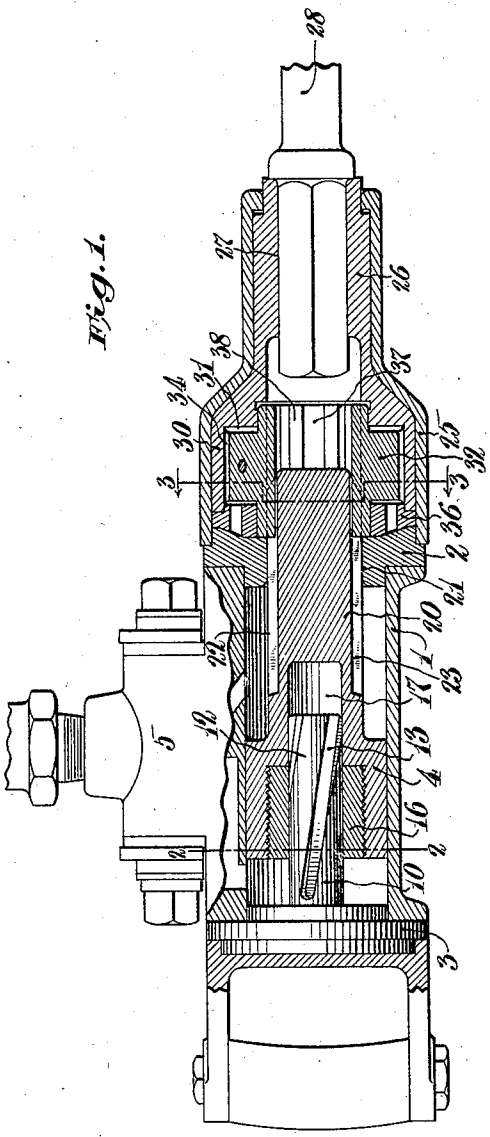
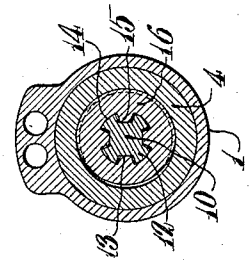


Fig. 3.



Fig. 2.



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by
Atty.

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UNITED STATES PATENT OFFICE.

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ROTATING MECHANISM FOR PERCUSSIVE TOOLS.

Application filed December 20, 1919. Serial No. 346,414.

To all whom it may concern:

Be it known that I, ELMER G. GARTIN, a citizen of the United States, residing at Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Rotating Mechanism for Percussive Tools, of which the following is a full, clear, and exact specification.

My invention relates to rotating mechanism for percussive tools.

It has for its object to provide an improved form of rotation device, and one which is simple in construction and of great strength. A further object of my invention is to provide an improved rotation device of the character set forth which is especially adapted to use in a hammer drill.

In the accompanying drawings I have shown, for purposes of illustration, one embodiment which my invention may assume in practice.

In these drawings,—

Fig. 1 represents a longitudinal section through a percussive tool embodying the illustrative embodiment of my invention, certain parts which do not directly pertain thereto being omitted.

Fig. 2 is a transverse section on line 2—2 of Fig. 1.

Fig. 3 is a transverse section on line 3—3 of Fig. 1.

In this illustrative embodiment, the cylinder 1 of the percussive tool has its ends closed by front and rear heads 2 and 3 respectively, and in the cylinder there reciprocates a piston 4 under control of a valve mechanism 5 which is of well known construction.

As a means to impart to the piston an oscillating movement simultaneous with its reciprocation, I have provided a rifle bar 10 rigidly secured with respect to the rear head 3, and preferably formed integral therewith. The rifle bar 10 is provided with alternate spiral tongues 12 and grooves 13 cooperating with grooves 14 and tongues 15 formed in a bushing 16 fixedly secured in the rear end of the piston, the piston being bored out as shown at 17 to receive the rifle bar when the piston is moving upon its backward stroke. As a result of this construction a point in the periphery of my piston partakes of both a reciprocatory and an oscillatory motion.

To transmit this oscillatory motion to a mechanism whereby it may be transposed into a unit-directional, intermittent motion of rotation, I provide the piston with a forwardly extending reduced portion 20 adapted to pass through a circular opening 21 in the front head 2 and form upon this piston extension a series of straight tongues 22 and grooves 23. Located in a suitable chuck housing member 25, which is secured to the front head 2, is a chuck member 26 having a squared socket 27 for a tool 28. In an enlarged rearwardly extending portion 30 of the chuck there is formed a housing 31 for a pawl carrier 32 and to cooperate with usual pawls 33 the inner peripheral wall of the housing 31 is provided with a series of racket teeth 34. Between the portion 30 of the chuck and the front head 2 of the cylinder I provide a racket collar 36 adapted to transmit the thrust of the chuck to the front head 2. The ratchet collar surrounds a reduced portion of the pawl carrier and the latter is provided with a central opening in the periphery of which a series of straight grooves 37, with intervening tongues 38, are formed, these being adapted to receive and cooperate with the tongues 22 and grooves 23 of the piston extension 20. As a result of this construction, the pawl carrier 32 partakes of the oscillation imparted to the piston by the rifle bar.

The operation of this mechanism is as follows: Assuming the piston 4 to be in the position indicated and moving upon its forward stroke, it will obviously receive a right hand or clockwise partial rotation due to the action of the tongues 12, 15 and grooves 14, 13. As the forward extension 20 of the piston, by its straight tongues 22 and grooves 23 cooperates with the straight grooves 37 and tongues 38 formed in the pawl carrier 32, the latter will be partially rotated in the same direction as the piston, and by the engagement of the pawls 33 with the ratchet teeth 34 will cause a partial rotation of the chuck. Attention is directed to the fact that upon the backward movement of the piston, its direction of rotation will be reversed, and the pawl carrier will accordingly be partially rotated in a reverse direction. In this movement, however, the pawls 33 will slip over the teeth 34 and the chuck will not be rotated.

I have illustrated and described the mechanism as adapted to cause rotation during

the striking pass of the piston, but it will be obvious that the rotation may be accomplished on the return stroke by a simple reversal in the formation of the ratchet parts or rifle bar.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a percussive tool comprising a cylinder and a percussive piston, a tool actuated by said piston, means to impart an oscillating motion to said piston comprising a fixed rifle bar cooperating with said piston, and means to transform said oscillating motion to an intermittent rotary motion and impart the latter to the tool.

2. In a percussive tool, a cylinder, a percussive piston, a rotary chuck, an oscillating member therein, a driving connection between said member and said chuck, said percussive piston having a straight tongue and groove connection with the oscillating member for oscillating it, and means to cause the piston to partake of an alternate partial rotation in opposite directions comprising a spiral tongue and groove connection between a fixed portion of said cylinder and said piston.

3. In a percussive tool, a cylinder, a percussive piston, a rotary chuck, an oscillating member, a ratchet and pawl connection between the chuck and member, a straight tongue and groove connection between the percussive piston and the oscillating member for oscillating the latter, and means causing the piston to partially rotate in opposite directions on alternate strokes comprising a fixed bar having a spiral tongue and groove connection with the piston.

4. In a percussive tool, a cylinder, a percussive piston, a rotary chuck provided at its rear end with a hollow portion having a series of ratchet teeth formed upon its inner periphery, a pawl carrier mounted in said hollow portion and provided with pawls to cooperate with said ratchet, said pawl carrier having a straight tongue and groove connection with said percussive piston whereby rotative movement of the piston may be transmitted to the pawl carrier, and a fixed rifle bar having spiral tongue and groove connection with said piston to cause alternate oscillations thereof in opposite directions.

In testimony whereof I affix my signature.

ELMER G. GARTIN.