J. J. PURCELL.

AUTOMATIC TURNING DEVICE FOR FLUID HAMMER DRILLS.

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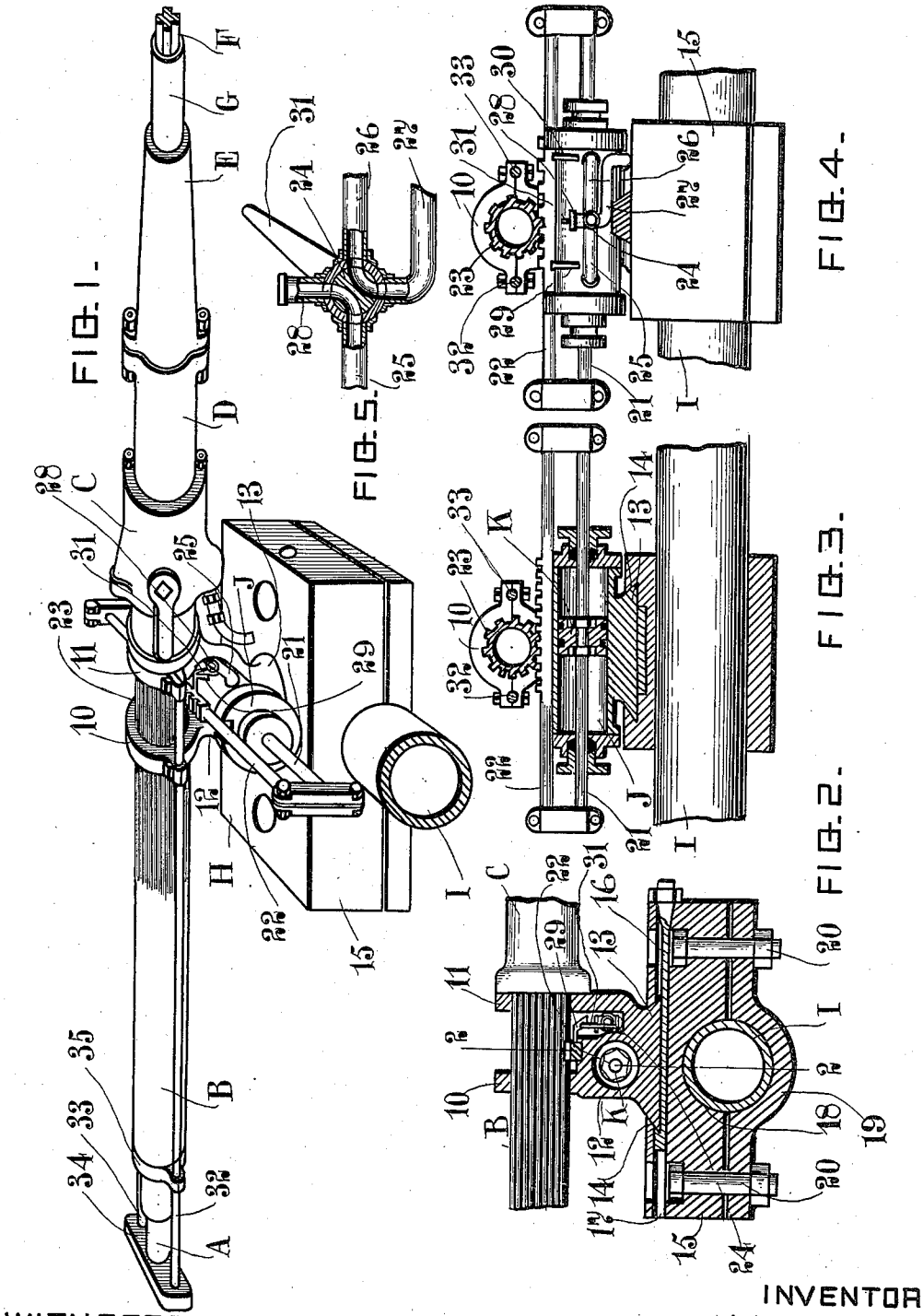

FIG. 1.

FIG. 5.

FIG. 4.

FIG. 3.

FIG. 2.

WITNESSES

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AUTOMATIC TURNING DEVICE FOR FLUID HAMMER-DRILLS.

1,028,275. Specification of Letters Patent. Patented June 4, 1912.

Application filed July 29, 1911. Serial No. 641,296.

To all whom it may concern:

Be it known that I, JOHN JAMES PURCELL, of the town of Burke, State of Idaho, one of the United States of America, have invented certain new and useful Improvements in Automatic Turning Devices for Fluid Hammer-Drills, of which the following is a specification.

My invention relates to automatic turning device for fluid hammer drills, and the objects of my invention are to provide simple and effective means for automatically turning the steel during use in order to increase the effectiveness of the operation and to enable it to be more speedily carried out.

Further objects are to provide improved means for supporting the drill during the turning movement and for effecting such movement over the motive power on the operating fluid which drives the drill.

Another object is to provide an instrumentality of the class specified, which from an operative standpoint will in usage possess a high degree of efficiency and effectiveness and which, structurally considered, will be of the greatest possible simplicity, being composed of but a few parts, all adapted for being made at a minimum of cost and individually so formed as to be capable of being readily assembled in a neat and compact arrangement for accomplishing the purpose intended.

Other objects and advantages will be in part obvious and in part pointed out hereinafter, and with these and other ends in view, this invention accordingly consists in the features of construction, combination of parts and arrangement of elements hereinafter more explicitly set forth as an exemplification of the underlying principles involved in the invention.

In order that this invention may be more fully understood and to be comprehensible to others skilled in the art, drawings illustrating a convenient means of carrying out the same are pointed out as a part of this specification, and while the controlling principles of the invention may be otherwise applied by modifications falling within the scope of the claims, the hereinafter disclosed embodiment is that which will ordinarily be preferable to employ in practice and is regarded as representing substantial improvements over the many obvious or implied variations of the same. In such drawings it is to be noted that like numerals refer to corresponding parts throughout all the figures of the drawings.

Figure 1 is a perspective view of a drill embodying the present invention. Fig. 2 is a section through the supporting means for the cylinder taken in a direction longitudinal of the cylinder. Fig. 3 is a section on the line 2—2 Fig. 2. Fig. 4 is a side view of the turning mechanism with cylinder shown in section. Fig. 5 is a sectional detail through the valve mechanism.

The invention is shown herein as applied to Ingersoll-Rand hammer drill the general construction of which does not form part of the present invention.

The reference letters are applied to represent the different parts of the drill as follows:

A is the tail piece, B the feed cylinder, C the valve chest of the drill, and D is the piston cylinder.

E represents the front head and chuck, F the steel and C the conduit surrounding the steel through which the cuttings may be withdrawn, as more fully set forth and described in my copending application Serial No. 626170.

The feed cylinder in accordance with the present invention is rotatively supported from a clamp H mounted on a column bar I. The clamp H includes spaced rings 10 and 11 which extend around and journal the cylinder B, said rings being supported from a bracket member 12 having a circular beveled plate 13 thereon which fits into a recess 14 in a block 15, said plate being adapted to form a swiveling support for the cylinder and to be clamped in adjusted position by suitable means such as the draw bolt 16 extending in a perforation 17 in the block 15 and being adapted to draw and bind the plate against one side of the recess. The block 15 itself is formed with a recess 18 to receive the part "I" and may be clamped thereto by a clamping plate 19 connected to the block by bolts 20. Fluid operated means are carried by the clamp adapted to impart an oscillatory movement to the cylinder. These means include a fluid pressure cylinder "J" having a double headed piston K reciprocatory therein, said piston being connected to the cylinder by any suitable form of gearing which will enable it to impart an oscillatory movement to the cylinder. The form of connection I have shown for the sake of illustration comprises a piston rod

21 which carries a rack bar 22, the teeth of which are adapted to engage suitable teeth 23 formed on the cylinder; these teeth may be either formed integrally on the cylinder or on a gear attached thereto or they may be set into the cylinder; it is simpler, however, to form them integrally with the cylinder as shown.

The admission of motive fluid to the cylinder J is controlled automatically by the movement of the rack bar 22. To this end a four-way valve 24 is provided connected with conduits 25 and 26 leading to opposite ends of the cylinder J and also connecting with a supply conduit 27 of motive fluid and an exhaust conduit 28. In one position of the four-way valve one end of the cylinder will be exhausted while motive fluid will be supplied to the opposite end. In the other position of the four-way valve a reverse action will take place. The four-way valve is adapted to be moved from one position to another through the medium of tappets 29 and 30 carried by a rack bar 22 and adapted to engage an arm 31 on the moving element of the four-way valve.

To support the tail piece of the drill parallel tie rods 32 and 33 are supported from the rings 10 and 11 and connected at their extremities to a cross bar 34 which supports the tail piece, said rods also extending through a bracket 35, on the feed cylinder.

In operation when the motive fluid is supplied to the cylinder J the piston therein will continuously reciprocate and this will oscillate the cylinder and thus the steel. The speed of oscillation may be controlled by regulating the supply of motive fluid.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention, within the scope of the claims, constructed without departing from the spirit or scope thereof, it is intended that all matter contained in the accompanying specification and drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim as my invention is:—

1. The combination of the rock drill and the feeding cylinder rigidly secured together, of supporting means engaging the feeding cylinder and fluid operative means for imparting an oscillatory movement to the feeding cylinder for oscillating the drill.

2. In a rock drill a combination of the feeding cylinder having teeth thereon, supporting means for the cylinder, a rack bar engaging the teeth and means for reciprocating the rack bar.

3. The combination with a fluid operated rock drill including a steel, a chuck therefor, and a feeding cylinder rigidly connected to the chuck and adapted to rigidly feed the drill against the work and supporting means for the cylinder, of a fluid pressure cylinder extending transversely of the feed cylinder, a piston therein, and connecting means between the piston and the feed cylinder whereby reciprocation of the piston causes oscillation of the feed cylinder and thereby oscillates the steel.

4. In a rock drill the combination with a feed cylinder of supporting means therefor, a transversely extending fluid pressure cylinder, a piston therein, a rack bar operated by the piston and teeth on the feed cylinder engaged by the rack bar.

5. In a rock drill the combination with a feed cylinder of supporting means therefor, a transversely extending fluid pressure cylinder, a piston therein, a rack bar operated by the piston and teeth on the feed cylinder engaged by the rack bar, a four-way valve controlling the admission and exhaust of motive fluid to the cylinder and tappet means carried by the rack bar adapted to actuate the valve.

6. In a rock drill a feed cylinder, a tail piece, a clamp having spaced rings journaling the cylinder, supporting means extending from the rings to the tail piece, means on the clamp for automatically imparting an oscillatory movement to the cylinder.

7. In a rock drill a feed cylinder, a tail piece, a clamp having spaced rings journaling the cylinder, supporting means extending from the rings to the tail piece, means on the clamp for automatically imparting an oscillatory movement to the cylinder, said means including a cylinder, a piston therein and gearing connecting the piston with the cylinder.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHN JAMES PURCELL.

Witnesses:
RUBY SOMMERS,
THOS. A. MURPHY.