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ROTATION DEVICE FOR FLUID PRESSURE OPERATED HAMMER TOOLS.

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998,864.

Patented July 25, 1911.

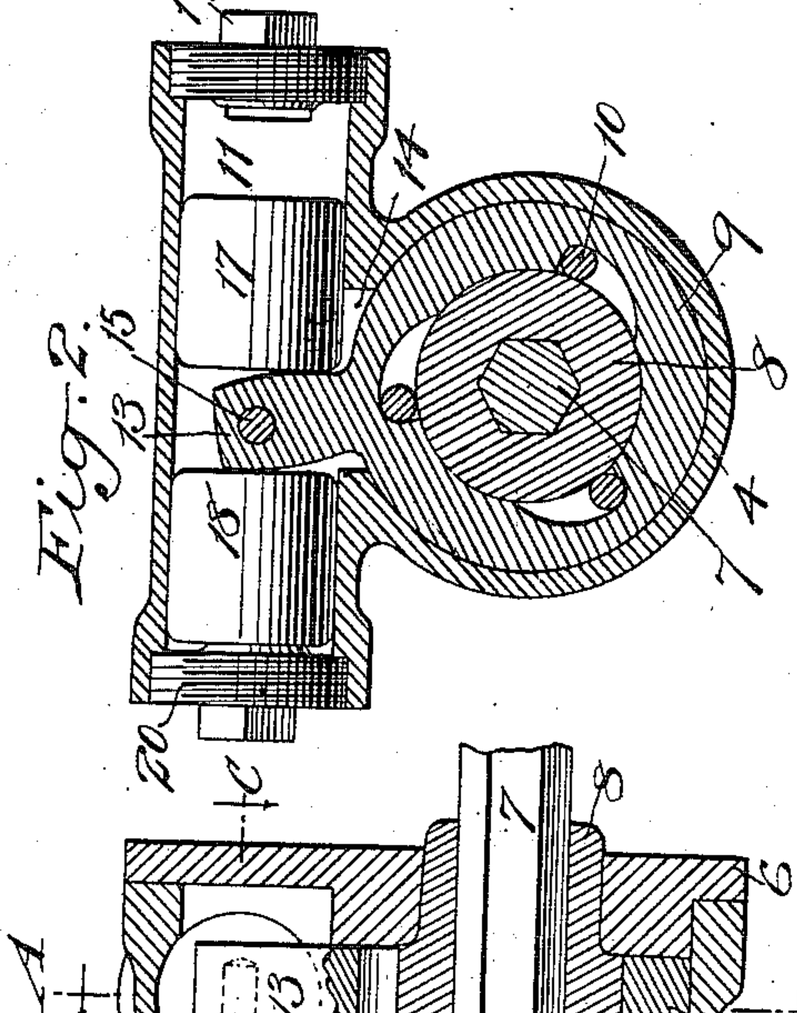

Fig. 2.

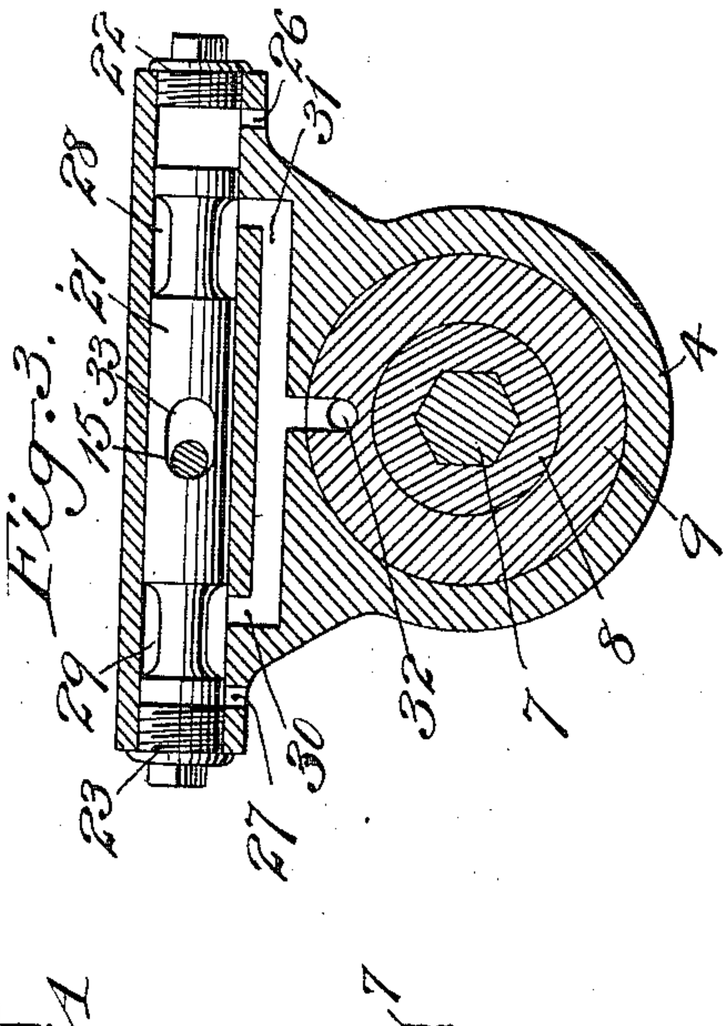

Fig. 3.

Fig. 1.

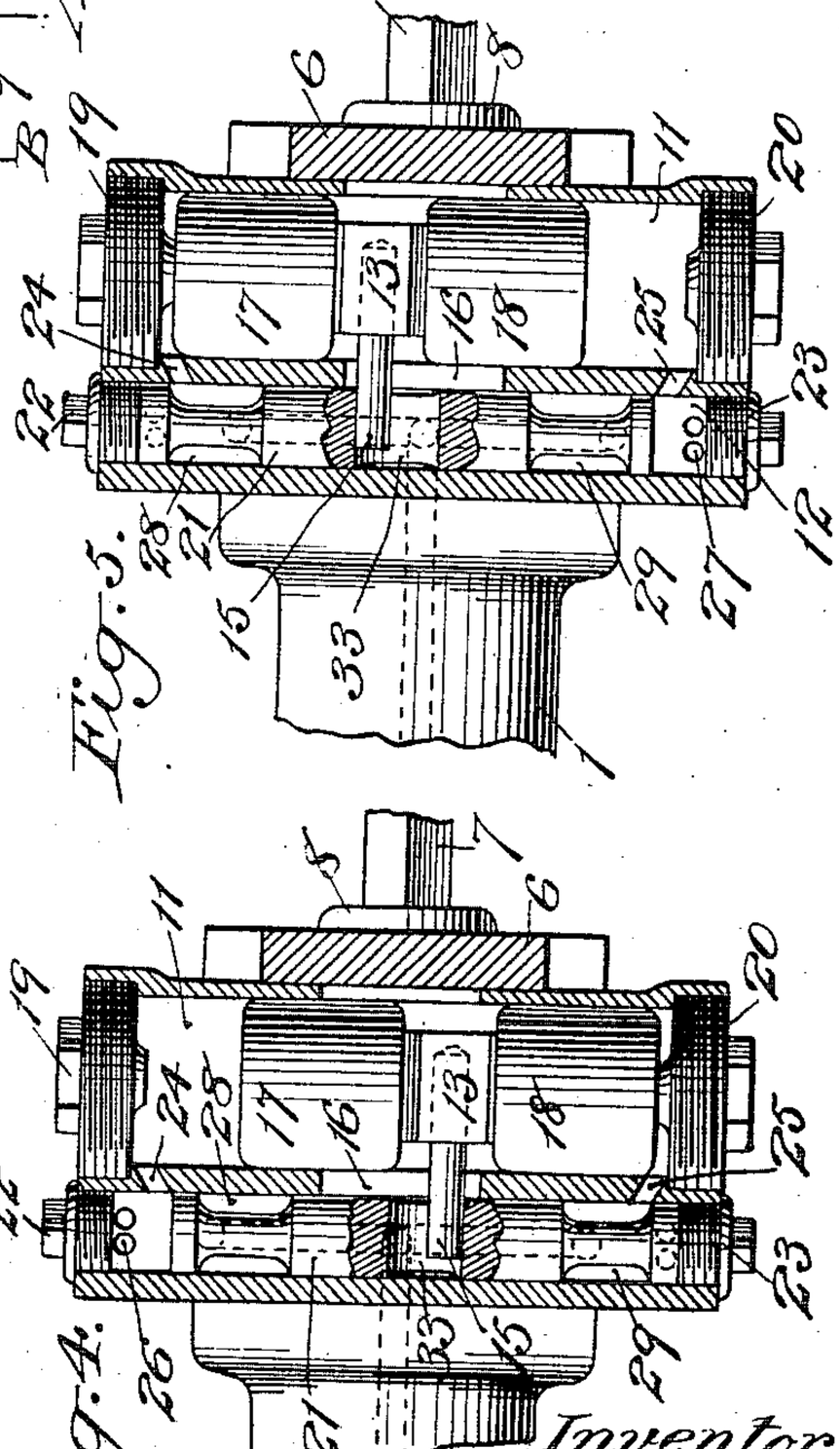

Fig. 5.

Fig. 4.

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UNITED STATES PATENT OFFICE.

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ROTATION DEVICE FOR FLUID-PRESSURE-OPERATED HAMMER-TOOLS.

998,864. Specification of Letters Patent. Patented July 25, 1911.

Application filed August 6, 1909. Serial No. 511,551.

To all whom it may concern:

Be it known that I, ALBERT H. TAYLOR, a citizen of the United States, and resident of Easton, in the county of Northampton and State of Pennsylvania, have invented a new and useful Improvement in Rotation Devices for Fluid-Pressure-Operated Hammer-Tools, of which the following is a specification.

This invention has for its object to provide certain improvements in the construction, form and arrangement of the several parts of a rotation device for fluid pressure operated hammer tools whereby the rotation of the tool steel will be produced independent of the hammer piston or its operating mechanism and which will be positive in its motion.

In the accompanying drawings, Figure 1 represents partly in side elevation and partly in longitudinal central section so much of a hammer tool as will give a clear understanding of the construction, location and operation of my improved rotation device, Fig. 2 is a transverse section taken in the plane of the line A—A of Fig. 1, Fig. 3 is a transverse section taken in the plane of the line B—B of Fig. 1, Fig. 4 is a longitudinal section taken in the plane of the line C—C of Fig. 1, with the movable parts at the limit of their movement in one direction, and Fig. 5 is a similar view with the parts at the limit of their movement in the opposite direction.

The cylinder 1 of the tool is provided with a piston hammer 2 and an anvil block 3.

A valve casing 4 is provided for the front end of the cylinder 1, which casing is fixedly secured to the cylinder as, for instance, by a cross pin 5.

A front plate 6 is secured to the outer end of the casing 4. The shank 7 of the tool steel extends through the chuck 8 into engagement with the anvil block 3. This chuck 8 is shown herein as being rotatably mounted within the front plate 6 and the front end of the cylinder 1. An oscillating ring 9 is mounted in the valve casing 4 around an enlarged portion of the chuck 8.

Any suitable device may be employed for clutching and releasing the chuck and oscillating ring, that shown herein being of the roller clutch type, the rollers being denoted by 10. The front plate 6 serves to retain the rollers and oscillating ring in position. Larger and smaller transversely arranged cylindrical chambers 11 and 12 are provided in the valve casing 4 and the oscillating ring 9 is provided with an arm 13 which projects through a slot 14 into the cylindrical chamber 11. A pin 15 carried by the arm 13 projects through a slot 16 into the smaller cylindrical chamber 12. Pistons 17 and 18 are located within the cylindrical chamber 11 upon opposite sides of the arm 13 of the rotation ring. Caps 19 and 20 screwed into the opposite ends of the cylindrical chamber 11 serve to limit the outward movements of the pistons 17, 18. A valve 21 is fitted to reciprocate in the cylindrical chamber 12. Caps 22, 23, screwed into the opposite ends of the cylindrical chamber 12 serve to limit the movements of the valve 21. Ports 24, 25, lead from the opposite ends of the chamber 11 into the opposite ends of the chamber 12 and ports 26, 27 lead from the opposite ends of the chamber 12 to external atmosphere.

The valve 21 is provided, adjacent to its ends, with reduced portions forming circumferential ports 28, 29, which are at all times in open communication with the source of motive fluid supply independent of the hammer piston 2 and its operating mechanism, through branch ports 30, 31, leading from a longitudinal passage 32 in the wall of the cylinder 1. The valve 21 has a lost motion connection with the arm 13 of the oscillating ring 9 by providing the body of the valve 21 with an elongated slot 33 into which the pin 15, carried by the arm 13, projects.

In operation, presupposing the parts to be in the position in which they are shown in Figs. 1, 2, 3, and 4, the valve 21 is in such a position that the motive fluid which enters the port 28 is cut off from escape while the motive fluid which enters the port 29 passes through the port 25 to the outer side of the piston 18. This will force the piston 18 toward the limit of its inward movement, causing it to rock the arm 13 of the rotation ring and through the arm to move the piston 17 to the limit of its outward movement, the space beyond the piston 17 being in open communication with the external atmosphere through the ports 24 and 26. As the clutch is herein represented, this movement of the oscillating ring 9 will not rotate the chuck 8. As the arm 13 approaches the limit of its movement, its pin 15 moves the

valve 21 to the limit of its movement in the opposite direction, viz: that shown in Fig. 5. This movement of the valve 21 will shut off the flow of the motive fluid leading through port 29 and open the motive fluid leading through port 28 to the outer side of the piston 17 through the port 24 thus causing the piston 17 to move inwardly thereby rocking the arm 13 of the oscillating ring 9 and through it moving the piston 18 back to its original position. As the piston 17 nears the limit of its inward movement the pin 15 carried by the arm 13 will be caused to move the valve 21 back to its original position. During this return movement of the oscillating ring, it will be clutched to the chuck 8 by the rollers 10 and thereby rotate the chuck and thus the tool steel 7.

When the parts are in the position shown in Fig. 5, the space in front of the piston 18 is open to external atmosphere through the ports 25 and 27. It will be furthermore seen that the ports 26 and 27 in the valve chamber 12 are alternately covered by the opposite ends of the valve 21 during its reciprocatory movements.

What I claim is:—

1. In a fluid pressure operated hammer tool, a tool steel and fluid pressure actuated mechanism independent of the hammer piston and its operating mechanism for rotating it comprising an oscillating ring, a valve and a pair of pistons controlled thereby for operating the oscillating ring.

2. In a fluid pressure operated hammer tool, a tool steel, an oscillating ring for rotating it, a valve, a pair of pistons controlled thereby for operating the oscillating ring and means carried by the oscillating ring for positively moving the said valve.

3. In a fluid pressure operated hammer tool, a tool steel, an oscillating ring for rotating it, a valve, a pair of pistons controlled thereby for operating the oscillating ring and a pin projecting from the oscillating ring into engagement with said valve for positively moving it.

4. In a fluid pressure operated hammer tool, a tool steel, an oscillating ring for rotating it, a valve and a pair of pistons actuated independently of the hammer piston and its operating mechanism for operating the oscillating ring and means carried by the oscillating ring for positively moving the said valve.

5. In a fluid pressure operated hammer tool, a tool steel, an oscillating ring for rotating it, a valve and a pair of pistons actuated independently of the hammer piston and its operating mechanism for operating the oscillating ring and a pin projecting from the oscillating ring into engagement with said valve for positively moving it.

6. In a fluid pressure operated hammer tool, a transversely arranged piston chamber, a pair of pistons therein, a valve for controlling the reciprocating movements of the pistons, a tool steel, an oscillating ring for rotating the steel, having an arm projecting into the piston chamber between said pistons and means carried by the oscillating ring for positively moving said valve.

7. In a fluid pressure operated hammer tool, a transversely arranged piston chamber, a pair of pistons therein, a transversely arranged valve chamber, a valve therein for controlling the reciprocating movements of the pistons, a tool steel, an oscillating ring for rotating the steel having an arm projecting into the piston chamber between the said pistons and a pin projecting from said arm into the valve chamber for positively moving the piston controlling valve.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this fourth day of August, 1909.

ALBERT H. TAYLOR.

Witnesses:

WARD RAYMOND,

RUSSELL H. WILHELM.