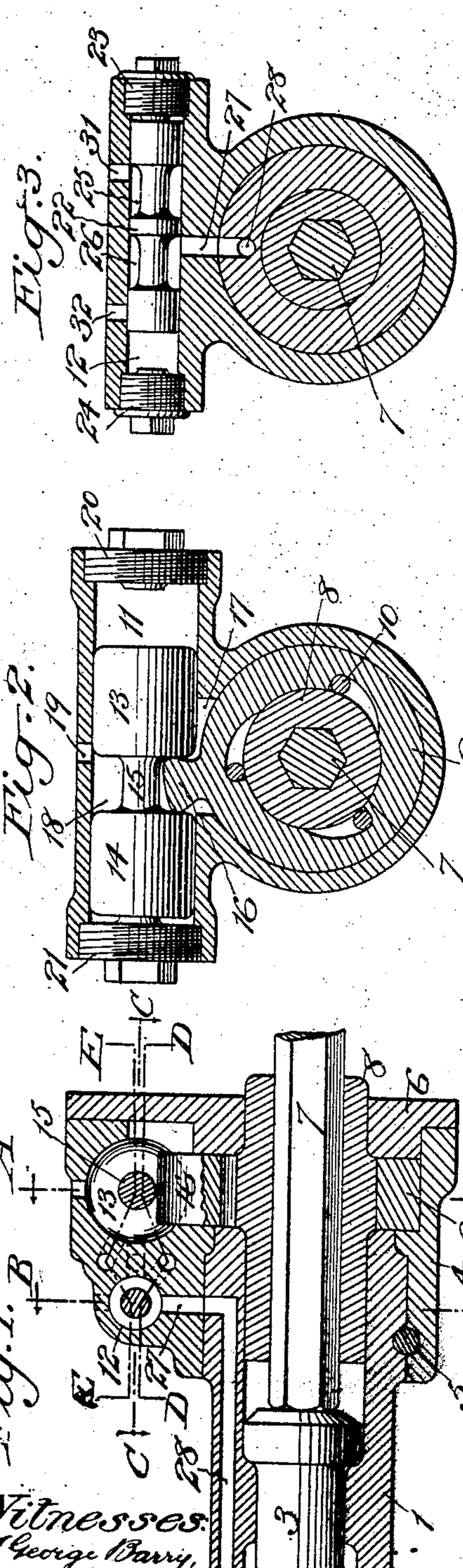
A. H. TAYLOR.

ROTATION DEVICE FOR FLUID PRESSURE OPERATED HAMMER TOOLS.

APPLICATION FILED AUG. 6, 1909.

998,932.

Patented July 25, 1911.



UNITED STATES PATENT OFFICE.

ALBERT H. TAYLOR, OF EASTON, PENNSYLVANIA, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

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

998,932. Specification of Letters Patent. Patented July 25, 1911.

Application filed August 6, 1909. Serial No. 511,553.

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 in longitudinal 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, Fig. 5 is a longitudinal section taken in the plane of the line D—D of Fig. 1, and Fig. 6 is a longitudinal section taken in the plane of the line E—E of Fig. 1.

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. A double headed piston 13, 14, 15, is fitted to reciprocate in the cylindrical chamber 11 and an arm 16 projects from the oscillating ring 9 through a slot 17 into the interior of the chamber 11 between the heads 13, 14, of the said piston. The annular space 18, formed by the reduced stem 15 of the double headed piston, is at all times in open communication with external atmosphere through an exhaust port 19. Caps 20, 21, screwed into the opposite ends of the cylindrical chamber 11 serve to limit the movements of the double headed piston.

A valve 22 is fitted to reciprocate in the cylindrical chamber 12 and caps 23, 24, screwed into the opposite ends of the said chamber serve to limit the movements of the valve. This valve 22 is provided with reduced portions forming circumferential ports 25, 26, which are brought alternately into communication with the port 27 of the passage 28 leading from the source of motive fluid supply independent of the hammer piston 2 and its operating mechanism.

Ports 29, 30, lead from the opposite ends of the piston chamber 11 to the ports 25, 26, of the valve 22 and are at all times in open communication with said ports 25, 26.

Exhaust ports 31, 32, to external atmosphere, lead from the valve chamber 12 at such points that they are alternately brought into and out of communication with their respective valve ports 25, 26.

A passage 33 leads from one end of the valve chamber 12 to ports 34, 35, at greater and lesser distances from the opposite end of the piston chamber 11. A similar passage 36 leads from the opposite end of the valve chamber 12 to ports 37, 38, at greater and lesser distances from the opposite end of the piston chamber 11.

In operation, presupposing the parts to be in the position in which they are shown in the accompanying drawings, the motive fluid will enter the port 26 of the valve 22 and from thence will pass through the port 30 to the outer side of the piston head 14. When the parts are in this position the space at the outer side of the piston head 13 is in open communication with external atmosphere through the ports 29, 25, 31. As the double headed piston approaches the limit of its movement away from the position shown in the drawings, the head 14 will

open the port 35 thus admitting the motive fluid through the passage 33 for moving the valve 22 to the other end of the chamber 12. This movement of the double headed piston will also rock the rotating ring 9 but will not rotate the chuck 8 because of the position of the clutch rollers. This movement of the valve 22 will bring its port 25 into position to open the motive fluid to the outer side of the piston head 13 through the port 29, the outer side of the piston head 14 being open to external atmosphere through the ports 30, 26, 32. This will drive the piston in the opposite direction and also rock the rotation ring and because of its clutching engagement with the chuck, the chuck and its tool steel will be rotated. As the piston nears the limit of its movement toward that shown in the accompanying drawings, the port 38 will be opened to the outer side of the piston head 13 thus forcing the valve 22 back to its position shown in the drawings, when the cycle of operations will be repeated. As the piston reaches the limits of its movement, it will alternately open the spaces at the ends of the valve 22 through the passages 33 and 36 and their ports 34, 37, to external atmosphere through the port 19 of the piston chamber.

What I claim is:—

1. In a fluid pressure operated hammer tool, a piston chamber, a double headed piston therein, a tool steel, an oscillating ring for rotating the steel, said ring having an arm projecting into the piston chamber between the heads of the said piston and a valve controlled by the movements of the piston for supplying fluid pressure thereto.

2. In a fluid pressure operated hammer tool, a piston chamber, a double headed piston therein, a tool steel, an oscillating ring for rotating the steel, said ring having an arm projecting into the piston chamber between the heads of the said piston and a valve controlled by the movements of the piston for supplying fluid pressure thereto, and means independent of the hammer piston and its operating mechanism for supplying the pressure fluid to the said valve.

3. In a fluid pressure operated hammer tool, a tool steel, an oscillating ring for rotating the steel, a valve casing having therein a transversely arranged piston chamber and a transversely arranged valve chamber, a double headed piston in the piston chamber for operating the oscillating ring and a valve in the valve chamber controlled by the movements of the said piston for supplying fluid pressure thereto.

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.