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DRILL STEEL TURNING DEVICE FOR PERCUSSIVE FLUID OPERATED DRILLS.

APPLICATION FILED MAR. 9, 1914.

1,160,648.

Patented Nov. 16, 1915.

2 SHEETS—SHEET 1.

Fig. 1

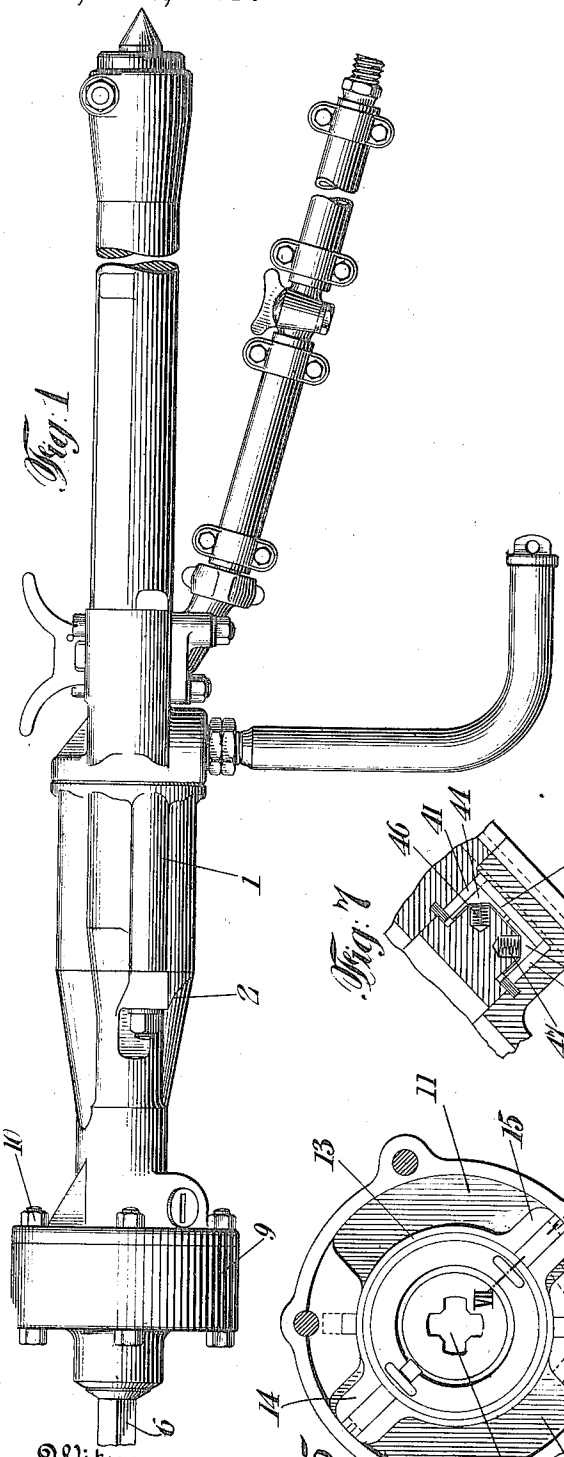


Fig. 4

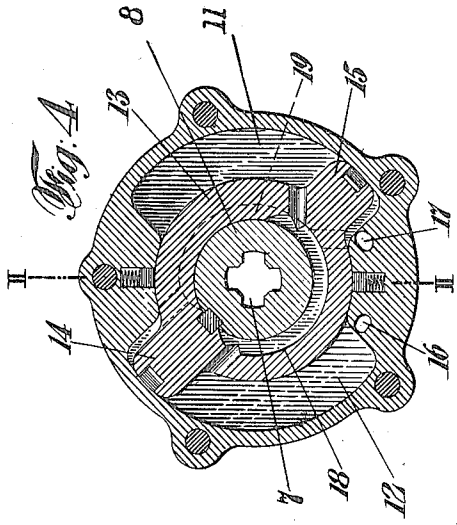


Fig. 7

Fig. 2

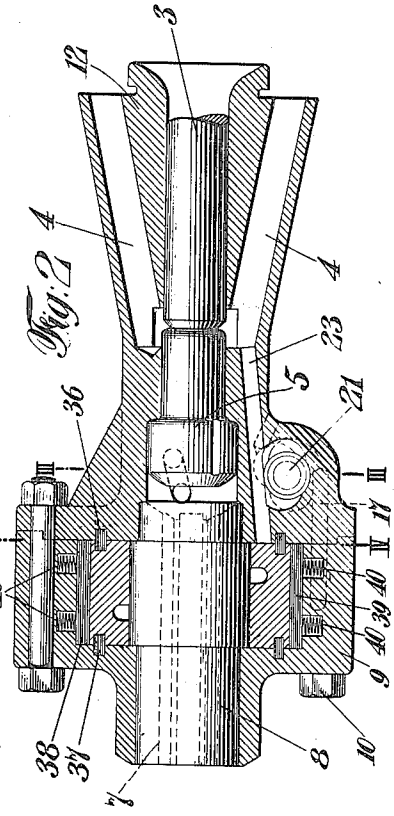


Fig. 5

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2 SHEETS—SHEET 2.

Fig. 6

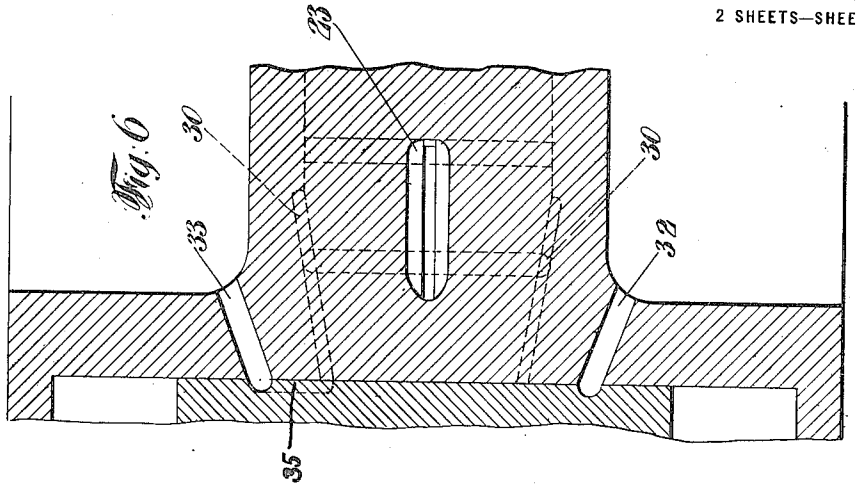
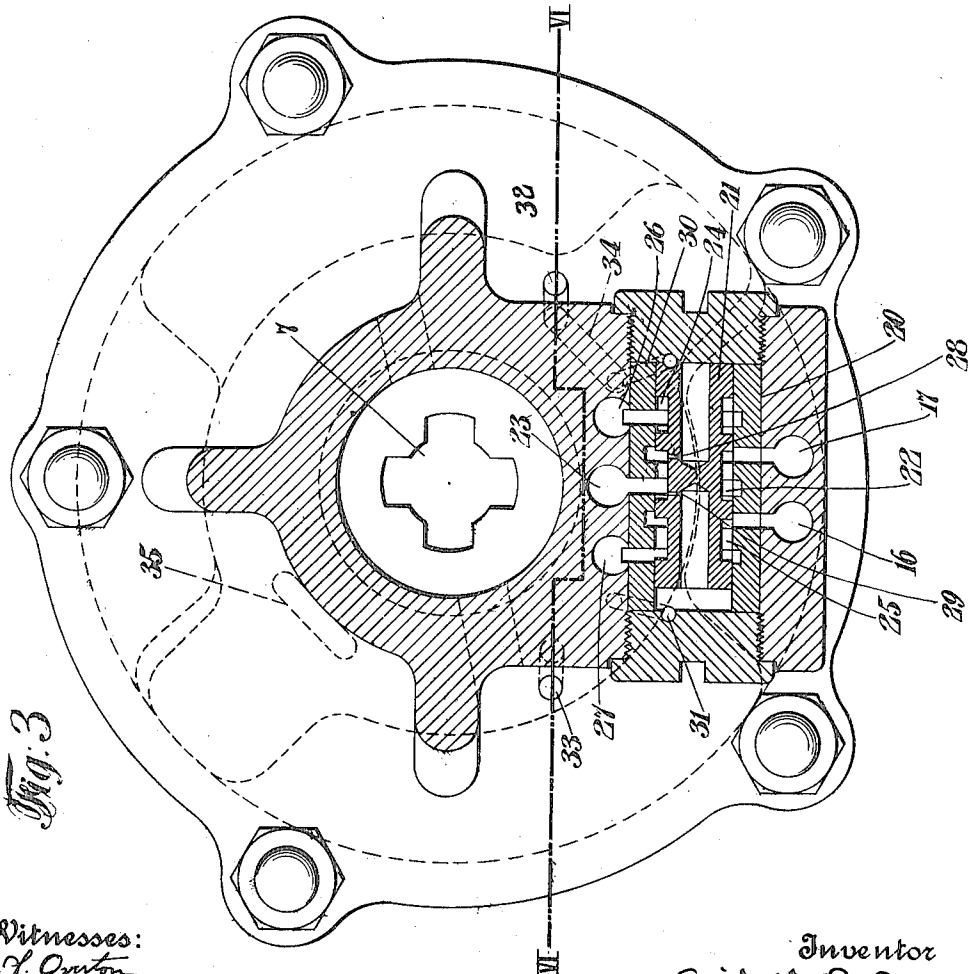


Fig. 3



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UNITED STATES PATENT OFFICE.

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DRILL-STEEL-TURNING DEVICE FOR PERCUSSIVE FLUID-OPERATED DRILLS.

1,160,648. Specification of Letters Patent. Patented Nov. 16, 1915.

Application filed March 9, 1914. Serial No. 823,522.

To all whom it may concern:

Be it known that I, CAID H. PECK, a citizen of the United States, residing at Waverly, in the county of Tioga and State of New York, have invented a certain new and useful Improvement in Drill-Steel-Turning Devices for Percussive Fluid-Operated Drills, of which the following is a specification.

This invention relates to percussive fluid operated drills and more particularly to a mechanism for giving the drill steel an oscillating movement so that its cutting edges strike different portions of the drilled surface in successive blows, resulting in increased drilling efficiency, and freedom from becoming wedged in the hole.

The object of the invention is to provide a fluid operated mechanism which enables the drill steel to be automatically oscillated preferably at a speed less than the reciprocation of the drill piston. This object is accomplished by mechanism, a practical embodiment of which is shown in the accompanying drawings in which—

Figure 1 shows an exterior view of an air feed stoping drill provided with this mechanism, Fig. 2 shows a longitudinal section through the forward end of the drill inside the oscillating mechanism, Fig. 3 shows a transverse section on a larger scale taken on the line 3—3 of Fig. 2, Fig. 4 shows a transverse section taken on the line 4—4 of Fig. 2, Fig. 5 shows an elevation of the rear end of the oscillating mechanism removed from the drill, Fig. 6 shows a fragmentary longitudinal section taken on the line 6—6 of Fig. 3 and Fig. 7 shows a detail section taken on the line 7—7 of Fig. 5.

In the drawings, the invention is shown applied to a stoping drill 1 of ordinary construction, the details of which form no part of the present invention. In Fig. 2 is shown the forward end 2 of the drill cylinder and the front portion 3 of the piston, the drill, here shown, being of the valveless type, the live air entering the front end of the cylinder through the ports 4. The piston 3 strikes an anvil block 5 the shank of which projects back into the cylinder and the anvil block 5 in turn actuates by its impact a drill steel 6 which fits into a polygonal bore 7 in a sleeve 8. This sleeve 8 is rotatably mounted in a front head casing 9 which is secured to the forward end of the drill cylinder by bolts 10. The rearward portion of the cylinder head casing 9 is of larger diameter and is bored out to form opposite partially annular cylinder chambers 11 and 12 surrounding the sleeve 8. Keyed to the sleeve 8 is a cylindrical piston 13 from which project two diametrically opposite wings 14 and 15 which are adapted to have an oscillating movement in the cylinder chambers 11 and 12. The valve mechanism for oscillating these wings is as follows: Fluid pressure is admitted and exhausted from the cylinders 11 and 12 by means of passages 16 and 17 which lead into the lower part of each of the cylinders. To double the effect of the fluid pressure cross passages 18 and 19 are provided through the piston 13 affording connection in each direction between the correspondingly operating faces of the wings 14 and 15, the wings thus each becoming a double acting piston. The passages 16 and 17 extend inwardly to the rear, and open into a valve chest 20 in which slides a spool valve 21 which has a central depression 22 adapted to connect the passages 16 and 17 alternately with the central fluid inlet passage 23, the valve 21 also having depressions 24 and 25 on either side of the depression 22 adapted to alternately connect the passages 16 and 17 with the exhaust passages 26 and 27. To move the valve, smaller live fluid leak ports 28 and 29 are provided which lead from the depression 22 to the opposite ends of the valve chest. These afford a constant pressure in both ends of the valve chest serving to move the valve, which movement is effected at each end of the piston stroke by means of outlet ports 30 and 31 which run to the face of the piston 13 and are alternately connected to exhaust passages 32 and 33, which lead to the atmosphere, by means of elongated depressions 34 and 35 in the face of the piston 13.

The size of the inlet and exhaust ports for the cylinders of this drill steel oscillating motor is so calculated that the piston 13 will oscillate or reciprocate at a considerably slower speed than the piston 3.

To prevent leakage from the oscillating motor cylinders to the outside or to each other annular packing rings 36 and 37 are provided in the front and rear faces of the piston 13. Packing strips 38 and 39 are also provided in the casing between the two cyl-

inders and are pressed against the body of the piston 13 by springs 40. To prevent leakage around the ends of the wings 14 and 15, packing strips 41, 42 and 43 are provided on the end and side faces of the wings, the ends of which dovetail into each other and which are held constantly against the interior of the cylinder, by small angle bars 44 and 45 set in grooves in the wings and pressed diagonally outwardly by springs 46 and 47.

The operation of the mechanism will be evident from the above description. As the drill steel 6 is struck by the piston it will be given a comparatively slow to and fro oscillation by means of the piston 13 of the oscillating motor. The movement of the piston 13, although slow, is powerful and prevents any possibility of the drill steel being caught in the hole. Furthermore, by reason of the fact that the oscillatory movement of the piston is considerably slower than the movement of the drill piston the cutting edges of the drill will strike a new rock surface at every blow of the piston. The slower movement of the oscillating piston also works an economy in the consumption of fluid used in oscillating the steel.

It is to be understood that the present showing and description discloses only one specified modification of my invention and other forms and modifications are included in the spirit and scope of the invention as expressed in the claims.

What I claim is:

1. In a percussive tool, a cylinder, a piston, a drill steel actuated by said piston, a sleeve for holding said steel, a partially annular cylinder surrounding said sleeve, a piston attached to said sleeve and oscillating in said cylinder, and valve mechanism for oscillating said piston and said drill steel at a speed less than said drill piston.

2. In a percussive tool, a cylinder, its piston, a drill steel actuated by said piston, a sleeve for the reception of said drill steel, a partially annular cylinder surrounding said sleeve, a wing attached to said sleeve and adapted to oscillate in said cylinder, and fluid connections for operating said oscillating piston.

3. In a percussive tool, a cylinder, its piston, a drill steel actuated by said piston, a sleeve for the reception of said drill steel, a partially annular cylinder surrounding said sleeve, a wing attached to said sleeve and adapted to oscillate in said cylinder, and a valve for admitting pressure alternately to opposite faces of the wing to oscillate said wing, sleeve and steel.

4. In a percussive tool, a cylinder, its piston, a drill steel actuated by said piston, a sleeve for the reception of said drill steel, a casing around said sleeve having a pair of opposed partially annular cylinders, a piston attached to said sleeve having oppositely projecting wings, cross passages leading from the cylinder portion on each side of said wings to the portion of the cylinder on the corresponding side of the other wing and fluid passages for admitting fluid to and exhausting it from opposed sides of said wings.

In testimony whereof, I have hereunto set my hand.

CAID H. PECK.

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