T. E. STURTEVANT.

FEED CONTROL VALVE.

APPLICATION FILED JAN. 30, 1914.

1,127,822. Patented Feb. 9, 1915.

Fig. 1,

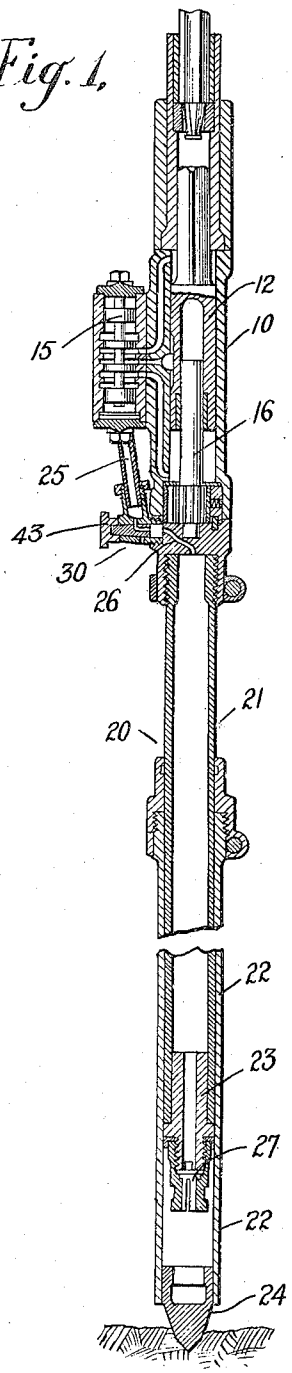


Fig. 2,

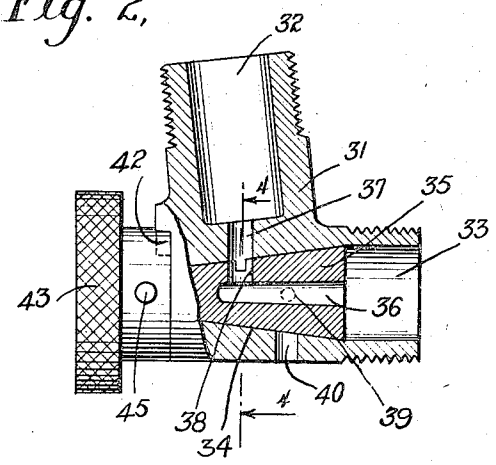


Fig. 3,

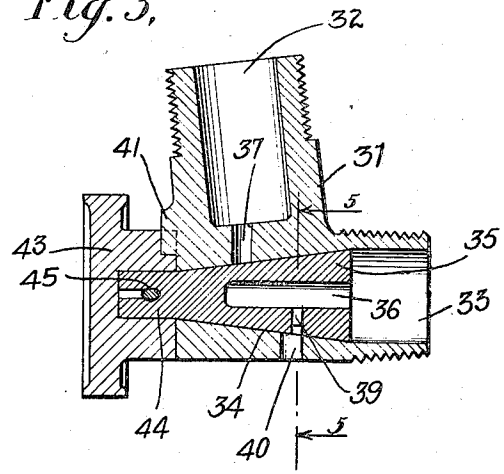


Fig. 4,

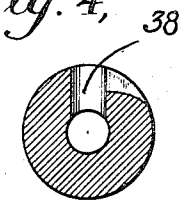
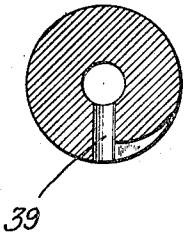


Fig. 5,



WITNESSES

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FEED-CONTROL VALVE.

1,127,822. Specification of Letters Patent. Patented Feb. 9, 1915.

Application filed January 30, 1914. Serial No. 815,361.

To all whom it may concern:

Be it known that I, THOMAS E. STURTEVANT, a citizen of the United States of America, and a resident of Dover, Morris county, and State of New Jersey, have invented certain new and useful Improvements in Feed-Control Valves, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to power drills and has special reference to such as are both actuated and fed by a motive fluid such for example, as compressed air or steam.

One object of my invention is to provide a simple and effective means for controlling the feed pressure.

More specifically one of my objects is to provide a control valve which may be manipulated readily by the operator of the drill and which shall require only a small turning movement to adjust the feed in accordance with the varying character of the work, by changing the fluid pressure which tends to feed the drill forward.

Other objects and advantages of my invention will be set forth hereinafter, and in order that my invention may be thoroughly understood, I will proceed to describe the same in the following specification, and then point out the novel features thereof in appended claims.

Referring to the drawings: Figure 1 is a central longitudinal section of a fluid pressure operated drill embodying the feed control valve of my invention. A partially sectional view of the valve adjusted for full feed pressure is shown on a larger scale in Fig. 2, a complete section corresponding to that of Fig. 2 in a different valve position, being shown in Fig. 3. Figs. 4 and 5 are respectively transverse sections drawn to a still larger scale and taken on the lines 4—4 and 5—5 of Figs. 2 and 3.

The rock drill illustrated comprises in general, a main working cylinder 10, a reciprocatory piston 12 therein, a distributing valve 15 for admitting and exhausting motive fluid to and from the cylinder below and above the piston, rotating mechanism 16 by which step by step rotative movements are imparted to the piston, a feed mechanism 20, and a feed control valve 30.

The feed mechanism 20 comprises a pair of telescoping sleeves 21 and 22 of which the sleeve 21 is secured to the cylinder 10 at one end and is closed at the opposite end, except for a small passage 27, by a plug 23. This sleeve extends into the sleeve 22 which is closed at its outer end by a plug 24. This is preferably pointed as shown in Fig. 1, in order that it may be firmly placed in contact with a reaction wall. For example, in drilling overhead in a mine, the pointed plug 24 may be forced into the floor or bench of the shaft and the drill pushed upwardly as it advances in operation.

The pressure tending to force the drill forward is produced by motive fluid introduced from a pipe 25 through the valve 30, and a passage 26 into the sleeve 21. From this sleeve it passes through the small passage 27 into the sleeve 22 beyond the end of the telescoping sleeve 21. The pressure of the fluid in this chamber tends to separate the sleeves, and force the plugs 23 and 24 apart. The plug 24 is set in a stationary wall or object and consequently the pressure acts upon the plug 23 to feed the drill forward.

In order that the drill may operate to the best advantage when the character of the rock or other substance upon which it is working is changing, there should be some means for adjusting the feed pressure from time to time and the regulating valve 30 is arranged for this purpose and may be very readily controlled by the operator of the drill. It comprises an elbow 31 having a recess 32 in one arm and a recess 33 which extends completely through the other arm. The recess 33 is tapered throughout a material portion of its length to form a valve seat 34 into which is fitted a tapered plug valve 35. The plug has a recess 36 which communicates, as shown in Figs. 2 and 4, with a passage 37 formed in the bottom of the recess 32, through a transverse passage 38. The plug has another transverse passage 39 which is arranged to establish communication between the recess 36 and the exhaust passage 40.

The plug is arranged to rotate in the valve seat and its rotation is limited to a predetermined angle by reason of the coöperation of a lug 41 of the elbow with a pair of shoulders 42 formed on a valve handle 43. The handle is mounted on a stem 44 of the plug valve and is held in position thereon by a pin 45.

The form of the transverse passage 38 is clearly shown in Fig. 4 and is such that when the valve plug is turned the passage is gradually closed off. The form of the passage 39 is similar to that of the passage 38 and is shown in Fig. 5, but is obviously so arranged that when the passage 38 is gradually closed the passage 39 is gradually opened and vice versa.

In operation the feed pressure may be adjusted by turning the handle of the valve stem so as to adjust the position of the valve. Assuming that the valve occupies the position shown in Figs. 1 and 2, full pressure of the motive fluid will exist in the feed chamber since the passage 38 is open and the passage 39 closed. If now the valve is adjusted the inlet passage 38 may be partially closed and the exhaust passage 39 partially opened. In this way a part of the motive fluid pressure is spent in exhausting through the passage 39 and hence the working pressure in the feed chamber is reduced. In the opposite extreme position of the valve which is illustrated in Fig. 3, the passage 38 is entirely closed and consequently no motive fluid is supplied to the feed chamber nor is any wasted through the exhaust, but the feed chamber is connected directly with the exhaust.

Variations in size and arrangement of parts may be effected within the spirit and scope of my invention, and I intend that only such limitations be imposed as are indicated in the appended claims.

What I claim is:

1. In combination, a percussive tool, a fluid pressure feed mechanism therefor, a motive fluid supply, and an interposed control valve between the motive fluid supply and the feed mechanism, comprising a member having an inlet passage, an outlet passage to the feed mechanism, and an exhaust passage, a second valve member rotatable relative to the first mentioned member and having openings arranged to establish passages in the various valve positions from the inlet to the feed outlet and from the inlet to both the exhaust outlet and the feed outlet whereby the feed pressure may be varied as desired.

2. A control valve comprising an L-shaped body having its arms recessed, a taper hole extending through the body and forming a continuation of one of the recesses, an inlet passage between the other recess and the taper hole, and an exhaust passage communicating with the taper hole; a taper plug seated in the taper hole having a stem projecting beyond the body and a handle thereon, said taper plug being provided with a longitudinal recess and transverse openings adapted to register in different valve positions with the inlet and exhaust passages.

3. A control valve comprising a body having a recess constituting a valve seat, a plug valve seated therein and adapted to be rotatively adjusted, means for limiting the angle of rotative movement of the valve, a fluid pressure inlet passage, an outlet passage for useful pressure and an exhaust outlet passage, said valve plug being provided with passages adapted to respectively register with the inlet when the valve is in one position, with the exhaust passage when the valve is in its opposite position and constantly with the useful pressure outlet.

4. A control valve comprising a body having an inlet passage, a useful pressure outlet passage and an exhaust passage, a valve plug rotatively mounted in the body and having openings arranged to establish passages in various valve positions from the inlet to the useful pressure outlet, and from the inlet to both the exhaust outlet and to the useful pressure outlet.

5. A control valve comprising a body having an inlet passage, a useful pressure outlet passage and an exhaust passage, a valve plug rotatively mounted in the body and having tapered openings arranged to establish passages in various valve positions from the inlet to the useful pressure outlet and from the inlet to both the exhaust outlet and to the useful pressure outlet, the form of the valve passages being such that a greater or less proportion of the pressure is wasted through the exhaust passage and the useful pressure is varied accordingly.

In witness whereof, I have hereunto set my hand in the presence of two subscribing witnesses, this 26th day of January, 1914.

THOMAS E. STURTEVANT.

Witnesses:

ERNEST W. MARSHALL,

R. J. DEARBORN.