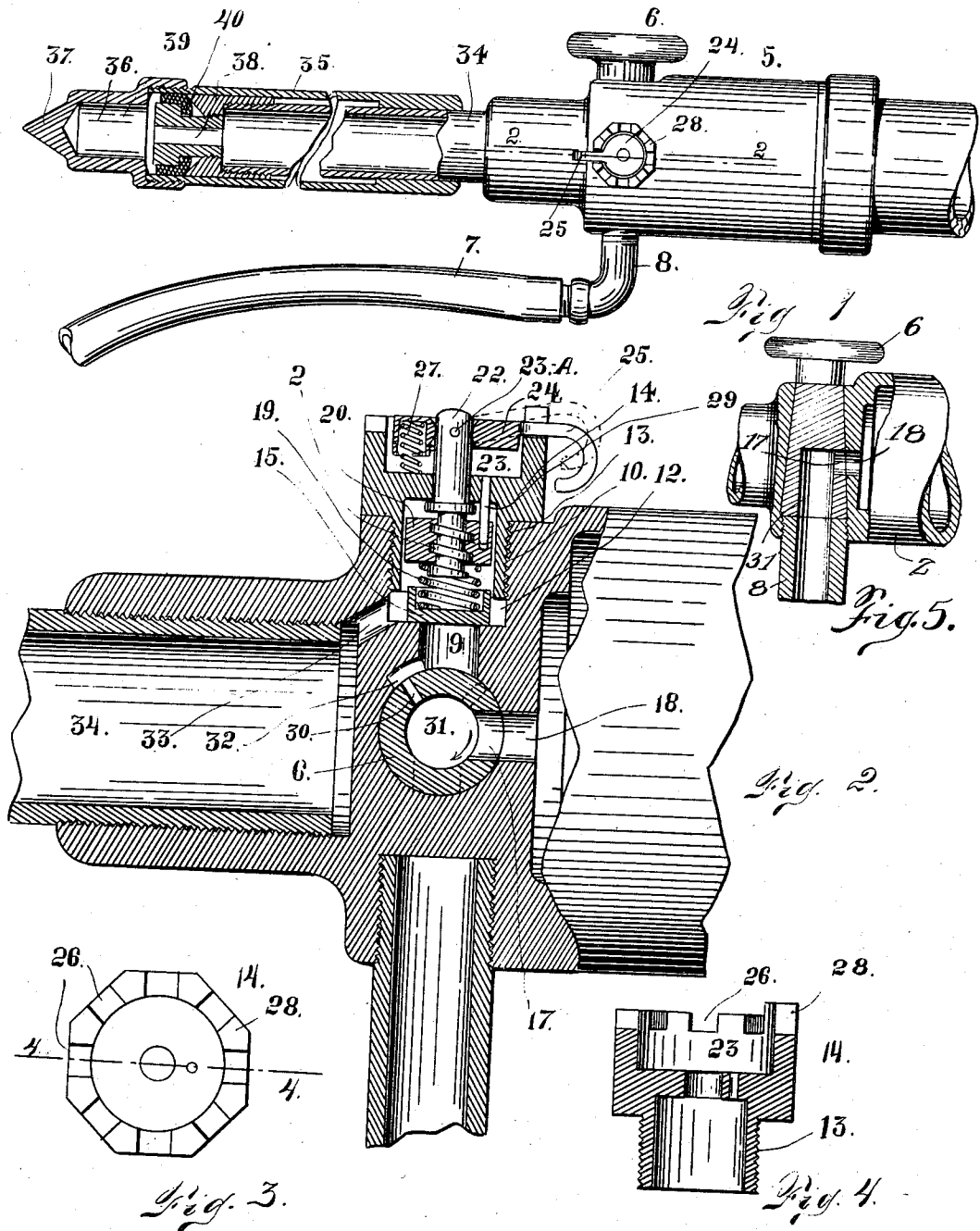


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 PRESSURE REDUCING MECHANISM FOR MOTIVE FLUID DRILLS.
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PRESSURE-REDUCING MECHANISM FOR MOTIVE-FLUID DRILLS.

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To all whom it may concern:

Be it known that I, DANIEL S. WAUGH, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Pressure-Reducing Mechanism for Motive-Fluid Drills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

The present invention relates more particularly to drilling mechanism of the motive fluid-operated type, and one of the objects of said invention is to provide novel, simple and compact means for controlling the supply of motive fluid to the motor and to motive fluid-operated feeding means employed for maintaining the drill in operative position with respect to the work.

As heretofore constructed, it has been customary to utilize the full pressure of the motive fluid that is used for operating the motor, in the feeding means to hold the drill in place. This pressure is often much greater than is necessary or desirable, and a further object of the present invention is to provide means for altering the pressure in the feeding means as circumstances may require.

One embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a view partially in elevation and partially in section of a portion of a pneumatic drill. Fig. 2 is a longitudinal sectional view on the line 2—2 of Fig. 1. Fig. 3 is a plan view of the locking device for the pressure reducing mechanism. Fig. 4 is a sectional view on the line 4—4 of Fig. 3. Fig. 5 is a detail sectional view at right angles to Fig. 2.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, the drill

body as a whole, is designated 5, and is provided at one end with a suitable motive fluid operated motor, and at its other end with motive fluid operated feeding means for such motor. A connection in the form of a body and valve casing is interposed between the motor and feeding means, as shown in Fig. 2, and contains a valve seat, in which is rotatably mounted a valve 6 that projects from one side of the body, as shown in Fig. 1. Said projecting portion constitutes means for rotating the valve. The wall is furthermore provided with a port 18 that leads from the valve seat, and communicates with the motor. It is also provided with a port 9 having an extension 32, said port 9 communicating with the chamber 12, from which leads a rearwardly extending port 33. The valve 6 is provided with an internal chamber 31 and lateral ports 17 and 30 that are respectively movable into and out of register with the ports 18 and 9 and the extension 32 of the latter. A supply conduit 7, leading from any suitable source of motive fluid under pressure, is connected by a coupling 8 to the side of the body opposite to that from which the valve 6 projects, and this coupling delivers motive fluid under pressure to the internal chamber 31 of the valve.

The motive fluid-operated feeding means consists of a cylinder 35 having its outer or rear end closed by a cap 36 secured thereto and provided with a spur 37. The cap also has an internal chamber 39. A piston reciprocates within the cylinder 35 and comprises a head with a packing washer 40, the latter being held in place on the head by a coupling having a longitudinal passage 38 therethrough. This piston is carried by a tubular piston rod 34 that projects from the inner end of the cylinder 35, and is secured to the rear end of the body, as shown in Fig. 2. The port 33 communicates with the interior of the piston rod 34, and consequently motive fluid admitted through said port, will pass through the piston rod through the channel 38 and into the chamber 39 so that it will act against the rear face of the piston, as will be obvious.

Operating in the chamber 12 over the end of the port 9 is pressure-reducing mechanism, the same preferably comprising a cap valve 15 that is located in said chamber, and is yieldingly maintained upon the bottom thereof over the port 9 by a coiled spring 19. This spring is borne upon by a tension nut 20 having a threaded engagement, as shown at 2 with a rotary shaft 22. The shaft 22 is journaled in a nut 14 having a plug portion 13 threaded as shown at 10 into the outer portion of the chamber 12. The nut 14 has an outstanding flange 23 surrounding the outer end of the shaft 22 and provided with a series of notches 26 and an outstanding stop lug 28. A locking dog 24 is pivoted, as shown at 23^a upon the outer end of the shaft, and has a handle 25 that is arranged to fit in the different notches 26 and abut against the stop lug 28. A spring 27, bearing against the nut and located in a socket in the dog, serves to normally maintain the handle 25 in the notches. To prevent the rotation of the tension nut 20, a pin 29 is provided that is slidably engaged by said nut.

The operation of the structure is substantially as follows. Assuming that motive fluid under pressure is being delivered to the conduit 7, it will be obvious that if the valve 6 is in a position with the ports 17 and 30, as indicated in dotted lines in Fig. 2, such motive fluid is entirely cut off both from the motor and the feeding means. If now the valve 6 is rotated in a direction opposite to the arrow shown in Fig. 2, the port 30 will first be brought into communication with the port 9 and the motive fluid will consequently be delivered through said port 9 against the cap valve 15. This valve will be raised by the pressure and the motive fluid will flow through the port 33, the piston rod 34 and the channel 38 into the chamber 36. Here it will act against the piston and force the same outwardly, carrying the motor with it in a manner well understood. If now the valve 6 is turned still further, the port 17 will be brought into communication with the port 18 and the motive fluid will be delivered to the motor, the port 30 still maintaining its communication with the port 9 by means of the extension 32. In this structure, the pressure of the motive fluid delivered to the feeding means can be varied as shown by raising the handle 25 out of the notch 26, in which it may be engaged and rotating said handle. This will cause the nut 20 to move inwardly or outwardly, thereby varying the tension upon the spring 19 as will be obvious. As a result, the pressure of the motive fluid can be changed at any time, without in any manner altering or affecting the pressure in the motor.

It is to be observed in this structure that

all the mechanism is compactly arranged 65 and is in convenient relation to an operator. The coupling 8 is located directly opposite the operating handle of the valve 6, and the adjusting means for the pressure-reducing mechanism is disposed on a different side, as 70 shown clearly in Fig. 1.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In a structure of the character set forth, 75 the combination with a motive fluid operated motor and motive fluid operated feeding means therefor, of means for delivering motive fluid under pressure to the motor and to the feeding means, and mechanism 80 for varying the pressure of the motive fluid delivered to the feeding means relative to that delivered to the motor.

2. In a structure of the character set forth, the combination with a motive fluid oper- 85 ated motor and motive fluid operated feeding means therefor, of means for delivering motive fluid under pressure to the motor and to the feeding means, and mechanism for varying the pressure of the motive fluid 90 delivered to the feeding means without affecting the pressure of the fluid delivered to the motor.

3. In a structure of the character set forth, the combination with a motive fluid oper- 95 ated motor, and motive fluid operated feeding means therefor, of a supply conduit having branches leading respectively to the motor and to the feeding means, and variable pressure reducing means located in 100 the branch that leads to the feeding means.

4. In a structure of the character set forth, the combination with a motive fluid oper- ated motor, of motive fluid operated feed- 105 ing means therefor, a valve casing having ports leading to the motor and to the feeding means, means for delivering motive fluid to the casing, a valve in the casing controlling the ports, and variable pressure reducing mechanism located in the port that leads to 110 the feeding means.

5. In a structure of the character set forth, the combination with a motive fluid oper- ated motor, of motive fluid operated feed- ing means therefor, a body located between 115 the motor and feeding means, said body having a valve seat, ports leading therefrom to the motor and to the feeding means, a controlling valve operating in the seat and projecting from one side of the body, means 120 connected to another side of the body for delivering motive fluid to the valve, and pressure reducing mechanism located in the port that leads to the feeding means, said pressure reducing mechanism projecting 125 from still another side of the body.

6. In a structure of the character set forth, the combination with a motive fluid oper-

ated motor, of motive fluid operated feeding means therefor, means for delivering motive fluid to the motor and feeding means, including separate channels leading thereto, and variable pressure-reducing mechanism controlling the passage of motive fluid through one of said channels.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL S. WAUGH.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."