W. A. SMITH.

ROCK DRILL.

APPLICATION FILED JULY 23, 1917.

1,293,961.

Patented Feb. 11, 1919.

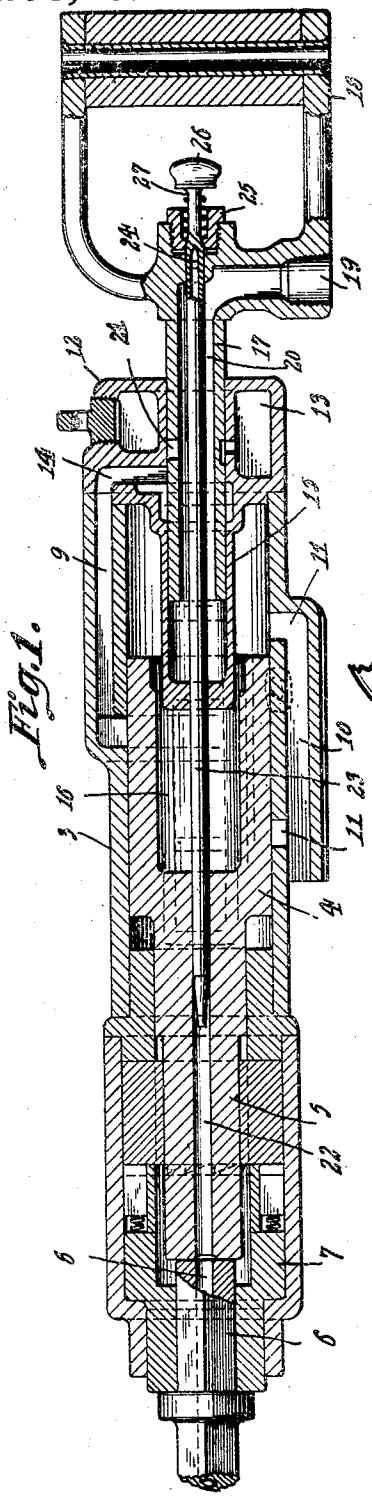


Fig. 1.

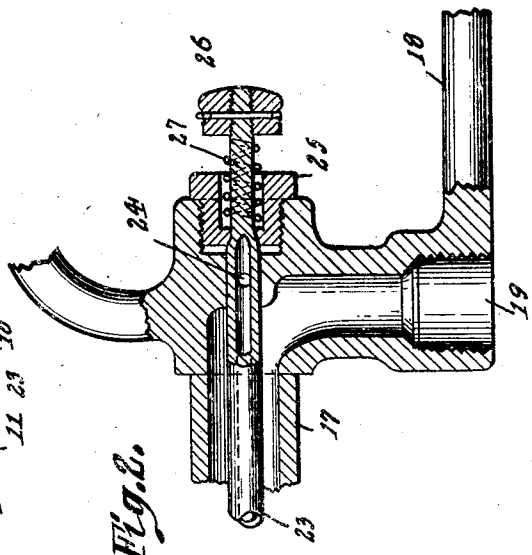


Fig. 2.

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by [illegible]

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UNITED STATES PATENT OFFICE.

WILLIAM A. SMITH, OF DENVER, COLORADO, ASSIGNOR TO THE DENVER ROCK DRILL MANUFACTURING COMPANY, OF DENVER, COLORADO, A CORPORATION OF DELAWARE.

ROCK-DRILL.

1,293,961. Specification of Letters Patent. Patented Feb. 11, 1919.

Original application filed December 16, 1916, Serial No. 137,363. Divided and this application filed July 23, 1917. Serial No. 182,309.

To all whom it may concern:

Be it known that I, WILLIAM A. SMITH, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification.

The present invention relates more particularly to rock drills of the hammer piston type, this application being a division of Serial No. 137,363, filed December 16, 1916.

The primary object of the invention is to provide novel mechanism of a simple and practical character for delivering cleansing fluid to the drill bit, said means being under the constant control of the operator, and furthermore coacting with the means for governing the supply of motive fluid to the drilling motor.

In the accompanying drawings,

Figure 1 is a longitudinal sectional view of a structure embodying the present invention.

Fig. 2 is a detail sectional view on an enlarged scale of the cleansing fluid controlling means.

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

In the embodiment illustrated, the motor consists of a barrel or cylinder member 3, within which reciprocates a piston 4 having an extension 5 of less diameter than the piston proper. This piston is of the hammer type, the extension 5 operating on a drill bit 6 detachably located in a rotatable chuck 7 and having a bore 8 therethrough, said bore providing means for conducting cleansing fluid to the bottom of the drill hole. The drilling motor is of the so-called valveless type, the piston constituting the means for controlling the distribution of the motive fluid to actuate said piston.

It is believed to be unnecessary for the purposes of the present invention to go into a detailed description of the motor, as the same is fully disclosed in the above identified application. It is sufficient to say that this motive fluid is supplied to the piston chamber by a passageway 9 leading to ports and channels controlled by the piston hammer. The exhaust takes place through a passageway 10 having ports 11 alternately covered and uncovered by the ends of the piston upon its reciprocation.

For the purpose of supplying motive fluid to the passageway 9, the following mechanism is employed. The cylinder member 3 is provided with a rear head 12 which is chambered as shown at 13, said chamber constituting a lubricant reservoir and is furthermore provided with a passageway 14 communicating with the passageway 9. The rear head 12 is furthermore provided with an extension 15 that projects into the cylinder member, the piston being hollowed out, as shown at 16, to accommodate said extension.

Slidably mounted in the rear head 12 and in the socket of the extension 15 is a tubular neck 17 which carries a handle 18. The handle is provided with a lateral inlet passageway 19 to which may be coupled the usual hose line, and this passageway is in communication with the bore 20 of the neck 17, which neck has its inner end open, and is thus in communication with the socket of the extension 15. The said neck furthermore is provided with a lateral port 21 that is movable into communication with the passageway 14 when the handle is moved toward the motor, said port being closed when the handle is in its outermost position. It will thus be seen that when the handle is pushed forward the port 21 will be brought into communication with the passageway 14, so that motive fluid supplied to the passageway 19 will pass into the motor to operate the same.

The piston hammer 4 and its extension is provided with a longitudinal axial bore 22 alined and communicating with the bore 8 of the drill bit. Fluid under pressure is delivered to the bore 22 and consequently to the bore 8 by means of a conducting tube 23, the rear end of which is slidably mounted in the handle 18, said tube passing through the bore 20 of the neck 17 and into the bore 22. The tube has a rear closed end and is provided with a lateral port 24 that is movable into and out of communication with the fluid supply passage 19, accordingly as the tube is moved forwardly and backwardly in the handle member. The mounting for this tube includes a plug 25 through which said tube slidably passes and against which it is

arranged to abut to limit its outward movement. The rear end of the tube is provided with a thumb or finger piece 26 arranged within the handle in convenient relation to be pressed upon by the operator, and a spring 27 is interposed between the finger piece and the plug 25, this spring as will be evident, holding the tube in its rearmost position, with the port 24 thereof out of communication with the passageway 19.

When the handle is pressed forwardly, the tube will, of course move forwardly with it and motive fluid, as already explained, will be delivered to the drilling motor. When the tube 23 is pressed with respect to the handle, the port 24 therein is brought into communication with the passageway 19, and consequently fluid under pressure can enter the tube 23 and discharging from the front end thereof will pass through the bore 22 into the bore 8 of the drill bit.

The operation of this tube is not dependent at all upon the manipulation of the handle. That is to say, the cleansing fluid can be caused to flow into the drill bit irrespective of the position of the handle, and whether or not it is in a position to deliver motive fluid to the drilling motor.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In drilling apparatus, the combination with a motor comprising a cylinder member and a piston operating therein and having a bore, of a cleansing fluid directing tube projecting into the cylinder member and engaged in the bore of the piston, said piston being slidable on the tube, and said tube being slidable in the piston, and means for supplying cleansing fluid to the tube, said supply being controlled by the tube on its sliding movement.

2. In drilling apparatus, the combination with a motor comprising a cylinder member and a piston operating therein and having a bore, of means for supplying motive fluid to the motor, and a cleansing fluid directing tube projecting into the cylinder member and engaged in the bore of the piston, said piston being slidable on the tube, and said tube being slidable in the piston and furthermore having communication with the motive fluid supply means to divert a part thereof for cleansing purposes when said tube is in one position and being out of communication with the motive fluid supply means when the tube is in another position.

3. In drilling apparatus, the combination with a motor comprising a cylinder member and a piston operating therein and having a bore, of means including a passageway at the rear portion of the cylinder member for supplying motive fluid thereto to operate the piston, and a tube extending into the passageway and into the bore of the piston and being slidable therein, said tube having a port movable into and out of communication with the supply passageway upon its sliding movement.

4. In drilling apparatus, the combination with a motor, of a tube movably mounted therein for directing motive fluid to a drill bit operated on by the motor, one end of said tube projecting toward such drill bit, the other end being exposed and constituting an actuating device for moving it, said tube by its movement controlling the supply of cleansing fluid directed thereby.

5. In drilling apparatus, the combination with a motor comprising a cylinder member and a piston operating therein and having a bore, of means for supplying motive fluid to the motor, including a passageway at the rear of the same, and a fluid conducting tube slidably mounted in the motor and slidably extending into the bore of the piston, the rear end of the tube being disposed in projecting relation and constituting means for sliding said tube, said tube having a port that is movable into and out of communication with the passageway upon the sliding movement of the tube.

6. In drilling apparatus, the combination with a motor, comprising a cylinder member and a piston operating thereon, of a handle member carried by the rear end of the cylinder member, a cleansing fluid supply tube slidably mounted in the handle member and having a projecting finger piece for operating it, said tube extending into the piston for directing cleansing fluid to a drill bit operated on by said piston, and said tube furthermore having a port located in the handle member, and a supply passage in said handle member with which the port moves into and out of communication upon the sliding movement of the tube.

7. In drilling apparatus, the combination with a drilling engine, of movable means for controlling the supply of actuating fluid to the engine, and means movable with and movable with respect to said controlling means for controlling the cleansing fluid supply to a drill bit operated on by said engine.

8. In drilling apparatus, the combination with a drilling motor, of means for supplying motive fluid to the motor, a throttle valve controlling such supply, and means for supplying cleansing fluid to a drill bit oper-

ated on by the motor, including means movably mounted on the throttle valve for controlling a supply of cleansing fluid.

9. In drilling apparatus, the combination with a drilling motor, of means for supplying motive fluid to the motor, a handle for holding the motor to its work movably mounted on said motor and having a throttle valve movable therewith for controlling the supply of actuating fluid to the motor, and means mounted on and movable with said handle for delivering cleansing fluid to the drill bit.

10. In drilling apparatus, the combination with a drilling motor, of means for supplying motive fluid to the motor, a throttle valve controlling such supply, and a tube for supplying cleansing fluid to a drill bit operated on by the motor, said tube being mounted on the throttle valve.

11. In drilling apparatus, the combination with a drilling motor including a cylinder member and a piston therein having a bore therethrough, a handle slidably mounted on the cylinder member and having a throttle valve movable therewith to control the supply of motive fluid to the drilling motor, and a tube slidably mounted on the handle and engaging in the bore of the piston, said tube having a valve portion movable into and out of coaction with a portion of the handle for controlling the supply of fluid through the tube and being movable into and out of communication with the motive fluid supply to the piston.

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

WILLIAM A. SMITH.

Witnesses:
C. F. CHAMBERS,
J. P. FLYNN.