June 9, 1925. 1,540,910

W. A. SMITH

ROCK DRILL

Filed Sept. 13, 1924

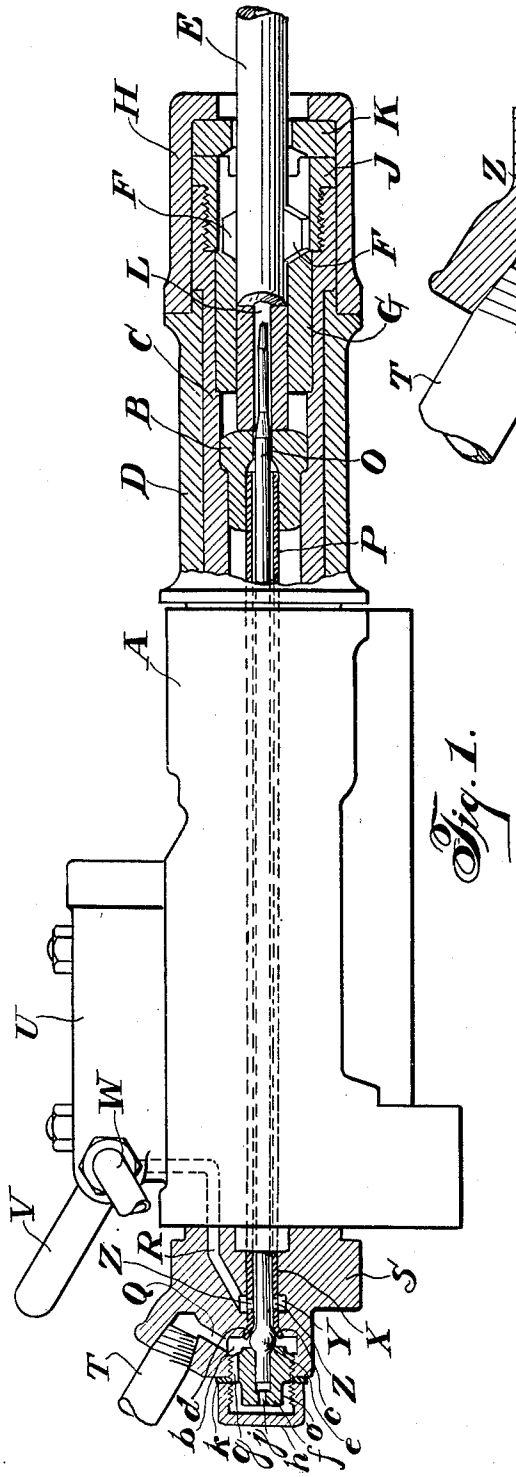


Fig. 1.

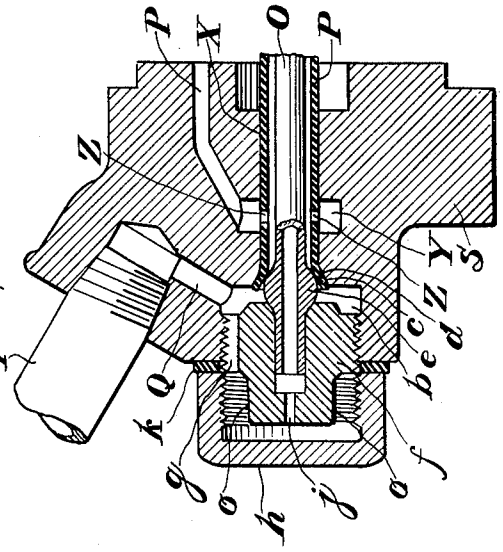


Fig. 2.

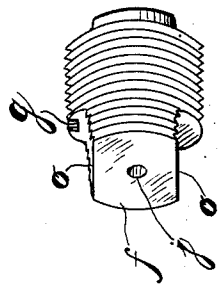


Fig. 3.

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UNITED STATES PATENT OFFICE.

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ROCK DRILL.

Application filed September 13, 1924. Serial No. 737,509.

To all whom it may concern:

Be it known that I, WILLIAM A. SMITH, a citizen of the United States, and a resident of Athens, county of Bradford, State of Pennsylvania, have invented a certain Rock Drill, of which the following is a specification, accompanied by drawings.

This invention relates to rock drills and more particularly of that type of rock drills in which the water is supplied to a hollow drill steel assisted by air pressure to cleanse the hole being drilled. In the type of drill to which this invention relates, water is fed to the drill steel through a water tube passing axially through the drill from the back head and the air to supply the pressure to feed the water through a water tube passing longitudinally through the drill steel is supplied through a tube concentric with the water tube communicating at the back head with a constant supply of air under pressure.

It is an object of this invention to seal the air and water tubes in the back head so as to prevent water from being forced into the hammer cylinder under pressure with the motive fluid.

Other objects and advantages of the invention will become apparent in the following description taken in conjunction with the accompanying drawings, in which—

Figure 1 is a side view of a drill constructed in accordance with the practice of the invention, parts being in section to show the internal construction of the drill.

Figure 2 is an enlarged view in longitudinal section of the back head structure showing the means by which the seal of the air and water tubes is effected, and

Figure 3 is a perspective view of the plug holding the water and air tubes in position.

In the drawing, A represents the hammer cylinder of a rock drill of the pneumatic type in which a hammer piston (not shown) is adapted to reciprocate to strike rapidly repeated blows against the anvil block B within a chuck sleeve C supported by a front head D adapted with the chuck sleeve C to receive a hollow drill steel E. Preferably the drill steel E is provided with lugs F to prevent turning of the steel in the chuck G which is held in engagement with the chuck sleeve C and supported on the front head by a suitable cap H. The front end J of the chuck may be formed separately and screwed to the chuck sleeve C so that wear on the front edge will not require replacement of the entire sleeve. A washer K forward of the front portion J of the chuck sleeve C prevents excessive wearing on the front end of the cap H.

Water for cleansing the hole being drilled is supplied to the hollow bore L of the drill steel E by means of a water tube O extending through the cylinder A and anvil block B.

Ordinarily the water pressure available is not sufficient to properly carry out chips and cuttings from the hole and therefore live air is admitted along with the water to provide sufficient pressure. To this end an air tube P is provided about the water tube O also extending through the cylinder A and into the anvil block B substantially to the end of the drill steel E.

Both the water tube O and the air tube P connected with a water passage Q and an air passage R are provided in a back head S sealing the rear end of the cylinder A. The water passage Q is adapted to be connected with a suitable water supply pipe T screwed into the back head and the air passage R is preferably associated with a suitable throttle valve (not shown) in the valve chest U and controlled by a handle V. W represents the pipe for the supply of air for operating the drill.

The back head S is provided with a longitudinal bore X of substantially the same diameter as the air tube P. The air passage R leads to an annular orifice Y about the bore X and is adapted to supply air through holes Z into the interior of the air tube P. The bore X opens into a larger bore *b* in the back head which communicates with the water passage Q. At the juncture of the bores X and *b*, the hole X is tapered as at *c* so as to fit roughly the flared end *d* of the air tube P forming a seat therefor. The water tube O is provided near its end with a bulb *e* which is adapted to seat in the flared end *d* of the air tube and forms a seal between the larger bore *b* and the smaller bore X.

The tubes O and P are held in this position by means of a hollow plug *f* which screws into the larger bore and which press-

es the bulb *e* into the flared end *d* and the latter against its seat at the conical hole *c*. The water supplied through the water passage finds its way from the larger bore *b* through a slot *g* in the side of the plug *f* into a cap *h* screwing onto the end of the plug *f* completing the passage for the water into a restricted hole *j* and thence into the water tube O. A suitable gasket *k* may be provided between the back head S and the cap *h* in order to screw the plug *f* into the larger bore *b*. Flat sides *o* as shown in Figure 3 may be provided on the plug to receive a wrench for screwing the plug in place.

I claim:

1. In a rock drill, a hammer cylinder, a front head on said cylinder adapted to receive a hollow drill steel, a back head for the cylinder, a water tube extending from said back head through the cylinder into the front head to supply cleansing water to the drill steel and an air tube about the water tube also extending from the back head substantially to the drill steel, said air tube being flared at its back end and said water tube being provided with a bulb fitting into the flared end of the air tube, and a plug screwing into the back head to press the bulb against the flared end of the air tube.

2. In a rock drill, a hammer cylinder, a front head on said cylinder adapted to receive a hollow drill steel, a back head for the cylinder, a water tube extending from said back head through the cylinder into the front head to supply cleansing water to the drill steel, an air tube about the water tube also extending from the back head substantially to the drill steel, said air tube being flared at its back end and said water tube being provided with a bulb fitting into the flared end of the air tube, and a hollow plug screwing into the back head for holding the bulb in sealing relation to the flared end of the air tube, said back head being provided with air and water passages leading to the air and water tubes respectively.

In testimony whereof I have signed this specification.

WILLIAM A. SMITH.