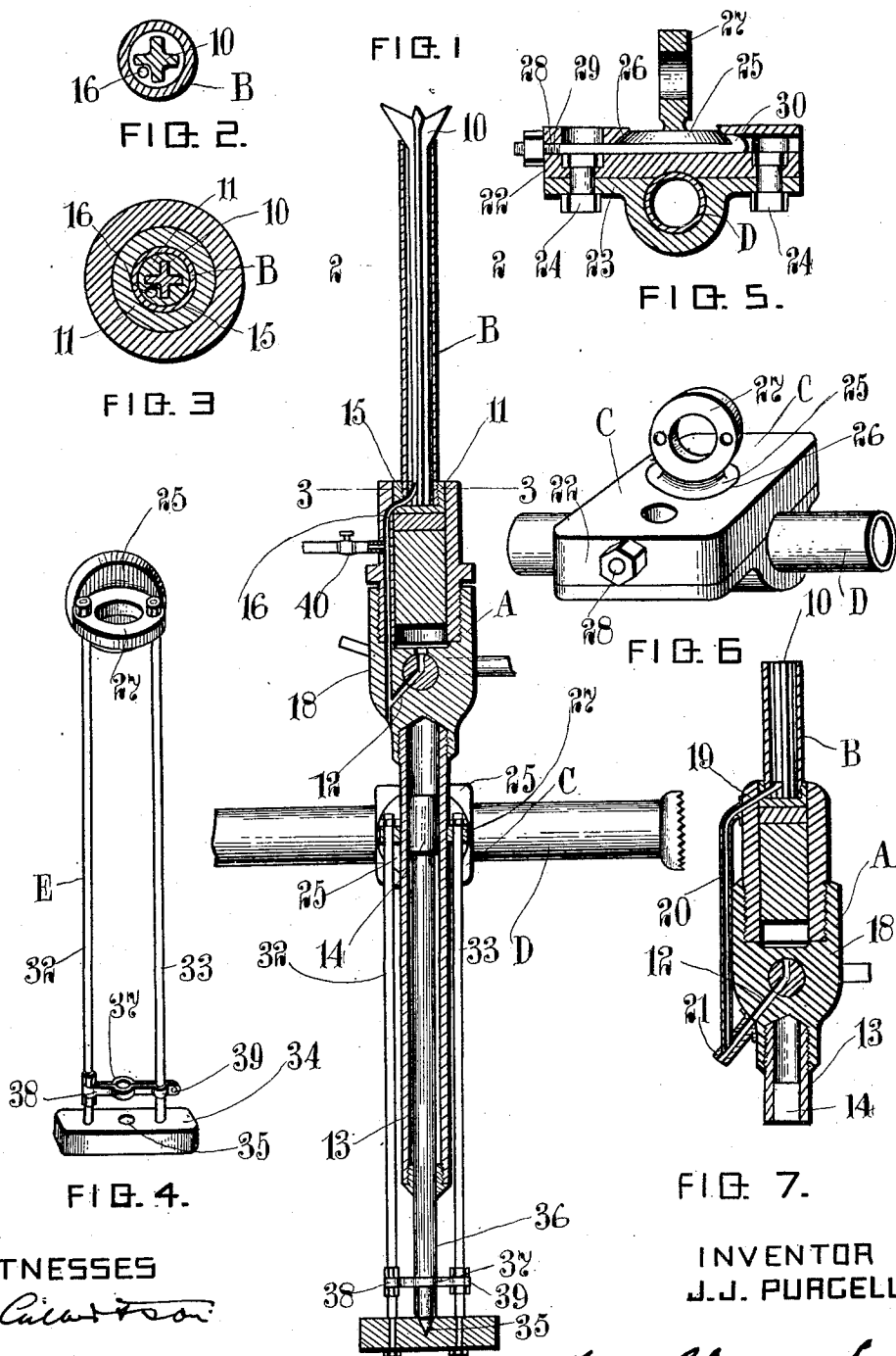


J. J. PURCELL.  
 ROCK DRILL.  
 APPLICATION FILED MAY 10, 1911.

1,109,782.

Patented Sept. 8, 1914.



WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHN JAMES PURCELL, OF BURKE, IDAHO.

ROCK-DRILL.

1,109,782.

Specification of Letters Patent.

Patented Sept. 8, 1914.

Application filed May 10, 1911. Serial No. 626,170.

To all whom it may concern:

Be it known that I, JOHN JAMES PURCELL, of Burke, in the county of Shoshone, in the State of Idaho, United States of America, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification.

This invention relates to improvements in rock drills and the like, and particularly to rock drills of the type wherein the steel or bit is surrounded by a tubular member extending near to the boring end thereof, the space or spaces formed between the steel or bit and the tube being adapted to be placed under suction in order that the cuttings may be drawn away through said spaces, thus leaving the hole free therefrom.

In rock drills and the like of this type as hitherto proposed, the suction in the space or spaces between the tube or bit is produced by means of an ejector, connected thereto by means of piping or tubing, the ejector being operated by the motive fluid for operating the drill, and preferably by the exhaust therefrom, the fluid being conveyed to the ejector by means of a pipe or tube. With apparatus as so constructed objection exists owing to the comparatively large amount of tubing necessary for the operation of the ejector and for the conveyance of the cuttings from the boring point, this tubing and the ejector occupying a large amount of space and being liable to prevent the easy operation of the device.

The object of the present invention is to provide an apparatus of the character above set forth, which shall be simple in construction and operation and inexpensive to manufacture, and in which the use of piping or tubing is obviated or reduced to a minimum.

An important feature of the invention consists in the provision of a rock drill or the like of the type referred to, wherein the passage or passages for producing the suction in the space or spaces between the tube or conduit and the steel or bit, and through which the cuttings are drawn, are formed in the wall of the holder or casing of the drill, thus obviating the use of external tubing for this purpose.

Another important feature of the invention consists in the provision of a rock drill or the like of the type referred to, wherein the passage or passages for producing the suction in the space or spaces between the tube and the steel or bit and through which

the cuttings are drawn, are formed partly in the wall of the holder or casing of the drill and partly by a tube or tubes extending therefrom and lying closely adjacent to the holder or casing, thus reducing the use of external tubing for this purpose to the minimum.

The invention also comprises the subsidiary features hereinafter referred to and pointed out in the claim.

In the drawings: Figure 1 is a vertical section through a hammer drill embodying the invention. Fig. 2 is a section on the line 2-2 Fig. 1. Fig. 3 is a section on the line 3-3 Fig. 1. Fig. 4 is a perspective view of the brace. Fig. 5 is a sectional view through the clamp. Fig. 6 is a perspective view of the clamp. Fig. 7 is a section showing an alternative form of the invention.

Like characters of reference indicate corresponding parts in all the figures of the drawing.

Referring to the drawings:—A represents a hammer drill of any well known type having a bit or steel 10, chuck 11, exhaust port 12, feed cylinder 13, and feed piston 14, of usual construction.

B represents a conduit, such as a tube which in accordance with the present invention is placed around the steel 10 and is somewhat larger than the same, whereby the drillings may pass through the tube around the steel, at the same time the tube must be sufficiently small in diameter to enable it to enter the hole being bored and it must consequently be of less diameter than the cutting edge of the bit. A suction is created through the tube by the moving motive fluid of the drill and this may be most conveniently accomplished by connecting the tube to the exhaust of the drill. In the form illustrated in Figs. 1-6 the tube B has screw threaded engagement with a socket 15 in the chuck from which a passageway 16 leads, and into this passageway the exhaust port 12 opens at an angle so that the exhaust fluid, discharging into the passageway will entrain the air in the tube and create a suction therethrough which will draw the drillings into the tube and discharge them with the exhaust on the side of the head 18 of the drill remote from the steel. In the form shown in Fig. 7 a passageway 19 leads from the end of the tube to a conduit 20 which enters the side of an exhaust conduit 21 at a sufficient angle to

cause the exhaust to exert a suction through the tube.

When the drill is used in very dry holes a provision may be made for the addition of water to the drillings as they are being drawn through the tube or passage-way, for example, in Fig. 1 I have shown a valved water conduit 40 leading to the side of the passageway 16. It may also be mentioned that in drilling down holes provision for the injection of water may be made in the usual way.

C represents a form of clamp used to connect the drill with mining column or shaft bar D. The form of clamp illustrated comprises two sections 22 and 23 which are adapted to be clamped about the column or shaft bar D by means of bolts 24. The upper member 22 is provided with a swiveling plate 25 fitting into a recess 26 and carrying a ring 27 adapted to embrace the feed cylinder 14. The swiveling plate is adapted to be clamped in adjusted position through the medium of a bolt 28 which extends through a bore 29 in the member 22 and has a hook shaped end 30 adapted to engage the side of the plate 25 whereby when the bolt is tightened the plate 25 will be forced against the edge of the recess 26 and thereby locked in adjusted position. It will be seen that when the bolts 24 and 28 are loosened that the drill may be adjusted in two directions and thus be caused to assume any desired position.

In order to give support to the drill from the column or bar D a brace E is provided comprising the ring 27 connected to the feed cylinder and parallel stay rods 32 and 33 extending from the ring to an end plate 34 having a socket 35 to receive the end of the feed piston rod 36. The rod 32 has a pair

of clamps 37 and 38 provided thereon adapted to embrace the piston rod 36 and the stay rod 33 and to be held in clamped position by a bolt 39.

It will be appreciated that while the present invention has for illustration been shown as applied to a hammer drill, that it could readily be used in connection with any form of fluid operated cutting tool.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention, within the scope of the claim, constructed without departing from the spirit or scope thereof, it is intended that all matter contained in the accompanying specification and drawings shall be interpreted as illustrative and not in a limiting sense.

What I claim as my invention is:—

In a mechanism of the class described, the combination with the cylinder of a piston slidable therein, means for supplying a fluid for operating said piston, a steel, a chuck, a head having a passageway formed from end to end of the same and extending through the chuck and cylinder wall, and an exhaust port joining at an acute angle into the passageway from the said cylinder, a tube surrounding the steel and communicating with one end of the passageway in the head, and being supported from the chuck, the exhaust in discharging through the port and passageway being adapted to create a suction and to draw the cuttings through the tube, as and for the purpose specified.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHN JAMES PURCELL.

Witnesses:

RUSSEL S. SMART,  
PEARLE GARRAW.