J. G. LEYNER.

CYLINDER LUBRICATION.

APPLICATION FILED JUNE 14, 1909.

958,260.

Patented May 17, 1910.

2 SHEETS—SHEET 1.

Fig. 1.

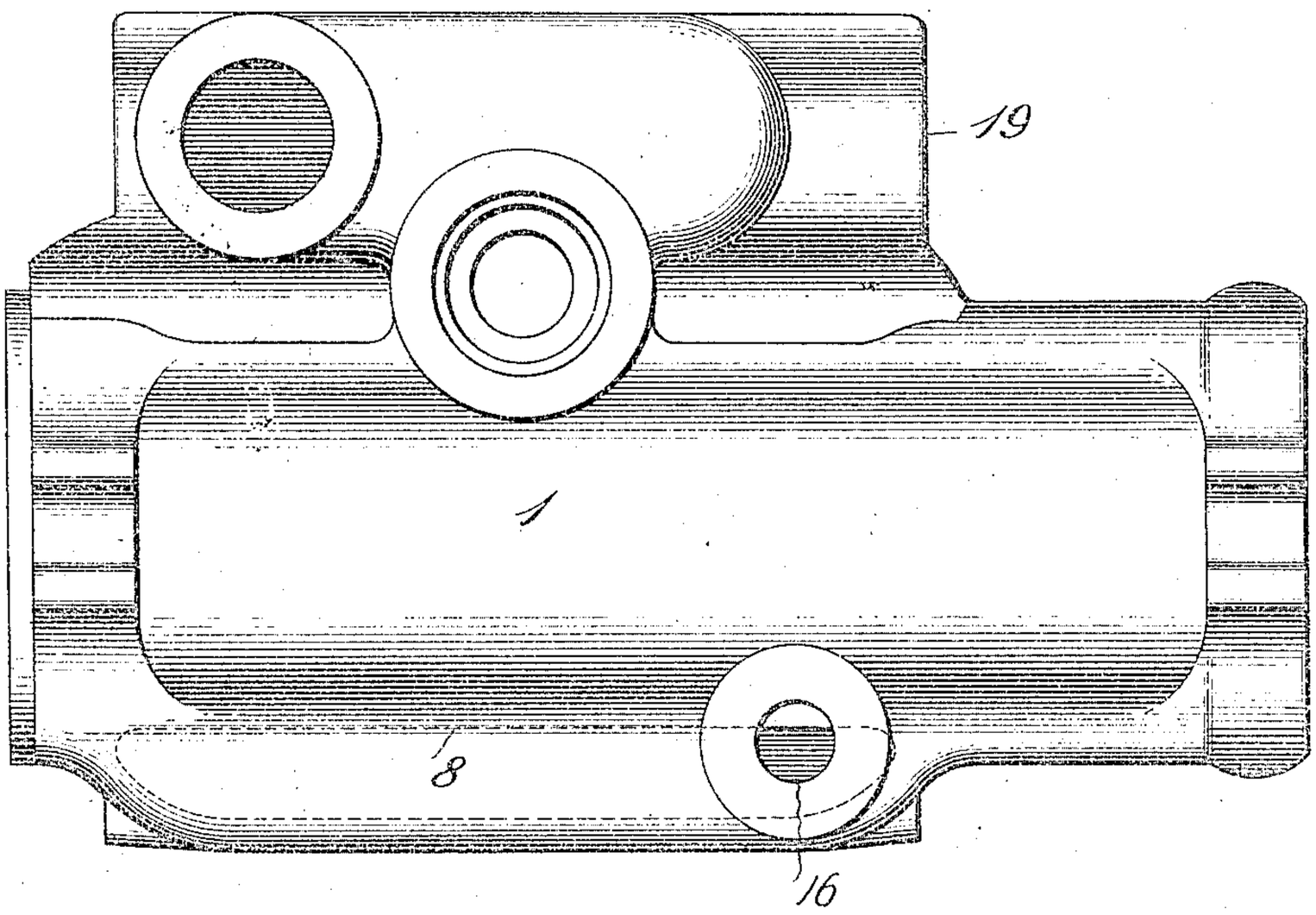
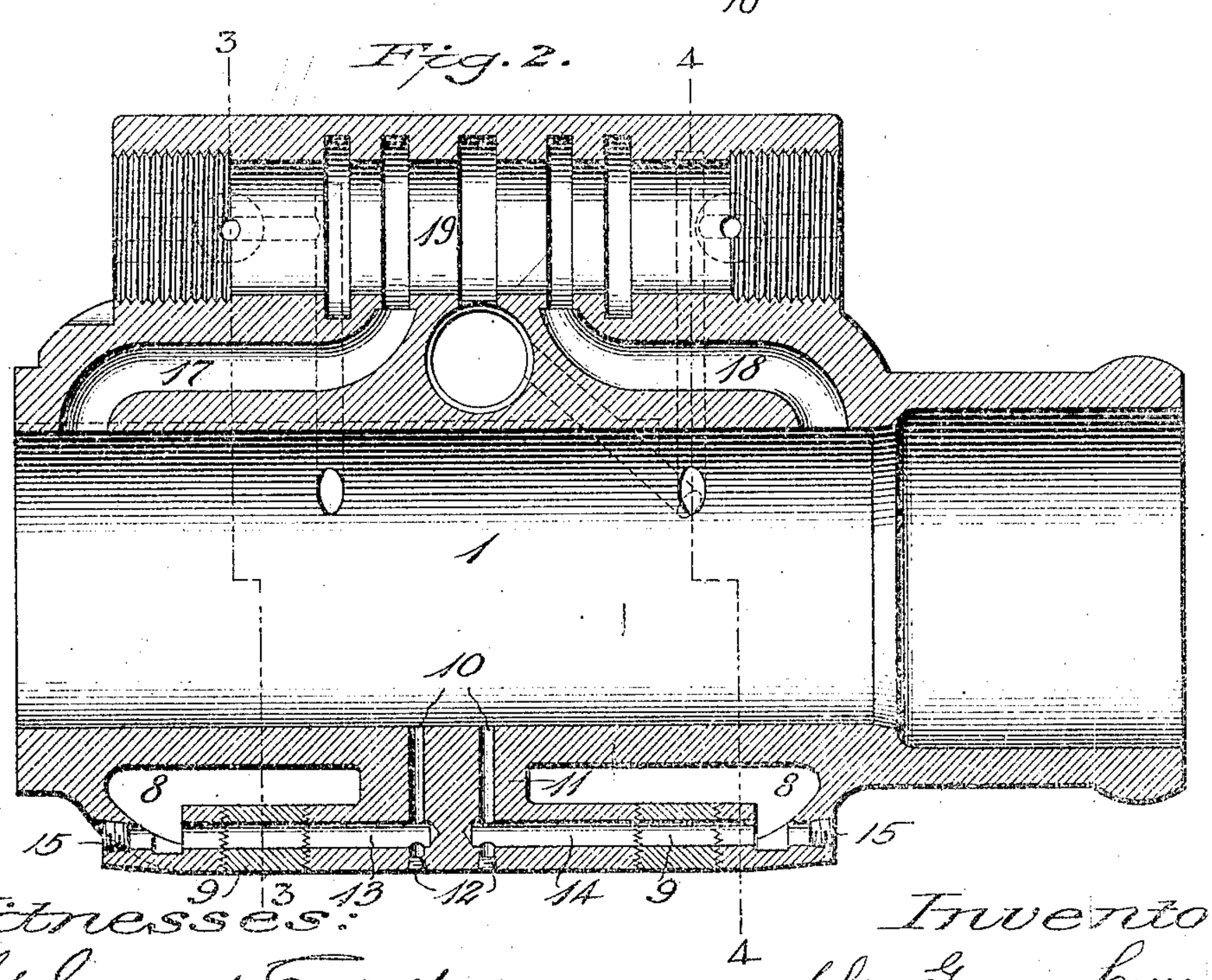


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

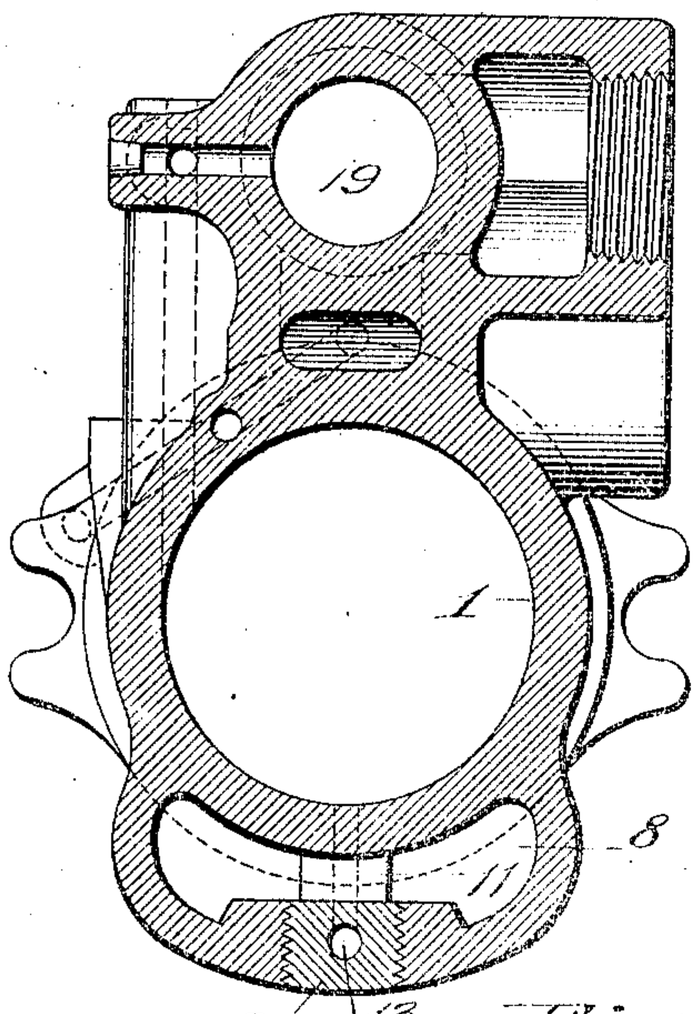


Fig. 4.

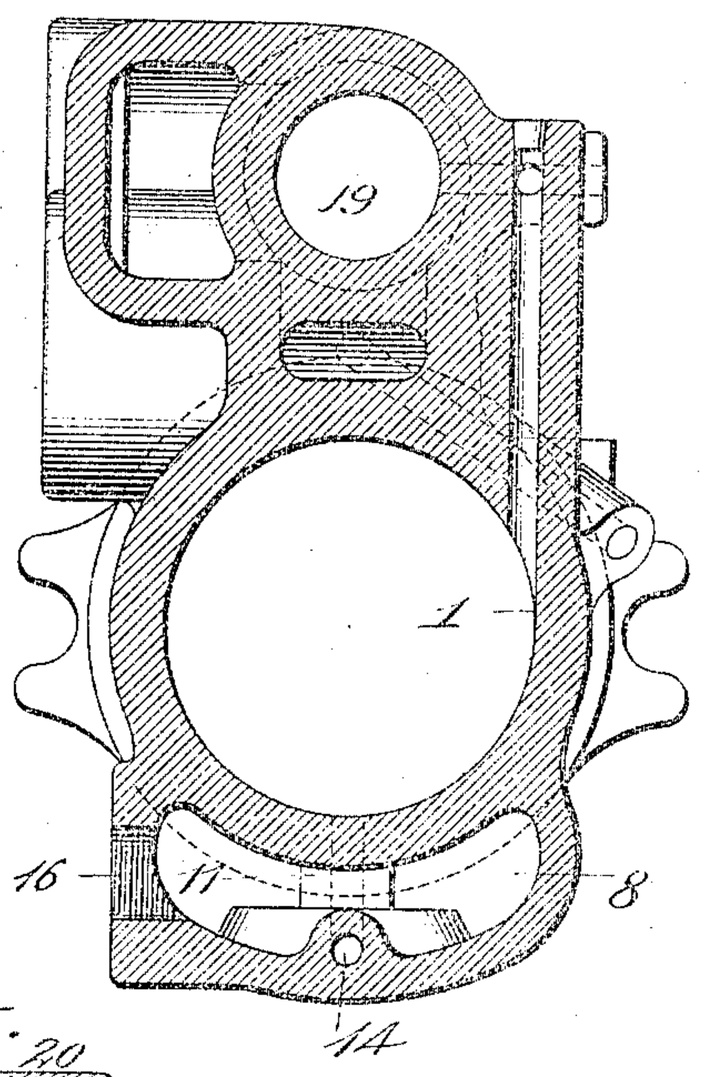


Fig. 5.

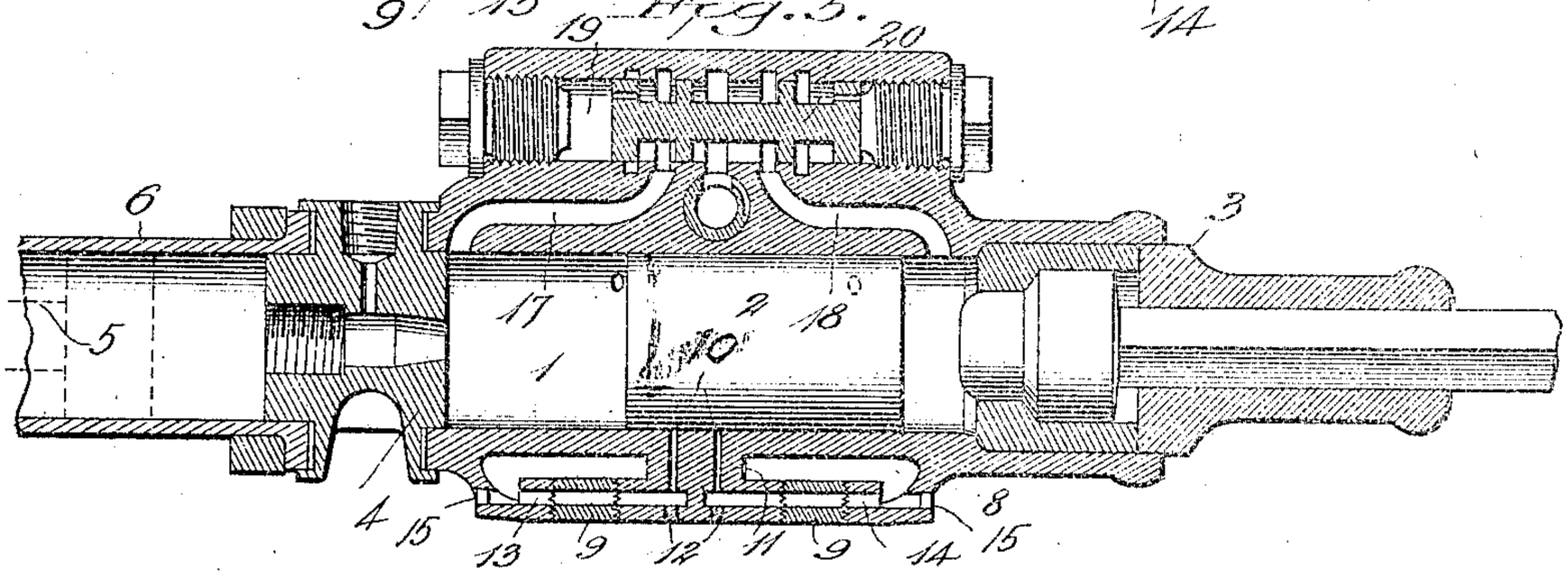
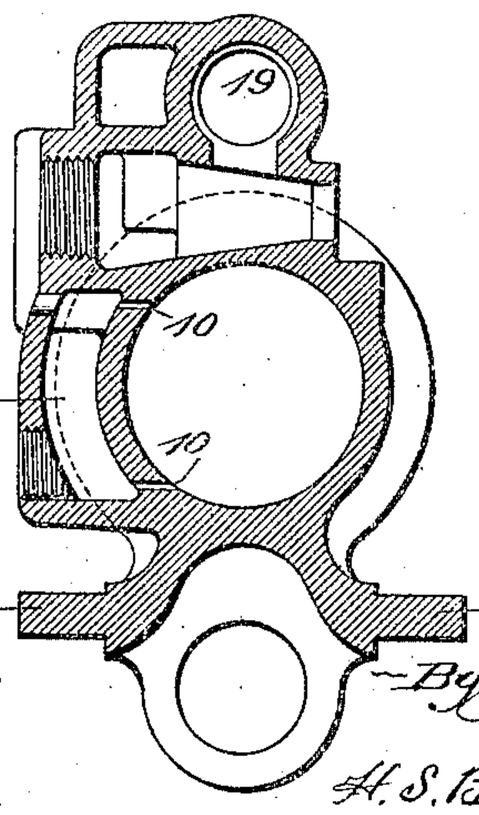


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN GEORGE LEYNER, OF DENVER, COLORADO, ASSIGNOR TO THE J. GEO. LEYNER ENGINEERING WORKS COMPANY, OF LITTLETON, COLORADO, A CORPORATION OF COLORADO.

CYLINDER LUBRICATION.

958,260. Specification of Letters Patent. Patented May 17, 1910.

Application filed June 14, 1909. Serial No. 502,152.

To all whom it may concern:

Be it known that I, JOHN GEORGE LEYNER, a citizen of the United States of America, residing in the city and county of Denver and State of Colorado, have invented a new and useful Cylinder Lubrication, of which the following is a specification.

My invention relates to improvements in the methods and systems in use for oiling the cylinders and pistons of rock drilling and all other types of piston engines; and the object of my invention is: to provide a pneumatically operating oiling system for the cylinders and pistons of all types of engines, and particularly of rock drilling engines. I attain this object by the mechanism illustrated in the accompanying drawings, in which:

Figure 1, is a side elevation of the cylinder of an air feed stoping drill, showing the oil reservoir in dotted lines, and the opening through which it is filled. Fig. 2, is a vertical, longitudinal sectional view through the cylinder, showing the reservoir, and the passages leading from the same to the interior of the cylinder. Fig. 3, is a transverse, sectional view on the line 3—3 of Fig. 2. Fig. 4, is a similar view on the line 4—4 of Fig. 2. Fig. 5, is a longitudinal, vertical, sectional view of an operative drilling engine, showing a portion only of the air feed cylinder and piston. And Fig. 6, is a transverse, vertical sectional view through the cylinder of a screw feed drill, showing the oil cylinder on one side of the same.

Referring to the drawings, the numeral 1, designates the cylinder of a rock drilling engine; and 2, designates the hammer piston, which is reciprocally mounted therein; 3, designates the front cylinder head; and 4, the rear cylinder head.

The drilling engine illustrated in Figs. 1 to 5 inclusive, is a style which is adapted to be fed against the rock, by any air operated piston rod 5, which extends out through a cylinder 6, secured to the rear end of the piston cylinder 1, while the engine shown in Fig. 6 is of the ordinary screw feed type, and is provided with the usual slideways 7, which move in the guideways of the usual supporting shell, not illustrated, but the particular construction of the drilling engine does not form any part of my present invention, and I have illustrated the two forms of engines simply to show that while the oil reservoir is placed on the under side of the cylinder, in the air feed engine, it is necessary to locate it on one side of the cylinder in the screw feed type of engine, as the slideways 7 would prevent its being located upon the under side, as will be understood by reference to Fig. 6. In either form of drill, the improved oiling system is adapted to supply the lubricant to the hammer piston, and parts operated thereby, and also to the valve chest, it being essential that all of these operating parts of a rock drilling engine be kept well and evenly and automatically lubricated. The invention is also applicable to all characters of air actuating presses, punches, and other direct acting engines.

My present invention consists in providing the cylinder of the drilling engine with an oil chamber 8, which is preferably cast in the shell of the cylinder, but which may be made separate therefrom if desired, and be attached thereto. I place this oil chamber along either the bottom or rear side of the cylinder, according to the style of drilling engine, and in the central portion thereof, and when the engine is in either a horizontal or inclined position, the piston will rest against the oil feeding apertures to be presently described, from which the oil feeds into the cylinder, as the piston will always rest and bear with its weight against the bottom or rear side of the interior of the cylinder in all positions in which it can be used except straight vertically up or down holes. This oil chamber is preferably formed in the shell of cast cylinders by placing a core in the mold when the cylinder is cast, that will form the said chamber in the cast shell of the cylinder, and in order to support this core in the mold in the proper position to form this oil chamber, it is necessary to cast apertures in the outer shell of the cylinder that lead into the oil chamber, and they are permanently closed after the cylinder is cast by soft metal plugs 9, of brass or other suitable metal. In the air feed engines, the oil chamber is provided with two oil and air feeding ports 10, which extend from the oil chamber into the cylinder. These two ports are positioned at a short distance apart, and preferably at substantially equal distances from the center of the length of the oil chamber, at which point a

lug or hub 11 is cast across the central portion of the oil chamber, and these oil and air ports are drilled through this hub portion from the outside of the shell of the cylinder, after which the entrances to these ports are plugged up with metal plugs 12. These air and oil ports are positioned at a distance apart that will permit the piston to make its reciprocal movements without uncovering either of them, and they communicate with independent passages 13 and 14 respectively, which are drilled into the opposite ends of the bottom wall of the oil chamber until the ports 10 intersect, and the drilled entrances to these ports are closed up by plugs 15. The oil chamber is also provided with a threaded oil entrance aperture 16, which is positioned at one end of the chamber, and which is closed after the chamber has been filled by a threaded plug.

The operation of my improved method of oiling cylinders and pistons is as follows: The oil chamber is filled with oil, and when the piston is started up the air pressure leaks by the piston into the oil and air ports and mingles with the oil until a space is made for it above the oil by the feeding out of the oil into the cylinder. The little air that enters the oil chamber exerts pressure enough on the body of the oil to keep it feeding against the piston, which wipes it off as it reciprocates and turns in the cylinder, and thus lubricates its peripheral surface. The piston is provided with a smooth peripheral surface, and the oil is fed thereby around the cylinder by the reciprocal and rotative step by step movement of the piston, and is carried to the various operating parts, which differ in the various types and styles of drilling engines. The oil is also carried by the force of the air through the cylinder ports 17 and 18, and into the valve chest 19, so that the cylinder, piston and slide valve 20, and all of the movable parts of the mechanism are automatically and continuously lubricated. The leakage of the air around the piston into the air and oil ports is probably but a small fraction of the volume of air in the cylinder, and this air when the oil chamber is completely full, enters both of said ports through the oil with which they are filled, and works to the upper portion of the chamber; then as the oil feeds out of the chamber a space is formed for the air above the oil, but not until the oil is lowered below the entrance of either one or the other of the feed ports 13 or 14, and depending on whether or not the drilling engine when in operation is pointing above or below a horizontal level in drilling upward or downward inclined holes in the breast of a tunnel, or in the stope, or is drilling down holes in a shaft. Consequently while it is not known positively whether or not the air enters both at the same time through the outward oozing oil or selects either one or the other, whichever is uppermost relative to the position of the engine to a horizontal plane, it is known that it does enter and exerts a slight expelling or feeding pressure on the oil, for if a cylinder head be removed and the piston be moved to uncover the ports 10, the oil will spurt out of both of them or out of one or the other, depending on the amount of oil in the oil chamber part-way across the interior of the cylinder, showing that it is under air pressure. Furthermore the oil will not feed out of this oil chamber in a satisfactory manner, and will not properly oil the piston and cylinder alone, much less the drill turning mechanism at its ends, when such mechanism is employed, and the valve, if only one feeding port 10 is used. In fact, during the early stages of the development of this invention, I labored for a long time to make it feed oil satisfactorily with but one oil feeding inlet port into the cylinder from the oil chamber, and was about to discard it when the idea came to me to try two feeding ports and connect them to the opposite ends of the cylinder, as the one port when connected in that way and in other numerous ways would not work.

My invention makes a most successful, thoroughly practical, and automatically operating method of oiling all of the interior working parts of air operating rock drilling engines, in particular, and of all air operating machinery in general, which is even and continuous in its application to the various parts of the machine, and does not require a replenishing of the oil in the oil chamber but once or twice in a drill shift of eight to ten hours, depending on the consistency of the oil or other conditions.

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

1. A pneumatically operating oiling mechanism for the cylinders and pistons of air operating engines, which consists of providing the cylinders of such air operated engines with an oil holding chamber, provided with a closable oil filling aperture, means including an air entering port extending from the inner peripheral wall of said cylinder to one end portion of said oil chamber, and means including an oil outlet aperture extending from the opposite end portion of said oil chamber from said other aperture to and through the shell of said cylinder to its piston bore, said air inlet aperture being adapted to admit the air pressure of said cylinder to said oil chamber, and said oil outlet and air inlet apertures being positioned in the interior wall of said cylinder to register at all times with the peripheral surface of said piston in its operative reciprocal strokes in said cylinder.

2. A pneumatically operating oiling mech-

anism for the cylinders and pistons of compressed air operated machinery, which consists of providing the cylinders of such machinery with an oil holding chamber provided with a closable oil filling entrance, and with a pair of ports positioned in said cylinder at the central portion of the reciprocal portion of said piston, and within the limits of its movement, whereby said ports are covered by the peripheral surface of said piston, said ports extending to said oil chamber and being adapted to permit the air pressure of said cylinder to flow into said oil chamber to force said oil out of said oil chamber and said ports into said cylinder and in contact with the peripheral surface of said piston.

3. In a pneumatically operating oiling mechanism for the cylinders and pistons and drill-bit rotating mechanism of air operating rock drilling engines, the combination of an oil chamber formed in the shell portions of rock drilling cylinders, and arranged along the lower or piston bearing side of the central piston operating portion of said drilling engine, said oil chamber being provided with a closable oil filling aperture, and with two ports formed in the shell portion of said cylinder and chamber and arranged at a distance apart within the limit of the operative movement of the piston, and positioned in said cylinder where the piston will reciprocate in contact with the interior surface of the bore of said cylinder surrounding said apertures, one of said apertures extending to one end portion of said oil chamber, and the other aperture extending to the opposite end portion of said chamber.

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

JOHN GEORGE LEYNER.

Witnesses:

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ROBERT J. WALTMAN.