

No. 879,971.

PATENTED FEB. 25, 1908.

B. H. LOCKE.
ROCK DRILL.

APPLICATION FILED JULY 10, 1907.

2 SHEETS—SHEET 1.

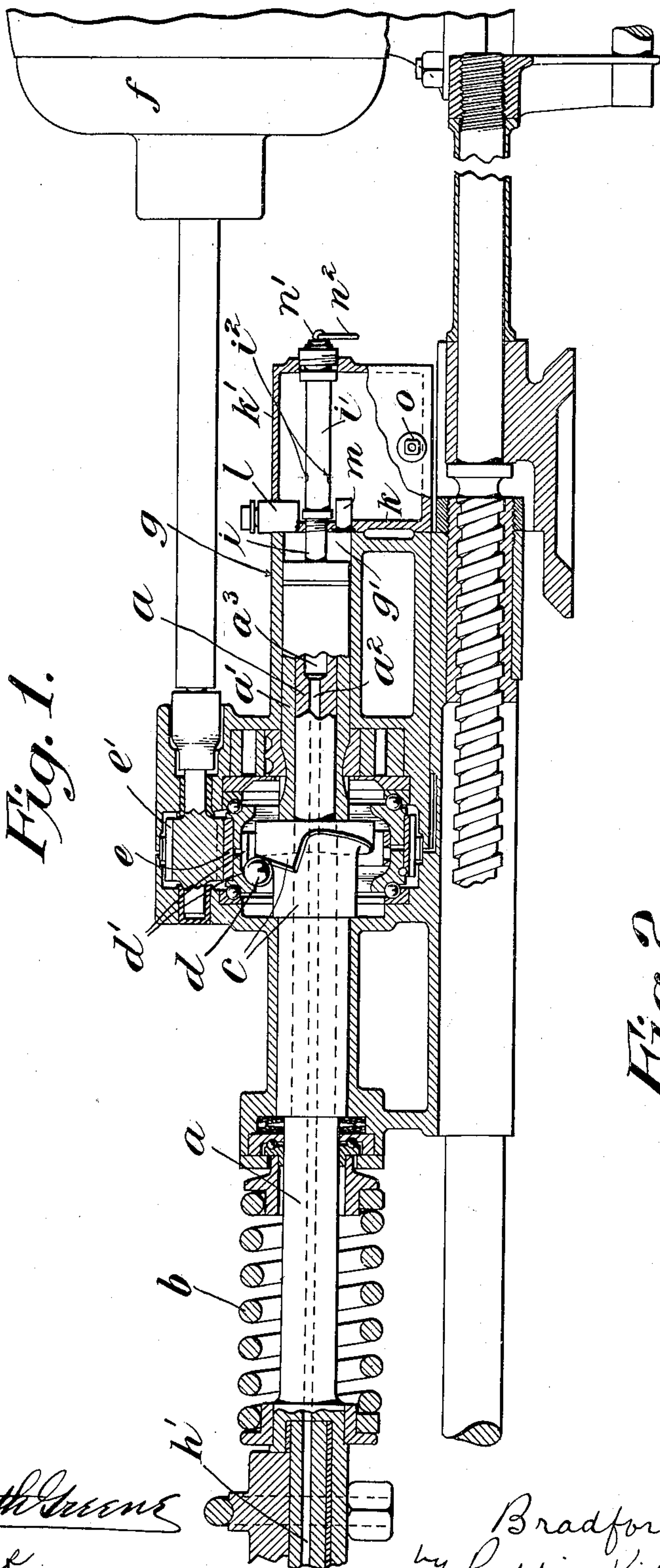


Fig. 1.

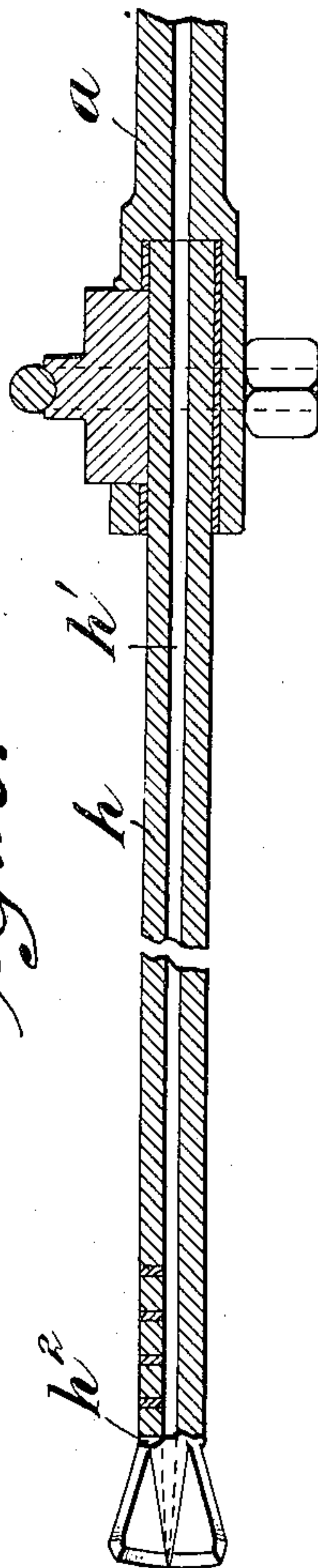


Fig. 2.

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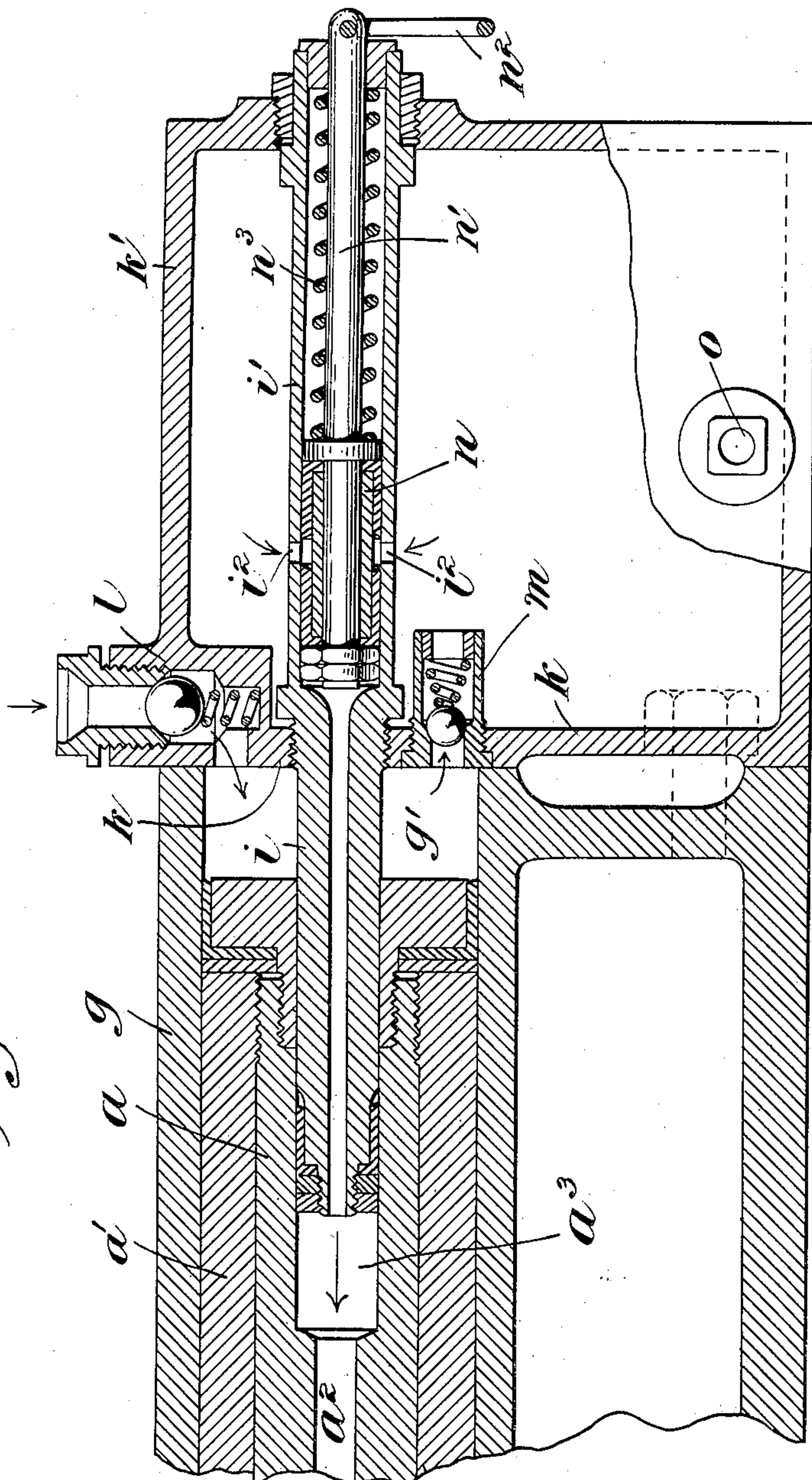
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2 SHEETS—SHEET 2.

Fig. 3.



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UNITED STATES PATENT OFFICE.

BRADFORD H. LOCKE, OF NEW YORK, N. Y.

ROCK-DRILL.

No. 879,971.

Specification of Letters Patent.

Patented Feb. 25, 1908.

Application filed July 10, 1907. Serial No. 382,985.

To all whom it may concern:

Be it known that I, BRADFORD H. LOCKE, a citizen of the United States, residing in the borough of Manhattan, of the city of New York, in the State of New York, have invented certain new and useful Improvements in Rock-Drills, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

Under some conditions of use of mechanical rock drills the hole which is being drilled is liable to become clogged by an accumulation of mud and the operation of the drill thereby interfered with. It is desirable, therefore, to provide means whereby such accumulation of mud may be prevented, and it is the object of this invention to provide means for this purpose which shall be efficient and reliable in operation and shall be especially applicable to electrically operated rock drills in the operation of which there is involved no source of steam or compressed air to be drawn upon for the purpose of clearing out the hole.

In accordance with the invention there is combined with the drill mechanism a reservoir in which air is compressed by the operation of the drill and from which the air thus compressed may be directed from time to time through the drill to or nearly to the bottom of the hole to expel the mud therefrom through the space around the drill stock. On account of the varying conditions of use and also that the operator may know when the discharge of the mud is to take place, it is preferable to have the air admitted at the will of the operator rather than automatically.

The invention will be more fully explained hereinafter with reference to the accompanying drawings in which it is illustrated and in which—

Figure 1 is a view partly in elevation and partly in longitudinal central section of so much of an electrically operated drill as is necessary to enable the application of the present improvement to be understood. Fig. 2 is a detail view in longitudinal central section, partly broken out, showing the drill stock, one end of which is shown in Fig. 1. Fig. 3 is a detail view, partly in elevation and partly in longitudinal central section, on a larger scale than Fig. 1, showing particularly the means for compressing air and discharging it into the drill hole.

The invention is illustrated in the draw-

ings as applied to an electrically operated rock drill of well known construction in which the drill piston *a*, driven forward by a spring *b*, is retracted by a cam *c* secured to the piston and cooperating with a cam ball *d* held frictionally by a floating ring *d'* in a geared sleeve *e*. The latter is driven through a pinion *e'* from a suitable electric motor *f* mounted on the frame of the drill. The cylinder *a* is extended backward beyond the cam *c* and receives, in the back cylinder *g*, a bushing *a'*, which, so far as the present invention is concerned, virtually forms a part of the piston. All of the parts thus far referred to are arranged and operated in the usual manner and need not be further described herein.

The piston has formed therein a longitudinal channel or bore *a²*, preferably axial, which communicates with a longitudinal channel or bore *h'* in the drill stock *h* and provided with a port or opening *h²* near the drill head. The rear portion of the bore or channel *a²* is enlarged to form a cylinder *a³* in which fits a tube *i* extended from the back cylinder cap *k*. The latter instead of being a simple plate, as heretofore, preferably forms one wall of a reservoir *k'*. An air inlet valve *l*, carried by the reservoir *k'*, permits air to be drawn by the forward movement of the piston *a* into the space *g'* within the back cylinder *g*, and an outlet valve *m*, also carried by the reservoir *k'*, permits the air which is compressed in the space *g* by the backward movement of the piston to be discharged into the reservoir. In order that the air which is thus compressed in the reservoir *k'* may be discharged at intervals through the piston *a* and drill stock *h* into the drill hole near the head of the drill, the tube *i* is preferably extended rearwardly into the reservoir *k'*, as at *i'*, its bore being somewhat enlarged to receive a piston valve *n* and its wall being provided with one or more ports *i²*. The stem *n'* of the piston valve *n* is extended beyond the wall of the reservoir *k'* so that it may be provided with a handle *n²* or other means by which the piston valve can be drawn back against the tension of the spring *n³* to such an extent as to uncover the ports *i²* and permit the air, under compression in the reservoir *k'*, to pass through the tube *i* into the channel *a²* of the piston and the channel *h'* of the drill stock and be discharged through the port or opening *h²* near the head of the drill. A clean-out for the reservoir may be provided at *o*.

As the reciprocations of the piston are rapid the compression of the air in the reservoir to any desired degree is quickly attained, and the discharge of the air under compression into the drill hole near its bottom will drive out the mud accumulated therein. In order that the discharge of the mud may not take place unexpectedly to the drill operator, and also that it may take place at such times as required, it is preferable to provide for the discharge of the air from the reservoir at the will of the operator.

It will be obvious that various changes in details of construction and arrangement may be made to suit different conditions of operation without departing from the spirit of the invention.

I claim as my invention:

1. In a rock drill, the combination of a reciprocating piston, a reservoir in which air is compressed by the reciprocating piston, and means to discharge the air therefrom into the drill hole.

2. In a rock drill, the combination of a back cylinder, a piston reciprocating therein, an air reservoir carried by the cylinder, an inlet valve to admit air into the back end of the cylinder, a valve to admit air from the cylinder into the reservoir, and means to discharge air from the reservoir into the drill hole.

3. In a rock drill, the combination of a reciprocating piston, a spring to drive the same forward, a cam secured to the piston, a geared

sleeve surrounding the cam, a ball coupling between the sleeve and cam, an electric motor and driving connections between the same and the geared sleeve, a reservoir in which air is compressed by the reciprocation of the piston, and means to discharge air from the reservoir into the drill hole.

4. In a rock drill, the combination of a reciprocating piston having a longitudinal channel, an air reservoir in which air is compressed by the reciprocations of the piston, a tube connecting the air reservoir with the channel of the piston, a valve controlling the admission of air from the reservoir through said tube to said channel, and means to operate said valve.

5. In a rock drill, the combination of a reciprocating piston having a longitudinal channel, a drill stock carried by said piston and having a channel communicating with the channel in the piston and provided with an opening near the drill head, an air reservoir in which air is compressed by the reciprocations of the piston and means to discharge air from said reservoir through the channels of the piston and drill stock into the drill hole.

This specification signed and witnessed this 2nd day of July, 1907.

BRADFORD H. LOCKE.

Signed in the presence of—

ELLA J. KRUGER,

AMBROSE L. O'SHEA.