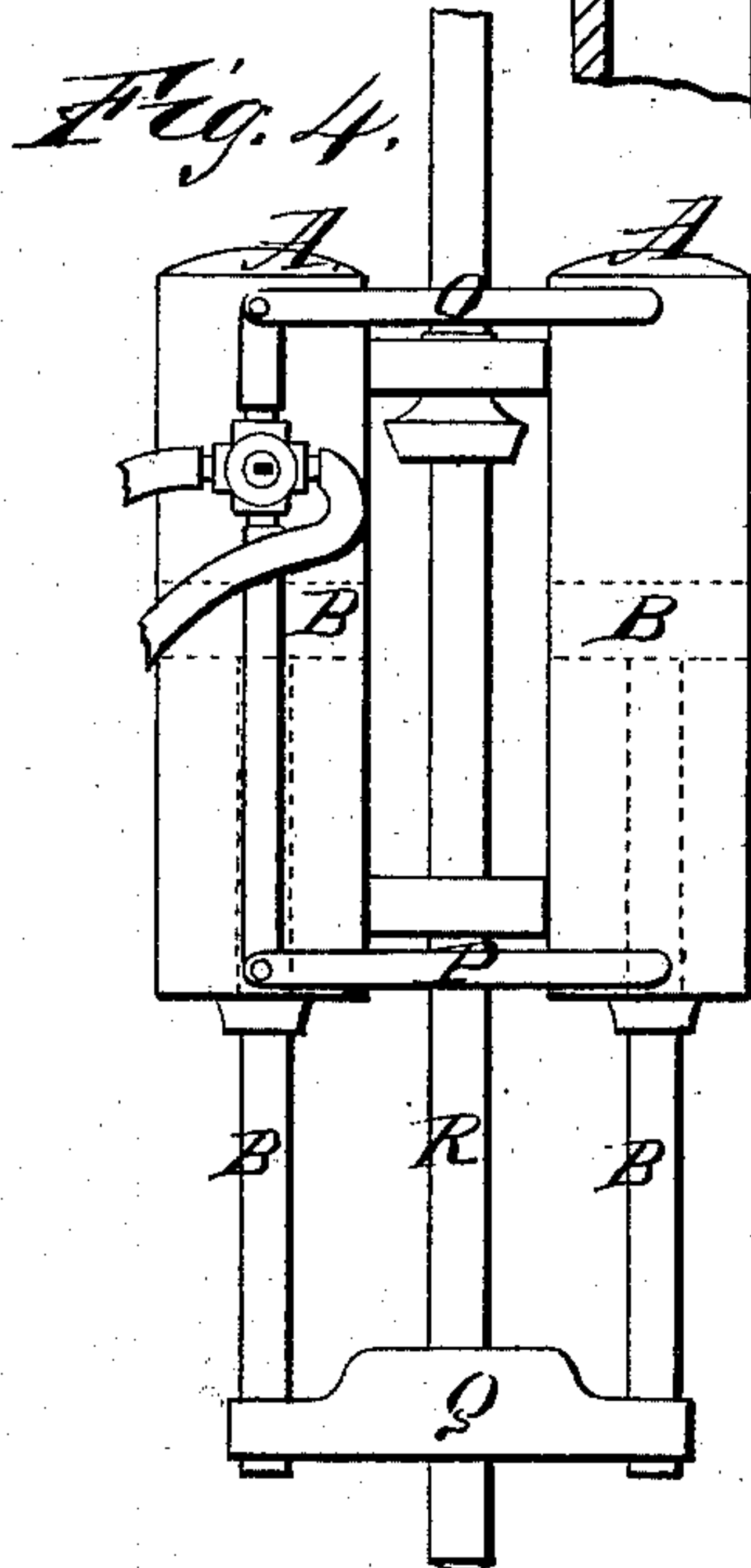
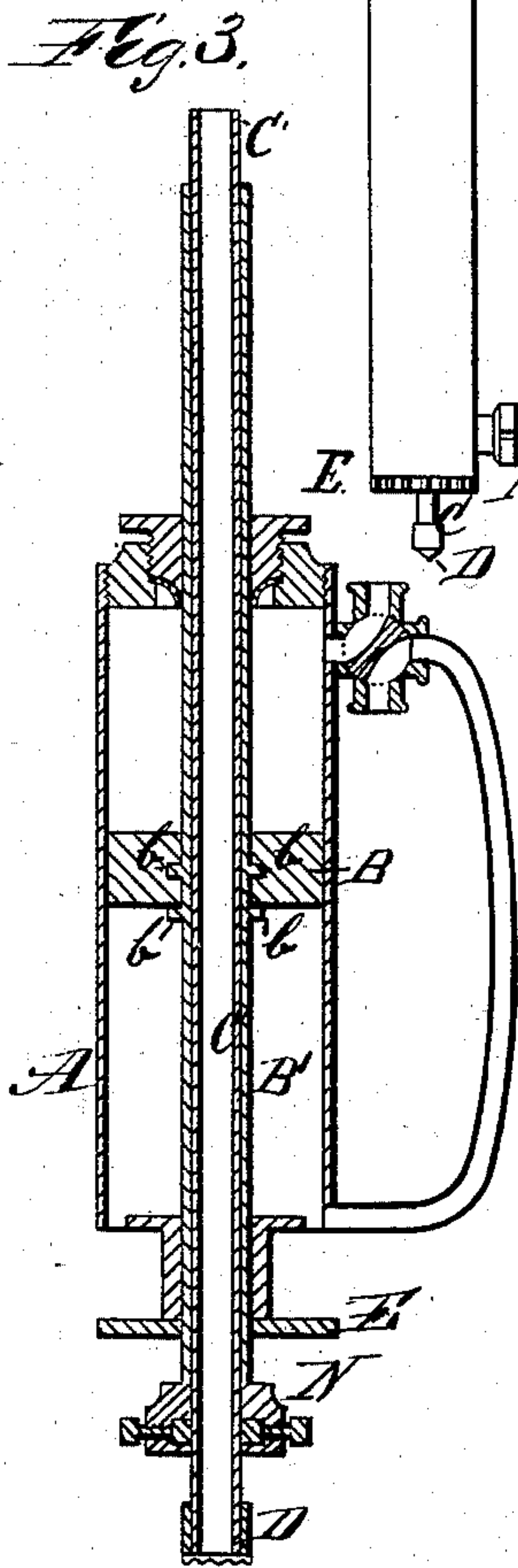
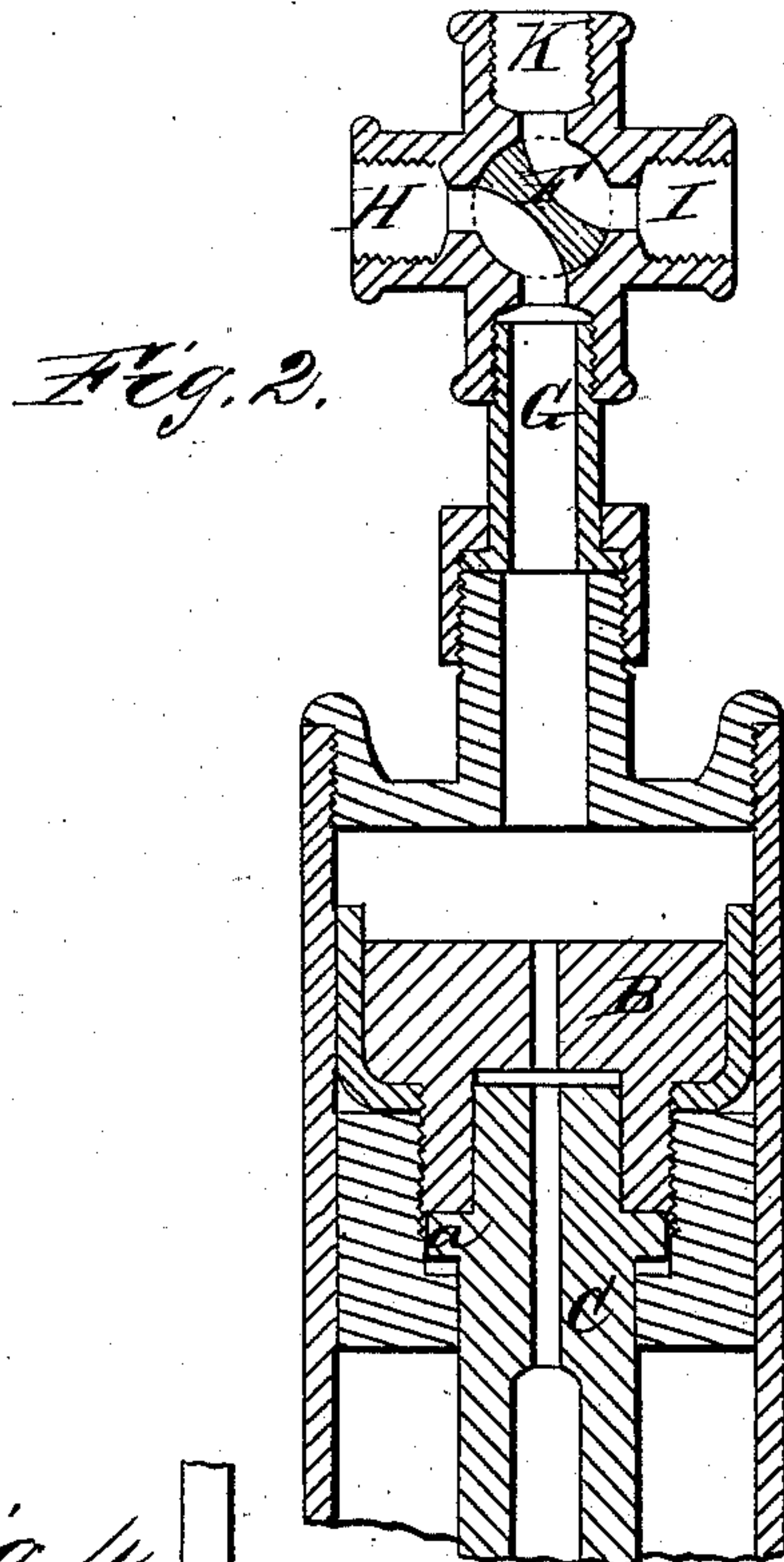
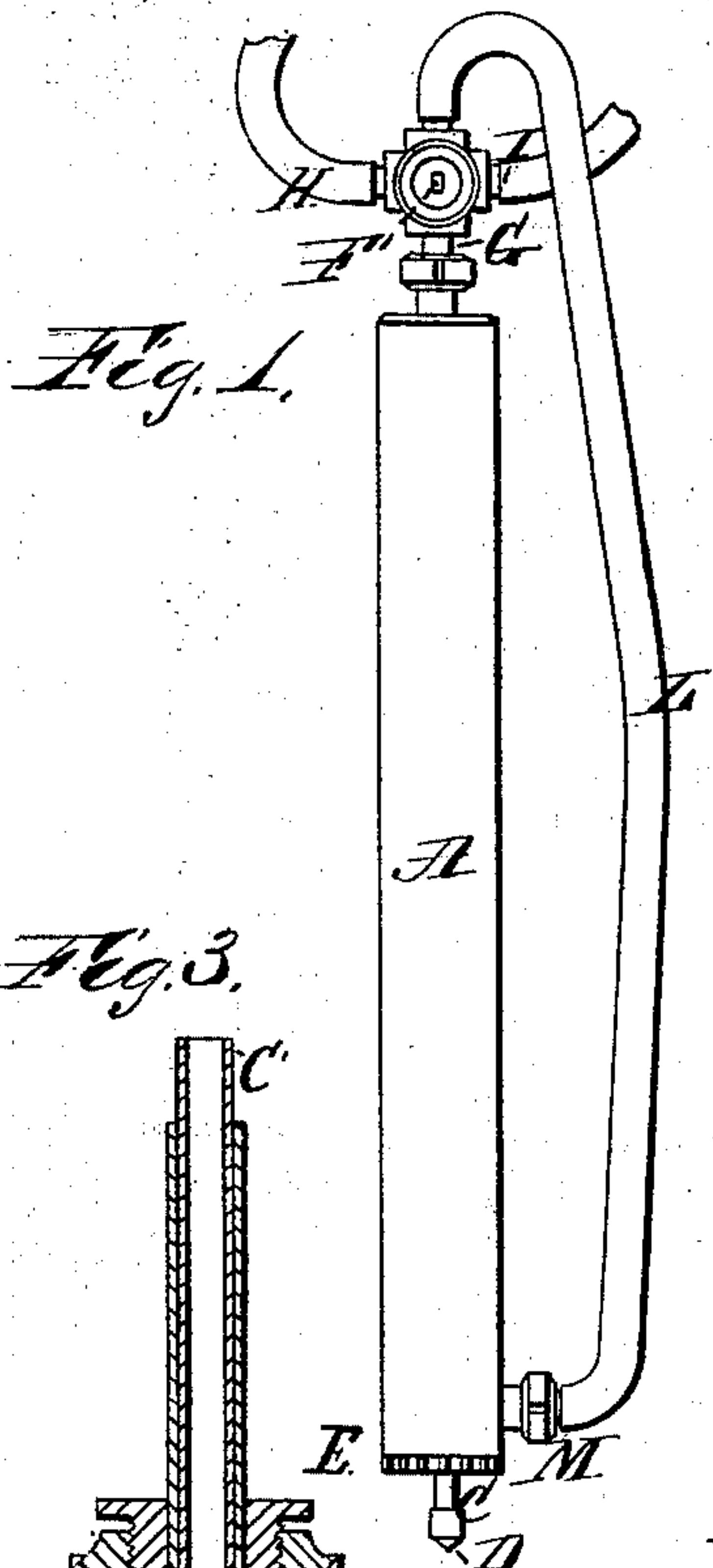


(No Model.)

R. ALLISON.  
ROTARY DRILL.

No. 261,978.

Patented Aug. 1, 1882.



WITNESSES:

*John P. Gray*  
*John J. Caldwell*

INVENTOR

*Robert Allison*  
*by Wetmore, Jenner and*  
*Thompson his Attys.*



# UNITED STATES PATENT OFFICE.

ROBERT ALLISON, OF PORT CARBON, PENNSYLVANIA.

## ROTARY DRILL.

SPECIFICATION forming part of Letters Patent No. 261,978, dated August 1, 1882.

Application filed May 4, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT ALLISON, of the town of Port Carbon, in the county of Schuylkill and State of Pennsylvania, have invented a new and useful Improvement in Rotary Drills; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use my invention, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side view of my invention in one form; Fig. 2, an axial section thereof; Fig. 3, an axial section of a modification thereof. Fig. 4 shows my invention applied to two cylinders as patented by me December 23, 1873.

This improvement relates to that class of rock-boring machines which operate by rotation and continued pressure—such, for instance, as the Leschot or diamond drill; and it consists in the combination of a single hydraulic cylinder with a revolving drill-rod, or a drill-spindle carrying the drill-rod when, as hereinafter set forth, a spindle is used, the rod or the spindle, when one is used, being connected to a piston which is made to move in either direction through the cylinder by water or other pressure on the piston, the water being preferably controlled and directed by a four-way cock.

The simplest form of my invention is represented in Figs. 1 and 2, in which A is a cylinder containing a piston, B, to which is attached the drill-rod C, armed with a boring head or bit, D, furnished with diamonds or otherwise, as the case may be, and feathered or otherwise attached in any suitable manner to the gear-wheel E, which is rotated by any suitable machinery. The rod C passes through a stuffing-box or similar contrivance at the end of the cylinder to prevent leakage. To the cylinder is connected a four-way cock, F, and system of pipes, the passage G communicating with the adjacent end of the cylinder A, the passage H with the feed-pipe, the passage I with the waste-pipe, and the passage K with the opposite end of the cylinder A through a pipe, L, which communicates with the passage M.

In the operation of the machine, the cock F

being in the position shown in Fig. 2, and a constant steam of water or other liquid under pressure being supplied to the feed-pipe, the drill will be fed forward by hydraulic pressure on the piston, and the rate of feed may be instantly diminished by partially closing the cock or increased again by opening it. The necessity for such adjustment may be indicated by a pressure-gage connected with the cylinder, so as to show the pressure on the drill, and the drill may be withdrawn by reversing the cock, which will connect the adjacent end of the cylinder with the waste-pipe and the forward end with the feed-pipe.

The drill-rod is furnished at the point where it is connected with the piston with the collar a, (seen in Fig. 2,) which rotates in a recess in the piston, so that the rod can be rotated without compelling the rotation of the piston. A suitable lubricating device, many of which are now well known, should be used at this point, which will lubricate it for a comparatively long period.

The above-described form of apparatus, in which the drill-rod is the piston-rod, is not adapted to boring to a depth greater than about the length of the cylinder.

To enable the drill to be fed by hydraulic pressure while boring to any depth required, I employ the modification shown in Fig. 3, in which B' is a hollow piston-rod or spindle projecting through a stuffing-box at each end of the cylinder A, and rotated by gear E. The drill-rod C' passes through this rod B', to which it is secured by a chuck, N. When the drill has descended far enough to require more length of rod the chuck is loosened and another section coupled to the drill-rod, and fastened to the piston-rod by the chuck, and in this way the drill may be made to bore to any depth required, and be fed or withdrawn in the manner above described. The piston-rod is also in this case furnished with the collars b b. (Seen in Fig. 3.) One or more may be used, which also rotate in recesses provided for them in the piston, and they are lubricated in the same way as before stated.

Pneumatic pressure—such as that of steam, condensed air, or other gas or vapor—may be employed in this apparatus, instead of hydraulic pressure, to feed the drill.



I have described this invention as applicable to drilling and boring in rock; but it is also applicable to drilling metals and other substances for which a continuously-revolving  
5 and gradually-progressing drill is used.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a rotary drill, the combination of the driving mechanism, a cylinder and piston, a  
10 hollow rotary rod passing through the piston and extending beyond the ends of the cylinder, and so attached to the piston that it receives longitudinal motion from it, a drill-rod held by the hollow rotary rod, and a four-way  
15 cock, substantially as and for the purposes set forth.

2. In a rotary drill, the combination of the driving mechanism, a cylinder and piston, a hollow rotary rod passing through the piston

and extending beyond the ends of the cylinder, and so attached to the piston that it receives longitudinal motion from it, and a drill-rod held by the hollow rotary rod, as and for the purposes set forth. 20

3. The combination, in a rotary drill, of a cylinder and piston, a hollow rotary rod passing through the cylinder and through the piston, and which receives its longitudinal motion from the piston, a clutch on the hollow rotary rod, mechanism for rotating this rod, and a  
30 drill-rod fastened to the hollow rotary rod by the clutch, substantially as and for the purposes set forth.

ROBT. ALLISON.

Witnesses:

A. C. EDMONDS,

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