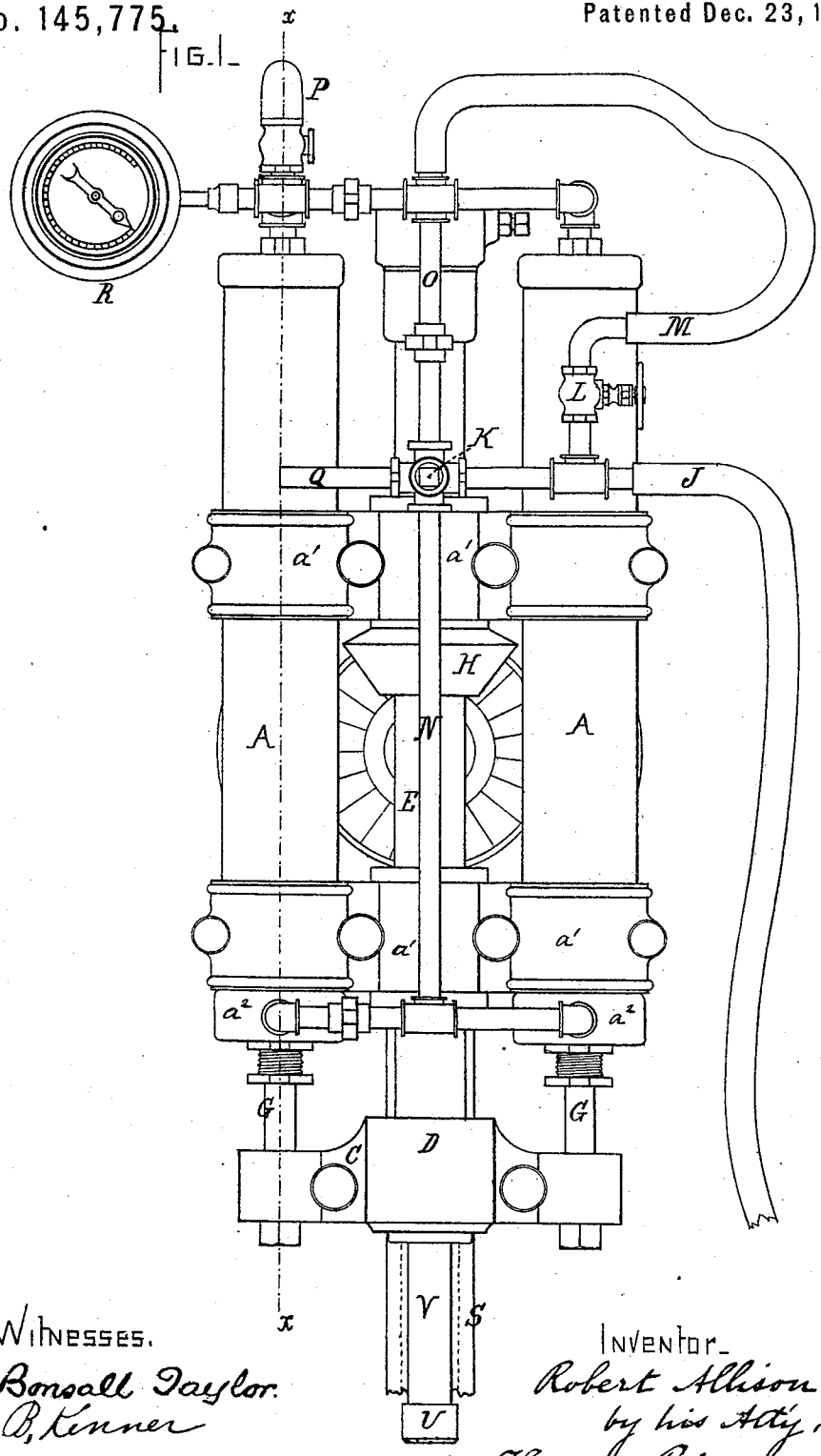


R. ALLISON.
Hydraulic Feed for Revolving Rock-Drills.
No. 145,775. Patented Dec. 23, 1873.



WITNESSES.
J. Bonsall Taylor.
J. B. Kenner

INVENTOR.
Robert Allison,
by his Atty.,
Horace Binney, 3rd.

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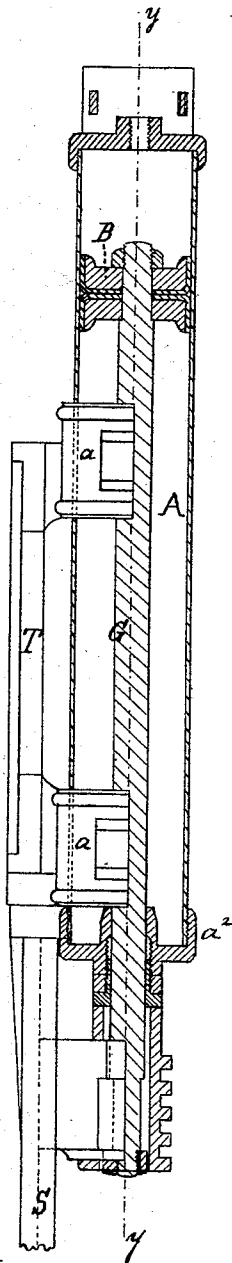
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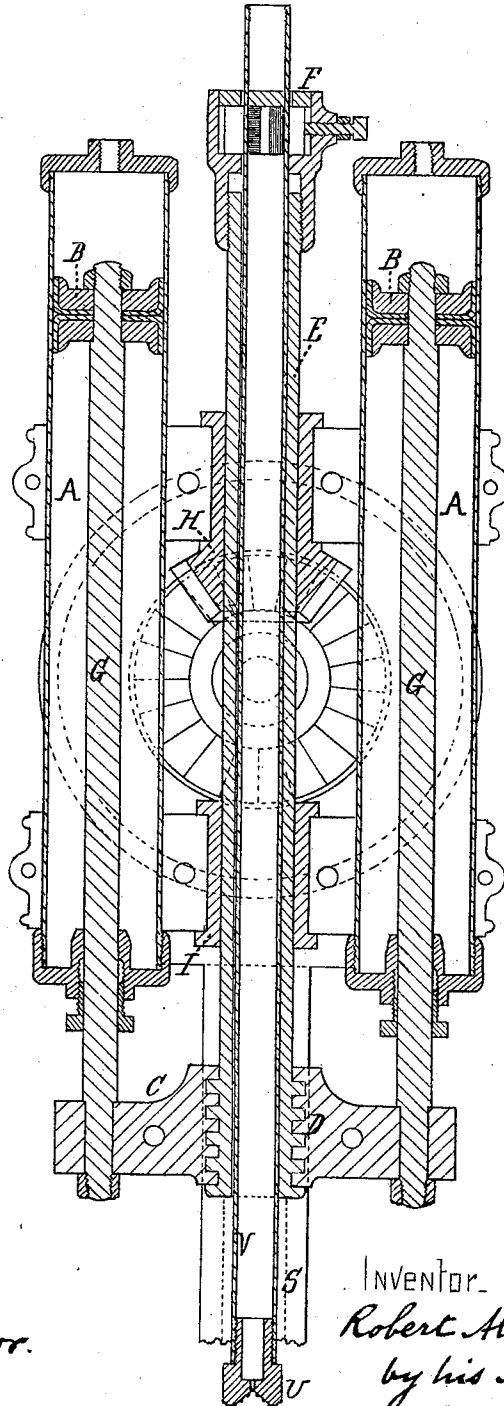
FIG. II.

FIG. III.



Witnesses.

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UNITED STATES PATENT OFFICE.

ROBERT ALLISON, OF PORT CARBON, PENNSYLVANIA.

IMPROVEMENT IN HYDRAULIC FEED FOR REVOLVING ROCK-DRILLS.

Specification forming part of Letters Patent No. **145,775**, dated December 23, 1873; application filed December 10, 1873.

To all whom it may concern:

Be it known that I, ROBERT ALLISON, of Port Carbon, in the county of Schuylkill and State of Pennsylvania, have invented a new and useful Improvement in Hydraulic Feed for Revolving Rock-Drills; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the said improvement, reference being had to the accompanying drawing, which forms a part of this specification, and in which—

Figure 1, Sheet 1, is an elevation of my improvement; Fig. 2, Sheet 2, a section on the line *x x*, Fig. 1; and Fig. 3, Sheet 2, a section on the line *y y*, Fig. 2.

The same parts are denoted by the same letters in all the figures.

This improvement relates to that class of rock-boring machines which operate by rotation and continued pressure, and I have represented it as applied to a Leschot or diamond drill. It consists in the combination of hydraulic cylinders with a revolving drill-spindle, carrying the drill-rod, and arranged externally to said cylinders, and so connected with their piston-rods as to be moved forward or back by pressure on the pistons. It also consists in the combination, with said cylinders and their supply and discharge pipes, of a four-way cock, by which the feed of the drill is regulated or reversed, as hereinafter described.

T in the drawing represents the swivel head or plate, by which the drilling apparatus is attached to the engine or driving power, and on which are cast the upper and lower concave rear bearing-plates *a a* of the hydraulic cylinders A A, sleeve-pinion H, and lower sleeve I. To these bearing-plates are bolted corresponding front concave bearing-plates *a' a'*, shown in Fig. 1. The cylinders A A are held in place by being turned down one-sixteenth of an inch smaller where they fit in the bearing-plates. The caps *a² a²* on the lower ends of the cylinders fit against the bearing-plates and take most of the upward thrust. B B are the pistons, and G G the piston-rods, projecting through stuffing-boxes at one end of the cylinders, and united by the cross-head C, in which is formed a thrust or collar box, D, for the

bearing of the revolving hollow spindle E. This spindle is made with collars fitting into box D, and carries the hollow drill-rod V, which is secured to it by a chuck, F. U is the diamond bit, screwed into rod V. The spindle E is revolved by a spline on the bevel sleeve-pinion H, which meshes with the bevel driving-gear. This pinion has collars above and below the bearing-plates to keep it in place, as shown in Fig. 3. I is a lower sleeve, likewise splined to the spindle and kept in place by top and bottom collars. The bearings in which H and I revolve are lined with anti-friction metal. S is a guide for the cross-head, projecting from the swivel-head, and serving to steady the lower end of the spindle. To the upper ends of cylinders A A is attached the pipe O opening into both cylinders. Their lower ends are similarly connected by the pipe N. K is a four-way cock opening into pipes N and O, hose J, (which leads from the pump or other source of water supply,) and waste-pipe Q, so that, when pipe O is open to hose J, pipe N is open to Q, and vice versa. M is a hose to carry water to the drill-rod, to the top of which it is attached by the usual swivel connection, the other end of M being connected with hose J through valve L, by which water is admitted to or shut off from the drill-rod. P is an adjustable spring safety-valve, and R a pressure-gage, both placed on pipe O.

The operation of this improvement is as follows: The machine having been set up in place, and the drill-rod and bit attached, the water from the steam-pump or other source of supply is turned on, and the valve L partly opened, permitting water to flow through the drill-rod to the bit. The engine which drives the bevel-gear is now started, and the four-way cock K opened, so as to admit water to the pipe O and upper end of the hydraulic cylinders, thereby pressing the pistons and cross-head downward, and forcing the bit against the rock with a pressure which is indicated by the gage R, and may be regulated by partially closing cock K or opening it wider. When the hole has been drilled as far as the piston-stroke permits, the engine which drives the bevel-gear is stopped, valve L closed, swivel connection of hose M detached, chuck F loosened, and the cock K is then reversed, connecting

the pipe N and lower ends of the cylinders with the water supply, and thereby forcing the pistons and spindle upward, the water above the pistons escaping through waste-pipe Q. Another section of drill-rod is then attached in the usual manner, and the operation proceeds, as before.

Before commencing work, it will be well to turn on the water both above and below the pistons, so as to run them up and down once or twice, to see if the passages are all open and the machine in working order before the drill-rod is attached.

The adjustable safety-valve may be set so as to relieve the water pressure whenever it exceeds a certain limit, and by this means the diamonds are protected from excessive pressure and consequent injury.

Should the bit become choked, it can be lifted from the bottom of the hole by reversing-cock K, and held in this position until the debris

has been washed out, without stopping the rotating machinery.

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

1. The combination, substantially as described, of the cylinders, pistons, and piston-rods with a spindle located outside of said cylinders, which carries the drill-rod, and is connected to said piston-rods, so as to be advanced or withdrawn by hydraulic pressure on the pistons.

2. The combination, with the cylinders A A and pipes O, N, J, and Q, of the four-way cock K, by which the feed of the drill is regulated or reversed, substantially as above described.

ROBT. ALLISON.

Witnesses:

M. S. PHILLIPS,
JOHN L. SHISSLER.