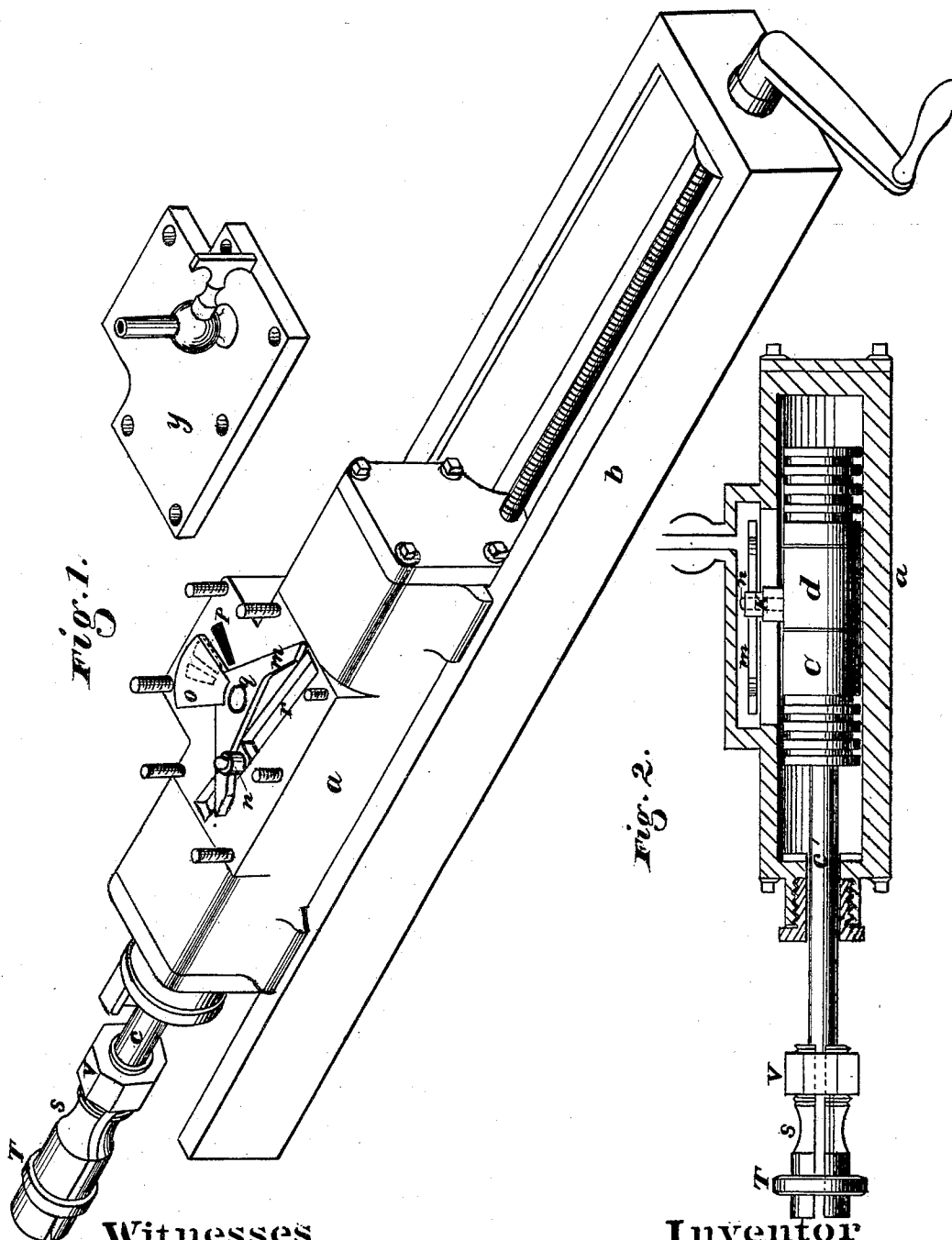


L. W. COE.
ROCK-DRILL.

No. 175,931.

Patented April 11, 1876.



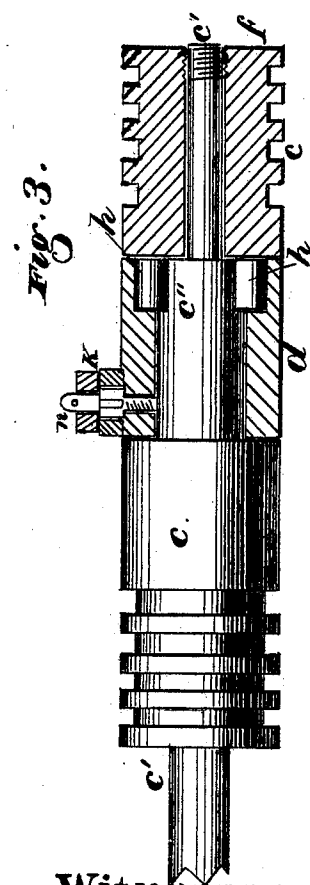
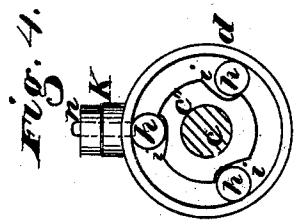
Witnesses
Geo. H. Strong.
Jas. L. Borne

Inventor
Lawrence H. Coe
by Dewey & Co
Attys.

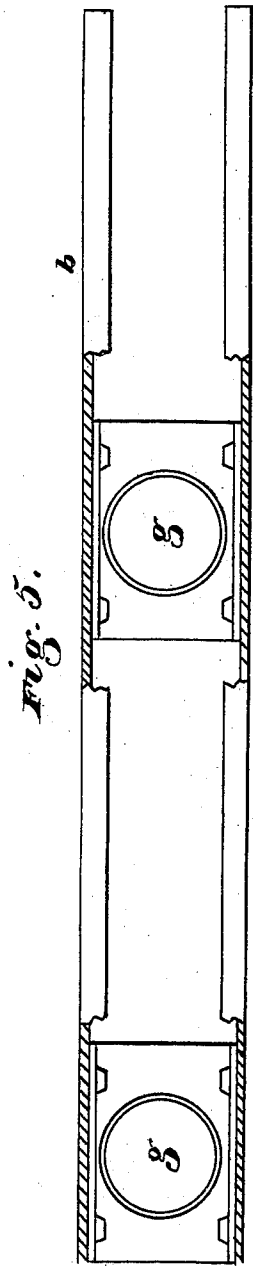
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UNITED STATES PATENT OFFICE.

LAWRENCE W. COE, OF AUBURN, NEW YORK.

IMPROVEMENT IN ROCK-DRILLS.

Specification forming part of Letters Patent No. **175,931**, dated April 11, 1876; application filed August 10, 1875.

To all whom it may concern :

Be it known that I, LAWRENCE W. COE, of Auburn, Cayuga county, State of New York, have invented an Improvement in Rock-Drilling Machines; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment :

My invention relates to certain improvements in that class of rock-drilling machines in which the drill is secured to the end of the piston-rod so as to be operated directly from the piston.

My invention consists first, in a novel means of operating the valve which alternately admits and exhausts the steam or other elastic motor to and from the ends of the cylinder; and, secondly, in a means for slightly rotating the drill at each stroke.

For a more complete explanation of my invention and the details of construction, reference is had to the accompanying drawings, and the letters of reference marked thereon, in which—

Figure 1, Sheet 1, is a perspective view of my drill. Fig. 2 is a longitudinal vertical section. Fig. 3, Sheet 2, is a view of the piston with a part broken away to show the clamping-rollers. Fig. 4 is a transverse section of piston and rollers. Figs. 5 and 6 are views of the frame.

a is the cylinder within which moves the piston *c*, which drives the drill. The cylinder is mounted upon a bed, *b*, and moved forward or back by a screw. In the ordinary construction of this bed, a central clamp is employed to secure the drill to the pillar, but this allows of very limited adjustment.

In my improved bed I employ two or more clamping-openings, *g g*, so that the drill may be adjusted to work at points varying considerably in distance from the pillar by attaching it through one or the other of these holes.

The piston *c* is secured to the rod *c'*, which extends out through the front cylinder-head, and carries at its end a means for securing the drill-stem. This device consists of a pair

of clamping-jaws, *s*, having a ring, *T*, which surrounds the front end, while a nut, *V*, at the rear end is screwed on so as to hold them firmly together, and thus secure the drill, as is fully described in an application for a patent made by myself and P. S. Buckminster.

Near the center of the piston is a smaller portion as shown at *c''*, and a loose sleeve, *d*, surrounds this part. Shallow grooves are made longitudinally on this part *c''*, as shown at *i*, and short rollers *h* lie in these grooves inside the cylindrical sleeve *d*. From the shape of the grooves *i*, it will be readily understood that when this sleeve is turned in one direction there will be no hinderance; but when turned in the opposite direction the rollers will bind in their grooves in the manner of a friction-clutch, so that a series of alternate movements of this sleeve from side to side will cause the piston, its rod, and the drill to be rotated by short movements. In order to give the sleeve *d* this oscillating movement automatically, a pin, *n*, extends upward from the sleeve through a slot, *r*, in the bottom of the steam-chest. This slot is made longitudinally, and slightly diagonal to the line of motion of the piston, so that as the piston moves from end to end of its stroke carrying the sleeve *d* and the pin *n*, it will be seen that the pin will make a short movement transversely, this movement depending, of course, upon the amount of deviation of the slot *r* from a line parallel with the movement of the piston. By this means the piston is caused to rotate slightly, at each stroke carrying with it the drill.

Suitable sleeves or rollers *k* are fitted upon the pin *n* to prevent friction.

The valve *o* is mounted upon a vertical pin, *q*, in the bottom of the valve-chamber, so that the part which moves over the ports *p* will oscillate at one side of this pin while two arms or extensions *m* project at the other side, and at such points that they are in a line above the slot *r*, and will be alternately struck by the pin *n* as it moves from one end to the other of the slot. By this construction I greatly simplify the mechanism necessary to rotate the drill and combine it at the same time with the valve-operating device.

From the manner of operating my valve, it

will be seen that I am enabled to give it as great a throw as may be needed with much less power than is expended in moving the valve transversely.

I also save a great amount of trouble and expense in coring out the ports for a transversely-moving valve, as my ports are only three in number and are as straight as those of any ordinary engine.

Having thus described my invention, I do not claim broadly the moving of the valve directly from the piston, nor the rotation of the piston or drill by means of a pin and inclined slot; but

What I do claim as new, and desire to secure by Letters Patent, is—

1. The pin *n* projecting from the piston or the sleeve *d* through the diagonal slot *r*, and operating the oscillating valve *o* by means of the arms *m m*, substantially as and for the purpose herein described.

2. The sleeve *d*, loosely fitted to the spindle *c''*, said spindle having the grooves *i*, as shown and provided with the rollers *h*, in combination with the pin *n*, and the diagonal slot *r*, substantially as and for the purpose herein described.

3. The combination, in one mechanism, of the device for rotating the drill and for moving the valve, the same consisting of the piston *c*, with its sleeve *d*, the rollers *h*, and pin *n*, together with the diagonal slot *r* and the oscillating valve *o*, with its arms *m m*, substantially as and for the purpose herein described.

LAWRENCE W. COE.

Witnesses:

J. L. BOONE,

C. M. RICHARDSON.