

(No Model.)

J. P. SIMMONS.  
ROCK DRILL.

No. 601,288.

Patented Mar. 29, 1898.

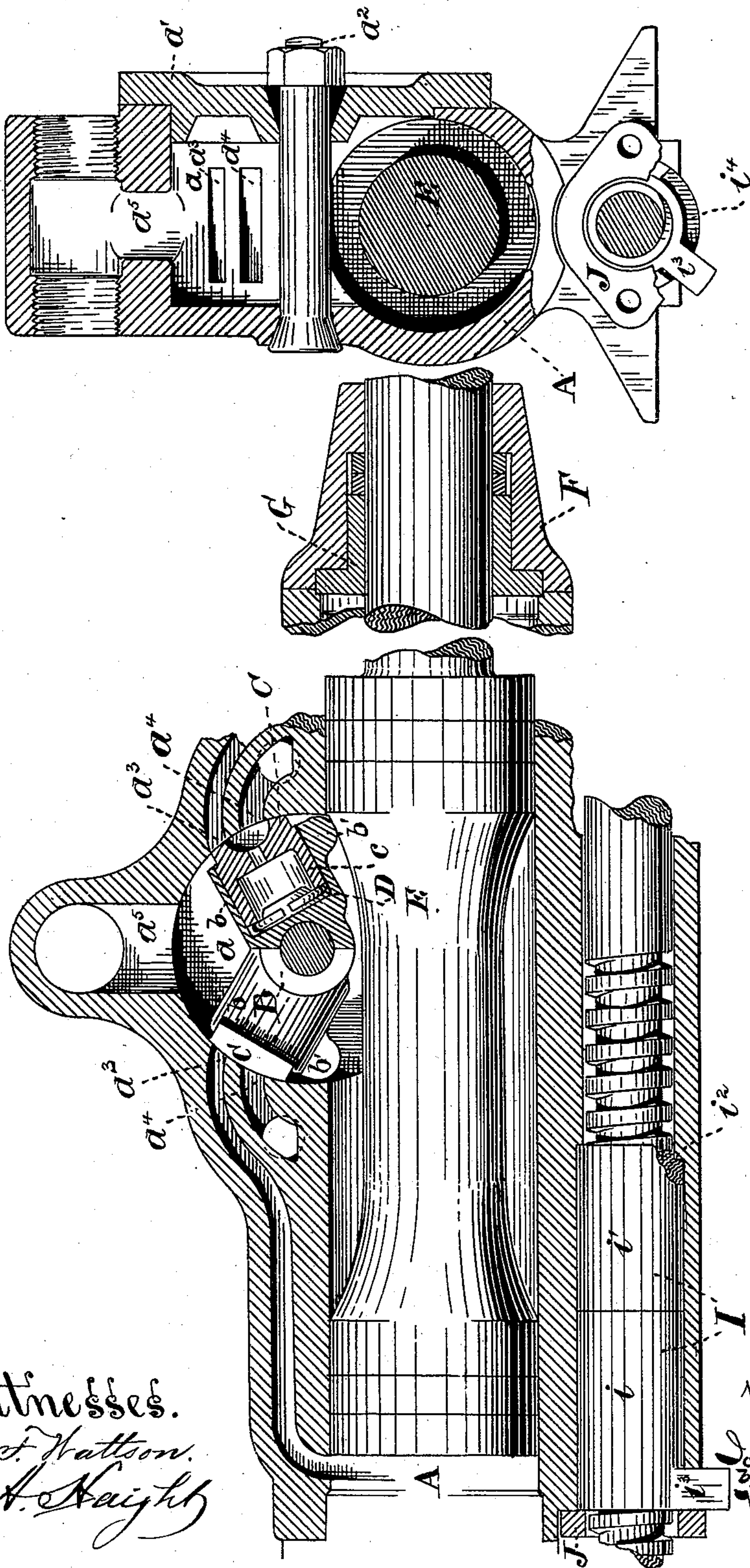


Fig. 2.

Fig. 1.

Witnesses.  
Wm. F. Hutton.  
C. A. Kaigh

Inventor.  
John P. Simmons  
by W. S. Smyth  
att'y



# UNITED STATES PATENT OFFICE.

JOHN P. SIMMONS, OF SAN FRANCISCO, CALIFORNIA.

## ROCK-DRILL.

SPECIFICATION forming part of Letters Patent No. 601,288, dated March 29, 1898.

Application filed March 10, 1897. Renewed February 28, 1898. Serial No. 672,095. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN P. SIMMONS, a citizen of the United States, residing in the city and county of San Francisco, and State of California, have invented an Improved Rock-Drill, of which the following is a specification.

My invention relates to the class of percussion-drills in which the drill is actuated by compressed air or steam in a direct-action engine.

It consists in the novel construction, arrangement, and combination of the several parts which I shall hereinafter fully describe and specifically claim.

The object of the invention is to provide a rock-drill of simple construction which shall be effective in operation. This I accomplish by means of the devices illustrated in the accompanying drawings, in which—

Figure 1 shows a longitudinal section. Fig. 2 shows a cross-section through the valve-chest.

Referring to the drawings, A is a cylinder provided with a valve-chest *a* of cylindrical form interiorly, the lower portion, as depicted in the drawings, intersecting the bore of the cylinder, the upper portion thus forming an approximately semicylindrical valve-face above the bore of the cylinder. A cover or covers *a'* close the circular ends of the valve-chest, preferably secured in place by a central bolt *a<sup>2</sup>*, suitably packed to make it airtight. Two inlet and two exhaust ports, respectively, *a<sup>3</sup> a<sup>3</sup>* and *a<sup>4</sup> a<sup>4</sup>*, are provided, one to each end of the cylinder. A suitable inlet *a<sup>5</sup>* for compressed air, opening into the valve-chest, is also provided.

B is a short rock-arm loosely journaled upon bolt *a<sup>2</sup>*. It is provided with two cylinders or sockets *b b*, into each of which is fitted a boss or plug *c*, projecting from the back of a slide-valve C. The bottom of each socket is raised in conical form and is provided with a spring-ring D of smaller diameter than the base of the cone. Upon this ring rests the plug of the valve. A tappet *b'* is formed upon the lower side of both extremities of the rock-arm B, projecting into the bore of the cylinder.

E is a piston having a portion of its length intermediate of its ends smaller in diameter than the bore of the cylinder and its smaller and larger diameters connected by a tapering

portion, as shown in Fig. 1. The forward end of the piston is provided with a suitable piston-rod, which passes through a detachable closely-fitting sleeve F. This sleeve at the cylinder end is bored out for a portion of its length of a larger diameter than the rod. It is also bored for a short distance from the same end of a still larger diameter, preferably slightly larger than the cylinder-bore. Into the annular space thus formed around the piston is fitted a gland or shouldered sleeve G, the sleeve portion of which is somewhat shorter than the annular space into which it fits, thereby leaving an annular space around the piston-rod, into which is placed any suitable packing, here shown as metallic rings. The sleeve G is secured to the cylinder by bolt and nut or any other suitable means.

I is a feed-nut, its length cut into two sections *i* and *i'*. The section *i'* is provided with a recess *i<sup>2</sup>*, and the inner surface of the pocket in which the nut fits is provided with a fixed projection corresponding with and fitting into the recess *i<sup>2</sup>*. The outer end of section *i* is provided with a lug *i<sup>3</sup>*, projecting radially from the nut. A portion of the side of the nut-pocket is removed to receive the lug *i<sup>3</sup>*, the width of this removed portion being wider than the lug, as shown at *i<sup>4</sup>*, Fig. 2. A clamp J secures the nut in place.

The rock-arm B is rocked upon its pivotal bolt *a<sup>2</sup>*, and consequently the valves C C close and open the inlet and exhaust ports alternately of each end of the cylinder by engagement of the inclined portion of the piston E with the tappets *b' b'* of the rock-arm at each stroke.

Owing to the construction described only a small portion of the back of each valve C C is exposed to pressure, thus reducing the friction and wear on valve and seat.

The fastening of the sleeve F in place also secures the sleeve G and packing around the rod. The flange on G serves also to center the sleeve F with the cylinder.

The radial recess *i<sup>4</sup>*, being wider than the lug *i<sup>3</sup>*, permits of some axial movement, thereby taking up slack of the threads.

Section *i* is held securely by pressure of clamp J.

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

1. A device comprising a cylinder, a piston therein having inclines a centrally-pivoted arm adapted to engage with and be operated by said inclines, a valve-seat, and a valve 5 radially socketed in each end of the rock-arm adapted to slide upon the valve-seat.

2. A device comprising a socket having a conical bottom a spring-ring adapted to operate by radial compression resting concentrically thereon, and a plug resting upon and 10 supported by the spring-ring, combined as described.

3. A device comprising a valve and a valve-

seat, an incline and a spring-ring thereon adapted to operate by radial compression 15 whereby the valve is kept in contact with its seat.

4. A device comprising a direct-acting engine and a feeding device comprising a feed-screw and a nut thereon made in two abutting 20 sections, and means for partially rotating one of said sections whereby loose fit is taken up.

JOHN P. SIMMONS.

Witnesses:

LINCOLN SONNTAG,

H. G. CORWIN.