No. 613,805. Patented Nov. 8, 1898.

J. P. SIMMONS.

DIRECT ACTING ENGINE.

(Application filed May 25, 1897.)

(No Model.)

Fig. 1.

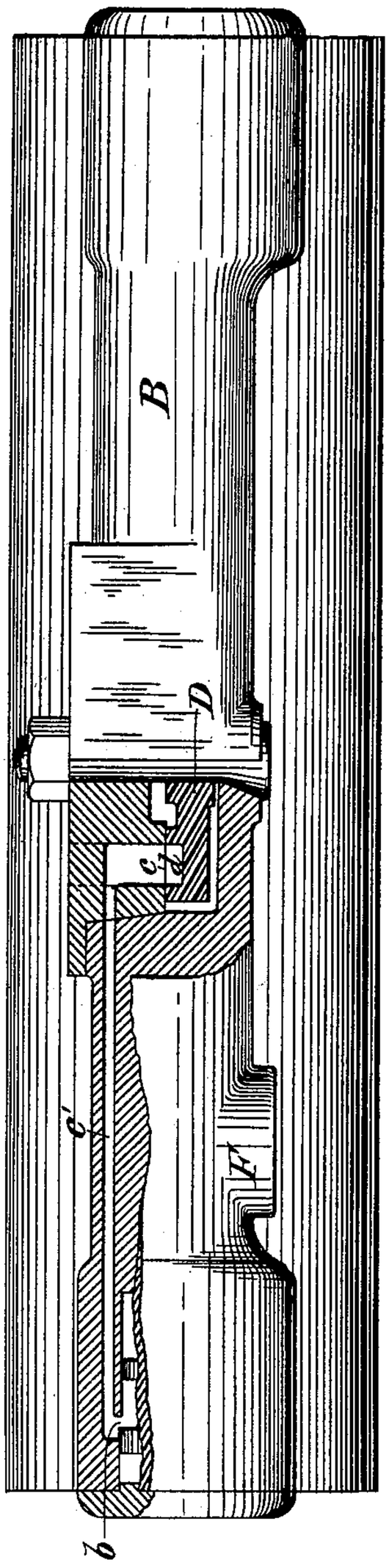
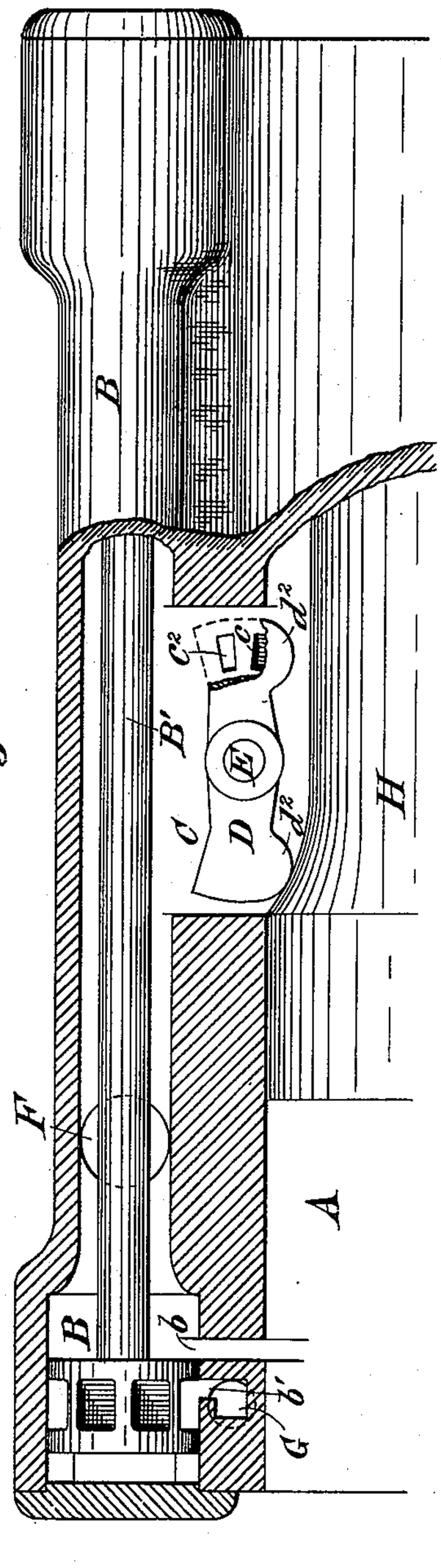


Fig. 2.



Witnesses:

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DIRECT-ACTING ENGINE.

SPECIFICATION forming part of Letters Patent No. 613,805, dated November 8, 1898.

Application filed May 25, 1897. Serial No. 638,144. (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 a new and useful Improvement in Direct-Acting Engines, of which the following is a specification.

This invention relates to the class of engines designed particularly to operate impact rock-drills.

It consists in the novel construction and combination of the several parts hereinafter fully described and specifically claimed.

The object of the invention is to provide a simple, cheap, and efficient device for operating the distributing-valve in this form of engine, whereby a more economical use is made of the actuating fluid. I accomplish these objects by means of the devices illustrated in the accompanying drawings, in which—

Figure 1 shows a plan, portions being broken to more clearly illustrate the invention. Fig. 2 shows an elevation, portions being in section.

Referring to the drawings, A is a cylinder of a direct-acting engine.

B is a tubular valve-chest extending from end to end of the cylinder and closed at each end by a suitable cap. A double-ended piston-valve B′ slides freely in the valve-chest. The periphery of each piston-head of the piston-valve B′ is provided with a series of cellular depressions, forming a number of D-valves around the circumference. Near each end of the valve-chest is a port *b*, communicating with the cylinder. There is also an exhaust-port *b′* adjacent to the inlet-port. Intermediate of the ends there is provided a longitudinal opening or passage C, connecting the interior of the valve-chest with the interior of the cylinder.

As each end of the cylinder and valve mechanism is a duplicate of the other, the description of one end applies equally to the other.

In one of the side walls of the space C is a port *c*, opening into a passage *c′*, which communicates with the end of the valve-chest, and adjacent to the port *c* is an exhaust-port c^2, communicating with the exterior. A rock-arm D, centrally pivoted upon a pin E, is provided in the space C, having a D-valve *d* at each end suitably arranged to control the inlet and exhaust ports *c* and c^2. The rock-arm D is also provided at each end with a tappet projection d^2, which extends slightly within the bore of the cylinder A and adapted to engage with and be operated by suitable cam-surfaces which are provided upon the engine-piston H in cylinder A. An inlet F is provided for the admission of the actuating fluid, and an exhaust-outlet G is also provided at each end of the valve-chest.

The operation of the device is as follows: The engine-piston by its motion engages one end of the rock-arm D, thereby causing the D-valve at the opposite end to establish connection between passage *c′* and exhaust c^2, which that end controls. This unbalances the pressure upon the ends of the piston-valve B′, and it moves to the exhausted end, thereby reversing the direction of the actuating fluid upon the engine-piston, and consequently the direction of motion of the engine-piston, and the described operation is repeated on the other side of the valve mechanism.

What I claim as new is—

1. In a direct-acting engine, a cylinder a piston therein, a valve-chest extending the whole length of the cylinder with inlet and exhaust ports at each end, a double-ended piston-valve having a series of circumferential depressions controlling these ports adapted to be operated by fluid-pressure, and means actuated by the engine-piston adapted to control the fluid-pressure upon the ends of the piston-valve.

2. In a direct-acting engine, a cylinder, a piston therein having valve-operating inclines, a valve-chest extending the whole length of the cylinder with an inlet and an exhaust port at each end a double-ended piston-valve having a series of circumferential depressions controlling these ports, a passage extending from each end of the valve-chest, whereby the pressure upon the ends of the piston-valve is controlled and a rock-arm adapted to control the flow of fluid in said passages.

3. In a direct-acting engine a cylinder, a piston therein having valve-operating inclines, a rock-arm located in the live-steam space provided at each end with a D-valve adapted to be operated by said piston, and a double-ended piston-valve the ends of which are provided with a series of circumferential depressions adapted to control the flow of the actuating fluid to either end of the cylinder substantially as described.

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Witnesses:
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