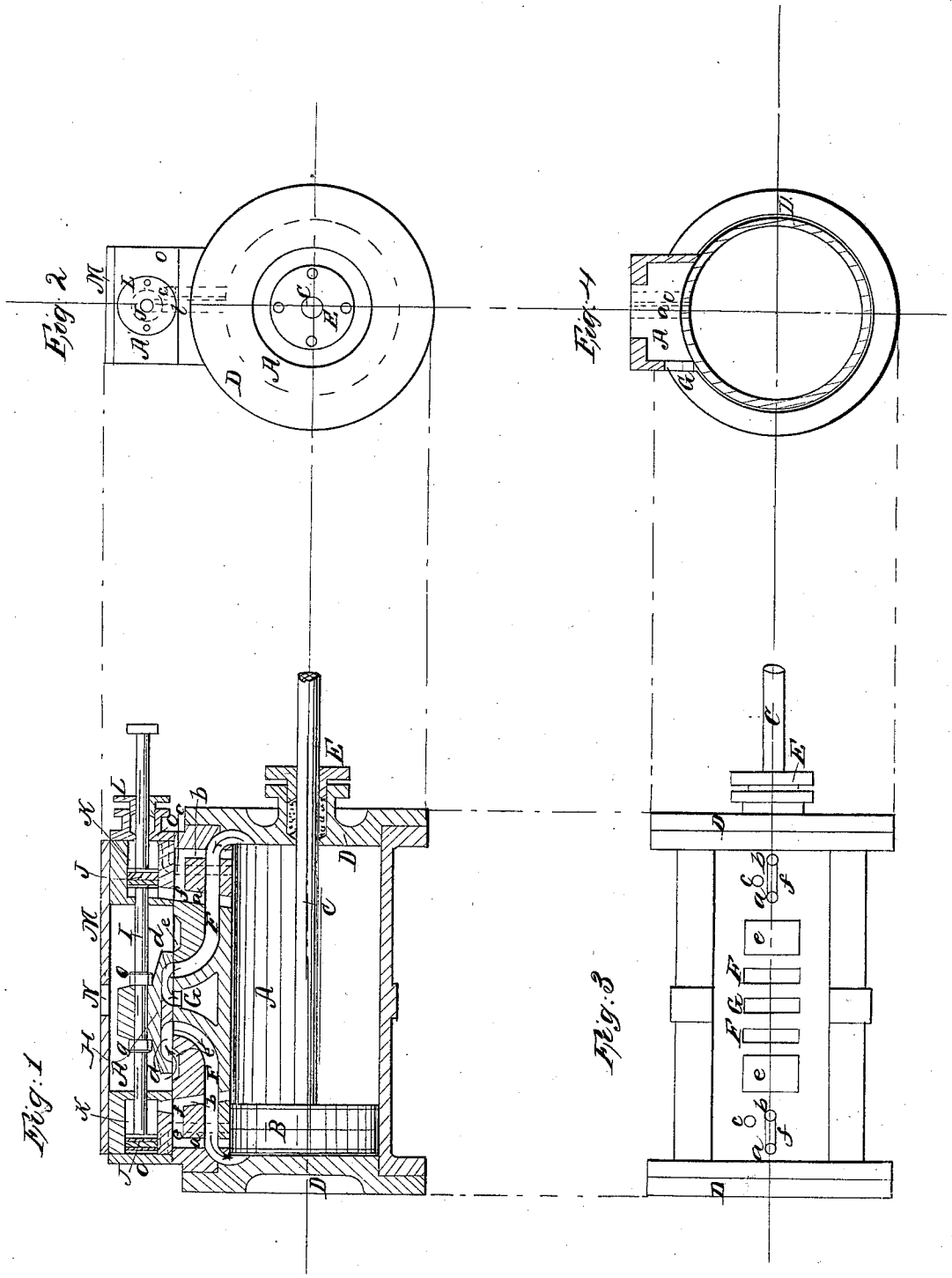
Roberts & Crumbie,

Steam Slide Valve.

No. 18,225. Patented Sept. 15, 1857.



N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

BARNABUS RUBERTS AND ALEXANDER CRUMBIE, OF BROOKLYN, NEW YORK, ASSIGNORS TO THEMSELVES AND JOHN BENSON, OF SAME PLACE.

ARRANGEMENT OF PASSAGES AND MEANS FOR WORKING STEAM-VALVES BY THE DIRECT ACTION OF STEAM.

Specification of Letters Patent No. 18,225, dated September 15, 1857.

To all whom it may concern:

Be it known that we, BARNABUS RUBERTS and ALEXANDER CRUMBIE, of Brooklyn, Kings county, State of New York, have invented a new and useful Arrangement of Passages and Means for Working Steam-Valves by the Direct Action of Steam; and we do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, figures and letters of reference thereon, making part of this specification.

Of the said drawings Figure 1 is a vertical longitudinal section of our improved method of working steam valves. Fig. 2, is an end view of the same. Fig. 3, is a top view of the cylinder having the steam chest removed in order to show the valve ports, etc. Fig. 4, is a vertical transverse section of the cylinder.

Similar letters of reference indicate like parts in all the drawings.

The nature of our invention consists in so arranging and working the valves that we are enabled to make a simple, cheap and economical engine, as will be more fully explained hereafter.

To enable others skilled in the art to make and use our invention we will describe its construction and operation.

A, represents the cylinder which has eduction and induction ports as in ordinary engines.

B, is the piston head.

D, D, are the cylinder heads.

E, is the gland for stuffing the piston rod C.

F, F, are the channels through which steam passes to the cylinder.

G, is the exhaust port.

H, is the valve.

I, is the valve rod.

J, J, are small pistons which by the pressure of steam thereon operate the valves.

K, K, are cylindrical chambers in which these pistons move.

L, is a gland for packing the valve rod.

A′ is the steam chest, the construction of which is plainly shown by Fig. 1.

M, is the steam chest cover and N, is the supply pipe for steam to enter the cylinder.

Operation: In Fig. 1, the piston is shown as being at the end of the stroke with the piston head at the left. Steam being admitted to the steam chest A′, it passes down into the cavity (*e*) at the left side, and thence under the valve cavity (*d*) and thence to the cylinder, as indicated by the arrows, and starts the piston by the pressure of steam toward its other end, while the steam contained to the right of the piston is passing out of the exhaust port G, as indicated by the arrows.

At each end of the cylinder on the side next the steam-chest are two holes or ports (*a*, *b*,) passing through and connecting with the cylinder, which holes have a passage (*f*) cast in the side next the steam chest equal in area to the holes which pass through the cylinder, as shown in Fig. 1 at (*a*, *b*). These holes are alternately opened and closed by the travel of the piston head which is wide enough to cover, or nearly cover both during its movements. On the cylinder and near the holes (*a*, *b*) there is another hole (*c*) passing through the same as the holes (*a*, *b*).

The steam chest is cast so as to allow a steam space A′ as seen by the white space in Fig. 1, while at each end it is so arranged as to allow the chambers K, K, in which the pistons J, J, work, which are secured to the valve rod in any proper manner. In the steam chest are arranged holes or ports (*a*, *b*, *c*,) so as to match those in the cylinder and thereby form direct communication between the pistons J, J, and cylinder A, as shown in Figs. 1, 2, and 4.

The valve rod I, has its bearings as shown in Fig. 1, and is secured to the saddle of the valve by collars (*g*, *g*) and pins or screws as may be most convenient.

The valve H, is shown in position to exhaust from the right end of the cylinder and receiving steam at the left to drive the piston to the right, and no movement of the valve will take place until the piston has passed far enough so that the side toward the left, shall pass by the hole (*a*), at the right end of the cylinder when a volume of steam will rush up through the hole (*a*), and act upon and force the piston J, at that end of the steam chest to change the valve from left to right. The object of the port (*b*) is to give an additional impulse to the piston J, which is done by the piston B,

again passing toward the left, which movement shuts the port (*a*) upon the inside of the cylinder and leaves (*b*), open, so that prime steam contained behind the piston B, will rush the port (*b*), and through the channel (*f*) to (*a*) and assist the piston J, to its full movement which operation being repeated insures a reciprocating motion of the piston B, by the pressure of steam acting alternately upon the pistons J, J.

The purpose of the port (*c*) is to equalize the pressure of steam upon the pistons J, J, which will appear plain from the fact that steam being on both sides of the piston J, at one end of the steam chest, of equal pressure, the admission of steam on the opposite side will force the valve in either direction as the steam is admitted through the ports *a*, *b*.

We would remark that the steam in the piston chambers, K, K, readily exhausts out with the steam in the main cylinder.

We are aware that the valves of steam engines actuated by steam pressure applied to pistons other than the main working pistons have been used, and therefore we disclaim such use. We are also aware of the patent of Norman W. Wheeler, July 31st, 1833, and we therefore claim no part, device or thing patented to him. But

We do claim as our invention—

The arrangement of the steam channels *a*, *b*, *c*, which are opened and closed by the travel of the main piston, connecting the steam chest and cylinder as described: in combination with the pistons J, J, of equal areas or their equivalents, substantially as described and set forth.

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Witnesses:
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