

## VALVES FOR STEAM-PUMPS.

Patented June 13, 1876.

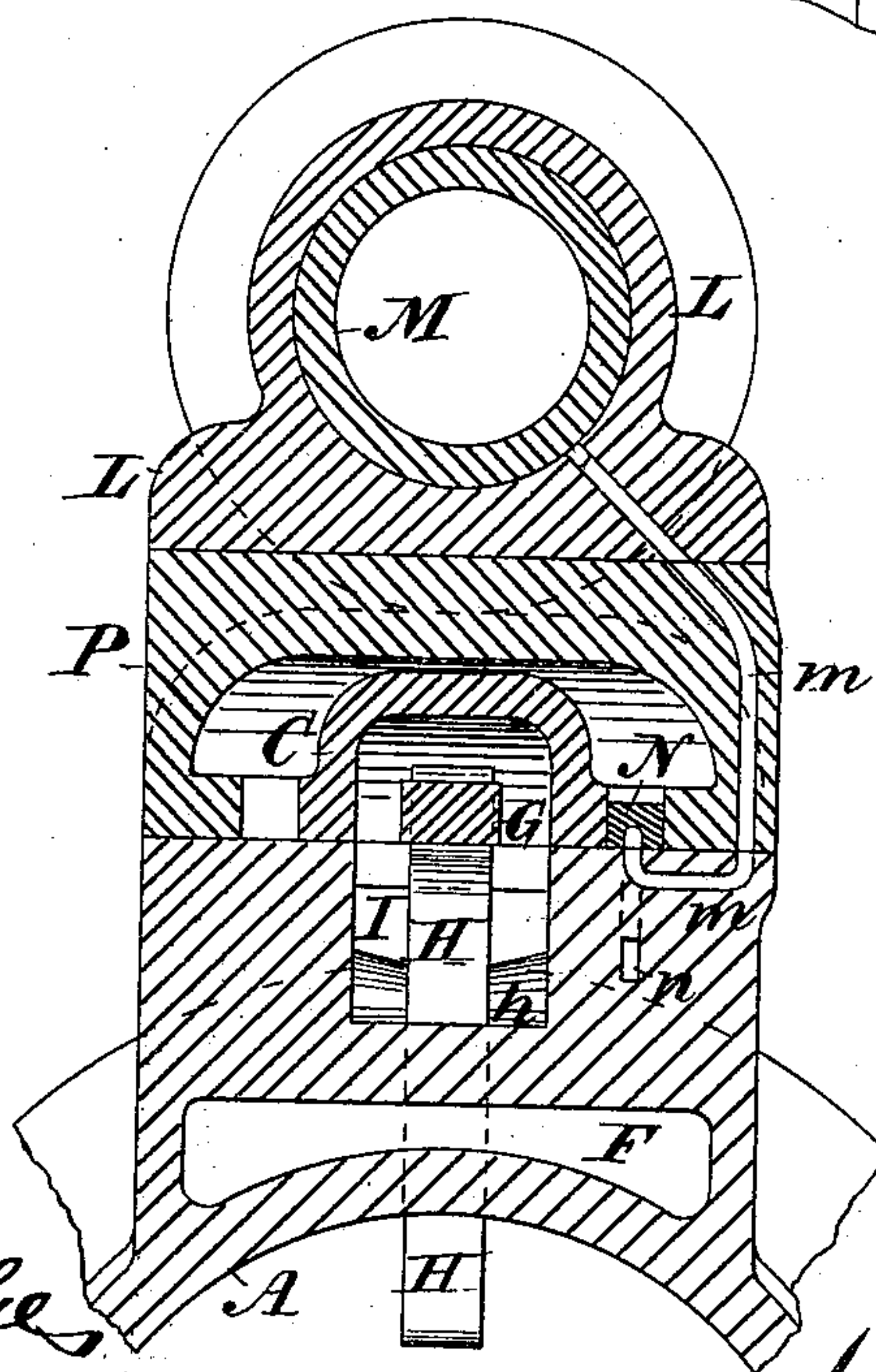
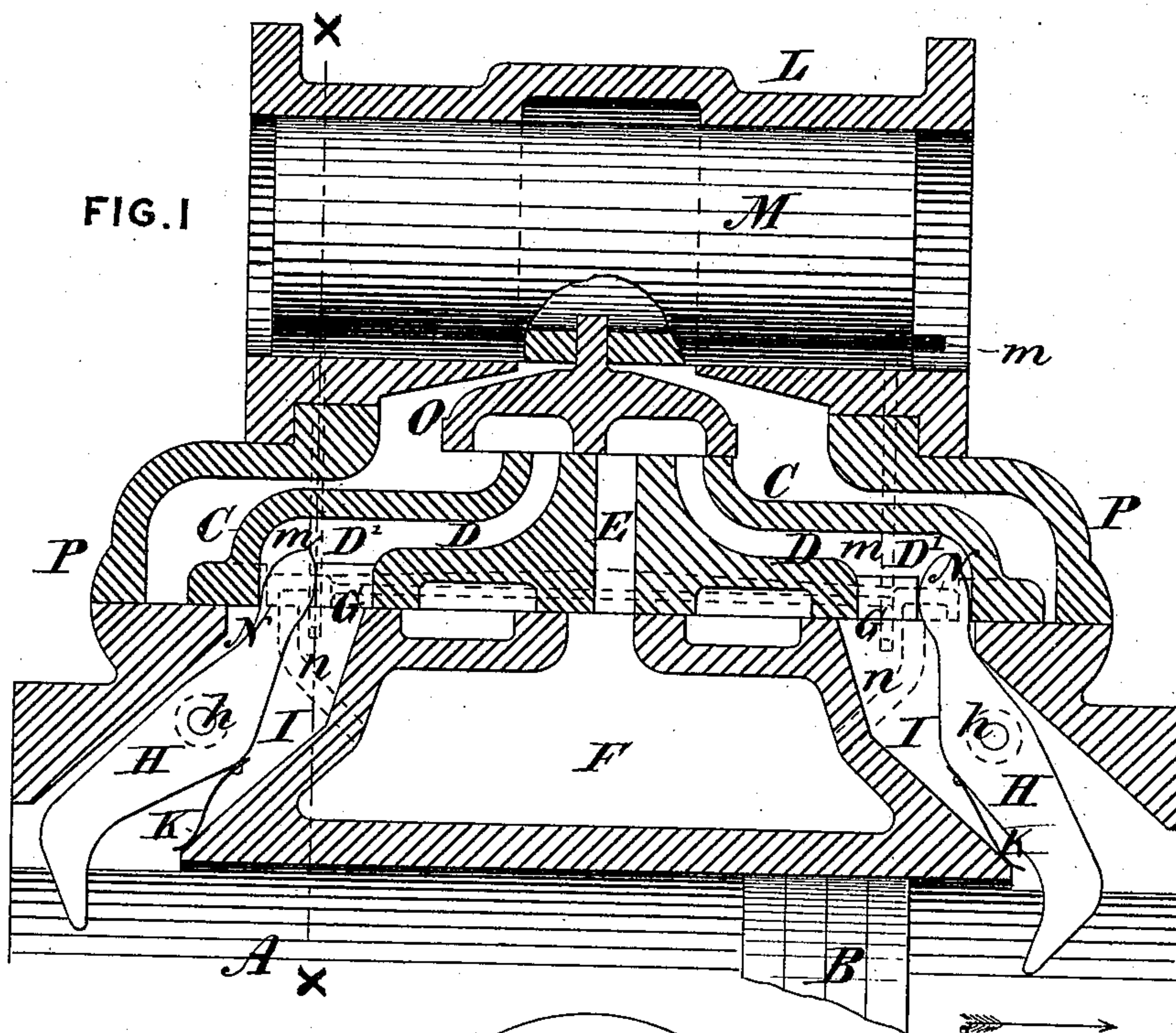


FIG. 2.

*Witnesses:*

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## IMPROVEMENT IN VALVES FOR STEAM-PUMPS.

Specification forming part of Letters Patent No. 178,648, dated June 13, 1876; application filed April 25, 1876.

*To all whom it may concern:*

Be it known that I, WALTER H. LAURIE, of the city of Montreal, in the district of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Steam-Pumps; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention has reference, more particularly, to improvements on the slide-valve of any steam-pump, and provides means for operating it directly by the action of the piston in the main cylinder, thus doing away with the necessity for slides, outside levers, valve-stems, &c., and enabling the pump-chamber to be set close to the cylinder, (sufficient space only being left between them for the stuffing-boxes,) thereby rendering the pump very compact. The amount of fitting required being, by my invention, much reduced the pump can also be constructed at less cost than those now in use.

To effect this I propose to arrange within each of the steam-ports of the main cylinder a dog or lever, pivoted so that the action of the piston will through it operate the slide-valve; but for full comprehension of my invention reference must be had to the annexed drawings, in which similar letters indicate like parts, and where—

Figure 1 is a longitudinal sectional elevation of the steam-chest, slide-valve, &c. Fig. 2 is a transverse sectional elevation on line *x x*.

A is the main cylinder, B the piston, and C the slide-valve, having arranged within it the steam-ports D D and exhaust-port E leading to the exhaust F, all these being, as usually constructed, with the exception that the lower part of the ports D is, as shown at D<sup>1</sup>, widened, and that on the face of the valve is placed a lug, G, against which works one end of a dog or lever, H, pivoted where shown at *h* in the port I, the other end of this dog reaching down into the main cylinder and having the piston, in its stroke, come in contact with it. It must be clearly understood that the portion D<sup>1</sup> of the port D, and the port or passage I, are of such size that they will give in clear space the exact amount of the sec-

tional area of the ports D D, so that the steam will not be allowed to expand at all before it enters the cylinder. On the inner face of this dog is preferably arranged a spring, K, bearing against the face of the port, so as to prevent any clicking or noisy working. L is the auxiliary cylinder, mounted on the steam-chest, and M the auxiliary piston, operated by the steam passing up through the passages *m m*, (shown in dotted lines in Fig. 1,) these being opened and closed by a double auxiliary slide-valve, N, working between two lugs on the main valve, and provided, as shown at *n*, or in any suitable way, with exhaust-port communicating with the main exhaust F. The auxiliary piston M operates, as shown, the piston-valve O. P is the casing of any usual construction.

The operation of my invention is as follows: The piston, coming in contact with the lower end of the dog H, and carrying it with it, moves thereby the slide valve C in the opposite direction, and this, just before cutting off the steam from the back side of the piston, opens the auxiliary slide-valve N and allows steam to pass through the passage *m* at the back of the piston into the auxiliary cylinder, thus driving the piston N over, and with it the piston-valve O, thereby reversing the current of steam and exhaust, and giving a positive motion whatever may be the rate of speed of the main piston.

Although specially adapted for steam-pumps, my invention may be used in any steam-engine where direct action is required.

I claim as follows:

In combination with a steam-chest of a direct-acting steam-engine, the combination of the dog H, pivoted in the steam-port, and acting directly in the slide-valve to give it initial motion, with the auxiliary slide-valve N, operating through ports *m*, the piston-valve M, and secondary valve O, to reverse the current of steam, as herein set forth.

WALTER H. LAURIE.

Witnesses:

FRAS. HY. REYNOLDS,  
ROBT. ARTHUR KELLOND.