# G. W. DIXON.

## VALVES FOR DIRECT-ACTING PUMP.

No. 193,600. Patented July 31, 1877.

Fig. 2.

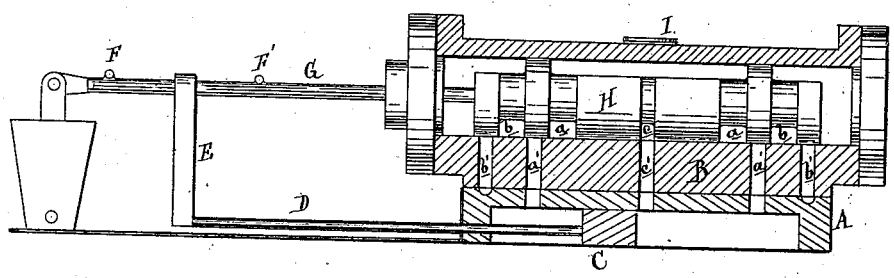



Fig. 1.

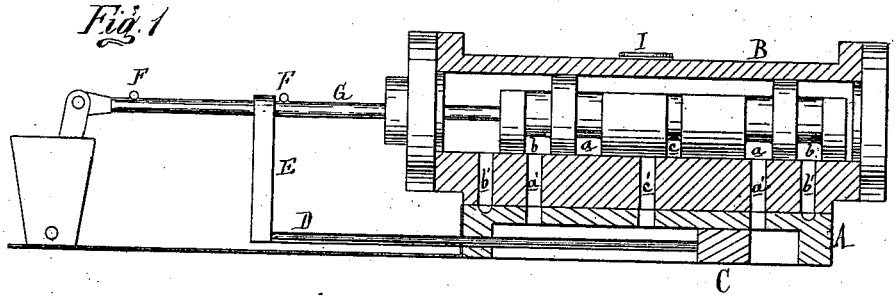
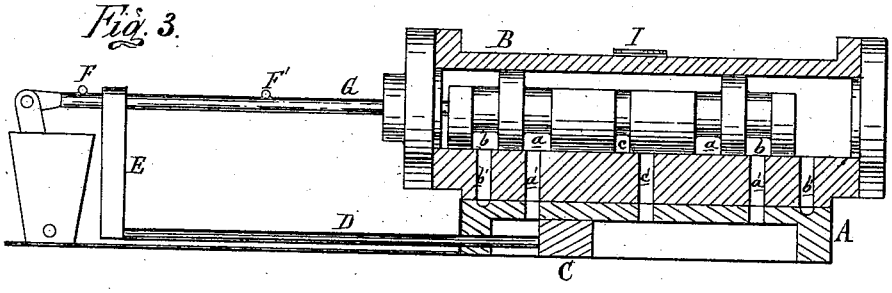



Fig. 3.

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# UNITED STATES PATENT OFFICE.

GEORGE W. DIXON, OF SPRING LAKE, ASSIGNOR TO WILLIAM M. FERRY, OF GRAND HAVEN, MICHIGAN.

## IMPROVEMENT IN VALVES FOR DIRECT-ACTING PUMPS.

Specification forming part of Letters Patent No. **193,600**, dated July 31, 1877; application filed January 13, 1877.

*To all whom it may concern:*

Be it known that I, GEORGE W. DIXON, of Spring Lake, in the county of Ottawa and State of Michigan, have invented an Improvement in Steam-Pumps, of which the following is a specification:

The nature of my invention relates to an improvement in direct-acting steam-pumps, of that class wherein the steam-valve is reciprocated by an arm on the piston-rod striking alternately one of two tappets on the valve-stem; and it consists in providing a cylindrical plug-piston valve with an auxiliary steam-channel communicating with an auxiliary port in the middle of the cylinder, to continue the movement of the steam-piston after the main parts are closed; and, further, to reverse the movement of the valve by the pressure of the outflowing exhaust steam.

Figure 1 is a longitudinal vertical section through the center of the steam-chest and top of cylinder, showing the position of the valve at the commencement of the stroke of the piston from the back head. Fig. 2 is a similar section, showing the position of the valve a little later than mid-stroke. Fig. 3 shows the position of the valve at the completion of the stroke.

In the drawings, A represents the upper part of the steam-cylinder, flat on top, and flanged to have the base of the steam chest B bolted thereto, which is bored out as a cylinder.

C is the piston, and D the piston-rod, carrying a tappet-arm, E, which alternately strikes two tappets, F F′, on the stem G of the valve H, which is a cylindrical plug, turned to fit the chest.

I is the steam-inlet to the chest. The middle part of the valve-body is flattened on top to allow the steam to pass into the steam-ports *a a*, which are simply grooves turned in the plug, communicating with the ports *a′ a′*, leading from the chest into the ends of the steam-cylinder. Near each end of the valve an exhaust-port, *b*, is turned in it, communicating with an exhaust-channel, *b′*, cored in the base of the chest.

I do not claim any novelty in the construction of the valve and steam chest so far as is above described. The essential feature of my invention consists in turning an auxiliary port, *c*, in the middle of the valve, communicating with a port, *c′*, leading into the middle of the cylinder, the office of which will be understood from a description of the movements in a stroke of the piston.

The piston being next the back head of the cylinder, as in Fig. 1, the back port *a′* will be uncovered by the valve to admit steam and move the piston forward, the valve remaining stationary until just after the piston has passed mid-stroke, when the arm E strikes the forward tappet F, and moves the valve along until both steam-ports *a′* are covered. This is the dead-point in ordinary direct-acting pumps, and when they are liable to stop, if it is attempted to run them slowly.

In the present case, however, the port *c′* is disclosed by the valve, and steam is admitted behind the piston to carry it to the end of the stroke, just before the completion of which the valve is moved along still farther by the arm E until the port *c′* is again partly covered.

In the further travel of the valve, as soon as the back port *a′* is disclosed the exhaust steam rushes out of the cylinder through said port, the exhaust-port *b* being closed, and, pressing against the back of the valve, shoots it forward (being balanced the valve is easily moved) to admit live steam to the forward port *a′*, which reverses the movement of the piston, the action of the valve on the return stroke being the same as just described, the exhaust steam passing over the flattened end of the valve and through the exhaust-channel *b′* to the atmosphere.

If it be desired to give the valve a quick throw at the completion of each stroke, the exhaust-ports *b′ b′* may be given a slight lead with relation to the auxiliary port *c′*.

What I claim as my invention is—

In a steam-pump, substantially as described, the auxiliary channel *c* in the valve, and the port *c′* leading into the cylinder, substantially as and for the purpose set forth.

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Witnesses:

ANDW. THOMSON,
EDWD. P. FERRY.