G. W. DIXON

Slide and Steam Valve.

No. 205,788. Patented July 9, 1878.

Fig. 1.

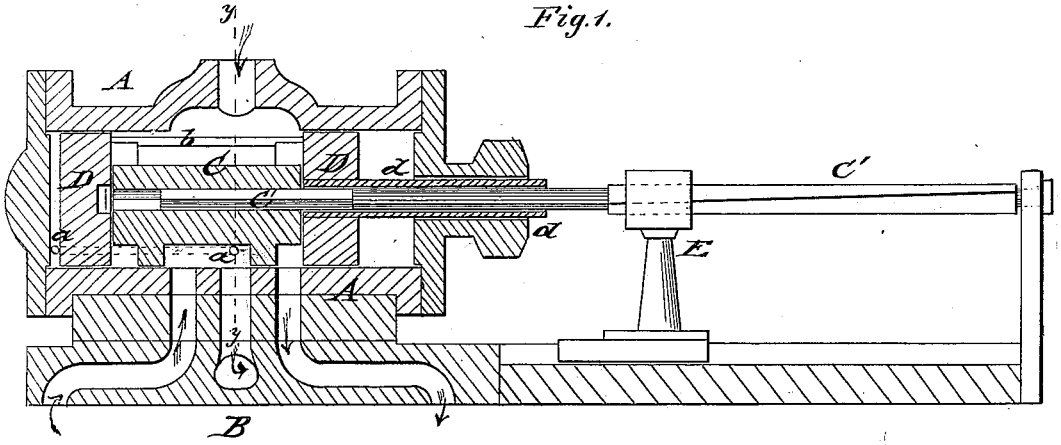


Fig. 3.

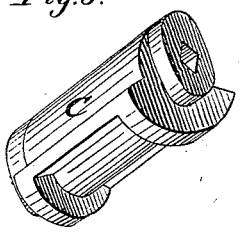


Fig. 2.

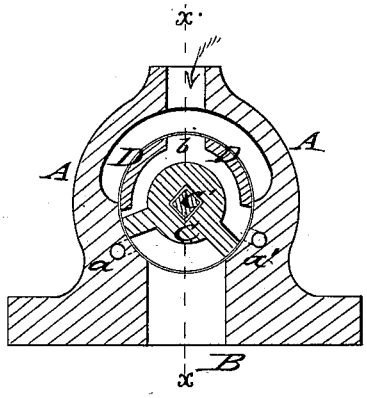
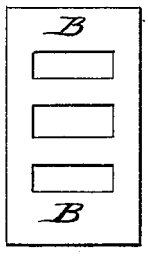


Fig. 4.



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UNITED STATES PATENT OFFICE.

GEORGE W. DIXON, OF SPRING LAKE, MICHIGAN.

IMPROVEMENT IN SLIDE AND STEAM VALVES.

Specification forming part of Letters Patent No. **205,788**, dated July 9, 1878; application filed May 4, 1878.

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 a new and Improved Valve for Direct-Acting Steam-Pumps, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a vertical longitudinal section of my improved valve for direct-acting steam-pumps on line *x x*, Fig. 2; and Fig. 2 is a vertical transverse section of the same on line *y y*, Fig. 1; Fig. 3, a perspective view of the main valve detached; and Fig. 4, a top view of the ports of the connecting pump-cylinder.

Similar letters of reference indicate corresponding parts.

This invention is intended to furnish an improved valve-movement for direct-acting steam-pumps, by which the noisy tappets and the expense for the same are dispensed with, and a smooth, positive, and reliable motion be given to the valve. The valve will always move with perfect accuracy, and dispense with an auxiliary valve.

The invention consists of a valve operated by a twisted valve-rod that is made with a square cross-section on that end that enters the valve, and also on the opposite end, over which a reciprocating socketed arm passes, so that the motion of the latter imparts a lateral and direct movement to the valve. The plunger is placed on the valve, and the steam supplied through the top part of the valve-casing and suitable steam-ducts, so as to give a direct motion to the same without turning with the valve. The plunger slides by an extension-sleeve on the round middle portion of the valve-rod.

Referring to the drawing, A represents the valve-casing or steam-chest, that is arranged above the main pump-cylinder B, and provided at the inside with a valve, C, and a plunger, D.

The valve-rod C′ is extended through the head of the casing, and supported at its end in bearings of a vertical end standard, the valve-rod being made square at both ends and round at the middle portion. The outer square portion of the valve-rod passes through a reciprocating socketed arm, E, that works in connection with the piston-rod of the pump-cylinder, while the inner square portion of the valve-rod C′ fits into a corresponding socket-recess of the main valve C. The valve-rod C′ is also twisted to such extent that the reciprocating motion of the socketed arm imparts a rocking movement to the main valve C. The turning of the valve C opens a small steam-duct, *a*, that leads from the middle portion of the casing to the end back of the plunger, while a second steam-duct, *a′*, leads at the opposite side of the casing from the center to the other end of the plunger. The plunger receives thereby steam at one end and exhausts at the other end, so as to move the valve forward or backward, and bringing it thereby in connection with the supply-ports of the pump-cylinder. The entrance and exhaust of the steam take place at the end of each stroke of the plunger as the valve is simultaneously set so as to supply the steam or exhaust the same by the action of the twisted valve-rod and reciprocating socketed arm.

The plunger D covers with its heads both ends of the main valve C, the heads being connected by a semicircular top portion with longitudinal center slot *b*, the valve-casing being also enlarged at the middle top part, as shown in Fig. 2, so as to leave sufficient space for the free entrance of the steam that passes through a top opening of the casing and alternately at one side or the other of the valve to the supply-ports of the cylinder, according to the lateral movement of the valve. The twisted valve-rod imparts an axial motion only to the valve, but not to the plunger, which reciprocates directly and carries the valve with it. The plunger slides, by a sleeve, *d*, on the middle round portion of the valve-rod, the sleeve passing out through a stuffing-box in the head of the casing.

The valve C is so fitted to the square end of the valve-rod that it readily slides thereon longitudinally, but follows the axial motion of the valve-rod that is imparted by the socketed arm. The valve-rod retains, by means of a bearing in the end support, a fixed position longitudinally, as it receives only a motion in axial direction. In this manner the noisy tappets are dispensed with and a better face given to the main valve. The turning of the main valve opens alternately the steam-

ducts of the casing and brings them in communication with the steam-supply and exhaust ports of the pump-cylinder, so as to move the plunger forward, and thereby the valve, which changes its position on the supply-ports, and also, by the socketed arm, its lateral position, so as to supply live steam to one end of the plunger and exhausts at the opposite end. In this manner a perfectly smooth, reliable, and positive motion of the valve is obtained, and thereby the pump-piston supplied with steam in regular and effective manner.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of the reciprocating plunger of a valve-casing with an interior main valve, operated by an axially-reciprocating valve-rod and reciprocating socketed arm, so as to alternately open the steam-ducts of the reciprocating plunger, substantially as and for the purpose set forth.

2. The combination of a valve-rod having square end portions, fitting a reciprocating socketed arm at one end and an interior main valve at the other end, with a directly-reciprocating plunger having top slot for admitting the steam, and with side steam-ducts, so as to set the valve properly on the supply-ports of the pump-cylinder, substantially as and for the purpose specified.

GEORGE WASHINGTON DIXON.

Witnesses:

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