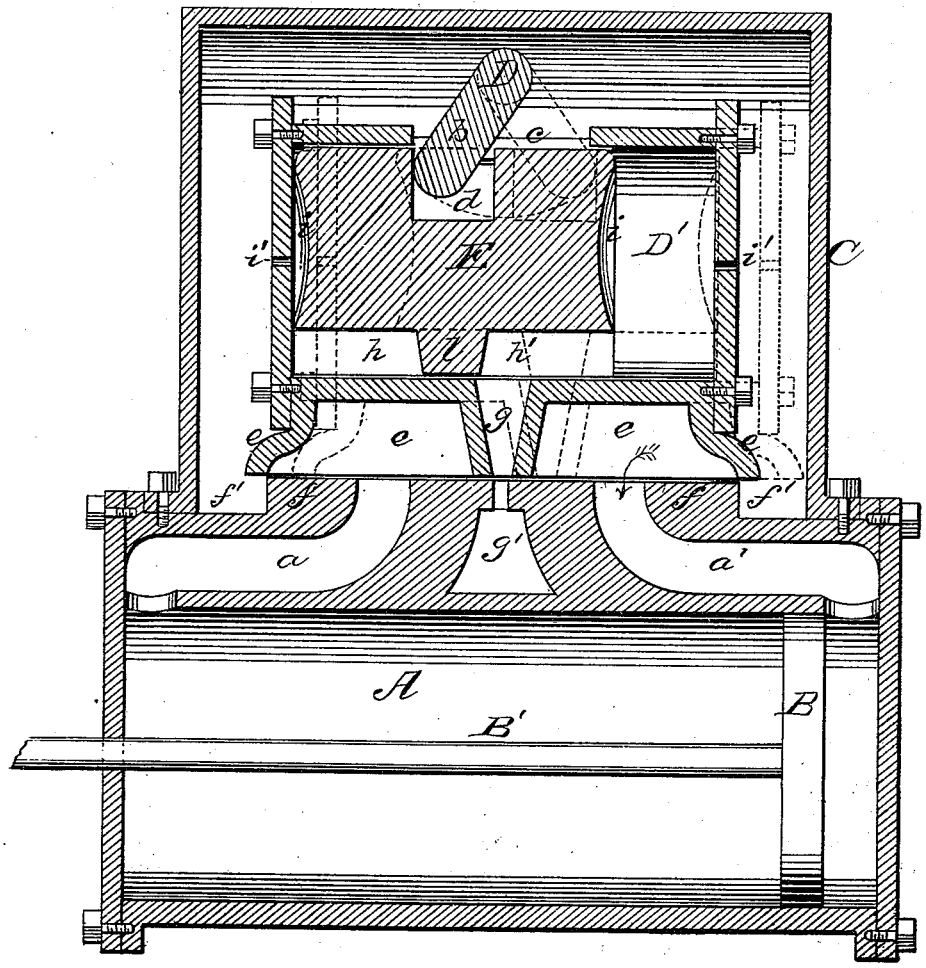
J. J. TONKIN
Slide-Valve.

No. 213,011 Patented Mar. 4, 1879.



WITNESSES
Villette Anderson.
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UNITED STATES PATENT OFFICE.

JOHN J. TONKIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO JOHN N. VAN LEW, OF RICHMOND, VIRGINIA.

IMPROVEMENT IN SLIDE-VALVES.

Specification forming part of Letters Patent No. **213,011**, dated March 4, 1879; application filed December 7, 1878.

To all whom it may concern:

Be it known that I, JOHN J. TONKIN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and valuable Improvement in Slide-Valves; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making a part of this specification, and to the letters and figures of reference marked thereon.

The figure in the drawing is a representation of a longitudinal vertical central section.

This invention has relation to improvements in valves for the engine-cylinders of steam-pumps.

The object of the invention is mainly to prevent the binding of such valves and to accelerate and govern their action, so that the pump will be regular in its strokes.

The nature of the invention consists in the combination, with an engine-cylinder having the usual entry-ports and a steam-chest on said cylinder, of a slide-valve reciprocating in said chest, and provided with end perforations and an educt-passage passing at each reciprocation across the exhaust-port, and a plunger reciprocating in said slide-valve, and provided with longitudinal passages and a wall separating the passages, the said plunger being connected to a rock-shaft operated from the cross-head, as will be hereinafter more fully set forth.

In the annexed drawing, the letter A designates an ordinary steam-cylinder, B its piston, and B′ a piston-rod. Upon the top of the cylinder is the steam-chest C, communicating with the cylinder by means of the usual ports *a a′*. D indicates a rock-shaft having its bearings in the upper part of the chest and extending transversely across the same. This shaft derives its rocking motion through suitable connections from the cross-head of the engine, and extends through stuffing-boxes in the sides thereof. It is provided with a downward-projecting arm, *b*, that extends through a slot, *c*, in the top of the slide-valve D′ and engages a recess, *d*, in a preferably metallic plunger, E, arranged inside of the slide-valve aforesaid. The body of this valve, as shown, is tubular, being circular in cross-section, and is supported by a flange, *e*, extending to and fitting closely upon a raised seat, *f*, forming a tight joint therewith. At either end of the seat *f* is formed a transverse recess, *f′*, for permitting steam to pass under the valve to the port. At the middle of the length of the slide-valve is an inverted conical educt-pipe, *g*, that at each reciprocation of the said valve passes over an exhaust-port, *g′*, between the entry-ports *a a′*, for a purpose hereinafter set forth.

The plunger E is cylindrical in cross-section, and fits snugly within the cylindrical bore of the slide-valve, forming a steam-tight joint therewith. It has free endwise motion in said valve, and is provided upon its under side with longitudinal ducts *h h′*, separated from each other by a wall, *l*, of sufficient thickness to completely close the upper end of the educt-pipe *g*. The ends of the plunger E are slightly concave or recessed, as shown at *i*, and the end walls of the slide-valve are each provided with a perforation, *i′*, opposite said recesses, of suitable size. Steam is admitted to the chest from the generator through the medium of a steam-pipe and throttle-valve, (not shown in the drawing, being common and well understood,) and surrounds the slide-valve. It then enters the latter at both ends through the perforations *i′* above mentioned in its end walls. If either end of said slide-valve and either of ducts *h h′* be in communication with the educt-pipe *g* and the exhaust-port *g′*, steam passes out of that end of the said valve into a condenser or into the open air, thus destroying the equilibrium of pressure, and causing the plunger to move toward that end of the slide from which the steam was exhausted. As the cut-off or wall *l* separating the passages *h h′* passes beyond the upper end of educt *g*, the remaining end of said valve is brought into communication with the exhaust-port *g′*, causing the steam to escape and the valve to be driven back with great activity. At each endwise movement of the plunger E the slide-valve is impelled in the direction of said movement, and one of the ports *a a′* opened and the other closed. The effect of this is to cause the piston to reciprocate in the cylinder with great regularity and to ex-

pedite the opening and closing of the entry-ports *a a'* aforesaid.

What I claim as new, and desire to secure by Letters Patent, is—

In a steam-pump, the combination, with the engine-cylinder A, having the entry-ports *a a'* and an intermediate exhaust-port, *g'*, and a steam-chest, C, of the slide-valve D', having perforations *i* in its ends and educt *g* in its bottom, the plunger E, endwise movable in said valve and controlled by suitable mechanism, and provided with the passages *h h'*, and a wall, *l*, separating said passages, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN J. TONKIN.

Witnesses:

JOSEPH W. MAULL,

FRANCIS S. CANTRELL.