2 Sheets—Sheet 1.

J. GATES.

STEAM-PUMP VALVE-GEAR.

No. 192,367. Patented June 26, 1877.

Fig. 1.

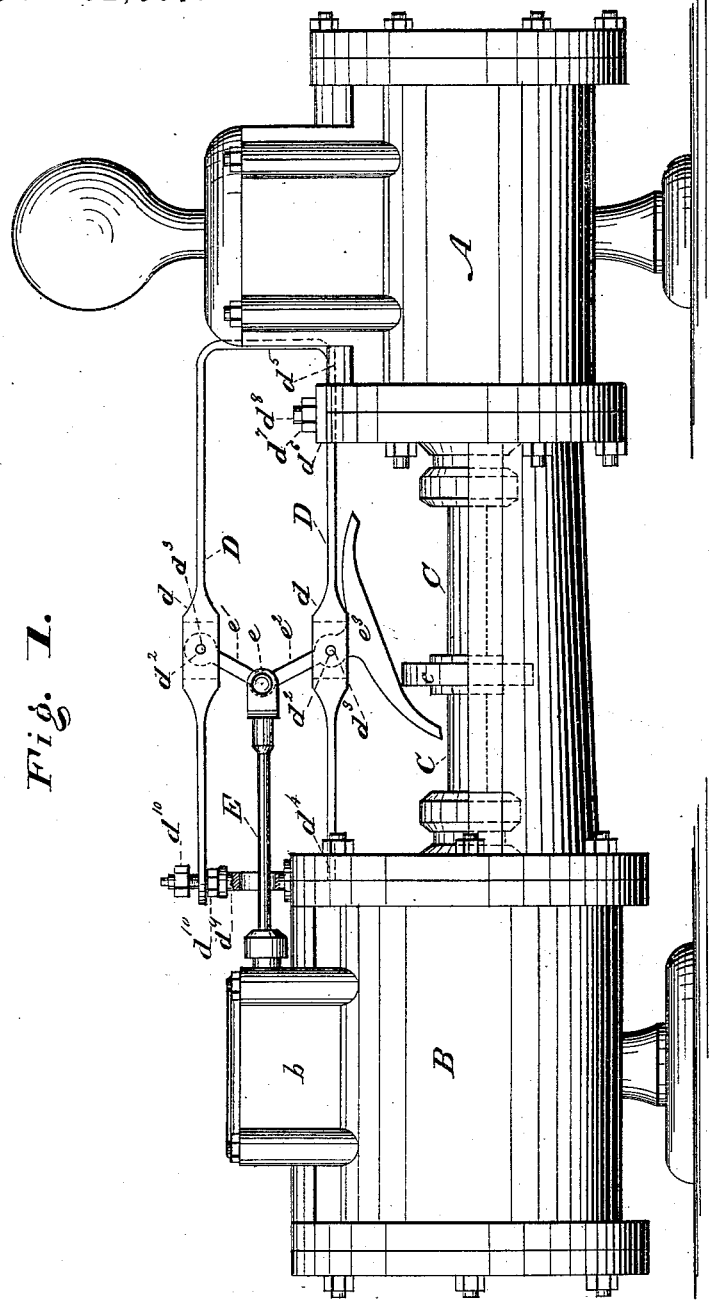
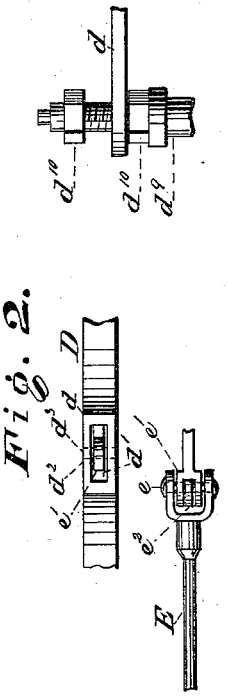


Fig. 2.



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2 Sheets—Sheet 2.

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STEAM-PUMP VALVE-GEAR.

No. 192,367. Patented June 26, 1877.

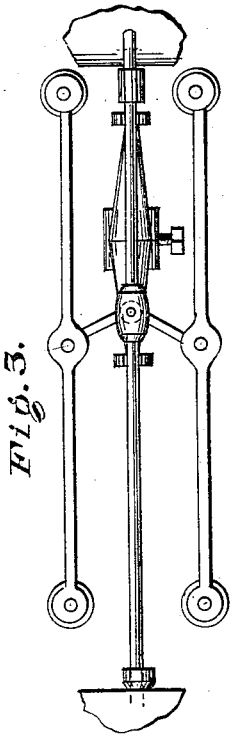

Fig. 3.

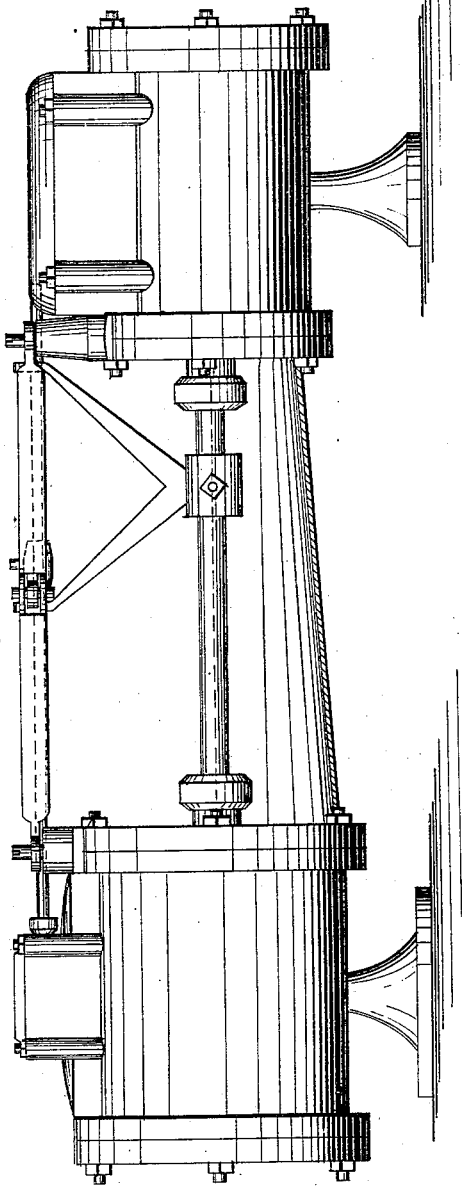

Fig. 4.

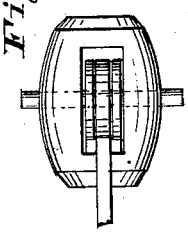

Fig. 5.

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UNITED STATES PATENT OFFICE.

JOHN GATES, OF PORTLAND, OREGON.

IMPROVEMENT IN STEAM-PUMP VALVE-GEARS.

Specification forming part of Letters Patent No. **192,367**, dated June 26, 1877; application filed May 8, 1877.

To all whom it may concern:

Be it known that I, JOHN GATES, of Portland, in the county of Multnomah and State of Oregon, have invented new and useful Improvements in Steam-Pumps; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to that class of steam-pumps in which the valves are shifted by certain intermediate tappet mechanism, actuated by the main piston-rod; and it consists, mainly, in the combination with the valve-piston of a toggle-joint and a double-acting spring. It consists, further, in certain means for adjusting the strength and throw of the spring; and also in certain minor details of construction, all of which will be fully described hereinafter.

In the drawings, Figure 1 represents a side elevation of my improved pump; Fig. 2, detail views of the spring-standard and toggle-joint lever; Fig. 4, a side elevation of a modified form of pump; and Figs. 3 and 5, detail views of the same.

To enable others skilled in the art to make and use my invention, I will now proceed fully to describe its construction and manner of operation.

A represents the pump-cylinder of a direct-acting steam-pump, which may be constructed generally in any proper manner. B represents the steam-cylinder, and *b* the valve-chest, both of which also may be constructed generally in any proper form. C represents the main piston, common to both cylinders, as ordinarily employed, which is provided with a central disk or block, *c*, rigidly fixed thereto, as shown. D represents the spring for actuating the valve-piston E, consisting, preferably, of a suitable metal bar or plate bent into U-shaped form, to obtain the equal or nearly equal and similar parts *d d*, as shown, each of which is provided with a proper recess, d^1, and transverse opening d^2, by means of which and a proper securing-pin, d^3, the extreme ends of the toggle-joint are secured in place, as shown. d^4 represents a proper socket or recess in one of the cylinder-heads, which is adapted to receive and hold one end of the lower portion of the spring, as shown. d^5 represents a proper bearing-surface adapted to support the other end of the lower portion of the spring, and d^6 a clamping-bar secured by bolts d^7 and nuts d^8, by means of which the spring is firmly held in its proper position, as shown. d^9 represents a standard or post, located at any proper point, which is adapted to support the free end of the upper portion of the spring, as shown. d^{10} d^{10} represent nuts located on the threaded portion of the standard d^9, above and below the spring, as shown, which are adapted by proper adjustment to vary the distance between the upper and lower portions of the spring, for the purpose of increasing or diminishing the power and length of the stroke resulting from the action of the spring. E represents the valve-piston, which is provided with a forked end, having proper openings, by means of which and a pin, *e*, it is secured to the joint of the toggle-levers e^1 e^2, as shown. e^3 represents a double tappet-arm, pendent from an extension of the toggle-lever e^2, as shown, which is adapted to be tilted on its pivot by contact with the disk *c* of the piston-rod at each end of the movement of the latter, as shown.

The operation will be readily understood.

Motion having been given to the engine, the tappet will be struck by the disk of the piston-rod, near the end of the movement of the latter, and be actuated, in the manner well understood, to throw the valve-piston and shift the valves.

The tappet-arm, it will be understood, is moved by the main piston-disk until the toggle-joint assumes and passes slightly beyond a vertical position, when the spring acts to throw the valve-piston and shift the valves.

The power and extent of the thrust of the spring may be determined by properly adjusting its free end, these actions being diminished, of course, by separating the parts of the spring, and increased by drawing them together.

Some of the advantages of the described construction are as follows: The construction is quite simple, and yet very effective in its results; the parts are compactly and conveniently arranged, and are not liable to get out of order.

I do not limit myself to the precise construction shown. If desired, instead of a single spring, bent as described, two independent springs may be employed, as shown in Figs. 3 and 4, and the toggle-joint may be acted upon directly by a moving piece on the piston-rod, instead of by an intermediate tappet.

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

1. In combination with an intermediate valve-piston and toggle-joint, the double spring, adapted to act equally upon each side of the joint, substantially as described.

2. In combination with the main piston and its striking-block, the intermediate tappet mechanism, the toggle-joint, and the double spring, adapted to act equally upon each side of the joint, substantially as described.

3. In combination with the double spring, adapted to act equally upon each side of the joint, the standard d^9 and nuts d^{10} d^{10}, for adjusting the power and extent of its thrust, substantially as described.

4. The spring D, having the equal parts d d, in combination with the clamping-plate d^8, the recess d^4, and standard d^9, as described.

5. In combination with the striking-block, the tappet e^3, the toggle e^1 e^2, and the spring D, substantially as described.

This specification signed and witnessed this 5th day of March, 1877.

JOHN GATES.

Witnesses:
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