J. E. SCHULTZ.

Slide and Steam Valve.

No. 204,617. Patented June 4, 1878.

Fig. 1

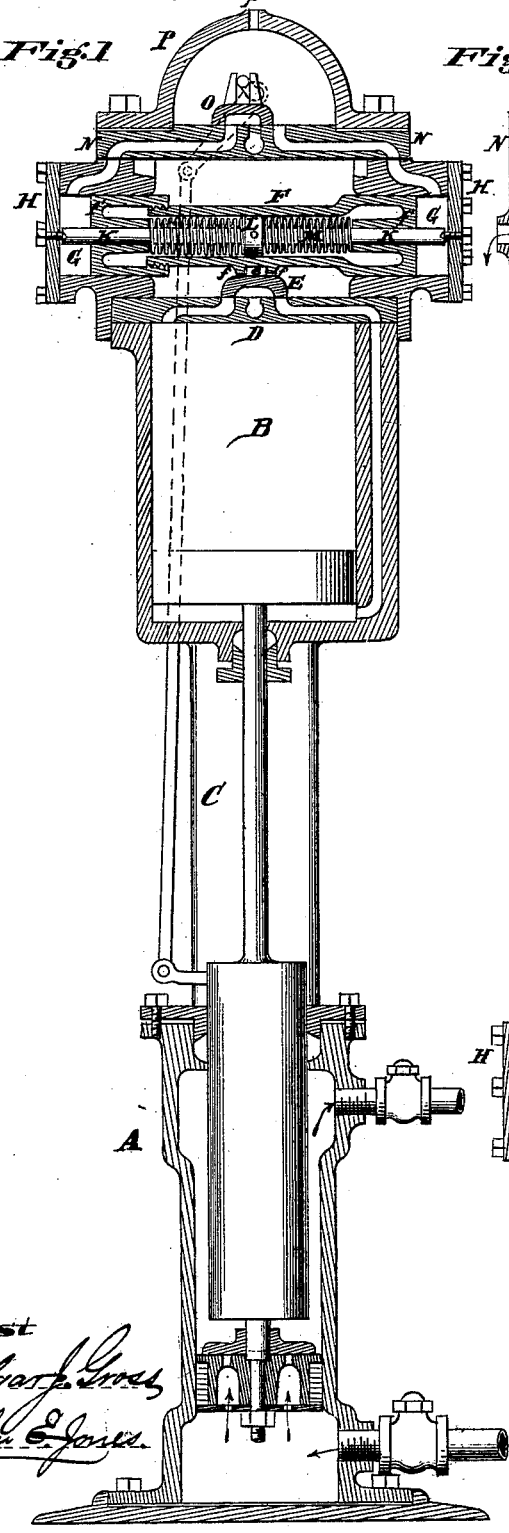


Fig. 2

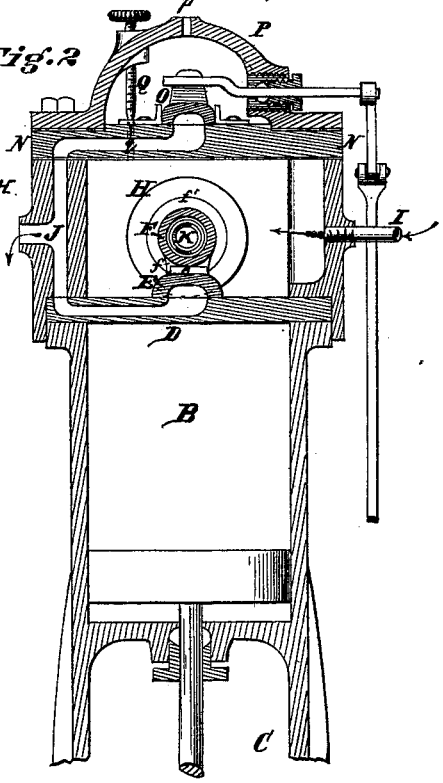
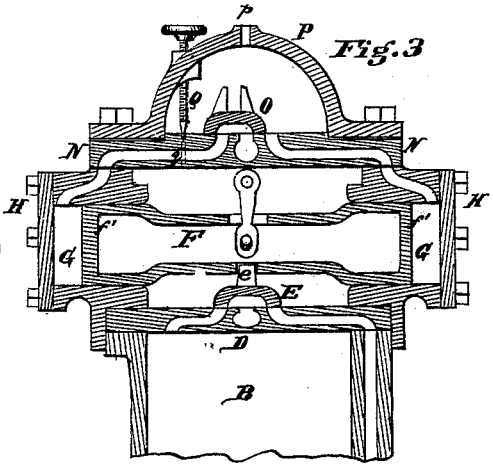


Fig. 3



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UNITED STATES PATENT OFFICE.

JOHN E. SCHULTZ, OF CINCINNATI, OHIO.

IMPROVEMENT IN SLIDE AND STEAM VALVES.

Specification forming part of Letters Patent No. **204,617**, dated June 4, 1878; application filed March 4, 1878.

To all whom it may concern:

Be it known that I, JOHN E. SCHULTZ, of Cincinnati, Hamilton county, State of Ohio, have invented an Improvement in Steam-Pumps, of which the following is a specification:

My invention relates to that class of steam-pumps in which the steam-piston is actuated by steam admitted through a slide-valve, which is reciprocated by a double-headed steam-moved piston-valve, the latter being operated by steam admitted through a small slide-valve having a positive motion by direct outside connection with the plunger of the pump.

My invention consists, in the first part, in the provision, between the main steam-chest and the cap in which the positive-moving valve operates, of a small aperture, governed by a needle-pointed adjusting-screw, for the purpose of nicely regulating the amount of steam admitted to actuate the steam-moved piston-valve, the object being to prevent the latter being shot across too violently at any time.

My invention consists, in the second part, in a peculiar construction of the steam-moved piston-valve, by which its motion is arrested at the ends of its stroke by a novel device for cushioning.

In the accompanying drawings, Figure 1 is a vertical section of my pump, taken through the length of the steam-moving piston-valve. Fig. 2 is a part-section taken at right angles to Fig. 1. Fig. 3 is a section of a head embracing the first part of my invention, but with an ordinary way of checking the steam-moved piston-valve at the ends.

A is the pump, and B the steam-cylinder, united by the upright frame-work C. On the upper flange of the steam-cylinder I rest a plate, D, which contains the ports which pass steam to and from cylinder B. The slide-valve E rests on this plate and governs the ports. It has a lug, *e*, which fits between the ears *f* of the steam-moving piston-valve F. It has piston-heads *f'*, moving in short cylinders G formed in the box or steam-chamber H. Boiler-steam is admitted freely at one side of this box through pipe I, and exhausted at the other side through passage J, its admission to the cylinder B and discharge therefrom being governed by the slide-valve E. Between the heads of the box H I secure a rod, K, which carries a fixed collar or piston, L, snugly fitting a cylinder formed in the piston-valve F between the heads thereof; and between this piston L and the heads of the piston-valve I introduce springs M of thin coiled German-silver wire, and I usually make the springs double—that is, one within another, to secure great flexibility. The piston L alone in the close cylinder makes a good cushion, and materially assists the springs, and the addition of the springs renders the cushioning positive and determinate.

On the steam chest or box H I fit a detachable valve-plate, N, whose lower side corresponds in its ports with the ports of the steam-chest H, and whose upper face receives the small positive-moving valve O. This valve is connected with the plunger of the pump in any of the well-known ways for giving it a reciprocated motion.

The plate is surmounted by a dome, P, at the top of which an oil-cup may be inserted at the aperture *p*.

In order to limit a supply of steam used to actuate the steam-moved piston-valve F to properly determine the quantity, I provide a very small aperture, *q*, to convey steam from the live-steam chamber, that is within the piston-heads of the box H. This small aperture extends upward into the dome P, and its upper end is governed by a needle-pointed adjusting-screw, Q. By the provision of this small aperture and its delicate adjustment, shocks and breakages, occasioned by the violent shooting of the piston-valve F, are entirely avoided, and I am enabled to govern the motion of my pump with great precision without interfering with the positiveness and reliability of its action. By the provision of the plate N I am enabled to adjust the main valve without any difficulty, as when the plate is removed the entire interior of the steam-chamber is exposed.

I claim—

1. In combination with the steam-chest H and its valve mechanism, and the chamber P which contains the positive-moving valve O the aperture *q*, with its needle-pointed adjust-

ing-screw Q, substantially as and for the purpose specified.

2. In a steam-pump, the combination, substantially as specified, of the hollow double-headed piston-valve, moved only by steam, the stationary rod K, provided with a centrally-disposed fixed collar or piston, L, and light cushioning-springs M, the tension of which is never so great as to overcome the weight and friction of the piston-valve.

In testimony of which invention I hereunto set my hand.

JOHN E. SCHULTZ.

Witnesses:
JOHN E. JONES,
CHAS. A. NEALE.