

J. F. HAMILTON.
Steam-Pumps.

No. 154,548.

Patented Sept. 1, 1874.

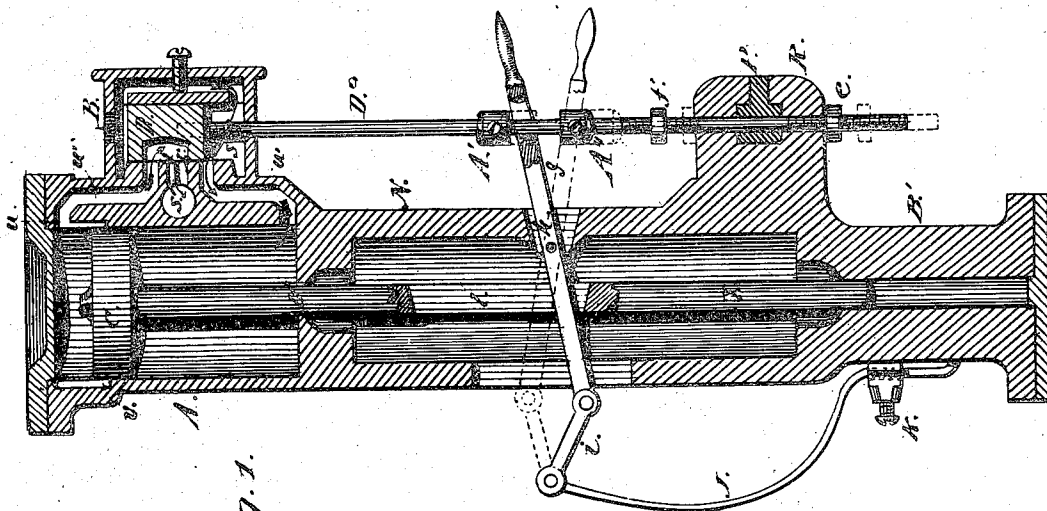


Fig. 1.

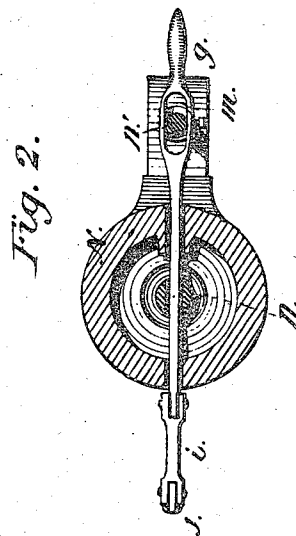


Fig. 2.

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IMPROVEMENT IN STEAM-PUMPS.

Specification forming part of Letters Patent No. 154,548, dated September 1, 1874; application filed March 16, 1874.

To all whom it may concern:

Be it known that I, JOSEPH F. HAMILTON, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Steam-Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to an improvement in steam-pumps, and consists in the combination of the slide-valve, its stem, adjusting-nuts, and a fixed projection or abutment, arranged between said adjusting-nuts, and in which the valve-stem moves, whereby the slide-valve can be adjusted with relation to the steam-ports of the cylinder for admitting more steam into one end of the cylinder than into the other end of it.

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

In the accompanying drawings, which form part of my specification, Figure 1 is a longitudinal and vertical section of my improvement in steam-pumps. Fig. 2 is a transverse section of the same at line *y*, of Fig. 1.

In the accompanying drawings, A represents an ordinary steam-engine cylinder, and B its steam-chest. The steam-supply ports *w*, and *w'*, exhaust-port *S'*, slide-valve D, and piston-head C, are also of the ordinary construction, excepting the steam-supply port *w'*, the opening of which in the cylinder at *u* is very narrow, and lengthwise of the cylinder instead of being at right angle to the longitudinal axis as is ordinarily the case, and the slide-valve is made a little longer, so as to cover part of the opening in the valve-seat *s* of the steam-port *w*. The object of these two variations will be hereinafter fully explained. B' represents an ordinary force-pump, its plunger *x* and the piston-rod D' forming a single piece, with a slot, *l*, through it for the lever *g*, which is pivoted at *h*. To the lower end of the lever *g* is pivoted a link, *i*, the lower end of which is pivoted to an adjustable spring, J, the tension of which is regulated by a set-screw, *k*. The cylinder A and

pump B' are cast in one piece, the port N between the cylinder A and pump being cored out for the piston-rod D', plunger *x*, and lever *g*, as shown in the accompanying drawings. On the side of the pump B' and port N is a projection, R, in which is formed in the casting process a recess for babbitt-metal. D'' represents the stem for the slide-valve D. The stem D'' passes through the projection R and an opening, *m*, in the lever *g*, and is secured to the slide-valve D. When the stem D'' is secured to the valve D and it is properly adjusted, melted babbitt-metal is poured into the recess, as indicated at P, whereby a cheap and perfect slide and guide is formed. On the stem D'' are two adjustable abutments, A' A'', and two screw-nuts, *e* and *f*. The screw-nuts *e* and *f* are used for regulating the position of the slide-valve D with relation to the opening of the steam-port *w* in the valve-seat *s*, and for determining the travel of the stem D'' and valve D. The abutments A' and A'' are used in connection with the lever *g*, link *i*, and spring J, for moving the valve D when the engine and pump are in operation. In the cylinder A at *v* is a recess, which corresponds to the opening *u* at the inner end of the steam-port *w'*. This recess is used for the purpose of balancing the pressure of the steam on the piston-head C when it is at or opposite to the opening *u*. By having the opening *u* narrow and long and parallel to the longitudinal axis of the cylinder, the steam is gradually admitted into the cylinder, so that when the pump fails to fill with water (which is frequently the case) the full pressure of steam does not come on the piston-head at once, forcing it down with all the power of the steam when there is no resistance to the plunger *x* of the pump B'. The advantage of thus gradually admitting the steam to the upper side of the piston-head C will be uniformity in the action of the engine, whether the pump is filled with water or not filled, and the sudden and violent action common to the engine when the pump fails to fill with water, is obviated. By the arrangement described of the opening *u* with relation to the opening *w*, adjustable slide-valve D, piston C, and plunger *x*, the sudden downward

movement of the piston and plunger is obviated when the pump fails to fill with water on the upward movement of the said piston and plunger. It will be observed that the slide-valve D is so adjusted that just sufficient steam is admitted through the opening *w'* to lift the piston and plunger, and in the event of the pump failing to fill with water (which is often the case) there would be but little resistance to them in their downward movement; therefore it is necessary to admit the steam gradually to the upper side of the piston, otherwise it and the plunger will descend too rapidly, causing a violent and jarring action, very liable to injure the pump and render it inoperative. By making the slide-valve D so that it will extend partly over the opening of the steam-port *w* more steam can be admitted to one end of the cylinder A than to the other end of it, whereby the power of the engine can be regulated to suit the work required of it, as in the case of a steam-pump or steam-hammer, which requires most power in the downward movement of the piston and plunger, and just sufficient power to raise them in the upward movement of the piston.

The operation of my improvement herein-

before described is as follows: Steam being supplied to the steam-chest B, and slide-valve D, and piston-head C, in the position represented in Fig. 1, the plunger *x* will, in connection with the spring J, move the lever *g*, so that its upper end will press against the abutment A'', which will move the slide-valve D and allow steam to enter the steam-port *w'*, and the piston D' in its downward movement will, in connection with the spring J, move the lever *g* so that its upper end will press against the abutment A', which will move the slide-valve D, so that the steam will enter the steam-port *w*. The exhausting of the steam is accomplished in the usual manner.

Having thus described my improvement, what I claim as of my invention is—

In a steam-pump, constructed substantially as hereinbefore described, the combination of the adjusting-nuts *e f*, valve-stem D'', and slide-valve D, the valve-stem D'' moving in a fixed projection between the nuts *e* and *f*, as and for the purpose set forth.

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Witnesses:

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