

UNITED STATES PATENT OFFICE.

WILLIAM ATKINSON, OF GARDNER, ILLINOIS, ASSIGNOR TO HIMSELF AND THOMAS MAYDEW, OF SAME PLACE.

IMPROVEMENT IN STEAM-PUMPS.

Specification forming part of Letters Patent No. 153,296, dated July 21, 1874; application filed April 7, 1874.

To all whom it may concern:

Be it known that I, WILLIAM ATKINSON, of Gardner, in the county of Grundy and State of Illinois, have invented a new and Improved Steam-Pump; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, in which—

Figure 1 is a longitudinal view in vertical section; Fig. 2, a horizontal section; and Fig. 3, a detail view in section of the end of steam-chest.

The invention relates to means whereby greater simplicity, less liability to stoppage, and greater economy in the operation of pumps may be secured. These means will first be fully described in connection with all that is necessary to a full understanding thereof, and then pointed out in the claims.

A represents the main cylinder of a pump, having inlet-ports *a a*, exhaust *a'*, and piston B. C is the piston-rod, which is extended through the cylinder at each end, and into the oppositely-placed auxiliary cylinders D D'. These have, respectively, water-inlet *d*, outlet *d'*, and pistons E E', the latter being reciprocated at the same time and by the same power as the main one, B. F is the steam-chest, in which is placed the valve-operating pistons G G, having the steam-inlets *g g*, and connected by the stem H, having the median disk or flange *h*. I is the main valve, recessed to receive the flange *h*, by which it is moved back and forth by the movement of pistons G G. J J' are channels leading from the steam-space behind pistons G to the exhaust. K K are valves, having shanks *k*, operated by a lever, L, that is pivoted at *l*, and actuated by a sliding bolt, M. The latter are alternately moved by the piston B in its reciprocations.

The operation of the pump is as follows: As the piston E moves forward and creates a vacuum behind it, the water flows in through inlet *d*, follows the piston, and, as soon as the latter begins to return, courses through the valve *e*. It now follows the channel N and the piston E', which in its turn is moving forward and creating a vacuum in its rear. As soon as the piston E' begins to move back,

this same water passes through valve *e'*, and is on the next movement expelled through outlet *d'*. This produces a continuous flow of water at the exit—an effect which has been produced heretofore, but, I believe, by different means and a different mode of operation.

As the pistons G G are perforated at *g g*, and receive the same pressure of steam on each side, it is necessary to destroy this equilibrium in order to make the pistons move. This I do by sliding forward the two valves K alternately, and thus letting the steam escape through a channel, J', to a space behind the valve, and thence to the exhaust through channel J.

As upon the degree of freedom with which the steam is exhausted from behind the valve K depends the resistance to valve-pistons G, and the consequent velocity and power exerted by the piston B, I use the transverse screw or valve O, that works across the channel-way J, and may be made to graduate the size of the outlet for the steam. This enables me to use a large piston, and yet regulate the degree of power exerted, while it also allows me, when using water that is muddy, or from other causes inclined to foam, to destroy this tendency by enlarging the exhaust-outlet.

It will be observed that the valves K and the valve-pistons G, with their several seats, are all arranged in the steam-chest, and maintained in place by a single cap, P, which may be held only by two set-screws. The caps P have a recess or chamber, *p*, behind the piston K, which communicates with steam channel-ways J J'. This is very important, as these parts require frequent examination and adjustment to cause them to fit closely and operate in the most effective manner. By arranging them all together in the ends of the chest F, complete access to them is obtained in a moment; while even in the Cameron pump, which is the nearest approximation to mine, and esteemed the most convenient of access, it requires a longer time to take out and return these parts than to refit them.

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

1. The combination, with main cylinder A, having steam-ports $a a'$, and the rod C, having thereon a middle piston, B, and two end pistons, E e E' e', of the two cylinders D D', placed at opposite ends of main cylinder, having, respectively, water-inlet d and outlet d' , d connected by a channel-way, N, as and for the purpose specified.
2. The combination, with piston G, of valves K and valve-seat caps P, the latter arranged in the ends of chest, and having chamber p and channels J J', arranged as and for the purpose specified.

WM. ATKINSON.

Witnesses:

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