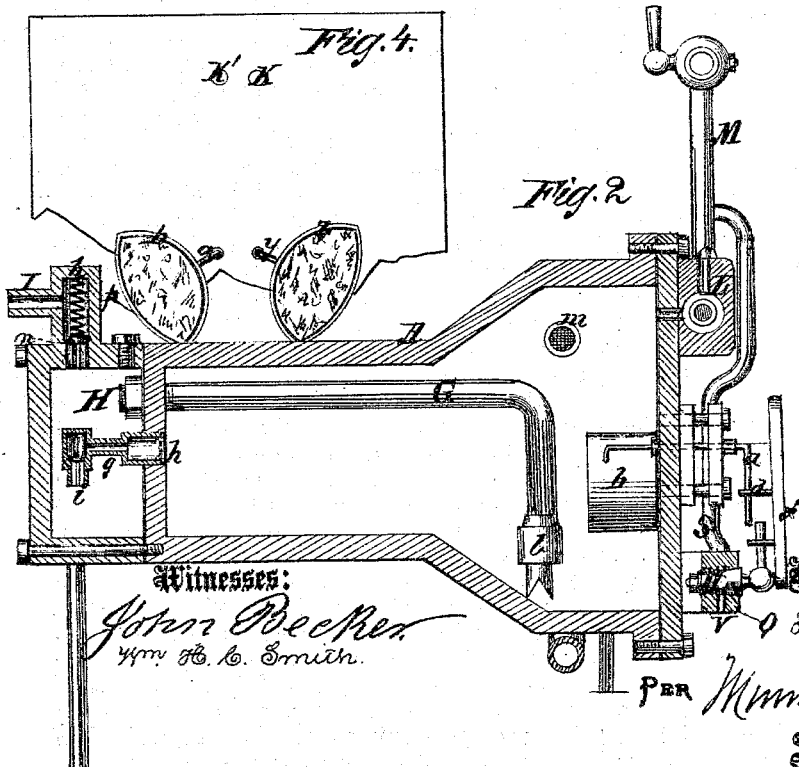
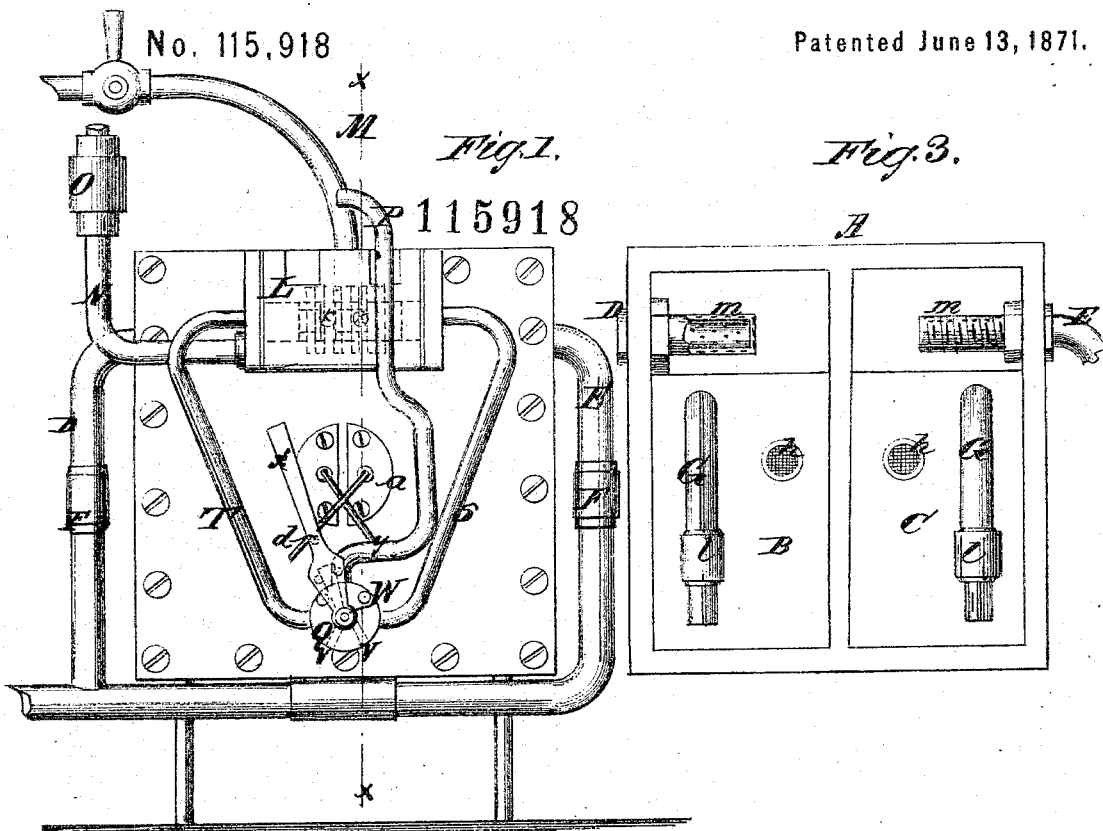


JAMES W. WHITAKER.

Improvement in Steam-Pumps and Fire Engines.

No. 115,918

Patented June 13, 1871.



Witnesses:

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JAMES W. WHITAKER, OF KENOSHA, WISCONSIN.

IMPROVEMENT IN STEAM-PUMPS AND FIRE-ENGINES.

Specification forming part of Letters Patent No. 115,918, dated June 13, 1871.

To all whom it may concern:

Be it known that I, JAMES W. WHITAKER, of Kenosha, in the county of Kenosha and State of Wisconsin, have invented a new and Improved Steam-Pump and Fire-Engine; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to improvements in engines for raising water in a vacuum formed by filling a cylinder or other chamber with steam and condensing it; and it consists in the construction and arrangement of certain parts, as hereinafter shown and described, in connection with others necessary to perfect the operation of the engine.

Figure 1 is an end elevation of my improved engine. Fig. 2 is a longitudinal sectional elevation of Fig. 1 on the line *x x*. Fig. 3 is an elevation of the condensing-chambers with the front plate and attachments removed. Fig. 4 is an inside view of a part of the front plate, showing also the floats for shifting the steam-valve.

Similar letters of reference indicate corresponding parts.

A represents a case, of any kind, containing two compartments or chambers, B C, for receiving water through the suction-pipes D E, having check-valves at F. The water is to be forced out of these chambers through a pipe, G, in each, into a water-tank, H, and thence through the nozzle I, to which the hose-pipe is to be attached in case the engine is employed for extinguishing fires. This water-tank, with the discharge water escaping through it, is considered to be very advantageous in simplifying the means of injecting the water for condensing the steam, and effecting the change from one condenser to another, which is accomplished by pressure of the steam when admitted to the filled chamber, as will presently appear. The steam for effecting the expulsion of the water enters one chamber at K and the other at K' from a steam-chest, L, having an ordinary reciprocating piston-valve, which is shown dotted in Fig. 1, and to which the steam is admitted from any source by a pipe, M, and the excess of

steam over the atmospheric pressure is exhausted through pipe N, which has a check-valve at O, which closes as soon as the said excess has escaped, and retains steam in the chambers equal to one atmosphere to be condensed to form the vacuum to be filled with water. The valve in steam-chest L is operated by steam taken from pipe M through the branch P to the four-way cock or valve Q, and thence to the chamber at each end, through pipes S T, being alternately admitted through one and cut off from the other, and vice versa, and exhausting from said chambers back again through the said pipes when the live steam is cut off, and escaping at the small holes U at the bottom of Q, shown dotted in Figs. 1 and 2. The opening and closing of these passages is effected by the oscillating plug or cock W, worked by the lever X, and this lever is thrown to the left by the double-cranked rod Y of float Z, and to the right by the similar rod *a* of float *b*, said rods working through stuffing-boxes in the case, and being suitably-shaped and arranged to act on the pin *d* of the lever X as soon as the chambers containing the float are filled, and the float raised to throw the lever to cut off the steam from the chamber being emptied, while the other is filling, and admit it to the filled one. For example, when the chamber C is being filled with water the lever will be in such position as to admit steam—say to the right of the piston-valve in chest L, and the said valve will be shifted to the left, so as to admit live steam to chamber B for forcing the water out, and to open the exhaust from C; the parts will remain in this position until the water rises in C sufficiently to cause float *b* to turn and throw the valve-lever X to the right; this will shut off steam from B and admit it to C, at the same time opening the exhaust from B and closing it from C, and when the water has been forced out of C, and B has become filled, the lever X will be shifted back to the place of beginning, or the position represented in the drawing. This lever X is weighted, so as to fall quickly, after it passes the vertical line, to insure the complete movement of the valve or cock. Water is admitted from the tank H to the condensing-chambers, for condensing the steam remaining after the exhaust, when the pressure of steam has fallen in said cylin-

ders to one atmosphere, or thereabout, through the small tubes *g*, which have a sprinkler, *h*, to distribute it at the entrance to said chambers; and said tubes have a valve, *i*, to admit the water, but prevent the escape of steam when the water falls below the tubes. These tubes are made small, so that they will not admit any considerable amount of water while the chambers are filling, as the valves in them are liable to be kept open by the constant pressure in tank H. The pipes G are extended to the bottoms of the chambers, which are depressed under them to prevent the escape of steam, and they have check-valves *l* to prevent the water from being forced back into them. The suction-pipes have sprinkling-extensions *m*, and they are introduced in an elevated part of the case to discharge into the partially-condensed steam and complete the condensation, the water entering from tank H being only intended to condense the steam enough to cause the water to be set in motion in the suction-pipes, which will then enter and condense the steam remaining. I place a weighted valve, *n*, in chamber *p*, through which the water escapes, to maintain at all times sufficient pressure, say three or four pounds, to eject water into the condenser.

In setting the engine in motion the tank H is filled by hand, and the lever X is also turned by hand until the air is expelled from the con-

densers and suction-pipes and they become filled, after which the engine will continue automatically. The steam passes, in this arrangement, by its own pressure through the exhaust-pipe, condenser-valve, and hot well, until the valve G' closes and the remaining steam is condensed in C', from which the water will be conducted by the next exhaust to the hot well, from which it may be pumped back into the boiler, and the air passing also into the hot well will escape through the exhaust B', which is unobstructed from the hot well.

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

1. The cold-water tank, arranged with the condensers for having the water forced through it, and provided with the weighted valve *p* in the escape-pipe and injecting-pipes *g*, with valves therein, all operating substantially as specified.

2. The arrangement, with the piston-valve and steam-chest L, of the valve O W, weighted lever X, floats, and the cranked rod thereof, all substantially as specified.

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Witnesses:

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