J. D. Warner.

Steam Water-Elevator.

No. 96,368. Patented Nov. 2, 1869.

Fig. 1.

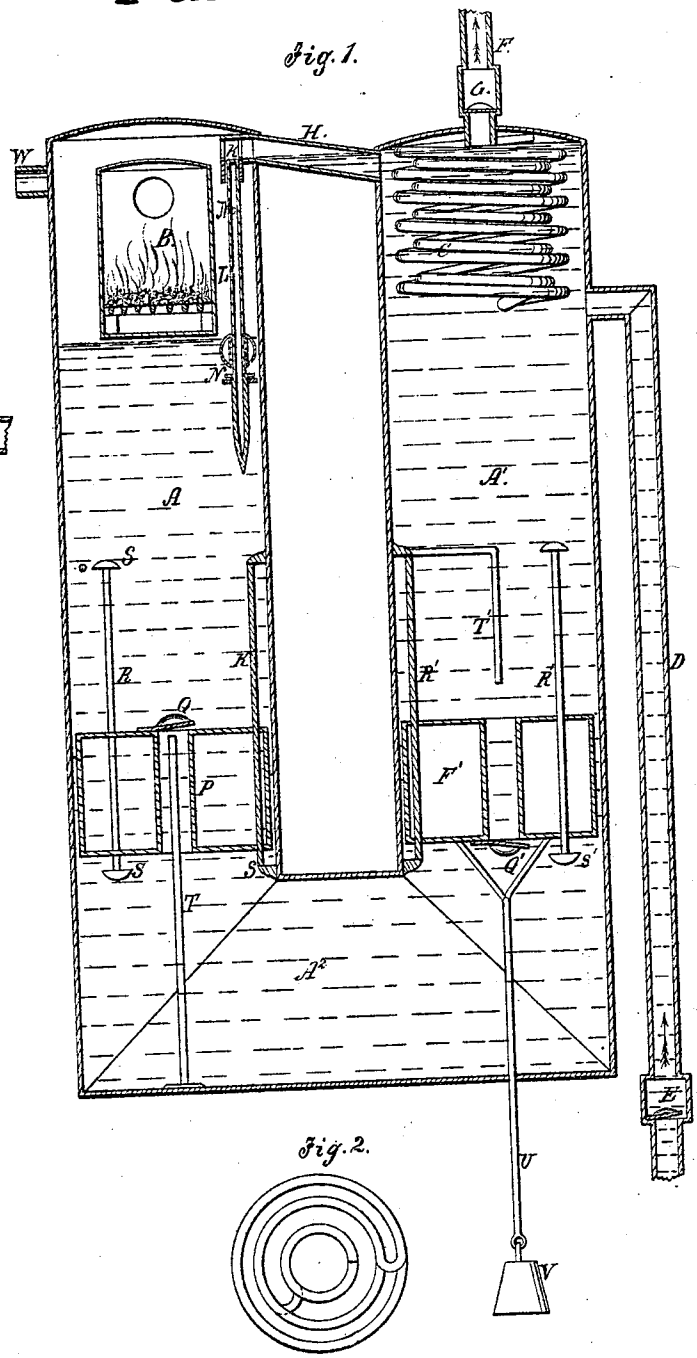

Fig. 3.

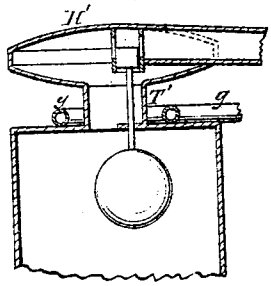

Fig. 2.

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JAMES D. WARNER, OF BROOKLYN, NEW YORK.

Letters Patent No. 96,368, *dated November* 2, 1869.

STEAM WATER-ELEVATOR.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, JAMES D. WARNER, of Brooklyn, in the county of Kings, and State of New York, have invented a new and useful Improvement in Water-Elevators; 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 drawings, forming part of this specification.

This invention relates to improvement in apparatus for elevating water, by the action of the vacuum formed by the condensation of the steam, for raising the water into a receiver, and by the direct pressure of the steam in forcing the water from the receiver through the discharge-pipes.

The invention comprises the arrangement, in a pair of vertical parallel tubes, connected at the bottom, and having a condenser, suction, and discharge-pipe connections, and a heater, of an improved automatic valve-arrangement, operated alternately by water and gravitation, for opening and closing the steam-passage from the top of one of the tubes, where the steam is generated, to the top of the other, where it is condensed and a vacuum formed.

The invention also comprises an arrangement of a piston, and certain adjuncts in each tube, to insure a prompt return of the water to the generator, and to prevent the advance, as much as possible, of the hot water in the condenser.

Figure 1 represents a sectional elevation of my improved apparatus, and

Figure 2 represents a detail view of the surface-condensing coil, and

Figure 3 represents a modified arrangement of heating-apparatus.

A and A^1 represent a pair of large vertical parallel tubes, of about the same height, united by a connection, A^2, at the bottom.

B is a furnace, arranged at the top of A.

C is a condensing-coil in the top of A^1.

D, a section of pipe, connected with A^1, and leading to the well. It is provided with a check-valve, E, opening upward.

F is a discharge-pipe, leading from the top of A^1, also provided with a check-valve, G, opening upward.

H is a steam-pipe, leading from the top of A to the top of A^1. It is provided in A with a valve, K, having a long stem, arranged to be floated by the water, projecting downward, and provided with stops, M N, and an empty bulb, O, sliding between the two stops.

When fire is applied to the furnace, the tubes A, A^1, and A^2, being previously filled with water, steam will be generated around the furnace, which, as it increases in volume, will force the water down in A, through A^1 and A^2, and out through the pipe F. During this time, the valve K, which was closed when the filling of the tube A took place, by the rising of the bulb against the stop M, will remain closed until the water falls so low in A that the weight of the bulb bears upon the stop N and opens the valve, and the steam having access to the top of A^1, the water therein will flow back into A, leaving the space around the condenser to be filled with steam, which, soon condensing, causes a vacuum, which will be filled through the suction-pipe D; the water rising in A forces the bulb against the stop M, again closing the valve K, by which the steam will be again accumulated in A, and the above-described operations will then be repeated as long as fire is kept in the furnace.

P represents a hollow piston in the pipe A, having a hole through it, to which is attached the valve Q, opening upward. R are guide-rods, whereon it works up and down. They have also stops S, to limit the movement of the piston.

T is a fixed rod, for insuring the opening of the valve when the piston arrives at or near the end of its downward movement.

P′ is a solid piston, similarly arranged in the tube A^1, with guide-rods R′ and stops S′, and having a valve, Q′, opening downward, also a rod, T′, for insuring the opening of the valve. This piston is also, if required, weighted by a rod, U, and weight V, the said rod passing down through the tube A^2 in a suitable stuffing-box.

The office of these pistons is to cause the immediate return of the water from the condensing-tube to the furnace; the one, P′, being heavy, will, by its weight, accelerate the movement of the valve, and the other being hollow, and consequently lighter than the water, will cause the water above it to rise. They will be carried back by the water, when it is forced into A^1. They are also intended to prevent a circulation of water, so that the heated water will not come into contact with the condenser.

I propose to dispense with the pistons, or use one or more with or without their adjuncts, or any part of them, as may be found necessary to the accomplishment of the object desired.

Instead of the employment of the heater at the top of A, for generating steam, the steam may be supplied from any other source through a pipe, W, or, dispensing with a fire-box, heat may be thrown against the tube A, or some enclosed space connected with A, as in fig. 3, where *g g* is a circular ring, perforated at the top, through which burning gas or fluid is projected against the hollow disk H, connected to the tube A by the tube T′.

Having thus described my invention,

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

The combination, with a heater and condenser, arranged substantially as described, of a cut-off valve, arranged to be operated by the action of water and gravity for opening and closing the passage from the generator to the condenser, substantially as specified.

Also, the combination, with the generator and condenser, of one or more pistons, to urge and regulate the return of the water to the generator, either with or without the valves, guides, and weight, or any of them, substantially as described.

Also, the combination of the generator, condenser, automatic valve-device, and pistons, either with their valve and weight V or not, substantially as specified.

The above specification of my invention signed by me, this 14th day of August, 1869.

JAS. D. WARNER.

Witnesses:

GEO. W. MABEE,

WM. F. CLARK.