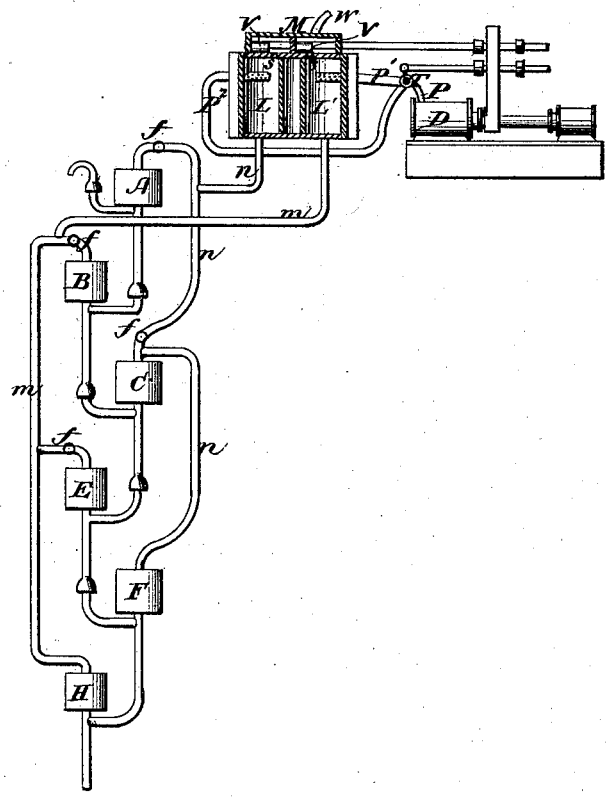
O. JACKSON.

Steam and Vacuum Pump.

No. 168,747.

Patented Oct. 11, 1875.

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# UNITED STATES PATENT OFFICE.

OSCEOLA JACKSON, OF PORTLAND, MAINE.

## IMPROVEMENT IN STEAM AND VACUUM PUMPS.

Specification forming part of Letters Patent No. **168,747**, dated October 11, 1875; application filed November 12, 1874.

*To all whom it may concern:*

Be it known that I, OSCEOLA JACKSON, of Portland, county of Cumberland and State of Maine, have invented a new and improved Method of Operating Pump; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which my invention is represented by a side elevation, showing the cylinder and steam-chest in section.

Similar letters of reference in the accompanying drawings denote the same parts.

This invention is an improvement in the mode of operating the pumps patented to Hatherly Spear, November 19, 1872; Smith and Jackson, July 21, 1874; and other pumps of analogous construction, in which a series of reservoirs, connected by tubes having valves opening upward, are employed in connection with a cylinder having a reciprocating piston, the said cylinder being connected at its heads with pipes opening into every alternate reservoir, so as to exhaust and compress the air alternately in each set of pipes and reservoirs, thus both lifting and forcing the water upward through the pump.

My invention consists in the combination of two steam-chambers distinct from each other, having a common dome or steam-box and ports and valves, with a donkey-pump having pipes, the perforated ends of which enter the steam-chambers, and pipes leading from the steam-chambers to a series of pump sections or reservoirs, for the purpose of giving the requisite movement to the columns of air in the pump sections or reservoirs by the application thereto of alternate steam-pressure and condensation, as will hereinafter more fully appear.

For the purpose of illustrating my invention I have shown a double steam-cylinder, having chambers L L′ distinct from each other, and having a common dome or steam-box, M. At *s s* are ports, connecting the chambers L L′ with the dome M, and covered by a sliding valve, V V, arranged to cover one port and leave the other open. The chamber L is connected by the pipe *n* with the alternate pump sections or reservoirs A C F, and the chamber L′ is connected by the pipe *m* with the remaining reservoirs B E H, the connection of the chambers L L′ with the reservoirs corresponding to that of the opposite ends of the cylinder with the reservoirs in the Spear patent above referred to.

D is a small donkey-pump, to which is attached by suitable mechanism the sliding valve V V in the dome M, so that when the pump works it shall with each stroke move the valve back and forth.

P represents the discharge-pipe of the donkey-pump, said pipe having branches $P^1$ $P^2$ which enter the chambers L L′, their ends within said chambers being perforated, as shown, so as to convert water passing through them into spray. The pipe P is provided with a cock, T, at its bifurcation, adapted to be operated by the donkey-pump piston so as to shut off the branches $P^1$ $P^2$ alternately, thereby causing the donkey-pump to discharge first into the chamber L and then into the chamber L′.

*f f* are adjustable cocks, gates, or ways, situated in the air-pipes *m n*, near their connections with the reservoirs, as shown, so that the amount of air may be regulated at these points, and thus the division of the air made equal as it passes to and from each reservoir.

By this means the less amount of the air, through the shorter portion of the air-pipes connecting with the rear reservoirs, can be increased and made equal to the greater amount through the longer portions connecting the remote reservoirs.

The pump sections or reservoirs being charged—that is to say, the sections H E B being filled with water while the sections F C A contain atmospheric air—steam is admitted to the dome M through the induction-pipe W, and passes into the chamber L′, the port *s* connecting this chamber with the dome being open. The steam drives the air in the chamber L′ through the pipe *m* upon the water in the sections or reservoirs H E B, and forces it upward into the sections F C A. The valve V V being now reversed, steam is admitted into the chamber L, forcing the air therein through the pipe *n* upon the water now contained in the sections F C A. At the same moment the cock T in the discharge-pipe of the donkey-pump is turned so as to inject a spray of water into the chamber L′, condens-

ing the steam therein and creating a vacuum, which causes the air in the sections H E B to expand into the chamber L′, thereby causing the sections H E B to be filled with water from below by atmospheric pressure. Reversing the operation at the next stroke, a spray is injected into the chamber L, condensing the steam therein and creating a vacuum, which causes the expansion of the air in the sections F C A, while steam introduced into the chamber L′ forces the expanded air therein through the pipe *m* into the sections H E B, expelling the water therein and forcing it upward into the exhausted chambers F C A.

The operation is thus continued, the alternate steam and atmospheric pressure keeping up a continuous upward flow of water through the pump.

Having thus described my invention, what I claim is—

The combination of the chambers L L′ having the dome M, ports *s s*, and valve V V with the donkey-pump D, pipes P $P^1$ $P^2$, having perforated ends, cock T, pipes *n m*, and pump sections or reservoirs A C F B E H, substantially as described, for the purpose specified.

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