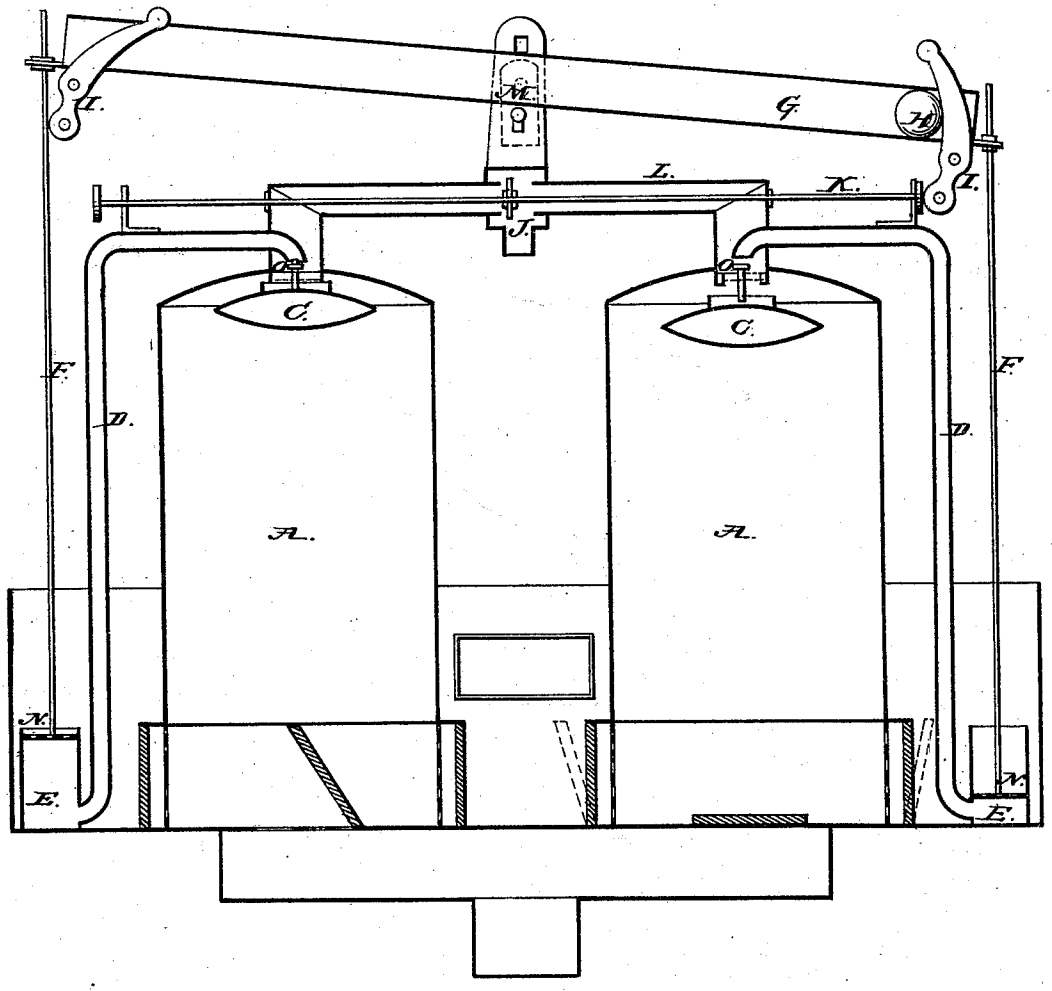
A. HUFFER.

STEAM VACUUM-PUMP.

No. 172,023. Patented Jan. 11, 1876.



Witnesses:

Wm. M. McDowell.

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UNITED STATES PATENT OFFICE.

ABRAHAM HUFFER, OF HAGERSTOWN, MARYLAND.

IMPROVEMENT IN STEAM VACUUM-PUMPS.

Specification forming part of Letters Patent No. **172,023**, dated January 11, 1876; application filed July 14, 1875.

To all whom it may concern:

Be it known that I, ABRAHAM HUFFER, of Hagerstown, in the county of Washington and State of Maryland, have invented certain new and useful Improvements in Automatic Steam Vacuum-Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

The object of my invention is to construct an automatic steam vacuum-pump that can be operated by steam direct from a steam-boiler, or the steam under low pressure from the exhaust of an engine or steam-heater, and without forming any back pressure to the engine or heater. In effecting this the operation of the steam-valve is most important, so as to be moved suddenly from one valve-seat to the other, and remain at intervals to allow one chamber time to fill with water while the other is receiving steam and discharging water, the movement of the steam-valve being independent of the current or force of steam, so as to form a free current of steam passing into chambers. This I accomplish by connecting with vacuum chamber or chambers a cylinder or cylinders, with a piston and rod connecting with an oscillating tube or hollow beam, with a ball or traveler, and small levers at each end, for the purpose of moving the steam-valve, as desired.

In the drawing, A and B are vacuum-chambers. C C are float-valves; D D, the pipes leading from chambers A and B to cylinders E E and pistons, with rods F F connecting with oscillating beam or tube G, with ball or traveler H and small levers I I; J, the steam-valve, with rod K extending to levers I I. L is the steam-pipe, connected with chambers A and B, which are also provided with suitable valves and pipes for receiving and discharging water.

When in operation the piston N is moved by vacuum in chambers A and B and rod F, drawing down the beam G, which rests in center, on bearing M, and forming an inclined plane, causing the traveler H to move from one end of the inclined plane to the other against the small lever I, and forcing back the lever, moving the rod with steam-valve J, cutting steam from chamber B, and turning it into chamber A, which then is receiving steam and discharging water, and at the same time cutting off steam from chamber B, which is partly condensed by water drawn through the cylinder E and piston N, which is perforated with small holes, and at the same time moving piston with rod K, drawing down the shaft or beam G, causing the traveler or ball to move and force back the steam-valve, cutting steam from chamber A, and turning it into chamber B. In this way the pump is kept in motion while steam is supplied. The float-valves C C close the steam and condensing pipes by the water rising in chambers, so as to prevent the momentum of water from moving the steam-valve J and piston N in cylinders E E. The rods F F are adjustable, so as to lengthen or shorten. When shortened, the inclined plane is greater, causing the traveler to move faster, increasing the motion of the steam-valve, and regulating the pump. The same can be accomplished by raising or lowering the inclined plane, as shown on bearing M.

The important feature in my invention is in moving the steam-valve and holding it at rest, so as to allow one chamber time to fill with water and the other to take steam and discharge water, and being operated by the vacuum in chambers A and B.

I claim as my invention—

1. In a vacuum-pump the combination of the valve J, oscillating beam G, and traveler H, substantially as set forth.

2. The combination of the traveler H and levers I I with rods K and steam-valve, substantially as and for the purposes set forth.

3. The cylinders E E and pistons N N, with chambers A, operating-rods F F, and oscillating beam or tube G, forming an inclined plane for moving the traveler H, substantially as and for the purposes set forth.

4. The above-described arrangement and combination of the float-valves C C, the steam-pipe L, the valve J, the vacuum-pipes D D, and pistons N N for the purpose of prevent-

ing the water from rushing into pipes L and D, and thus moving the valve J and the pistons N N, substantially as set forth.

5. In a vacuum-pump the combination of the valve J, traveler H, beam G, and the adjusting device M for raising and lowering the center of said beam to regulate the speed of the pump, substantially as set forth.

6. The combination of the cylinders E, pipes D, and the perforated piston N, the perforations in said piston serving to admit sufficient water to begin the condensation in the chambers A, substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 13th day of July, 1875.

ABRAHAM HUFFER.

Witnesses:

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