

W. WALKER.

APPARATUS FOR CONDENSING STEAM.

No. 180,973.

Patented Aug. 8, 1876.

Fig. 1.

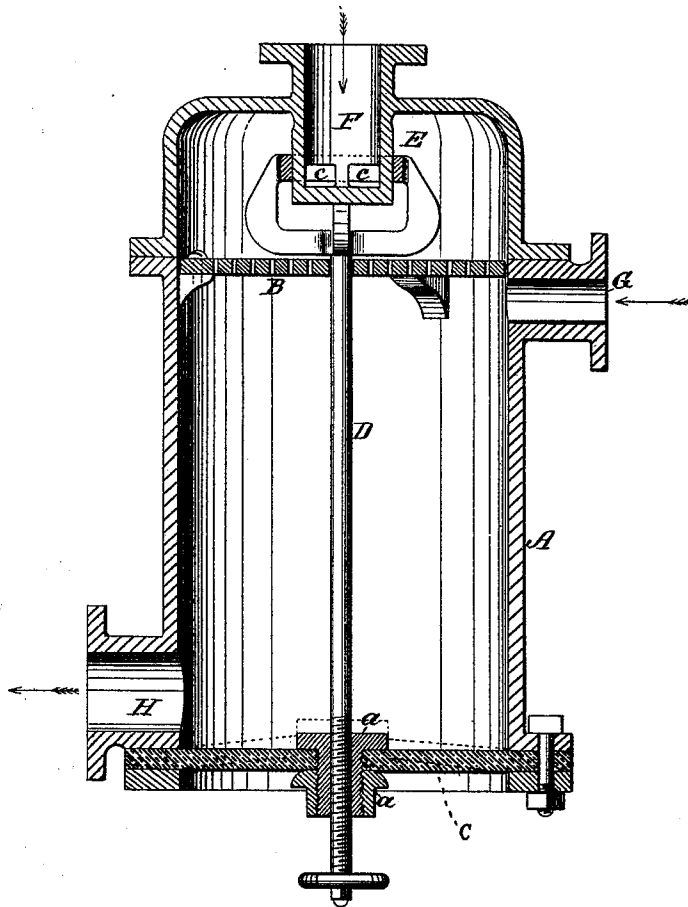
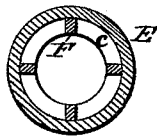


Fig. 2.



WITNESSES:

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INVENTOR:

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BY [Signature]

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UNITED STATES PATENT OFFICE.

WILLIAM WALKER, OF MANCHESTER, ENGLAND, ASSIGNOR OF ONE-HALF HIS RIGHT TO EDWARD AND ALFRED BETTS, OF WILMINGTON, DEL.

IMPROVEMENT IN APPARATUS FOR CONDENSING STEAM.

Specification forming part of Letters Patent No. **180,973**, dated August 8, 1876; application filed July 21, 1876.

To all whom it may concern:

Be it known that I, WILLIAM WALKER, of Manchester, in the county of Lancaster, England, have invented a new and Improved Apparatus for Condensing Steam; and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention relates to a certain method of condensing steam, and is mainly applicable to steam-pumps of the reciprocating or rotary type.

The general arrangement will be readily understood upon reference to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a sectional elevation of my improved apparatus, and Fig. 2 represents a cross-section of the steam-induction pipe and regulator-valve.

The circular vessel A is composed, by preference, of two pieces, a spray-plate, B, being fixed at the joint thereof, as shown. A flexible diaphragm, C, forms the bottom of said vessel, and is directly attached to the spindle D of regulator-valve E by means of lock-nuts *a*. The said regulator-valve is in the form of a hollow cylinder, and encircles a pipe or tube, F, which is pendent from the top of vessel A, and provided with side openings or issues *c*, as shown.

The pipe F leads to a well or other source of water-supply, while the branches or pipes G and H communicate, respectively, with the exhaust-pipe of the steam-cylinder, and with the suction-orifice of the water-cylinder or pump proper.

The pipe G opens into the side of vessel A just below the perforated stationary spray-plate B, and the tube H is attached near the bottom of said vessel.

The action of the apparatus is as follows: Supposing the engine is at work, water would be flowing from the well by suction; and passing along pipe F, and through openings *c*, and, again, through the spray-plate B, in a series of jets. The exhaust steam, entering by the branch G, would also discharge and mix with the said water passing through the spray-plate, whereby the former would be-

come condensed, and such condensed steam and water would be drawn off by the pump piston or plunger.

The object of the flexible diaphragm and regulator-valve, however, is to prevent the vessel A being completely filled with water when the pump is running at either high or slow speed, as the case may be, so as to insure a vacuum, into which the exhaust steam may discharge, thereby producing a condensing-engine.

The flexible diaphragm is operated upon—*i. e.*, elevated—by the pressure of the atmosphere on the outside of the vessel, and the vacuum or partial vacuum within the same.

It will be seen that if there were not such vacuum the diaphragm would tend to be flat or horizontal, and would thus hold the valve in such position as to prevent the water being supplied through the openings *c* in pipe F; but in consequence of the vacuum the diaphragm assumes a convex shape, thus holding the valve raised, and allowing a plentiful supply from the well.

No "flooding" of the vessel A can occur by the automatic action of the flexible diaphragm and regulator-valve combined, and yet by these means a steady vacuum may always be insured in the steam cylinder.

What I claim is—

1. In a steam-condensing apparatus, in combination with a pipe communicating with a water source or supply, a regulator-valve, and adapted to be operated by atmospheric pressure, and a flexible diaphragm connected with said valve, substantially as shown and described, to operate as specified.

2. In a steam-condensing apparatus, the vessel A, provided with a flexible diaphragm, the exhaust-steam induction-pipe G, and the water induction and eduction pipes F H, all arranged as shown and described, whereby the diaphragm is acted upon by the atmosphere without, and the vacuum within, said vessel, as set forth.

WILLIAM WALKER.

Witnesses:

WILLIAM BETTS,
EDWARD T. BETTS.