

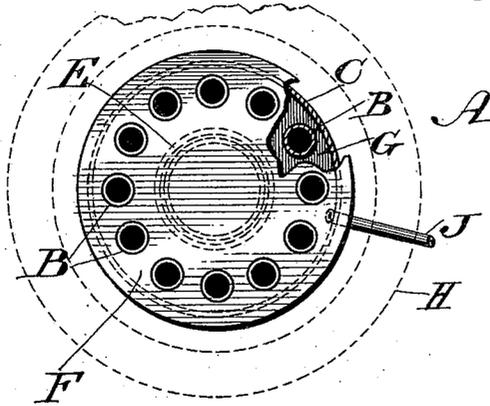
(No Model.)

W. WEBSTER.  
APPARATUS FOR CONDENSING STEAM.

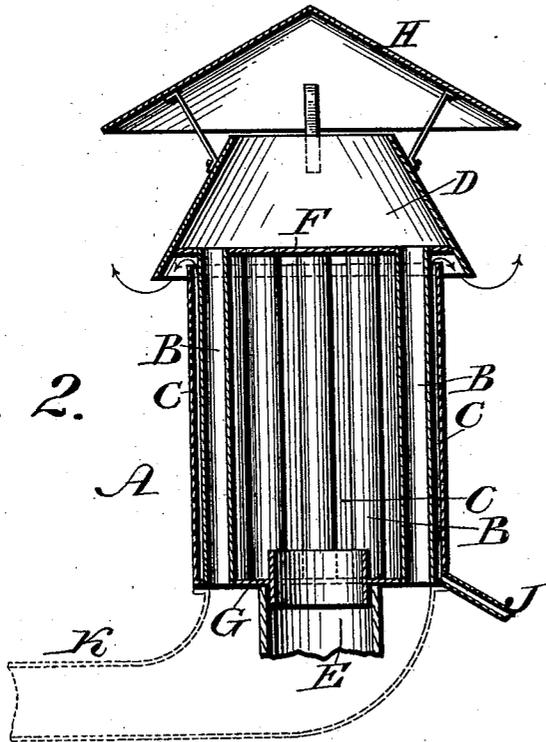
No. 525,931.

Patented Sept. 11, 1894.

*fig. 1.*



*fig. 2.*



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WARREN WEBSTER, OF MERCHANTVILLE, NEW JERSEY.

## APPARATUS FOR CONDENSING STEAM.

SPECIFICATION forming part of Letters Patent No. 525,931, dated September 11, 1894.

Application filed October 6, 1892. Serial No. 448,000. (No model.)

*To all whom it may concern:*

Be it known that I, WARREN WEBSTER, a citizen of the United States, residing at Merchantville, county of Camden, and State of New Jersey, have invented a new and useful Improvement in Apparatus for Condensing Steam, which improvement is fully set forth in the following specification and accompanying drawings.

My invention relates to an improvement in an apparatus for condensing steam, as hereinafter described and consists in adapting such apparatus to effect condensation by directing the steam against or around one or more pipes or other passages into which air is admitted, thus reducing the temperature of said pipes or passages by the action of such air.

Figure 1 represents a top or plan view of an apparatus for condensing steam embodying my invention, the draft producer being omitted from said figure. Fig. 2 represents a vertical section of the apparatus.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings: A designates an exhaust head formed of the tubes B, a surrounding shell or jacket C, a chamber D which is in communication with the air or passage tubes B at the top thereof, the steam-supply pipe E, which enters said jacket C, the latter being open at top and closed at bottom, excepting at the place of connection with the pipe E, and the discharge pipe J.

The tubes B are open at top and bottom, and connected with the sheets F and G respectively, the sheet F closing the bottom of the chamber D, while the top of the latter is left open.

Above the chamber D is supported a hood H, which forms a draft-producer, as will be hereinafter more fully described.

The operation is as follows:—Air enters the tubes B, and passes through the same, and steam is directed into the jacket C and circulates freely around said tubes, whereby owing to the reduced temperature of the latter, the steam will be condensed, and the water of condensation may be directed from the jacket by means of the spout or drip pipe J, to the place of collection or discharge. Should the natural current of air in the tubes B be

insufficient to effect the condensation, the hood H increases the draft of air in said tubes, the effect of which is evident. If a greater volume of air is desired or required, I may employ a mechanical device, such as a fan or blower, the same being connected with a pipe K, which as shown in dotted lines, is in communication with the tubes B, so as to force cold or fresh air into the latter, and thus increase the efficiency of the apparatus in proportion to the low temperature maintained in the air passages, it being noticed that the shell C is exposed to the atmosphere, whereby its temperature may be reduced, and it may also be subjected to a blast of cold air directed against the same so as to still further reduce its temperature.

Some of the steam in the jacket C may retain sufficient life to escape therefrom, this being permitted at the open top of said jacket, as indicated by the arrows in Fig. 2.

It is obvious that the pipes B may be placed in other than vertical positions if desired, and that other changes may be made within the scope of my invention, which may suggest themselves to those skilled in the art.

It will be noticed that the air passages or tubes B are of less diameter than the steam supply pipe E, thus causing effective condensation of the steam in the jacket C.

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

1. In an apparatus for condensing steam, a series of pipes, tube sheets therefor an air chamber in communication with the ends of said pipes, a shell having a space between one end thereof, and an adjacent tube sheet inclosing said pipes thereby forming a chamber, a steam inlet pipe leading into said chamber and a drain pipe leading therefrom, and a draft producer connected with said air chamber, said parts being combined substantially as described.

2. A steam condensing apparatus consisting of a series of pipes, tube sheets therefor a jacket surrounding said pipes forming a chamber having one end closed, a steam pipe leading into said chamber, and a drain pipe leading therefrom, an air chamber in communication with the open ends of said series of pipes, a hood forming a draft producer

connected with said air chamber, said jacket chamber having an outlet between its wall and the wall of the air chamber, said parts being combined substantially as described.

5 3. In a condenser, the pipes B, the upper and lower tube sheets therefor, the inclosing jacket C supported on the lower tube sheet and forming a chamber having its upper end open, the air chamber F and hood H suitably

supported above said tubes, a drain pipe, 10 means for admitting steam to said chamber, and means for creating a draft through said pipes, the above parts being combined substantially as described.

WARREN WEBSTER.

Witnesses:

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