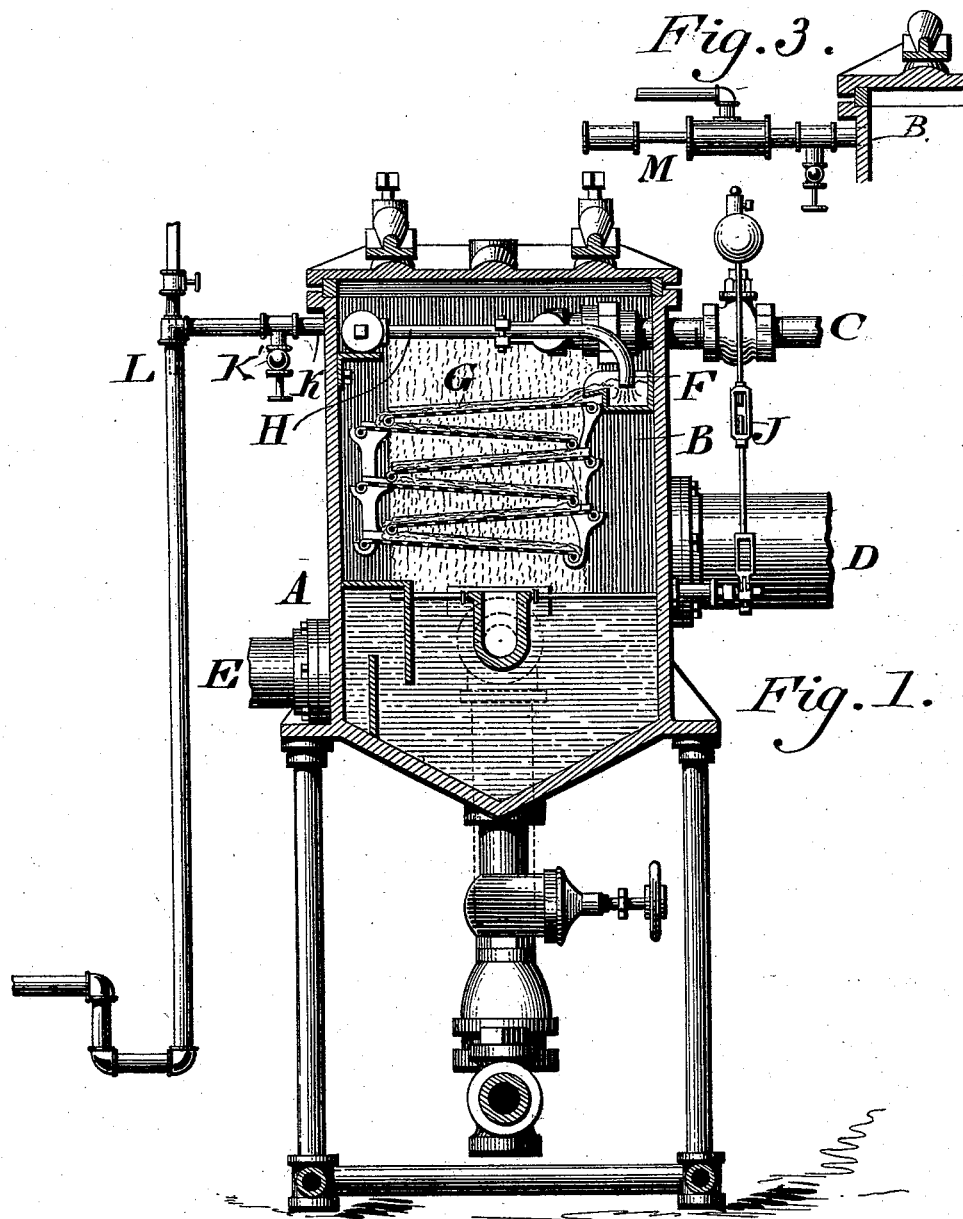


W. WEBSTER.
FEED WATER HEATER AND PURIFIER.

No. 524,152.

Patented Aug. 7, 1894.



WITNESSES:

O. F. Nagle.
L. Douville.

INVENTOR

Warren Webster.
BY *Wm. D. Johnson.*
ATTORNEY.

(No Model.)

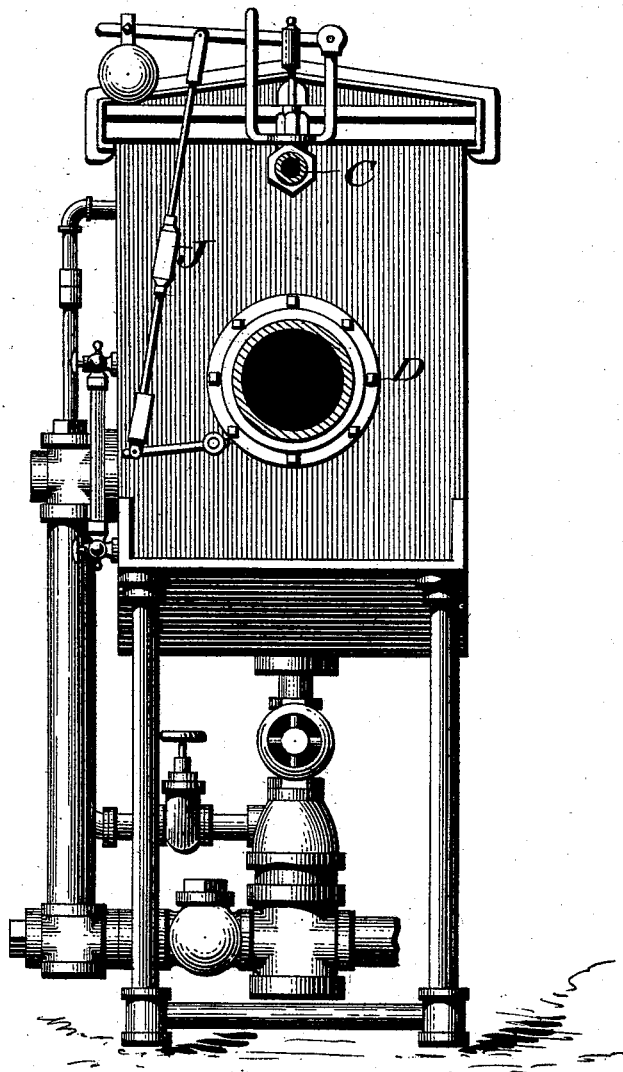
2 Sheets—Sheet 2.

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Fig. 2.



WITNESSES:

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L. Douville.

INVENTOR

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UNITED STATES PATENT OFFICE.

WARREN WEBSTER, OF MERCHANTVILLE, NEW JERSEY.

FEED-WATER HEATER AND PURIFIER.

SPECIFICATION forming part of Letters Patent No. 524,152, dated August 7, 1894.

Application filed August 15, 1892. Serial No. 443,124. (No model.)

To all whom it may concern:

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

I have found that in the class of feed water heaters and purifiers, at certain times when the supply of steam is limited and insufficient in volume to heat the inflowing water to the highest temperature, the air which is expelled from the water accumulates in the top of the heating and purifying chamber, and renders the device inoperative until said air is removed, thus requiring a pressure of steam to enter said chamber at intervals at a pressure in excess of that of the atmosphere, so as to expel the air through the overflow or relief pipe, and thus make room for the steam. In order to obviate the necessity of requiring steam to enter at a pressure in excess of that of the atmosphere, and to get rid of the air as rapidly as it is liberated from the water, together with being able to use steam at a pressure less than that of the atmosphere by maintaining a partial vacuum within the feed water heater, I employ a suitable suction creating or air withdrawing device, which is adapted to be positive in its action, and capable of being operated at will, independently of any other discharging pipe, said device connecting with a pipe communicating with the inside of the chamber above the water line, so as to obtain the amount of suction necessary to withdraw the air and maintain a partial vacuum within the heater if desired, thereby insuring the best results in heating feed water for steam boilers, and manufacturing purposes.

Figure 1 represents a partial side elevation and a partial vertical section of a feed water heater and purifier embodying my invention. Fig. 2 represents a side elevation at a right angle to Fig. 1. Fig. 3 represents a modification of the air exhausting device.

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

Referring to the drawings: A designates a

feed water heater and purifier consisting of the chamber B with the water supply C, the steam inlet D, the outboard water delivery pipe E, the spraying device F, the metal distributing plates G, the condensing tubes H and gravity regulator J.

Connected with the chamber B, and communicating with the interior thereof, is an air pipe K, having an automatic air inlet valve K'. To the said pipe is attached a suction exhaust or vacuum - creating device, which latter is of the form of air injector as at L in Fig. 1, or a pump as at M in Fig 3, the result being similar in either case, in that the air is withdrawn from the chamber B and the heater and purifier is thereby adapted to work effectively as hereinbefore stated.

In a prior patent granted to me May 31, 1892, No. 475,992, I have therein shown and claimed the combination of a portion of a compound engine with a feed water heater, said heater and its connections to the engine being provided with valves of a peculiar construction. In another patent granted to me October 2, 1888, No. 390,538, I show and claim a feed water heater having suitable inlets and outlets for water and steam, but no separate and independent suction creating device is provided distinct from any other discharging pipe, whereby the air within the heater can be positively and independently withdrawn, and a partial vacuum maintained therein whenever desired. This latter feature comprises the subject matter of the present application, and to the constructions disclosed and claimed in my prior patents I herein make no claim.

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

1. A feed water heater and purifier constructed substantially as described, having an air pipe communicating with the interior thereof, and an air exhaust device separate and independent of any other discharge pipe attached to said air pipe as set forth for the purpose stated.

2. In a feed water heater and purifier, means for directing water thereinto in the form of spray, in combination with an air inlet pipe, said device being separate and independent

of any other discharge pipe communicating with the interior of said heater and purifier, and an air exhaust device attached to said pipe, substantially as stated.

- 5 3. A feed water heater having a vacuum chamber, a steam inlet pipe, a water inlet pipe, and a pipe in communication with said vacuum chamber having an air inlet valve, and

an air exhaust device connected therewith, said exhaust device being separate and independent of any other discharge pipe said parts being combined substantially as described.

WARREN WEBSTER.

Witnesses:

JOHN A. WIEDERSHEIM,
A. P. JENNINGS.