

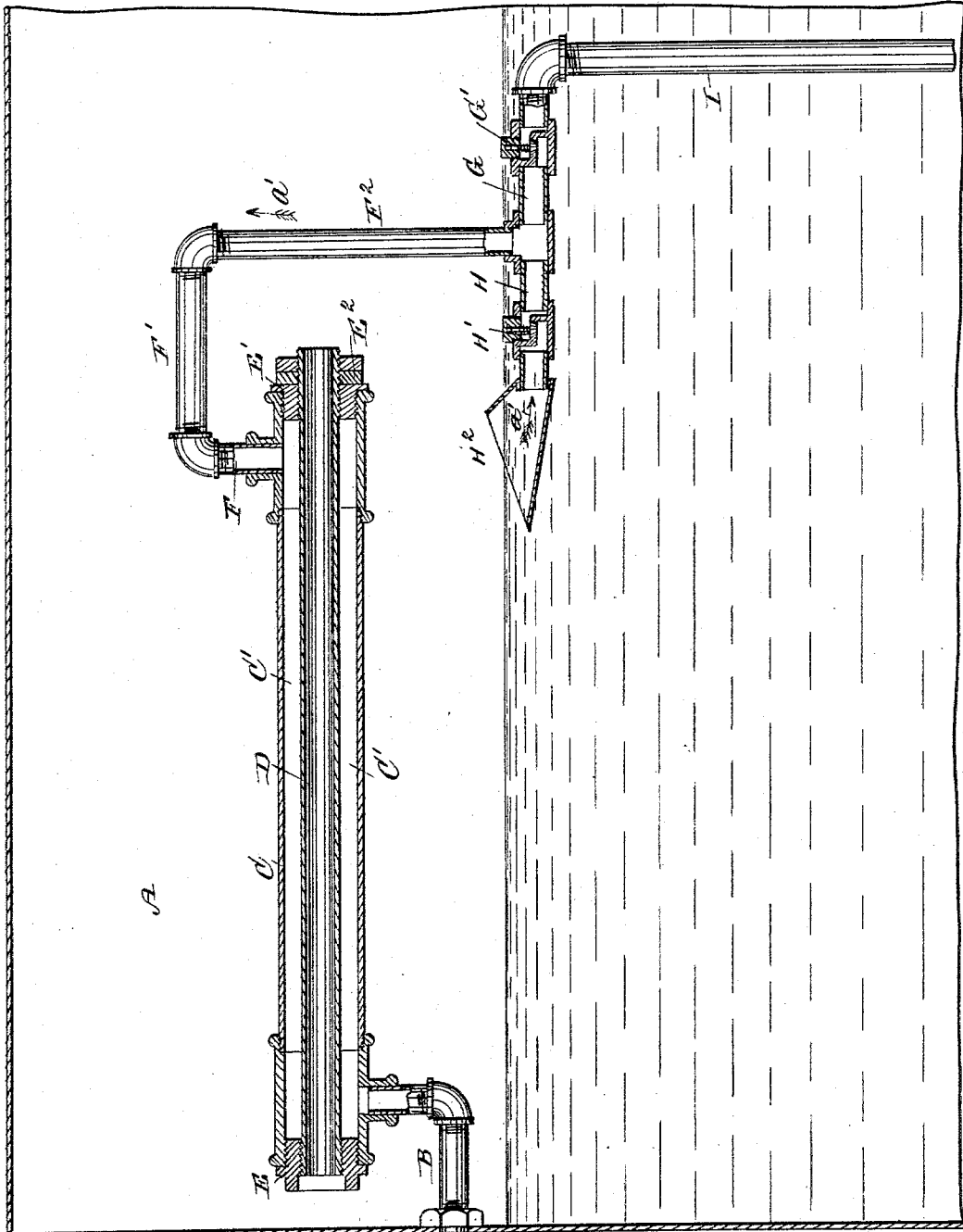
(No Model.)

D. D. WASS.

FEED WATER HEATER AND PURIFIER.

No. 323,611.

Patented Aug. 4, 1885.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

DYSON D. WASS, OF SAN FRANCISCO, CALIFORNIA.

## FEED-WATER HEATER AND PURIFIER.

SPECIFICATION forming part of Letters Patent No. 323,611, dated August 4, 1885.

Application filed May 12, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, DYSON D. WASS, of San Francisco, in the county of San Francisco and State of California, have invented a new and Improved Feed-Water Heater and Purifier, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved feed-water heater and purifier for steam-boilers, so constructed as to deliver all sediment or other impurities at any desired part of the boiler, and to scour and clean the feed-water heater by the water contained in the boiler.

The invention consists of a feed-water heater suspended in the boiler above the water-level, of a feed-pipe dividing into two branches, each provided with a check-valve, of an extension of the feed-pipe attached to one of the said branches, and of a blow-off pipe and valve.

The invention also consists of various parts and details hereinafter more fully set forth and described.

Reference is to be had to the accompanying drawing, forming part of this specification, in which the figure represented is a vertical section of part of a steam-boiler, showing my improved feed-water heater and purifier attached to the same.

The feed-pipe B enters the boiler A a short distance above the water-level, and extends upward and is attached to the under side of the tube or feed-water heater C near one end. Through the center of the feed-water heater C passes a pipe, D, open at each end and screwed in the bushings E and E', which are screwed in each end of the feed-water heater C. The pipe D is further secured to the bushing E' by the lock-nuts E<sup>2</sup>. The pipe D is less in diameter than the feed-water heater C, thereby forming the annular space C'. A pipe, F, secured to the top of the feed-water heater C near its innermost end, leads from the annular space C' upward and bends at right angles to form the horizontal pipe F', which again bends at right angles to form the vertical pipe F<sup>2</sup>, which reaches a short distance below the water-level and divides into the two horizontal branch pipes G and H. To the outer end of the branch pipe G is secured the vertical pipe I, which leads downward and opens near the

mud-drum of the boiler, or is continued to any part of the boiler, if desired. The pipe G is provided with a check-valve, G'. The branch pipe H is provided with a check-valve, H', and on its end is attached a skimming-box, H<sup>2</sup>. The feed-pipe B, before it enters the boiler A, is provided with the blow-off pipe J, having a valve, J'.

The operation is as follows: The feed-pipe B, having connection with the usual pump and source of supply for the boiler A, forces the water to the annular space C' in the feed-water heater C, where it is acted upon by the steam surrounding the feed-water heater C, and by the steam in the pipe D, thereby heating the feed-water, and separating the solid matter contained in the feed-water and carried with the same in a non-soluble state through the pipes F, F', and F<sup>2</sup> to the branch pipe G, and, opening check-valve G', passes down the vertical pipe I and discharges in the water of the boiler near the mud-drum, or at any other place, as desired, where the solid matter is precipitated and can be removed in any suitable manner. Any particles of the solid matter contained in the feed-water forming on the inner surface of the feed-water heater C and the pipes F, F', and F<sup>2</sup>, and all impurities or other matter collecting on the surface of the water in the boiler A, can be expelled therefrom by opening the valve J' on the blow-off pipe J, whereby the steam-pressure in the boiler A forces the water to open the check-valve H' in the branch pipe H, and closes the check-valve G' in the branch pipe G, and returns in the direction of the arrow a' through the pipes F<sup>2</sup>, F', and F into the annular space C' of the feed-water heater C, and passes out of the same by pipe B to the blow-off pipe J, carrying with it all scale and other impurities encountered on this return movement under the high pressure in the boiler A. The skimming-box H<sup>2</sup> collects the impurities on the surface of the water in the boiler, and facilitates the discharge of the same when the valve J' on the blow-off pipe J is opened.

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

1. A feed-water heater suspended in the

- steam part of the boiler and provided with a longitudinal tube open at each end and secured at each end of the feed-water heater by suitable means, the said tube forming in the interior of the feed-water heater an annular space, which has no direct connection with the steam part of the boiler, and the said feed-water heater being provided with inlet and outlet feed-pipes, substantially as shown and described.
2. In a feed-water heater and purifier, the feed-water heater C, provided with the inlet and outlet feed-pipes B and F, in combination with the tube D and bushings E and E', substantially as shown and described.
3. In a feed-water heater and purifier, the feed-pipe B, the feed-water heater C, the tube D, and bushings E and E', in combination with the pipes F, F', F<sup>2</sup>, and G, the check-valve G', and the pipe I, substantially as shown and described.
4. In a feed-water heater and purifier, the feed-water heater C, the tube D, the bushings E and E', and the pipes B F F', in combination with the branch pipe H, the check-valve H', the blow-off pipe J, and the valve J', substantially as shown and described.
5. In a feed-water heater and purifier, the feed-water heater C, the tube D, the bushings E and E', and the feed-pipes B, F, F', and F<sup>2</sup>, in combination with the branch pipe H, the check-valve H', the skimming-box H<sup>2</sup>, the blow-off pipe J, and valve J', substantially as shown and described.
6. In a feed-water heater and purifier, the feed-water heater C, the tube D, the bushings E and E', and the feed-pipes B, F, F', and F<sup>2</sup>, in combination with the branch pipe G, the check-valve G', the pipe I, the branch pipe H, the check-valve H', the blow-off pipe J, and valve J', substantially as shown and described.

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Witnesses:

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CHAS. D. WHEAT.