

(No Model.)

B. EYNON.
FEED WATER HEATER.

No. 521,708.

Patented June 19, 1894.

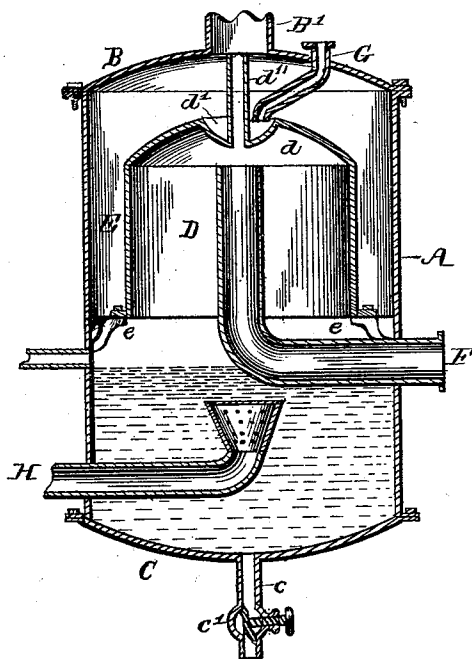


Fig. 1

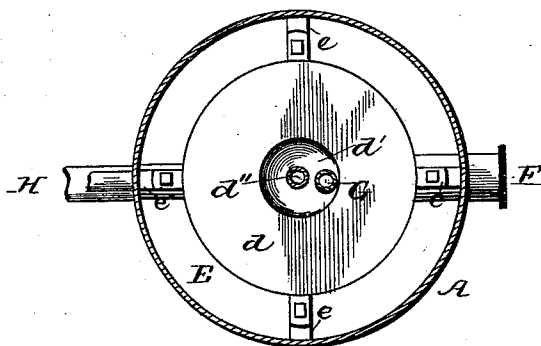


Fig. 2

Witnesses
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UNITED STATES PATENT OFFICE.

BENJAMIN EYNON, OF PITTSBURG, PENNSYLVANIA.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 521,708, dated June 19, 1894.

Application filed March 20, 1894. Serial No. 504,446. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN EYNON, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Feed-Water Heaters; 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 appertains to make and use the same.

My invention has relation to feed water heaters and has for its object the provision of a feed water heater of novel form and construction in which the water is adapted to be heated solely by the exhaust steam from an engine.

My present invention is an improvement on the feed water heater patented to me April 3, 1877, No. 189,206, and is designed to obviate certain defects in the apparatus constructed according to said patent. I have found that in the said patented apparatus the steam which passes up between the vertical walls of the dome and the walls of the heater is liable at times, owing to increased working of the engine, to carry upwardly and out through the exit pipe at the top of the heater a portion of the water falling down from the top of the dome, thereby wasting the partially heated water and also wasting a considerable proportion of the oil which enters the heater with the exhaust steam and which it is advantageous to have conveyed into the boiler with the heated feed water.

In carrying my present invention into effect I provide a relief pipe which passes up through the dome, above the steam inlet pipe and toward the exit pipe at the top of the heater and serves to relieve the steam pressure when from any reason it exceeds the normal limit requisite for proper heating of the feed water.

Referring to the accompanying drawings, Figure 1, is a vertical central sectional view of my improved feed water heater, and Fig. 2, a horizontal sectional view of the same.

A, designates the exterior wall or casing of the heater, which is of cylindrical shape; B, the top and C, the bottom of the same, both the top and bottom being concavo-convex, the top to facilitate the escape of steam and

the bottom to insure the settlement of the sediment near the center, at which point there is a pipe *c*, with a blow-off cock *c'* by means of which the sediment in the heater may be removed from time to time as required.

Within the casing A, is arranged a dome D, the side walls of which are of cylindrical shape and which has a concavo-convex top *d*, that is dished or depressed at the center forming a cup *d'* that serves to receive the water when it first enters the heater and distribute it equally over the surface of the top of the dome. The dome D, is supported on lugs *e*, *e*, and is arranged concentrically with the outer wall A, of the heater, leaving a space E, through which the steam ascends, meeting the feed water which percolates downwardly from the top of the dome. The exhaust steam from the engine enters the heater through pipe F, that passes through the side of the heater below the lower edge of the dome D, and is bent upwardly at the center of the heater and terminates a short distance below the top of the dome. An exit pipe B' at the top of the heater leads the steam from the heater and an inlet pipe G, brings the feed water into the same through the top B, and said pipe G, is bent so as to deliver the water directly into the cup *d'* from whence it flows over the top of the dome and down the sides of the same. In the center of the cup *d'* a relief pipe *d''* is arranged and extends upwardly toward the exit pipe B', and serves to conduct a portion of the steam entering the heater through the pipe F, directly to the exit pipe B'. The pipe *d''* is of comparatively small diameter and its purpose is only to prevent an excess of steam from passing up the space E between the dome and heater at times when, owing to an abnormally rapid working of the engine, an excess of steam is delivered to the heater over that required for heating the feed water. Under such abnormal circumstances if no relief pipe were provided, the steam would escape through the space E, with such force that it would carry up with it and out through the exit pipe B' a very considerable proportion of the already heated feed water. The exhaust steam coming from the engine carries with it small quantities of oil and this oil is taken up by

the feed water and conveyed back into the boiler and is of some advantage in preventing the formation of scale, but where a portion of the feed water is forced out of the heater by a sudden abnormal influx of steam, a large proportion of the oil is carried off with the water and lost. A feed pipe H, having a suitable strainer head, is arranged at the center of the heater below the water line and serves to conduct the feed water to the engine.

The operation of the heater is as follows: The steam entering by pipe F, strikes the under side of the top of the dome and a portion escapes through the relief pipe d' , but the major portion of the steam passes under the lower edge of the dome and ascends through the space E, and escapes through the exit pipe B'. The feed water entering the heater by pipe G is first deposited in the cup d and escaping over the edge of the same is distributed evenly over the top of the dome and descends in a thin sheet through the

space E, where it meets the steam passing upwardly and is thoroughly heated. Any excess of steam over that required for the heating of the water escapes through the relief pipe d' , and hence there is no waste of water and the heater works effectually and economically under all conditions.

Having described my invention, I claim—

In a feed water heater, the combination with the casing A, the exit pipe B', the steam inlet pipe F, and the water inlet pipe G, of the dome D, having the concavo-convex top with the cup d at the center of the same, and the relief pipe d'' of less diameter than said pipe F and arranged to convey steam from within the dome to below said exit pipe, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

BENJAMIN EYNON.

Witnesses:

WM. E. PRICE,
JACOB J. WILLIAMS.