W. J. AUSTIN.

FEED-WATER HEATER FOR STEAM-BOILERS.

No. 169,332. Patented Nov. 2, 1875.

Fig. 1.

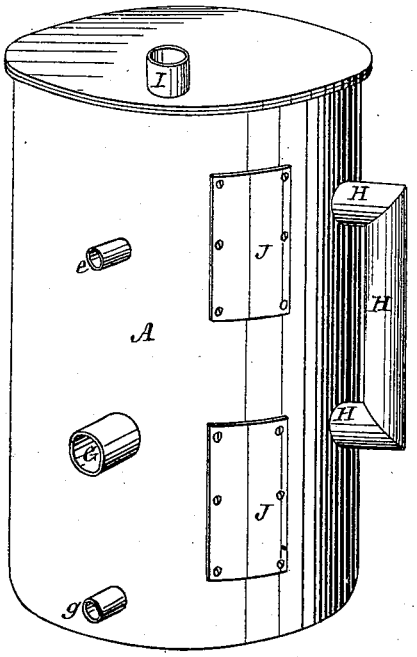
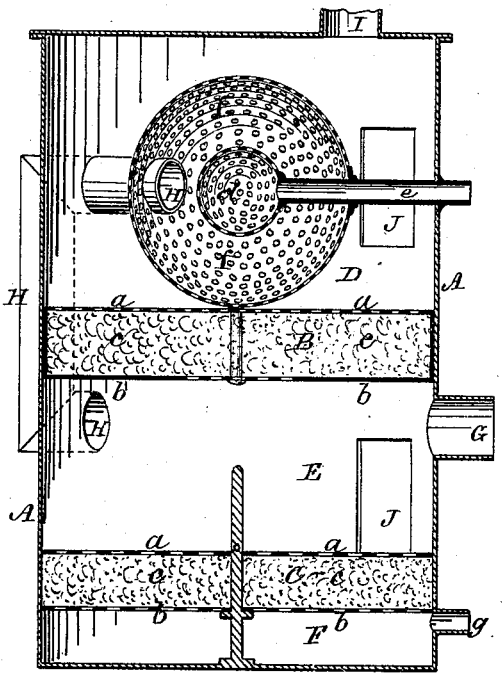


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

WILLIAM J. AUSTIN, OF HORTONSVILLE, WISCONSIN.

IMPROVEMENT IN FEED-WATER HEATERS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **169,332**, dated November 2, 1875; application filed December 7, 1874.

To all whom it may concern:

Be it known that I, WILLIAM J. AUSTIN, of Hortonsville, in the county of Outagamie and State of Wisconsin, have invented certain new and useful Improvements in Condensing, Feed-Water Heating, and Filtering Apparatus for Steam-Boilers; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 represents an exterior view of the apparatus, and Fig. 2 represents a vertical section through the same.

My invention relates to an apparatus to be used in connection with steam-boilers, in which exhaust or other steam is admitted and condensed, so as to impart its latent heat to water in spray or jets, which water is filtered, and then, in its heated condition, used for supplying the boiler with feed-water.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

The cylinder A, made of sheet or boiler iron, is divided in its interior by two diaphragms, B C, so as to make three sections or chambers, D E F—viz., an upper, middle, and lower section. The diaphragms B C are composed of an upper and under perforated head, *a* and *b*, with a packing of hay, shavings, or other not very compact material, *c*, between them, so as to make a filtering medium therein. In the upper section or chamber D there is a hollow perforated head, *d*, into which water from any source is brought through a pipe, *e*, and outside and around this head *d* there is another and larger perforated head, *f*. The object of these perforated heads is to spray or throw the water entering through the pipe *e* into fine jets. Escape-steam from the engine or boiler is taken into the middle section or chamber E through a pipe, G, and from this middle section or chamber a pipe, H, extends outward, upward, and then into the upper section D, and terminates in the space between the two perforated heads *d* and *f*, so as to convey steam from the section E and escape it in contact with the spray or jets of water passing through the inner head *d*. Any portion of the steam not condensed by the spray or jets of water will pass through the perforations in the outer head *f*, and out of the cylinder through the pipe I in the upper cylinder-head. Portions of the steam, also, from the section E will pass up through the packing of the diaphragm B, and what remains in the section is condensed, taken up, or imparts its heat to the water that drips through the diaphragm B, and drops through said section or chamber E onto the second diaphragm C, and, passing through this diaphragm, the water falls into the lower section or chamber F, whence it may be taken in its heated condition, by any of the usual well-known ways, to the boiler, through the pipe *g*. By passing the heated water through the diaphragms, and the packing therein, it (the water) gives up any mineral or crude matter contained in it, and passes to the boiler in a pure, filtered condition. When the packing becomes filled with the deposit from the water, and requires removal and renewal, man-holes J, in the jacket of the cylinder A, are opened, and access easily had to the diaphragms, so as to cleam them or renew their filtering substances. And while I prefer two diaphragms, as shown, more may be used, and a single one, as at B, accomplishes a very good result without the under one.

Having thus fully described my invention, what I claim is—

The combination of the cylinder A, filtering-diaphragms B C, with steam space or chamber E between them, steam-inlet G, and steam-conveying pipe H, leading from said chamber to the water and steam distributing heads *e f*, one within the other, so that the partially-heated feed-water from the heads, after passing through the first diaphragm B, shall drip through a volume of more highly-heated steam in the chamber E, all as and for the purpose described and represented.

WILLIAM J. AUSTIN.

Witnesses:

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