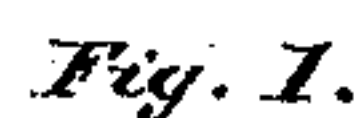


Patented May 17. 1870.



H. E. Shaw
by Dodge & Munn
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UNITED STATES PATENT OFFICE.

DAVID E. SHAW, OF CHATSWORTH, ILLINOIS.

FEED-WATER HEATER AND FILTER.

Specification forming part of Letters Patent No. 103,243, dated May 17, 1870.

To all whom it may concern:

Be it known that I, DAVID E. SHAW, of Chatsworth, in the county of Livingston and State of Illinois, have invented certain Improvements in Feed-Water Heaters and Filters, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to feed-water heaters and filters for steam-boilers; and consists in the novel construction and arrangement, within a metallic box, of one or more series of metallic pendent rods, and the arrangement on the upper surface of an inclined partition, and the bottom of the box of a serpentine course or trough, by means of ledges in connection with a water-space and filterer, all so constructed and arranged that the water may be heated and filtered, as hereinafter explained.

In the drawings, Figure 1 is a longitudinal vertical section of my device, and Fig. 2 is a top-plan view of a part removed.

As is well known, most of the water used for boilers contains more or less earthy matters, which, being deposited on the surface of the boiler, form a scale that seriously interferes with its safety and efficiency.

The object of my invention is to feed the boiler with water free from these earthy substances and in a heated state.

I make a rectilinear metallic box, A, with a water-space, M, on its under side, and provide it with a cover, N, arranged to be fastened with screw-bolts and nuts *a*, and also with a removable inclined partition, B, all arranged as clearly shown in Fig. 1. On the upper side of this partition, as well as upon the bottom of the box, are placed or arranged ledges O, extending from each side alternately nearly across the same, so as to form a serpentine trough or passage from one end to the other, as clearly shown in Fig. 2.

From the cover N, or from a plate immediately under the cover, are suspended a number of metallic rods, C, in any convenient manner, as clearly shown in Fig. 1, and from the partition B a like number of pendants, D, as shown in the same figure. The arrangement of these pendants is shown in Fig. 2. Those connected to the cover C or plate under it may be rigidly attached; but the pend-

ants D should be provided with heads and be dropped through holes P, so as to be suspended by their heads, and so as to leave a small opening about the necks of the pendants.

The water-space M is partly divided by a partition, *b*, extending from its upper to nearly its lower or bottom side, into two compartments, *c* and *d*. In the compartment *d* is placed a wool filter, K, made by compressing wool between wire grating J, as clearly shown in Fig. 1. Access may at any time be had to the wool in the filter by means of a door, L, in the side of the compartment, as shown in dotted lines in the same figure.

To the upper side of the box A are attached, near one end, the feed-water pipe E, and near the opposite end an exhaust-pipe, G.

In the end of the box, opposite the pendants D, is connected the exhaust-pipe H from the engine, and in the end of the compartment *d* of the space M, and above the filter, is a hot-water-supply pipe, I, connected with the force-pump of the engine. Immediately under the feed-water pipe B is placed an inclined water-shelf, F, for a purpose hereinafter described.

In operating my device I introduce the exhaust-steam through the pipe H and the feed-water through the pipe E. As the water strikes the shelf F it is thrown toward the pendants C and is carried forward in the same direction by the current of heated steam passing in the same direction, as shown by the arrow at the end of the partition B.

The steam, it will be noticed, first strikes and passes through the pendants D, then onto the opposite end of the box and around the end of the partition B, on through the pendants C, and out through the exhaust-pipe G. By this means the whole interior of the box becomes heated.

The water, after it runs from the shelf F and against the pendants C, will run down the same to the partition B, and then along the serpentine course made by the ledges O, and in the direction shown by the arrows in Fig. 2, until it reaches the perforated portion of the partition from which the rods D are suspended; then a portion of it will pass through these perforations and run down the rods. The rest will pass onto and through an opening for the purpose in the end of the partition,

when it will be met by the blast of hot steam from the engine, as shown in Fig. 1, and be thrown forward among the pendants D, down which it will run onto the bottom of the box, and then along the serpentine passage formed by the ledges thereon to the compartment *c* of the water-space M, then on under the partition *b* into the compartment *d*, and up through the wool filter and out through the pipe I to the force-pump, heated, and for the most part free from all calcareous or earthy matters calculated to form a deposit and scale on the interior surface of the boiler.

By this arrangement of devices it will be seen that the water is heated by the exhaust-steam from the engine, and, in its course through the heater, is made to pass slowly over a large heated surface, and a good portion of it to trickle down a double series of pendants, during which process it will not fail to deposit most of the calcareous or other earthy or foreign matters that go to form the deposits and scale in boilers, and, besides, after it has passed through the heater it is then further filtered by being passed through the wool filter, so that in the end it is about entirely free from earthy matters, and can be used without any injury to the boiler.

Having thus described my invention, what I claim is—

1. A feed-water heater and filter consisting of the metallic box A, provided with the water-shelf F, partition B, metallic pendent rods C and D, and filter K, all constructed and arranged for operation substantially as herein described.

2. In a feed-water heater and filter, so constructing and arranging metallic pendent rods as to allow the water to trickle and run down them in its passage through the heater, in the manner substantially as herein described, and for the purpose set forth.

3. In a feed-water heater and filter, so constructing and arranging upon the upper side of its bottom, as well as upon that of any partition above it, alternate transverse ledges as to form a serpentine course for the water in its passage through the heater, substantially as and for the purpose set forth.

4. In combination with a feed-water heater constructed as herein described, the water-space M, with a partition, *b*, and filter K, constructed and arranged therein, substantially as and for the purpose set forth.

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Witnesses:

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