

(No Model.)

G. MILES.
FEED WATER HEATER.

No. 267,797.

Patented Nov. 21, 1882.

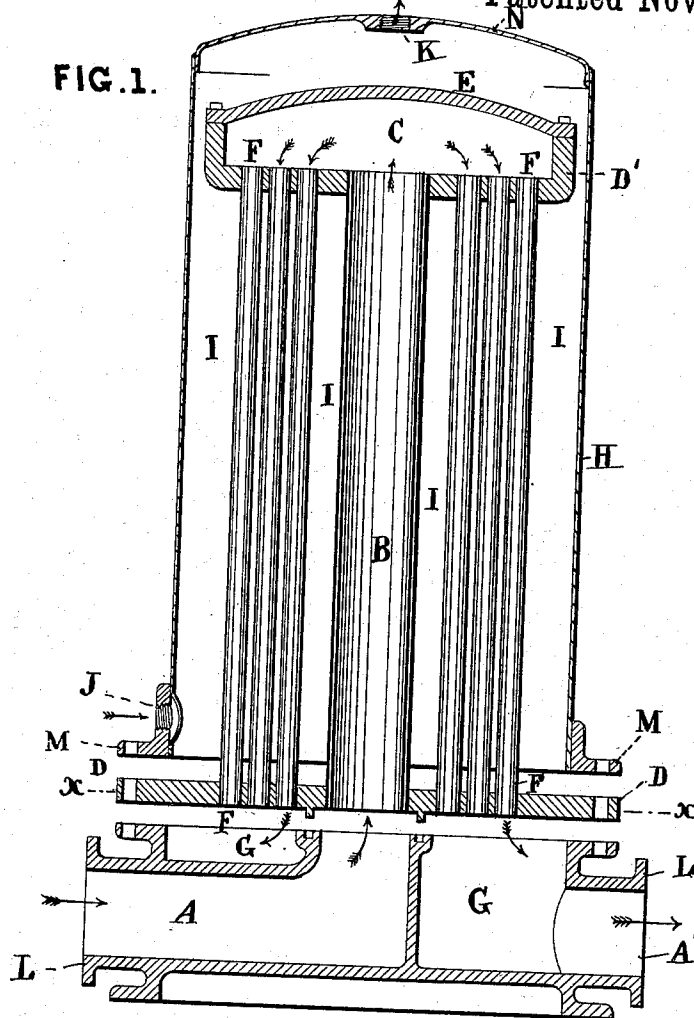
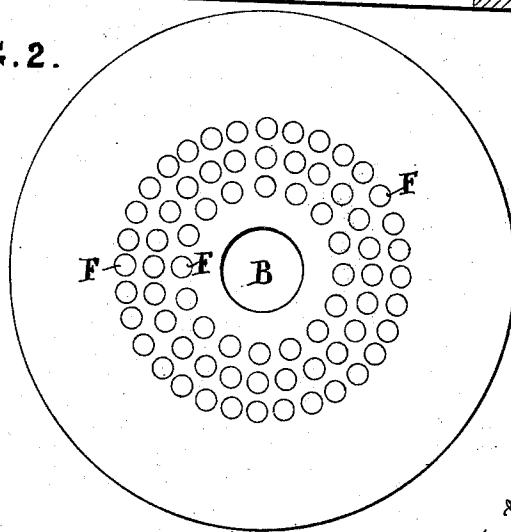


FIG. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

GEORGE MILES, OF WELLESLEY HILLS, MASSACHUSETTS.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 267,797, dated November 21, 1882.

Application filed March 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE MILES, of Wellesley Hills, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Feed-Water Heaters, of which the following is a specification.

My invention relates to an improved means for heating feed-water or other fluids by exhaust-steam.

My invention consists of an apparatus composed of a large central pipe to which exhaust-steam is conducted from an engine, and a series of smaller pipes arranged within a water-chamber, and connected at their lower ends with a tube-sheet, and at their upper ends to the tube-sheet of a chamber which is independent of any other connection, so that as the tubes expand or contract longitudinally the said tube-sheet and chamber will rise or fall with such expansion and contraction without loosening or endangering the tube-connections.

In the accompanying drawings, Figure 1 is a vertical section of an apparatus embodying my invention, and Fig. 2 is a horizontal section of the same on the line *xx* of Fig. 1.

A is the inlet for the exhaust-steam, and is connected by a suitable pipe with the engine.

G G represent a space, into which the steam descending through the small tubes F enters and passes out at the outlet A'. The inlet pipe or space A and the space G G' are formed in a base, L L, all being cast in one piece.

D is the lower tube-sheet, in which are secured the lower ends of the tubes F F, and is designed to be bolted to the base L. It is shown in the drawings as raised up off the base. The upper ends of the tubes F F are secured to an upper tube-sheet or expansion-head, D', which, in connection with a cover, E, forms a supplementary chamber, C, as shown. This construction admits of the free expansion and contraction of the tubes longitudinally without any liability of interfering with or loosening the tubular connections.

H represents the outer shell of the feed-water chamber, having a cover, N, provided with an outlet, K, for the feed-water, and to be con-

nected with any suitable pipe. The lower portion of the shell H is secured to a base, M, which is to be bolted to the lower tube-sheet, D, (shown in the drawings as raised above the same,) and also to the base L.

J indicates the inlet for the feed-water.

I I represent the feed-water space.

The tubes B and F, it will be seen, are secured at their lower ends to a separate tube-sheet, D, and at their upper ends to the tube-sheet D', the latter, with chamber C and tube-sheet D, being entirely disconnected with and independent of the shell H and base-piece M, which latter and the tube-sheet D and base L are bolted together when prepared for operation.

In operation the exhaust-steam, being introduced at the inlet A, passes up through the central tube, B, into the chamber C, and from thence down the tubes F F into the space G in the base L and out at the outlet A'. The feed-water enters at the opening J in the base M, and passes out at the outlet K at the upper end of casing H.

The apparatus above described may also be used as a condenser or cooler.

What I claim as my invention is—

1. In a feed-water heater, the combination of a central enlarged pipe, B, the chamber C, pipes F, and casing H, said pipe B connecting chamber C with the inlet A, substantially as shown and described.

2. The combination of the upper tube-sheet, D', the tubes B and F F, attached to the separable tube-sheet D, and the base L, containing the inlet-passage A and outlet G, as and for the purpose specified.

3. The combination of the base M, the shell H, the separable tube-sheet D, the tubes B F, and the base L, as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEORGE MILES.

Witnesses:

JOS. H. ADAMS,
GEO. L. LAVERY.