

(No Model.)

E. GREEN.
FEED WATER HEATER.

No. 339,983.

Fig. 1. Patented Apr. 13, 1886.

Fig. 5.

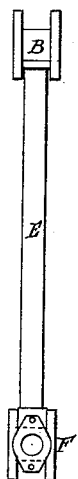


Fig. 4.

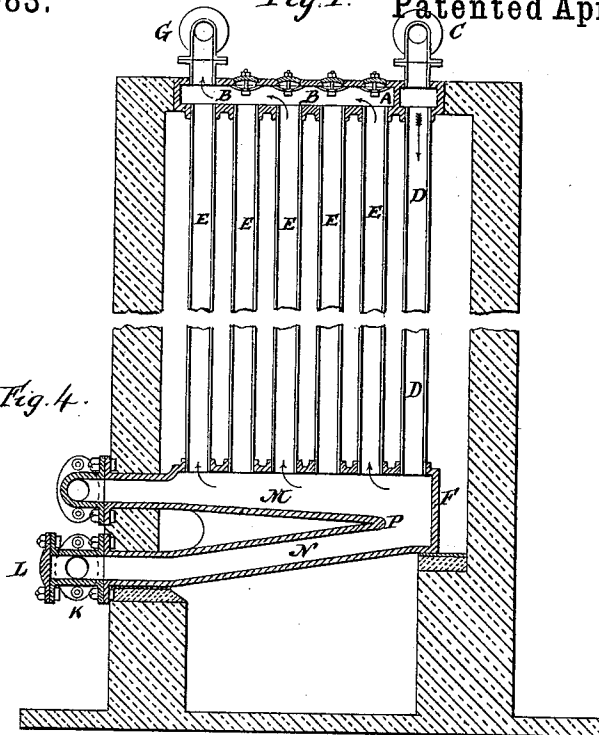


Fig. 6.

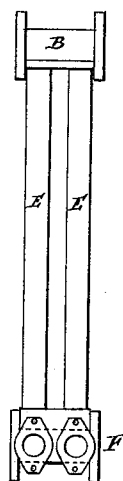


Fig. 2.

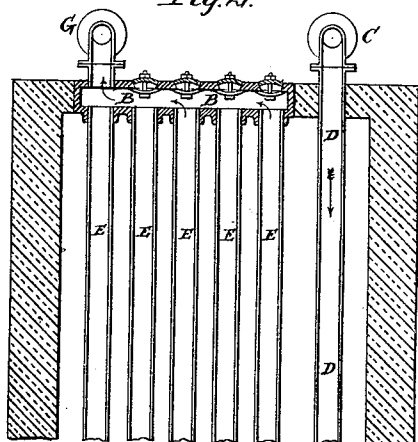
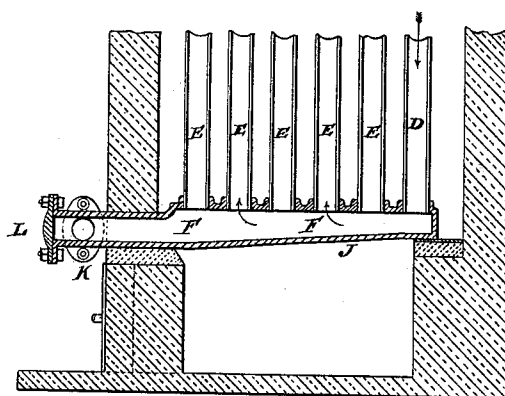


Fig. 3.



Witnesses.

J. L. Coombs
Robert Everett

Inventor.

Edward Green.

By

James L. Norris.

Atty.

UNITED STATES PATENT OFFICE.

EDWARD GREEN, OF WAKEFIELD, COUNTY OF YORK, ENGLAND.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 339,983, dated April 13, 1886.

Application filed December 29, 1885. Serial No. 187,046. (No model.) Patented in England July 6, 1885, No. 8,178.

To all whom it may concern:

Be it known that I, EDWARD GREEN, a subject of the Queen of Great Britain, residing at Wakefield, in the county of York, England, have invented new and useful Improvements in Feed-Water Heaters, (for which I have obtained a patent in Great Britain, No. 8,178, bearing date July 6, 1885,) of which the following is a specification.

The object of this invention is certain new or improved details of fuel-economizers, whether for heating the feed-water or for generating steam, and it consists—

First. In separating one or more pipes from the others of the series by a partition or diaphragm in the upper box, or by a disconnection of the pipes, so that the cold-water-feed pipe, which is at the top, allows the water to pass down tubes from one side of the partition and up the other tubes at the other side of the partition. The tubes up which the water flows are greater in number than that of the feed, whereby the water is broken into many streams and is therefore quickly heated before it leaves the apparatus or is rapidly converted into steam.

Second. In forming the lower box deeper at the outer or exposed end than at the inner end, for the collection of sediment, and in filling said exposed part with a sludge-cock for blowing-off purposes.

Third. In dividing the lower box into two compartments by an internal inclined wing, so that the sediment from the water in the tubes may slide from the upper compartment into a lower one, in which it can accumulate and be removed at intervals, as desired. Portions may be of pipe shape.

Fourth. In making the boxes, top and bottom, or one of them only, of separate castings, and providing them with flanges by which any two may be bolted together, the pipes and their sectional boxes being interchangeable.

The details of my invention will be understood by reference to the annexed drawings, in which at Figure 1 I show a sectional elevation of the upper box of a fuel-economizer, with a partition or diaphragm, A, in said upper box, B, and with the cold-water-feed inlet C, so that the water entering at C may flow down the first row of the series of pipes D into the lower box and then up into the pipes E,

which are at the other side of the partition A, into the upper box, B, and away by the outlet G, to convey the hot feed-water to a boiler, if the apparatus be used for heating feed-water, but if used as a steam-generator the upper box, B, would form the steam-space, the steam generated being taken by the pipe G or in other convenient manner. The partition or diaphragm A may be formed in the casting of the upper box, B, or affixed within it in any suitable manner so as to separate the feed-water space H from the hot-water portion I of the upper box, or the feed-water entry may be by a separate pipe, C, not forming part of the upper box, B, as at Fig. 2, the upper box, B, having a series of pipes, E, attached in the usual manner.

The second part of my invention is shown at Fig. 3, in which the lower box, F, is made with an inclined bottom, J, with a deeper portion at or near the outer or exposed end than at the inner, so that the sediment which deposits itself in said box may flow to the deeper part J', from which it can be readily removed on opening the sludge-cock at K. L is a cover-plate which can be removed to permit of the lower box, F, being cleaned out.

The third part of my invention is represented at Fig. 4, the lower box, F, being divided into two compartments, M N, by an internal inclined wing, so that the sediment which deposits itself upon the surface forming the bottom of the upper compartment, M, in the box may slide down said incline into the lower compartment, N, within which it can accumulate. The lower compartment, N, is also inclined so that the sediment accumulating therein may slide to the outer or exposed portion of the said box so as to be blown out by the sludge-cock K, or be otherwise removed.

Instead of the upper or lower boxes being made from a single casting, they may be in separate castings, as at Fig. 5, having one vertical pipe to each upper and lower box, or they may be in pairs, as at Fig. 6. Each upper and lower box may have two sockets for two vertical pipes, or they may be otherwise arranged, the boxes both top and bottom being interchangeable and capable of being bolted together to form the requisite size of fuel-economizers.

The several detail improvements hereinbe-

fore described are applicable in most cases to be used one with the other, but they may be used separately, or any two of them may be used in conjunction, as desired.

5 I claim as my invention—

1. The combination, with the series of pipes D and E, the upper box, B, and the water-inlet pipe C, communicating with the pipes D, of the diaphragm A, located in said box between
10 the inlet-pipe C and pipes D, and the series of pipes E, substantially as described.

2. In a feed-water heater, the combination, with the upper and lower boxes, B and F, and connecting-pipes E, of the inlet D for the cold
15 water to the lower box, said inlet being disconnected from the upper box, substantially as described.

3. The combination, with the upper box, B, inlet-pipe C, and series of pipes E and D, of
20 the lower box, F, having an inclined bottom wall, J, to widen the box at its outer end, and a sludge-cock, K, connected with said widened outer end, substantially as described.

4. The combination, with the upper box, B,

inlet-pipe C, and series of pipes E and D, of
25 the lower box, F, having an inclined bottom wall, J, the inclined wing located in the lower box to separate the same into two compartments, and a sludge-cock, K, connected with the outer end of said box, substantially as
30 described.

5. The combination, with the upper box, B, inlet-pipe C, and the two series of pipes E and D, of the diaphragm A, located in the upper
35 box between the pipes D and E, and the lower box containing the inclined wing to divide it into two compartments, M and N, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing
40 witnesses.

EDWARD GREEN.

Witnesses:

I. FREDK. JANSON,
Solicitor, Wakefield, England.

J. E. JONES,
His Clerk, Wakefield, England.