

T. J. Simpson,

Feed Water Heater.

No. 113,355.

Patented Apr. 4, 1871.

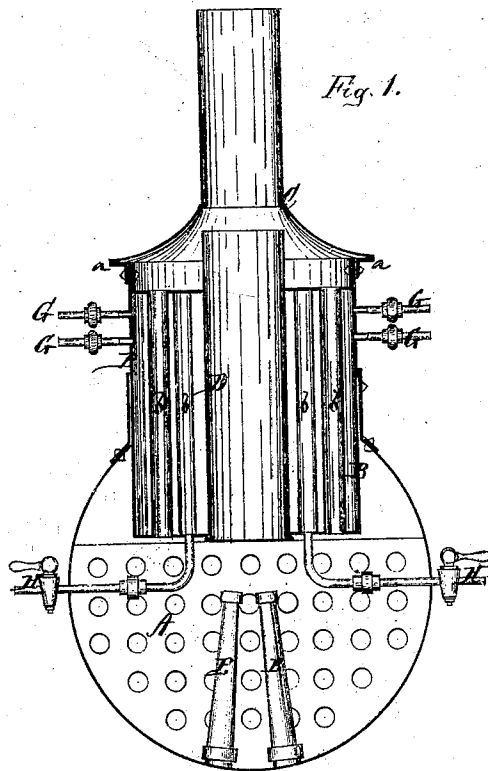


Fig. 1.

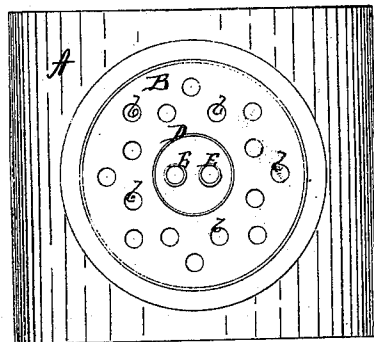


Fig. 2.

Witnesses:

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Att'y.

UNITED STATES PATENT OFFICE.

THOMAS D. SIMPSON, OF MOUNT VERNON, OHIO.

IMPROVEMENT IN FEED-WATER HEATERS.

Specification forming part of Letters Patent No. **113,355**, dated April 4, 1871.

To all whom it may concern:

Be it known that I, THOMAS D. SIMPSON, of Mount Vernon, in the county of Knox and State of Ohio, have invented certain new and useful Improvements in Feed-Water Heaters for Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to feed-water heaters; and it consists in the construction and arrangement of some of the parts of which it is composed, as will be more fully explained hereinafter.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Figure 1 is a vertical section of the heater and of a section of a steam-generator to which it is attached, its arrangement with reference to the tubes or flues of the generator being clearly shown. Fig. 2 is a plan view of the heater and of a portion of the generator.

Corresponding letters refer to corresponding parts in both figures.

A in the drawing refers to the smoke-box of a steam-generator, it having an aperture formed in its upper surface for the reception of the heater, as shown in the drawing.

B refers to the heater, which, as shown, consists of a cylindrical vessel, which is to be of sufficient strength to sustain a pressure equal to that of the steam upon the generator, its ends being supplied with heads, which are riveted or otherwise secured to the shell or cylinder, said heads being perforated for the reception of small tubes *b b*, which pass entirely through it, and also at its center with a large aperture for the reception of a pipe or tube, through which the steam from the exhaust or blast pipes *E E* passes. This heater is passed downward through the aperture in the generator until its lower end reaches a point which is within four inches (more or less) of the upper surface of the upper row of the tubes of the generator, in which position it may be held by means of a ring of metal, which may be

riveted to it and to the generator, as shown in Fig. 1 of the drawing; or it may be held in any other suitable manner.

D refers to a pipe or flue which passes up through the center of the heater, it being of such dimensions as to permit the steam which passes from the cylinders of the engine through the exhaust-pipes *E E* to pass freely through it, and at the same time a portion of the gases which pass through the tubes of the generator, and which arise from the burning fuel. The lower end of this pipe or flue is flush with the lower surface of the lower tube-sheet of the heater, while its upper end extends for some distance above the upper tube-sheet thereof, in order that it may approach so near to the conical pipe upon its upper end as to form a narrow throat or passage between it and such pipe, so that as the steam is forced through the pipe or flue D it shall cause a draft through the small tubes *b b* of the heater, and thus cause the heated gases which pass through the tubes of the generator—which are directly under said tube—to be carried or drawn directly through them, for the purpose of more evenly distributing the heat throughout the heater.

C refers to a conical cap or cover to the heater, and which also forms the base of the uptake or smoke-pipe of the generator. It is attached to the upper end of the heater by means of a ring, *a*, it being so constructed and arranged that when in place it shall have the contracted passage above alluded to between it and the upper end of the flue or pipe D.

On each side of the heater, near its upper end, two pipes, *G G*, are attached, through one of which the feed-water is passed from either of the pumps of the engine to the heater, and from the others it passes therefrom to the generator in its heated condition. To the lower tube-sheet of this heater pipes are attached, which extend downward for a short distance, when they are bent outward, and pass through the shell of the generator, their outer ends being supplied with blow-off cocks, so that by opening them and pumping the water through the heater any sediment which will accumulate in the same may be forced or

worked out without removing any part of the device.

Some of the advantages due to the arrangement of the parts, as above described, may be enumerated as follows:

First, by causing the upper end of the flue D to approach so near the cap C as to form the contracted space between the two, an increased draft is caused through the small heating-tubes, which causes an equal distribution of heat throughout the entire heater, thus effecting an increase in the temperature of the water beyond what could be effected if the largest portion of the heat were allowed to pass through the central and large flue.

Secondly, by arranging the blow-off cocks upon the heater, as described, the same may at any time be cleaned out without causing any delay in the use of the engine.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

The combination, in a water-heater, of a pipe, D, and cap C, when they are so arranged with reference to each other as to form between them a contracted or narrow passage for the purpose of causing an increased draft through the small tubes of the heater, substantially as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

THOMAS D. SIMPSON.

Witnesses:

J. H. ROMANS,
G. B. GRAY.