2 Sheets—Sheet 1.

A. T. DENISON.

FEED-WATER HEATERS FOR BOILERS.

No. 189,847. Patented April 24, 1877.

Fig. 1.

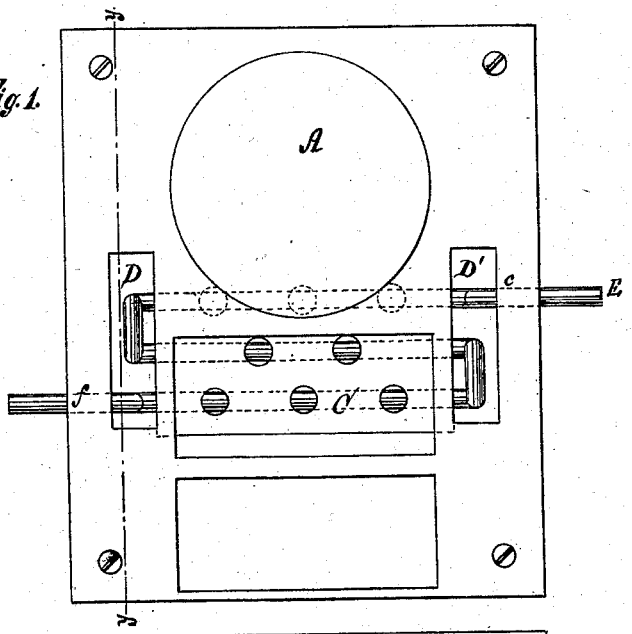
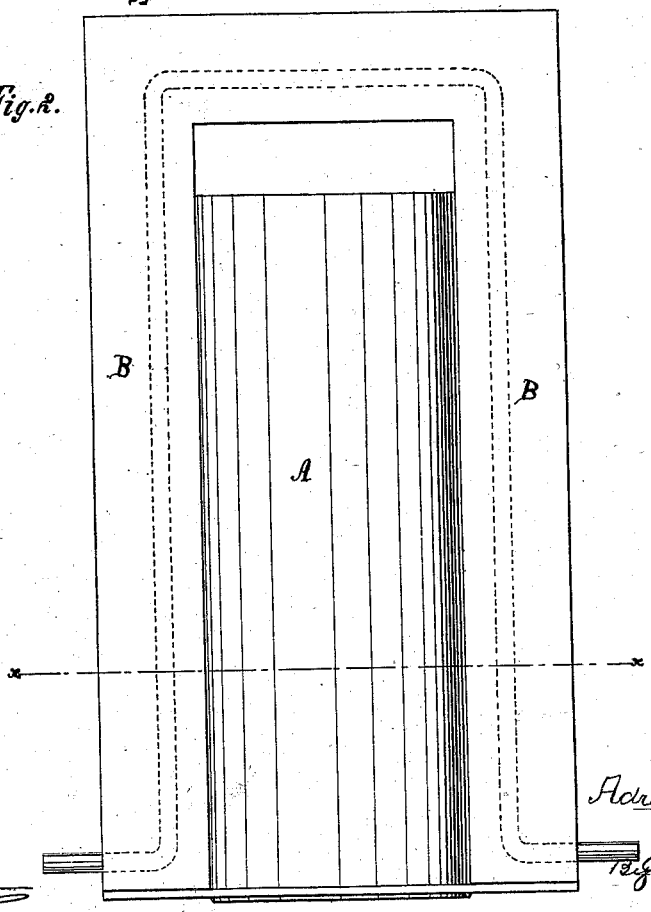


Fig. 2.



Witnesses:

Theodore Hoester.

E. S. Clark.

Inventor:

Adrea T. Denison

by J. P. Fitch his atty.

2 Sheets—Sheet 2.

A. T. DENISON.

FEED-WATER HEATERS FOR BOILERS.

No. 189,847. Patented April 24, 1877.

Fig. 3.

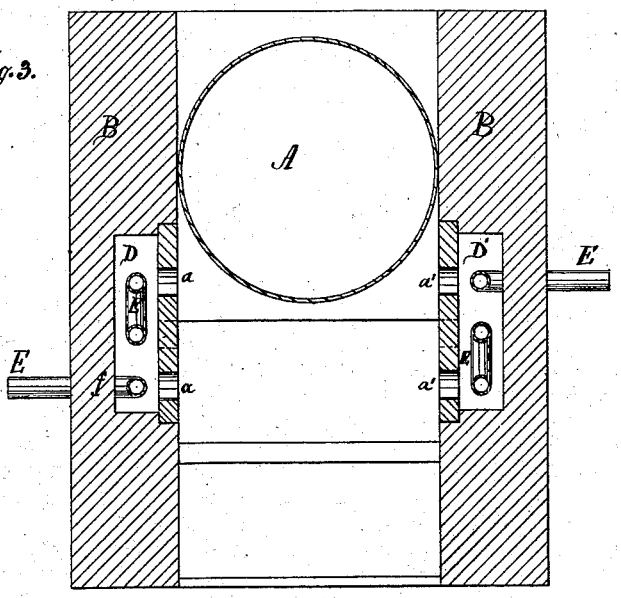
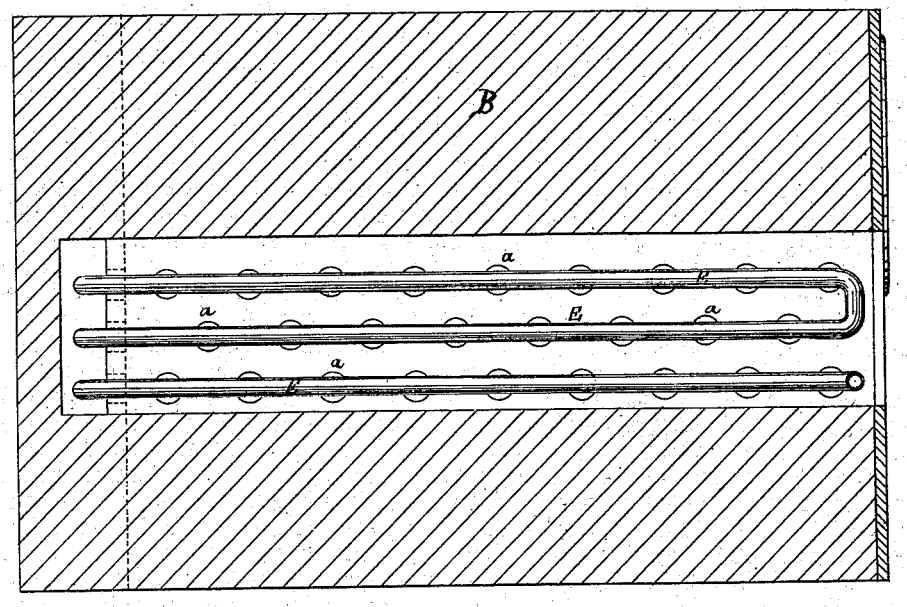


Fig. 4.



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Inventor:

Adrea T. Denison

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UNITED STATES PATENT OFFICE.

ADNA T. DENISON, OF MECHANICS FALLS, MAINE.

IMPROVEMENT IN FEED-WATER HEATERS FOR BOILERS.

Specification forming part of Letters Patent No. **189,847**, dated April 24, 1877; application filed July 7, 1876.

To all whom it may concern:

Be it known that I, ADNA T. DENISON, of Mechanics Falls, Maine, have invented a new and useful Improvement in Apparatus for Heating the Supply-Water for Steam-Boilers, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a front-end elevation of a steam-boiler, set in a brick-work, containing my invention. Fig. 2 is a top view of said boiler and brick-work. Fig. 3 is a transverse vertical section of one side of said brick-work on line *x x*, Fig. 2; and Fig. 4 is a longitudinal vertical section on line *y y*, Fig. 1.

My invention relates to a heating apparatus for heating the supply-water for steam-boilers that is formed of a pipe or pipes, through which the supply-water is conveyed to the boiler, heated by the same fire by which the water in the boiler is heated; and consists of the peculiar heating-chambers hereinafter described, formed in the walls of the brick-work B, and combustion-chamber of the boiler, in which the said pipes are located, the heat from the fire reaching said pipes through apertures made in the wall dividing the said fire-place and combustion-chamber from the said heating-chamber.

A represents a common steam-cylinder boiler, set in brick-work B. C is the fire-place, the combustion-chamber extending along underneath the boiler, in the usual way. D and D′ represent end views of the chamber formed in the walls of the brick-work. This heating-chamber extends the entire length of the sides of the brick-work B, and across its ends, inclosing a space about equal in extent vertically to that of the fire-place and combustion-chamber. Through their inner walls *a a′* are apertures. (Shown by the small circles *e* in Fig. 4, and at *e′* in Fig. 3.) These apertures permit the ready transmission of heat from the fire-place and combustion-chamber to the heating-chamber D D′. Within this chamber D D′ is placed a continuous pipe, or a series of pipes, E, through which the supply-water for the boiler is to be forced. In the drawing a single pipe is represented, which enters the said chamber at the front end, on one side, as represented by *f*, Figs. 1 and 3. It runs along near the bottom of the chamber D to the rear end; then across said end, and back through and near the bottom of the chamber D′ to its front end; then, bending back upon itself, runs around the stack to its starting-point; then, again bending, returns to the front end of side chamber D′, and out of the brick-work B, as represented at *c*. Water forced through this pipe will thus pass three times the entire length of the sides and end of the chamber. A greater or less number of bends may be made, as may be thought desirable.

The walls or partitions *a a′*, between the chamber and fire-place, may be of brick, built into and forming part of the general wall of the fire-place; or they may be built up independently after the pipe is put in place; or, again, they may consist of heavy iron plates, anchored into the wall, so as to be conveniently removed. Of whatever material formed, it is essential that these partition-walls should be pierced by a number of apertures of suitable size to permit the heat from the fire-place to penetrate freely into the chamber, but, at the same time, not so large but that the said pipe shall be protected in the heating-chamber from disturbance or injury. The pipe is to be connected at one end with a force-pump, or other means of forcing water through it, and at the opposite end with the boiler.

It is obvious that this construction and arrangement of heating chambers and pipe will secure the heating of the supply-water to any desired degree by the same fire by which the water in the boiler is heated, without exposing the pipes to injury, and without cumbering the fire-place with their presence in it.

Water-heaters have been placed in chambers formed in the walls of the fire-places of steam-boilers, through which the products of combustion pass on their way to the smoke-stack, the said chamber thus constituting, in fact, a part of the flue. My claim is restricted to the special construction and arrangement shown and described, wherein the heater is located in chambers or a chamber formed in the walls of the fire-place outside, and forming no part of, the flue, and communicating with the fire-place or flue only by apertures in the division-wall, between the said chamber or chambers and the fire-place or flue.

The special advantages of this location and arrangement of the pipes for heating the supply-water for steam-boilers are, that while they are submitted to the action of the same fire by which the steam is formed in the boiler, they are, at the same time, not exposed to the direct heat of said fire, by which they would be more rapidly oxidized and destroyed. They are also out of the way, and not exposed to accidental injury, as they would be if not inclosed in the chamber described. This arrangement also secures the heating of the supply-water very economically and uniformly.

What I claim as my invention, and desire to secure by Letters Patent, is—

The combination of a steam-boiler, fire-place, and water-heater, the said heater being located in a chamber in the sides or ends of the brick-work setting, said chamber forming no part of the smoke-flue, and communicating with the fire place by apertures through the division-wall, separating the said chamber from the fire-place, all substantially as and for the purpose described.

Witness my hand this 30th day of June, 1876.

ADNA T. DENISON.

Witnesses:
G. L. REED,
C. M. CRANE.