H. Howard.

Steam Heater.

No. 48,067. Patented Jun. 6, 1865.

Fig: 1.

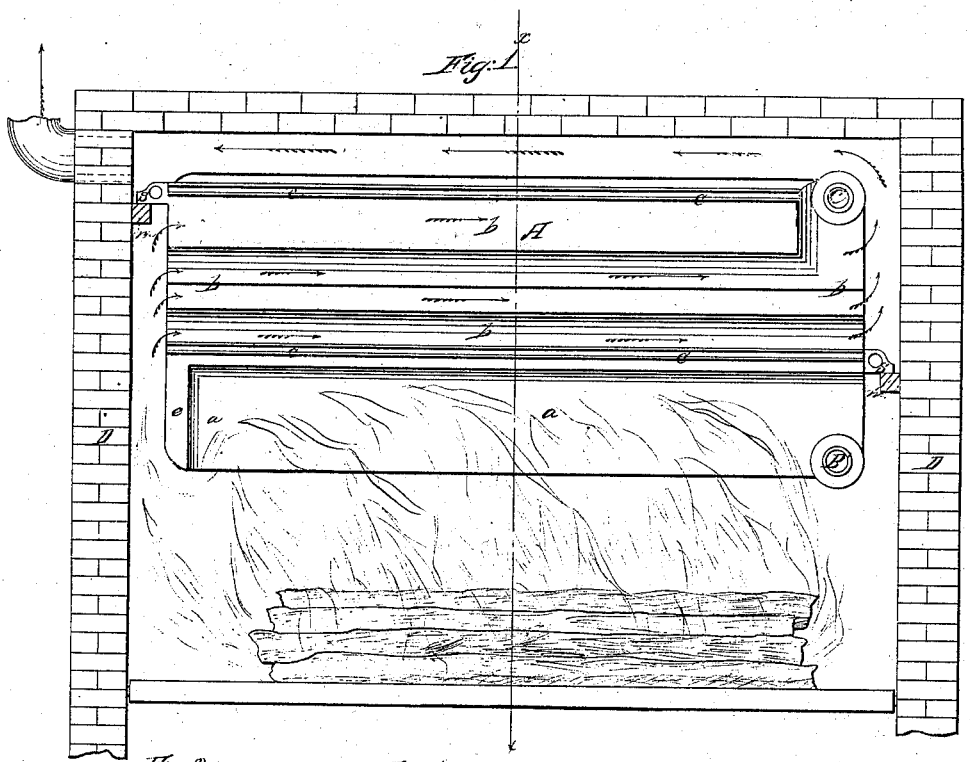


Fig: 2.

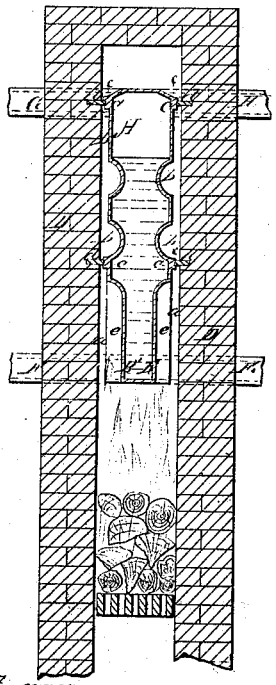


Fig: 4.

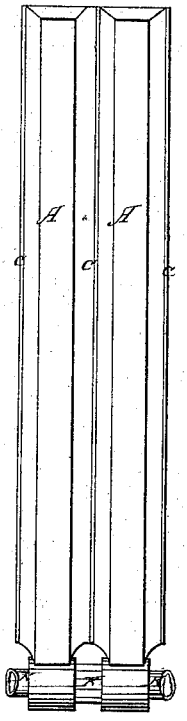
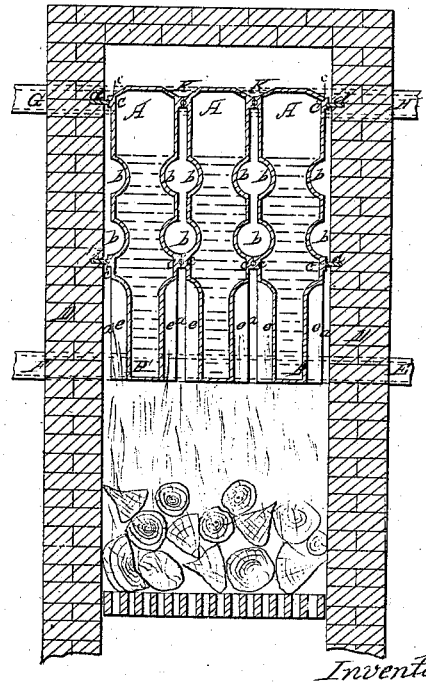


Fig: 3.



Witnesses

Randolph Eaton Co.

David Alter

Inventor.

Henry Howard

UNITED STATES PATENT OFFICE.

HENRY HOWARD, OF WESTFIELD, MASSACHUSETTS.

IMPROVED BOILER FOR STEAM-HEATING.

Specification forming part of Letters Patent No **48,067**, dated June 6, 1865.

To all whom it may concern:

Be it known that I, HENRY HOWARD, of Westfield, in the county of Hampden and State of Massachusetts, have invented a new and Improved Boiler for Heating Water and Generating Steam, which is more especially designed for warming purposes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a side elevation of one of my improved steam-boilers, the side of the furnace being removed to show the position and arrangement of the boiler therein. Fig. 2 is a vertical section through the boiler in the line *x x* of Fig. 1. Fig. 3 is a similar section, showing the manner of combining two or more of my improved boilers together within one furnace; and Fig. 4 is a top view of two of the boilers combined, illustrating more clearly the manner of connecting them.

Similar letters indicate like parts in all of the figures.

The nature of my invention consists of a boiler for heating water and generating steam, so formed and constructed as that its sides, when placed against the corresponding sides of similar boilers or against the perpendicular plain wall of an inclosing-furnace, shall constitute, in combination therewith, (and partially embrace,) two or more longitudinal flues to conduct the flame and heat of the fire backward and forward over nearly the entire exterior surface of the boiler. I have sought by this invention to produce very cheaply efficient boilers, which may not only be used singly, but may be also readily combined with each other in one furnace, as a greater or less extent of boiler-surface is required, the peculiarity of their form being such as that each individual boiler, used either independently or as one of a series, shall, when properly set, be encompassed by a flue passing over nearly its entire surface.

The general shape of my improved boiler A is that of a long parallelogram, and its configuration is shown by the side elevation thereof in Fig. 1 and the vertical section in Fig. 2 of the drawings. It may be economically cast in one piece upon a suitable core, or it may be formed of rolled iron plates properly riveted together. When cast, the core is removed through pipe-holes B and C, formed in the sides of the boiler, in its upper and lower front corners. The parallel recesses *a* and *b*, which extend longitudinally along the sides of the boiler, as seen in the drawings, form flue-spaces for the passage of the heat and flame from the fire. The narrow flanges *c c*, which project beyond the sides of the boiler, serve as partitions between the flues, dividing them from each other, and which, by preventing the direct upward passage of the heated air from the furnace, cause it to sweep in a current backward and forward over the sides and ends of the boiler from the bottom to the top thereof, as indicated by the arrows in Fig. 1. When one boiler only is used, these flanges *c c* rest closely against the sides of the furnace, as seen in Fig. 2. Plates *d d* may be inserted in the brick wall and received into grooves formed in the flanges *c c*, so as to form a more close joint therewith, if desired. When an increased water-heating surface is desired, it is only necessary to place two or more of these boilers side by side within a suitable furnace, the entire number required being cast from the same pattern. When so placed, the flanges *c c*, coming in contact with each other, complete the flues *a a* and *b b*, as illustrated by Fig. 3, the joints between the flanges being closed with any cheap iron cement. Vertical flanges *e e*, placed at the rear ends of the lower flue-recesses, *a a*, divert the flame down, so as that it shall pass under the lower rear end of the boiler, as seen in Fig. 1, and also form a pocket in this lower flue to concentrate, to a certain extent, the heat of the fire at this point.

The pipe-apertures B and C are formed through bosses so cast as to give the thickness required to obtain a good screw-seat for the ends of the water and steam pipes to be connected with the boiler. The water-supply pipe E, (red lines, Figs. 2 and 3,) connected with the main reservoir, is attached to the lower pipe-aperture, B, upon one side of the boiler, and the pipe F, returning the condensed steam from the radiators, (where the boilers are used for warming purposes,) is connected to the lower aperture, B′, upon the other side of the boiler. The main steam-pipe G is connected to the upper aperture, C′, of the boiler upon the same side as the condensing-pipe F,

while a pipe, H, connecting with a suitable automatic fire-regulator, (Clark's patent,) is attached to the opposite aperture, C.

Where two or more boilers are used in combination, as shown in Figs. 3 and 4, they are connected by means of suitable pipes, K K, Fig. 4, placed between the opposite adjacent pipe-apertures above and below, (see the red dotted lines in Fig. 3,) so that the water and steam may pass freely from one boiler to the other.

The boiler A, Figs. 1 and 2, (or the series of connected boilers A A A, Fig. 3,) are supported in the furnace D by means of projections S S, cast upon the front and rear ends of the boiler, as seen in Fig. 1. These projections rest upon bars W W, inserted in the front and rear walls of the furnace, and are pierced with apertures, through which a bolt may be passed for additional security.

It will be observed that the direct and more intense heat of the fire is exerted upon the cold water entering the lower part of the boiler, and that the current of heat (gradually losing its intensity) passes through the upper flue around the steam-space in the upper part of the boiler, so as to superheat the steam formed therein. The current of heat in passing over the boiler strikes more directly against the roof of the furnace, so as not to effect the top plate, although it serves still to keep it properly heated.

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

The boiler A, for heating water and generating steam, when formed, constructed, and arranged substantially in the manner herein set forth.

HENRY HOWARD.

Witnesses:
DAVID A. BURR,
RANDOLPH COYLE, Jr.