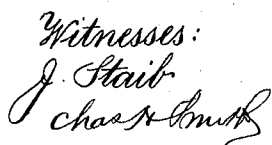


J. MERSEREAU.
WATER HEATING BOILER.

Patented Oct. 8, 1895.



Inventor:
Jacob Mersereau
per Lemuel W. Perrell
Att'y.

UNITED STATES PATENT OFFICE.

JACOB MERSEREAU, OF PORT CHESTER, NEW YORK, ASSIGNOR TO
ABENDROTH BROTHERS, OF SAME PLACE.

WATER-HEATING BOILER.

SPECIFICATION forming part of Letters Patent No. 547,560, dated October 8, 1895.

Application filed August 6, 1895. Serial No. 558,399. (No model.)

To all whom it may concern:

Be it known that I, JACOB MERSEREAU, a citizen of the United States, residing at Port Chester, in the county of Westchester and State of New York, have invented an Improvement in Water-Heating Boilers, of which the following is a specification.

Water-heating boilers have been made in which there are sections placed together, each section being a casting and extending down as hollow legs at each side of the fire-space.

In the present improvements the sections are constructed in a peculiar manner, so that there is a free space for the products of combustion to rise between pipes that connect the external and internal portions of the sections together, and then the products of combustion pass downwardly and return through a central flue that is also hollow, and the edges of this central flue are in the same plane as the edges of the sections, so that they set tightly together, and the sections, which may be more or less in number, may be bound to each other by suitable tie-rods and are made gas-tight by asbestos packing or a luting around the edges where such sections come together, and each section is provided with an inlet for the water and an outlet for either water or steam.

It is to be understood that this improvement is adapted to boilers in which water circulates by the action of the heat through a system of radiators, or this improvement may be used where steam is generated and passes off to suitable radiators throughout the building, the water of condensation being returned to the lower ends of the respective sections.

In the drawings, Figure 1 is a vertical cross-section through one of the sections. Fig. 2 is a sectional plan at the line 2 2, Fig. 3; and Fig. 3 is a vertical section at the line 3 3, Fig. 2.

Each section is made as a casting, preferably of iron, and any desired number of sections may be set together. I have shown four sections A B C D. All of these sections are substantially alike—that is to say, the hollow legs 4 extend down at each side of the fire-chamber E and are preferably provided with inwardly-projecting loops for the reception of the grate-bars F, which may be of any desired character, and the legs 4 extend upwardly,

forming the hollow sides 6 of each section, and there is a cross piece or arch 7, and there is a return-flue G formed by the quadrangular hollow tubes 8 that come at the sides of the return-flue and the cross-tube 9 at the bottom and the cross-tube 10 at the top of the flue G, and there is an upper flue H, which is formed between the extensions 11 of the side tubes 8, which unite at their upper ends with the hollow arch 7; and I remark that the width of the tubes 6, 7, 8, 9, 10, and 11 should be uniform, or nearly so, in order that the edges of the tubes may be in one plane and form the surfaces of the sections; and there are upwardly-inclined tubes 12, that connect from the sides of the fire-chamber to the end portions of the cross-tube 9, and also branch tubes 13 and 14, between the side tubes 8 and the interior surfaces of the hollow sides 6 of the sections, and these tubes 12, 13, and 14 are narrower than the other tubes in the sections, so that flue-spaces are formed between the sections that allow the products of combustion to rise freely from the fire upon the grate-bars into the upper portions of the sections.

In the back section D the pipes 11 are left off, so that the products of combustion that rise between the pipes 12, 13, and 14 are directed toward the back of the furnace and return through the upper flue H to the front plate K, at which place there is left a descending-flue 16, so that the products of combustion pass down and go through the flue G toward the back end of the furnace. If desired, a portion of the cross-tube 10 may be left off in the first section A, so as to increase the size of the opening between the flues H and G. The back plate L is provided with ribs that come into contact with the edges of the next section, and there is an opening G' through this plate to the smoke-flue M, and there is also an opening E' to the smoke-flue M, which opening is at the back of the fire-chamber E, and there is in this opening a damper 18, so that by opening this damper 18 a direct draft is obtained to the smoke-flue for promoting rapidity of combustion when the fire is started, and by closing this damper 18 the products of combustion are compelled to ascend between the tubes 12, 13, and 14 and pass to

the back and through the upper flue H and then to descend through the return-flue G and opening G' to the chimney.

I have shown a fuel-door at N and doors O O' at the ends of the flues G and H and opposite the flue-spaces between the tubes 12, 13, and 14, so that by opening these doors O O' the respective flue and flue-spaces can be cleaned out.

Any suitable base can be provided, either of metal or brickwork. I have shown the base P as of metal, with an ash-door Q.

Upon the top of each section there is a nipple S, uniting the sections with the circulating pipe or drum R, and from this drum the pipes T convey away the circulating hot water or steam, as the case may be, and the return circulation or water of condensation goes to the pipes U and passes by the nipples V into the lower portions of the water-legs or hollow sides 4 and 6 of the respective sections.

It will be observed that the inclinations of the pipes 12, 13, and 14 are such that the circulation of the heated water is promoted, and the water not only rises vertically in the hollow sides 4 and 6, but it also rises in the tubes 12, 8, and 11, so that the circulation is very rapid and the water which is once heated ascends and is still more heated, and there is nothing to check the most rapid circulation that is possible in the apparatus.

The front plate K and the back plate L are represented as cast hollow, in order that water may pass through them for keeping the parts cool, there being connections to the respective return-pipes and drum. I do not limit myself to making these front and back plates hollow for containing water, as they may be plain castings.

I claim as my invention—

1. The combination in a water heating boiler of a series of hollow sections, the edges of the tubes in the sections setting closely together at the sides and top of the sections and also around an upper flue, and branch tubes between the flue and the side tubes in each section which branch tubes are of less diameter than the thickness of the section to allow the products of combustion to pass to the upper inside part and along to one end of the upper flue and through the same, substantially as specified.

2. The combination in a water heating boiler of a series of hollow sections the edges of the tubes in the sections setting closely together at the sides and top of the sections and also around an upper flue and a lower flue, and branch tubes between the flues and the side tubes in each section, which branch tubes are

of less diameter than the thickness of the section to allow the products of combustion to pass to the upper inside part and along to one end of the upper flue and through the same and then descend and return through the lower flue, substantially as specified.

3. The combination in a water heating boiler, of a series of sections each section being formed of a hollow casting with tubular legs at the sides of the fire chamber extending upwardly and connected by a cross arch and having side tubes to a return flue over the fire chamber and the tubular connection therefrom to the outer portions of the sections so that the products of combustion pass between the tubular connections in one section and those in the next to an upper flue, a front plate having a descending flue to connect the upper flue with the return flue, a back plate having an opening and flue connection forming a continuation of the return flue, substantially as set forth.

4. The combination in a water heating boiler, of a series of sections each section being formed of a hollow casting with tubular legs at the sides of the fire chamber extending upwardly and connected by a cross arch and having side tubes to a return flue over the fire chamber and the tubular connections therefrom to the outer portions of the sections so that the products of combustion pass between the tubular connections in one section and those in the next to an upper flue, a front plate having a descending flue to connect the upper flue with the return flue, a back plate having an opening and flue connection forming a continuation of the return flue, and an opening and flue connection with a damper at the rear of the fire chamber, substantially as set forth.

5. The combination in a water heating boiler, of a series of sections each section being formed of a hollow casting with tubular legs at the sides of the fire chamber extending upwardly and connected by a cross arch and having side tubes to a return flue over the fire chamber and the tubular connections therefrom to the outer portions of the sections so that the products of combustion pass between the tubular connections in one section and those in the next to an upper flue, nipples and connecting pipes at the tops of the sections and at the bottom portions of the water legs, substantially as set forth.

Signed by me this 31st day of July, 1895.

JACOB MERSEREAU.

Witnesses:

J. H. LYON,
W. F. TOOKER.