

S. B. WATERS.
STEAM AND WATER HEATER OR BOILER.
APPLICATION FILED APR. 11, 1912.

1,061,890.

Patented May 13, 1913.

2 SHEETS-SHEET 1.

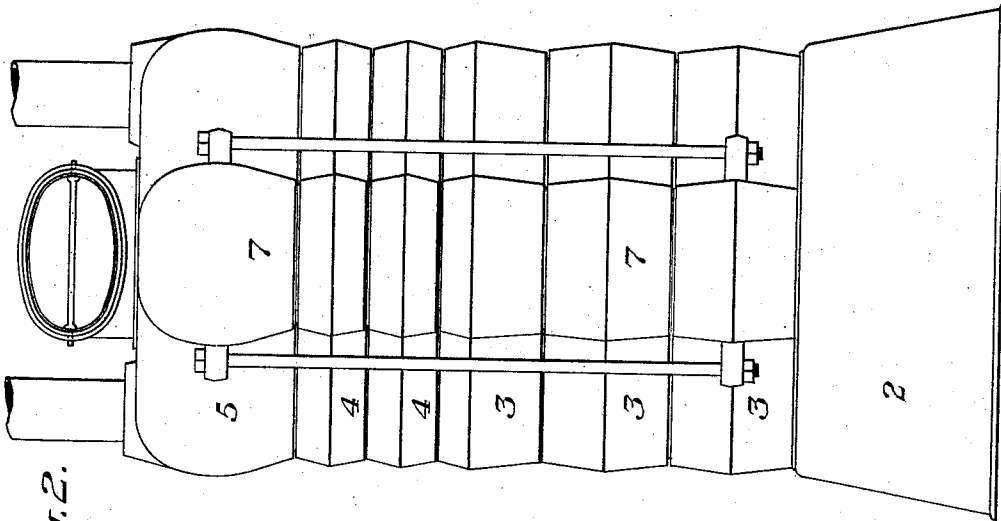


Fig. 2.

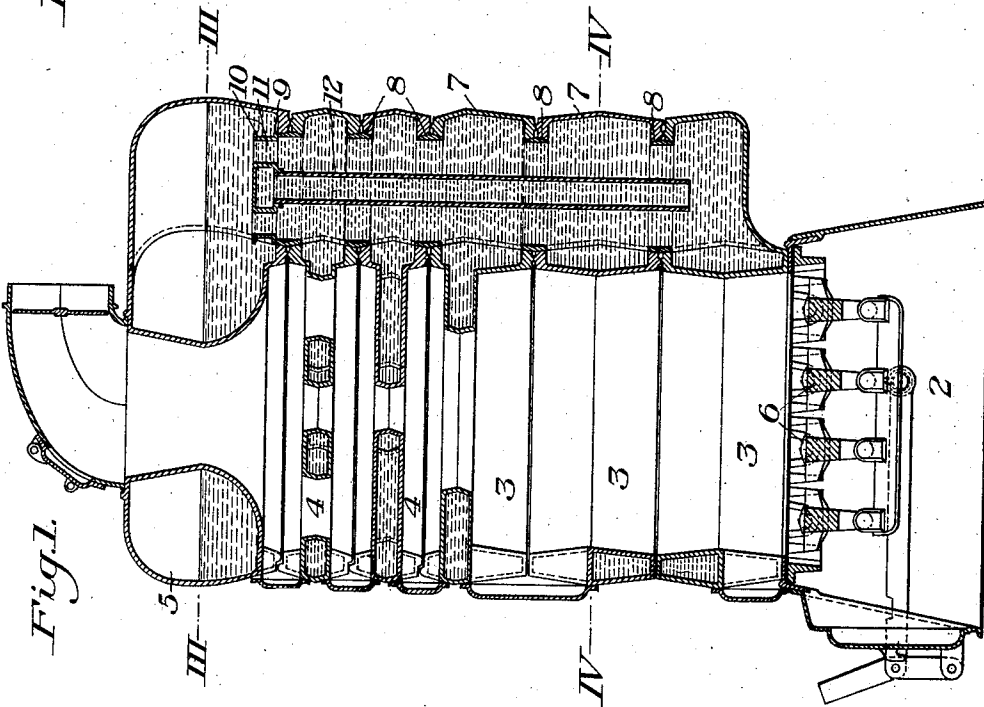


Fig. 1.

WITNESSES

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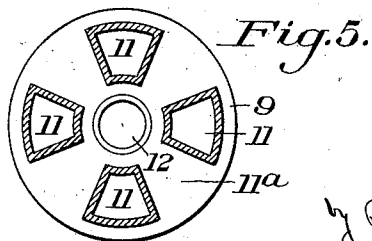
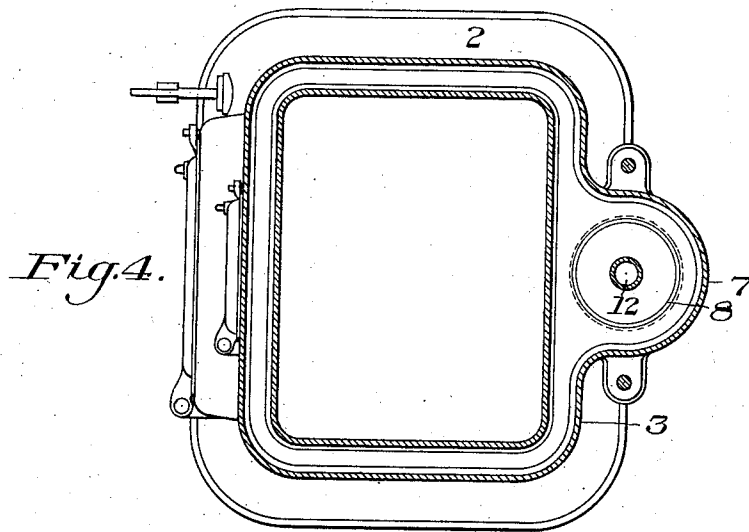
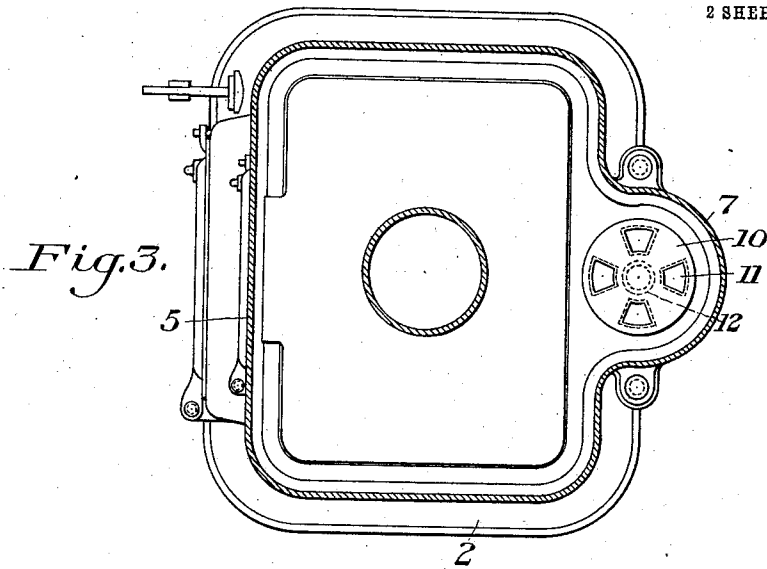
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2 SHEETS—SHEET 2.



WITNESSES
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UNITED STATES PATENT OFFICE.

SAMUEL B. WATERS, OF JOHNSTOWN, PENNSYLVANIA, ASSIGNOR TO NATIONAL RADIATOR COMPANY, OF JOHNSTOWN, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

STEAM AND WATER HEATER OR BOILER.

1,061,890.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed April 11, 1912. Serial No. 690,206.

To all whom it may concern:

Be it known that I, SAMUEL B. WATERS, a resident of Johnstown, in the county of Cambria, State of Pennsylvania, have invented a new and useful Improvement in Steam and Water Heaters or Boilers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of a heater embodying my invention; Fig. 2 is a rear elevation of the same; Fig. 3 is a horizontal section of the same on the line III—III of Fig. 1; Fig. 4 is a section on the line IV—IV of Fig. 4; and Fig. 5 is a detail sectional plan view through the circulating device.

My invention has relation to cast iron steam and water heaters or boilers of the class which are principally used for furnishing heat in residences or other buildings. These heaters or boilers as usually constructed consist of a base, a firepot section, and a dome section with or without intermediate sections between the firepot and the dome sections. These various sections have suitable flue openings or connections for allowing the smoke and products of combustion to escape from the firepot to the flue, and are also joined or connected with ports or openings to allow the free circulation of water throughout the sections.

One feature of my invention relates to the firepot portion of the heater or boiler which I construct in two or more superimposed sections which are connected at the back with only a single port or opening between them.

A further feature of my invention has relation to means for improving the water circulation, especially where the boilers are used for steam heating and are put under severe firing. In such cases, there is a tendency to force the water up into the dome, raising the water above the true water line. This I overcome by a circulating device of simple and effective character which can be readily applied to the heater and which can be readily removed or omitted when the boiler is used for water-heating only.

In the accompanying drawings, I have shown the preferred embodiment of my invention, the numeral 2 designating the base of a heater or boiler, 3 the firepot portion, which is here shown as formed in three su-

perimposed hollow sections, 4 the intermediate sections, and 5 the dome section.

6 designates a suitable grate.

Each of the firepot and intermediate sections and the dome section is formed at the back with a hollow extension 7. These extensions form continuations of the water space of the respective sections, and the extensions of adjacent sections are superimposed one above the other and are connected by means of the nipples 8. These extensions, therefore, form a single continuous water column at the back of the heater, the only communication between the sections being through this single column.

By making the firepot in a plurality of sections, it is possible to reduce the size of the castings, and the patterns and cores may be so designed that the castings can be made of a more uniform and, consequently, of a lighter thickness of metal than was possible under the old construction. The cost of foundry production is also materially reduced. The castings being of lighter section and of more uniform thickness, the heat from the fuel is carried through the metal and comes into quicker contact with the water to be heated, thereby giving a higher efficiency. The machine work cost is also greatly reduced.

As above stated, in this type of boiler when they are used for steam heating and when put under severe firing, there is a tendency to force the water into the dome above the true water line; and to overcome this, it has been common to use two or three sets of connections between the sections, one set of connections acting as a return port for carrying the water back to the lower section. Where only a single connection is employed, such as above described, it is much more difficult to maintain the water level, and in order to overcome this difficulty, I have provided an improved circulating device, whereby the hot water is carried up into the dome and the cooler or return water is carried back to the lower section, without the reverse currents conflicting or interfering with each other in any way. This circulating device is shown in Figs. 3 and 4, and consists of two separated flat disks 9 and 10, placed one above the other and connected by means of vertical tubes or ports 11 of any desired shape, size and number. The lower disk 9 has a central opening, into

which a pipe or tube 12 is screwed and which is carried downwardly through the water column at the rear to a point near the bottom of the lower firepot section. The device is supported on the upper side of the bottom part of the extension of the dome section, resting over and covering the opening which connects this section with the adjacent intermediate section.

In operation, the water which is being heated passes up until it strikes the lower disk 9, and thence through the ports or openings into the dome. The cooler water lying in the bottom of the dome passes in between the open edges of the two disks around the ports or tubes 11, and thence downwardly into the central depending tube 12, by which it is carried to the lower section to be further heated and circulated through the boiler. In this manner, as will be readily seen, the up and down currents of water do not meet, but each has a free and unobstructed path.

This device entirely prevents the strong up current which is produced when the boiler is working near its capacity, driving the water up into the dome and thus creating a false or high water line. The circulator is inexpensive and being made separate from the boiler can be readily inserted where the boiler is to be used for steam heating, or removed where it is to be used for water heating only. In the latter case, it is not needed, as there is no return current, all the water that enters the bottom of the boiler being heated and passing out at the top. The only change necessary to convert a water boiler into a steam boiler is to put on a somewhat higher dome section to allow for sufficient steam space and to insert the circulator before the dome section is set in place.

It will be obvious that the exact form and number of the sections may be varied, as may be desired, and that various other changes may be made in the details of construction and arrangement of the parts, without departing from the spirit and scope of my invention, as defined in the appended claims.

I claim:

1. A heater or boiler having a firepot portion formed in a plurality of superimposed hollow sections, each of said sections having an extension at the back, said extensions being united by a single circulating opening, said circulating openings forming a continuous circulating passage, and means within said passage for separating the up and down circulating currents; substantially as described.

2. A heater or boiler comprising a plurality of superimposed firepot sections, a

dome section, and intermediate sections, each of said sections having a single extension at the back communicating with the water space of the section and said extensions superimposed and connected to form a continuous single water column at the back of the heater or boiler, and a circulation controller or regulating device within said column for separating the up and down currents therein; substantially as described.

3. A heater or boiler comprising a plurality of superimposed firepot sections, a dome section, and intermediate sections, each of said sections having a single extension communicating with the water space of the section and superimposed and connected to form a continuous single water column at the back of the heater or boiler, said column having a single opening communicating with the water space of each section, and a removable device within the column for separating the up and down currents of water therein; substantially as described.

4. A heater or boiler comprising a plurality of superimposed sections, a dome section surmounting the heater, each of said sections having a single rearward hollow extension communicating with the water space of the body of the section, said extensions being superimposed and connected to form a continuous water column, and a circulating device for separating the up and down currents of water in said column, said circulating device having an inlet adapted to take water downwardly from substantially the lowest portion of the water space of the dome section and an outlet for the upgoing currents of water which communicates with the dome section at a higher level, substantially as described.

5. A heater or boiler having a continuous water-circulating column at the back and a surmounting dome section, together with a circulating device for separating the up and down currents of water in said column, said device comprising a head portion extending within the dome section and a tube or pipe extending downwardly within the column and open at its lower end, said tube or pipe communicating at its upper end with the dome section at substantially the lowest level of the water space therein and the head portion having openings there-through communicating with the interior of the dome section at a higher level, substantially as described.

In testimony whereof, I have hereunto set my hand.

SAMUEL B. WATERS.

Witnesses:

H. A. HERSHEY,
E. S. CROUSE.