(No Model.) 3 Sheets—Sheet 1.

E. C. HALL.

HEATER.

No. 604,859. Patented May 31, 1898.

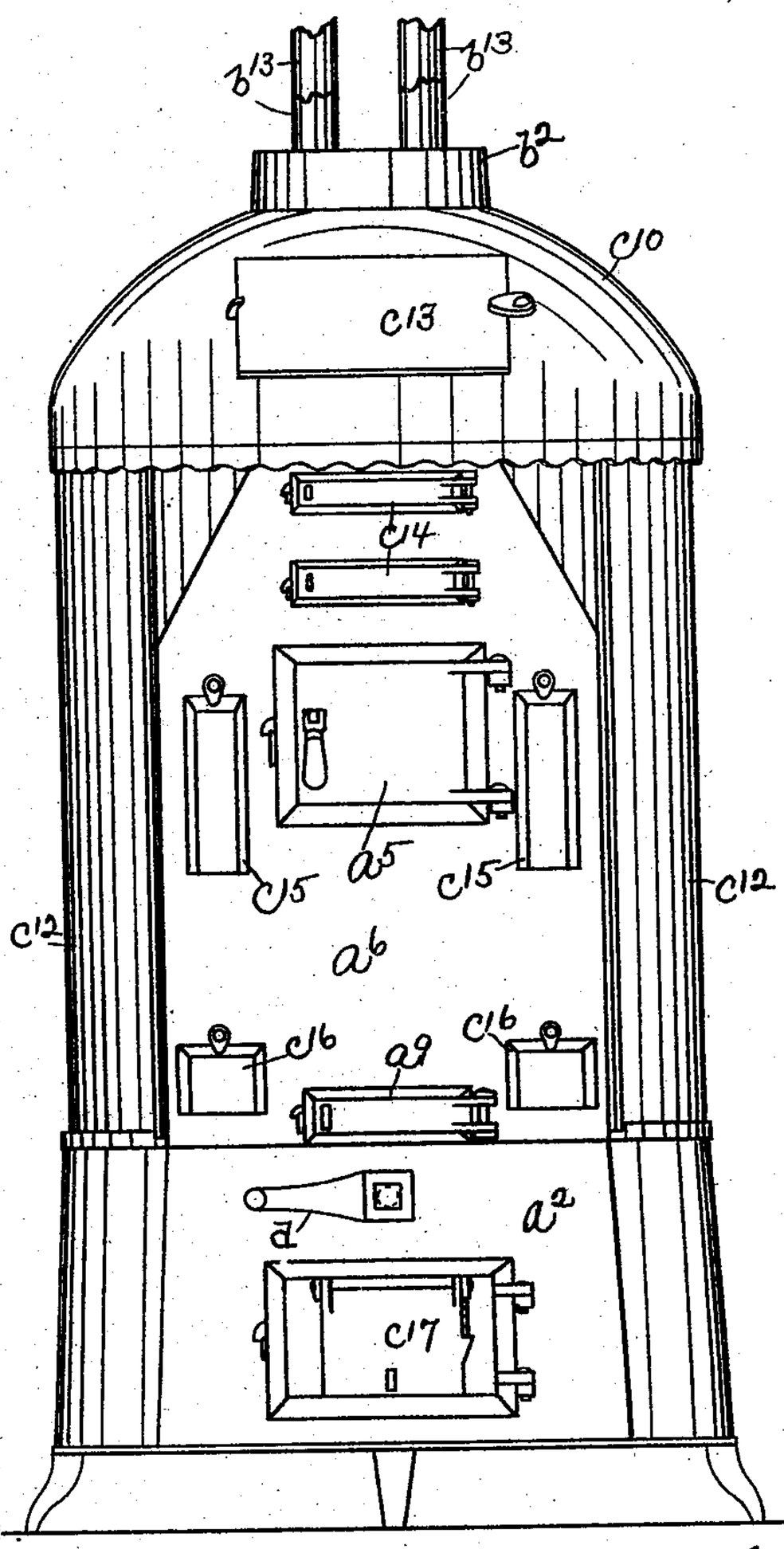

Fig. 1.

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J. Murphy.

INVENTOR.
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ATT'Y.

(No Model.) 3 Sheets—Sheet 2.

E. C. HALL.

HEATER.

No. 604,859. Patented May 31, 1898.

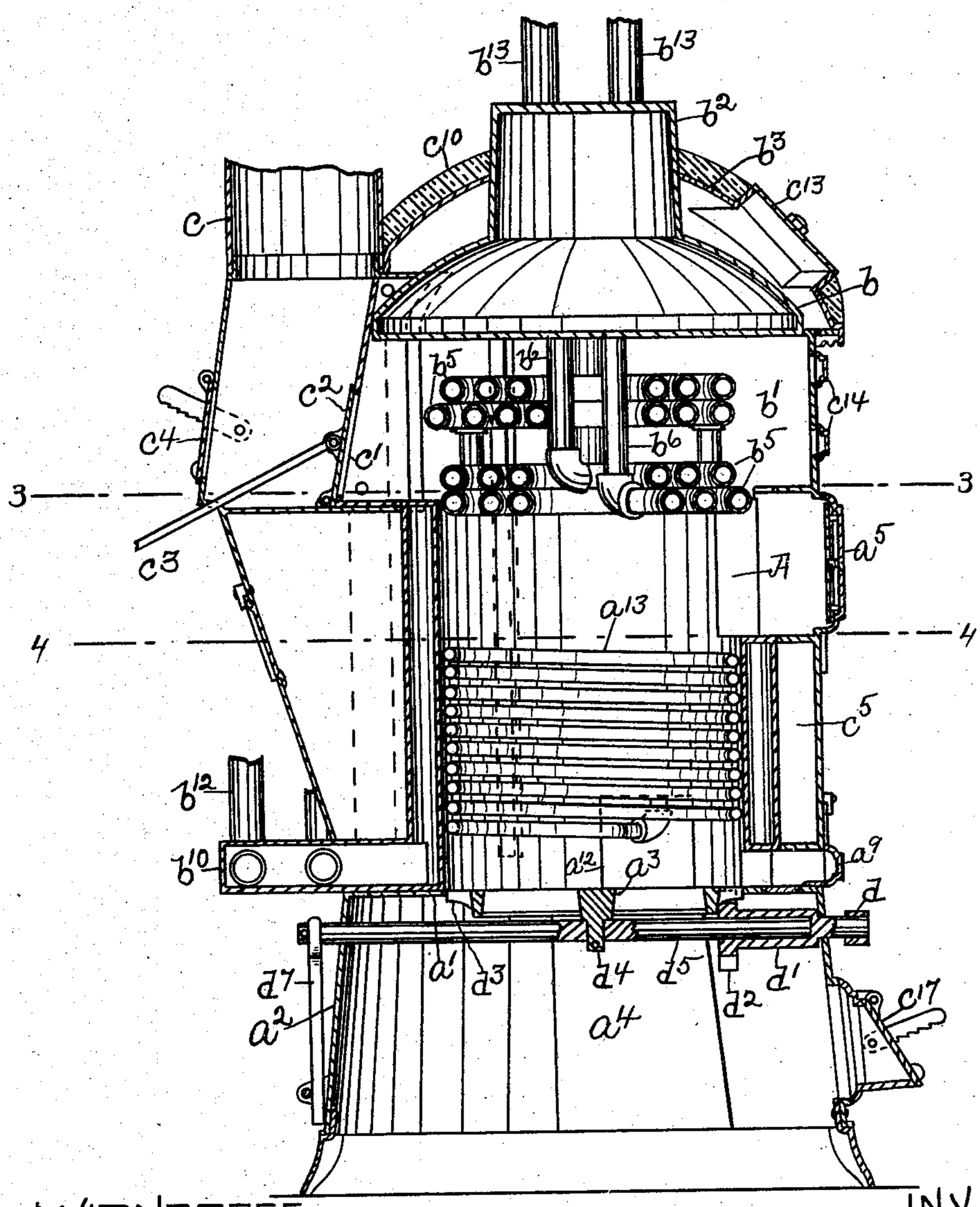

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

E. C. HALL.

HEATER.

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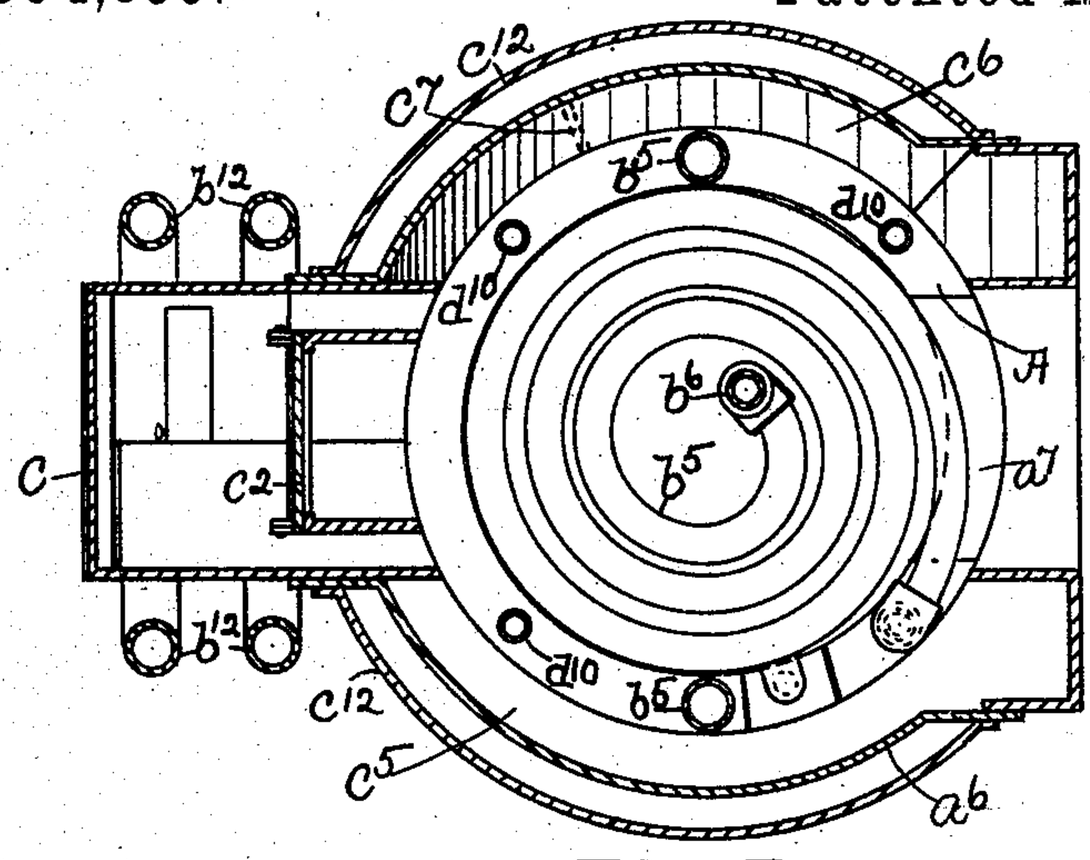

Fig. 3.

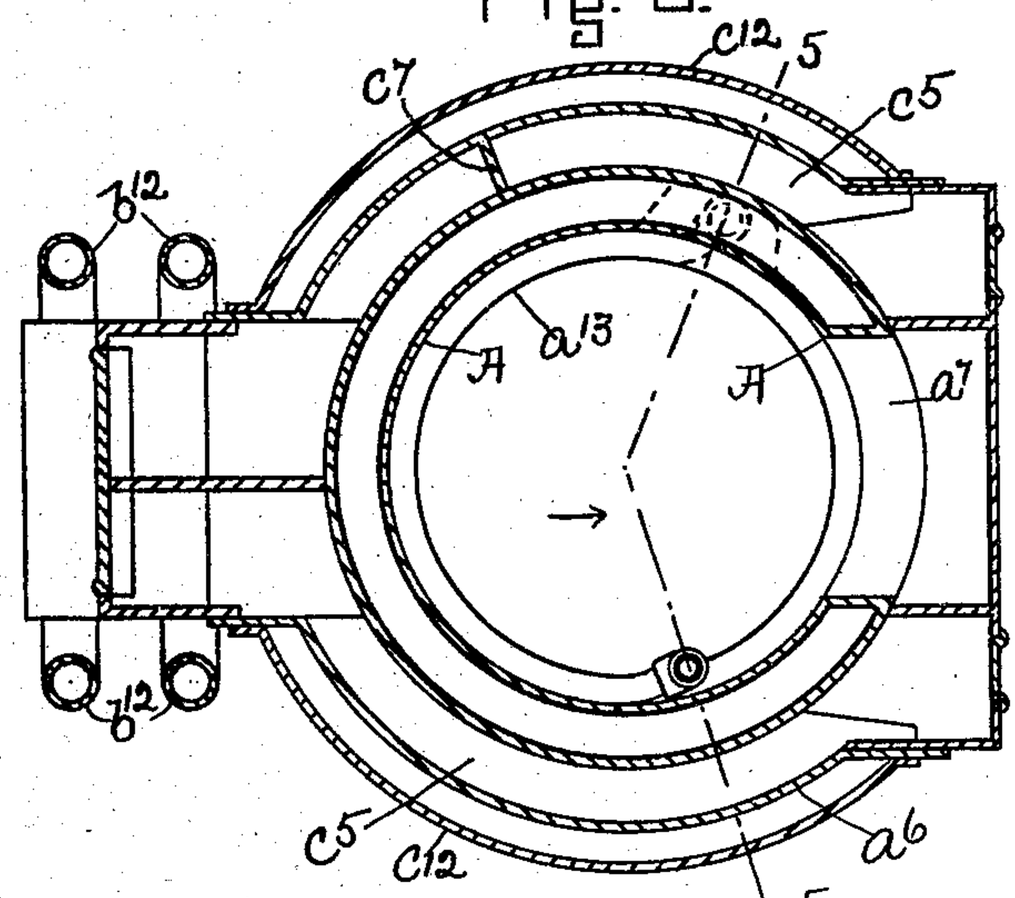

Fig. 4.

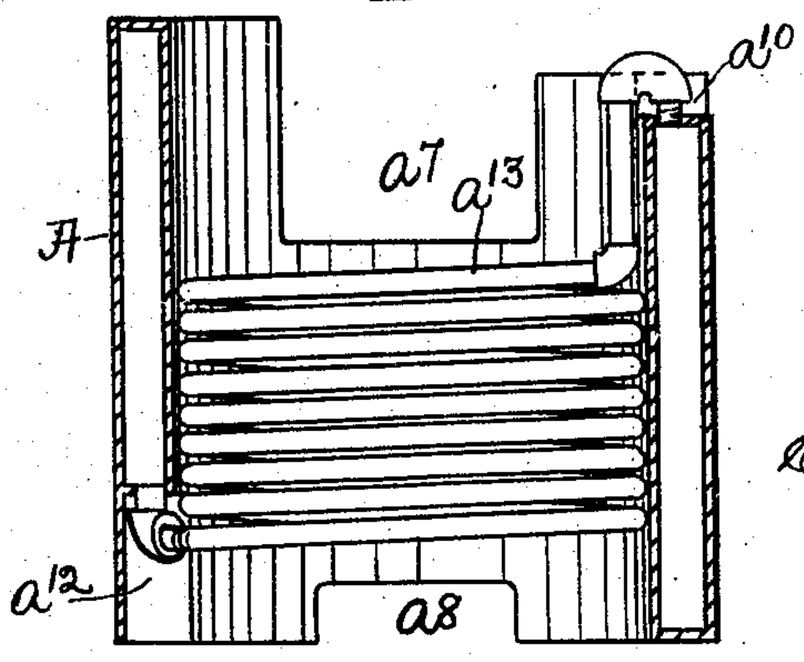

Fig. 5.

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UNITED STATES PATENT OFFICE.

ELIJAH C. HALL, OF BRAINTREE, MASSACHUSETTS.

HEATER.

SPECIFICATION forming part of Letters Patent No. 604,859, dated May 31, 1898.

Application filed July 2, 1897. Serial No. 643,189. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH C. HALL, residing in South Braintree, in the county of Norfolk and State of Massachusetts, have invented an Improvement in Heaters, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a heating apparatus and is herein shown as embodied in a water-heater and is an improvement upon that shown and described in United States Patent No. 570,993, granted to me November 10, 1896.

My present invention has for its object to provide a heater of maximum heating capacity at a minimum cost, and I accomplish my object as will be hereinafter described.

Figure 1 is a front elevation of a heater embodying this invention; Fig. 2, a vertical section of the heater shown in Fig. 1; Fig. 3, a horizontal section on the line 3 3, Fig. 2; Fig. 4, a horizontal section on the line 4 4, Fig. 2; and Fig. 5, a vertical sectional detail to be referred to.

Referring to the drawings, a represents the combustion-chamber or fire-pot, having its circumferential wall made as a hollow casting A, which rests upon an inwardly-projecting flange a' of a base a^2, which supports a grate a^3 and forms the ash-pit a^4, substantially as shown in the patent referred to.

In accordance with this invention the hollow casting A is made of a height substantially equal to the height of the fuel-door a^5 on the outside shell or casing a^6 above the grate a^3 and is cast to leave at its upper end an opening a^7, (see Fig. 5,) constituting a fuel-opening, and which registers with the fuel-door, and at its lower end the casting A is provided with an opening a^8, which registers with the clinker-door a^9 in the casing or shell a^6. The casting A is preferably also provided at its upper and lower ends with additional openings a^{10} a^{12} for the reception of the ends of a coil a^{13} of pipes located within the fire-box and communicating with the hollow casting, as represented in Figs. 2 and 5, for the circulation of water from the bottom of the hollow casting through the coil of pipe to the top of said hollow casting. The outer casing or shell a^6 also contains within it a dome b, located over the fire-box, above the casting A, and separated therefrom by an open chamber b', the said dome, as shown, having its upper portion b^2 extended out through and above the top b^3 of the casing or shell a^6.

The chamber b' in accordance with this invention contains within it, preferably, a plurality of coils b^5 of pipe, herein shown as four in number, arranged one above the other with the convolutions of each coil in a substantially horizontal plane, each coil having one end connected to the hollow casting A, to communicate therewith, and its other end provided with a substantially vertical and central pipe b^6, which is connected to the bottom of the dome b to communicate therewith.

The hollow casting A is provided at its bottom with a substantially horizontal extension b^{10}, to which are connected the inlet-pipes b^{12}, and the upper portion b^2 of the dome has connected to it the outlet-pipes b^{13}. The casing or shell a^6 is of substantially the same construction as that shown in the patent referred to and is provided with the outlet-pipe c, adapted to communicate directly with the chamber b', for the passage of the products of combustion through the port c', controlled by the damper c^2, adapted to be operated by the handle c^3, and the outlet-pipe c is also provided with a cold-air check or damper c^4.

The heater is also provided with an indirect draft, which is formed by closing the space c^5 between the shell or casing a^6 and the hollow casting A, on one side by means of a top plate c^6, (see Fig. 3,) leaving the said space open at its top on the other side to communicate with the chamber b'. The top plate c^6 preferably has depending from it a vertical partition c^7, which extends to near the bottom of the space c^5, so as to cause the heat to be carried downward around the hollow casting A. The shell or casing a^6 may have secured to its top a covering c^{10}, of asbestos, and to its sides jackets c^{12}, and the said casing or shell may be provided with cleaning-doors c^{13} c^{14} c^{15} c^{16}, and the base a^2 is provided with the ash-pit door c^{17}.

The grate a^3 may be rotated by means of a handle d on a sleeve d', provided with a pinion d^2 in mesh with a gear d^3 on the under side of the grate, the said grate having its pivot d^4 supported by a cross-bar d^5, to which

the pivot d^4 is connected, so as to enable the grate to be dumped or turned vertically, and the bar d^5 is locked from turning by a locking-bar d^7, all substantially as in the patent referred to.

By reference to Fig. 2 it will be seen that by means of the coils b^5 of pipes in addition to the hollow casting A and dome b I am enabled to obtain a very large area of heating-surface in a small-sized heater, and, further, it will be noticed that the coils b^5 in the chamber b' are directly over the fire-box and are subjected to the greatest heat, and therefore these coils of pipe are preferably made of somewhat large diameter, as represented in the drawings. The dome b may be supported upon the hollow casting A preferably by hollow standards or pipes d^{10}.

I claim—

1. In a heater, the combination of the following instrumentalities, viz: a hollow casting forming the walls of a fire-pot, a hollow dome supported above said casting, a coil of pipe in the fire-pot having its opposite ends connected to the said hollow casting near the top and bottom of the same, and a coil of pipe intermediate of the hollow casting and the said dome and connected therewith for the circulation of liquid from the hollow casting through the coil of pipe into the said hollow dome, substantially as described.

2. In a heater, the combination of the following instrumentalities, viz: an inclosing shell, a hollow casting located therein and forming the walls of a fire-pot, a hollow dome supported above said hollow casting, and a plurality of horizontal coils of pipe interposed between said hollow casting and the said dome and placed one above the other and connected therewith, substantially as described.

3. In a heater, the combination of the following instrumentalities, viz: an inclosing shell, a hollow casting provided with openings a^{10} a^{12}, a coil of pipe located in said hollow casting and having its end extended into the openings a^{10} a^{12} and connected to the hollow casting, and a coil of pipe located above the hollow casting and having one end connected thereto, substantially as described.

4. In a heater, the combination of the following instrumentalities, viz: a hollow casting forming the walls of a fire-pot and provided with a fuel-opening a^7, clinker-opening a^8 and openings a^{10} a^{12}, of a coil of pipe located in said hollow casting and having its ends extended into the openings a^{10} a^{12} and connected to the hollow casting to communicate therewith for the circulation of water from the bottom of the hollow casting through the coil of pipe to the top or upper part of said casting, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELIJAH C. HALL.

Witnesses:

JAS. H. CHURCHILL,

J. MURPHY.