

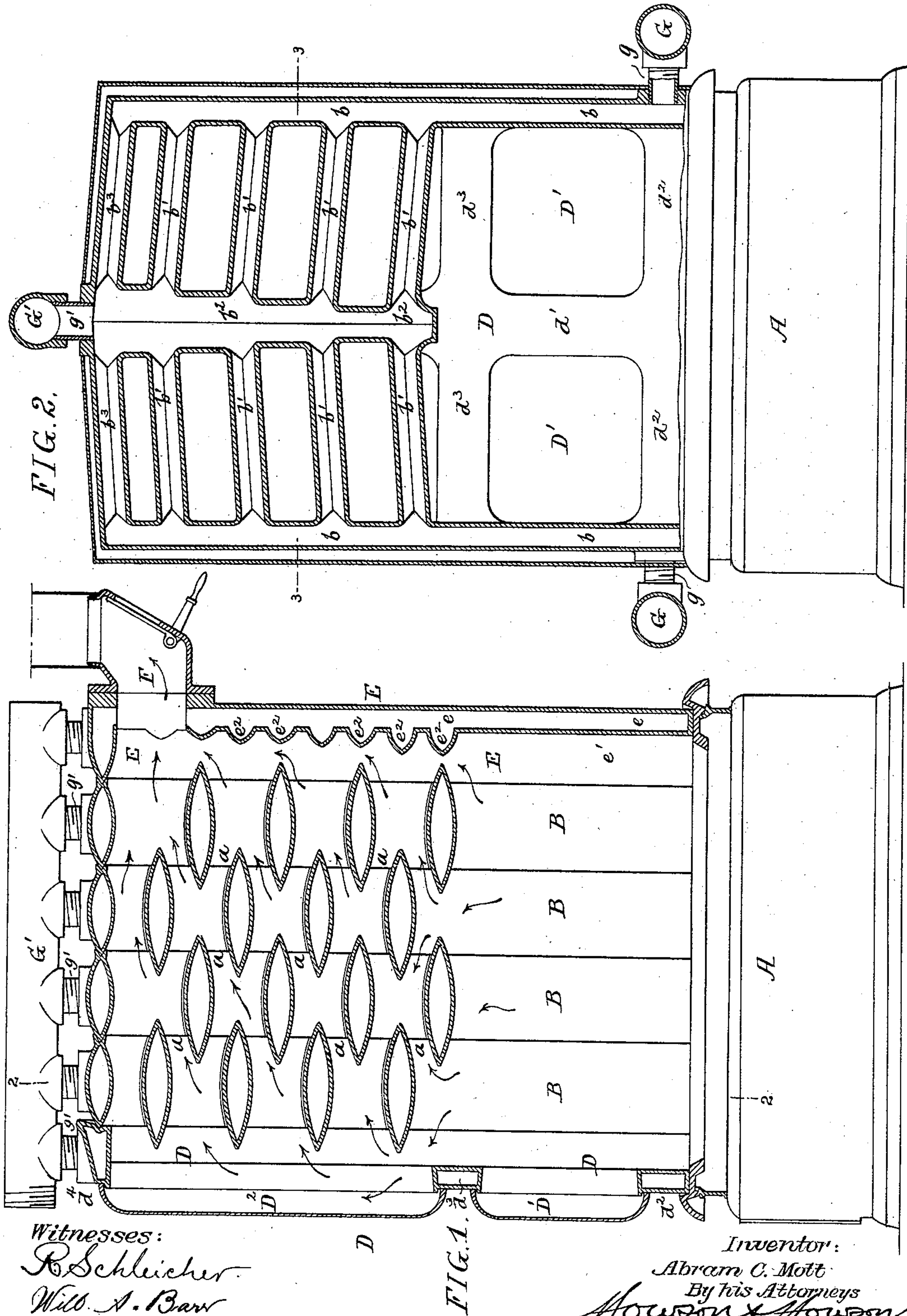
(No Model.)

2 Sheets—Sheet 1.

A. C. MOTT.
WATER HEATING FURNACE.

No. 540,453.

Patented June 4, 1895.



(No Model.)

2 Sheets—Sheet 2.

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FIG. 3.

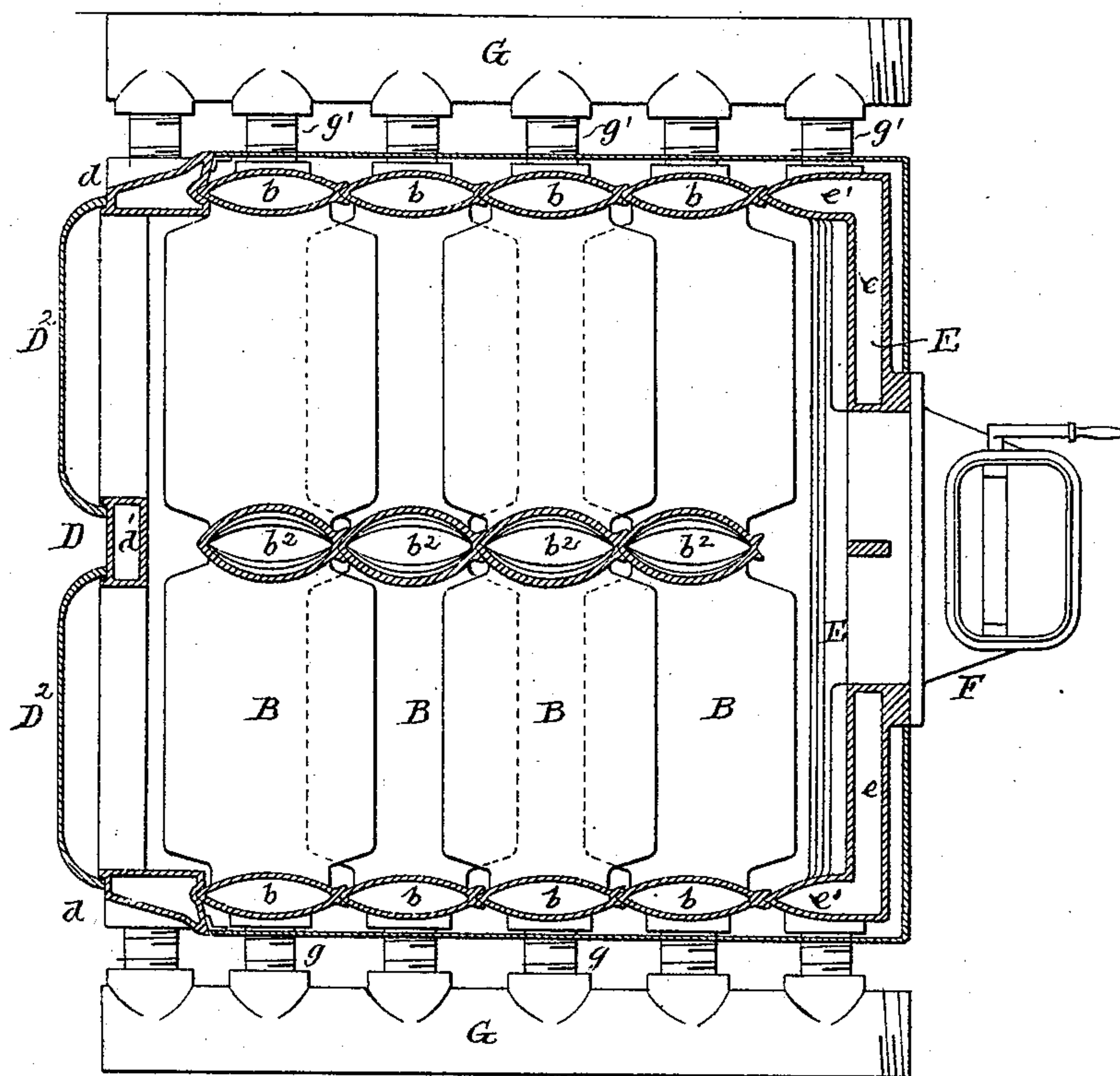
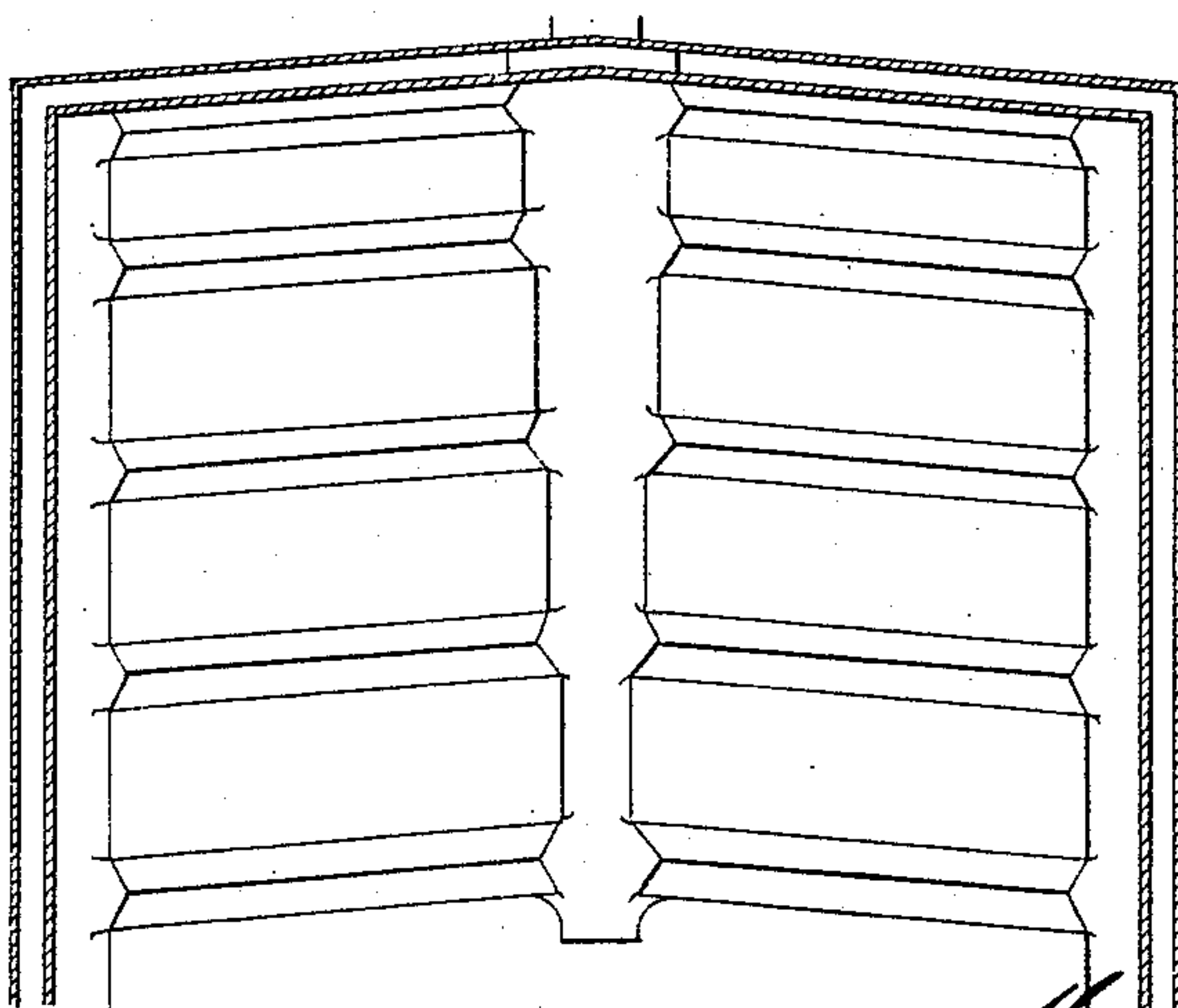


FIG. 4.



Witnesses:
R. Schlicher.
Will. N. Barr.

Inventor:
Abram C. Mott
By his Attorneys

Howson & Howson

UNITED STATES PATENT OFFICE.

ABRAM C. MOTT, OF PHILADELPHIA, PENNSYLVANIA.

WATER-HEATING FURNACE.

SPECIFICATION forming part of Letters Patent No. 540,453, dated June 4, 1895.

Application filed July 21, 1894. Serial No. 518,250. (No model.)

To all whom it may concern:

Be it known that I, ABRAM C. MOTT, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented certain
5 Improvements in Water-Heating Furnaces, of which the following is a specification.

My invention relates to water heating boilers of the sectional type, such as are used especially for warming buildings and the object
10 of my invention is to so construct a hot water furnace of this type that perfect circulation is insured, the parts can be readily assembled and the products of combustion will be distributed throughout the entire furnace.

15 In the accompanying drawings, Figure 1 is a longitudinal section of my improved hot-water furnace. Fig. 2 is a transverse section on the line 2 2, Fig. 1. Fig. 3 is a sectional plan on the line 3 3, Fig. 2, and Fig. 4 is a
20 side view of one of the sections.

A is the ash pit section, supporting the grate, which may be of any desired construction and upon this base section are mounted
25 the several sections B forming the side walls and roof of the furnace; the top, sides, and center portions of these sections B B fitting snugly one against another, preferably with tongue and groove joints, which I prefer to pack with sheet asbestos.

30 D is the furnace front also supported on the ash pit section and provided with water legs d at each side and a water leg d' at the center, these water legs being connected by cross channels d^2 , d^3 , d^4 forming a framework to
35 which may be secured the fire doors D' and combustion chamber doors D^2 . This front section has a groove adapted to receive the tongue of an adjoining water section B.

The back section E of the furnace has a
40 water chamber e extending the full width and height of the back space being left for the smoke flue. The back section has also hollow side legs e' , which communicate with the water space e and the back section is joined
45 to the side sections by tongue and groove joints.

The several sections are secured together, in the present instance, by the inlet manifolds G G near the bottom at each side and
50 the outlet manifold G' at the top, suitable

nipples g g' being screwed into the manifolds and into the several sections.

The sections B are made as shown in Fig. 4, said sections having side water channels b extending down to the grate and forming the
55 side walls of the fire chamber and a series of transverse channeled deflectors b' extending from each side channel to a central vertical channel b^2 which extends from the lowermost cross channel to the channel b^3 formed in the
60 roof of the furnace. The central vertical channel b^2 increases in diameter from bottom to top, as clearly shown in Fig. 2, so that the water will have free circulation in the channel, the tendency of the water being to travel
65 to the central channel, through the cross channels from the side channels. Hence, I make the central channel somewhat larger in diameter than the side channels. The cross channel
70 deflectors b' are much wider than the sides or roof of each section B so that when the sections are placed together, as shown in Fig. 1, the deflectors b' will overlap one another, thus preventing the products of combustion from
75 passing directly to the chimney. The deflectors are preferably staggered, as shown in Fig. 1, so as to leave spaces a for the passage of the products of combustion.

The back plate E of the furnace has a series of projections e^2 which are in line with
80 the several deflectors, and the lowermost projection extends into the furnace a greater distance than the projection at the top, so that when the back section is coupled to the sections B, the lowermost projection e^2 will very
85 nearly touch the lowermost deflector b' directly over the fire chamber and the space between the back and the side sections will gradually increase in width as they near the smoke flue.

The doors D^2 of the combustion chamber are so shaped in the present instance, as to provide a large flue or passage for the products of combustion at the front of the furnace so that the tendency of the products of
95 combustion will be to pass up at the front of the furnace and travel across in a diagonal line to the smoke flue at the back of the furnace, thus insuring the proper heating of the entire surface of the boiler.

The several sections are so shaped that soot will not accumulate to any great degree and by shaping the sections as shown the surfaces can be readily cleaned from the openings at the front.

If it is wished to increase the capacity of a boiler one or more sections B can be added and the manifolds extended, the grate surface being also extended, or a foundation being built up to receive the added sections.

I claim as my invention—

1. The combination in a water heating furnace, of the vertical sections arranged side by side, each section having side water channels forming the side walls of the combustion chamber, and a series of transverse channeled deflectors extending from one side channel to the other, said transverse deflectors being wider than the sides and so arranged as to alternate with and overlap the adjoining deflectors, substantially as described.

2. The combination in a furnace, of the vertically arranged sections having side channels and a series of cross channels formed therein, the deflectors in which the cross channels are formed being wider than the sides and lozenge shaped in cross section, the deflectors of one section being out of line with and overlapping the deflectors of the adjoining section, forming inclined passages for the products of combustion, with means for securing the sections together, substantially as described.

3. The combination of the front section the intermediate body sections and the rear section having side and back water spaces, the front, rear and intermediate sections being united together, deflectors on the intermediate sections and projecting ribs on the inner surface of the back section, the lower ribs projecting farther into the furnace than the upper ribs, substantially as and for the purpose set forth.

4. The combination of the front section hav-

ing a flue space therein, intermediate sections coupled to each other and to the front section, deflectors in the upper portion of each intermediate section, the deflectors of one section overlapping the deflectors of the adjoining sections, a back section coupled to the intermediate sections, a smoke flue coupled to the back section, and inlet and outlet manifolds coupled to the several sections, substantially as described.

5. A section for a hot water heater consisting of a single casting having side legs forming part of the fire chamber and combustion chamber casing, vertical channels in said side legs, deflectors for forming a series of inclined channels in the upper portion of the combustion chamber, and a vertical channel extending from the lowermost cross channel to the upper channel and wider at the top than at the bottom, inlet openings being formed in each leg and outlet openings at the top, substantially as described.

6. The combination in a water heating furnace, of the ash pit casing, the grate, the front section having side and cross flues and a combustion chamber in the upper portion, intermediate sections consisting of side legs and transverse deflectors, said deflectors being wider than the legs, and a back section having water channels at the side and back and having a series of ribs projecting from its inner surface, the lower ribs projecting farther than the upper ribs, a flue opening in said back section and inlet and outlet manifolds connecting the front, rear and intermediate sections together, substantially as described.

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

ABRAM C. MOTT.

Witnesses:

WILL. A. BARR,
JOSEPH H. KLEIN.