

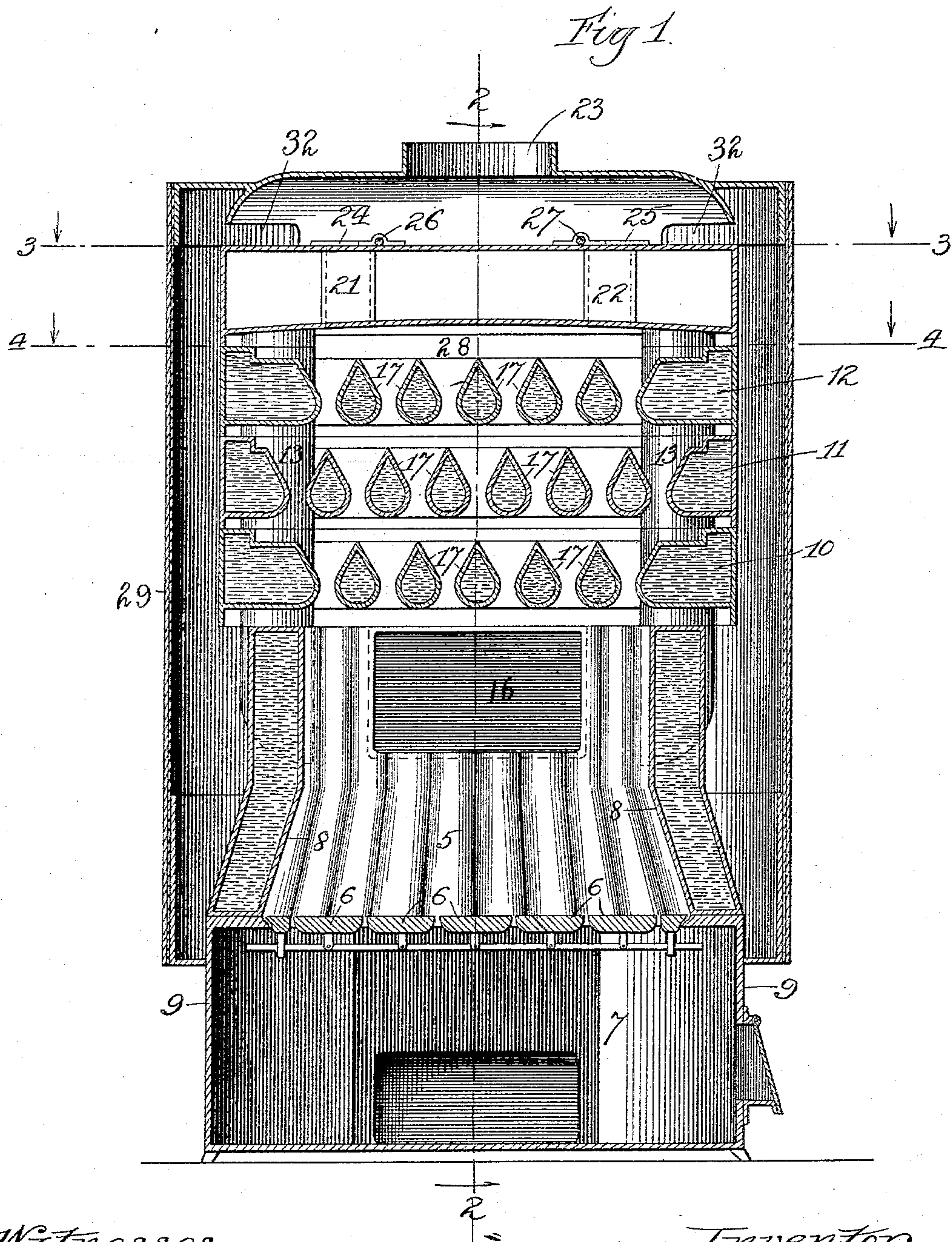
(No Model.)

3 Sheets—Sheet 1.

C. B. THOMPSON.
FURNACE.

No. 533,569.

Patented Feb. 5, 1895.



Witnesses.

Wm. M. Rheem.
Wm. J. Fleming

Inventor.

Charles D. Thompson
by Bond Adams & Pearson
his Atty's

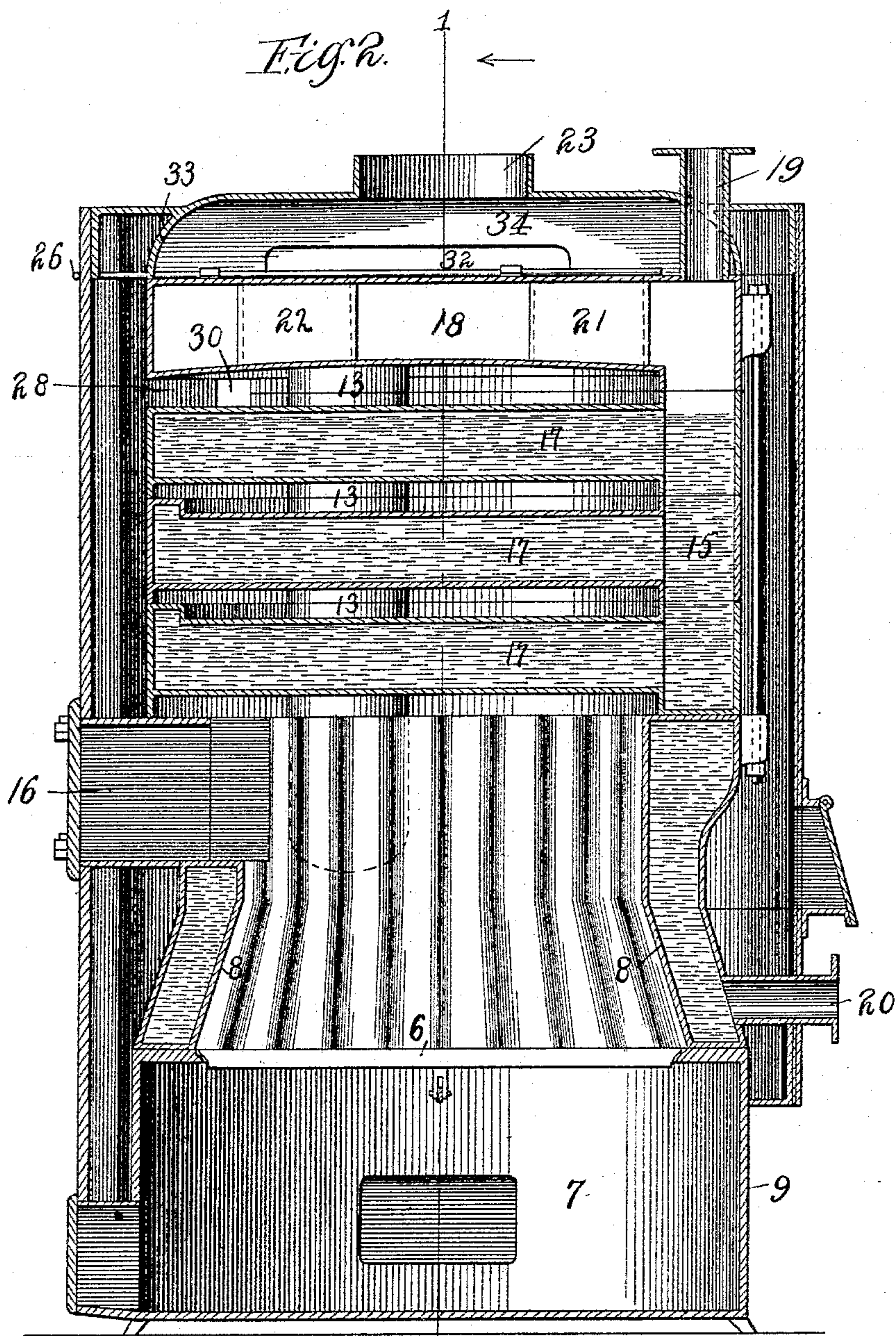
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Rosa M. Bickard Jackson
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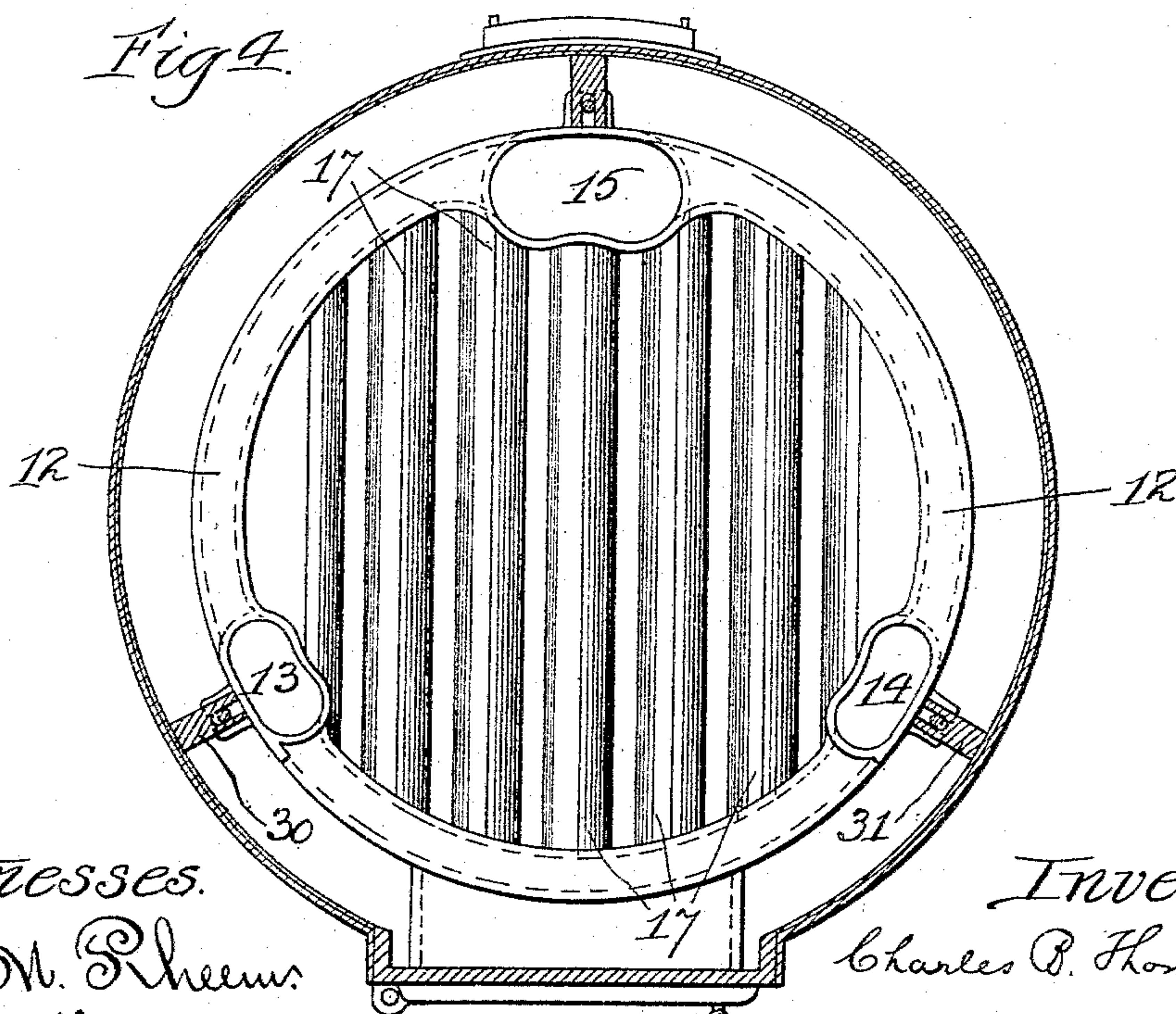
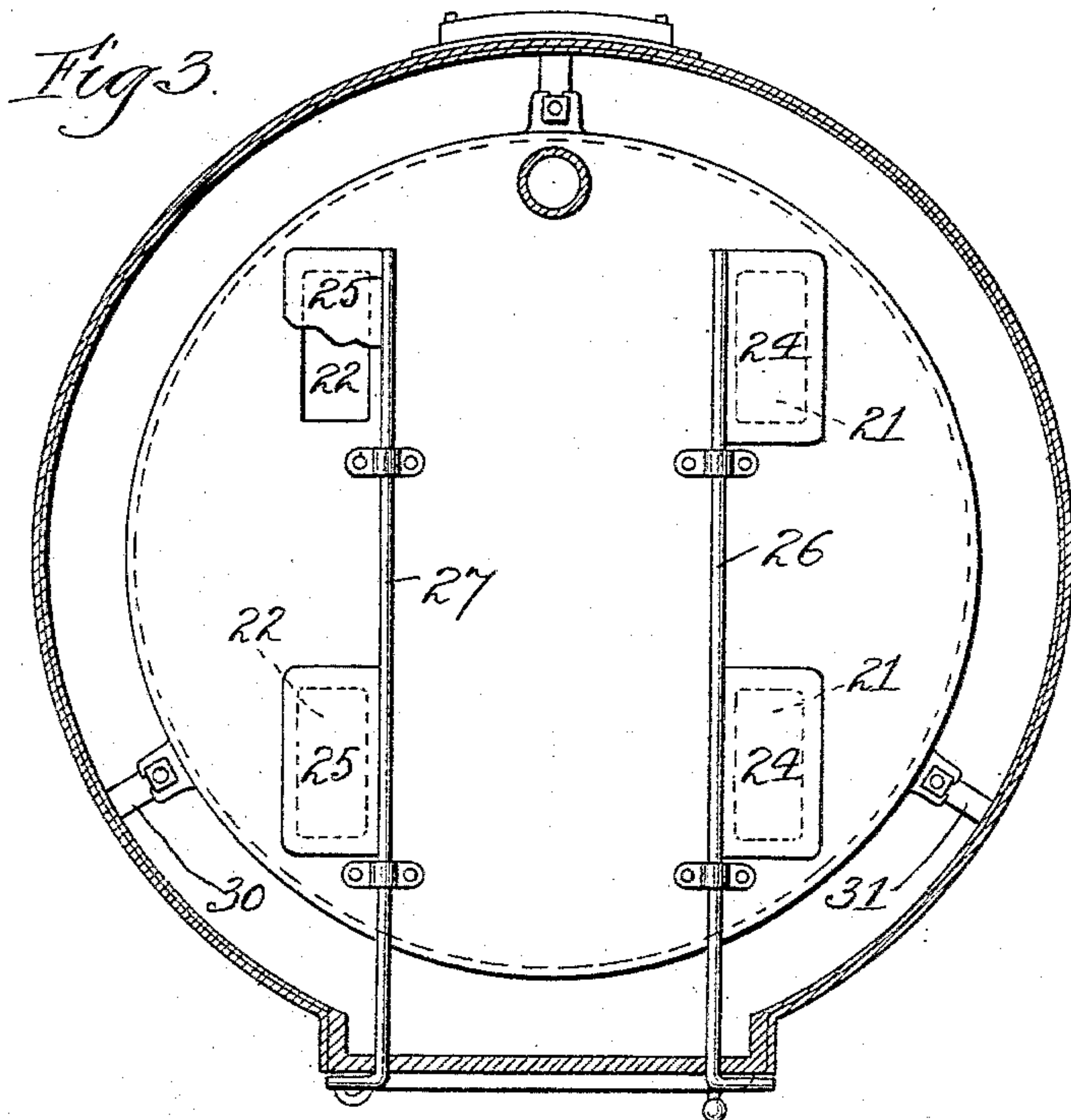
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Wm. A. Fleming

Inventor

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Attorneys

UNITED STATES PATENT OFFICE.

CHARLES B. THOMPSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE ILLINOIS HEATING COMPANY, OF SAME PLACE.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 533,569, dated February 5, 1895.

Application filed May 29, 1894. Serial No. 512,941. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. THOMPSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Furnaces, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical cross section on line 1—1 of Fig. 2. Fig. 2 is a vertical section on line 2—2 of Fig. 1. Fig. 3 is a horizontal section on line 3—3 of Fig. 1. Fig. 4 is a horizontal section on line 4—4 of Fig. 1.

My invention relates to furnaces, and has particularly to do with furnaces adapted for heating water for steam-heating purposes.

It has for its objects to provide for an improved circulation of water through the furnace; to provide a heating surface of increased area; and to provide an improved construction whereby the draft of the furnace may be more perfectly regulated. I accomplish these objects as hereinafter specified and as illustrated in the drawings.

That which I regard as new will be set forth in the claims.

In the drawings—5 indicates the fire-box, 6 the grate-bars, and 7 the ash-pit.

8 indicates a water jacket which rests upon the base 9 of the furnace and forms the wall of the fire-box 5, as shown in Figs. 1 and 2. Above the water jacket 8 are a number of annular flues 10—11—12 arranged one above another and communicating by means of vertical flues 13—14—15, as best shown in Figs. 1 and 4. The flue 15 is preferably arranged at the rear of the furnace opposite the furnace door 16, the flues 13—14 being arranged about one hundred and twenty degrees from the flue 15 at opposite sides of the furnace, as shown in Fig. 4. The flues 13—14 extend down to and communicate with the water jacket 8, as indicated by dotted lines in Figs. 1 and 2, but the flue 15 does not communicate directly with such water jacket.

17 indicates a number of flues which extend transversely of the furnace in a horizontal position, affording communication between the opposite portions of the different annular flues 10—11—12, as best shown in Fig. 2. The flues 17 are somewhat pear-shaped

in cross section, the rounded portion being lowermost, as shown in Fig. 1. The flues 17 of each row are parallel—or substantially so—with each other, and the different rows are staggered, so that flames and gases rising through a lower row of flues will be directed against the row next higher. By making the flues of the shape shown, a greater surface is exposed to the direct action of the flames and hot gases rising from the fire-box, and consequently greater results are secured from the same heat than in any construction heretofore used; and by narrowing the upper portions of the flues more direct channels are presented for the passage of the flames and a better draft may thereby be secured.

18 indicates a steam dome which is arranged at the upper portion of the furnace and is in communication with the annular flues 10—11—12 by means of the vertical flues 13—14—15.

19 indicates an outlet pipe through which steam is conducted from the steam dome.

20 indicates a return pipe through which water from the condensation of the steam is returned to the rear portion of the water jacket 8, as shown in Fig. 2.

Water entering the rear portion of the water jacket 8 must pass around the fire-box to the passages 13—14 before it can rise, and consequently it is subjected to the direct heat of the fire-box for a considerable length of time. After reaching the vertical flues 13—14 it rises to the various annular flues and thence passes around the upper portion of the fire-box, the greater portion passing through the flues 17, where it is exposed to the heat of the furnace as above described. The steam generated is free to rise through the vertical flues 13—14—15 to the steam dome, and thence through the outlet pipe 19.

When a strong draft is desired the smoke and gases are conducted through the steam dome, through vertical passages 21—22, to a smoke chamber 34 at the top of the furnace, and thence to the smoke pipe 23. The smoke chamber 34 is formed by a top plate 33, the edges of which rest upon the top of the steam dome, as shown in Fig. 2. The smoke chamber 34 is cut off from the space between the outer casing 29 of the furnace and the outer

wall of the furnace proper, by the top plate 33, except at two points, where openings 32 are provided in the top plate 33; one of said openings being shown in Fig. 2.

5 When an indirect draft is desired the passages 21—22 are closed by lids 24—25 mounted upon rods 26—27 extending to the outside of the furnace, as shown in Fig. 3. The smoke and gases then pass through a lateral opening 28 into the space between the outer covering 29 of the furnace and the furnace proper, as shown in Fig. 2. That portion of such outer space into which the smoke is conducted is inclosed by vertical plates 30—31 15 which are arranged forward of the openings 32 at opposite sides of the door, which plates extend from the upper portion of the furnace to a point substantially on a level with the upper portion of the water jacket 8. The 20 smoke and gases pass down around the lower ends of such plates 30—31, and then rise and pass through the openings 32 in the top plate 33 to the smoke pipe 23. I prefer to make the plates 30—31 of the length described, but 25 obviously they may be of any desired length.

Although my furnace is primarily adapted for heating water for steam-heating, it may also be adapted for heating water for hot-water heating, and therefore I wish it to be 30 understood that my improvements may be used in any furnace to which they are adapted.

An important advantage arises from shaping the flues as described, which is that the furnace is thereby made practically self-cleaning 35 since all portions of the flues are exposed

to the flame, and therefore the soot is prevented from gathering upon them.

That which I claim as my invention, and desire to secure by Letters Patent, is—

1. In a furnace, the combination with a fire-box, of flues extending through said fire-box, said flues being pear-shaped, the rounded portions being lowermost, substantially as described. 40

2. In a furnace, the combination with a fire-box, of a plurality of layers of flues extending through said fire-box, said flues being substantially pear-shaped in cross section the rounded portions being lowermost and the flues in the different layers being staggered, 45 substantially as described. 50

3. A furnace flue consisting of a tube substantially pear-shaped in cross section, the rounded portions being lowermost substantially as described. 55

4. In a furnace, the combination with a fire-box, and an outer casing, of a steam dome, a smoke box, passages affording communication between the fire-box and the smoke box, means for closing said passages, vertical plates 60 30—31, a passage affording communication between the space inclosed by said plates and the upper portion of the fire-box, and one or more openings 32, substantially as described.

CHARLES B. THOMPSON.

Witnesses:

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ALBERT H. ADAMS.