

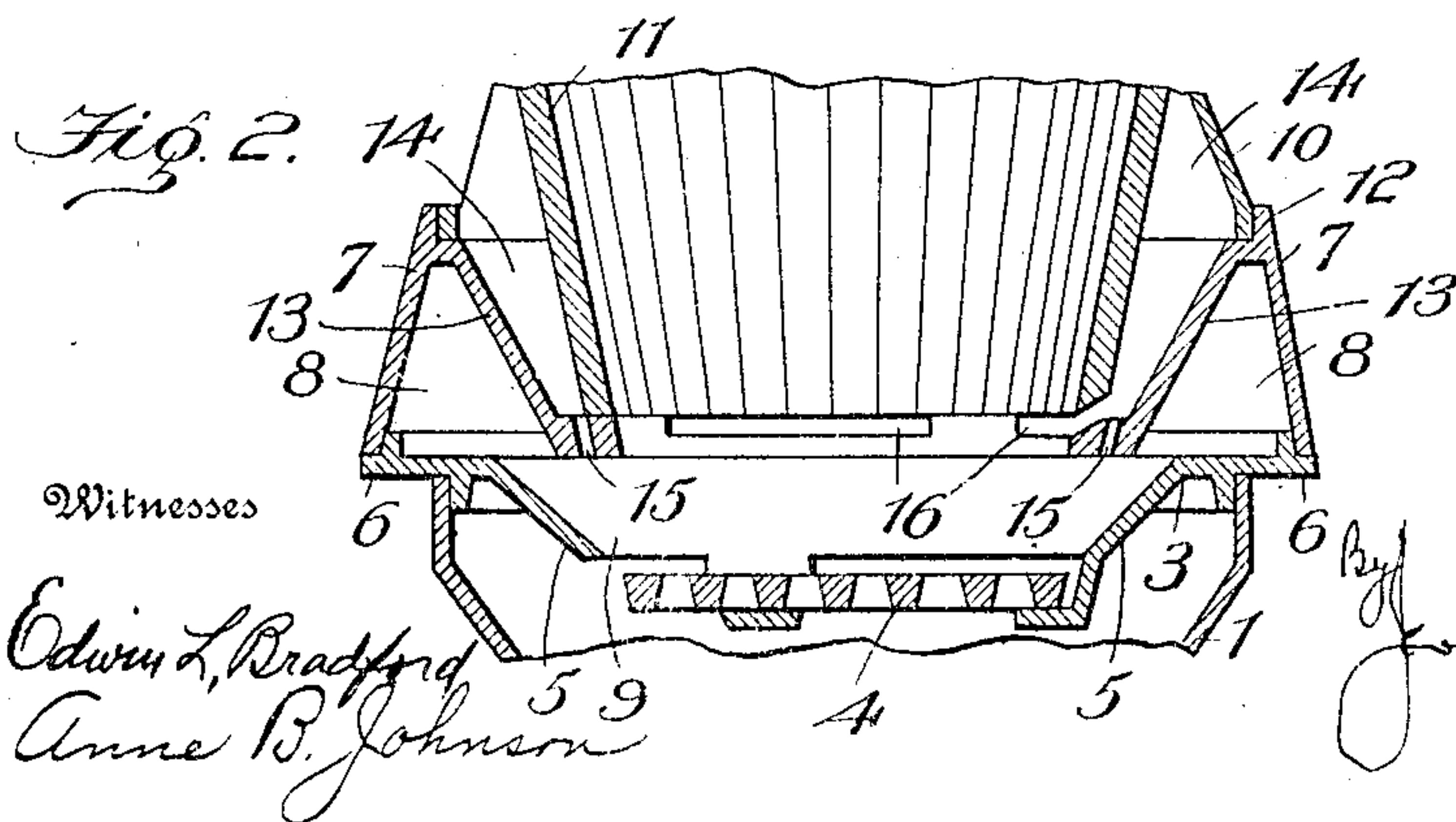
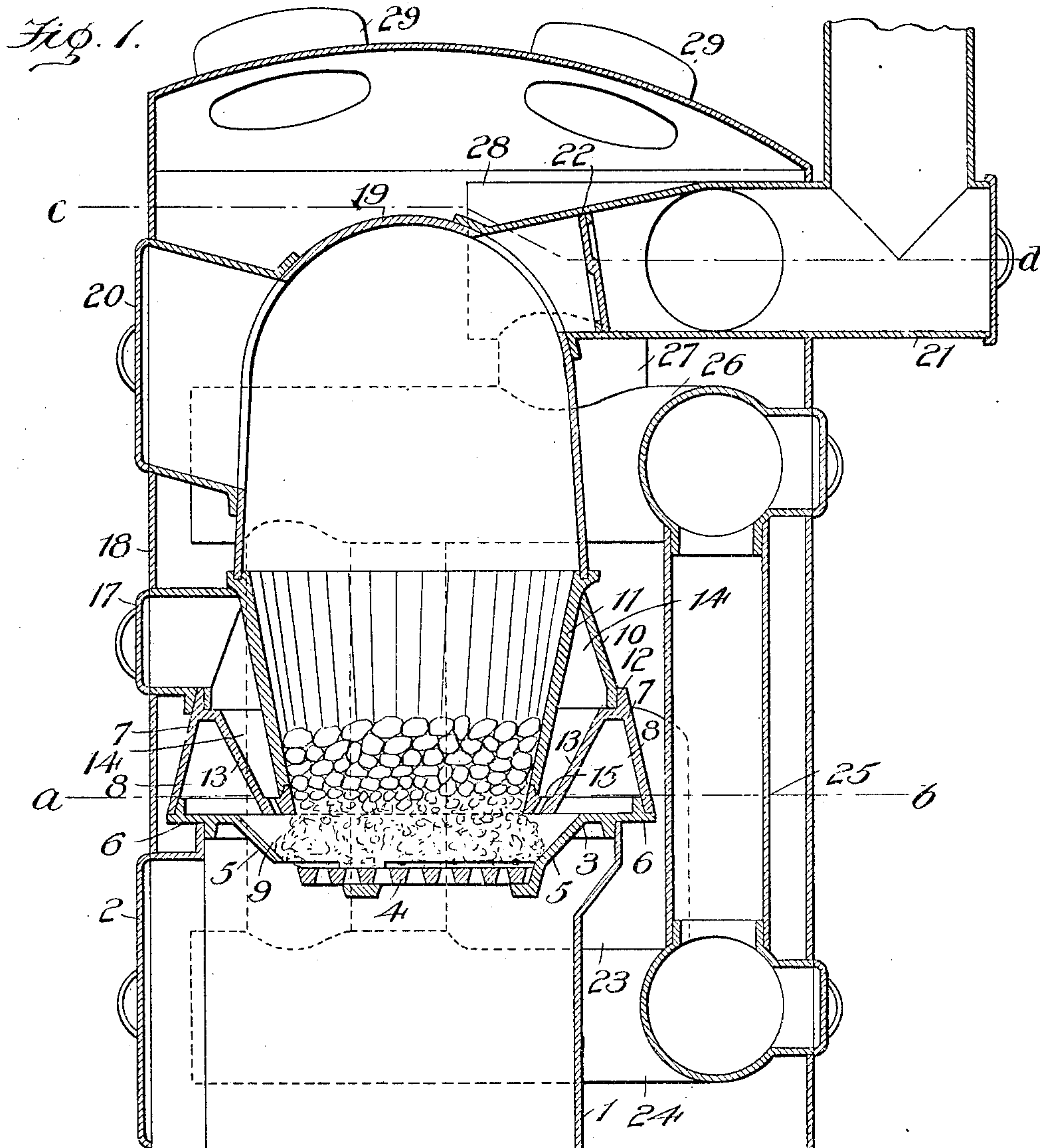
No. 843,104.

PATENTED FEB. 5, 1907.

C. F. A. RÖELL.
HOT AIR FURNACE.

APPLICATION FILED SEPT. 5, 1905. RENEWED DEC. 17, 1906.

2 SHEETS—SHEET 1.



Witnesses

Edwin L. Bradford
Anne B. Johnson

Inventor

Cornelis F. A. Röell

By *Johnson & Johnson*
Attorneys

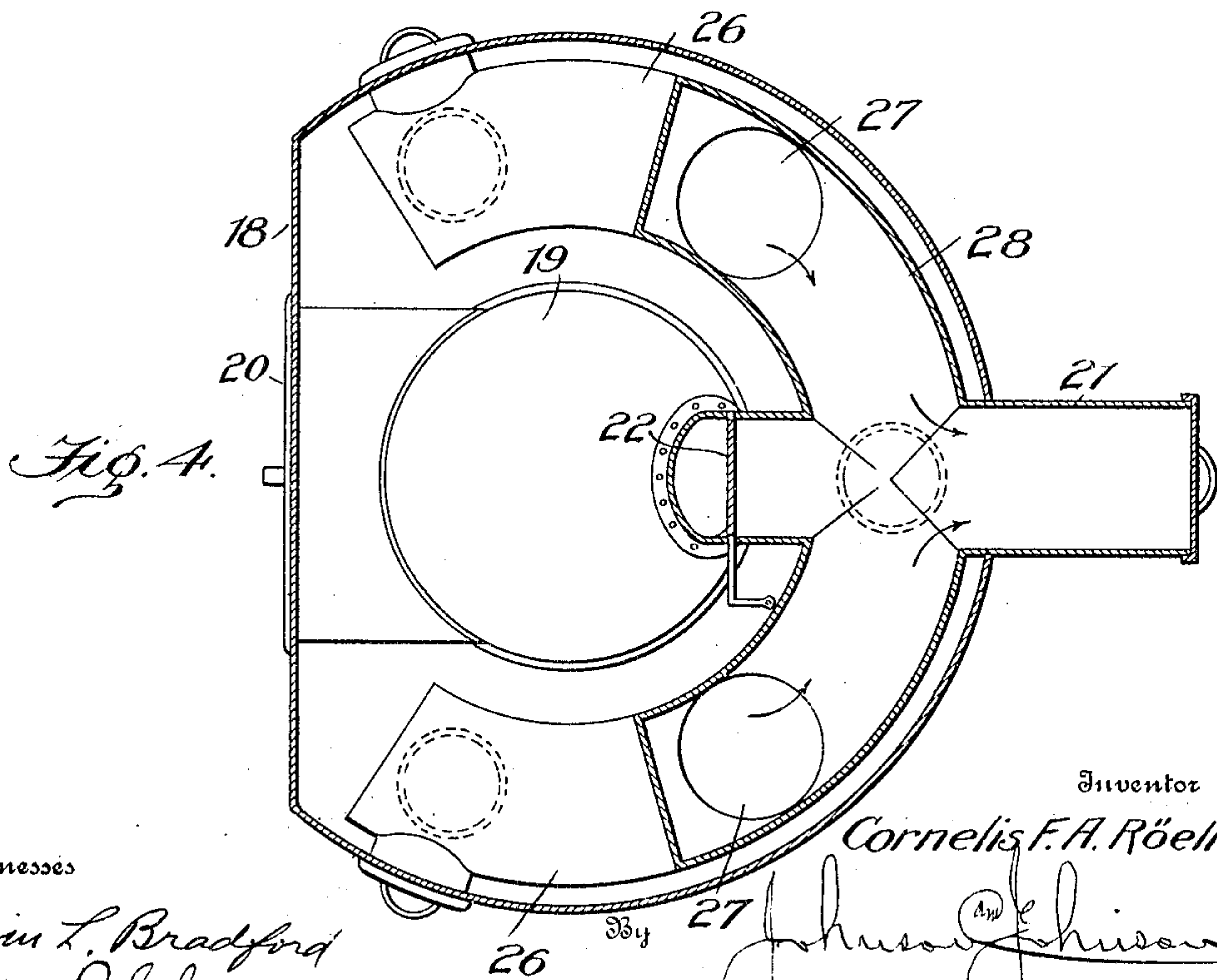
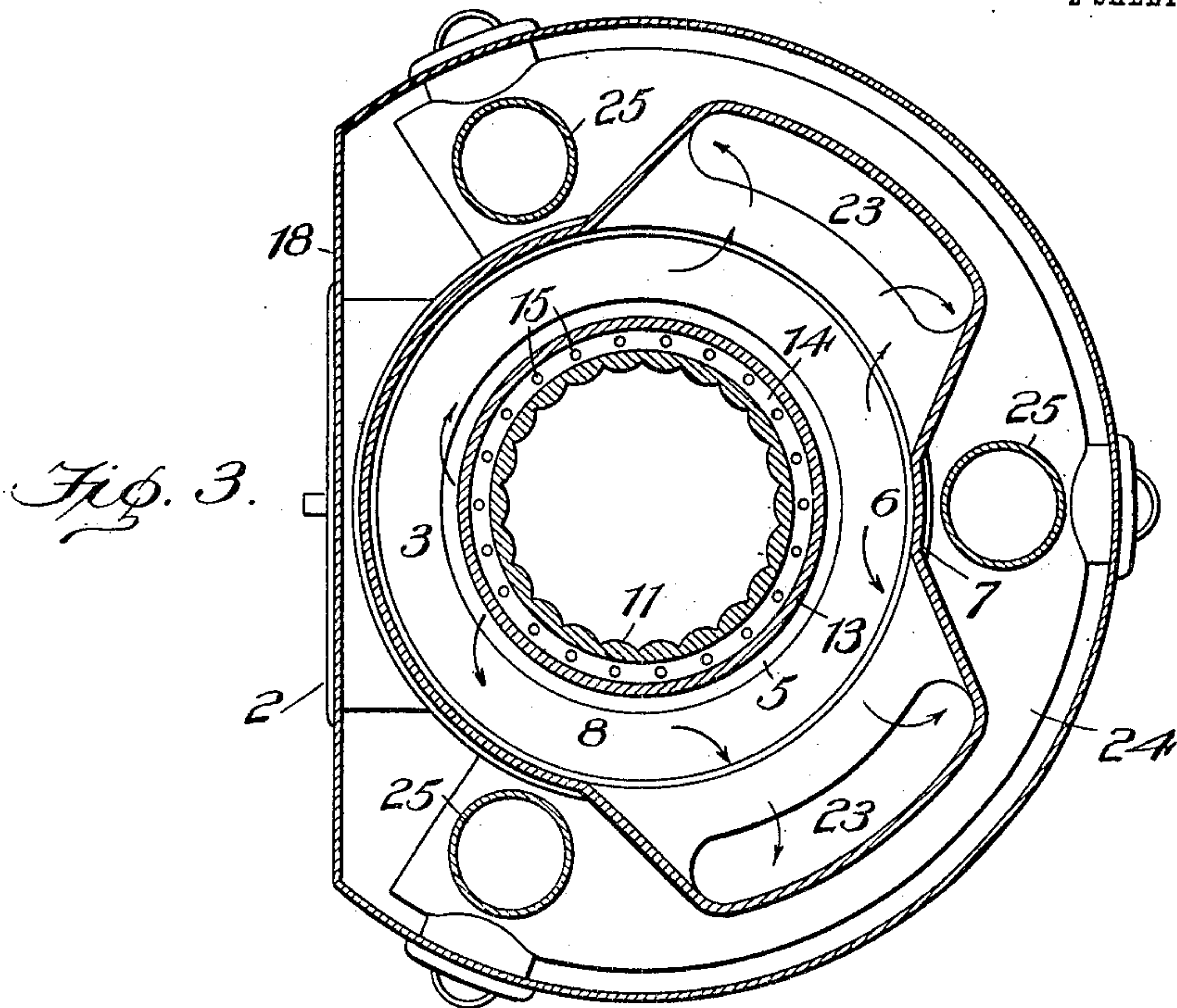
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Cornelis F. A. Röell

Johnson & Johnson
Attorneys

UNITED STATES PATENT OFFICE.

CORNELIS F. A. RÖELL, OF INDEPENDENCE, MISSOURI, ASSIGNOR TO
ROELL MANUFACTURING COMPANY, OF INDEPENDENCE, MISSOURI,
A CORPORATION OF MISSOURI.

HOT-AIR FURNACE.

No. 843,104.

Specification of Letters Patent.

Patented Feb. 5, 1907.

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To all whom it may concern:

Be it known that I, CORNELIS F. A. RÖELL, a citizen of the United States, residing at Independence, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Hot-Air Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the furnace known as "base-revertible draft" I have designed certain novel features of construction the purpose of which is to provide for an efficient central base-draft for producing a high heat with increased surface radiation and in which the construction is specially designed for durability and convenience of assembling of the fire-pot and its supporting and protecting air-chamber and fire-zone forming parts, and in the claims appended hereto I will point out the parts and combination of parts which constitute my invention, in connection with the accompanying drawings, in which—

Figure 1 represents in vertical central section a hot-air furnace embodying my invention. Fig. 2 is a vertical section of the fire-pot, the grate, and their supporting parts. Fig. 3 is a horizontal section taken on the line *a b* of Fig. 1. Fig. 4 is a like section taken on the line *c d* of Fig. 1.

Within an inclosing casing a cylindrical or ring casting 1 forms the ash-pit base, has the usual door 2 for the base-draft, and on this base-ring is seated a ring-plate 3, which is formed with a sunken bottom, on which the grate 4 is supported and from which the ring-wall 5 flares upward. The horizontal part of this ring-plate overhangs the base-casting and on its overhanging circular edge 6 is seated a trough-shaped casting 7, inverted so as to form a chamber 8, which opens into the sunken bottom of the ring-plate 3 and forms with it and with the grate the fire zone 9. Upon the apex of this trough-shaped casting is seated the base edge of a ring 10, which forms a frustum of a cone, and on its upper edge is supported laterally the fire-pot 11, the lower end of which terminates on a plane with the open bottom of the inverted trough.

The apex of the inverted-trough casting

forms a shouldered seat 12 for the upper conical ring, and this ring, the inner inclined wall 13 of said trough-casting, and the fire-pot together form a chamber 14 around the fire-pot for supplying air to the fire zone at the lower edge of the fire-pot. The fire-pot is supported upon the inner edge of the inner inclined wall of the inverted trough, and this edge is quite thick and has perforations 15, through which air from the chamber 14 passes into the fire zone, while spaces 16 may be formed around the upper side of the thick edge on which the fire-pot rests and beneath its edge, through which air from the chamber 14 enters the side of the fire-pot, so that these two outlets for the air from the chamber can be used together, the one promoting combustion in the fire zone, the other promoting combustion within and at the base of the fire-pot. The spaces entering the fire-pot, however, may be dispensed with, leaving the perforations opening into the fire zone. The air-inlet for the chamber 14 is by register 17 at the front of the casing 18, which incloses all the parts of the furnace, and the cold air circulating around this chamber and passing into the fire zone serves to protect the lower edge of the trough-wall 13, where the heat is greatest. As this wall 13 supports the fire-pot, it is the more important to protect the edge of the wall on which the fire-pot is seated, and the perforations 15 are made around this edge at the bottom of the air-chamber.

The dome 19 is supported on the top edge of the fire-pot, forms the combustion-chamber, has the feed-opening closed by a door 20, and has communication for direct draft with the smoke-pipe 21, which is controlled by a damper 22. From the inverted-trough casting, which forms the fire zone, one or more, preferably a pair, of flue-forming pipes 23 descend and open into a horizontal pipe-forming flue 24, having the form of a horse-shoe partially surrounding the base-casting and from which three flue-forming pipes 25 rise and open into a flue-forming pipe 26, partially surrounding the dome and which by two short pipes 27 communicate with a like pipe-forming flue 28, which intersects the horizontal branch 21 of the smoke-pipe between its exit and the damper 22 therein. It is this construction of three horizontal pipe-

forming flues 24, 26, and 28, one above the other, having communication with each other and with the smoke-pipe, that provides the revertible draft and the even distribution of the heat within the casing, because the draft passing through the different flues is at equal distance from the exit and forms an extended surface for the radiation of the heat within the casing. The lower pipe 24 receives the heat direct from the fire zone by the large diving flues 23 outside of the base-casting and delivers the heat by three pipes 25 into an upper horizontal pipe 26, from which it passes by two short pipes 27 into a still higher horizontal pipe 28, which intersects the smoke-pipe 21, and it will be noted that the vertical pipes 25 are disposed equal distances apart with the upper short flues 27 at equal distance on each side of the smoke-pipe and all at equal distances from the center of the fire-pot. 29 are openings in the top of the inclosing case, whereby the hot air therefrom may be carried where wanted. The fire-pot and its chamber-forming parts having no fastenings are quickly and conveniently assembled. The single casting of trough shape by being inverted and seated upon the outer edge of the grate-supporting ring-plate forms the fire-zone chamber, a support for the fire-pot, and a support for the conical ring, which, with the fire-pot and the inner wall of the inverted trough, forms the air-chamber around the fire-pot. This inverted-trough casting forms the means of connecting the diving flues of the revertible draft, and the coacting relation of this inverted trough and its connected elements gives economy in the construction and in the assembling of the parts and constitutes a feature of my invention.

It will be understood that the direct draft up through the grate is used in starting the fire and creates a vacuum in the pipes to render the revertible draft effective, because when the damper is closed the draft is compelled to follow the longest way; but the damper being open the draft will follow the shortest way, and hence only one draft at a time is active.

While I have shown the fire-pot, the grate, and the fire zone connected and forming parts assembled with revertible flue-pipe connections in a hot-air furnace, obviously these parts may be assembled in a stove or range in the same relation.

I claim—

1. In a hot-air furnace, an inclosing casing, a grate, a ring-plate supporting the grate, a trough-ring inverted upon the circumference of said ring-plate and forming a fire-zone chamber, a fire-pot seated upon the inner lower edge of said inverted trough, a conical plate seated upon the apex of said inverted trough and including its inner wall forming an air-chamber around the fire-pot, and re-

vertible flue-pipes connected to the outer wall of said inverted trough.

2. In a hot-air furnace, an inclosing casing, a base, a grate, a ring-plate having a sunken center support for the grate, a trough-ring inverted upon the circumference of said ring-plate and including the grate forming a fire zone, a fire-pot supported upon the inner lower edge of said inverted ring-trough, depending pipes connected to the outer wall of said ring-trough, a base-pipe partially surrounding the base and connecting the depending pipes, a plurality of flue-pipes connecting and rising from said base-pipe, and flue-pipes connecting said vertical pipes with the exit-pipe.

3. In a hot-air furnace, an inclosing casing, a base, a grate, a ring-plate, supporting the grate, a trough-ring inverted upon said ring-plate and forming a fire-zone chamber, a fire-pot seated upon the inner lower edge of said inverted trough, a conical plate seated upon the apex of said inverted trough and against the outer wall of the fire-pot and including the inner wall of said inverted trough forming an air-chamber around the fire-pot, a flue-pipe partially surrounding the base, revertible flue-pipes connecting the base-pipe and the outer wall of said inverted trough, a dome forming the combustion-chamber, a valved exit-pipe connecting the crown of the dome, a flue-pipe partially surrounding the dome, a plurality of flue-pipes connecting the base flue-pipe with the flue-pipe around the dome, a flue-pipe partially surrounding the crown of the dome and intersecting the exit-pipe, and a pipe connecting each end of said top flue-pipe with each side of the flue-pipe around the dome.

4. In a hot-air furnace including an inclosing casing, a grate, a ring-plate supporting the grate, a trough-ring inverted upon the circumference of said ring-plate and forming a fire-zone chamber, a fire-pot seated upon the inner lower edge of said inverted trough, a conical plate seated upon the apex of said inverted trough and including its inner wall having perforations around its inner lower edge forming an air-chamber around the fire-pot, and revertible flue-pipes depending from the outer wall of said inverted trough.

5. In a hot-air furnace, including an inclosing casing, a grate, a ring-plate supporting the grate, a trough-ring inverted upon the circumference of said ring-plate and forming a fire-zone chamber, a fire-pot seated upon the inner lower edge of said inverted trough-ring, a conical plate seated upon the apex of said inverted trough-ring and including its inner wall forming an air-chamber around the fire-pot, said trough-ring being provided with perforations in the base edge of said inner wall opening into the fire zone and spaces at the seating of the fire-pot upon said wall edge opening into the fire-pot, and

revertible flue-pipes depending from the outer wall of said inverted trough-ring.

6. In a hot-air furnace, an inclosing casing, a grate, a fire-pot, an inverted ring-trough
5 surrounding the base of the fire-pot and including the grate forming the fire zone, revertible flue-pipes depending from the outer wall of said inverted ring-trough, a base flue-pipe connecting the revertible flue-pipes,
10 a dome forming the combustion-chamber, a smoke-pipe connecting the dome and having a direct-draft-controlling damper, and a plurality of vertical and horizontal flue-pipes connecting the base flue-pipe with the
15 smoke-pipe between the controlling-damper of the latter and the exit for the purpose stated.

7. In an air-heating furnace and including an inclosing casing, a grate, a ring-supporting
20 plate therefor, an inverted ring-trough provided with an inward-projecting edge seated upon the circumference of said ring-plate and with it and the grate forming a fire zone, a fire-pot supported upon the inward-project-
25 ing edge of the inverted trough, and reverti-

ble flue-pipes depending from the outer wall of said inverted ring-trough.

8. In an air-heating furnace, an inclosing casing, a grate, a ring-supporting plate there-
for, an inverted trough-ring forming with 30 said plate and the grate, the fire zone, a fire-pot supported upon an inner edge of the inverted trough, revertible flue-pipes depending from the outer wall of said inverted
35 trough, and a ring-plate seated on the top of said trough and with its inner wall and outer wall of the fire-pot, forming an air-chamber, the bottom of said trough at its inner end having perforations opening into said cham-
40 ber and into the fire zone and openings leading from said chamber into the fire-pot at its lower edge.

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

CORNELIS F. A. RÖELL.

Witnesses:

W. S. LOAR,

A. J. FLETCHER.