

No. 771,026.

PATENTED SEPT. 27, 1904.

A. J. RANDALL & F. W. HARRIS.

HOT AIR FURNACE.

APPLICATION FILED DEC. 24, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

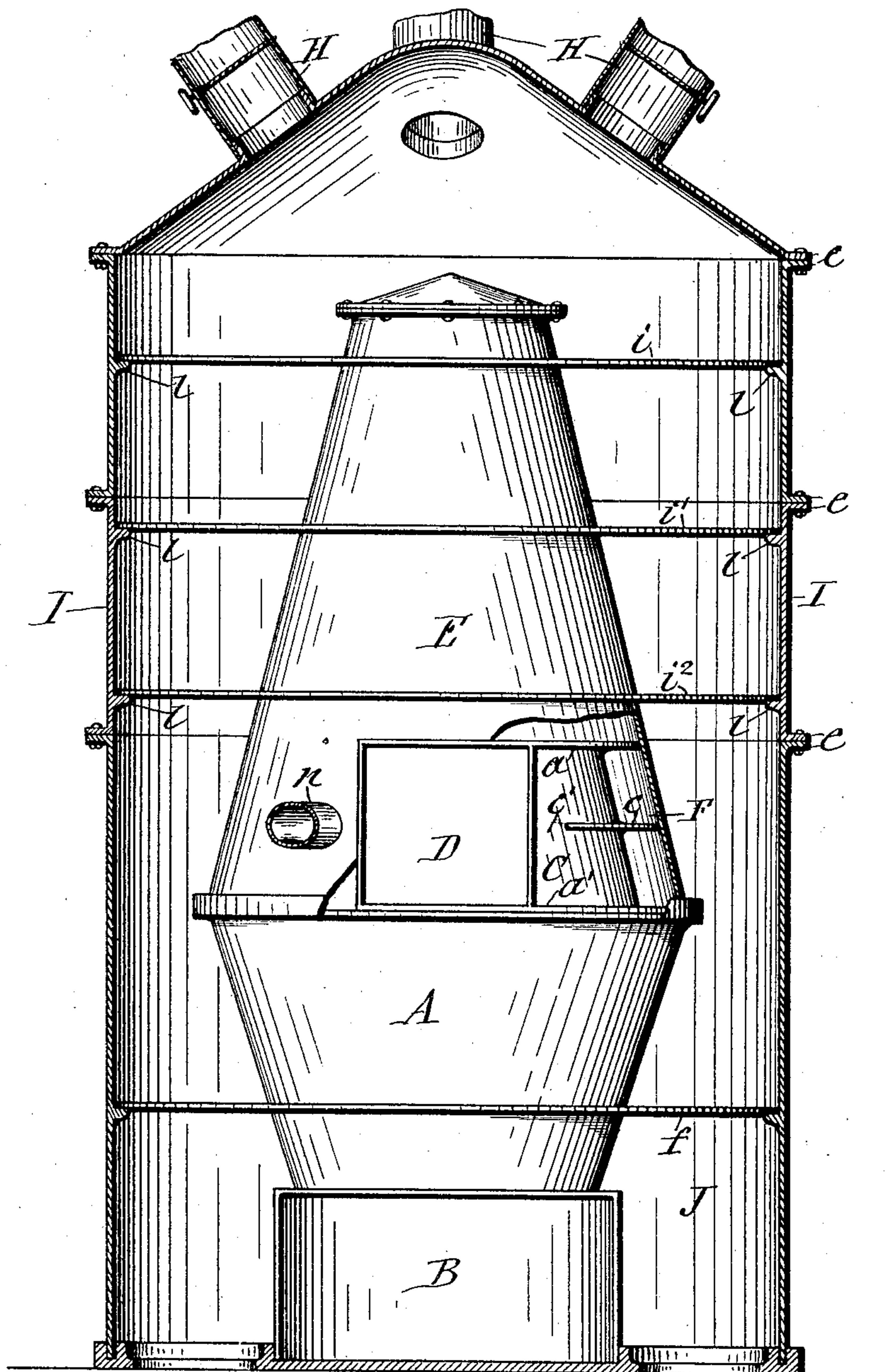


Fig. 1

WITNESSES:

J. J. Laass.
E. L. Meier.

INVENTORS
Arthur J. Randall
& Frank W. Harris
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3 SHEETS—SHEET 2.

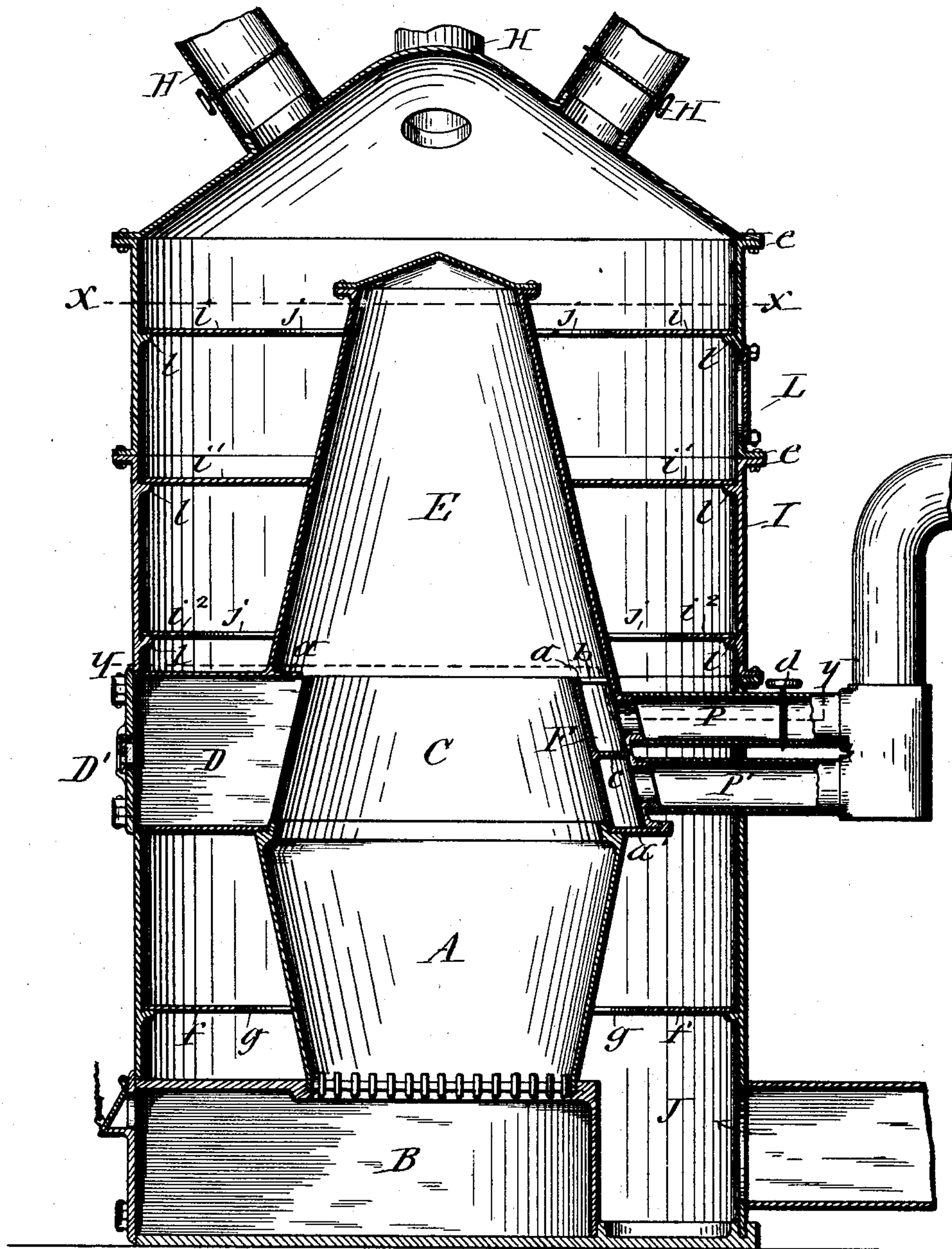


Fig. 2

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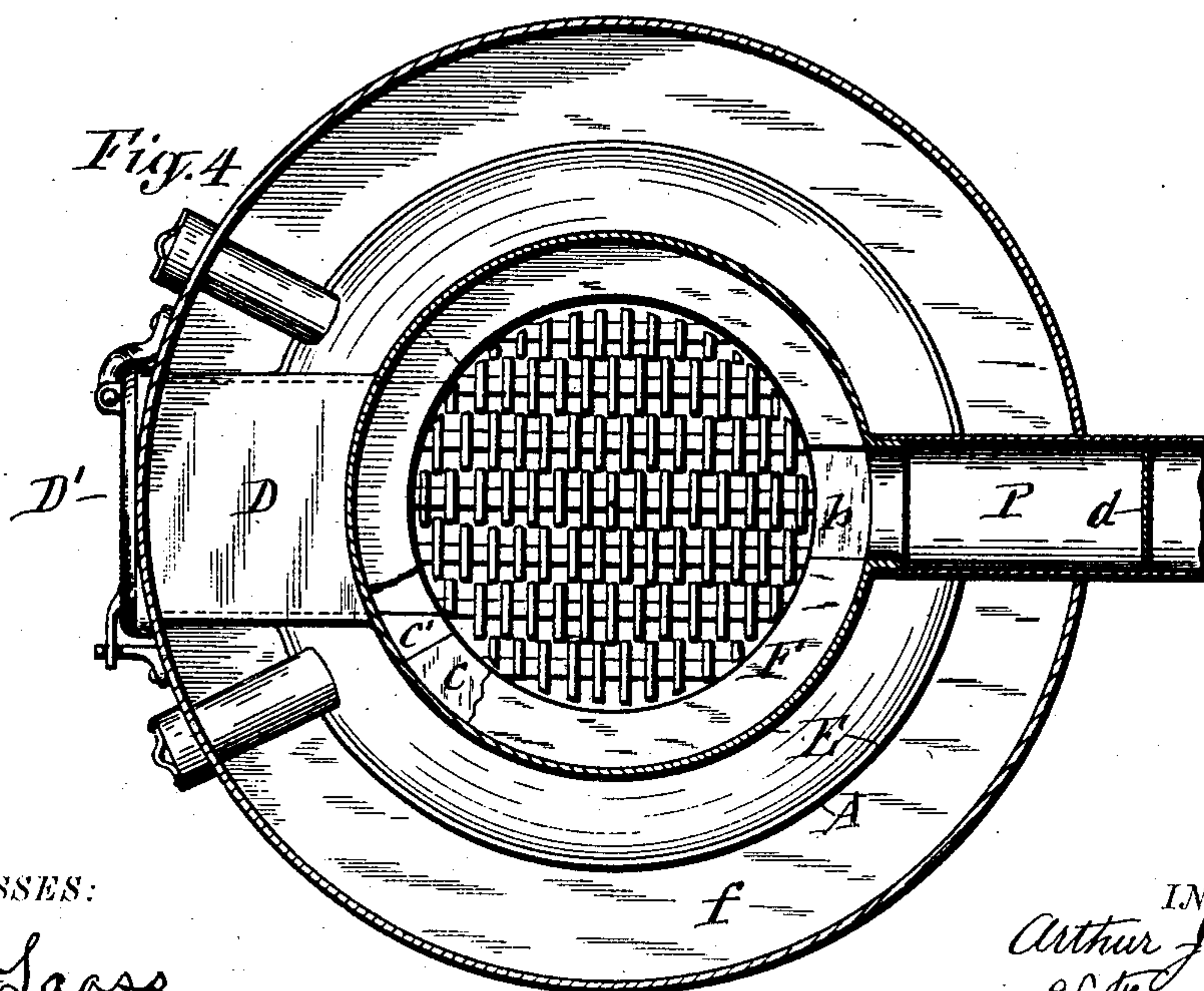
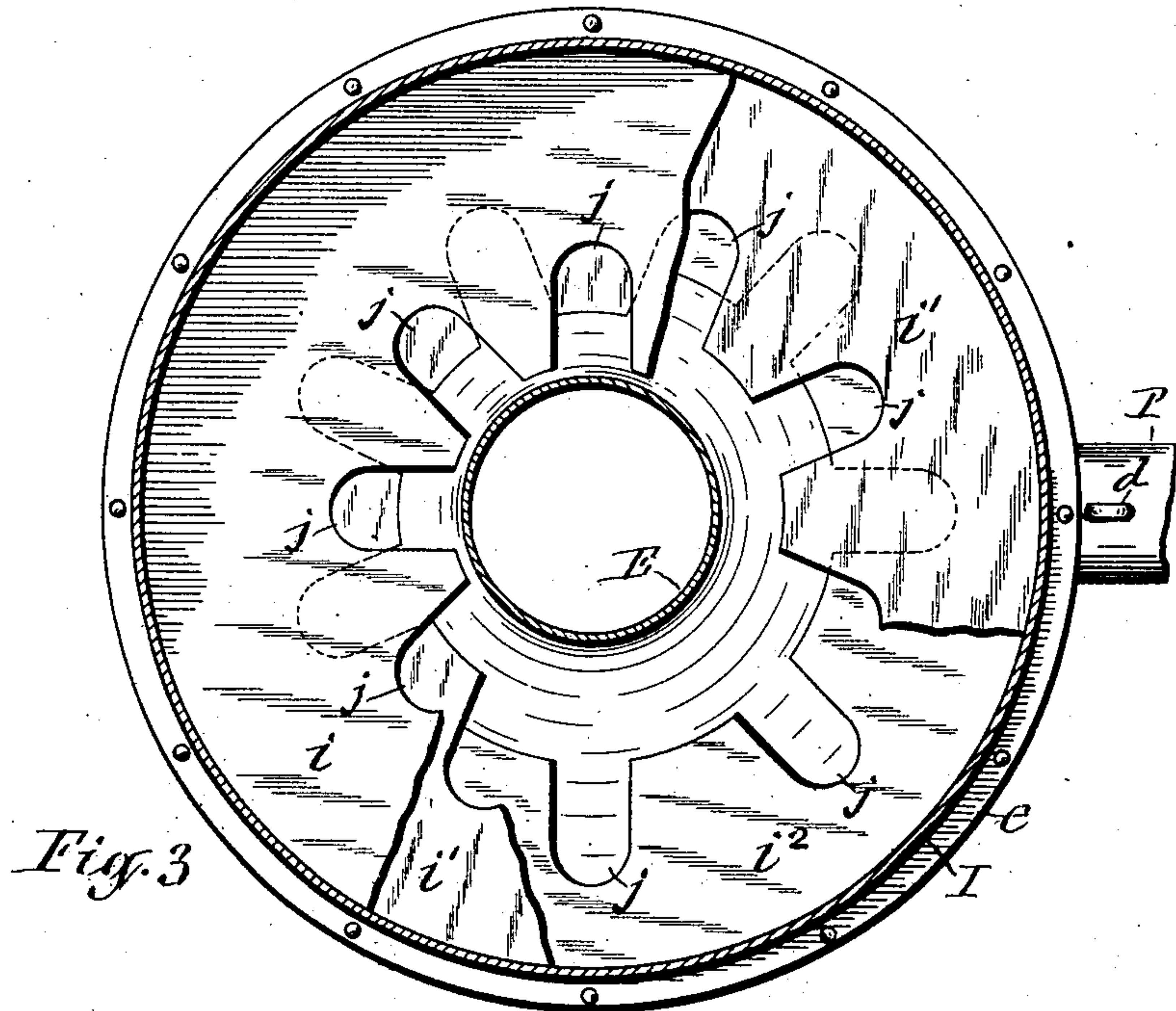
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3 SHEETS—SHEET 3.



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E. L. Meier.

INVENTORS:
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UNITED STATES PATENT OFFICE.

ARTHUR J. RANDALL, OF MANLIUS, AND FRANK W. HARRIS, OF
FAYETTEVILLE, NEW YORK.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 771,026, dated September 27, 1904.

Application filed December 24, 1903. Serial No. 186,425. (No model.)

To all whom it may concern:

Be it known that we, ARTHUR J. RANDALL, residing at Manlius, and FRANK W. HARRIS, residing at Fayetteville, in the county of Onondaga, in the State of New York, citizens of the United States, have invented new and useful Improvements in Hot-Air Furnaces, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention consists in a novel construction and combination of a hot-air furnace which is simple and inexpensive to manufacture and efficient and economical in heating the interior of buildings.

The invention is clearly illustrated in the annexed drawings, in which—

Figure 1 is a front view with the casing shown in section and exposing the interior of our improved hot-air furnace. Fig. 2 is a vertical transverse section of said furnace. Fig. 3 is a horizontal transverse section on line X X in Fig. 2, with portions of the horizontal partitions broken away to show the arrangement of the openings in said partitions; and Fig. 4 is a horizontal transverse section on line Y Y in Fig. 2.

Similar letters of reference indicate corresponding parts.

A represents the fire-pot, and B the ash-box.

C is a combustion-ring which is mounted on the fire-pot and is conical or inclined inwardly to cause the fire to more effectually impinge said ring and sufficiently deflect the heat toward the center of the ring to produce perfect combustion of the gases rising from the fire-pot.

D denotes the feed-passage extending from the combustion-ring C and provided with the usual feed-door D'. This combustion-ring is provided with outwardly-projecting flanges *a a'* at its top and bottom.

E represents the dome, which is shaped conical and seated upon the bottom flange *a'* and closely embraces the top flange *a* and forms the outer wall of a flue F, surrounding the combustion-ring C, which constitutes the inner wall of said flue. The top flange *a* is provided with an aperture *b*, which is located in

the center of the length of the flue F and serves to conduct the products of combustion from the dome E into said flue.

To form a circuitous and partly-retarding passage for the products of combustion through the flue F, we provide the said flue with a horizontal partition *c*, disposed between the flanges *a a* and terminating in openings *c'* at opposite ends of the flue or nearly diametrically opposite the aperture *b*, so as to cause the products of combustion to be conducted from the inlet-opening *b* in opposite directions in the upper part of the flue, thence down into the lower part of the flue, and back to the center of the length of the flue, where two exit-pipes P P' extend from the flue. The pipe P, which communicates with the flue above the partition *c*, constitutes the direct exit and is provided with a suitable damper *d*. The other pipe, P', communicates with the flue F below the partition thereof and constitutes the indirect exit.

I represents the casing which incloses the furnace to collect the heated air which by means of the usual pipes H H is conducted therefrom to the apartments to be heated. We prefer to form the said casing of cast-iron to more effectually confine the heat therein and prevent radiation of the heat from the exterior of the casing, which we further insure by asbestos lining applied to the casing in the usual manner. (Not necessary to be shown.) To allow the said casing to be varied in height as may be required, we form it of horizontal sections mounted one upon the other and provided with perforated flanges *e e*, receiving through them bolts or rivets by means of which the sections are detachably secured to each other. A casing thus constructed is less expensive to manufacture, more durable, and more readily erected around the furnace proper than the usual sheet-metal casing formed in one piece or of permanently-united sections. The upper part of this casing we provide with a suitable door L to afford access to the interior of the case when desired for repairs or renewal of parts, herein presently explained. In the bottom part of the case we form a cold-air chamber J, the top of which

is formed of a horizontal partition f , located a sufficient distance above the bottom of the fire-pot A to cause the upper portion of the cold-air chamber to surround the fire-pot. The partition f is provided with openings g (shown in Fig. 2 of the drawings) adjacent to the fire-pot to cause the cold air to be brought into direct contact with the wall of the fire-pot, and thus receive heat therefrom.

$i i' i''$ are horizontal annular partitions or baffle-plates which extend from the dome E to the casing I and are mounted loosely on ledges or lugs $l l l$, cast or otherwise secured to the interior of the casing. The inner edges of the partitions rest on the wall of the conical dome and are supported by the slope of said wall, as shown in Fig. 2 of the drawings. The partitions $i i' i''$ are each provided with a series of apertures $j j j$ at their inner edges or adjacent to the dome to cause the air which ascends in the casing to be forced into intimate contact with the dome and absorb the heat therefrom. To retard the current of said air, so as to more effectually subject it to the heat of the dome, we arrange the openings j in each of the aforesaid partitions in different positions in relation to the openings in the adjacent partition, and thus form a tortuous passage for the air. The partitions $i i' i''$ can be shifted circumferentially on the ledges $l l l$ to regulate the positions of the apertures $j j j$ as may be found advisable. To permit the said adjustment of the partitions without taking the case I apart, we provide the casing with the door L, as hereinbefore stated, which door affords the necessary access to the partitions.

n represents one of the cleaning-flues which are extended from the ends of the circuitous flue F through the casing and permit soot and ashes to be removed from the said flue.

What we claim as our invention is—

1. The combination with the fire-pot and the dome, of the casing formed with a door in its side, horizontal annular partitions extending from the dome to the casing and provided with openings adjacent to the dome and movable in circumferential direction, and the cold-air chamber surrounding the fire-pot and communicating with the upper part of the casing as set forth.

2. The combination with the fire-pot, the casing, and hot-air pipes extending from said casing, of the combustion-ring mounted on the fire-pot and inclined inwardly therefrom, a circuitous flue formed directly on the exterior of the combustion-ring and extending the entire height thereof and provided with an inlet-opening in its top, the dome rising from the outer wall of the said flue, horizon-

tal annular partitions extending from the dome to the casing and provided with openings adjacent to the dome, direct and indirect smoke-flues extending from the circuitous flue, the cold-air chamber surrounding the fire-pot and communicating with the upper part of the casing as set forth.

3. The combination with the fire-pot and ash-box, of a combustion-ring mounted on the fire-pot and inclined inwardly therefrom, a circuitous flue formed directly on the exterior of said combustion-ring and extending from the bottom to the top thereof and provided with an inlet-opening in its top, a horizontal partition in said flue terminating in openings at the ends of the flue, exit-flues extending from the circuitous flue respectively above and below the partition thereof and at the center of its length, a damper in the upper exit-flue, the dome of conical shape rising from the outer wall of the aforesaid circuitous flue and communicating with the inlet-opening thereof, the casing composed of horizontal sections of cast-iron detachably united and provided with a door in its side, a horizontal partition surrounding the fire-pot and provided with openings adjacent thereto, a plurality of horizontal partitions extending from the dome to the casing and provided with apertures adjacent to the dome and in different relative positions in the successive partitions, and hot-air pipes extending from the top of the casing all constructed and combined substantially as set forth.

4. The combination with the fire-pot and casing, of a conical combustion-ring seated upon the fire-pot and provided with outwardly-projecting flanges at its top and bottom and with an aperture in its top flange, the conical dome seated upon the said bottom flange and embracing the top flange and forming a flue around the combustion-ring, a horizontal partition in said flue terminating in openings at opposite ends of the flue, exit-pipes extending from the said flue above and below the partition thereof, a damper in the upper exit-pipe, a cold-air chamber in the base of the casing and surrounding the fire-pot and provided in its top with apertures adjacent to the fire-pot, and horizontal partitions extending from the dome to the casing and provided with apertures adjacent to the dome and in different relative positions in the successive partitions all substantially as set forth and shown.

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FRANK W. HARRIS. [L. S.]

Witnesses:

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LUCIE C. ALSOP.