

(No Model.)

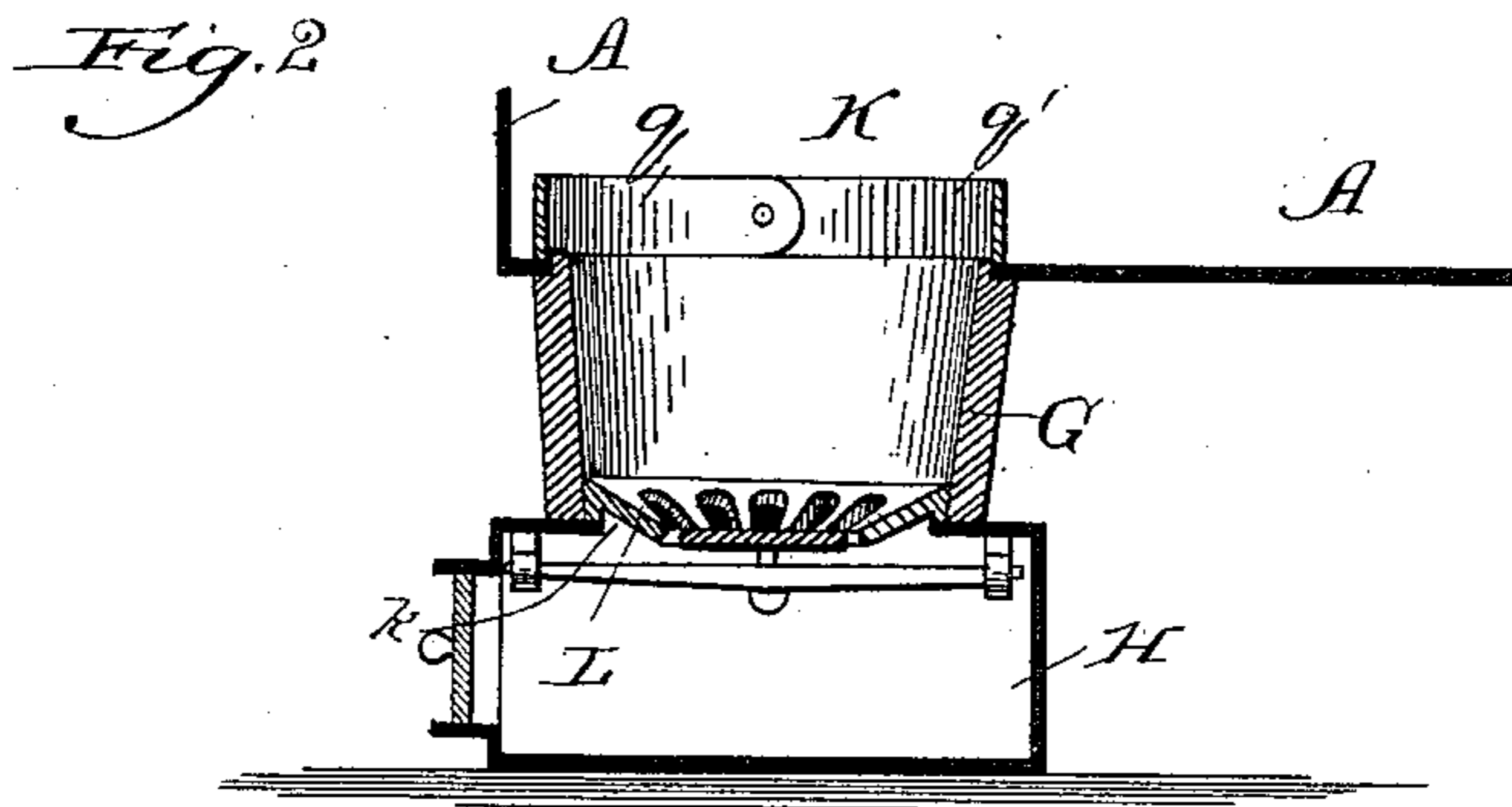
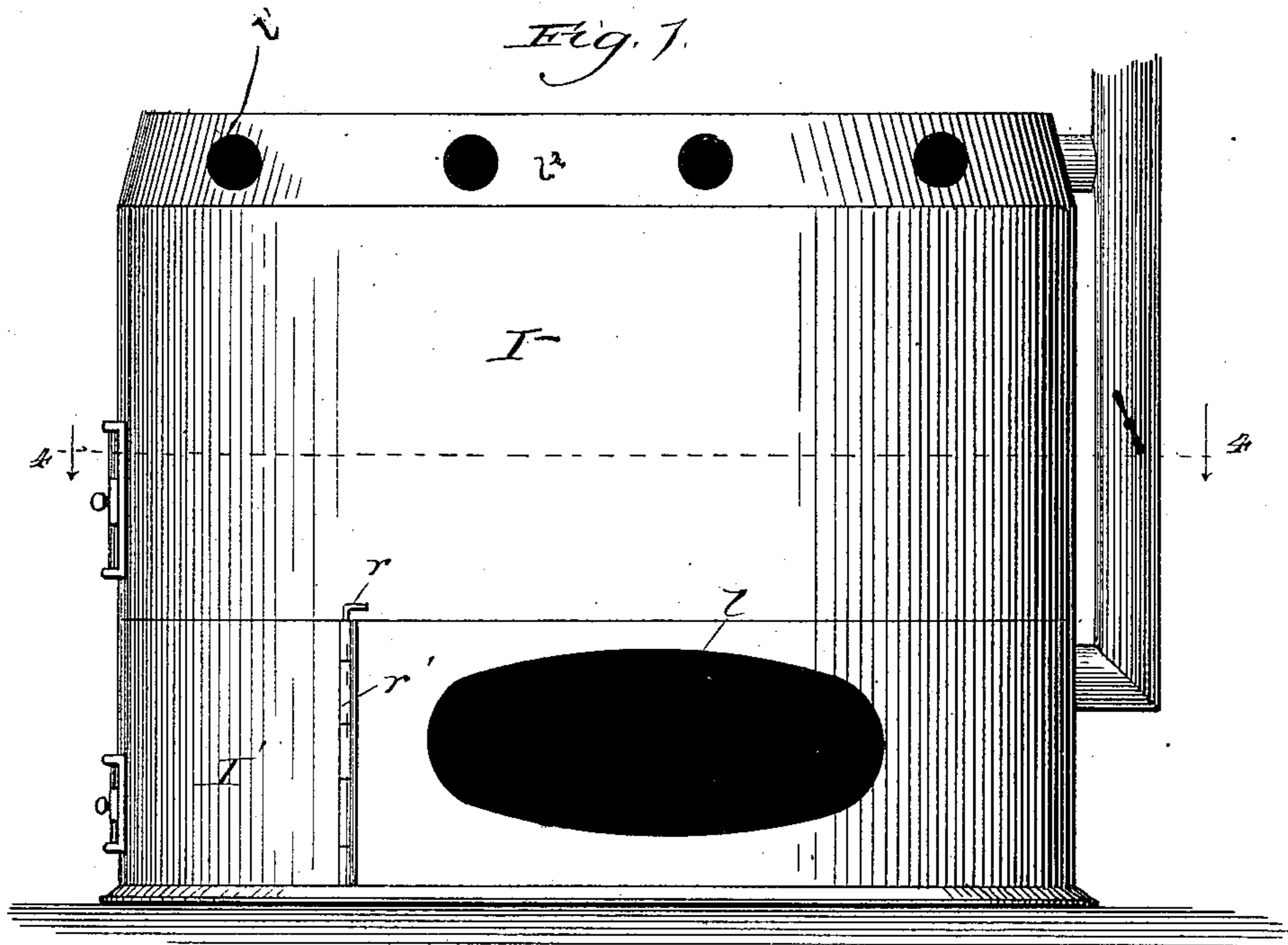
2 Sheets—Sheet 1.

M. T. BALDWIN.

AIR HEATING DEVICE.

No. 379,755.

Patented Mar. 20, 1888.



WITNESSES:

Chas. E. Gaylord.
Fred. Dorr.

INVENTOR

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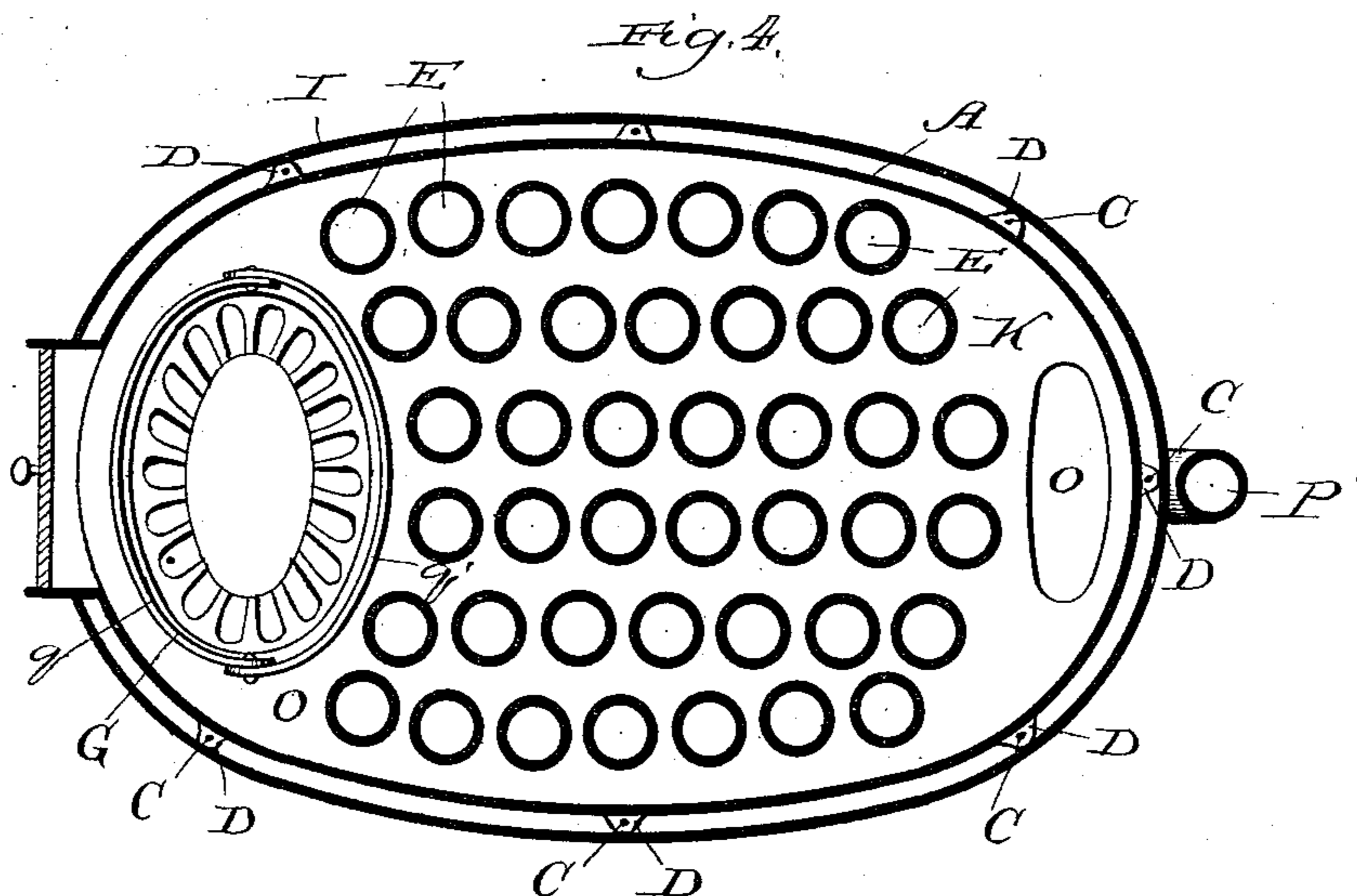
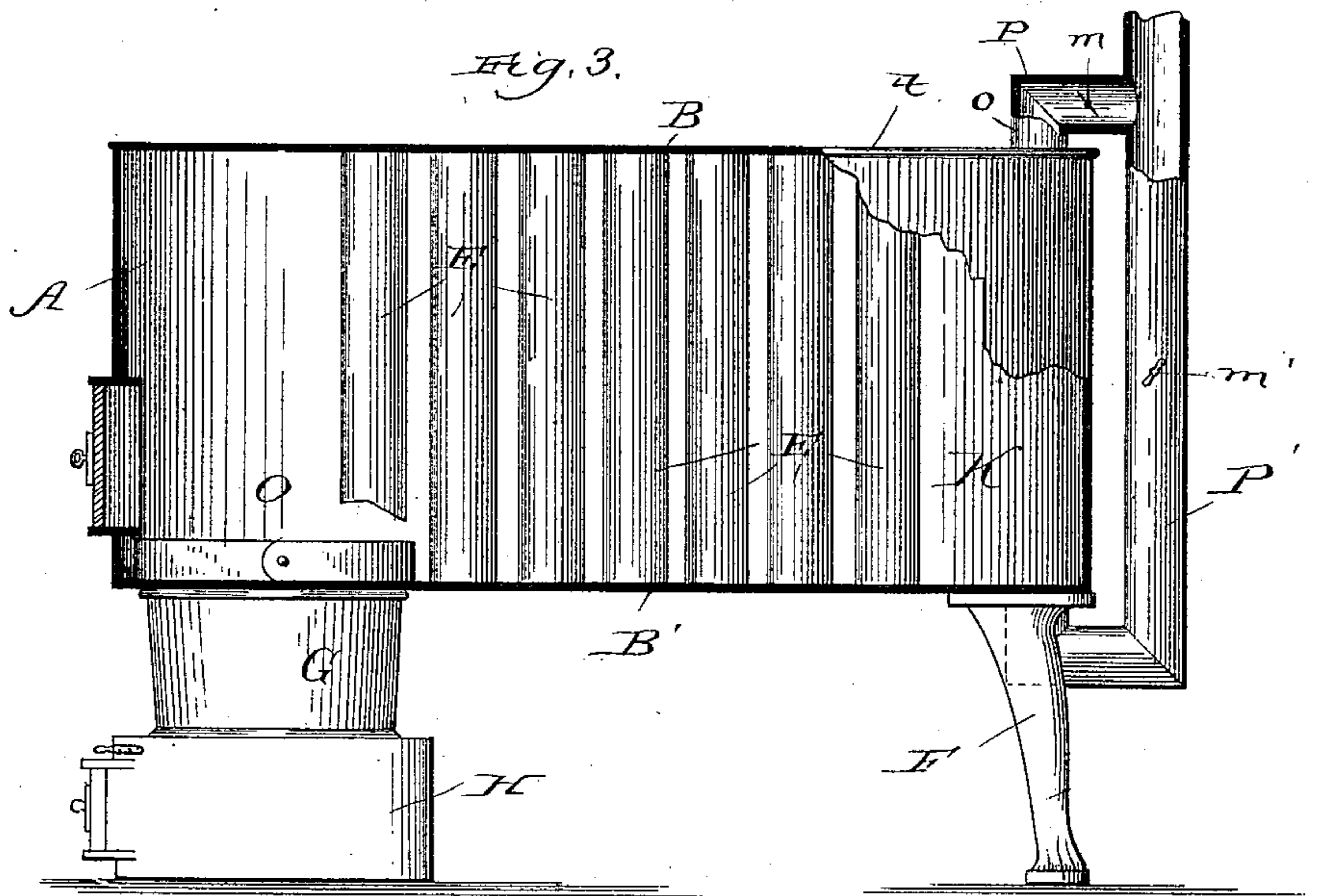
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2 Sheets—Sheet 2.

M. T. BALDWIN.
AIR HEATING DEVICE.

No. 379,755.

Patented Mar. 20, 1888.



WITNESSES:

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INVENTOR

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UNITED STATES PATENT OFFICE.

MYRON T. BALDWIN, OF LA GRANGE, ILLINOIS.

AIR-HEATING DEVICE.

SPECIFICATION forming part of Letters Patent No. 379,755, dated March 20, 1888.

Application filed May 13, 1887. Serial No. 238,025. (No model.)

To all whom it may concern:

Be it known that I, MYRON T. BALDWIN, a citizen of the United States, residing at La Grange, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Air-Heating Devices; and I hereby declare the following to be a full, clear, and exact description of the same.

My device constitutes a hot-air furnace, which contains the fire-pot, combustion-chamber, the air flues or pipes through which passes the air to be heated by the products of combustion, the ash-pit, and also, as is common with hot-air furnaces generally, an outside covering or casing.

It is my object to provide a device of the foregoing description which shall, owing to its construction and resultant manner of action, operate to heat air rapidly and intensely by the consumption of a comparatively small quantity of fuel, permit quick cleaning to remove soot and ashes, allow the fire-pot to be easily replaced by a new one when damaged by use, and which may be shipped in separate parts from the place of manufacture after the combustion-chamber and air-flues have been put together and cemented, so that it may be readily set up at its place of use by even inexperienced workmen.

My invention consists in the general construction of my device; and it also consists in certain details of construction and combinations of parts, all as hereinafter more fully set forth.

Referring to the drawings, Figure 1 is a side elevation of my improved device with outside casing; Fig. 2, a vertical central section through the fire-pot and ash-pit, the position of which features with reference to the body of the furnace is indicated by heavy lines; Fig. 3, a view in broken side elevation of the furnace with the outer casing removed, and Fig. 4 a horizontal section on the line 4 4 of Fig. 1 and viewed in the direction of the arrows.

The inner shell, A, forms the sides of the combustion-chamber and is made of sheet metal. The plates B and B' form, respectively, the top and bottom of the combustion-chamber, are made of cast-iron, and each has on its outer edge a flange or collar, *t*, to receive between them the opposite edges of the shell A, held in place by bolts or rods C, passed

through ears D, extending laterally from the plates B and B' in vertical line with each other, the rods being fastened with nuts. (Not shown.) The rods and nuts likewise hold the plates B B' together.

The combustion-chamber is oblong or oval in shape, as shown in Fig. 4, and has numerous small pipes or hot-air flues, E, passing through it perpendicularly and arranged in parallel or substantially parallel rows longitudinally of the combustion-chamber, the pipes being secured at their opposite ends to the upper and lower plates, B and B', and coincide with openings in the said plates in the usual manner of hot-air flues in furnaces. The flues E may be made of cast or wrought iron or sheet-steel.

The legs F, or equivalent thereof, support one end of the combustion-chamber, and the fire-pot G, resting on the ash-pit H, the other end of the same, as shown, whereby to remove the fire-pot for the purpose of substituting another it is but necessary to pry or lift up the forward end of the combustion-chamber, draw out the old fire-pot, and insert a new one. The casing I may be composed of sheet or galvanized iron, or may be made of brick where the furnaces are of large size and are to be permanently stationary.

At the lower front end of the casing I there is a movable section, I', which may be removed when it is desired to withdraw the fire-pot; and it is secured in place by means of rods *r*, inserted through cylindrical perforated ears *r'* on the edges of the casing I and section I', which ears coincide vertically when the section I is adjusted in place.

As will be seen, my heating device contains numerous small flues, by which the air in process of being heated is subdivided into a corresponding number of small portions, whereby the air is more intensely heated than it would be with the same degree of heat in the combustion-chamber were the flues of larger dimension.

Surfaces of metal forming the combustion-chamber, or surfaces coming into contact with the gases of combustion, soon become coated with ashes and soot, which materially prevent the heat of combustion from radiating through the metal. To facilitate the removal of this soot and ashes, I have arranged the flues in

parallel rows in line with the fuel-door in front and from the fire-pot, whereby with a suitably-constructed brush the flues, and also the sides of the combustion-chamber, may be easily and quickly cleaned, and by having the bases of the flues within the combustion-chamber terminate on a level with the upper edge of the fire-pot in connection with the floor or lower terminus of the combustion-chamber the accumulation of soot when brushed off the surfaces may be readily drawn from between the flues into the fire-pot and passed down into the ash-pit. To protect the lower end of the flues and prevent particles of fuel from passing between them, I have placed around the top of the fire-pot a movable ring, O, formed, preferably, in two parts, *q* and *q'*, hinged together, as shown, and so arranged that the part *q'* may be turned back or the ring removed entirely, so as to be withdrawn from between the top of the fire-pot and base of the flues when it is desired to clean the combustion-chamber and exterior of the flues.

The heat from the combustion within the fire-pot and the products of combustion rise directly upward from the fire-pot to the top of the combustion-chamber, when they pass backward between and around the flues and gradually settle as fresh hot products of combustion rise to take their place. At the rear extremity of the flues, occupying the extreme end of the combustion-chamber, is a space, K, constituting an equalizing draft-chamber with a flue-opening, *o*, at its base and top for the passage of the gases of combustion into the chimney. The upper opening acts as a direct draft during the building of a new fire, but is to be closed by a damper, *m*, in the pipe P during the active operation of the heater.

The lower opening, from which leads a pipe, P', having a damper, *m'*, and into which the pipe P enters, draws from the interior of the equalizing draft-chamber those gases which immediately surround it, and which are replaced by the gases from between the rows of flues at the base of the combustion-chamber, which, having become cool and more dense in their contact with the air-flues, naturally pass into the equalizing draft-chamber and flue-opening at the bottom. Thus it may be seen that the heat from combustion is utilized the whole length of the air-flues.

Aside from the outside casing, which is provided with an opening, *l*, on each side near its base to permit the access of air into the flues, and with openings *l'* at intervals all around the top from which to distribute the hot air, the construction of the furnace ready for shipment is in three distinct parts—namely, the combustion-chamber, containing the air-flues and equalizing draft-chamber, the fire-pot, containing the grate L, and the ash-pit H.

The narrow oblong shape and compactness of the combustion-chamber enable it to be easily transported after being put together at the place of manufacture, which enables the work to be more thoroughly done than if

shipped in separate parts and put together at the place of use, and, in connection with the fire-pot and ash-pit, may be set up quickly at its destination by inexperienced workmen.

Near the front end of the combustion-chamber, adjacent to the fuel-door R at the base, directly in front of the flues, is a large opening, *k*, to receive the upper end of the fire-pot, which passes into and supports one end of the combustion-chamber. The lower end of the fire-pot rests above the opening to the ash-pit, the ash-pit resting on the ground or floor of the place it occupies. The rear end of the combustion-chamber is supported by two legs, F. Thus it may be seen that when the lower front section, I', of the outer casing is removed, as hereinbefore described, the front end of the combustion-chamber may be raised or pried up by means of a lever from its resting-place on the fire-pot, when the latter may be easily withdrawn when damaged by use and replaced by a new one.

The outside casing forms two air-chambers—one below the combustion-chamber, which receives through the openings *l* from the surrounding space or from the bases of rooms the air to be heated, and one (indicated at *l'* in Fig. 1) at the top of the combustion-chamber, which receives air from the exterior of the combustion-chamber and from the interior of the air-flues for distribution at the openings *l'*.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a heating device, the combination of a drum or shell, A, forming the combustion-chamber, a fire-pot, G, opening into the base of the combustion-chamber near its forward end in line with the fuel-door and flush with the said base, vertical flues E, arranged in parallel or substantially parallel rows longitudinally within the combustion-chamber in line with the fuel-door, whereby ready access may be had through the fuel-door to opposite sides of each row of flues for the purpose of cleaning, as described, an equalizing draft-chamber, K, of the full interior width and height of the shell A between the rearmost transverse row of flues and adjacent end of the combustion-chamber, and a flue-opening, *o*, in the base of the said equalizing draft-chamber, substantially as described.

2. In a heating device, the combination of a drum or shell, A, forming the combustion-chamber, a fire-pot, G, opening into the base of the combustion-chamber near its forward end in line with the fuel-door and flush with the said base, a removable ring, O, surrounding the mouth of the fire-pot, vertical flues E, arranged in parallel or substantially parallel rows longitudinally within the combustion-chamber in line with the fuel-door, whereby ready access may be had through the fuel-door to opposite sides of each row of flues for the purpose of cleaning, as described, an equalizing draft-chamber, K, between the rearmost transverse row of flues and adjacent end of the

combustion-chamber, and a flue-opening, *o*, in the base of the said equalizing draft chamber, substantially as described.

3. In a heating device, the combination of a
5 drum or shell, *A*, forming the combustion-chamber, a fire-pot, *G*, opening into the base of the combustion-chamber near its forward end in line with the fuel-door and flush with the said base, a removable ring, *O*, surround-
10 ing the mouth of the fire-pot and formed in two parts, *q* and *q'*, hinged together, vertical flues *E*, arranged in parallel or substantially parallel rows longitudinally within the combustion-chamber in line with the fuel-door,
15 whereby ready access may be had through the fuel-door to opposite sides of each row of flues for the purpose of cleaning, as described, an equalizing draft-chamber, *K*, between the rear-most transverse row of flues and adjacent end
20 of the combustion-chamber, and a flue-opening, *o*, in the base of the said equalizing draft-chamber, substantially as described.

4. In a drum or shell, the combination of a drum or shell, *A*, forming the combustion-chamber, a removable fire-pot, *G*, supporting
25 and opening into the base of the combustion-chamber near its forward end in line with the fuel-door and flush with the said base, vertical flues *E*, arranged in parallel or substantially
30 parallel rows longitudinally within the combustion-chamber in line with the fuel-door, whereby ready access may be had through the fuel-door to opposite sides of each row of flues for the purpose of cleaning, as described, an
35 equalizing draft-chamber, *K*, between the rear-most transverse row of flues and adjacent end of the combustion-chamber, a flue-opening, *o*, in the base of the said equalizing draft-chamber, and an outer shell, *I*, having a removable section, *I'*, substantially as described.

MYRON T. BALDWIN.

In presence of—

G. P. LINDSLEY,

J. W. DYRENFORTH.