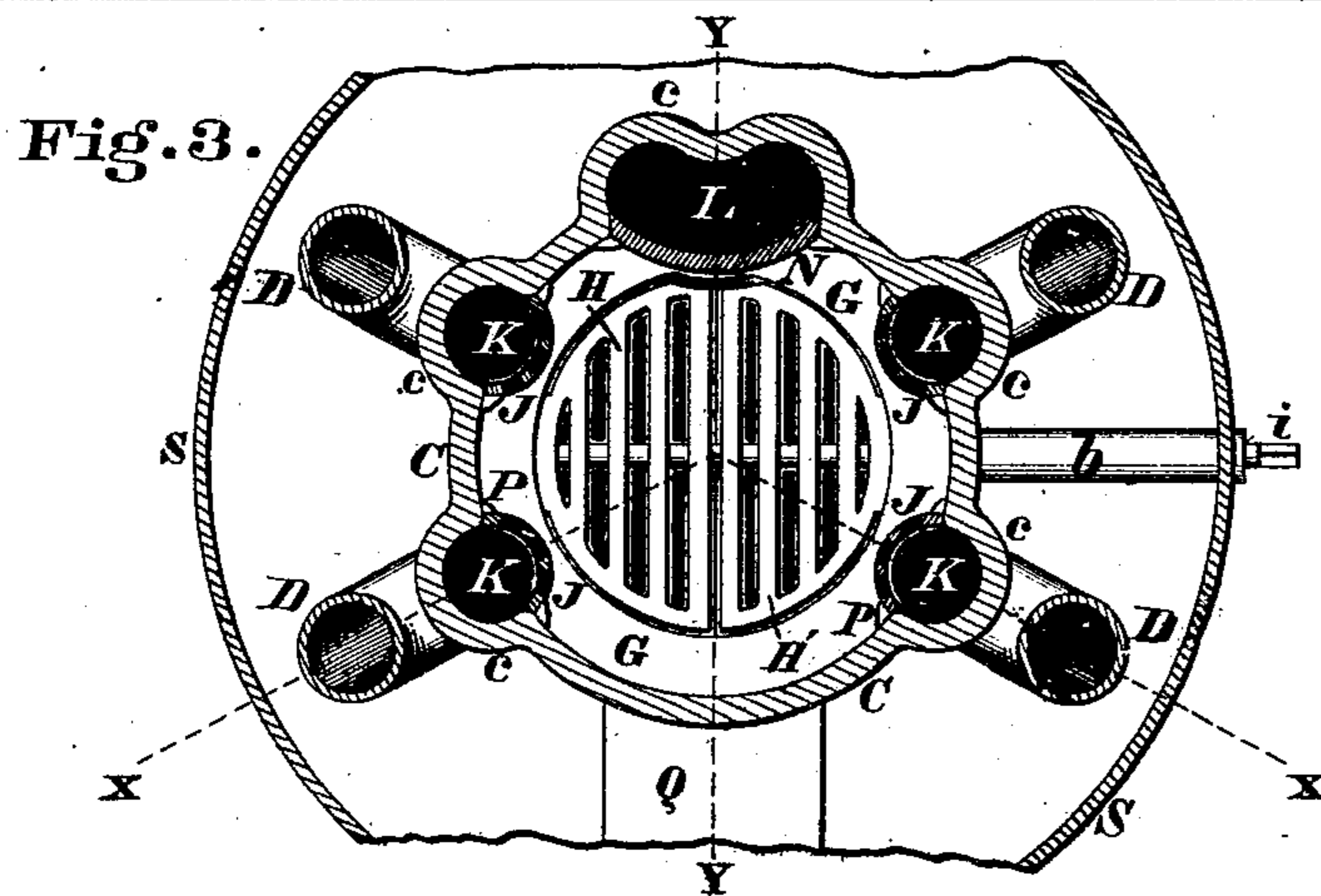
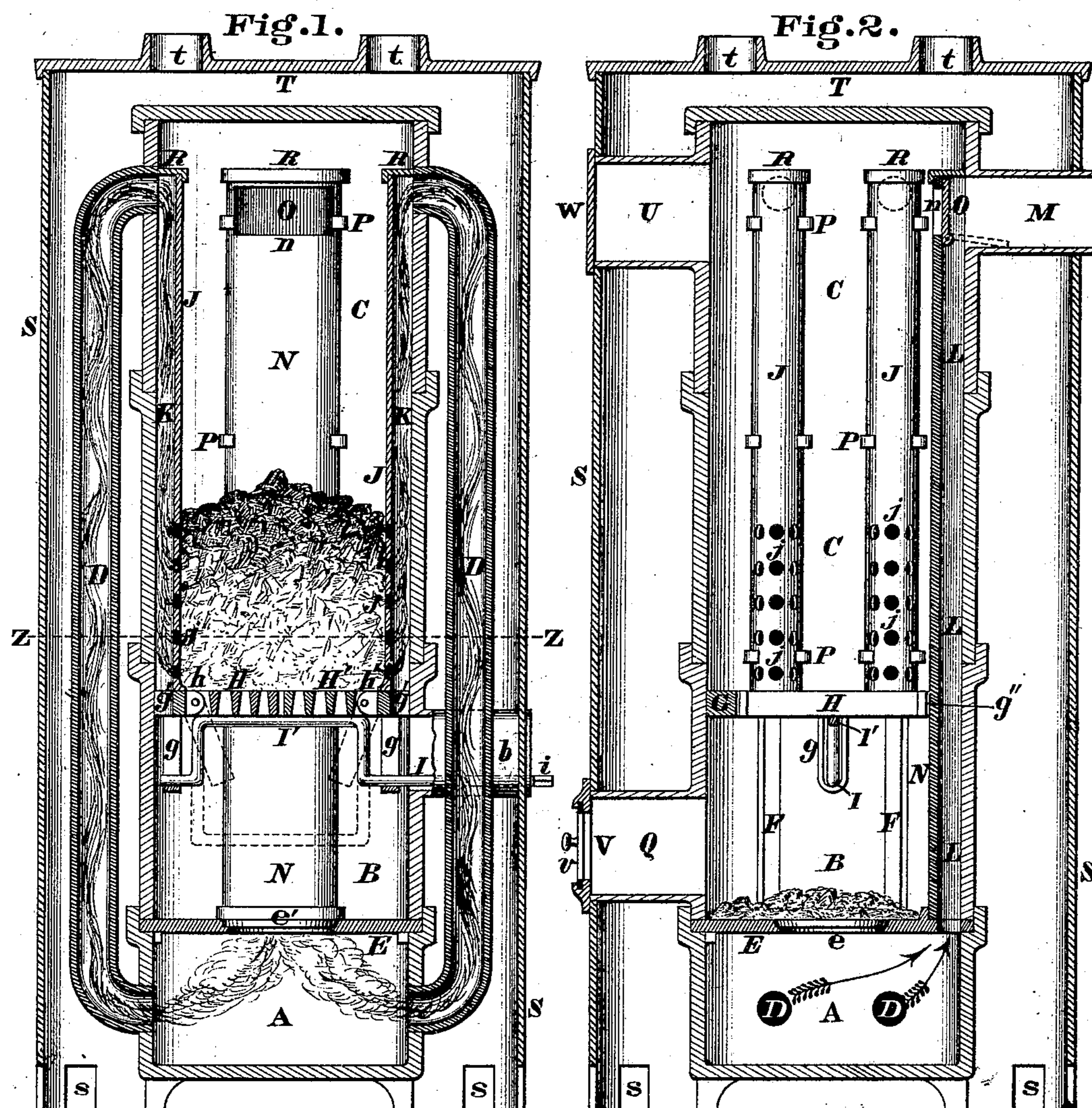


P. MARTIN.
Hot-Air Furnace.

No. 110,664.

Patented Jan. 3, 1871.



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UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 110,664, dated January 3, 1871.

To all whom it may concern:

Be it known that I, PETER MARTIN, of Cincinnati, Hamilton county, Ohio, have invented certain Improvements in Warm-Air Furnaces; of which the following is a specification.

This invention relates to that class of apparatus which is employed for warming churches, schools, dwelling-houses, &c.; and my present improvement consists in arranging the pipes which carry off the products of combustion in such a manner as to effectually consume the smoke, thereby overcoming one of the principal objections to such furnaces, and causing them to give out a large amount of heat with the least consumption of fuel.

In the accompanying drawings, Figure 1 is a vertical section of my improved furnace, the section being taken at the line X X. Fig. 2 is another vertical section of the same at the line Y Y; and Fig. 3 is a horizontal section at the line Z Z, showing a modification of the fire-chamber.

The furnace is composed of three distinct superimposed cylindrical sections, A B C, of which the lower one, A, is the combustion-chamber, the intermediate one, B, the ash-pit, and the upper one, C, the fire-chamber. The said upper and lower sections, C and A, are connected by a number of side pipes, D, which are external to said sections. A diaphragm, E, is placed between the combustion-chamber and ash-pit, and said diaphragm is furnished with a central opening, *e*, having a lid, *e'*, the removal of which allows soot, ashes, and other obstructions to be withdrawn from chamber A.

Situated near the upper end of ash-pit B, and supported upon feet or lugs F, is a ring, G, to which is pivoted, at *h h'*, the two semi-circular drop-grates, H H', that are retained in their normal or horizontal positions by the cranked portion I' of rock-shaft I. This rock-shaft, after being passed through the neck *b* of pit B, is journaled in hangers *g*, which depend from the ring G, and the external end of said rock-shaft is provided with a non-circular head, *i*, for the reception of a spanner or wrench, by which it may be rotated whenever occasion requires. By a partial rotation of said shaft the grates will be agitated sufficiently to rattle out the ashes, and by a complete revolution of said shaft, so as to bring its cranked portion I' to the position shown by

dotted lines in Fig. 1, the entire contents of the fire-chamber will be dumped into the ash-pit B.

Resting upon the ring G, and in line with marginal recesses *g'* of the same, are a series of semi-cylindrical tubes, J, which, in connection with the inner portion of the chamber C, form channels K, up which the smoke, gas, &c., ascend after they have entered said channels through the perforations *j* in the lower portions of tubes J. The channels K communicate at their upper ends with the external side pipes, D, and the smoke and gas from the fire, after ascending said channels, descend through said side pipes and mix in the combustion-chamber A, from which they escape through the large flue L and pipe M. This flue L is formed by a portion of the interior walls of the pit B and chamber C, and an imperforate curved plate or semi-tube, N, which latter is located entirely within chambers B C, and at the rear side of the same. The curved and imperforate plate N commences at the diaphragm E, and, after passing through a recess, *g''*, in the ring G, extends up almost to the top of chamber C, and the upper portion of said plate has an opening, *n*, which is closed by a damper, O. This plate, being situated within the furnace, becomes very highly heated, and as the products of combustion from chamber A are compelled to traverse the entire length of flue L before escaping from pipe M, they are thus brought into intimate contact with the heated plate N, and the smoke is thereby effectually consumed, nothing but an invisible gas or vapor escaping through pipe M. When fire is first kindled in the furnace, the damper O is opened, as shown by dotted lines in Fig. 2, so as to allow the smoke to escape directly into the pipe M; but after the fire has got well under way said damper is closed, and the products of combustion are compelled to take the above-described circuitous route before escaping from the apparatus. The tubes J and N are fitted within lugs P, which project from the interior of the furnace, and their upper ends are covered with caps R. The chambers A B C, together with their side pipes D, are all incased within a shell, S, which may be of masonry, corrugated iron, or any other suitable material, and said shell is closed at top by a plate, T, having necks *t*, to which

pipes are to be attached for conducting warm air to the various rooms of the house in which the furnace is situated. The shell S has openings *s* at its bottom, through which cold air enters.

Q and U are passages leading to the ash-pit and fire-chamber, respectively, and said passages are closed with doors V and W, the former of which has a register, *v*, for regulating the quantity of air flowing into the fire.

If preferred, the fire-chamber C may be cast with corrugations *c*, as shown in Fig. 3, and said corrugations can be so arranged as to constitute part of the flues K and L, for the purpose of increasing the area of the same.

The corrugations *c*, instead of being located only where the flues occur, may be sufficiently numerous to entirely surround the fire-chamber.

The interior of chamber C may be lined with fire-tiles.

The smoke-pipe M may be omitted, and the flue L carried up through the top plate, T.

I claim as my invention—

1. The combination, substantially as described, of the combustion-chamber A, ash-pit B, fire-chamber C, external side pipes, D, diaphragm E, interior and perforated tubes, J *j*, channels K, flue L, and internal and imperforate plate N, for the object stated.

2. In combination with the tubes J or N, the corrugations *c* of the fire-chamber C, for the purpose herein set forth.

3. In combination with the parts A, B, C, D, E, K, L, and M, the opening *n* and damper O, for the object described.

In testimony of which invention I have hereunto set my hand.

PETER MARTIN.

Witnesses:

GEO. H. KNIGHT,
WM. F. BAUER.