

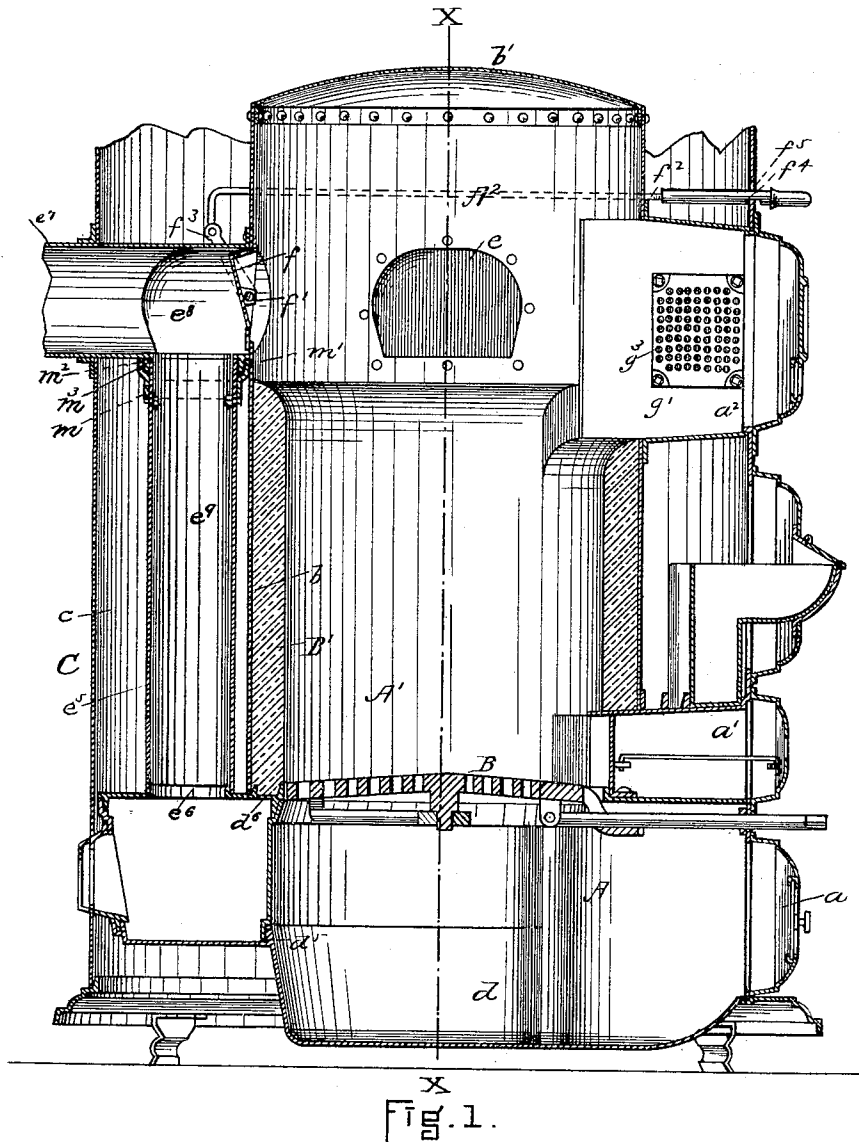
(No Model.)

4 Sheets—Sheet 1.

F. A. MAGEE & S. VAN VORST.
HEATING FURNACE.

No. 388,293.

Patented Aug. 21, 1888.



WITNESSES,

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INVENTORS.

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(No Model.)

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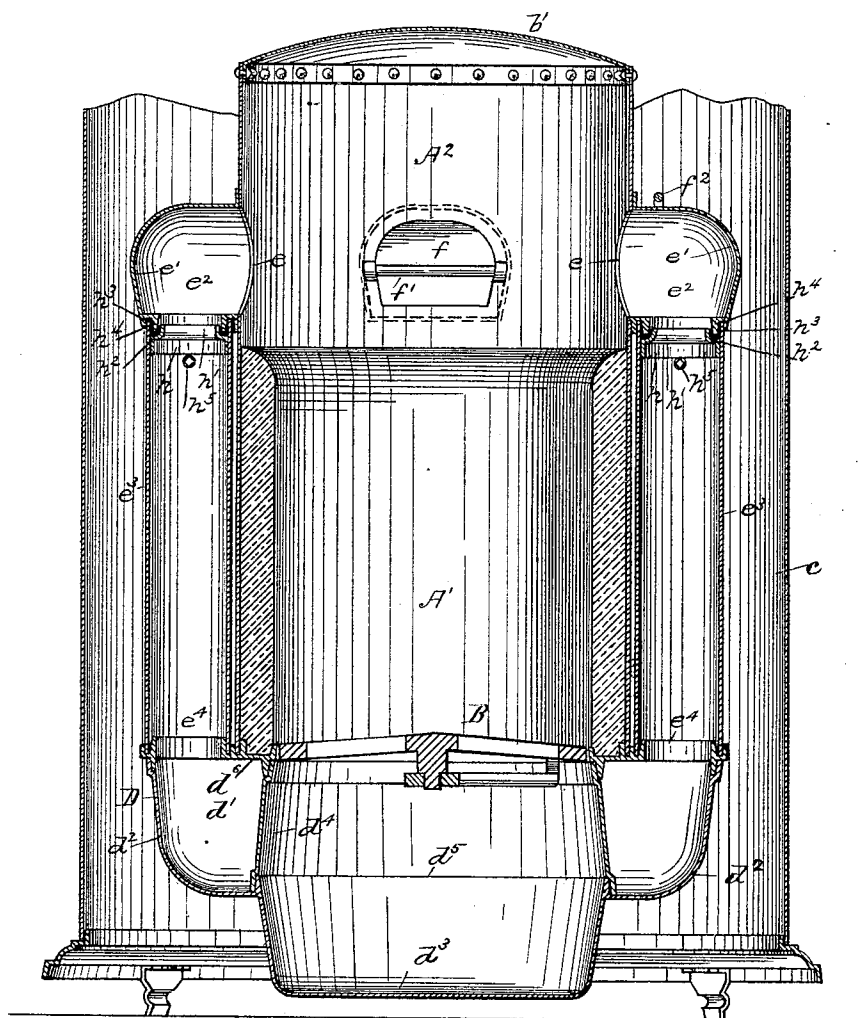


Fig. 2.

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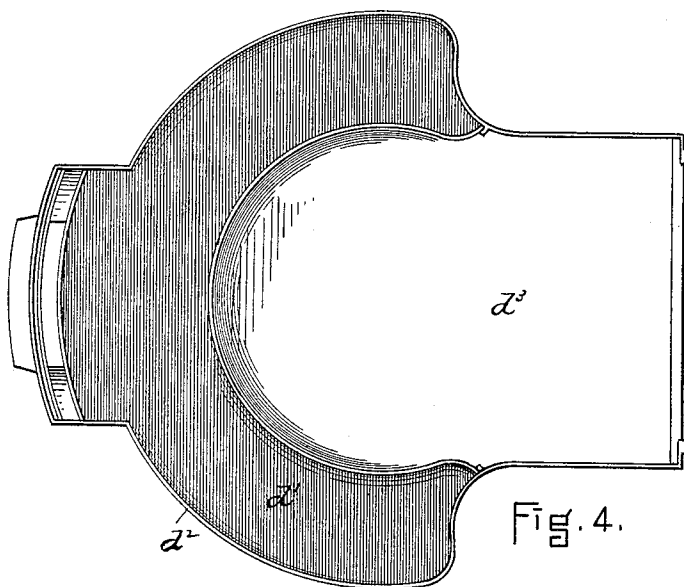
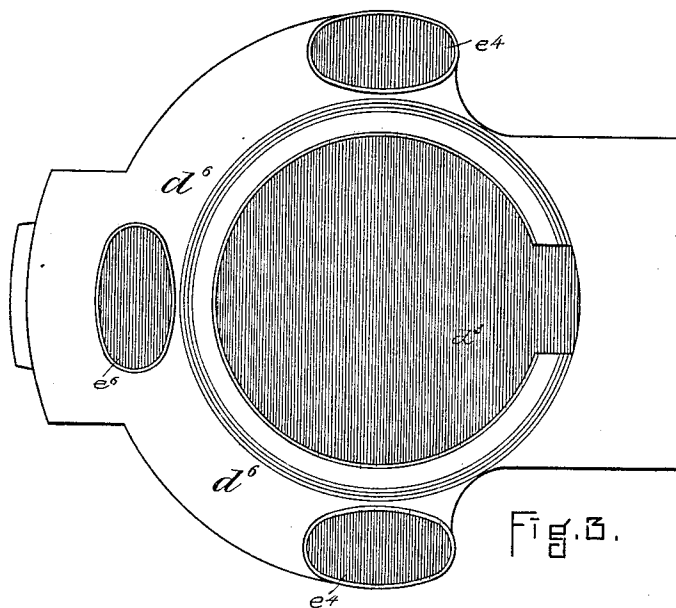
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WITNESSES.

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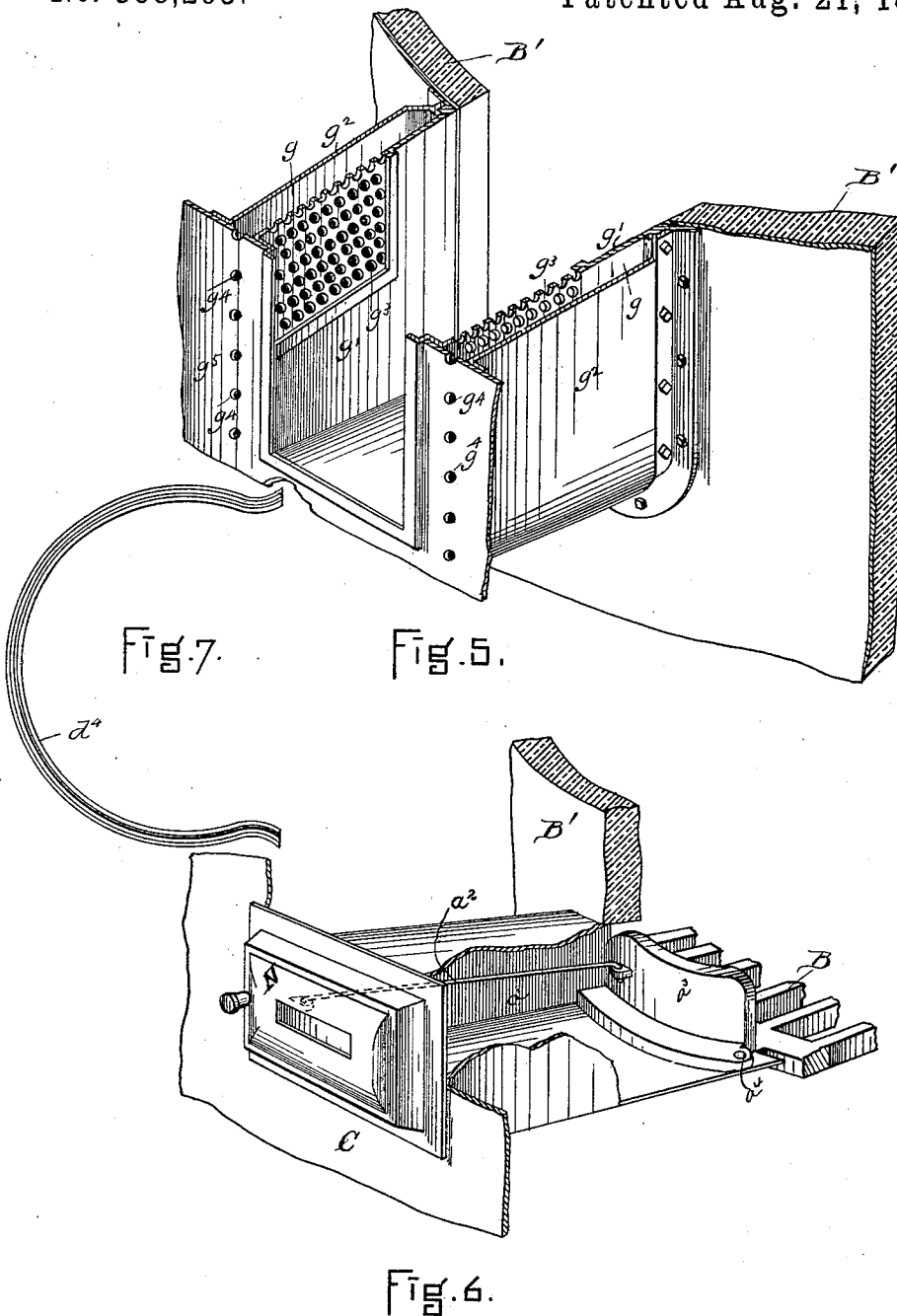
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Patented Aug. 21, 1888.



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UNITED STATES PATENT OFFICE.

FRANK A. MAGEE AND SYLVESTER VAN VORST, OF CHELSEA, ASSIGNORS
TO THE MAGEE FURNACE COMPANY, OF BOSTON, MASSACHUSETTS.

HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 388,293, dated August 21, 1888.

Application filed October 2, 1886. Serial No. 215,135. (No model.)

To all whom it may concern:

Be it known that we, FRANK A. MAGEE and SYLVESTER VAN VORST, both of Chelsea, in the county of Suffolk and State of Massachusetts, citizens of the United States, have invented a new and useful Improvement in Heating-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature, wherein—

Figure 1 is a vertical central section of the furnace with the exception of the top of the outer casing. Fig. 2 is a vertical section upon the line *xx* of Fig. 1. Fig. 3 is a plan view of the base. Fig. 4 is a view of said base with its top plate removed. Fig. 5 is a detail view, in perspective, illustrating the entrance to the combustion-chamber and the construction whereby air for consuming gases in the combustion-chamber is provided. Fig. 6 is a detail view illustrating the clinker-passage from the front of the furnace to the grate. Fig. 7 is a plan view of a base-flue plate, hereinafter described.

The invention relates especially to the form and construction of the base, to the arrangement and organization of the combustion-chamber, downflues, base-flues, and upflue or uptake, to a gas-burner arranged on each side of the passage to the combustion-chamber, and to details of construction which will hereinafter be enumerated.

In the drawings, *A* is the ash-pit; *A'*, the fire-pot; *A²*, the combustion-chamber.

a is the entrance to the ash-pit; *a'*, the anti-clinker passage or opening; *a²*, (see Fig. 1,) a passage to the combustion-chamber *A²*.

B is the grate.

B' is the lining of the fire-pot.

b is the inner casing or shell of the furnace, and it includes the section which is lined by the fire-brick and the upper section, which forms, in connection with the top plate, *b'*, the combustion-chamber.

C is the outer casing of the furnace. Between it and the inner casing or shell, *b*, is the air-heating space *c*. The base *A* has the deep section *d*, which forms a part of the ash-pit chamber, and the side and rear extension, *D*,

which forms the semicircular flue *d'*, extending on each side and the back of the base. The vertical wall *d²* of the base, its extension, and the bottom plate, *d³*, of the base are made integral or in one casting, and the flue *d* is formed by the flue-plate *d⁴*, which is shaped as represented in Fig. 7 and extends from the corner edge, *d⁵*, of the extension to the top plate, *d⁶*, of the base. There is formed on each side of the shell *b*, near its top, an opening, *e*, to the combustion-chamber, (see Figs. 1 and 2,) and there is bolted to the casing *b* the boxes or sections *e'*, each of which surrounds its respective opening *e*, has the passage *e²*, and is adapted to receive and hold the upper end of a pipe, *e³*. (See Fig. 2.)

The boxes or projections *e'* and pipes *e³* are in the heating-chamber *c*, and the lower ends of the pipes *e³* close upon the upper base-plate, *d⁶*, and surround the openings *e⁴* therein. (See Fig. 2.) These openings connect the passages in the pipes *e³* with the base-flue *d'*, near the front ends thereof and upon each side of the base. There also extends from the plate *d⁶* the pipe *e⁵*. (See Fig. 1.) This pipe is also in the heating-chamber *c* and at the rear of the inner casing, *b*. It surrounds the opening *e⁶* in the base-plate *d⁶*, and is secured at its upper end to the horizontally-extending pipe *e⁷*, which forms the direct escape-passage from the combustion-chamber. The passage *e⁸* in the pipe opens into said passage *e³*. The opening to the direct escape-passage *e⁸* is controlled by a damper or valve, *f*, which is pivoted at *f¹*, so that its upper part swings outwardly and its lower part inwardly, and it is operated from the front of the stove by means of a rod, *f²*, which connects with the lever *f³*, attached to the damper spindle or pivot, and the damper-rod *f²* has a shoulder, *f⁴*, which is adapted to bear against the inner surface of the casing *C*, in close proximity to the slot *f⁵*, when it is desired to hold the damper *f* closed; but it may be released therefrom by lifting the rod so as to draw it outward through the slot.

There is formed upon each side of the passage *a²* to the combustion-chamber a narrow chamber, *g*, (see Fig. 5,) between the plates *g'* and *g²*. The plate *g'* forms the side walls of the

passage to the combustion-chamber and is provided with perforations g^3 , which are either formed directly therein or in a plate attached thereto; and the chambers g have inlets or connections g^4 with the outer air through the casing g^5 , (see Fig. 5,) outside the line of the door, so that air for the consumption of gases shall be supplied to the combustion-chamber in proper form through the inlet g^4 and the perforations or holes in the plates g^4 .

By making the side wall and bottom of the base and its extension in one casting we are enabled to form the flue d' by the flue-plate d^4 , and this brings the joints between the flue-plate d^4 , the outer wall of the base, and with the top plate of the base between the flue d' and the ash-pit, so that any escape of gas from said flue d' would be into the ash-pit, instead of into the air-heating chamber. This result is obtained by making the side wall of the base and the extension and the bottom thereof of one casting, or integral. We also use a gas-check at the upper ends of the pipes e^3 , e^5 , which we term "self-filling" checks.

The construction employed in connection with the pipes e^3 comprises a ring, h , having the contracted section h' . This ring is of a size to tightly fit the interior of the pipe e^3 , and the contracted portion, in connection with the upper end of the pipe, forms a pocket or recess, h^2 , which receives a downward-extending flange, h^3 , from the box or projection e' . The box or projection also has a recess, h^4 , which receives the upper end of the pipe. The cup or packing-recess h^2 is so located that it is always kept filled with soot and dust, so that it makes the joint in effect self-packing.

The pins h^5 may be arranged in the pipe e^3 , upon which the ring h may rest. The construction of the gas-check for each of the pipes e^3 is the same. The connection between the lower ends of the pipes e^3 and the base-plate d^6 is of the ordinary form. The gas-check for the upper end of the pipes e^3 varies from those used in connection with the pipes e^3 , in that the packing-ring m is arranged to fit the exterior of the pipe e^3 , and it has an outward-extending section, m' , which forms, with the outer surface of the upper end of the pipe e^3 , a pocket or recess, m^2 , which receives a flange, m^3 , extending from the pipe e^3 .

The gas-check ring is placed upon the outside of the pipe e^3 , because this pipe should have substantially the capacity of two pipes, e^3 , and the greatest capacity of these two pipes is that of their smallest diameter, which is the diameter of the gas-check rings h , and by placing the gas-check ring upon the exterior of the pipe e^3 , while the pipe is of the same size as the pipe e^3 , not having a gas-check upon the inside to decrease its diameter, it has practically a capacity sufficient to include both pipes e^3 .

In Fig. 6 we have shown the door N to the anti-clinker passage a' , connected by means of

a rod, a^2 , with a plate, a^3 , at the inner end of the said passage, which acts when the door N is closed as a part of the front of the fire-pot wall. This plate is pivoted at a^4 , and upon the opening of the door N is adapted to be moved or swung upon said pivot to open the passage to the fire-pot chamber immediately above the grate.

This organization is cheaply made, is simple in construction, provides a powerful heater, and does not easily get out of order.

Having thus fully described our invention, we claim and desire to secure by Letters Patent of the United States—

1. In a furnace, the combination of the outer shell or casing, C , the inner shell, b , the air-heating chamber c between the two shells, the fire-pot A' , and combustion-chamber A^2 , inclosed by the inner shell, b , a top plate, b' , the base having the deep section d and the semicircular extension D for the flue d' , the said flue, the flue-plate d^4 , the openings e through the side of the shell b , the connections e' , the pipes e^3 , the plate d^6 , having the openings e^4 , e^5 , the pipe e^6 , the direct escape-pipe e^8 , and the damper a , substantially as described.

2. In a hot-air furnace, the combination, with the combustion-chamber and fire-pot section of the furnace, of a base-section which is provided with a central depressed ash-pit portion and an outwardly and upwardly flaring substantially semicircular portion, d^2 , formed together in a single casting, and which is provided, also, with vertical curved plate d^4 , extending from the upper extremity of the depressed portion to the upper extremity of such base-section and separating the ash-pit portion from the base-flue portion of such base-section, substantially as described.

3. In a hot-air furnace, the combination, in the base-section thereof, of the one-part lower portion, having the central depression provided with the bottom plate, d^6 , and having also the outwardly and upwardly flaring portion or prolongation d^2 , the covering-plate d^8 , provided with the openings e^4 , e^5 at the sides, and with the rear opening, e^6 , and the intermediate imperforate plate, d^4 , extending from the top of the central depression to the bottom of the covering-plate d^8 , and separating the ash-pit chamber from the semicircular base-flue, substantially as described.

4. The combination of the combustion-chamber, formed with entrance a^2 , the plates g' , forming the vertical walls to the passage a^2 and having perforations g^3 , the chambers g , formed by the plates g' , g^2 , g^5 , and the perforations or holes g^4 in the plate g^2 , providing air-inlets to the chambers g , substantially as described.

5. In a heating furnace or stove, the combination, with the pipe e^3 , of the ring h , fitted within such pipe below the upper extremity thereof, and having the upper indrawn por-

tion or contraction, h' , forming, in connection with the inner face of the pipe, the recess or pocket h^2 , and the box or section e' , having at its lower extremity an inner and an outer
5 depending flange, the outer flange embracing the exterior surface of the pipe e^3 , and the inner flange extending into the recess or pocket h^2 , between the body of the pipe and

the upper extremity or contraction, h' , of the ring h , substantially as and for the purposes specified.

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