(No Model.)

G. D. SANFORD.

HOT AIR FURNACE.

No. 384,789. Patented June 19, 1888.

Fig. 1.

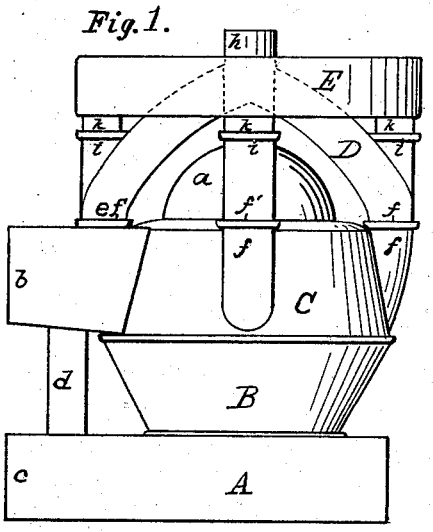
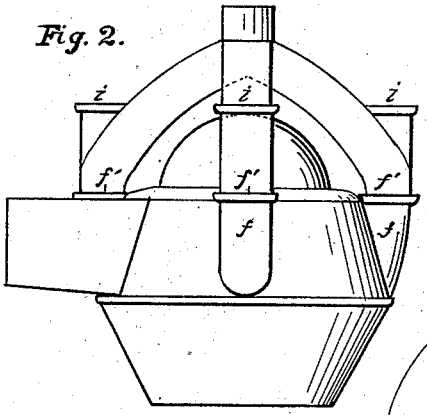


Fig. 2.



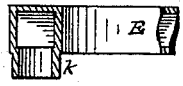
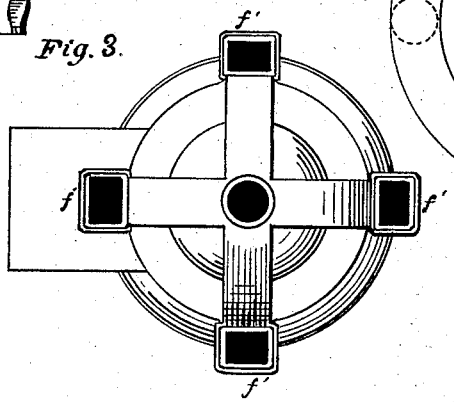


Fig. 4

Fig. 3.



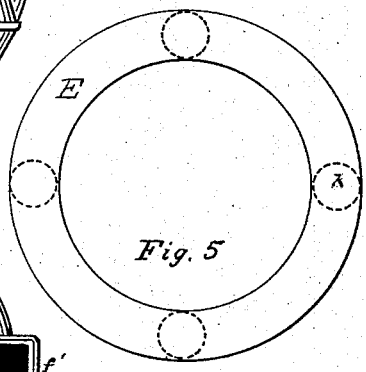


Fig. 5

Witnesses:
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By H. Audubon His Atty.

UNITED STATES PATENT OFFICE.

GEORGE D. SANFORD, OF PEEKSKILL, NEW YORK.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 384,789, dated June 19, 1888.

Application filed December 28, 1887. Serial No. 259,252. (No model.)

To all whom it may concern:

Be it known that I, GEORGE D. SANFORD, a citizen of the United States, residing at Peekskill, in the county of Westchester and State of New York, have invented new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

My invention has relation to heating-furnaces that are inclosed either in metal casings or with brick walls, the air to be warmed being drawn through the inclosures and becoming heated by contact with the radiating-surfaces of the furnace; and it has for its objects, first, the provision of compact, simple, and inexpensive means for securing an equal distribution of drafts and consequent complete combustion of fuel and the light gases and particles arising therefrom; second, a uniform heating of all the radiating-surfaces of the furnace and a consequent uniform and complete warming of the air coming in contact therewith, and, third, means for providing a direct draft in any direction from the furnace. My means for attaining said objects, as well as other advantages to be explained, will be fully described in the following specification, of which the accompanying drawings form a part.

Figure 1 represents an elevation of a complete furnace without any casing. Fig. 2 is an elevation of fire-pot, combustion-chamber, and arching radiators. Fig. 3 is a plan through the line *x*, Fig. 1. Fig. 4 represents a section of the radiating-ring E. Fig. 5 represents a plan of the ring E.

In the various figures, A represents the ash-box; B, the fire-pot; C, the combustion-chamber, provided with a dome, *a*, and D and E draft-flues and radiators. *b* is the fire-door to chamber C, and *c* the opening or doorway to the ash-box A. *d* represents a dust-flue leading from the ash-box A through the fire-door opening *b* to the flue *e*.

The chamber C is provided with projecting flues *f f f*, jutting from the sides, their top edges being widened and provided with rising flanges, as shown at *f' f' f'* Fig. 3, furnishing receptacles for the feet of the radiator-arches D, as in Figs. 1 and 2, the widened surfaces and rising flanges affording ample means for a close cement joint. This chamber is likewise provided with a dome, *a*, common to such furnaces. The arches D, answering the double purpose of draft-flues and radiators, spring from the flues *f* upward, uniting over the dome *a*, substantially in the manner shown, the arches having a curve on the under side that will prevent the accumulation of ashes on their inner surfaces—that is, from the apex *m*, Fig. 1, the slope of the arches to their bases is such as to render them practically self-cleaning, as their pitch will prevent any gathering of particles thereon in masses. Where the arches intersect at their tops I place the outlet *h*, which affords a convenient means of leading the smoke-pipe in any direction to the chimney. These arches I also provide with outlets *i i i i*, having, preferably, the same cross-sectional area of the arches and being widened and flanged at their tops similarly to the flues *f*. When using the heater in its simplest form, these outlets are closed; but when it is desirable to increase the radiating capacity of the heater these openings serve to receive the feet *k k k k*, Figs. 1 and 5, of a radiating-ring, E, which is shown in cross-section in Fig. 4 and in plan by Fig. 5.

Now, it is obvious that, having the flues *f* opening from the combustion-chamber at regular intervals and communicating through the arches D to the centrally-located exit *h*, an almost absolutely uniform spreading of the fire within the furnace must result, and a uniform heating of the chamber C, dome *a*, and the radiators above them is unavoidable. It follows that if the admission of the outer air to within the casing is given an equal and uniform distribution its uniform heating is bound to take place. Even in the absence of unusual precautions to obtain such a uniform distribution of the incoming air the arrangements of the radiating-surfaces are such as to make it impossible for any currents to pass through without becoming well warmed.

It will also be observed that, while the arrangement of the flues and radiators is such as to insure complete consumption of all the combustible particles of the fuel, in ascending the heat will be taken up by the abundant iron surfaces, with which it cannot escape contact, before it can pass out to the chimney through the outlet *h*. As will be seen, these results are all obtained without undue obstructions to the drafts and with no troublesome combinations of dampers and regulators.

In the construction of these furnaces, so long as I embody the principles of my invention, I do not wish to be restricted to the particular forms herein shown and described.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a hot-air furnace, the combination, with a fire-chamber provided with side flues, *f*, and a dome, *a*, of the radiator D, consisting of tubular arches resting upon the side flues, *f*, and doorway *b*, and uniting centrally above the dome *a*, where they form a chamber which is provided with a pipe-rim, substantially as herein shown and described.

2. In a hot-air furnace, the combination of the tubular arches D, resting upon the side flues, *f*, in the fire-chamber C, and uniting to form a common chamber above the dome *a*, said chamber being provided with a pipe-rim, as shown, and said tubular arches being provided with the outlets *i*, which support and afford communication with the interior of an annular chamber, E, substantially as herein shown and described.

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