(No Model.)

H. G. HERBERT.

HOT AIR FURNACE.

No. 402,323. Patented Apr. 30, 1889.

Fig. 1.

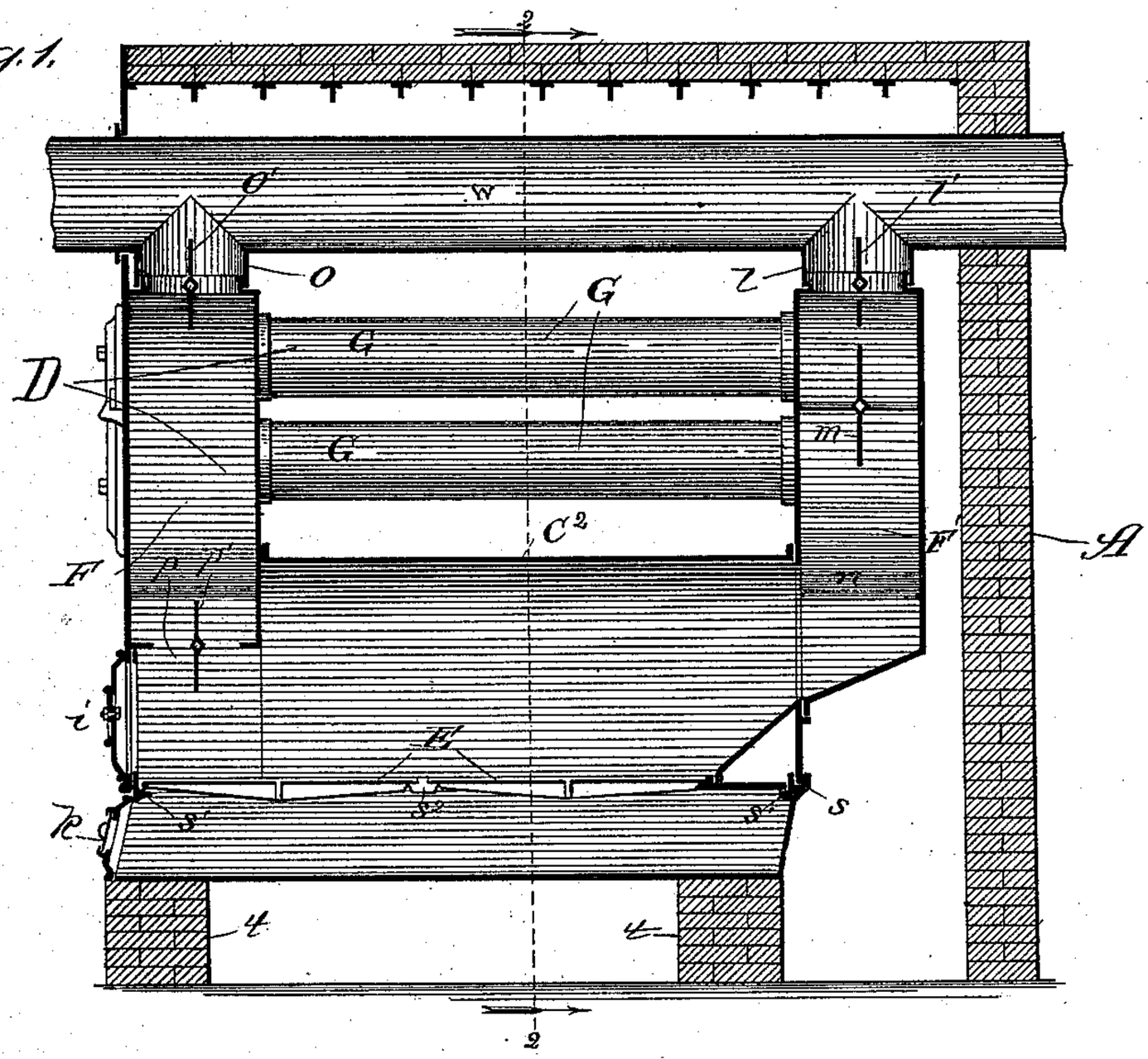
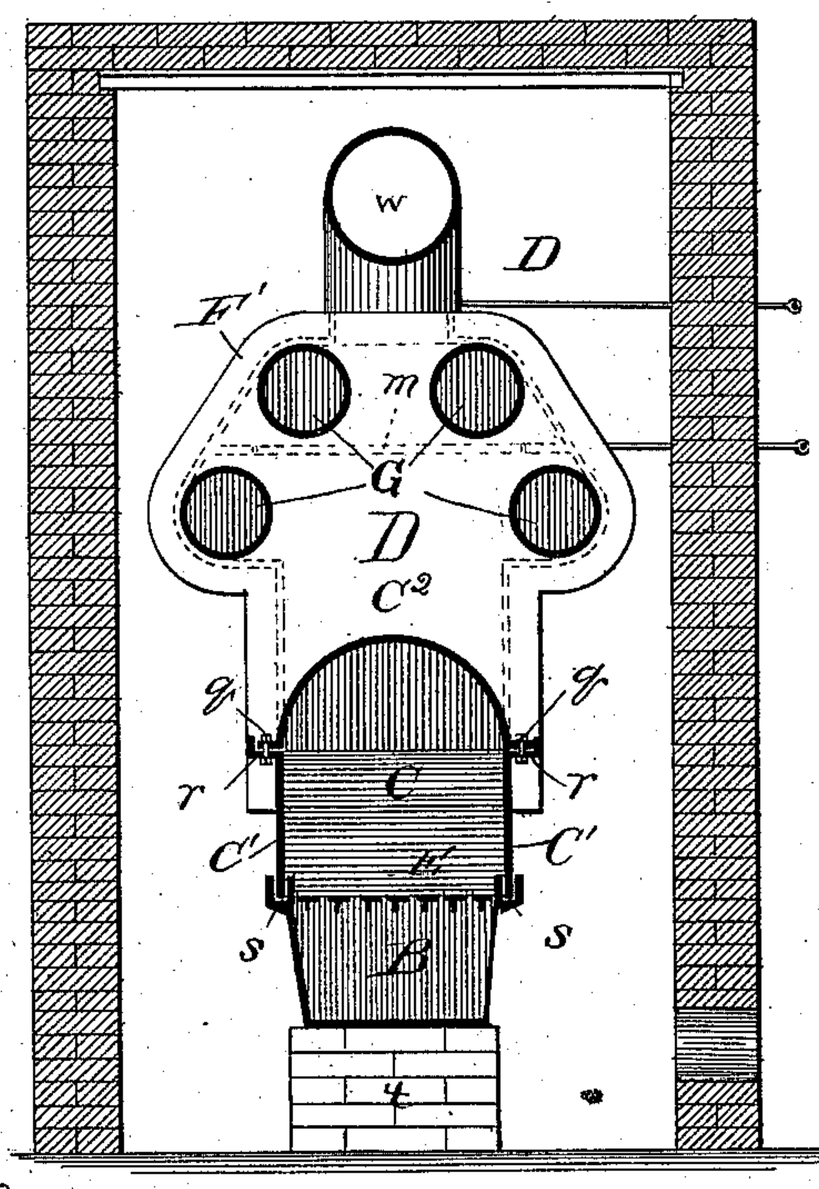


Fig. 2



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UNITED STATES PATENT OFFICE.

HENRY G. HERBERT, OF CHICAGO, ILLINOIS.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 402,323, dated April 30, 1889.

Application filed December 26, 1888. Serial No. 294,641. (No model.)

To all whom it may concern:

Be it known that I, HENRY G. HERBERT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Hot-Air Furnaces, of which the following is a specification.

My invention relates more especially to improvements in air-heating furnaces which are adapted for burning soft coal or wood, and my object is to provide a furnace of the above class having horizontal inclosed heating-flues and communicating with the fire-pot or combustion-chamber and having a peculiar system of dampers, whereby the hot products of combustion may be directed through any of the flues for the purpose of heating, more especially, a particular part of the furnace, or through all the flues in a manner to fully utilize the calorific power of the products of combustion before they escape to the chimney. To this end my invention consists in the general construction of my improved furnace; and it further consists in details of construction and combinations of parts.

In the drawings, Figure 1 is a view in sectional elevation through the longitudinal center of the furnace, and Fig. 2 a section on the line 2 2 of Fig. 1, and viewed in the direction of the arrows.

A is the brick outer casing of the furnace, provided with one or more openings toward the bottom for the ingress of air to be heated and toward the top with outlet-pipes for the heated air, all in the usual manner. The internal parts of the furnace comprise an ash-pit, B, combustion-chamber, C, and a radiator, D, which rests upon pillars *t* to permit the free passage of air underneath. The ash-pit B is provided in its upper edge or rim with a groove, *s*, and inwardly-projecting flanges *s'* are formed in its ends just below the rim to afford a seat for the opposite ends of a grate, E, which is in two sections. The adjacent edges of the grate-sections abut against and rest upon a flanged bar, s^2, which extends across the ash-pit and is secured at opposite ends about midway of the latter. The usual draft and "clean-out" door, *k*, is provided at the forward end of the ash-pit.

The fire-chamber C comprises an angular wall portion, C', the lower edge of which rests upon the ash-pit B in the groove *s*, and a circular top portion, C^2. The upper edge of the wall C' is flanged, as shown, to afford a seat, *r*, for the flanged edge *q* of the top portion, C^2. The flanges *r q* are riveted together, as shown. The fire-chamber has the usual feed-opening closed by a door, *i*, at its forward end, and an opening, *n*, at the rear, of the full width of the fire-chamber.

The radiator D comprises two smoke-chambers, F and F', which rise from opposite ends of the fire-chamber and communicate with each other through upper and lower flues G. The smoke-chamber F at the forward end of the fire-chamber communicates with the latter through a passage, *p*, of a length corresponding with the width of the fire-chamber and provided with a damper, *p'*, which when closed shuts off communication between the chambers F and E. At its upper extremity the chamber F is provided with a flue, *o*, leading to a horizontal pipe, *w*, above and controlled by a damper, *o'*.

The smoke-chamber F' at the rear of the fire-chamber opens into the latter at *n* and is provided between the openings of the upper and lower flues G with a damper, *m*, which is as nearly the length of the width of the chamber F' at that point as the shape of the chamber will admit for the ready turning of the damper. The chamber F' is also provided at the top with a flue, *l*, which leads to the pipe *w* and is controlled by a damper, *l'*.

Of the hot-air flues which lead from a furnace to different parts of the building heated thereby, some, owing to the course they take, carry off the heated air much more readily than others, which causes certain rooms of the building to receive more heat than necessary while others receive little or none, and this occurs more especially at the "firing-up" or starting of the furnace. To obviate this difficulty I attach the hot-air flues that become readily heated toward one—say the rear—end of the furnace, and those that are slow to heat toward the opposite end of the same.

When it is desired to throw the heat of the furnace more toward the flues at the forward end of the latter, the dampers *m* and *l'* are

closed and the damper o' opened; and, if desired, the hot products of combustion may be directed almost entirely to the front of the furnace by opening the damper p'. By closing the dampers p', m, and o' and opening the damper l' the heat is more equally distributed to all parts. By having the dampers m and p' practically the full width of the smoke-boxes the hot products of combustion meet with comparatively little obstruction to their passage at those points when the said dampers are open.

It has been usual hitherto in the construction of fire-boxes to construct them in two parts which are joined at the top instead of the sides, as I manufacture them. When joined at the top, the seam is liable to open as the metal becomes expanded by the heat, and permits gas from the fire-chamber to escape to the air-chamber. By having the joints at the sides and constructing them as shown at r q no opening of seams can take place and the fire-box is always gas-proof. To increase the heating-surface of the fire-chamber I construct it of corrugated metal.

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

1. In a hot-air furnace, the combination, with the casing A, fire-chamber, and ash-pit, of a radiator, D, comprising smoke-chambers F F′, upper and lower flues G and flue w, dampers o' p' in the chamber F, an opening, n, damper l', and damper m, substantially as described, in the chamber F′, substantially as and for the purpose set forth.

2. In a hot-air furnace, the combination, with the casing A and radiator, of an ash-pit, B, having a groove, s, in its upper edge, and a fire-chamber, C, comprising a wall portion, C′, which rests in the groove s and is provided toward its upper edge with a flange, r, and a circular top portion, C^2, having a flange, q, riveted to the flange r, substantially as described.

HENRY G. HERBERT.

In presence of—
M. J. BOWERS,
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