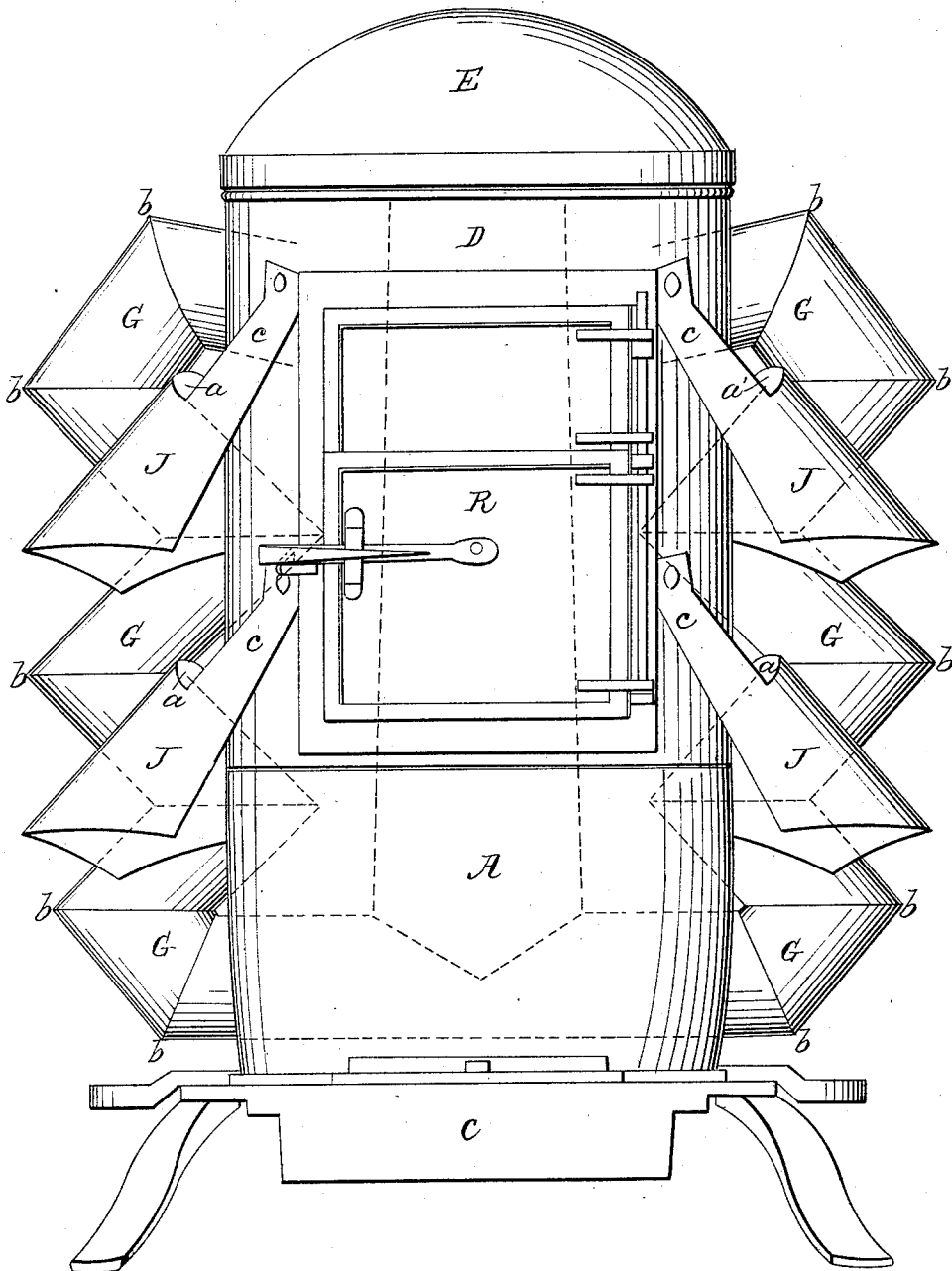


P. D. BECKWITH.
Hot-Air Furnace.

No. 90,630.

Patented June 1, 1869.

Fig: 1.



Witnesses.

R. T. Campbell
J. W. Campbell

Inventor

P. D. Beckwith
by
Mason Kemrick & Son

P. D. BECKWITH.

Hot-Air Furnace.

No. 90,630.

Patented June 1, 1869.

Fig. 2.

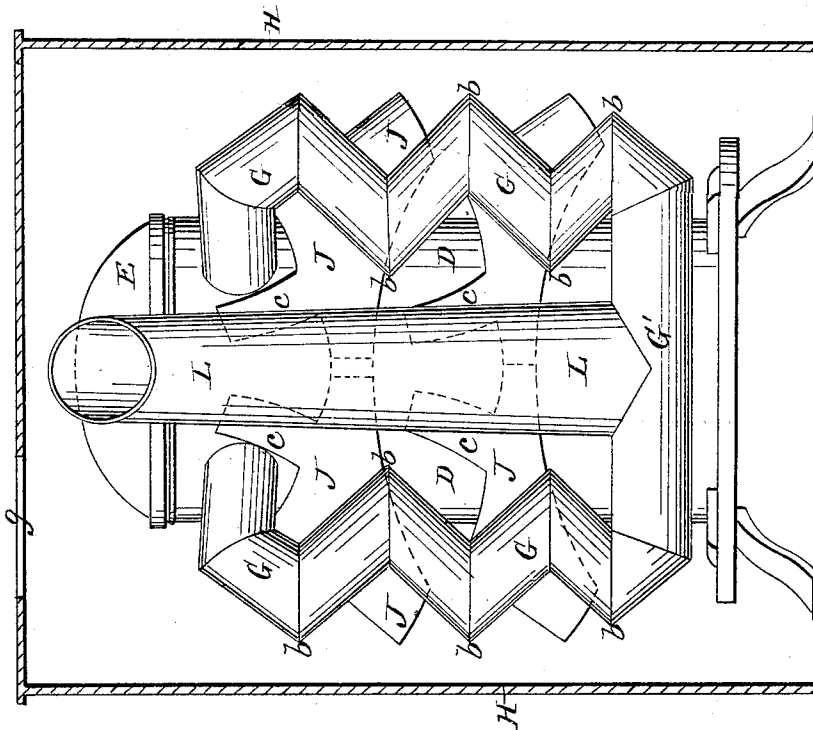
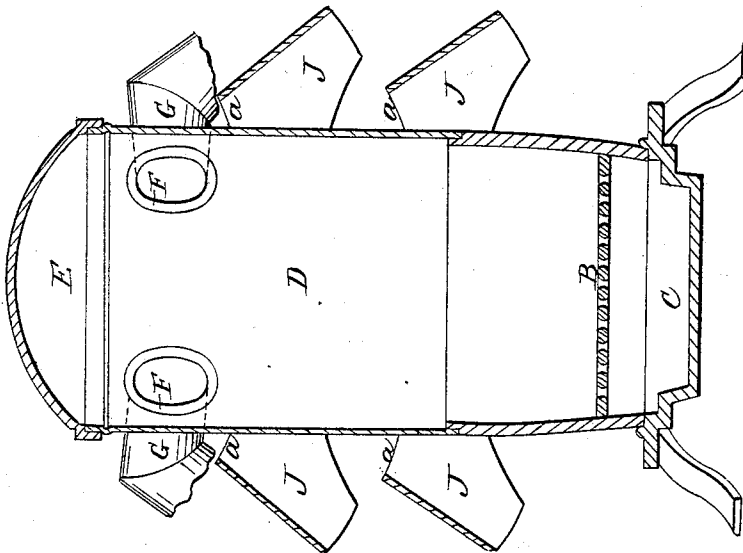


Fig. 3.



Witnesses.

R. T. Campbell
J. V. Campbell

Inventor.

P. D. Beckwith
Mason Jennie & Launier

United States Patent Office.

P. D. BECKWITH, OF DOWAGIAC, MICHIGAN.

Letters Patent No. 90,630, dated June 1, 1869.

HOT-AIR FURNACE.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, P. D. BECKWITH, of Dowagiac, in the county of Cass, and State of Michigan, have invented a new and improved Hot-Air Furnace; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is an elevation of the front part of the improved furnace, without its casing.

Figure 2 is an elevation of the rear side of the furnace, enclosed within its casing, which latter is shown in section.

Figure 3 is a diametrical section through the furnace, showing the two points of escape for the products of combustion.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to certain new and useful improvements on furnaces which are particularly designed for warming apartments with heated air, by conducting cool air into a casing, which encloses a stove or furnace, heating the air, and thence conducting it whither-soever it may be required.

The nature of my invention consists in applying to the external wall of a stove or furnace, a number of inclined plates, or collars, arranged one above the other, with air-outlets at their upper ends, and adapted for deflecting ascending currents of air against the heated walls of the stove, and at the same time so retarding the ascent of the air as to considerably heat it on its way through the space enclosed by the casing surrounding said stove to an apartment to be warmed, as will be hereinafter explained.

Also, in providing two or more outlets for the escape of the products of combustion from the stove, which outlets are arranged at or near the top of the stove, and which communicate with zigzag or angular descending flues, arranged outside of the wall of the stove, but within the casing surrounding it, and communicating, at or near the base of the stove, with an ascending escape-pipe, also arranged within the said casing, whereby the products of combustion are caused to give off a very large per centum of heat before they are allowed to escape, as will be hereinafter explained.

To enable others skilled in the art to understand my invention, I will describe its construction and operation.

In the accompanying drawings—

A represents the fire-pot of the stove or furnace, which is preferably made of cast-iron, and mounted upon a suitable hearth, of which C is the ash-pit depression.

B is the grate, and

D is a cylinder, or wall of other suitable shape, in horizontal section, which is mounted upon and suitably secured to the fire-pot section A.

This upper section D is capped by a dome, E, and perforated at two or more points, F F, near its upper end, for the escape of the products of combustion into two or more independent descending flues, G G, down which the products pass nearly to the bottom of the stove or furnace, and are conducted through a horizontal pipe, G, into an upwardly-ascending pipe, L, shown clearly in fig. 2.

When the products arrive at the upper end of the vertical pipe, or flue L, they escape from the casing H, which encloses said parts.

My object is to abstract as much heat as possible, with a proper draught, from the products of combustion, and communicate this heat to the air rising through the space between the walls of the stove, and the surrounding or enclosing casing H. To do this, I construct the descending or revertible flues G G upon the back or sides of the stove, so that the heated products of combustion, in their escape from the upper end of the stove or furnace, will be equally divided, and conducted downward through these flues G G, to the common escape-flue L; and I also construct said flues G G of short angles, *b b*, united so as to cause the products to take a zigzag course in their descent. This arrangement not only increases the flue-spaces and radiating-surfaces, but the numerous elbows, or angles *b*, so retard the products as to cause them to lose a large proportion of their heat, which is communicated to the rising currents of air. The arrangement of flues also admits of great length of passages within a comparatively short space.

In conjunction with the divided draught-flues of zigzag form, I employ deflectors, J J, which are arranged one above another, and secured to the stove-wall D, by extensions *c c*, formed on their upper edges, as shown in figs. 1 and 2. These deflectors J nearly encircle the stove, the front being left free, to allow the door to be opened easily, and they incline, or flare from the stove downward, so as to receive ascending currents of air, and deflect these currents against the heated wall of the stove; also to concentrate and retard the air about the walls of the stove, so as to communicate a large amount of heat to such air.

The upper ends of the upwardly-converging spaces formed by said deflectors and the stove-wall, are left open at *a a*, shown clearly in figs. 1 and 3, for the escape of the heated air.

These deflectors may be made of sheet-metal, and applied to a stove-wall at a very small cost, and when applied as above described, it will be found that the air discharged from the casing H, through its holes *g*, will be of a more uniform temperature than it would otherwise be; also, that there will be less heat radiated through the casing H, and more heat will be obtained from a given quantity of fuel than would be obtained without the said deflectors.

It will be seen that I am enabled to retard the pas-

sage of highly-heated products of combustion through flues which are exposed on all sides to the ascending currents of air between the stove and its casing, thus depriving the products of considerable heat; also, that I am enabled to retard the upward passage of the air through the space between the stove and said casing, and at the same time keep most of the air in close proximity to the heated stove-wall.

The casing H may be made of sheet-metal or masonry, in the usual manner of enclosing stoves or furnaces designed for warming air.

If desirable, a short pipe, provided with a damper, may be applied near the upper end of the stove, for the purpose of obtaining a direct draught with ascending-pipe L, in making a fire, or for any other purpose for which it may be required. Of course, the damper in such pipe should be shut when it is desired to conduct the products down through the serpentine or zigzag flues.

Having described my invention,

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

1. The combination, with a stove having outlets, F F, of zigzag descending-flues G G, horizontal flue G', and upright escape-flue L, arranged to operate substantially as described.

2. Inclined deflecting-plates J J, applied to their arms c c, to the outer wall of a stove or furnace, and arranged between the same and a casing, H, so as to operate substantially as described.

3. The combination of deflectors J and zigzag flues G G, arranged within a hot-air furnace, in the manner substantially as described.

P. D. BECKWITH.

Witnesses:

EPHRAIM O. ADAMS,
WILLIAM H. TICE.