

H. WHITTINGHAM.

Hot Air Furnace.

No. 57,026.

Patented Aug. 7, 1866.

Fig. 2.

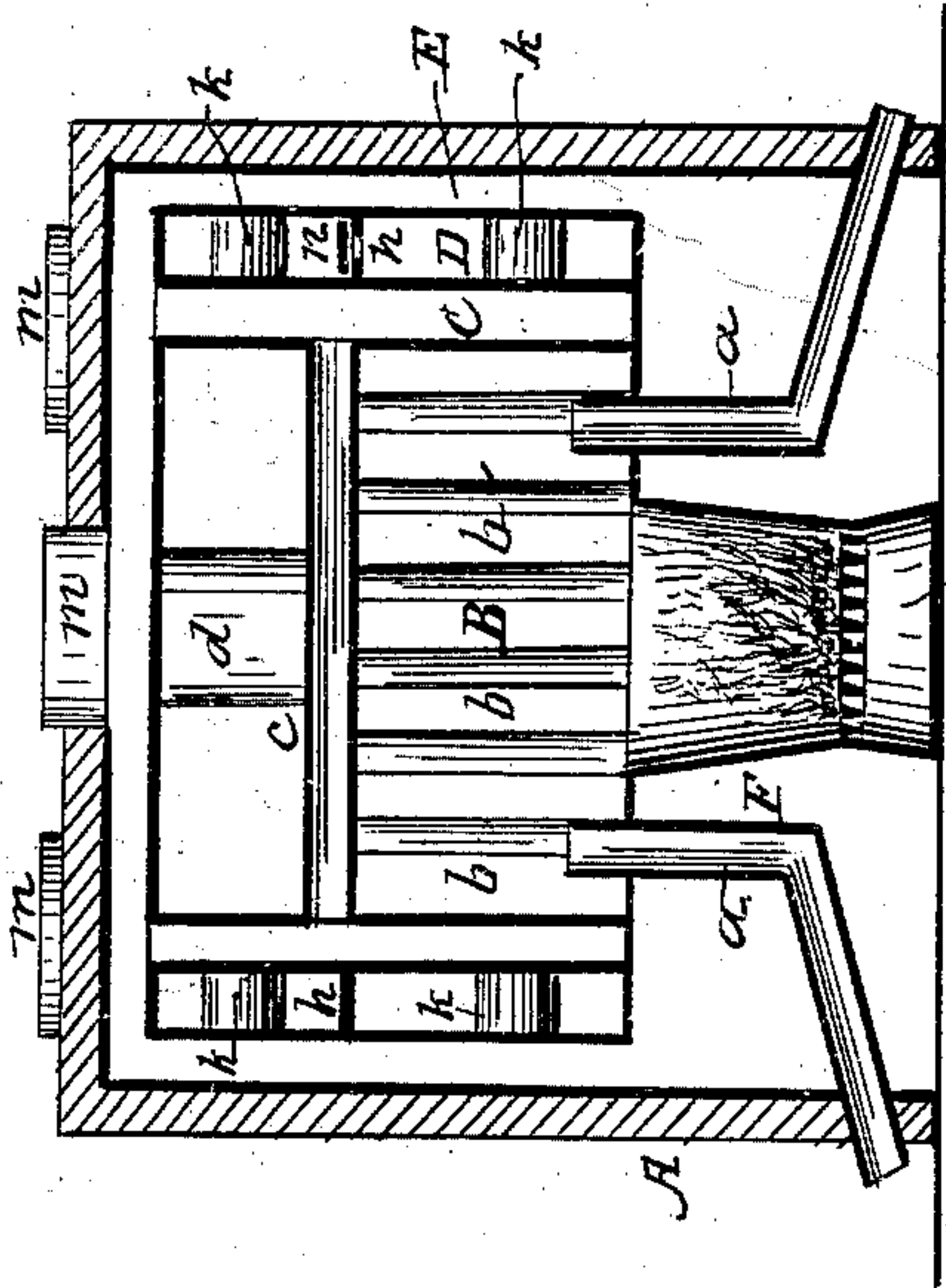


Fig. 4.

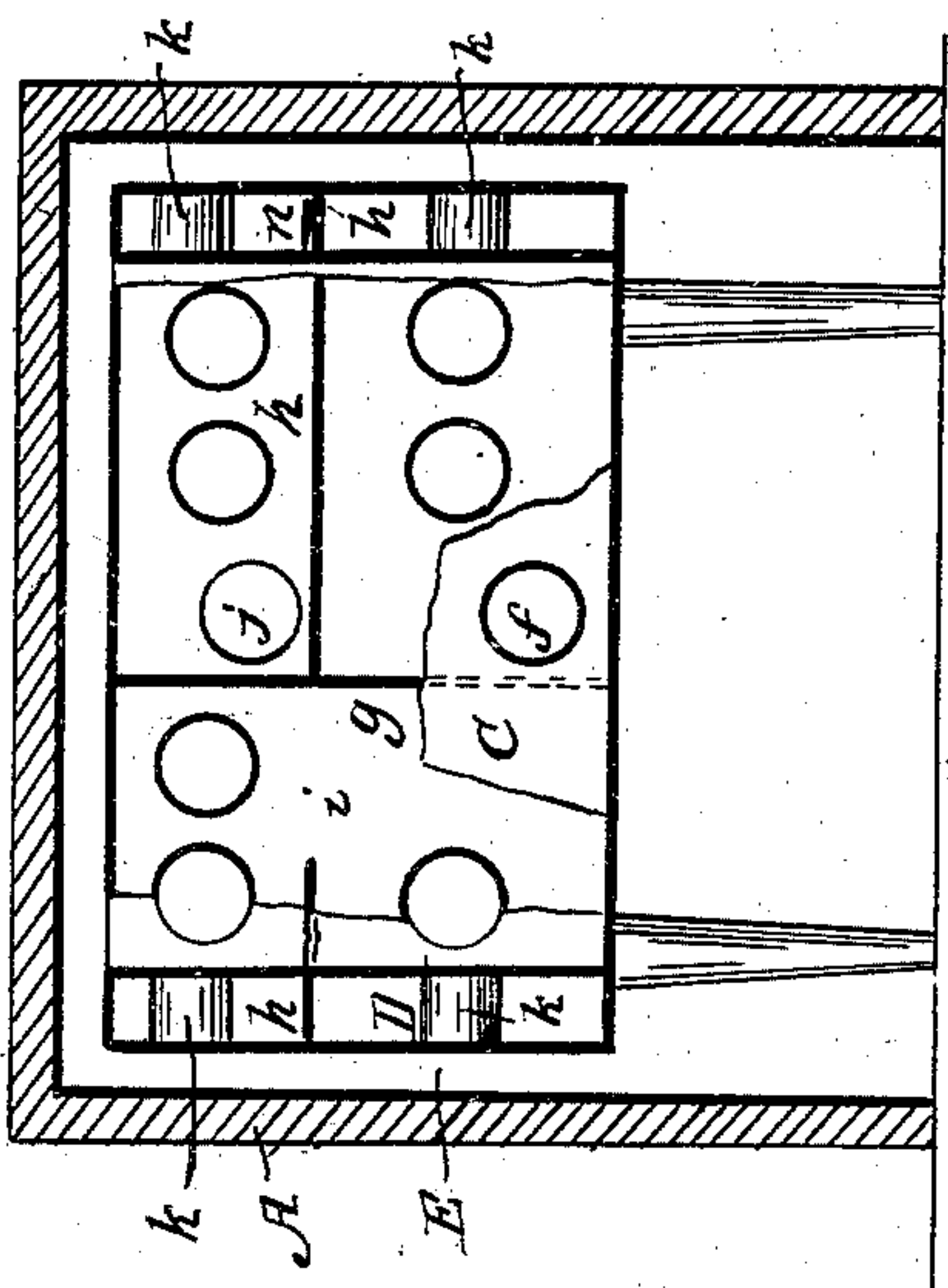


Fig. 1.

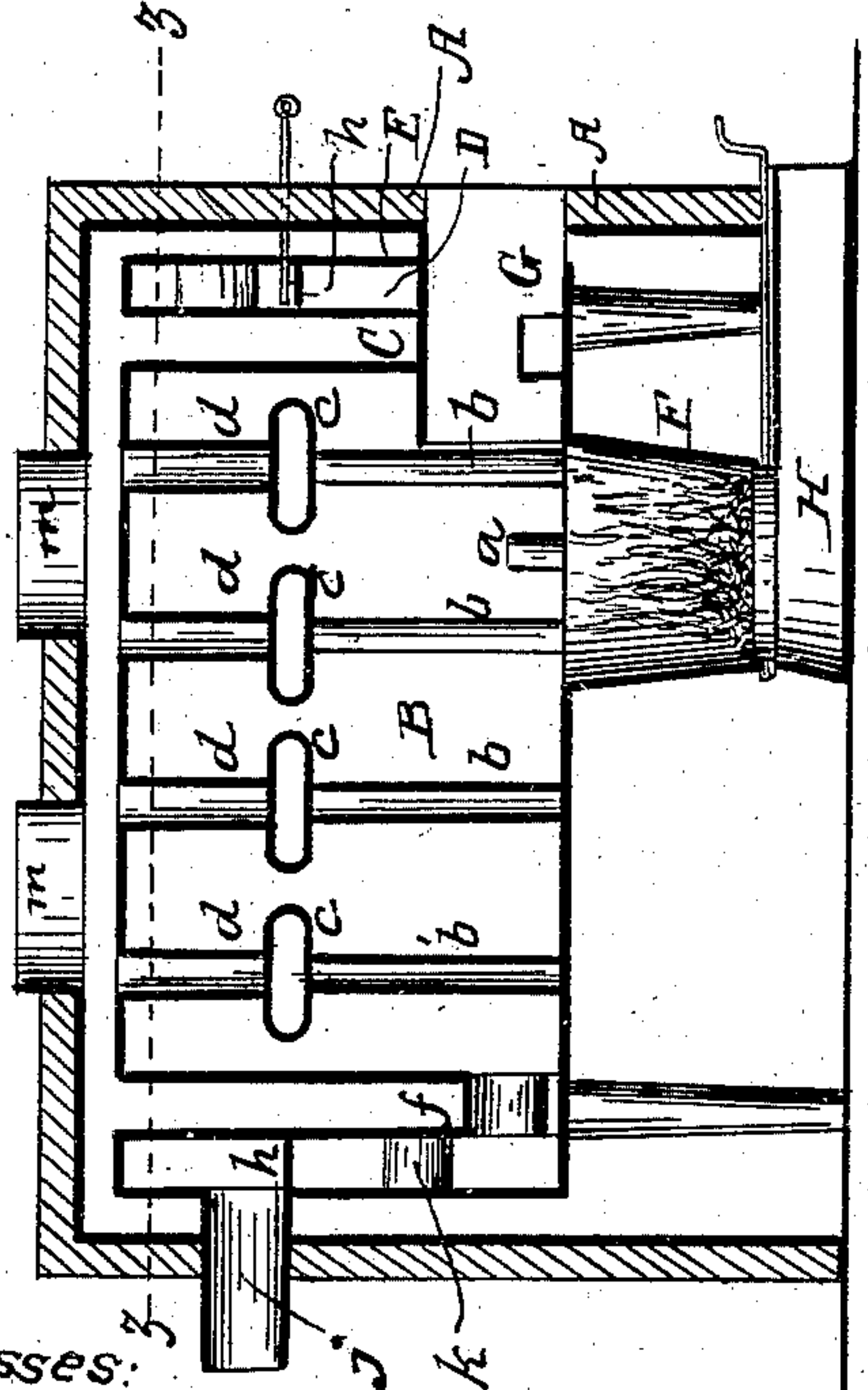
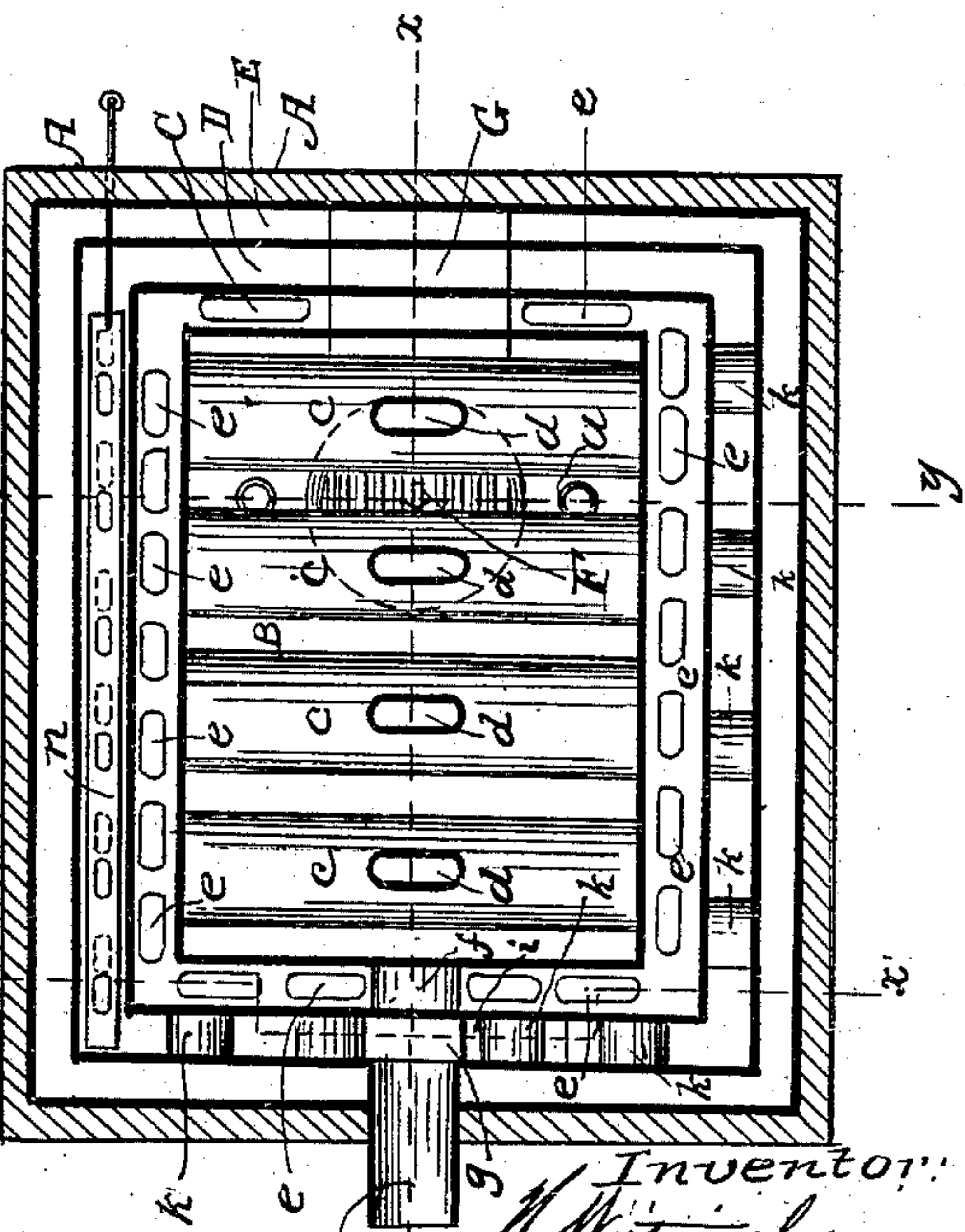


Fig. 3.



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# UNITED STATES PATENT OFFICE.

HARRY WHITTINGHAM, OF NEW YORK, N. Y.

## HOT-AIR FURNACE.

Specification forming part of Letters Patent No. 57,026, dated August 7, 1866.

*To all whom it may concern:*

Be it known that I, HARRY WHITTINGHAM, of the city, county, and State of New York, have invented a new and useful Improvement in Hot-Air Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of this invention, the line  $xx$ , Fig. 3, indicating the plane of section. Fig. 2 is a transverse vertical section of the same, the plane of section being indicated by the line  $yy$ , Fig. 3. Fig. 3 is a horizontal section of the same, taken in the plane indicated by the line  $zz$ , Fig. 1. Fig. 4 is a transverse vertical section of the same, the line  $x'x'$ , Fig. 3, indicating the plane of section.

Similar letters of reference indicate like parts.

This invention relates to a hot-air furnace the combustion-chamber of which is surrounded by an air-chamber, to which air is admitted from below and through which extends a series of vertical and horizontal flues, the vertical flues to conduct the cold air to the horizontal flues, where the same is heated, and where it passes into a hot-air chamber to be distributed to the various rooms or compartments in a building, the whole being arranged in such a manner that a comparatively small quantity of fuel is sufficient to heat a large quantity of air.

A represents a furnace, which is built of brick or any other suitable material, and the interior of which is divided into four compartments, B C D E, one inside the other, as clearly shown in Fig. 3 of the drawings. The inner compartment, B, forms the combustion-chamber, and this chamber communicates freely with the fire-pot F, to which the fuel is introduced through the feed-channel G, and which is situated over the ash-pan H, so that ashes dropping from the fire can be conveniently raked out, and at the same time a sufficient quantity of atmospheric air is supplied to the fire from below to support combustion.

Two pipes,  $a$ , serve to conduct atmospheric air into the combustion-chamber over the fire,

for the purpose of consuming the smoke, and a series of vertical tubes,  $b$ , extend through the bottom of the combustion-chamber up into horizontal flues  $c$ , which run transversely across said combustion-chamber, as clearly shown in Fig. 2 of the drawings, and which are open on both ends, so that the air from the second compartment or air-chamber, C, can freely pass through the same. From the flues  $c$  rise tubes  $d$ , which serve to carry up the heated air into the hot-air chamber E.

The air-chamber C is supplied with cold air through apertures  $e$  in its bottom, and the air contained in said air-chamber is heated by being in contact with the heated sides of the combustion-chamber B and of the smoke-chamber D.

The products of combustion pass through a flue,  $f$ , from the chamber B, through the chamber C, into the chamber D, and in this chamber said products are compelled to circulate by a vertical partition,  $g$ , which rises on one side of the flue  $f$ , and by a horizontal partition,  $h$ , whereby the gases, on emanating from the flue  $f$ , are compelled to travel first under said partition in the direction of the dotted arrow marked near said flue in Fig. 3, and, after having passed clear round to the vertical partition  $g$ , said products rise through an aperture,  $i$ , in the horizontal partition and return above said partition in the direction of the full arrow until they reach the escape-flue  $j$ .

By these means the products of combustion and the heated gases, on emanating from the combustion-chamber B, are compelled to circulate twice all round the air-chamber C, and while circulating through the smoke-chamber D they come in contact with a series of air-pipes,  $k$ , which extend from the air-chamber C through to the hot-air chamber E.

The air passing through the vertical tubes  $b$ , and also the air which accumulates in the horizontal tubes  $c$  and in the air-chamber C, is heated to a high degree, and it discharges through the tubes  $d$  and through a series of tubes,  $m$ , into the several compartments or rooms.

The horizontal partition  $h$  in the smoke-chamber is provided with a series of openings which are opened and closed by a damper,  $n$ , and by moving this damper the dirt accumulated on said partition can be made to drop

down on the bottom of the smoke-chamber, whence it can be readily raked out.

By these means a comparatively small quantity of fuel is sufficient to heat a large quantity of air, and a single furnace of moderate size will suffice to heat a large building.

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

1. The arrangement of the combustion-chamber B with a fire-pot, and with a series of vertical and horizontal air-flues, in combination with the air-chamber C, smoke-chamber D, and hot-air chamber E, all constructed and operated substantially as and for the purposes described.

2. The openings *e* in the bottom of the air-chamber C, in combination with the horizontal flues *c* and vertical tubes *b* in the combustion-chamber B, constructed and operated substantially as and for the purposes described.

3. The air-tubes *k*, passing from the chamber C, through the smoke-chamber D, into the hot-air chamber E, constructed and operated substantially as and for the purpose set forth.

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Witnesses:

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