

C. L. PIERCE.
Hot-Air Furnaces.

No. 138,188.

Patented April 22, 1873.

Fig. 1.

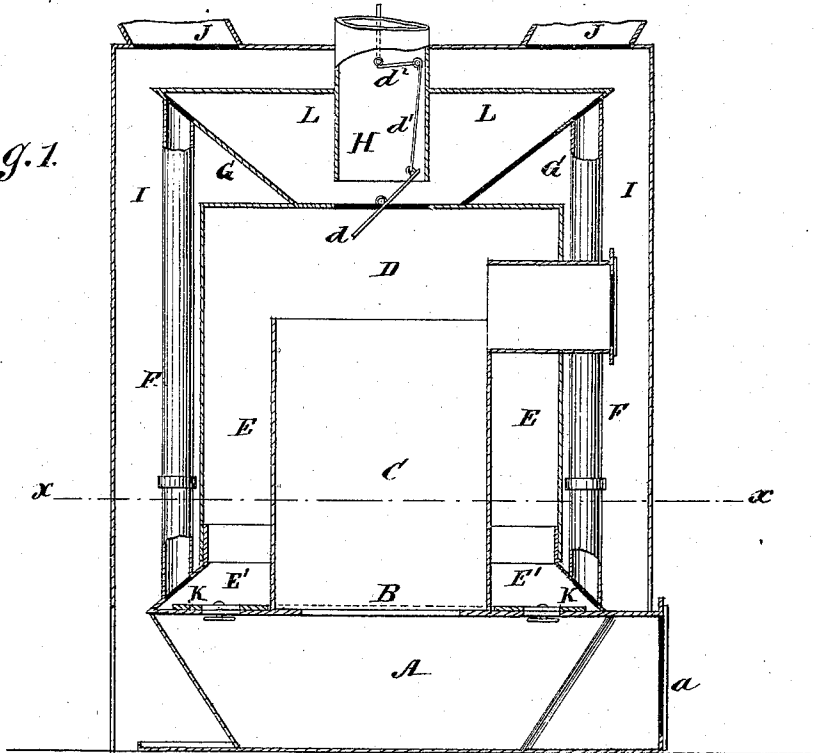
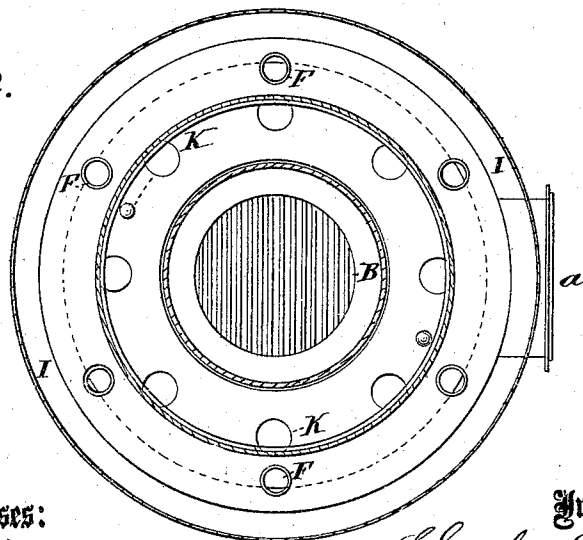


Fig. 2.



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UNITED STATES PATENT OFFICE.

CHARLES L. PIERCE, OF NATICK, MASSACHUSETTS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **138,188**, dated April 22, 1873; application filed December 28, 1872.

To all whom it may concern:

Be it known that I, CHARLES L. PIERCE, of Natick, in the county of Middlesex and State of Massachusetts, have invented a new and Improved Hot-Air Furnace; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing forming a part of this specification.

My invention consists, first, in providing a double and perfectly uniform return draft, thereby greatly increasing the radiating capacity of the furnace and distributing the heat equally over the entire radiating surfaces. This insures great durability for the radiators, which can never be heated red hot. It also consists in an arrangement of an annular register in relation to the combustion-chamber and smoke-flues, whereby the accumulation from the flues and chamber may be readily transferred to the ash-pit. It also consists in making the tunnel project over air-chamber, and by its conical form reflect the current of heated air back upon top of the furnace, thus more thoroughly heating said air before it ascends to its destination.

In the drawing, Figure 1 is a central vertical section; and Fig. 2 is a horizontal section through the line *xx* of Fig. 1.

A represents the ash-pit, B the grate, C the fire-pot, and D the combustion-chamber, of a hot-air furnace. *d* is a damper in the center of top plate of said combustion-chamber, which is connected by a rod, *d'*, to a crank-shaft, *d''*. This shaft is turned by a lever or otherwise to open or close the damper. E is an annular chamber formed around fire-pot, made open at the top and passing down to a space, E', the surrounding wall of which is a frustum of a cone, to which is connected the lower ends of a series of vertical flues, F, which connect at the top with an oblique or conical tunnel, G, that projects over furnace on every side to receive them. This tunnel then connects with the up-draft chamber H leading to smoke-flue. I is the cold-air chamber between the whole heating apparatus and the case. This discharges the air after being heated into the pipes J J which lead to the apartments to be heated. K is an annular register arranged in space E, and provided with suitable device so

that it may be turned by hand. This allows any deposit from the pipes F to be readily transferred to the pit, from which it is removed with the ashes through door *a*. In the tunnel is a chamber, L, that receives the products of combustion, from which a great portion of the heat has already been abstracted, that resists their immediate outward passage, and that causes them to dwell for a time until their depletion is more thoroughly effected.

The hot gases and products of combustion, whenever the draft through the damper *d* is cut off, are carried down over fire-pot C, through chamber E, and into space E'; thence they are forced up the flues F, down the tunnel G, and into chamber H, from which they are discharged.

The cold air that enters chamber I is carried up against outer cylinder of the chamber E, around the flues F, and against the sloping outer face of tunnel G; from thence it is reflected back upon the top plate of furnace, one of the hottest parts of the heating-surface. It then passes out through pipes J.

These flues F afford a very great increase of heating-surface to the air, cause a great uniformity in distribution thereto of the heat, and utilize a greater percentage of it, while the overlapping tunnel with its reflecting-surface contributes also to the latter in no small degree.

Practical experiment with a furnace now in full operation demonstrates not only the correctness of the theory embodied in this construction, but that its advantages are of the most palpable and practical character.

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

1. The chamber E E' opening at top into combustion-chamber D and arranged about fire-pot, in combination with a series of radiating vertical flues, F, placed at intervals around the air-chamber and leading to the smoke-flue through chamber L, as and for the purpose described.

2. A annular combustion chamber, D, having damper *d* at the top and opening into chamber E, as and for the purpose set forth.

3. The annular register K combined with

the chambers E and E' and flues F, and so arranged in relation to them that it will allow any deposit from either to be transferred to the ash-pit beneath it, as set forth.

4. The tunnel G declined inwardly and obliquely downward toward the center of combustion-chamber and having the smoke-flue H extending to near the bottom thereof, in combination with damper D, combustion-

chamber D, annular chambers E E', and flues F, as described, to enable the deposit from the tunnel to be readily emptied into the fire-pot.

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