H. D. FREER.

Hot-Air Furnace.

No. 167,657. Patented Sept. 14, 1875.

Fig. 1.

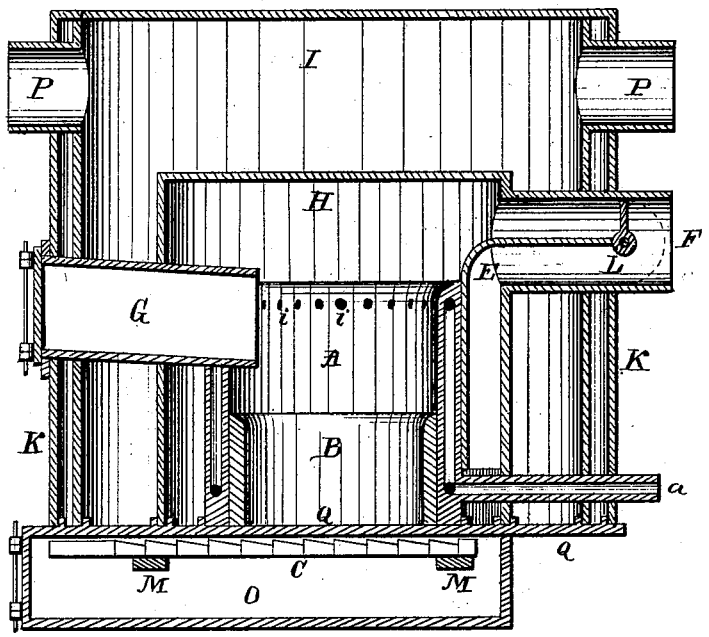


Fig. 2.

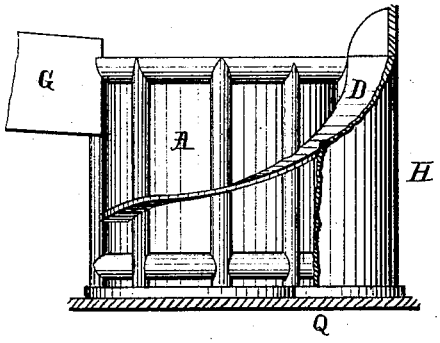
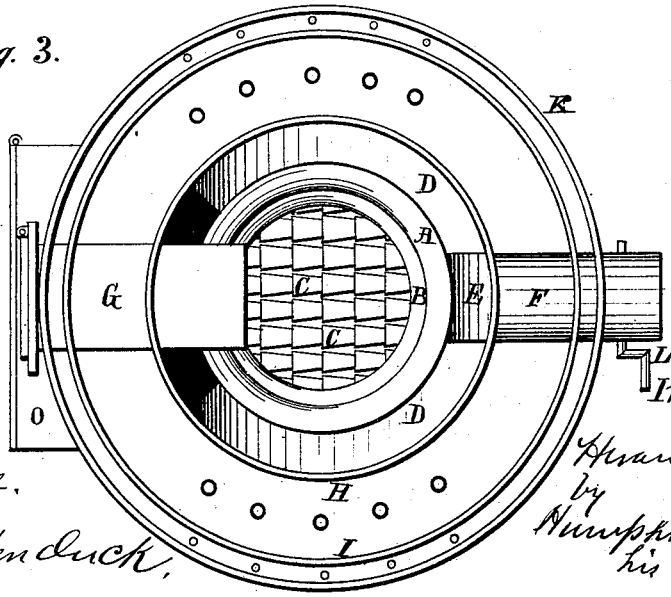


Fig. 3.



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UNITED STATES PATENT OFFICE.

HIRAM D. FREER, OF AKRON, OHIO.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **167,657**, dated September 14, 1875; application filed June 22, 1875.

To all whom it may concern:

Be it known that I, HIRAM D. FREER, of the city of Akron, State of Ohio, have invented an Improvement in Hot-Air Furnaces, of which the following is a specification:

The objects of my invention are, first, to insure more perfect combustion of fuel by the construction of a fire-pot which shall introduce upon the burning fuel jets of heated atmospheric air; second, to cause more even distribution of the heat from the fire upon the radiating-drum by means of a partition or web between the inside of the radiating-drum and the outside of the fire-pot, extending from the upper back edge of the fire-pot diagonally on each side toward the front and bottom thereof; third, to provide a more simple device for down-draft, by having a single smoke-flue divided longitudinally by a mid-feather, either half of which may be closed by a semicircular damper; and, fourth, to break up clinkers by a grate composed of independent bars of peculiar pattern.

My invention is fully shown in the drawing hereto attached, wherein—

Figure 1 is a vertical central section of a hot-air furnace embodying my improvements; Fig. 2, a view of the fire-pot and radiating-drum, to show the arrangement of the deflecting partition, and Fig. 3 a plan of the furnace with the cover removed.

The furnace does not differ in general arrangement from furnaces in common use; and consists of the double case K I, resting upon a cast base, Q, the radiating-drum H, and fire-pot A lined with fire-brick B and supplied with fuel through the box G.

The fire-pot A has air-passages cast therein passing entirely around it at the top and bottom, the two communicating through upright passages similarly formed, the upper one opening into the interior of the pot through a series of small holes, *i i*, (see Fig. 1,) and the lower connected with the outer air by means of the tube *a*.

The air passing in through this tube *a* finds its way through the lower and upright to the upper passage, and, becoming hot, is discharged in fine jets into the fire through the holes *i i*, causing complete combustion of the smoke and gas, thereby effecting an increase of heat without a corresponding consumption of fuel.

The smoke-pipe F passing from the radiating-drum H is, by means of a horizontal web or mid-feather, divided into two flues, the upper whereof opens into the upper part of the drum H, and the lower is prolonged by means of the flue E below the partition D. At L is a semicircular damper capable of closing either flue of the pipe F to provide either a direct upward or a down draft, as desired.

Beginning at either side of the flue E, at the top of the fire-pot, is a partition between the fire-pot A and the drum H, and passing on each side diagonally around the fire-pot toward the front and bottom thereof, leaving only a portion of the space between the fire-pot and the drum open at the front.

Experience has demonstrated that this position of the partition conforms nearly to the natural direction taken by the flame in seeking an outlet through a lower front opening, and affords a more complete action of the flame against the entire inside of the drum H than when the partition is placed horizontally at any point between the bottom and top of the fire-pot.

The grate is composed of single independent bars C resting upon cross-supports M N, (see Fig. 1,) plain on the under surface, but assuming on the other sides the form of a series of frustums of quadrilateral pyramids attached together, top to base.

The peculiar shape of these bars renders them efficacious in breaking up and removing clinker, while, being single independent bars, they are easily rearranged as they are affected by heat, and removed and replaced when worn out.

Having thus described my invention, I claim—

1. The fire-pot A, cast with the air-passages passing entirely around its upper and lower ends, and the upper passage opening into the fire-pot, and the vertical passages communicating with said top and bottom passages, in combination with the horizontal air-passage *a* communicating with the external air, as and for the object specified.

2. The combination, in a hot-air furnace, of

the double casing K I, the base Q, the fire-pot A, resting upon said base, and constructed with the diagonally-arranged partition D, the closed radiating-drum H, arranged over the fire-pot and the lateral pipe F, projecting through the double casing, and constructed with the flues, the upper one of which opens into the drum H, while the lower one is prolonged and extends beneath the diagonal partition of the fire-pot, as and for the purpose described.

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