

S. D. VOSE.
HEATING-FURNACE.

No. 171,888.

Patented Jan. 4, 1876.

FIG I

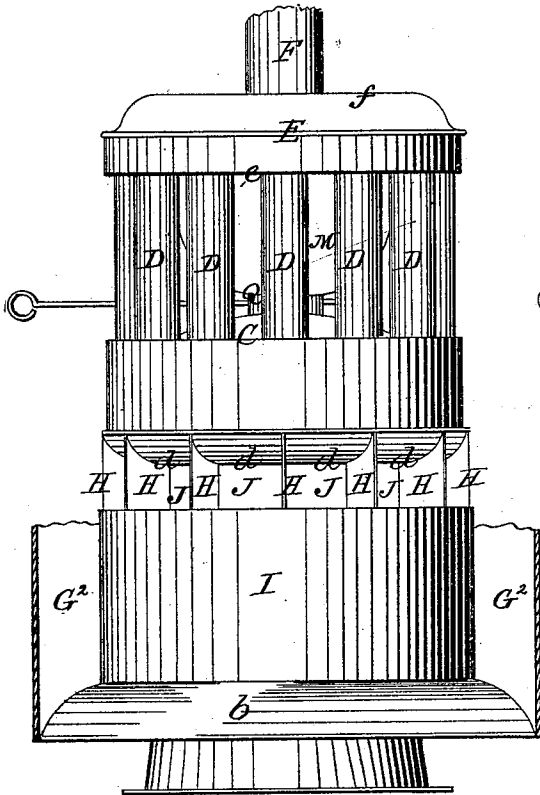
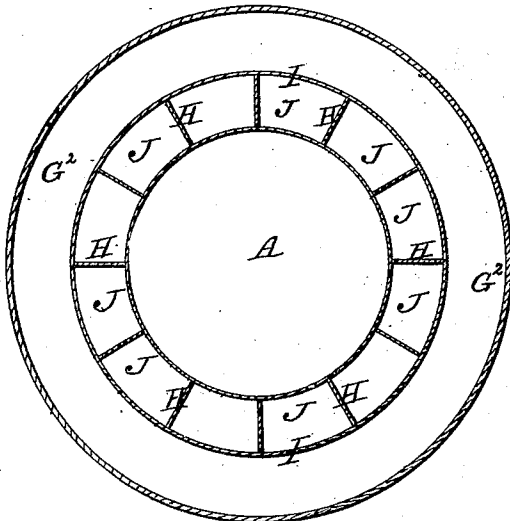


FIG IV



WITNESSES

John C. Laing:
J. H. Rutherford

FIG II

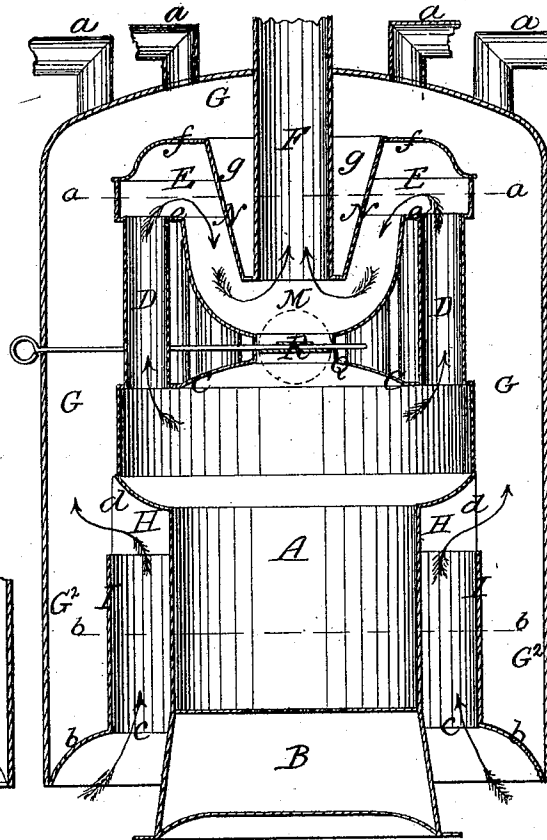
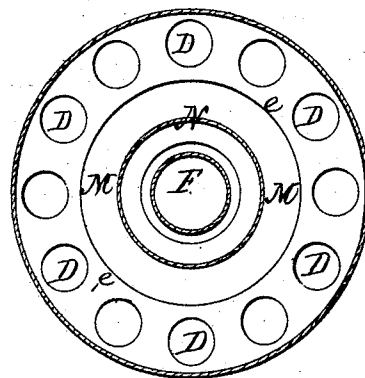


FIG III



INVENTOR

Samuel D. Vose,
By Johnson and Johnson,
his Attorneys.

UNITED STATES PATENT OFFICE.

SAMUEL D. VOSE, OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN HEATING-FURNACES.

Specification forming part of Letters Patent No. 171,888, dated January 4, 1876; application filed June 5, 1875.

To all whom it may concern:

Be it known that I, SAMUEL D. VOSE, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Heating-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 which it pertains to make and use the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, which form a part of this specification.

My desire is to produce a furnace designed with a special view to properly heat the largest quantity of air possible, with the simplest construction of furnace.

The improvements in such furnace will be specifically pointed out in the claims.

I am aware, however, that a drop-flue above the combustion-chamber, is not new; and that a series of vertical radial blades have been combined with the outer wall of the fire-pot, both with an outside drum communicating with a top drum, or by an outer-side case extending from the bottom to the top of the furnace; but my improvements involve a more simple and advantageous construction of the furnace, which I shall distinguish in the claims.

In the accompanying drawings, Figure 1 represents an elevation of the furnace without its inclosing-case; Fig. 2, a vertical section, showing also the inclosing-case of the furnace; Fig. 3, a horizontal section through the sunken or drop-flue chamber; and Fig. 4, a similar section, taken through the fire-pot and its jacketed blades on the line *b b* of Fig. 2.

The furnace has the usual fire-chamber A, and the ash-pit B, and from the arch C of the fire-chamber the usual flue-pipes D rise and connect with the top flue-chamber E, with which the smoke-pipe F connects. The furnace is inclosed by a case of metal or brick-work, to form the usual hot-air space G, and with which the pipes *a* connect and lead to the several rooms of the building to be heated. This hot-air space G is closed at its bottom by means of a flange, *b*, and envelops the furnace, as shown in Fig. 2. The exterior walls of the fire-pot are provided with radial heat-absorbing blades H, arranged at suitable distances

apart, and extending from the bottom to the top of the fire-pot. With these radial blades I combine a jacket, I, which, surrounding them closely and joining the bottom flange or rim *b*, forms a series of box-chambers, J, open at the bottom at *c* for the inlet of air, and at their upper ends for the outlet thereof into the hot-air space G surrounding the furnace. To obtain these upper openings, the jacket I does not inclose the full length of the radial blades H, but stops short of their upper ends to leave openings *d* about equal in area to the space formed between the walls of the box-flues. As the bottom flange or rim *b* extends outward from the lower edge of the jacket I, and joins the lower edge of the inclosing-case, the jacket will necessarily occupy a position intermediate with the walls of the fire-pot and the outer casing, and form thereby a non-conducting chamber, G², to prevent the loss of heat from the box-flues, and to hold the heat radiated from their inclosing-jacket. The cold air entering and passing into the box-flues is forced into direct contact with the outer wall of the fire-pot, the inner wall of the jacket, and the sides of the radial blades, and as the latter become as highly heated as the fire-pot the cold air is thereby highly heated, and, passing into the hot-air space G, joins the heated-air in the non-conducting chamber G² and passes upward with the draft, which is rendered quite rapid, through the box-flues in consequence of the intense heat therein, and the tendency of the cold air to rush in, and filling the series of hot-chambers, passes out and receives increased heat in contact with the entire upper section of the furnace. This not only gives a larger volume of incoming air, but obtain from the box-flues a very largely increased heating-surface at the very point most needed to obtain the best effect.

A flue-chamber, E, surmounts the furnace and communicates with the fire-chamber by a series of vertical flue-pipes, D, arranged in a circle in the space between these two chambers, and through which pipes the products of combustion pass to the smoke-pipe. The flue-chamber E is of peculiar construction, and consists of a sunken or drop flue, M, depending centrally from its bottom plate *e*, and nearly reaching the arch of the fire-chamber, and

a hollow conic section, N, depending from the top plate *f* of said flue-chamber centrally into the sunken flue, but not filling it, so that a proper annular space is left to form the sunken flue. Nor does the lower end of the conic section N extend to the bottom of such flue, as the smoke-pipe F joins the lower end of the conic section, and its communication, therefore, with the fire-chamber is through the sunken flue. The sunken flue is formed within the circle of the flue-pipes, and it tapers downward, its bottom being rounded; and the conic section, being hollow, opens into the hot-air chamber G, and leaves a space, *g*, between it and the smoke-pipe which rises from its bottom. The effect of this sunken flue is of special advantage in causing the products of combustion to be diverted from an easy exit and caused to descend, after leaving the flue-pipes, and be compressed within the smallest area of the sunken flue before they can escape upward through the conic-section pipe F, and thereby obtain the greatest benefit from the products of combustion in passing from the furnace, as the walls of the sunken flue and those of the conic section will be more highly heated by the concentrating effect of the sunken flue, which, projecting within the space formed by the flue-pipes D, is in immediate contact with the air passing round the furnace to be heated. The conic section, opening upward, also sends out a large volume of heat at the top of the furnace. The arch C of the fire chamber and the bottom of the sunken flue M are joined by a central neck, Q, within which a damper, R, is arranged so as to open direct draft with the smoke-pipe when desired, and especially for cleaning out all soot that may gather in the bottom of the sunken flue, which is so formed

as to allow such matter to pass down into the fire-chamber by opening the damper.

It is obvious that the inclosing-case may be dispensed with and the radiator left intact and complete for use as a portable heater.

I claim the following as new:

1. The combination, with the hot-air space G, and the closed top chamber E, of the chamber M depending into said chamber G, and the chamber *g*, opening upward therein, with the smoke-pipe F, passing therefrom through the chambers *g* G, as and for the purpose set forth.

2. The air-chamber *g*, and the drop-flue chamber M, combined with the chambers E and G, the smoke-pipe F, and the flue-pipes D, as described.

3. The combination, with the top chamber E and the drop chamber M of the arch C, of the fire-chamber, the damper R, and the flue-pipes D, as described.

4. The curb I, of less height than the blades H, and combined with them and the hot-air space G G² by the opening *d*, in the manner and for the purpose set forth.

5. The flues J, opening into the hot-air space G G² and combined with the drop-chamber M depending into said hot-air space above the arch C of the fire-pot, whereby the hot air, leaving the opening *d*, passes over and round the combustion chamber, and between the drop-chamber and the heat-receiving chamber E, as described.

In testimony that I claim the foregoing I have affixed my signature in presence of two witnesses.

SAMUEL D. VOSE.

Witnesses:

A. E. H. JOHNSON,

J. W. HAMILTON JOHNSON.