

(No Model.)

E. C. CONDIT.
HOT AIR FURNACE.

No. 355,301.

Patented Jan. 4, 1887.

Fig. 1.

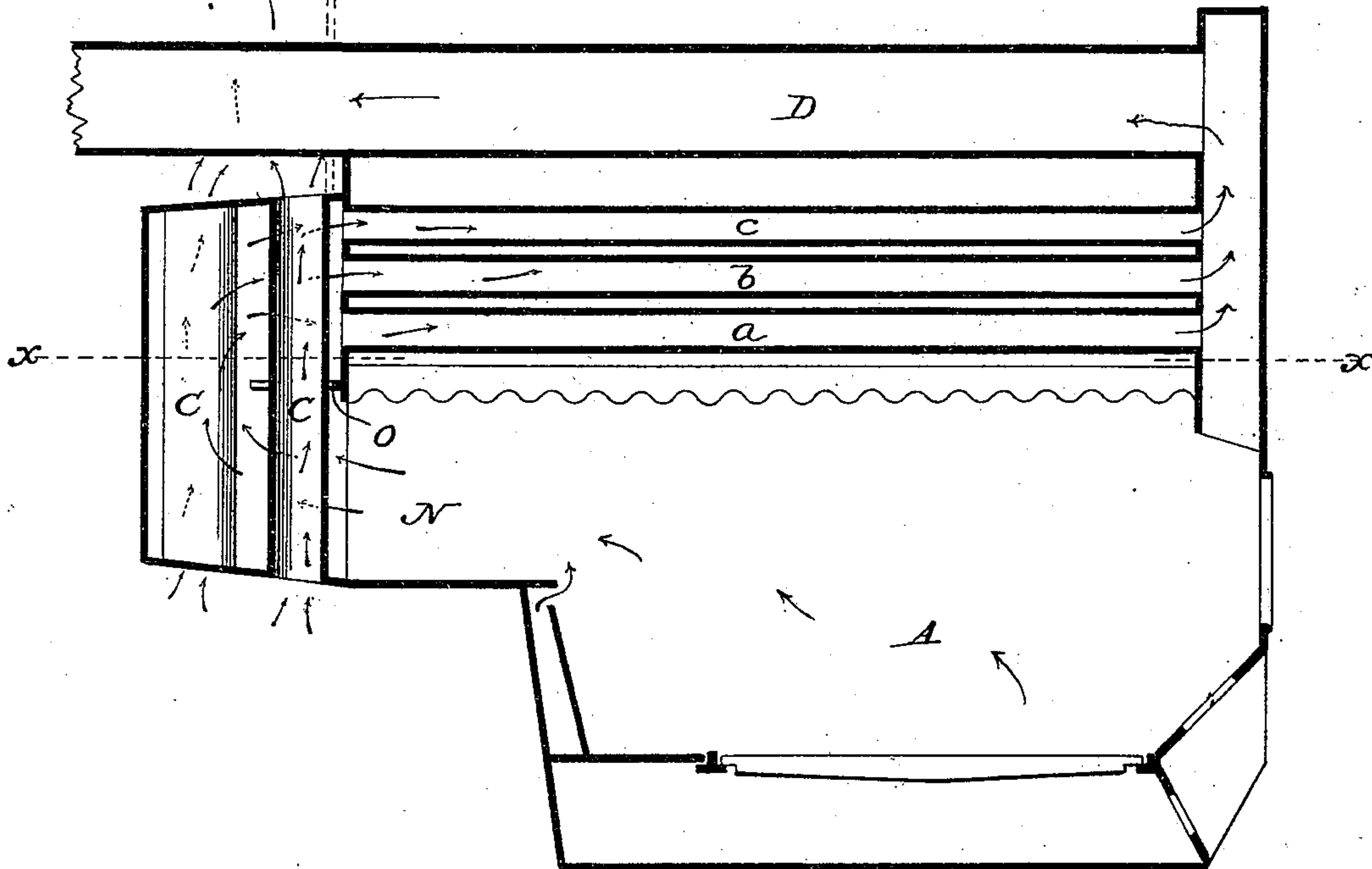
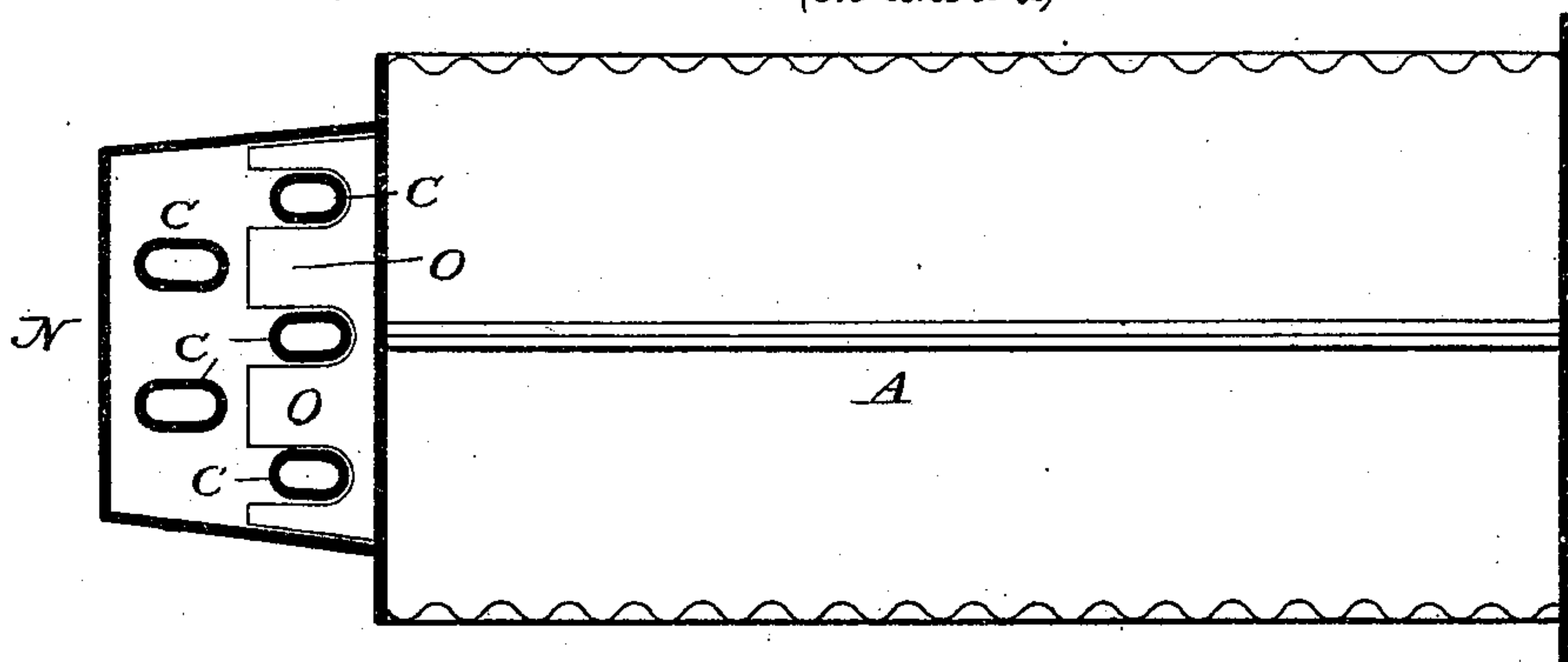


Fig. 2.
(on line x-x)



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

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HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 355,301, dated January 4, 1887.

Application filed October 19, 1885. Serial No. 180,320. (No model.)

To all whom it may concern:

Be it known that I, EZEKIEL C. CONDIT, of Kansas City, in the county of Jackson and State of Missouri, have invented certain Improvements in Hot-Air Furnaces, of which the following is a specification.

This invention relates to that style of furnace known as the "Ruttan Tubular Furnace," and is an improvement on that patented to Otis Jones, April 7, 1885, No. 315,040.

The invention consists in the addition and arrangement of a series of flues for the passage of air through a portion of the extension or heat chamber of the furnace, as hereinafter more fully set forth.

Figure 1 is a longitudinal vertical section of a furnace with my improvement applied thereto, and Fig. 2 is a transverse horizontal section on the line *x x* of Fig. 1.

As will be seen by reference to the Patent No. 315,040, one special feature of the furnace as therein shown is a combustion-chamber, N, in rear of the fire-box, with an arrangement for the delivery of fresh air at the point where the gases or products of combustion enter said combustion-chamber, for the purpose of consuming the gas escaping from the coal on the grate, thus insuring more perfect combustion and increasing the heat. Experience has demonstrated that this arrangement produces great heat in the chamber N, and that it is not as fully utilized in its passage through the flues above as is desirable, and to remedy this is the object of my present invention or improvement.

In the drawings, A represents the body or fire-box of the heater, and N is the extension or combustion chamber, these parts, with air-inlets and the heat-flues *a*, *b*, and *c* and smoke-pipe D, being constructed as described in said patent, except as hereinafter specified.

In order to more effectually utilize the heat of the combustion-chamber N, I arrange therein a series of vertical air flues or pipes, C, more or less in number, as shown in Figs. 1 and 2. These pipes C extend entirely through the chamber N, and are open at both ends, so that the cold air can pass directly up through the same, as indicated by the arrows in Fig. 1. The size and number of these pipes or tubes C will vary according to the size of the furnace; but I prefer to make them oblong or

oval in cross-section, as shown in Fig. 2, to secure the largest amount of heating-surface practicable without interfering with the requisite space for the products of combustion to pass, and also to arrange them, as shown, so that those in rear shall be opposite the spaces between those in front, so as to expose all their surface to the direct action of the heat.

In order to cause the products of combustion and heat to act more effectually upon these tubes C, I secure a deflecting plate or diaphragm, *o*, in the rear part of the chamber N, as shown in Fig. 1, this plate being located about midway between the top and bottom walls of this rear part of the chamber, as shown, and being made of the form shown in Fig. 2, so as to project between and extend to the rear of the front row of pipes C, to cause the products of combustion to pass back against and around the lower part of said pipes, and from thence up around their upper portions before entering the horizontal pipes *a*, *b*, *c*, &c., as indicated by the arrows in Fig. 1.

It is obvious that the diaphragm or plate *o* need not necessarily extend back between the front row of pipes, but may stop at their front edge, the difference being merely one of degree, and in practice I find the latter plan is sufficient for all practical purposes.

To render this improvement still more effectual, I propose to make the combustion-chamber N somewhat deeper vertically than in the original furnace, so as to increase the length of the air-tubes C, and so that they may be placed closer together and still leave ample space for the products of combustion to pass.

By this improvement a large addition is made to the heating-surface of the furnace, and this additional heating-surface is secured at a point where the heat is the greatest, and where it is therefore the most effective. It is exceedingly simple, and can be applied to the furnace as now constructed without any change of the patterns, except the holes in the top and bottom plates of the rear portion of the chamber N, and the addition of the deflector-plate *o*, which may either be cast integral with the rear wall of the body, or may be cast separately and be bolted on, as may be found most convenient.

Another advantage of this improvement is that (as is frequently the case) where there is a hot-air flue which, on account of its location, size, or other reason, fails to draw or convey its proper share of the hot air, it can be made to work better by locating the furnace so that these vertical tubes C shall be directly under or near the mouth of said flue, and, if necessary, putting a partition-plate in the hot-air chamber, as indicated by dotted lines in Fig. 1, so that the hot air, which ascends with considerable velocity through the tubes C, shall be made to pass directly into the separate flue above.

As the various hot-air flues leading from the chamber surrounding the furnace necessarily have to be located at different points to convey the heated air to different parts of the building to be warmed, and as their location is usually determined before the furnace is set, no further instruction or illustration is deemed necessary, as persons skilled in the setting of these furnaces will readily understand how to

arrange the furnace and locate the partition in order to accomplish the desired object, as above set forth.

I am aware that furnaces have been made with drums attached having vertical air-tubes therein, and also that it is common to construct circular furnaces with vertical tubes for the passage of air, and that it is also common to use deflecting-plates in heating apparatus, and I do not claim either of these features, broadly; but

What I claim is—

The combination, in a furnace, of the fire-box A, the rear combustion-chamber, N, having the vertical air-tubes C and deflecting-plate arranged therein, and the horizontal heat or smoke pipes, all arranged to operate substantially as shown and described.

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Witnesses:

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