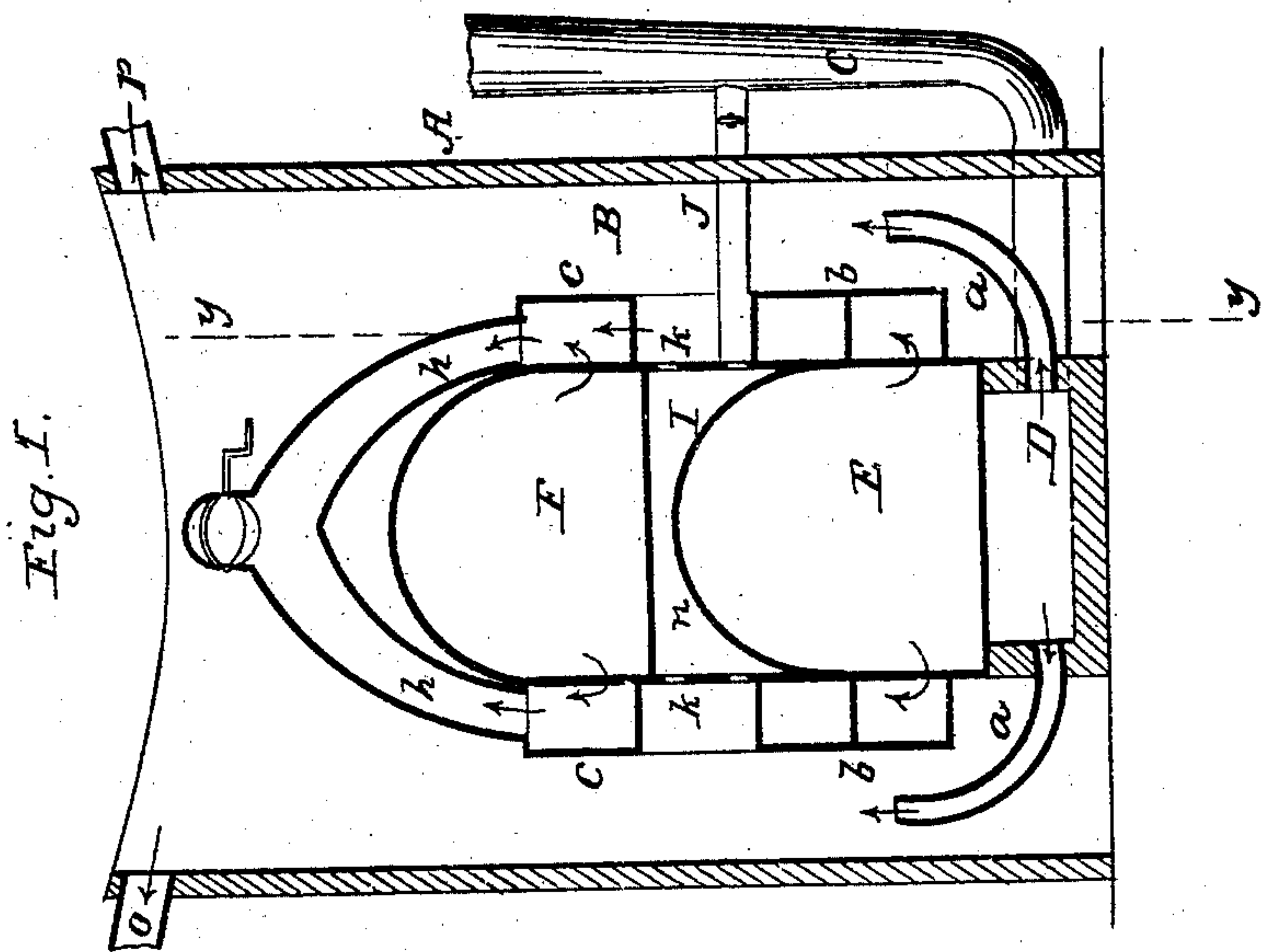
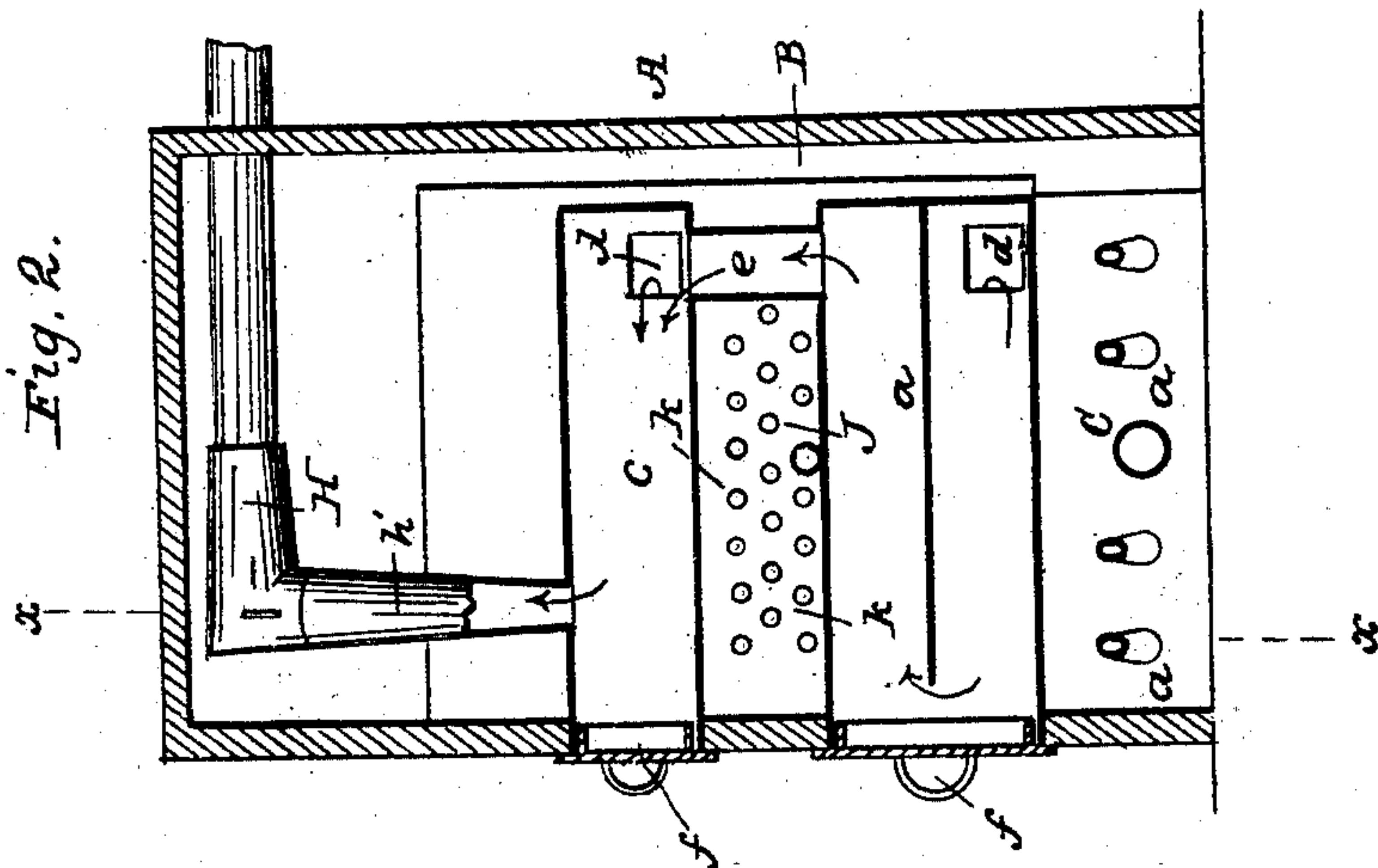


R. L. BATE.
Hot Air Furnace.

No. 34,856.

Patented April 1, 1862.



Witnesses:
J. H. Coombs
C. H. Reed

Inventor:
R. L. Bates
per Munroe & Co
Attorneys.

UNITED STATES PATENT OFFICE.

R. L. BATE, OF ADRIAN, MICHIGAN, ASSIGNOR TO HIMSELF AND W. S. WILCOX, OF SAME PLACE.

IMPROVEMENT IN AIR-HEATING FURNACES.

Specification forming part of Letters Patent No. 34,856, dated April 1, 1862.

To all whom it may concern:

Be it known that I, R. L. BATE, of Adrian, in the county of Lenawee and State of Michigan, have invented a new and Improved Air-Heating Furnace; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a vertical section of my invention, taken in the line *x x* of Fig. 2. Fig. 2 is a vertical section of the same, taken in the line *y y*, Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures.

The object of this invention is to obtain a much greater area of heating-surface than any air-heating furnace now in use, with but little increase in the cost of the apparatus and of the fuel required to supply the same; and it consists in the manner of arranging two furnaces, one on top of the other, both having flues on each side extending horizontally of the same, in combination with the distributing-pipes for injecting cold air into the space surrounding the furnace, where, coming in contact with the heated surface of the same, it becomes rapidly heated and is thrown out through registers into the rooms, as will be hereinafter fully described.

To enable others skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents the exterior wall of the device, which may be of masonry, and which incloses the whole apparatus. The compartment B, formed by this wall, is covered or arched over, and has a cold-air-induction pipe C leading into its lower end, as clearly shown in Fig. 1.

Placed or built centrally within the compartment B is a tight box or air-reservoir D, which has leading from its sides a number of distributing-pipes *a a*, extending upward, and which are for the purpose of injecting cold air into the space surrounding the furnace. The furnaces are supported on top of the reservoir D, it forming the foundation of the same. The fire-boxes E F of the furnaces are arranged one above the other, and on their outer sides are provided with flues *b b c c*, which extend horizontally and communicate

with their respective fire-boxes at their back ends through openings *d d*, and the flues on each side with each other through a flue *e*. Both of the flues *b* and *c* are closed at their back end, and at their front end are open and pass through the front wall flush with the outer surface of the same to enable them to be cleaned out when desired, they being closed when the furnace is in use by covers *f*. The lower flues *b* on each side of the fire-box E have a partition *g*, extending through them horizontally and centrally to near the front end, dividing them into two compartments or passages and causing the smoke and gases of combustion from the lower fire-box on each side of the same to traverse the entire length of the flue and back before escaping into the flue of the upper fire-box F, after traversing which they escape into the pipe H, leading through the back wall into the chimney. This pipe H is located directly over the longitudinal center of the furnace, and at its front end branches out into two pipes *h h'*, which at their lower ends communicate, respectively, with the flues *c c'* on opposite sides of the fire-box F. In the upper part of this fire-box, and which forms the top of the same, there is fitted or placed a circular radiator I, having an inner chamber formed between it and the bottom of the fire-box F, as clearly shown in Fig. 1. This inner chamber *n* communicates with the space surrounding the furnace through perforations *k* and with the cold-air pipe C through a branch pipe J. The pipe C has a partition placed or fitted within it, which extends from the top down to a point below where the branch pipe enters it, forming two separate air-passages. (Not shown in the drawings.)

Dampers are placed in each of the pipes J H, in the former of these on the outside of the wall, and in the latter on the front end, or it may be at any other point in the pipe which may be desired. The rod by which it is operated should protrude through the outer wall to allow it to be operated from the outside.

The operation is as follows: The cold air descends through the pipe C into the tight box or reservoir D, and then passes through the distributing-pipes *a* into the open space surrounding the furnace and between it and

the exterior wall A, where in its passage up it is rapidly heated by contact with the heated surfaces of the flues. Both sides of the furnace being precisely alike, a description of one will answer for both. Fires being built in both of the fire-boxes E F, the smoke and unconsumed gases escape at the back end from the lower box E, through the opening *d*, into the lower part of the flue *b*, whence they pass to the front end and up over the partition *g*, thence back to the rear end of the flue, then ascend the passage *e* and pass along the flue *c* to the forward end, where they discharge through the branch pipe into the pipe H, leading into the chimney. The smoke and unconsumed gases of combustion from the fire in the upper fire-box F enter the flue *c*, and, after passing to the forward end of the flue through the branch pipe into the pipe H, pass thence into the chimney. The damper in the branch pipe being open, the air rushes from the pipe C through the branch pipe into the chamber, where, impinging against the surface of the radiator, it is thrown out in a

heated state through the partitions *k* into the surrounding space, when it ascends and escapes through the register-pipes *o p*. By means of the damper in the pipe J more or less cold air may be admitted into the radiating-chamber, and consequently more or less heat by radiation obtained. By having the flues arranged on the sides of the fire-boxes of the furnaces a great amount of heat is obtained, which, if the flues were arranged on top of the furnace, would escape into the chimney without effecting any useful result.

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

The fire-boxes E F, flues *b b c c*, cold-air reservoir D, distributing-pipes *a a*, radiating-surface I, and pipes C, when combined, arranged, and operating in the manner substantially as described.

R. L. BATE.

Witnesses:

A. L. MILLERD,
R. A. BURY.