

J. A. MILLER.
Hot Air Furnace.

No. 47,443.

Patented April 25, 1865.

Fig. 2

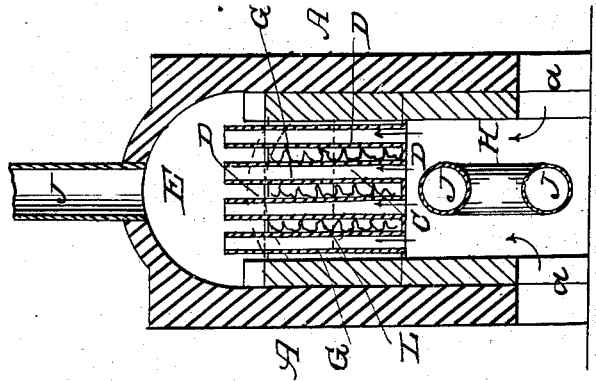
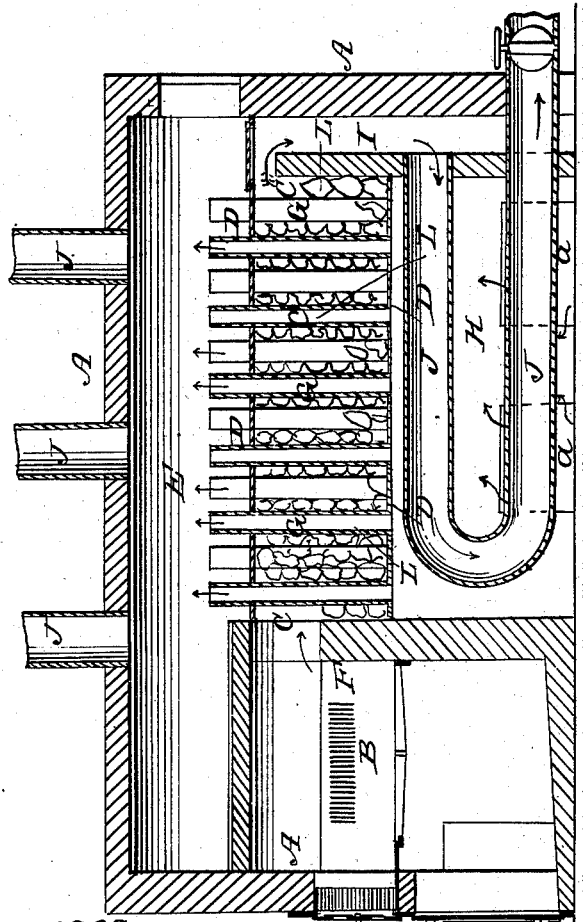


Fig. 1



Witnesses
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Inventor
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JOSEPH A. MILLER, OF NEW YORK, N. Y.

HOT-AIR FURNACE.

Specification forming part of Letters Patent No. 47,413, dated April 25, 1865.

To all whom it may concern:

Be it known that I, JOSEPH A. MILLER, of No. 200 Broadway, in the city, county, and State of New York, have invented a new and useful Improvement in Hot-Air Furnaces; 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, forming part of this specification, in which—

Figure 1 is a central longitudinal vertical section of a furnace constructed according to my invention. Fig. 2 is a transverse vertical section of the same.

Similar letters of reference indicate corresponding parts in both figures.

In hot-air furnaces in which air is heated by passing through iron tubes between and around which the flame and gaseous products of combustion circulate on their way from the fire to the chimney, or by passing between iron tubes through which the flame and gaseous products of combustion so circulate, the temperature of the air so heated is liable to rapid fluctuations, with variations in the condition of the fire.

The object of the first part of my invention is to obviate this, and to prevent the temperature of the heated air from being so much or so quickly influenced by changes in the condition of the fire; and to this end it consists in placing between, among, or within the tubes in the spaces through which the flame and heated gases circulate lumps of brick or other refractory material which is a poor conductor of heat, and which acts as a heat-receiving medium or heat-reservoir.

The second part of my invention consists in a novel arrangement of flues and air-heating tubes and spaces in relation to each other and to the fire-place, whereby the air circulating upward in contact with heating media, in contact with which the heated gaseous products of combustion circulate downward, is heated with a very economical expenditure of fuel.

To enable others skilled in the art to make and use my invention, I will proceed to describe it with reference to the drawings.

A is a shell or casing of brick-work or other material of a capacity according to the quantity of air to be heated, having the fire-place B at one end. In rear of the fire-place there is a horizontal flue, C, of the whole width of

the shell A, and extending from the bridge-wall F of the fire place nearly to the rear end of the said chamber. This flue is formed by two horizontal tube-sheets, D D', extending all across the shell A, and these tube-sheets receive a number of vertical air-tubes, G G, the lower ends of which communicate with the cold-air chamber H in rear of the ash-pit and below the tube-sheet D', and the upper ends of which communicate with the hot-air-distributing chamber E above the tube-sheet D and fire-place. In rear of the flue C and cold-air chamber H, and in communication with the flue C, there is a vertical drop-flue, I, from which, just below the flue C, a pipe-flue, J, extends horizontally forward through the upper part of the chamber H nearly to the front thereof, where it has a downward bend, and from whence it returns in a horizontal direction through the lower part of the said chamber and through the rear of the shell A, outside of which it leads to a chimney or up-take.

The spaces left between the tubes G G in the flue C are filled up with lumps L L, of brick or other poor conducting material, of such irregular or other shape that interstices will be left between them for the circulation of the flame and heated gaseous products of combustion on their way from the fire-place through the flue C toward the chimney.

At the sides of the cold-air chamber H, close to the bottom thereof, are openings for the ingress of cold air, and at the top of the hot-air chamber E one or more pipes, J J, are provided for conveying the heated air wherever it is to be used.

When the fire is lighted, the flame and gaseous products of combustion pass through the flue C, thence down the flue I, thence forward, downward, and backward through the flue J to the chimney, the circulation to the chimney being downward. By the heating of the air in contact with the exteriors of the flue J and tube-sheets D D' and interiors of the tubes G G, an upward circulation of air from the chamber H through the tubes G G to the chamber E, and thence through the pipes J J, is produced, and a copious supply of cold air enters through the openings *a a* of the chamber H, to supply the place of what has passed upward. The air as it enters first strikes the coolest part of the heating-surface—viz., the lower

part of the flue J—and as it rises comes next into contact with the hotter surface of the upper part of the said flue, afterward with the still hotter surface of the tube-sheet D, then passes up through the tubes G G, which are hotter toward the top than at the bottom, and finally over the tube-sheet D, which is the hottest part of the heating-surface. It will thus be seen that the air entering where the heating-surface is coolest passes into contact with gradually-hotter surfaces, and is thus heated in the most effective manner.

The flame and gaseous heated products of combustion, circulating through the interstices between the lumps L, of brick or other poor conducting material, between the tubes G G, heats the said lumps in such a manner that they form a reservoir of heat to prevent the sudden cooling of the tubes G G when a fresh charge of fuel has been put on the fire, or from any other cause, and thus prevent sudden changes in the temperature of the heated air delivered into the distributing-chamber E. A reservoir of heat may be formed in a similar manner within the tubes of hot-air fur-

naces in which the products of combustion pass through tubes, and the air to be heated passes in contact with the exterior of such tubes.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Forming a heat-reservoir between or within the tubes of a hot-air furnace by means of lumps or pieces L L, of brick or other material which is a poor conductor of heat, so applied that the flame and heated gaseous products of combustion may circulate through interstices between the said lumps or pieces, substantially as herein specified.

2. The arrangement of the horizontal flue C, drop-flue I, forward-and-backward-circulation pipe-flue J, in combination with each other and with the cold-air chamber H, tube-sheets D D', air-tubes G G, and air-distributing chamber E, substantially as herein specified.

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Witnesses:

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