2 Sheets—Sheet 1.

J. BARKER.

Hot Air Furnace.

No. 5,436. Patented Feb. 8, 1848.

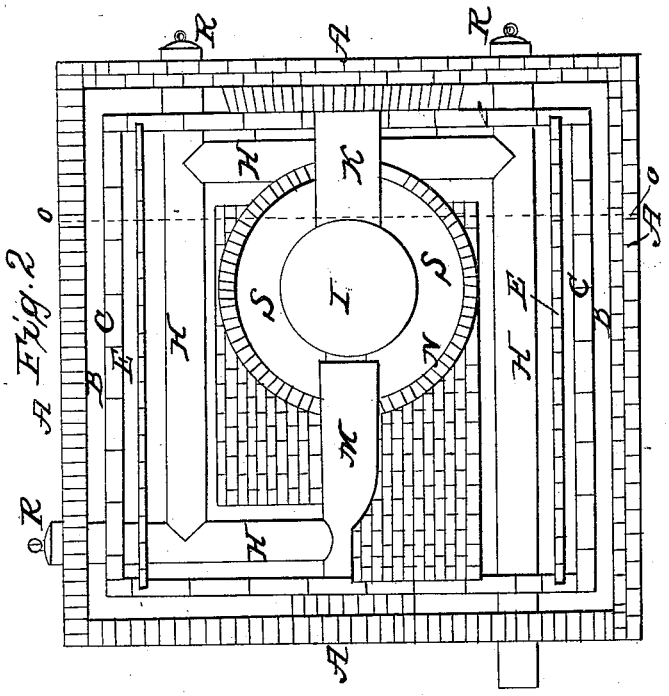

Fig. 2

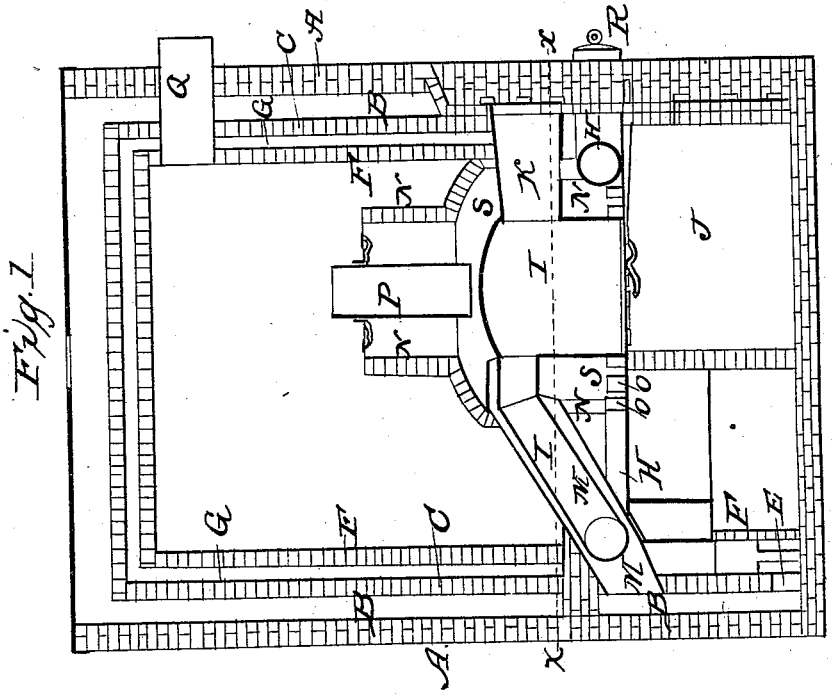

Fig. 1

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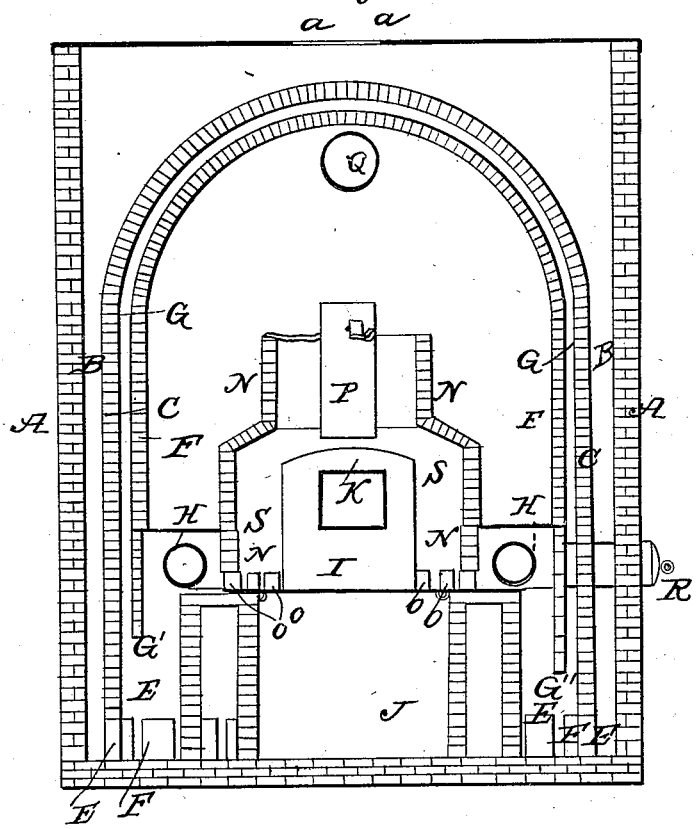
Fig. 3



UNITED STATES PATENT OFFICE.

JNO. BARKER, OF BALTIMORE, MARYLAND.

AIR-HEATING FURNACE.

Specification of Letters Patent No. 5,436, dated February 8, 1848.

To all whom it may concern:

Be it known that I, JOHN BARKER, of the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in the Manner of Constructing Air-Heating Furnaces for the Warming of Buildings, said improvements being made on a furnace for a like purpose for which I obtained Letters Patent of the United States dated July 7, 1846; and I do hereby declare that the following is a full and exact description of my improvements thereon.

In my improved air heating furnace instead of erecting a single brick wall, and arching it over, I erect two walls, both of which are arched over, leaving a space, say of an inch or two between the two walls and arches, which space being occupied by a bad conductor of heat, atmospheric air, has the effect of keeping the outer wall and arch at a low temperature; which not only economizes the heat, but allows of the ready descent of the cool atmospheric air on the outside of the outer wall, which air is to pass down between it and the walls of the apartment in which the furnace is situated, and is to enter the heating compartment through openings at the lower part of the walls, as in the structure described in my original patent.

In the accompanying drawings Figure 1, is a vertical section through the middle of the furnace, from front to back. Fig. 2, is a horizontal section through the brick work and chamber, in the line *x*, *x*, of Fig. 1, but not cutting off the iron work of the stove, or of the feeding and escape openings connected with it. Fig. 3, is a vertical section through the structure in the line *o*, *o*, of Fig. 2; in each of these figures where the same parts are shown they are designated by the same letters of reference.

A, A, are the walls of the apartment containing the air heating furnace. This part where circumstances admit of it, I prefer to cover with a flat plate, having an opening along its middle, as at *a*, *a*, Fig. 3, to cause the air from without to pass in along the center of the outer arch; which air is to descend through the spaces B, B, between the wall A, and that *c*, of the outer arch; from which space it enters into the air heating compartment by means of the openings E, left in the bottom for that purpose. F, is the wall of the inner arch, and G, G, the space between it and the wall of the outer arch. Into this space a portion of the cool air introduced through the openings E, E, enters, and by allowing it to enter the spaces G, at a greater height on one side, as at G′, than it does at the other, as at G″, Fig. 3, it has been found that a slight circulation of the cool air is kept up, and its cooling influence preserved; the difference in the height of the openings G′, and G″, has, in practice, been about twelve or fourteen inches.

The air heating pipes H, H, I use in a single tier, causing them to pass nearly around the four sides of the furnace, and as near as may be to its bottom; the arrangement in these respects being the same in principle with that in my original patent. I, is the fire chamber, and J, the ash pit, K, the opening through which the fuel is passed into the fire chamber, and L, the pipe through which the heated air from the furnace passes into the air heating pipes H, H. In order to prevent the pipe L, from becoming too highly heated, I surround it by a larger pipe M, Fig. 1, which larger pipe passes through the walls of the two arches, and enters the space B, by which it is supplied with cold air which rushing up through it, becomes heated, and in so doing keeps down the temperature of the pipe L. The pipe M, terminates before it reaches the stove, or fire chamber, leaving a space for the passing of its heated air into the general hot air chamber.

The stove, or fire chamber I, is surrounded by brick work N, N, Figs. 1, and 3, forming an air heating flue space S, S, around it, into which space air passes at its lower part through openings O, O, which openings lead from the space containing the pipes H H; by this means a current of ascending air is produced within this flue space up the sides of the stove; one object particularly kept in view in the general arrangement of the apparatus is to keep down the temperature of the surface of the stove, and to heat the air as much as possible by contact; and not by radiation, and this object is thereby promoted. It was found, however, that under the foregoing arrangement the ascending air which had passed in contact with the sides of the stove had little tendency to approach

the surface of its top plate, and that this part became more highly heated than was desirable; to obviate this difficulty I have suspended a pipe P, of about eight inches in diameter in the upper part of the flue space that surrounds the stove, this pipe is open at both ends, and its lower end is situated at about two inches above the top of the stove, or at such distance as to allow a space for the entrance of air into it, about equal to the area of the pipe itself.

By this device a lateral current of air is made to pass over the top of the stove, and through the suspended pipe, abstracting a large portion of heat from the said top, and keeping it at a temperature too low for deteriorating the air.

Q, is a tube for distributing the heated air, and R, R, covers which may be removed for the purpose of cleaning the air heating pipes H, H.

Having thus fully described the improvements made by me in the air heating furnace, and which improvements are especially adapted to that for which I have already obtained Letters Patent, as herein before stated, what I claim therein as new, and as of my invention, is—

1. The inclosing of the air heating chamber within a double arch, in such manner as to admit of the entrance of a stratum of cool air between such arches and their sustaining walls, said air being made to descend, in the manner set forth, between the walls of the outer arch and those of the inclosing compartment.

2. I also claim the manner of arranging the pipes L, and M, so as to cause a current of cold air to be brought into contact with the former by means of the latter, as described and represented.

3. I likewise claim the manner of employing the pipe P for causing a lateral current of air to pass over the top of the stove in combination with the openings O O, for the introduction of said air under an arrangement and combination of parts substantially the same with that herein made known.

JOHN BARKER.

Witnesses:

ALEXR. YEARLY,

EVAN T. BARKER.