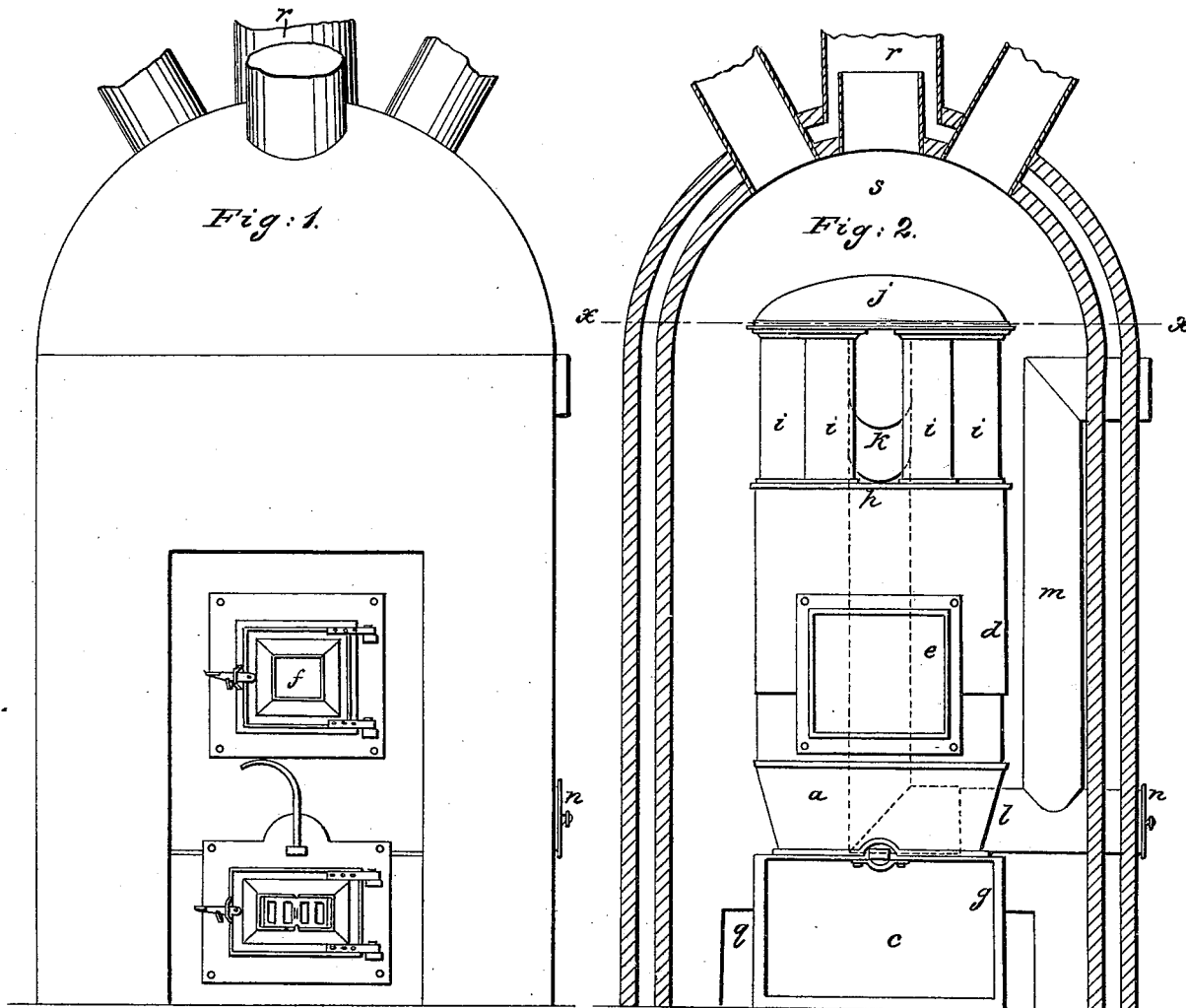


2 Sheets—Sheet 1.

G. CHILSON.
Hot Air Furnace.

No. 5,550.

Patented May 2, 1848.

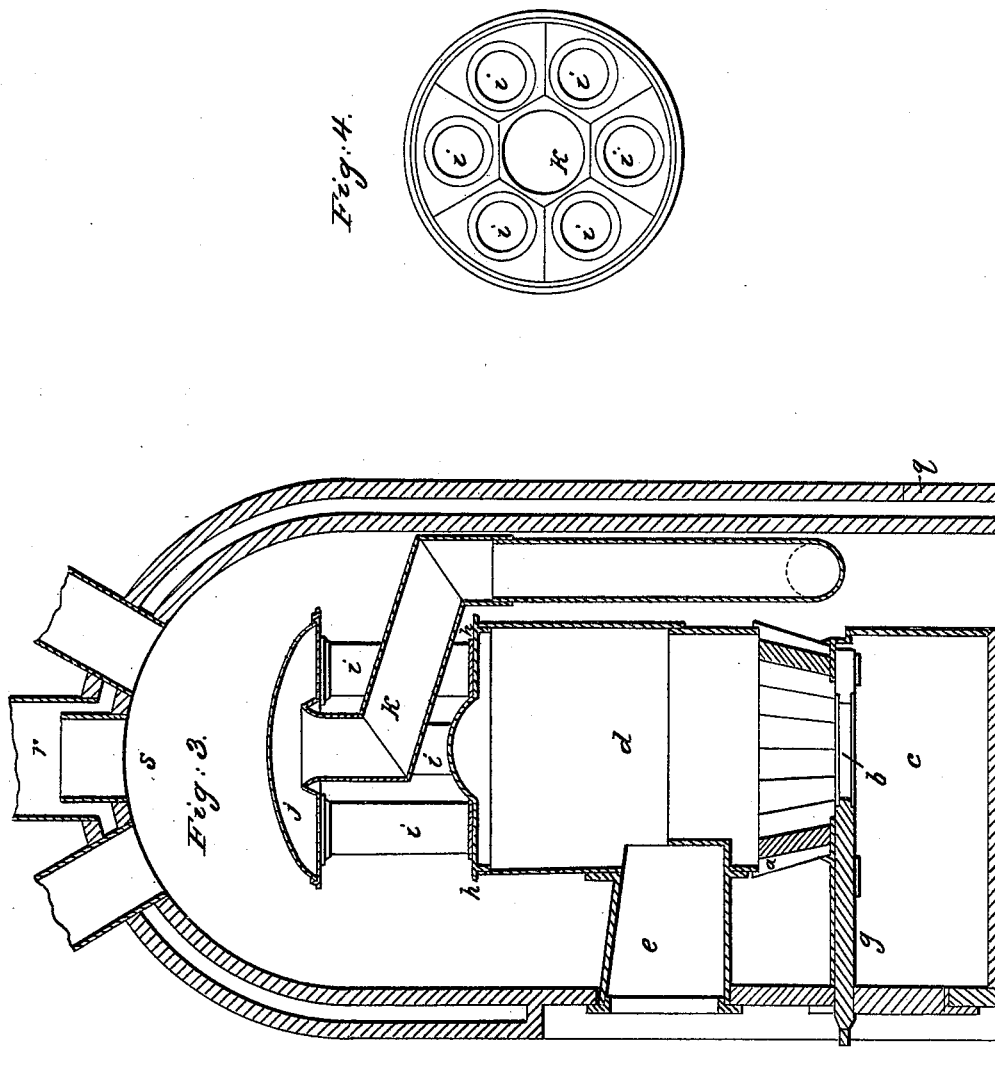


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UNITED STATES PATENT OFFICE.

GARDNER CHILSON, OF BOSTON, MASSACHUSETTS.

HOT-AIR FURNACE.

Specification of Letters Patent No. 5,550, dated May 2, 1848.

To all whom it may concern:

Be it known that I, GARDNER CHILSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in the Hot-Air Ventilating-Furnace for Heating and Ventilating Buildings, &c., and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—
Figure 1 is an elevation of the outside of the furnace; Fig. 2, an elevation of the furnace within the surrounding chamber which is represented in section; Fig. 3, a vertical section taken through the center of the furnace; and Fig. 4 a horizontal section taken at the line X X of Fig. 2.

The same letters indicate like parts in all the figures.

In the class of furnaces which consists of a cylindrical fire chamber above the grate, the upper part of this chamber has often been provided with a series of vertical tubes arranged in a circle within its periphery and opening into a chamber above provided with an exit smoke pipe at the top or side through which the products of combustion escape into the chimney. The objections to this plan are, that the products of combustion have too direct an escape, and therefore do not act sufficiently on the metal forming the chamber to give the heat due to the fuel; and in addition to this there is no escape for the soot, ashes, and dust which are formed or carried up into the dome and pipes by the draft.

The object of the first part of my invention is to remedy these two evils, which I do by making the escape for the products of combustion from the upper chamber, or dome, as it is denominated, in the middle of the bottom thereof through a pipe running down obliquely to a horizontal pipe which runs through to the outside of the wall of the surrounding chamber and is there provided with a movable cap through which the soot, ashes, and dust can be cleared out, the said horizontal pipe also communicating with a vertical pipe within the surrounding wall for the escape of the smoke to the chimney. And the second part of my invention relates to the method of preventing

the escape of heat through the surrounding wall of the hot air chamber. This wall has heretofore been made double with a stratum of air between the two to act as a partial non-conductor; the air has also been introduced into this space at the top thereof and discharged into the hot air chamber at the bottom, but experience has shown this to be defective as there is but a very slight tendency to produce a current through this space. The nature of this, the second part of my invention consists in providing the space between the two walls with apertures near the bottom thereof for the admission of cold air, which escapes at the top, (after being partially heated by the heat that passes through the inner wall,) into the main pipe or pipes that carries off the heated air from the hot air chamber surrounding the furnace, that the two bodies of air, the one highly heated and the other only partially so may mingle together and take a mean temperature as they pass to the apartments to be heated. In this way the current of air between the two walls carries off into the apartments to be heated that portion of heat which would otherwise be wasted by passing through the two walls and the air between them, while at the same time the apartment containing the whole apparatus is prevented from being heated to a disagreeable temperature as heretofore.

In the accompanying drawings (a) represents a fire pot of considerable diameter and shallow that the coal may be burned in a thin stratum on the grate (b) which discharges the ashes, &c., into the ash pan (c) below. The fire chamber (d) is cylindrical and placed above the fire pot, with a spout (e) extending through the surrounding wall for the supply of fuel, the outer end of the spout being provided with a door (f) in the usual manner. A like spout (g) is placed below to give access to the ash pan. The top (h) of the fire chamber opens into a series of vertical flues (i) arranged around near the periphery thereof and through these the products of combustion pass up into a dome formed chamber (j) and all these separate currents reverberate and all unite in the center and pass down an inclined pipe (k), along that portion of it which is vertical into a horizontal pipe (l), and thence through the vertical pipe (m) to the chimney, the horizontal pipe (l) being continued through the wall and there pro-

vided with a movable cover (*n*) through which can be removed the soot, dust, ashes, etc., which are carried up by the force of the draft through the vertical flues (*i*) into the dome and thence down the inclined pipe and deposited in this horizontal pipe, where the currents have not sufficient force to carry them up the vertical pipe to the chimney.

By reference to the drawing it will be seen that the upper ends of the vertical flues (*i*) are slightly trumpet mouthed to permit the larger particles carried up by the draft to fall back into the fire, and that from the edges of these the bottom of the dome formed chamber inclined toward the mouth of the inclined pipe to insure the descent of the rest. From the foregoing it will be seen that when the products of combustion reach the top of the fire chamber, and become less intense they enter and pass through the vertical tubes acting on a larger surface of metal around which the air to be heated circulates, and then they impinge against the inner surface of the dome which is thus heated, and being thereby reverberated strike against the bottom and heat that also in passing to the inclined pipe, thus affording equal or nearly equal heat to every part.

The furnace is surrounded by a double wall (*o, o*) with a space (*p*) between for the passage of air which is admitted through apertures (*q*) at or near the bottom of the

outer wall, and which being heated by the heat conducted through the inner wall is rarefied and passes to the top, and into the main pipe (*r*) to mingle with the heated air from the hot air chamber (*s*) formed between the furnace and the inner wall, and from this pipe the two bodies of air, thus mingled together and having a mean temperature, are carried off in the usual or any desired manner to the apartments to be heated. Cold air is supplied to the hot air chamber in the usual manner which needs no description.

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

The arrangement of the inclined pipe in the center of the bottom of the dome for carrying the products of combustion down in combination with the vertical flues surrounding the same and forming the communication between the fire chamber and the drum or dome-formed chamber, as described, whereby the currents of products of combustion are reverberated to give an equal or nearly equal heat to the whole surface, and at the same time giving a free discharge to the soot, dust, ashes, &c.

GARDNER CHILSON.

Witnesses:

A. P. BROWNE,
JAMES N. KELLER.