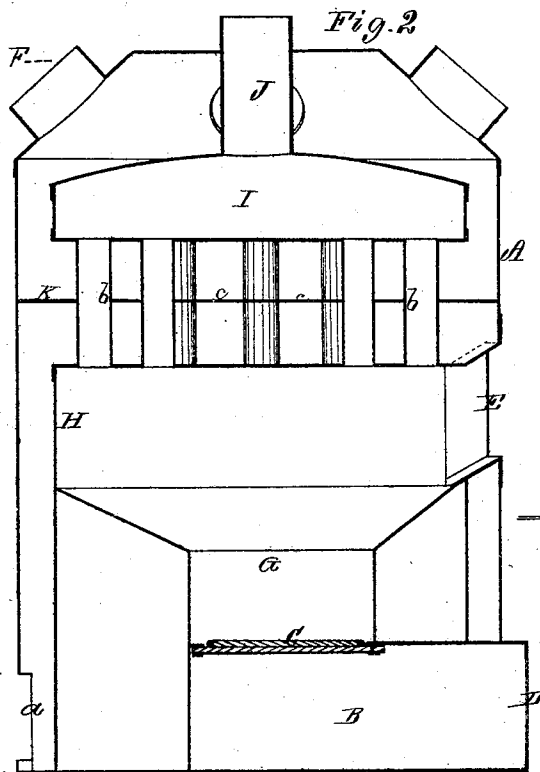
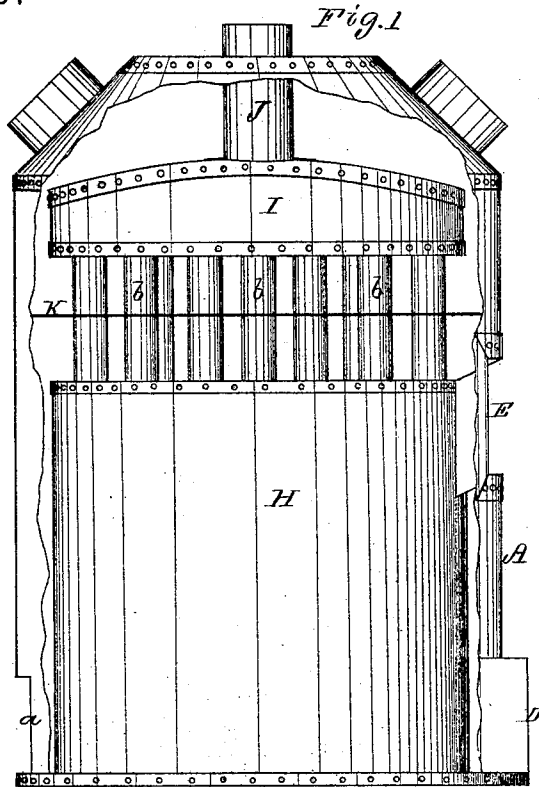


G. W. DAY.
Hot-Air Furnaces.

No. 145,489.

Patented Dec. 16, 1873.



Witnesses

Geo Gray
J. C. Hale

George W. Day

by his attorney
J. P. Hale

UNITED STATES PATENT OFFICE.

GEORGE W. DAY, OF HAVERHILL, MASSACHUSETTS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. **145,489**, dated December 16, 1873; application filed July 7, 1873.

To all whom it may concern:

Be it known that I, GEORGE W. DAY, of Haverhill, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Hot-Air Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawing making a part of this specification.

In the said drawing, Figure 1 denotes a side elevation of my improved furnace, one-half of the external covering being removed; and Fig. 2 is a central and vertical section thereof.

Experience has fully proved that cast-iron furnaces, as commonly made, are not capable, under all circumstances, of withstanding the penetrating power of the gaseous products of combustion and preventing the passage of such gases through them. This arises from the greater or less porosity of the iron, produced by the process of casting, as well as from a difficulty of effecting a perfectly tight connection of the joints. In remedying this defect, furnaces have been made of wrought or malleable iron, which, being of a more uniform and of greater density, is found, when properly compacted, to be perfectly impermeable to gases generated by the combustion of the fuel.

My invention relates to that class of hot-air stoves or furnaces in which the air-chamber surrounds the entire heat-radiating surface, and the outer casing forms the walls of the air-chamber. The object of my invention is to produce a furnace having a large radiating capacity, and so controlling the currents of air circulating in contact with its radiating-surfaces as to most economically heat and rarefy the air; and my invention consists in the construction of a hot-air furnace of wrought or malleable iron, having an outer casing (forming the air-chamber) and two internal drums, or main and auxiliary chambers, united by a series of pipes, and having an air-deflector arranged between the two chambers, whereby the air passing up the air-chamber will be arrested, deflected, and caused to pass over the top of the main drum or combustion-chamber, and in contact with the lower part of the stand-pipes, (where the heat is the greatest,) and thence through the cen-

ter of the deflector and against the bottom of the secondary chamber, and impinge against the upper portion of the series of pipes, and thence over the sides and top of the secondary chamber, whereby the currents of air, being thus held in continuous impact with the large area of heated surface, will most effectually abstract the heat therefrom and be rarefied thereby.

In the drawing, A denotes the outer case, which is made of galvanized iron. *a* is the pipe or opening, through which the cold air enters the furnace; B, the ash-chamber; C, the grate; D, the ash-pit door or entrance; E, the fuel door or orifice; F, the hot-air educts; G is the fire-pot, which is made of wrought or malleable iron, bolted or riveted together, and connected with the main drum, as shown in Fig. 2, such fire-pot to be lined with fire-brick or other refractory material. H is a main drum or combustion-chamber, which is also to be made of wrought, malleable, or boiler iron, the portions thereof being firmly riveted together. *b b*, &c., are one or more series of pipes, extending up from the top plate of the chamber H, and opening into an auxiliary chamber or dome, I, provided with a smoke-flue, J. The said dome is also made of wrought or malleable iron, the parts thereof being securely riveted together. The holes in the plates of the chambers H and I are reamed out, and the tubes firmly secured thereto, in the same manner that tubes are affixed in tubular boilers. K is an annular plate or deflector, disposed midway between the chambers H and I, such plate extending horizontally and into close contact with the walls of the case A. *c* is an opening formed through the center of this plate, the same being to permit the ascent of the heated air.

From the above, it will be seen that by the employment of two radiating-chambers with their connecting-pipes, and the air-deflector arranged between the chambers, as set forth, not only is provision made for a most adequate area of heating-surface, but all the currents of air passing through the furnace are so deflected as to be brought into continued and direct impingement therewith as to become most effectually and economically heated.

I do not claim the inventions as shown in

Letters Patent Nos. 108,790, 137,277, or 137,818, as my invention differs therefrom.

Having described my invention, what I claim is—

In a hot-air stove or furnace provided with a combustion and a smoke chamber, and a series of pipes connecting the two, and with an air-chamber surrounding the entire heat-radiating surface, the combination with the same

of the horizontal partition or deflector K, constructed and arranged as shown and described, to divert the entire ascending currents of air and cause them to pass over the top surface of the fire-chamber, for the purpose stated.

GEO. W. DAY.

Witnesses:

F. P. HALE,

H. W. PROUTY.