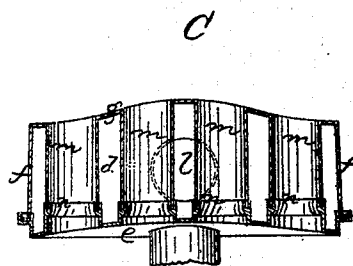
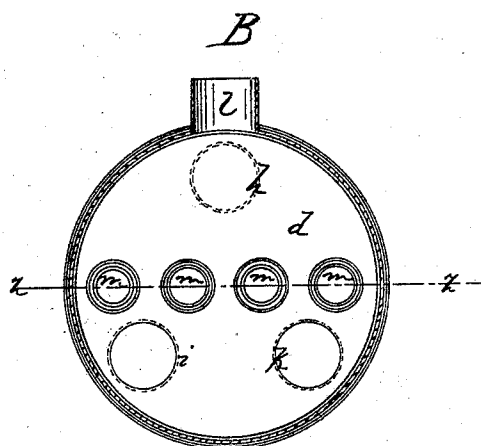
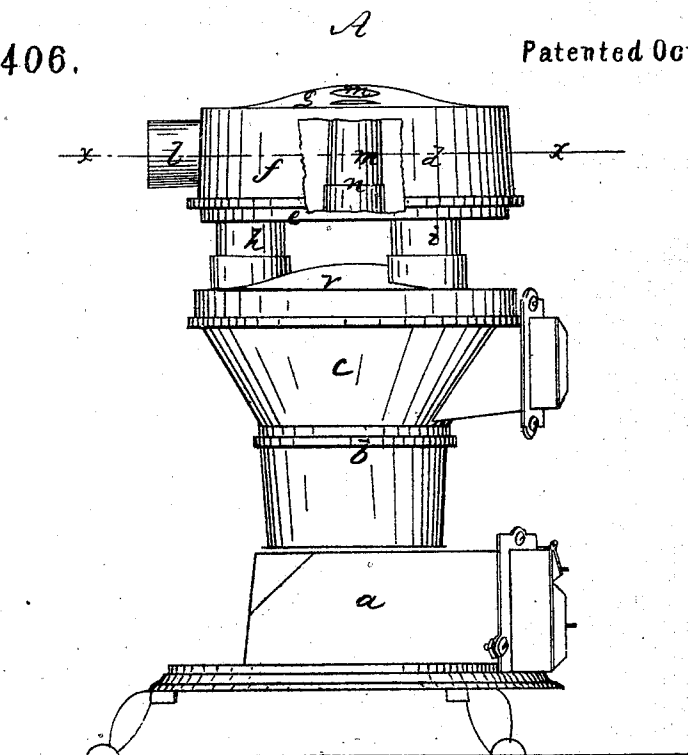


G. W. Walker.
Imp'ts in Hot Air Furnaces.

No. 120,406.

Patented Oct. 31, 1871.



Witnesses.
S. B. Fader.
M. W. Frothingham.

G. W. Walker.
by his Attys
Crosby, Hallett & Fournier

UNITED STATES PATENT OFFICE.

GEORGE W. WALKER, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN HOT-AIR FURNACES.

Specification forming part of Letters Patent No. 120,406, dated October 31, 1871; antedated October 27, 1871.

To all whom it may concern:

Be it known that I, GEORGE W. WALKER, of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Hot-Air Furnaces; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

The invention relates to the construction of hot-air furnaces with particular reference to such disposition to the flue-pipes leading from the combustion-chamber, and the hot air-pipes which pass through the dome or auxiliary chamber into which the flue-pipes lead, as shall cause all the smoke and other volatile products of combustion to pass in direct contact with or between the hot-air pipes in their passage from the fire-pot into the dome, and thence to the main flue; and my invention consists primarily in combining, with a flue or series of flues leading from one side of the combustion-chamber into a flue-chamber or dome, from the opposite side of which a main flue-pipe leads, a series of hot-air pipes passing through said dome, and so arranged that all of the volatile products from the combustion-chamber, in passing from the said flue-pipes to the main flue, shall not only impinge upon the top and bottom surfaces of the flue or heat-radiating chamber or dome, but shall also impinge against the surfaces of the hot-air tubes passing through the dome, the more effectually to heat the air rising through these tubes.

The drawing represents a furnace embodying the invention.

A shows the furnace in elevation. B is a horizontal section on the line *xx*; C, a vertical section of the dome taken on the line *zz*. *a* denotes the ash-pit; *b*, the fire-pot; *c*, the combustion or flame-chamber, the sides and top of which constitute the main heat-radiating surfaces, the air to be heated passing into the lower part of the chamber surrounding the whole furnace and becoming heated by contact with the heat-radiating surfaces being distributed by the hot-air pipes to the rooms to be heated in the ordinary manner. Over the main combustion-chamber *c* is an auxiliary flue-chamber, *d*, the outer sides *e f g* of which constitute heat-radiating surfaces, flues *h i k* leading from the flame-chamber *c* into

this chamber *d*, and conveying the flame, smoke, and other gaseous products of combustion from the fire-pot into the chamber *d*, from whence they escape into the main flue-pipe *l*. Two or more of these pipes, *i k*, lead into the front of the chamber *d*, or into one side thereof; but the pipe *h* leads from the rear or opposite part of the combustion-chamber into the rear or opposite part of the chamber *d* adjacent to the main flue-pipe *l*. The pipe *h* is furnished with a damper, by opening which the volatile products of combustion escape from the flame-chamber directly into the flue *l*. When this damper is closed, however, such products can only reach the flue *l* through the pipes *i k* and by traversing across the dome-chamber *d*. Through this chamber, in the path thus traversed by the heated gases, I carry the series of hot-air tubes *m* open at top and bottom and passing entirely through the dome, as seen at C. Air heated by contact with the outer surface and top of the combustion-chamber passes upward through these tubes, which, being heated by the hot currents passing around them in the chamber *d* from the pipes *i k* to the flue *l*, impart their heat to the air coming in contact with their interior surfaces, thus utilizing to a great extent all the heat contained in the smoke, &c., after their escape from the combustion-chamber on their way to the main flue. In whatever position the top plate *r* of the combustion-chamber is placed when the furnace is set up, whether the flue-pipe *l* leads from the side, the front, or the back of the furnace, the relative position of the auxiliary flue-pipes *h i k*, main flue-pipe *l*, and hot-air tubes *m* remain unchanged, the tubes *m* always occupying such position that all the gaseous products of combustion must come into direct contact with them in passing from the flues *i k* to the main flue *l*. Each tube *m* is cast integral with the upper dome-plate *g*, or is permanently attached to and so as to form a projection from such plate, the tube being connected to the bottom-plate by a sand-joint *n*. By this construction the tubes are kept from displacement, and their permanent position facilitates the setting up of the furnace. The pipe *h* may be simply a support for the side of the dome opposite the flues *i k*, and not a flue, in which case it will not have any damper, but will have a stationary diaphragm extending across it.

I claim—

In combination with the main combustion-chamber *c*, the auxiliary dome or flue-chamber *d* connecting with the combustion-chamber by pipes *k i* at and only at the front of the fire-pot, and with the main flue by a pipe, *l*, at and only at the rear of the dome, the arrangement being such that all of the volatile products of combustion pass from the main combustion-chamber at

the front thereof, traversing the auxiliary dome-chamber and around the air-pipes *m m*, and escaping therefrom only at the rear thereof.

GEO. W. WALKER.

Witnesses:

FRANCIS GOULD,
S. B. KIDDER.

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