

(No Model.)

A. D. MARTIN.
HOT AIR FURNACE.

No. 466,920.

Patented Jan. 12, 1892.

Fig. 1.

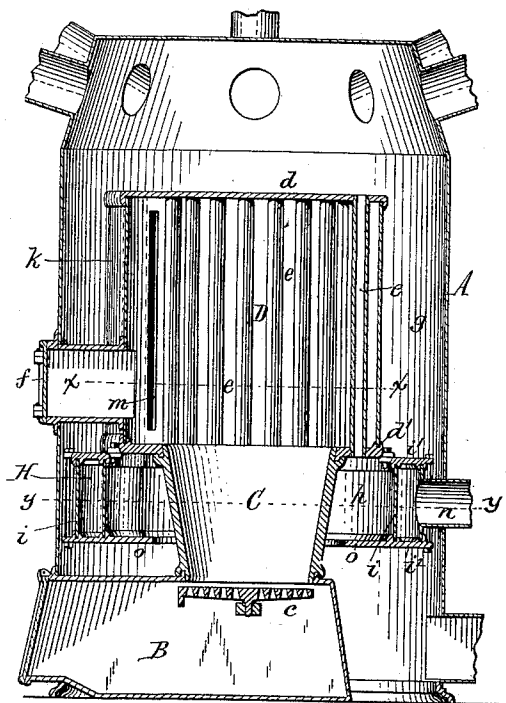


Fig. 2.

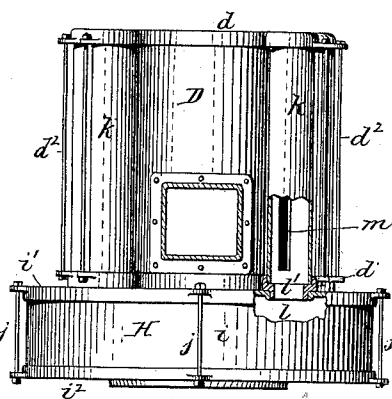


Fig. 3.

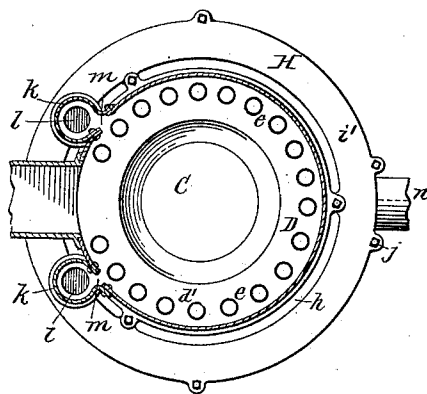
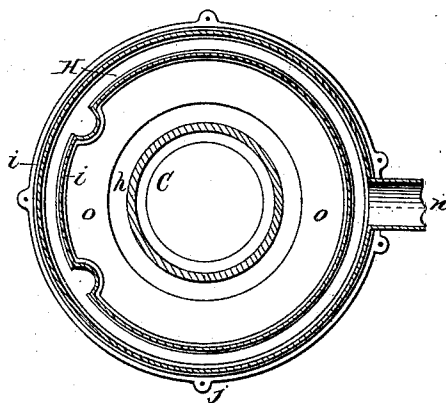


Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

ALBERT D. MARTIN, OF HAMBURG, NEW YORK, ASSIGNOR OF ONE-HALF
TO FISH & KRONENBERG, OF SAME PLACE.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 466,920, dated January 12, 1892.

Application filed April 28, 1890. Serial No. 349,771. (No model.)

To all whom it may concern:

Be it known that I, ALBERT D. MARTIN, a citizen of the United States, residing at Hamburg, in the county of Erie and State of New York, have invented new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

This invention relates to that class of hot-air furnaces in which an annular chamber or smoke-belt surrounds the fire-pot, which chamber is connected with the combustion-chamber in such manner as to receive the products of combustion from the combustion-chamber and convey the same to the smoke-pipe of the furnace.

The object of my invention is to improve the construction of the combustion-chamber and the annular chamber or smoke-belt, so as to obtain a more perfect combustion of the fuel, thereby increasing the temperature and effecting a saving in fuel.

In the accompanying drawings, Figure 1 is a vertical section of my improved hot-air furnace. Fig. 2 is a front elevation, partly in section, of the combustion-chamber and annular smoke-chamber removed from the furnace. Figs. 3 and 4 are horizontal sections in lines *x x* and *y y*, Fig. 1.

Like letters of reference refer to like parts in the several figures.

A represents the inclosing casing of the furnace; B, the ash-pit; C, the fire-pot resting upon the ash-pit, and *c* the grate.

D represents the combustion-chamber surrounding the fire-pot and consisting of a cylindrical shell closed at its top by a head *d* and at its bottom by a ring *d'*, surrounding the fire-pot and resting upon an annular rim or shoulder formed at the upper end of the fire-pot. The heads of the combustion-chamber are firmly connected together by vertical tie-bolts *d²*, passing through perforated lugs formed on the heads. The combustion-chamber is preferably provided with an annular row of upright heating pipes or flues *e*, arranged within the chamber near the wall thereof and secured at their upper ends in openings in the head *d* and at their lower ends in openings in the ring *d'*. These pipes are open at both ends, so that the cold air entering the lower part of the furnace ascends

through these pipes into the upper part of the casing A, and is heated in passing through said pipes.

f represents the fire-door arranged in the lower portion of the combustion-chamber and through which the fuel is introduced into the furnace. The combustion-chamber is separated from the inclosing casing A by the usual annular passage *g*, through which a portion of the air rises.

H represents an annular chamber or smoke-belt surrounding the fire-pot and separated therefrom by an annular space or passage *h*, through which the incoming cold air passes before entering the heating-pipes of the combustion-chamber. The annular chamber H is composed of two concentric upright walls or rings *i i* and heads *i' i'*. The two heads *i' i'* are firmly clamped against the ends of the walls *i* by vertical tie-bolts *j*, and the heads are provided at their inner sides with annular grooves, in which the ends of the walls are confined.

k k represent upright flues or hollow circular projections arranged on the outer front side of the combustion-chamber on opposite sides of the fire-door *f*, whereby the annular chamber or smoke-belt H is placed in communication with the combustion-chamber. The upper ends of these flues are closed and their open lower ends register with openings *l*, formed in the upper head of the chamber H, as represented in Fig. 3. The lower head of the combustion-chamber is provided on its under side with short tubes or nipples *l'*, which fit in circular sockets formed in the upper head of the chamber H, as represented in Fig. 2, so as to form a tight joint. The flues *k* are each provided on their inner sides within the combustion-chamber with a longitudinal slot or opening *m*, which extends from the upper head *d* to the lower head or ring *d'* of the combustion-chamber, as shown.

n represents the smoke pipe or flue, which enters the rear side of the chamber H. The products of combustion pass from the combustion-chamber into the flues *k* and from the latter into the chamber H. The smoke and gases circulate within the annular chamber or smoke-belt and heat the same, and finally escape through the smoke-pipe. The slots of

the flues or conduits k preferably open rearwardly toward the side walls of the combustion-chamber, as shown in Fig. 3. This construction prevents the gases in the vicinity of the fire-door from passing directly into the flues and compels the same to pass rearwardly toward the sides of the combustion-chamber in seeking an exit, thereby retarding their escape and effecting a more perfect combustion. The volume of cold air entering the bottom of the furnace ascends between the fire-pot and the inner wall of the annular chamber H and is heated on both sides by contact with these parts. It then passes upwardly through the heating-pipes, whereby it is further heated, and finally enters the upper part of the casing A, from which latter it is conducted from the furnace by the usual pipes.

o represents a deflecting ring or flange arranged at the lower end of the chamber H and extending inwardly to within a short distance from the fire-pot, so as to leave a narrow circular space for the passage of the ascending cold air. This deflecting-ring directs the cold air inwardly against the fire-pot, and thereby brings the bulk of the air into intimate contact with the outer surface of the fire-pot. This deflecting-ring is preferably formed on the lower head i^2 of the chamber H. By providing the combustion-chamber with narrow exit slots or openings k , extending from top to bottom of the chamber, the draft is more diffused and equalized in the combustion-chamber than when a single large exit-opening is arranged at or near the top of the chamber, and the escape of the products of combustion is retarded to a greater extent, thereby producing a more complete combustion and effecting a material saving in fuel. The aggregate area of the slots m should about equal the area of the single large exit-opening usually employed.

I claim as my invention—

1. The combination, with the fire-pot and the annular chamber or smoke-belt surrounding the fire-pot and separated therefrom by an air-passage, of the combustion-chamber formed at its front side with upright flues, each connected at its lower open end with the smoke-belt and provided on its inner side with a slot opening into the combustion-chamber and extending from the upper to the lower head of the same, and a smoke-exit pipe connected directly with the rear side of the smoke-belt, substantially as set forth.

2. The combination, with the fire-pot and the annular chamber or smoke-belt surround-

ing the fire-pot and separated therefrom by an air-passage, of the combustion-chamber provided at its front side with upright flues, each connected at its lower open end with the smoke-belt and having in its inner side a slot opening into the combustion-chamber and extending from the upper to the lower head of the same, air-pipes arranged within the combustion-chamber and communicating at their lower ends with the air-passage between the smoke-belt and the fire-pot, and an exit-pipe connected directly with the rear side of the smoke-belt, substantially as set forth.

3. The combination, with the fire-pot and the smoke-belt having its upper head provided with openings, of the combustion-chamber having its lower head provided with hollow nipples which fit into the openings in the head of the smoke-belt, and upright flues arranged on the front side of the combustion-chamber, provided on their inner sides with slots opening into the combustion-chamber and extending from the upper to the lower head of the combustion-chamber and having their lower ends registering with said nipples, substantially as set forth.

4. The combination, with the fire-pot, the combustion-chamber, and the smoke-belt surrounding the fire-pot and separated therefrom by an air space or passage, of a flue connecting the smoke-belt with the combustion-chamber and an inwardly-projecting flange arranged at the lower portion of the smoke-belt around the fire-pot, whereby the ascending cold air is directed toward the fire-pot, substantially as set forth.

5. The combination, with the fire-pot and the combustion-chamber provided with projecting upright flues having longitudinal slots in their inner sides, whereby they communicate with the combustion-chamber, of a smoke-belt surrounding the fire-pot separated therefrom by an air-passage and having its upper head provided with openings which coincide with the lower open ends of said upright flues and having its lower head formed with an inwardly-extending flange separated from the fire-pot by an air-passage and forming a deflector for directing the ascending cold air against the fire-pot, substantially as set forth.

Witness my hand this 20th day of March, 1890.

ALBERT D. MARTIN.

Witnesses:

FAYETTE KELLY,
NEWTON C. FISH.