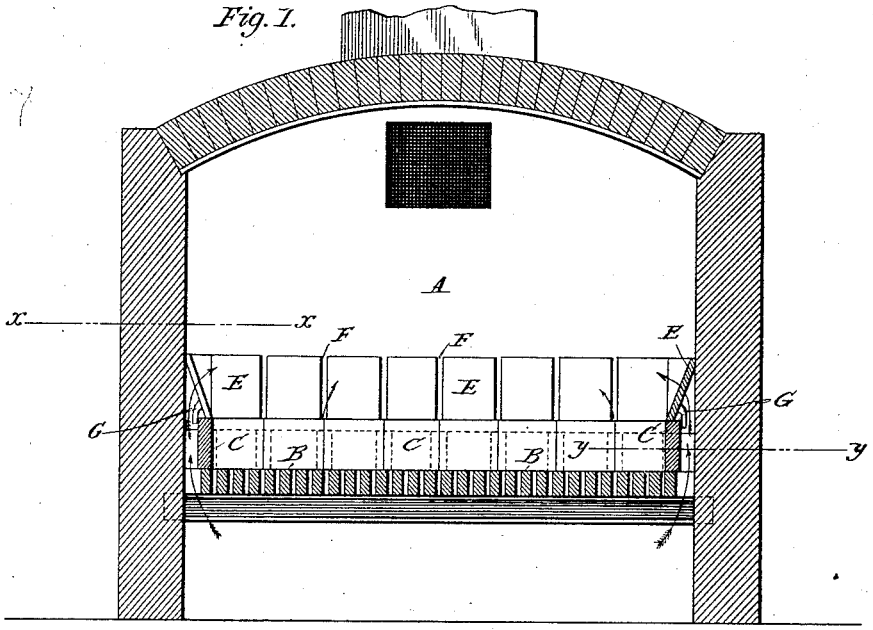
(No Model.)

E. G. HEWITT.

FURNACE.

No. 345,971. Patented July 20, 1886.

Fig. 1.



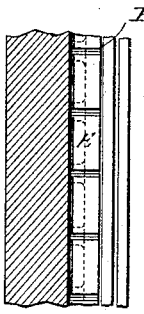


Fig. 2.

Fig. 3.

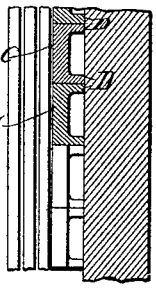
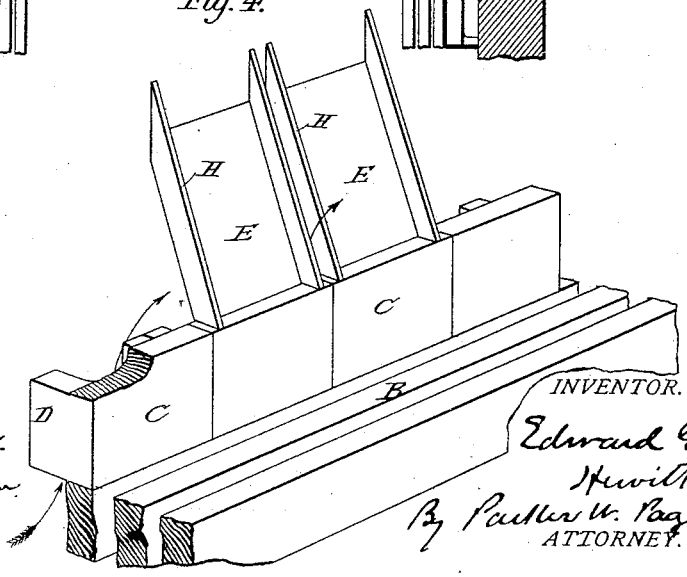


Fig. 4.



WITNESSES.

Raymond W. Barnes.

Chas. Daniel Compton.

INVENTOR.

Edward G. Hewitt.

By Parker W. Page,

ATTORNEY.

UNITED STATES PATENT OFFICE.

EDWARD G. HEWITT, OF BROOKLYN, NEW YORK.

FURNACE.

SPECIFICATION forming part of Letters Patent No. 345,971, dated July 20, 1886.

Application filed November 28, 1885. Serial No. 184,194. (No model.)

To all whom it may concern:

Be it known that I, EDWARD G. HEWITT, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Furnaces, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My invention is an improvement in appliances for introducing heated air into furnaces above the fire or coals, in order to effect a more perfect combustion of the gases and solid particles which would otherwise pass off incompletely consumed through the lack of a sufficient supply of oxygen.

The objects of my invention are to produce not only a cheap and yet effective means for accomplishing this, but also one that may be directly applied to any existing furnace of ordinary construction without modification in any essential particulars of the latter.

In carrying out my invention I apply to the interior of the furnace above the grate and around the sides or walls of the furnace a tier of fire-bricks constructed or applied to the walls in such a way as to leave air-passage between the furnace-wall and the bricks. Upon these bricks I then build another tier of bricks or their hereinafter-described equivalents, formed or applied in such manner as to continue the air-passages for some distance above the lower tier, and to afford outlets for the air through narrow slots or slits. The lower tier of fire-brick extends somewhat above the fire or bed of coals, so that the air which passes up behind or through the bricks enters the flame well up above the coal, while the fire does not clog up nor fall through the slots or narrow air-passages. This is the general principle of the construction of the devices forming the subject of my invention.

In other respects the invention involves certain novel features in the construction and composition of the described devices, which are these: The bricks of the lower tier are of the refractory material commonly employed for fire-brick. I prefer to mold them, however, with flanges that extend from the lower edge nearly to the upper edge, and which rest against the furnace-walls when the bricks are in place. By this means the bricks may be made comparatively thin without impairing their strength, so that the air behind them is more perfectly heated and a better and larger air-space is formed. The upper tier may be made of molded fire brick, but as it is not in direct contact with the coals it is not necessarily made of such refractory material. I therefore secure greater cheapness and durability by using, instead of fire-brick, cast-iron plates, and these I make with flanges that extend outward into the furnace, and along the lower edge is also a flange or equivalent by which they are more securely held upon the fire-bricks. The upper edges of the flanges and plates are beveled off and rest against the furnace-wall. This arrangement in its preferred form is illustrated in the accompanying drawings.

Figure 1 is a sectional view of a furnace to which my invention is applied. Fig. 2 is a partial section of the same on line $x\ x$ of Fig. 1. Fig. 3 is a similar section in line $y\ y$ of Fig. 1. Fig. 4 is a perspective view of a modification.

A designates any kind of furnace, of which B B are the grate-bars. Immediately above these bars and along the furnace-wall are laid the flanged bricks C C. As I have before stated, these may be of any conformation that affords free passage for the air up through them, and it is obvious that they may be molded in vertical or horizontal sections without at all departing from the invention.

In the present case the bricks consist of the slabs C C with flanges D, that extend from the bottom nearly to the top of the brick, and they are placed with these flanges against the furnace-wall. The upper tier of iron plates, E, are laid with their lower edges resting on the tops of the fire-bricks C, and their upper edges resting against the furnace-wall. They are placed a little distance apart, whereby the long narrow slots or openings F are formed. I prefer to make these plates with lower flanges or lugs, G, that abut against the inner faces of the fire-bricks and hold both bricks and plates in position. I also make them with side flanges, H, for the purpose hereinafter described. If this appliance is to be used in a circular furnace, the bricks and

plates should be slightly rounded to conform to the shape of the same. In a square or rectangular furnace the corners are built up with the bricks described, and any convenient form of angle-plate is used. The device may be used entirely around the furnace or only on two or three sides.

The operation or effect of this combination is as follows: When the fire is started, two causes operate to draw up the air from below the grate into the space in the furnace above the fire—the natural draft in the flues and the expansion of the air behind the bricks and plates by the heat of the fire. The heat to which these are exposed raises the air that passes behind them to a very high temperature. This is the better effected by employing the flanges H, between which the air passes in a thin film. The air issues then into the flame not in jets, as would be the case if small perforations only were made in the plates, but in thin and extended films, by which means a much more perfect commingling of the oxygen with the flaming gases is effected and a more perfect combustion obtained.

I am well aware that a great variety of means have heretofore been employed for introducing heated air into a furnace above the grate, and I do not claim this, broadly. The device which I have invented and described herein offers, however, these several advantages. It is extremely simple and easily applied to any kind of furnace. It furnishes a plentiful supply of hot air by natural draft alone, and without requiring any complicated and elaborate means for heating the air and forcing it into the furnace. These and other advantages are due to the novel features in the construction which I have above described.

What I claim is—

1. The combination, with a furnace, of a lining provided with or forming air-passages extending from the ash-pit and opening into the furnace above the fire, the said lining being built up upon the grate-bars of a number of sections of a refractory material, and provided with long narrow openings for the entrance of air into the flame, as set forth.

2. The combination, in a furnace, of a tier of fire-bricks laid above the grate-bars and formed or applied so as to form air-passages, and a tier or series of cast-iron plates laid upon the bricks, the two tiers or series of bricks and plates forming a lining for the furnace, the upper portion of which is formed or provided with openings or outlets for the heated air to issue into the flame, as set forth.

3. The combination, in a furnace, of a tier of fire-bricks laid above the grate-bars and formed or applied so as to form air-passages, and a tier or series of refractory plates laid upon the bricks and with their upper edges resting against the furnace-wall, the said plates being placed at short distances apart, so as to leave long narrow outlets for the heated air to issue into the flame, as set forth.

4. The combination, in a furnace, of a tier or series of fire-bricks laid above the grate-bars and formed or applied so as to leave air-passages, and a tier or series of cast-iron plates laid upon the fire-bricks with their upper edges against the furnace-wall and at short distances apart, so as to leave long narrow outlets for the heated air to issue into the flame, as set forth.

5. In a furnace, the combination of a tier of flanged fire-bricks laid above the grate-bars with their flanges against the furnace-wall, so as to form air-passages behind the bricks, and a series of iron plates laid above the bricks with their upper edges against the furnace-wall, and provided with outlets for the air to issue from the passage into the flame, as set forth.

6. In a furnace, the combination of a series or tier of flanged fire brick laid upon the grate-bars with their flanges against the furnace-wall, and a series of flanged iron plates above the fire-bricks, their upper edge beveled and resting against the furnace-wall, the plates being placed at short distances apart, so as to leave openings for the heated air to issue into the flame, as herein set forth.

7. In a furnace, the combination of a series or tier of fire-bricks formed with flanges on their inner faces that extend nearly to the upper edges of the bricks, and a tier of cast-iron plates having flanges or lugs along their lower edges adapted to fit over the edges of the fire-bricks, the plates being laid with their upper edges against the furnace-wall and at short distances apart, to leave outlets for the air-passages behind or in the bricks, as set forth.

EDWARD G. HEWITT.

Witnesses:
PARKER W. PAGE,
JAS. DANIEL COMPTON.