(No Model.)

A. CUTHBERT.

REGENERATIVE FURNACE.

No. 301,048. Patented June 24, 1884.

Fig. 1.

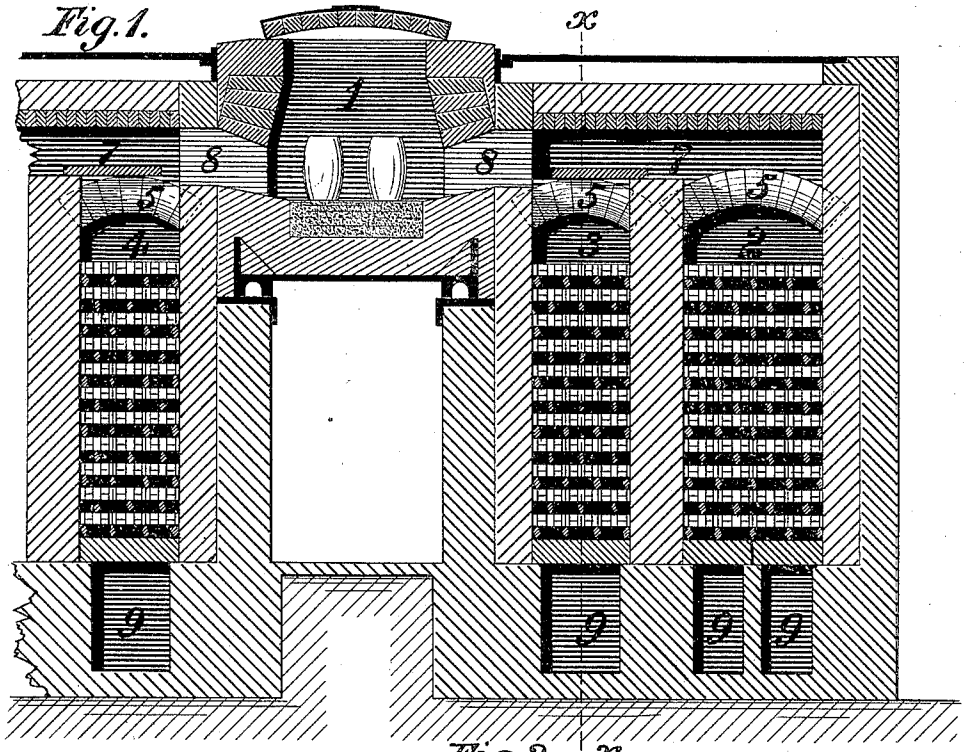


Fig. 2.

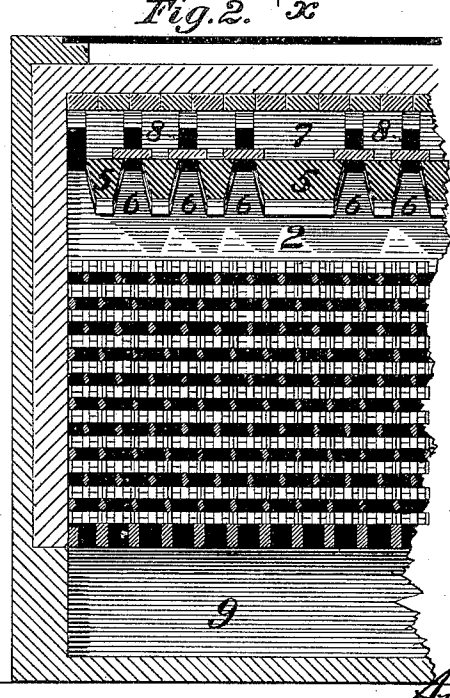


Fig. 3.

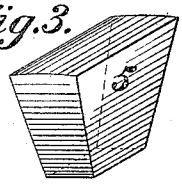


Fig. 4.

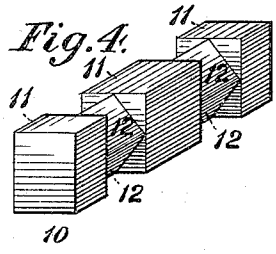


Fig. 6.

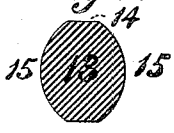


Fig. 5.

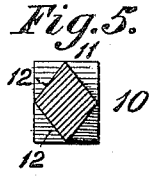
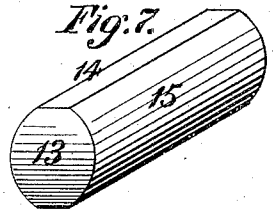


Fig. 7.



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UNITED STATES PATENT OFFICE.

ANDREW CUTHBERT, OF PITTSBURG, PENNSYLVANIA.

REGENERATIVE FURNACE.

SPECIFICATION forming part of Letters Patent No. 301,048, dated June 24, 1884.

Application filed February 11, 1884. (No model.)

To all whom it may concern:

Be it known that I, ANDREW CUTHBERT, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Regenerative Furnaces, of which improvements the following is a specification.

The object of my invention is to prevent clogging or filling up of the checker-work of regenerator-chambers by the accumulation therein of cinders and dirt from the furnace, as well as to facilitate the passage of gas to and from the furnace or melting-chamber, and to increase, as far as may be, the amount of surface available for the absorption and emission of heat in the regenerators.

To these ends my improvements consist in a regenerator-chamber having its upper arches formed of tiles, which are downwardly tapered on their ends, so as to form between them passages of increasing transverse area from top to bottom, and also in the combination of a regenerator-chamber having gas-passages of increasing transverse sectional area from their upper to their lower sides, and a regenerator having checker-work formed of a series of bricks which are inwardly curved or beveled on their sides from their center portions to their upper and lower surfaces.

The improvements claimed are hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical transverse section through a regenerative melting-furnace embodying my invention; Fig. 2, a vertical longitudinal section through a regenerator-chamber thereof at the line *x x* of Fig. 1; Fig. 3, a view in perspective of one of the arch-tiles; Figs. 4 and 7, similar views illustrating different forms of regenerator-bricks adapted to the practice of my invention; and Figs. 5 and 6, transverse sections of the bricks shown in Figs. 4 and 7, respectively.

My invention is herein shown in connection with a melting-furnace, 1, and regenerator-chambers 2 3 4, &c., which are, except as relating to my improvements presently to be described, constructed and arranged in the ordinary manner, and they may be of any different construction preferred, at the option of the constructor.

In the practice of my invention I construct the arches which form the tops or ceilings of the regenerator-chambers of arch-tiles 5, the ends of which are inwardly beveled or inclined toward their lower sides, as shown in Figs. 2 and 3, and thereby form between said arches a series of passages, 6, connecting the regenerator-chambers with the upper flues, 7, which passages are of gradually-increasing transverse sectional area from their upper to their lower sides, in lieu of being made of uniform width from top to bottom, as has heretofore been the case. By such construction I provide a material increase of area for discharge upon the checker-work, and thereby effect the easier exit of the escaping gases, as well as cause the particles of cinder and dirt, which pass out of the furnace through the ports 8, to be diffused over a correspondingly larger area of the checker-work than heretofore. By such diffusion of the solid waste matters they tend to drop readily through the checker-work into the lower flues, 9, instead of lodging on and filling up the interstices of the checker-work, as is the case when they are projected closely together upon it in passing out of the narrow openings ordinarily employed. In order to facilitate the passage of said solid waste matters through the checker-work and prevent them from settling therein, as well as to increase the amount of heating-surface available in a regenerator-chamber of any given capacity, I construct the checker-work of fire-bricks, which are inwardly beveled or curved on their sides from their middle portions to their upper and lower faces, and provide a seat or seats on each of said faces, to admit of properly stacking the bricks in the chambers. A checker-work thus constructed presents practically no horizontal surfaces for the lodgment of solid matters, as in the case of tapered bricks. The seat portions of each course are covered by the bricks above it and with curved bricks. The narrow seats which are left between the curved faces embrace only a slight amount of horizontal surface when the bricks are stacked. Again, the diffusion of the gas through the mass of brick is more thoroughly accomplished and a substantial increase of area of heating-surface attained by the inclined or curved surfaces of the sides of the brick, against

which the gases impinge on both their upward and their downward passage through the regenerator-chambers.

Figs. 4 and 5 illustrate a brick, 10, having its sides beveled or inclined inwardly from its middle portion to edges on its upper and lower faces, on which flat seats 11 are formed at its center and ends, its section being thus alternately rectangular and trapezoidal. In a checker-work constructed of bricks of such form it will be seen that no horizontal surfaces will be presented to the currents of gas, as the flat seats will be covered by the courses of brick above them, and the gas will impinge upon inclined side faces, 12, whether passing upwardly or downwardly through the chambers.

Figs. 6 and 7 show a brick, 13, having its sides 15 inwardly curved from its middle portion to narrow longitudinal seats 14 on its top and bottom, curved surfaces 15 being thus presented to the impingement of the gas, in lieu of inclined sides 12, as in the former case, such curved surfaces providing an increase of heating-surface and reducing the horizontal surface presented when the bricks are stacked to such degree that its capacity for affording lodgment to solid matter is practically eliminated.

The specific forms of bricks above described are desirably adapted to use in the application of my improvements; but the same are not *per se* claimed as of my invention.

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

1. A regenerator-chamber for regenerative furnaces, having top arches formed of bricks or tiles, which are inwardly beveled or inclined on their ends, substantially as and for the purpose set forth.

2. A regenerator-chamber for regenerative furnaces, having in its top a series of gas-passages of increasing transverse sectional area from their upper to their lower sides, substantially as and for the purpose set forth.

3. The combination of a regenerator-chamber having upper gas-passages of increasing transverse sectional area from their upper to their lower sides, and a regenerator composed of bricks, which are inwardly curved or inclined on their sides from their middle portions to their upper and lower surfaces, substantially as set forth.

ANDREW CUTHBERT.

Witnesses:
DARWIN S. WOLCOTT,
S. HARVEY THOMPSON.