No. 659,602. Patented Oct. 9, 1900.

F. BREDEL.

RECUPERATIVE FURNACE.

(Application filed May 24, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

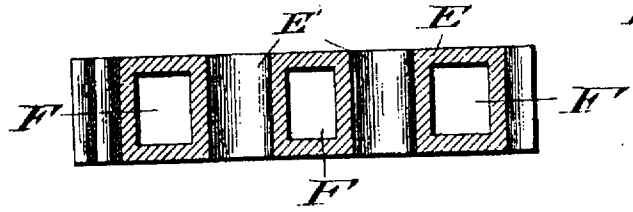


Fig. 3.

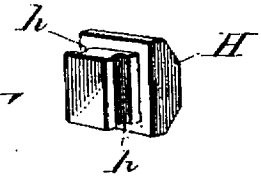


Fig. 2.

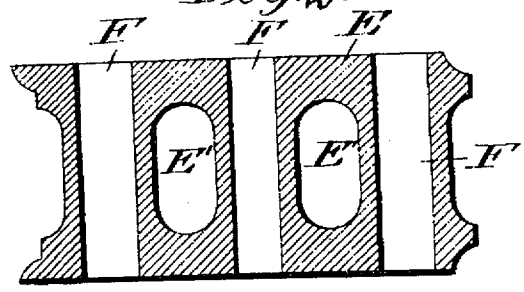


Fig. 5.

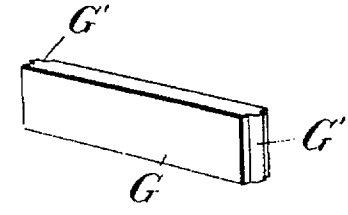
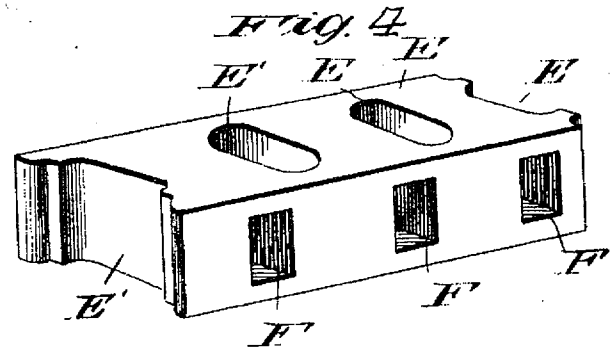


Fig. 4.



WITNESSES:

L. C. Hills

A. L. Hough

INVENTOR:

F. Bredel,

BY Franklin H. Hough

Attorney

No. 659,602. Patented Oct. 9, 1900.

F. BREDEL.

RECUPERATIVE FURNACE.

(Application filed May 24, 1900.)

(No Model.) 2 Sheets—Sheet 2.

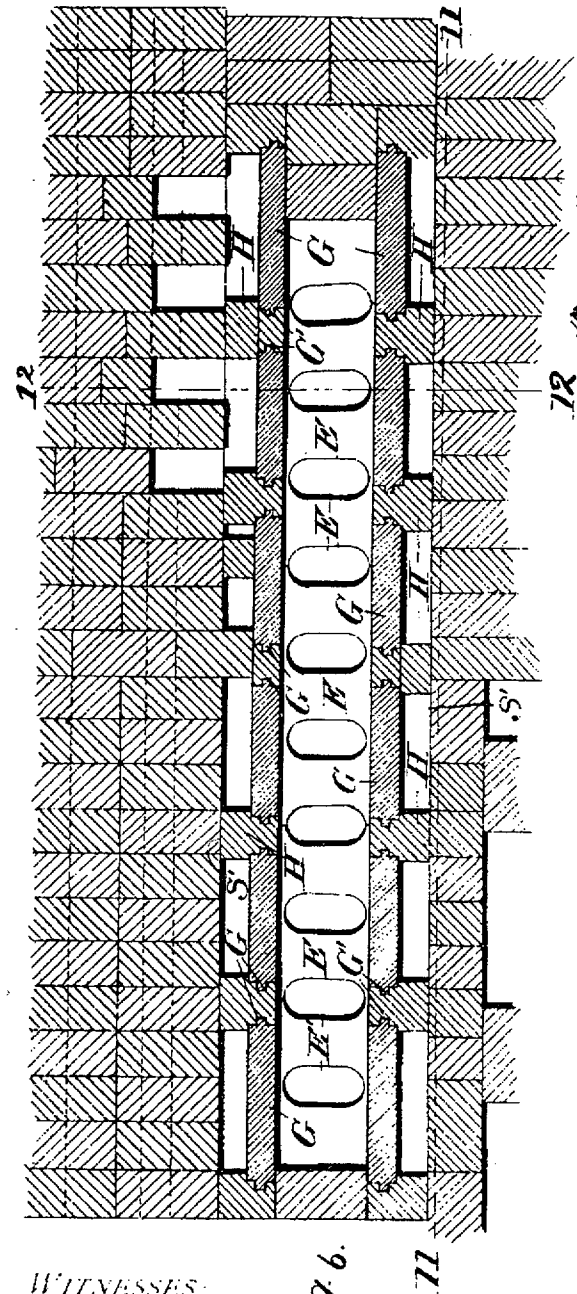


Fig. 6.

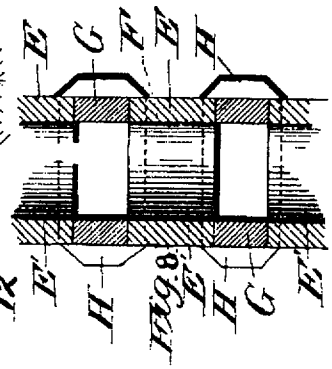


Fig. 8.

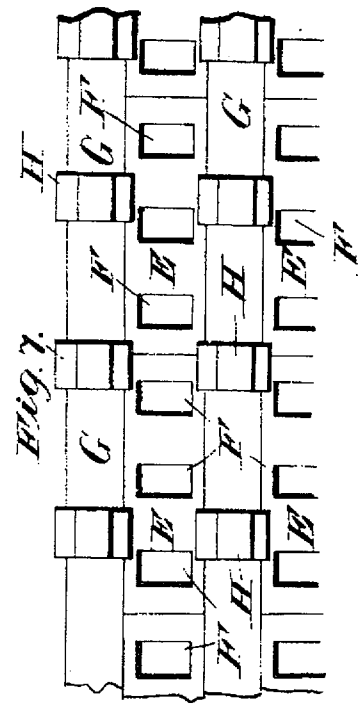


Fig. 7.

WITNESSES:

L. C. Wills.

O. L. Wills.

INVENTOR:

F. Bredel,

BY Franklin N. Hough

Attorney

UNITED STATES PATENT OFFICE.

FREDERICK BREDEL, OF MILWAUKEE, WISCONSIN.

RECUPERATIVE FURNACE.

SPECIFICATION forming part of Letters Patent No. 659,602, dated October 9, 1900.

Application filed March 24, 1900. Serial No. 10,116. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK BREDEL, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Recuperative Furnaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in apparatus for heating retorts, muffles, &c., and especially to a furnace in which a primary supply of air is delivered to the fire-box and a secondary supply of air mingled with the gases which form a part of the products of combustion.

The invention consists, further, in a peculiarly-constructed recuperator and its connection with the other parts of the furnace, in which are arranged peculiarly-constructed interlocking blocks between the recuperators, whereby the separating-blocks are prevented from becoming loose, which would cause the recuperator to leak and destroy the efficiency of the latter.

In carrying out the present invention I improve upon the apparatus for heating retorts as shown in the Klonne patent, No. 378,097, which is a type of furnace well known in the art.

My invention will be readily understood from the following detailed description when considered in connection with the drawings forming a part of the present application.

The invention is clearly illustrated in the accompanying drawings, which have similar letters of reference indicating like parts throughout the several views, in which—

Figure 1 is a longitudinal sectional view through one of the recuperator-tiles. Fig. 2 is a vertical sectional detail view through the recuperator-block. Fig. 3 is a perspective view of one of the blocks on which the recuperator-tiles rest. Fig. 4 is a perspective view showing the shape of one of the recuperator-tiles. Fig. 5 is a detail view of one of the recuperator locking and separator blocks. Fig. 6 is a vertical longitudinal section through a recuperator-furnace, showing the arrangement of the blocks. Fig. 7 is a sectional view taken on line 11 11 of Fig. 6, and Fig. 8 is a sectional view on line 12 12 of Fig. 6.

Reference now being had to the details of the drawings by letter, on either side of the fire-box (not shown in the drawings) are arranged the two sections of the recuperators, each section of which is composed of superimposed tiles E, (a detail view of one of said blocks being shown in Fig. 5 of the drawings.) These blocks of tile have vertical passage-ways E′, preferably arranged in quincunx order to obtain the maximum heating effects, and the heated products of combustion are adapted to pass down through said vertical passage-ways in their exit from the furnace. Said tile blocks have also horizontal passage-ways F between said vertical passage-ways, through which horizontal ways the primary and secondary supplies of air flow and become somewhat heated by the adjacent outflowing products of combustion passing through the vertical passage-ways. Between each of said recuperator-blocks are disposed the separating-strips G of tile, which have their ends contracted, as at G′, to fit into the recesses or grooves *h* in the retaining-blocks H. The opposite faces of the contracted portions of the blocks H have similarly-disposed grooves, as shown in the drawings. The lower faces of said contracted portions of blocks H are adapted to rest upon the upper faces of the recuperator tile blocks, and the headed or flanged portions of the blocks are adapted to project beyond the outside faces or sides of the superimposed tile blocks. On each longitudinal upper face, near its outer edge, of the tile recuperator-blocks strips and locking-blocks are placed and support tier after tier of the recuperator-blocks, thus forming two circuitous passage-ways in two directions, one being for conducting the inflowing currents of air and the other for the products of combustion. By the arrangement of the interlocking blocks above described the recuperator-blocks are prevented from becoming loosened and are kept intact. This loosening of the blocks in recuperators now in use is caused

by small explosions in firing up the benches or when in cleaning the recuperator the blocks have been found to be easily displaced.

Leading into the furnace, through the front wall of same, is a duct which leads to and communicates with the space about the lower set of recuperator-blocks. From the space about the lower set of recuperators a duct leads through into the fire-box (not shown) beneath the grate. Through this passage-way leading from the entrance to the space about the lower set of recuperator-blocks and thence to and through said duct the supply is designed to pass into the combustion-chamber.

By reason of the outer faces of the blocks H bearing against the walls S it will be observed that the various recuperator-blocks and retaining-strips will be securely held intact.

Having thus described my invention, what I claim to be new, and desire to secure by Letters Patent, is—

1. In a recuperative furnace, a recuperator made up of superimposed recuperator-blocks, having vertical and transverse passage-ways through same, key-blocks engaging said recuperator-blocks and side supporting-strips interlocking with said key-blocks, and interposed with the latter between the rows of recuperator-blocks.

2. In a recuperative furnace, a recuperator made up of superimposed recuperator-blocks having horizontal and vertical passage-ways through same, key-blocks having flanged heads engaging the outer edges of the recuperator-blocks, the outer ends of said key-blocks bearing against the wall of the recuperator-chamber, the supporting-strips interlocking with the key-blocks and interposed with the latter between the tiers of recuperator-blocks, and suitable passage-ways leading to and from the recuperator, as set forth.

3. In a recuperative furnace, the combination with the recuperative blocks arranged in tiers, and having the usual vertical and horizontal passage-ways through same, the key-blocks having vertical grooves in their opposite faces, and having flanged heads, the supporting-strips having contracted ends seated in said grooves, and interposed with said key-blocks between the tiers of recuperator-blocks, the outer ends of the key-blocks held against the wall of the recuperator-chamber, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK BREDEL.

Witnesses:
ERNEST KETTLER,
FRANKLIN H. HOUGH.