April 8, 1930. K. KNIEPERT 1,753,467

BRICK OR BLOCK FOR REGENERATORS

Filed Feb. 11, 1928

Fig. 1

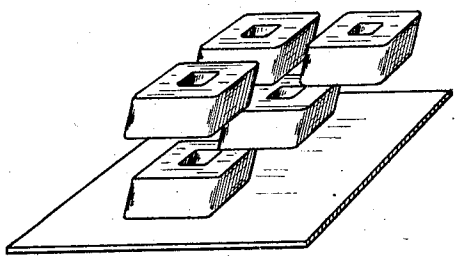


Fig. 2

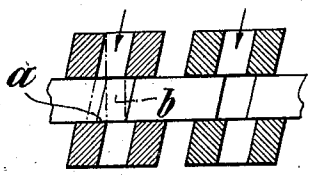


Fig. 4

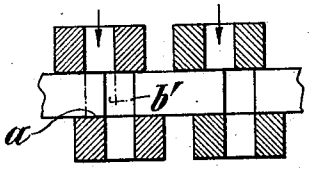


Fig. 3

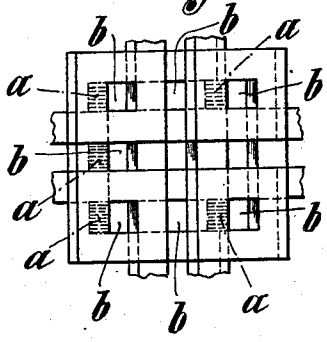


Fig. 5

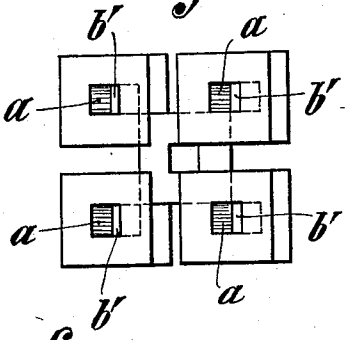
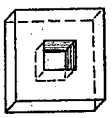


Fig. 6



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UNITED STATES PATENT OFFICE

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BRICK OR BLOCK FOR REGENERATORS

Application filed February 11, 1928, Serial No. 253,698, and in Austria February 19, 1927.

This invention relates to improvements in bricks or blocks for regenerators (recuperators, hot blast arrangements) for instance in connection with blast-furnaces or open hearth furnaces. Such brickwork should provide the largest possible free heating surface and possess stability and should consist of durable although inexpensive blocks or bricks and be designed to produce eddies in the medium circulation through the regenerator. Heretofore these requirements could not all be fulfilled together. In order to obtain the maximum heating area, it has been proposed to make the thickness and height of the bricks and the space therethrough as small as possible. However, when employing the common prismatic moulded brick, the stress or strain, particularly on the lower or bottom courses, is too great and the stability of the regenerator structure is reduced. In order to produce eddies, the blocks had to be staggered. This also reduces the stability of the regenerator structure and gives less free space through the structure when looking down vertically through it.

Another object of the invention is to provide a checkerwork of this character wherein the vertical passages are so arranged that the gases will pass through a maximum number thereof, thereby reducing the number of "dead" or unused passages to a minimum, or approximately 75% less than with the ordinary brickwork.

The brick or block according to the present invention satisfies all the above requirements and is characterized by the fact that some or all of its side faces are inclined to the vertical. According to a preferred embodiment, the brick or block consists of a four-sided inclined hollow prismatic member.

The subject matter of the invention is illustrated by way of example on the accompanying sheet of drawings in which

Fig. 1 is a perspective view of the mode of arranging the bricks.

Figs. 2 and 3 show in sectional elevation and plan view respectively the arrangement of hollow prismatic bricks in which two surfaces are inclined.

Figs. 4 and 5 illustrate in sectional elevation and plan view respectively the arrangement of vertical hollow prismatic bricks of the same base and height, in order to explain the advantages of the inclined surfaces.

Fig. 6 is a plan view of a block or brick with all the surfaces inclined and formed by a four-sided inclined hollow prismatic member.

The bricks or blocks, illustrated in Figs. 1 and 2, consist of hollow prismatic members provided with a square base and two inclined surfaces and with slightly rounded inside and outside edges. The hollow space is of square cross-sectional area, the length of one side corresponding to one-third part of the length of the base of the brick and the hollow space being symmetrically arranged. The bottom faces of the bricks in the first, third and fifth courses and so on, as well as those of the second, fourth and sixth courses and so on, overhang, this being also the case with respect to the top faces, in consequence of the shape of the bricks or stones. Thus, as shown in Fig. 2, this imparts a sufficient stability to the regenerator brickwork. The medium passing in the direction of the arrows (Fig. 2) meets at the base of every third brick course a large baffle-surface *a* (Figs. 2 and 3), the width of which is indicated by the base-line of the triangle shown in dash-dotted lines. The clear through space (indicated by parallel dash-dotted lines), remaining on looking through in a vertical direction, is reduced by only one half of the value *a*, corresponding to the upper half of the triangle. The advantage obtained thereby is readily visible on looking at Figs. 4 and 5, in which, with the same size of bricks, in order to produce the same baffle-surfaces *a*, a method of setting of the bricks is illustated, in which the through space is reduced by the surface *a*, and is reduced much more than in the first case with the same sized baffle-surface. Of course the advantage obtained with the hollow spaces of the bricks arranged according to the present invention is also obtained with the spaces remaining between the adjacent bricks, as will be apparent on reference to Figs. 3 and 5, wherein the baffle-sur-

faces *a* are indicated by hatchings and the through spaces are designated with the characters *b* and *b'* respectively.

The baffle-surfaces may be increased without altering the stability of the brickwork if the brick is in the shape of a hollow prismatic member with four inclined surfaces (Fig. 6).

The brick or block constructed according to the present invention is inexpensive, its resistance is increased and therefore it can be small size although the heating area of the brickwork is large. The stability of the brickwork is very great and the baffle-surfaces are large in order to produce eddies, whilst the through space is only slightly reduced. A further advantage is that there is a clear through draught through the brickwork.

I claim:—

1. A checkerwork for regenerators and the like, comprising courses of oblique parallelopipedic blocks each having a vertical opening therethrough of a shape corresponding to that of the block, the courses being staggered with respect to adjacent courses whereby a comparatively large portion of the upper face of each block is exposed through the opening of a block of the course above, so as to induce an eddy of the gases thereon, and to produce comparatively large vertical gas passages through the checkerwork.

2. A checkerwork for regenerators and the like, comprising courses of blocks each block of which has a vertical opening of oblique parallelopipedic shape, each course being arranged in staggered relation to the adjacent courses to produce continuous oblique gas passages, whereby to induce a flow of gases through the maximum number of said passages, with the minimum of dead or unused passages.

3. A checkerwork for regenerators, and the like comprising courses of oblique parallelopipedic blocks, each block having a vertical parallelopipedic opening therethrough, the courses being staggered with relation to each other with the maximum of the upper face of each block exposed at the bottom of the opening of a block above, and a minimum reduction in the size of the passages through the blocks, whereby to produce a flow of gases through all of the passages except a very small percentage thereof.

In testimony whereof I have signed by name to this specification.

KARL KNIEPERT.