Oct. 22, 1935. C. OTTO 2,018,223

REFRACTORY BRICK

Filed July 1, 1931

Fig. 1

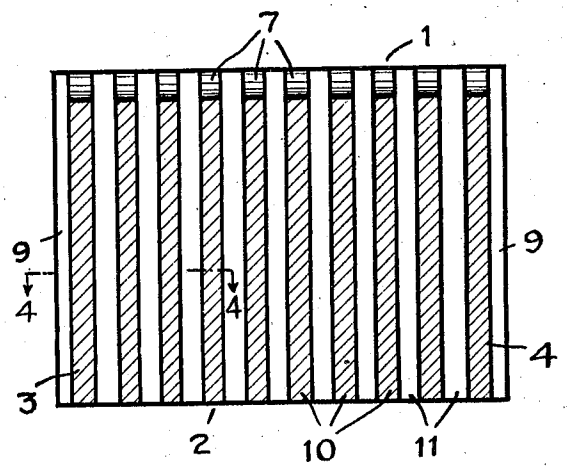


Fig. 2

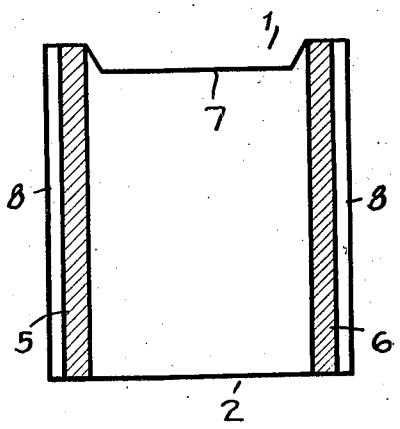


Fig. 3

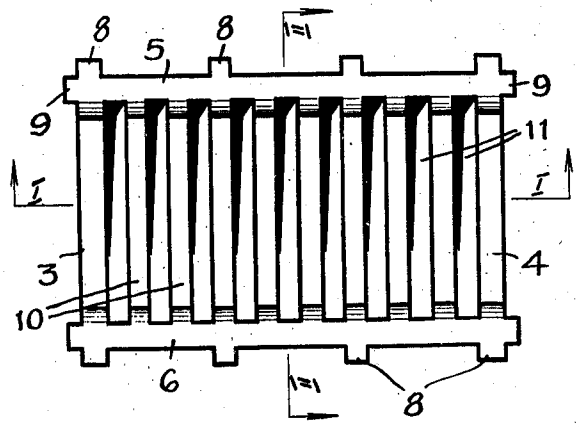
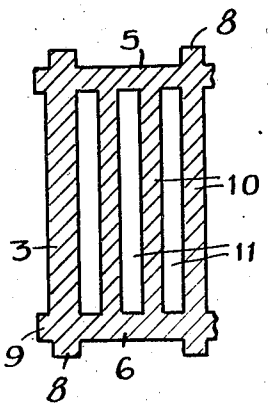


Fig. 4.



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REFRACTORY BRICK

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3 Claims. (Cl. 263—51)

This invention relates to refractory bricks and, more particularly, to refractory bricks to be used in the construction of coke oven regenerators.

One of the objects of the invention is to provide a refractory brick comprising end walls and a pair of horizontally elongated side walls and to construct the side walls so that at least one longitudinal edge of each side wall projects vertically beyond the plane of the end walls of the brick.

Another object of the invention is to provide a refractory brick as described and to extend the side walls of the brick horizontally beyond each of the end faces of the brick.

Another object is to provide at least one side wall of the brick with a plurality of equally spaced, exterior vertically extending ribs.

Another object is to provide a refractory brick in which the interior of the brick is subdivided into a plurality of compartments by means of partitions extending from one side wall to the other. Whereby a plurality of passages is provided permitting a fluid body to pass through the brick in a vertical direction.

With the above and other objects in view, the invention consists in the parts, improvements and combinations more fully pointed out hereinafter.

Referring now to the drawing, which illustrates one embodiment of the invention:

Figure 1 is a cross-sectional view of the brick, taken on the line I—I of Figure 3,

Figure 2 is a sectional view taken on the line II—II of Figure 3,

Figure 3 is a horizontal view of the brick in elevation, and

Figure 4 is a horizontal section of a part of the brick.

In accordance with the invention, I provide a refractory brick of special construction which is particularly adapted to be used in the construction of coke oven regenerators.

The construction of the brick is such as to permit the bricks to be easily and rapidly assembled in rows to provide the regenerator chambers, and to permit damaged bricks to be easily removed and replaced without disturbing the regenerator structure.

As shown in the drawing the brick comprises an upper face 1, a lower face 2, end walls 3, 4, and horizontally elongated side walls 5, 6. As shown, see Figure 2, at least one longitudinal edge of each side wall projects vertically beyond the plane of the end walls of the brick. In the form illustrated, the brick is undercut as shown at 7, with respect to the side walls to provide a construction in which one longitudinal edge of each of the side walls projects above the body of the brick. It will thus be seen that when the bricks are assembled in rows one above the other, the face 1 of each brick of one row is spaced from the adjacent lower face 2, of the bricks of the next higher row. When it is desired to remove one or more bricks of a row, a bar or lever may be inserted in this space and used to jack up and support the rows immediately above the row containing the damaged bricks. The damaged bricks may then be easily withdrawn and replaced and the lever then removed, without disturbing the arrangement of the rows of bricks in the rows above that containing the damaged brick or bricks.

Means are provided for spacing each row of bricks from its neighboring row in a horizontal direction.

In the form shown at least one side wall and preferably both side walls of the brick are provided with exterior, vertically extending ribs 8, which are spaced equal distances apart in the longitudinal direction of the side walls. It will be clear that each side wall of a brick with its ribs cooperates with a side wall and ribs of a brick of a neighboring row in a horizontal direction to define a plurality of passages between the bricks of neighboring rows.

Means are also provided for spacing the end walls of the bricks of a row from each other. The side walls 5 and 6, are extended horizontally beyond at least one end wall and preferably beyond both end walls 3, and 4, as shown at 9 see Figure 3. By this construction the end walls of a brick and the extensions of the side walls cooperate with end walls and extensions of its neighboring bricks in a row to form passages between the adjacent ends of the bricks of a row.

As illustrated, see Figure 3, in the preferred form, the brick comprises side walls and end walls and is provided with a plurality of interior partition walls 10. Partitions 10, extend from one side wall 5 to the other side wall 6 of the brick and extend over substantially the entire height of the side walls. Partitions 10, thus subdivide the interior of the brick into a plurality of passages 11, within the brick.

Having thus described the construction, the use of the brick will be clear.

Each row comprises a number of bricks one behind the other, and the first series of rows consists of a number of rows arranged side by side in the same horizontal plane. The first series of

rows rests on the sole of the regenerator to be constructed, which sole is provided with openings communicably connecting the interior of the regenerator with duct means for supplying agents of combustion or for permitting discharge of waste heat gases. As shown the lower end of the end walls, and the side walls and partition walls of the brick are in the same plane to present a flat, even surface. The bricks of each row are spaced apart from each other by means of the side wall extensions 9, and these extensions and the end walls form passages between the bricks of a row. Each row of the first series is also spaced from its neighboring rows of the series by means of the side wall ribs 8, which ribs together with the side walls of the bricks form another series of passages between the rows of bricks in a horizontal direction.

After the first row is laid, to permit easy assembly, bars or the like may be laid across the undercut upper portions of the end walls and partition walls of the bricks of a row. The bricks of the next higher rows may then be easily slid into position, after which the bars or plates are withdrawn, leaving a space between the side walls of the bricks adjacent rows in a vertical direction. This operation is continued until the regenerator of desired dimensions is completed.

In use it is understood that while certain regenerator groups are operating as inflow regenerators, other regenerator groups are operating as waste heat receivers, the latter taking on heat from the waste gases. Upon reversal the products of combustion flow thru the former regenerators, while the agents of combustion flow thru the latter and are preheated by the previously heated checker work bricks of the latter.

The interior of each brick in accordance with the invention is subdivided into a plurality of passages, while each end wall of a brick and the extensions of the side walls at such end cooperates with the adjoining end wall and side wall extensions of another brick in the same row, to provide another passage between the bricks, the cross-sectional area of which is substantially equal to that of each of the compartments within the brick. Also as described each side wall of each brick of a row with its exterior ribs, cooperates with one side wall of each brick and its ribs in a neighboring row to form a plurality of passages between adjacent rows of bricks in a horizontal direction. Accordingly, when assembled, each layer of rows of bricks gives the appearance of a unitary structure provided with a plurality of passages each of the same cross-sectional area.

The advantage of this construction is to provide a greatly increased surface area within the bricks, between the bricks of each row and between the rows of bricks in a horizontal direction. This increased surface area enables the regenerators when acting as waste heat receivers to take on a greater amount of heat from the products of combustion on their way to the stack. It also, when the regenerators are reversed and act as inflow regenerators, breaks up the air, or gas into smaller streams which flow thru the compartments and chambers formed in a uniform manner and take on heat rapidly from the increased heated areas provided by the described construction.

It will be understood that changes may be made in the construction herein described without departing from the principle of the invention.

What is claimed is:

1. A regenerator checkerwork brick rectangular in general outline and formed with a plurality of passages oblong in cross section and extending between two opposed sides of the brick and having an aggregate passage wall surface area substantially in excess of the aggregate area of the portions of the external surface of the brick between said sides and having an aggregate cross sectional area less than the average cross sectional area of the portions of the brick extending between said two sides.

2. A regenerator checkerwork brick rectangular in general outline and formed with parallel, external spacer ribs extending between two opposed sides of said brick and with a plurality of passages oblong in cross section extending between said sides and of an aggregate cross-sectional area substantially in excess of the aggregate cross-sectional area of the spaces between the planes in contact with the outer edges of said ribs and the adjacent outer sides of said brick.

3. A regenerator checkerwork brick as specified in claim 1 and formed with a shallow, open ended trough-shaped recess in one of said sides extending between two opposed ends of said side.

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