Refractory bricks for rotary cement kiln linings have beveled edges, and adjoining beveled edges of adjacent bricks in the lining form channels open toward the hot inner face of the lining to facilitate anchoring of the coating formed during operation of the kiln.
ROCKY CEMENT KILN LINING BRICK

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates to an improved refractory brick for rotary cement kiln linings, and to such linings.

It is well known that the life of rotary cement kiln linings is extended considerably when a deposit or coating of cement-clinker, which is formed during operation of the kiln, is retained on the refractory lining of the kiln. Many proposals have, therefore, been made to favor the formation of such coatings and, most importantly, to prevent the formed coatings from falling off the lining since this subjects the lining to a sudden temperature change causing damage to the lining and shortening its useful life. The stronger the coating layer adheres to the kiln lining, the longer the same will remain operative.

It is the primary object of this invention to provide lining bricks which facilitate the formation and retention of a coating on the lining during operation of the rotary kiln.

This and other objects of the invention are accomplished with a refractory brick having an inner face, an outer face and a plurality of side faces extending from the inner to the outer face. The side faces intersect at edges which are beveled at least along a portion of their length extending from the inner brick face, with adjoining beveled edges of adjacent bricks in the lining forming channels open to the interior of the kiln before the kiln is put into operation and of sufficient dimension to remain open after the kiln has been heated to facilitate anchoring of a cement-clinker coating on the lining. Preferably, the channels formed by the beveled brick edges extend only to a point spaced from the outer face which is cooler during operation of the kiln than the inner face. In one specific embodiment, the bricks are of square cross section and are so beveled at their edges that the inner face of each brick is a regular octagon, the adjoining beveled edges of four adjacent bricks forming a channel of square cross section. The open channels provide improved anchorage for the coating forming on the kiln lining during operation and, if desired, the walls of the open channels may carry a substance to which the coating adheres particularly well. It is important, however, to use a sufficiently thin layer of such a substance so that the channels remain open upon expansion of refractory brick material when the kiln is heated.

BRIEF DESCRIPTION OF DRAWING

The above and other objects, advantages and features of the present invention will become more apparent when considered in the light of the following description of preferred embodiments thereof, taken in conjunction with the accompanying drawing wherein:

FIG. 1 is a top view of a portion of a rotary cement kiln lining consisting of refractory bricks according to one embodiment of this invention;

FIG. 2 is a section along line II--II of FIG. 1;

FIG. 3 is a perspective view of another embodiment of a brick according to the invention; and

FIG. 4 is a fragmentary view showing a plurality of the bricks of FIG. 3 in a rotary kiln casing.

DETAILED DESCRIPTION

As shown in FIGS. 1 and 2, each brick 1 has an outer face 1a, an inner face 1b, the inner brick faces being hot during the kiln operation while the outer faces remain cooler. The edges formed by the intersecting side faces of the bricks and are beveled, as shown at 1c, along a portion of their length extending from the inner brick faces. Another portion A, extending from the outer faces of the bricks, is filled in, as shown at 1e, so that a blind channel 2 is formed by four adjoining beveled edges of four adjacent bricks. The channels 2 remain open when the kiln is put into operation so that the coating formed during operation is deposited not only on the inner face of the bricks but is anchored in the open channels. This anchorage may be further improved if the walls of the channels 2 carry a thin layer of a substance to which the coating adheres particularly well. Such layers may be applied, for instance, in the form of a slurry by spraying, such as is conventional in repairing kiln linings. This slurry will penetrate into the open channels but the amount must be controlled so that it will not close the channels upon heating of the bricks during operation of the kiln.

The brick illustrated in FIG. 3 is wedge-shaped and comprises a base portion B which forms the cooler face of the brick during the operation of the kiln, and a portion C which forms the hot face of the brick during the kiln operation. The edges formed by the intersecting side faces 1f and 1g of the brick portion C are beveled, as shown at 1h.

In the modification shown in FIG. 3a, all side faces of the brick are recessed in portion C so that the latter portion is of smaller transverse cross section than the brick portion B. Otherwise, the brick is identical with that of FIG. 3.

It would also be possible to make only the base portion B of the brick wedge-shaped while the portion C is prismatic.

The bricks may consist of any suitable refractory material, such as fireclay or high-alumina material. A useful brick material is magnesia which may contain up to about 20 per cent, by weight, of chromite. By using lightweight materials for the lining bricks, the load on the metallic wall of the kiln will be reduced.

I claim:

1. A refractory brick for a rotary cement kiln lining, the brick having an inner face, an outer face and a plurality of side faces extending from the inner to the outer face, the inner face being hot when the brick is part of said lining and the kiln is in operation, the side faces of the brick intersecting at beveled edges extending only to a point spaced from the outer face which is cooler than the inner face during operation of the kiln and on a plane oblique to, and intersecting, the adjacent side faces, adjoining beveled edges of adjacent ones of the bricks in the lining being adapted to form a channel extending from the inner face, and the dimensions of said beveled edges being such that the channels remain open at the inner face when the kiln is put into operation whereby a coating formed during said operation may be anchored in the open channels, said brick having a wedge-shaped base portion adjacent the outer face, and a recessed brick portion adjacent the inner face, the intersecting edges of the side faces being formed in the recessed brick portion.

2. In a rotary cement kiln having a circular casing, a refractory brick lining inside said casing, said brick lining comprising a plurality of rows of circumferentially juxtaposed bricks, each of said bricks having an outer face at the kiln casing, an inner face spaced radially inwardly from said outer face, a pair of opposite side faces which are parallel, and a pair of opposite side faces which are radially inwardly convergent so that the convergent side faces of the bricks in each row are in contact with abutment in radial planes with respect to the circular casing and so that the parallel side faces of bricks in adjacent rows are also in contacting abutment, each brick having beveled edges at the intersections of its parallel and convergent side faces, said beveled edges extending from the inner face of the brick to a point spaced inwardly from the outer face thereof, whereby said beveled edges of the abutting bricks cause to form blind channels open at the inner faces of the bricks.