

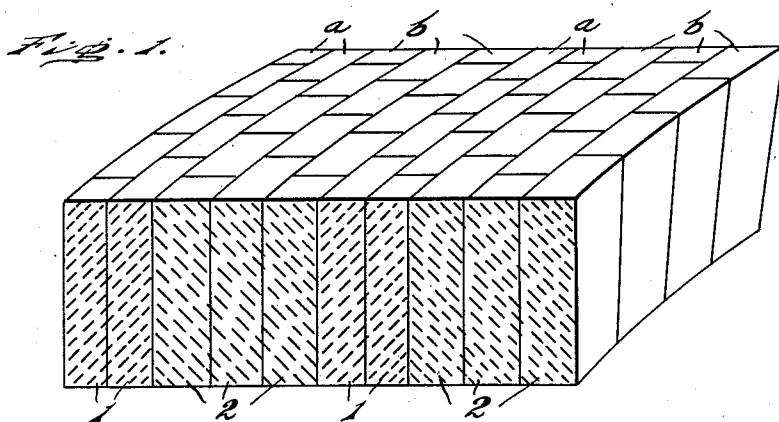
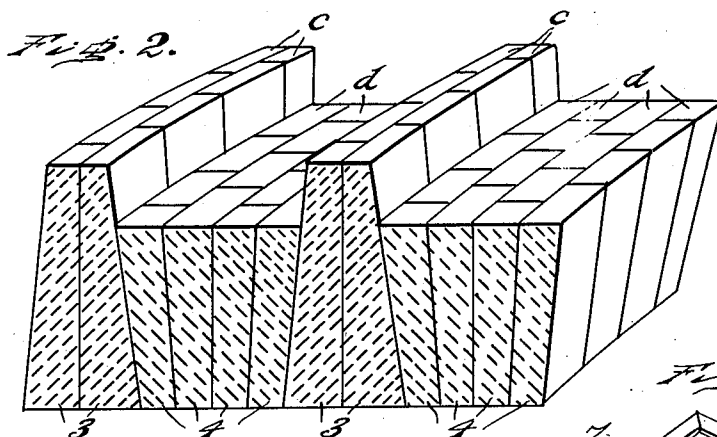
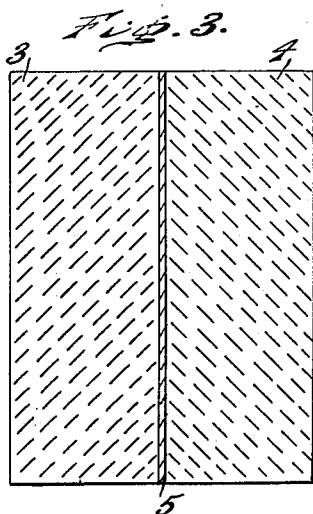
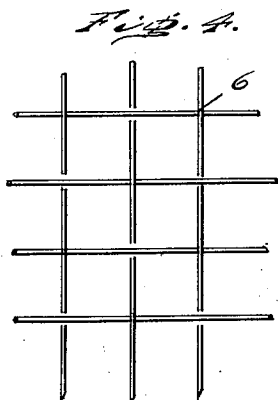
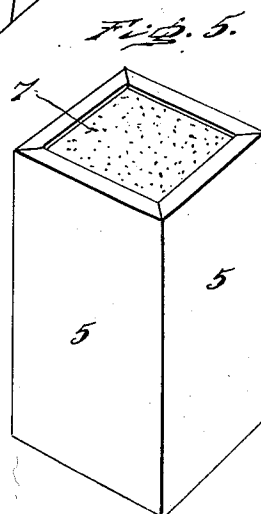
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BASIC ROOF FOR REVERBERATORY FURNACES

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BASIC ROOF FOR REVERBERATORY FURNACES

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3 Claims. (Cl. 110—99)

The present invention relates to a basic roof for reverberatory furnaces, that is, especially open-hearth steel furnaces.

In the prior art basic roofs were built exclusively from a single kind of brick, originally with magnesia brick and more recently with chrome-magnesia brick, that is, brick made from mixtures of chromium ore and sintered or fused magnesia with a predominating content of chromium ore. The outstanding properties of these chrome-magnesia brick are their great refractoriness under load and their great stability under fluctuating temperature conditions. On the other hand, chrome-magnesia bricks are relatively less resistant against chemical attack and under mechanical stress. Thus, basic roofs erected from chrome-magnesia brick exhibit, along with the advantageous properties hereinbefore mentioned, a relatively reduced resistance against chemical attack and mechanical stresses so that the useful life of the roof built with chrome-magnesia brick is impaired.

The present invention is intended to provide basic roofs for reverberatory furnaces, especially open-hearth steel furnaces, which have the good features of roofs built from chrome-magnesia brick, but exhibit an improved resistance to chemical attack and mechanical stresses and consequently have a longer service life.

The basic roofs according to the invention consist of a combination of chrome-magnesia brick and magnesia-chrome brick.

In the case of the chrome-magnesia brick, it is intended to indicate that the magnesia is the minor constituent by weight and that it is sintered or fused magnesia.

In the case of the magnesia-chrome brick, it is intended to indicate that the brick are produced from mixtures of sintered or fused magnesia and chrome ore in which the magnesia is the predominant constituent by weight.

In the preferred embodiment the chrome-magnesia brick will contain from 55 to 95 percent refractory chrome-ore preferably from 65 to 85 percent, and from 45 to 5 percent of magnesia, preferably from 35 to 15 percent magnesia, all percentages being by weight.

Likewise the magnesia-chrome brick will in the preferred embodiment contain from 55 to 95 percent of magnesia, preferably from 65 to 85 percent magnesia, and from 45 to 5 percent of refractory chrome ore, preferably from 35 to 15 percent of chrome ore, all percentages being by weight.

In the combined roof structure, the chrome-magnesia brick impart to the roof the great refractoriness under load and great stability under fluctuating conditions characteristic of such brick, while the magnesia-chrome brick provide increased resistance against chemical attack, such as infiltration of iron oxides, bursting, and the like, and also against mechanical stresses, so that through the combined use of chrome-magnesia brick and magnesia-chrome brick the overall service life of the roof is considerably increased especially in furnaces such as open-hearth steel furnaces in which chemical attack is a major influence. The pro-

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portion of chrome-magnesia brick and magnesia-chrome brick in the particular roof is controlled by the plant conditions in the particular case.

The two kinds of brick may be grouped in numerous different ways. A particularly suitable arrangement consists of the chrome-magnesia brick and the magnesia-chrome brick in alternate rows in the roof.

In order to enable the invention to be more readily understood, reference is made to the accompanying drawings which illustrate diagrammatically and by way of example, two embodiments of the invention.

Figures 1 and 2 are diagrammatic sectional perspectives showing different roof constructions embodying the invention.

Figure 3 is an enlarged fragmentary vertical section showing two adjoining roof brick with a metallic spacer plate at the interface.

Figure 4 is a perspective showing an oxidizable metallic screen for use in the lateral interface between the brick.

Figure 5 is a detail perspective showing a single unfired roof brick according to the invention which is encased in oxidizable metallic spacer plates on the lateral faces.

Considering the roof of Figure 1, the chrome-magnesia brick 1 and the magnesia-chrome brick 2 are respectively arranged in groups or stripes of two rows *a*, *a* of chrome-magnesia brick and three rows *b*, *b*, *b* of magnesia-chrome brick. The number of rows *a* and rows *b* in each group depend upon the plant conditions in each particular case. The rows extend longitudinally of the arch or arc of the roof.

In the roof illustrated in Figure 2, the chrome-magnesia brick 3 are arranged in the form of extended, wedge-shaped ribs which are laid in pairs *c*, *c* of rib rows, the wide portions being at the bottom. Between the rib rows *c* there are filler rows *d* of shorter, interstice-filling magnesia-chrome brick 4, laid with the wide portions at the top. Obviously also the number of protruding rib rows *c* and of relatively shorter filler rows *d* in each group will vary in individual installations. The rows here also extend longitudinally of the arch.

The combination of chrome-magnesia brick and magnesia-chrome brick in the design of the roof may also be provided for part only of the total length of the roof.

The chrome-magnesia brick may be used in the form of fired brick or unfired brick which will be subjected to firing temperature for the first time during service in the roof, which are often called chemically-bound brick. The magnesia-chrome brick are preferably unfired or chemically-bound brick which will be subjected to firing temperature for the first time in service in the roof.

In the preferred embodiment the chrome-magnesia brick and the magnesia-chrome brick are laid in a manner well known per se, with the insertion of oxidizable metallic spacer plates between the joints laterally, both between chrome-magnesia brick and chrome-magnesia brick, and between magnesia-chrome and magnesia-chrome brick, and also between chrome-magnesia brick and magnesia-chrome brick. Thus, in Figure 3, between the chrome-magnesia brick 3 and the magnesia-chrome brick 4 there is an oxidizable metallic spacer plate 5 which may be on the transverse or longitudinal lateral face of the brick or both. This oxidizable metallic spacer plate, of steel or the like may be replaced by a wire mesh 6 shown in Figure 4, interposed between the lateral joints.

The chemically-bound brick, whether chrome-magnesia brick or magnesia-chrome brick, may have oxidizable metallic spacer plates 5 on adjoining lateral faces of the brick 7, and these may extend around all four faces of the brick if desired. A brick of this character is known as an encased brick, and can be used with adjoining brick

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which need not be provided with oxidizable metallic spacer plates.

The roof may be supported as a sprung arch or as a suspended roof, or as a combination.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the structure shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

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

1. A basic refractory roof for an open-hearth furnace, said roof in traverse cross-section being arch-shaped, said roof consisting of two kinds of refractory bricks of different compositions arranged in alternating stripes extending transversely across the roof between the ends upon which the arch is supported, each stripe consisting of one of the two kinds of bricks only and each stripe consisting of at least one row of bricks, said two kinds of bricks being essentially non-reactive with one another when in contact under the operating conditions of said open-hearth furnace, one of said kinds of refractory bricks being burned chrome-magnesia bricks containing 55 to

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95 percent refractory chrome ore and 45 to 5 percent magnesia, and the other of said kinds of refractory bricks being unburned magnesia-chrome bricks containing 55 to 95 percent of magnesia and 45 to 5 percent refractory chrome ore, all percentages being by weight.

2. A basic refractory roof of claim 1, wherein in at least one of said stripes oxidizable metallic spacer plates are arranged between radial faces of adjoining bricks.

3. A basic refractory roof of claim 1, in which the unburned magnesia-chrome bricks are encased in oxidizable metallic sheets.

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