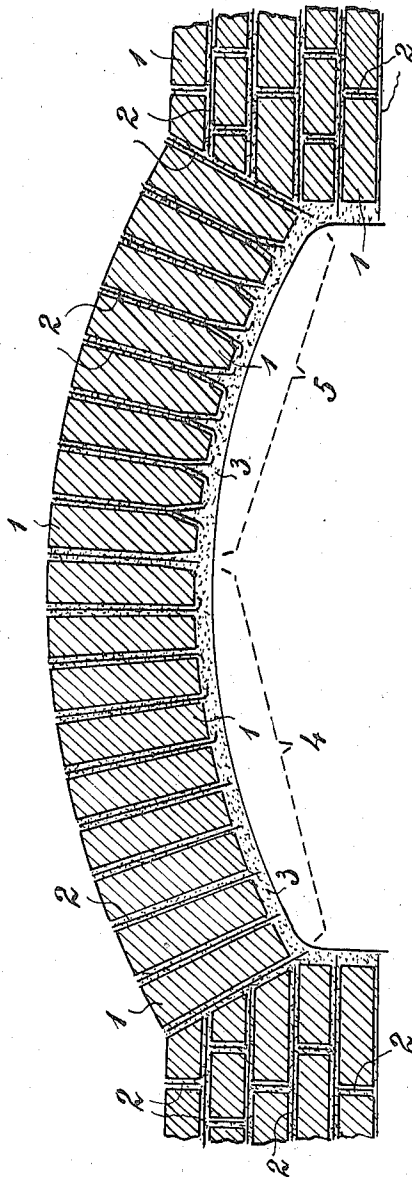


J. HEMMER.
FURNACE WALL.
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1,123,874.

Patented Jan. 5, 1915.



Witnesses

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FURNACE-WALL.

1,123,874.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSEF HEMMER, a subject of the Emperor of Austria-Hungary, residing at Veitsch, Province of Styria, Empire of Austria-Hungary, have invented certain new and useful Improvements in Furnace-Walls; and I do hereby 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.

It has hitherto not been possible to employ blocks or bricks composed of material which is sensitive to changes of temperature, in the construction of the arches and walls of ovens and furnaces, in which considerable and sudden changes of temperature occur, such as metallurgical furnaces. Especially magnesite which could otherwise be advantageously used in the form of blocks or bricks for the walls of furnaces, has the characteristic that it splits or breaks away under sudden changes of temperature. This splitting is chiefly attributable to the fact that under heat the mortar in the interstices between the bricks shrinks or that the bricks themselves contract (or both may shrink) so that empty spaces occur between the bricks into which the cold air enters when the temperature drops thus causing the bricks to split.

In the preparation of basic or carbonaceous bricks for the lining of furnaces it has been proposed to form the bricks of a certain mixture of lime, magnesia or dolomite with water, which bricks, however, expand and have a tendency to disintegrate at high temperatures. Further, a lining for such furnaces has been proposed consisting of a basic material with an admixture of iron or steel wire netting, no bricks being employed.

It is also known in the construction of boiler settings and the like to reinforce them by embedding in the mortar of the brickwork, stiff sheet metal perforated strips which cannot be distorted; while, a protective covering of cement clinker has been keyed to the brick lining of rotary cement kilns by inserting between bricks, metal plates or strips which project beyond the surface of the lining for the purpose of keying.

Now I have discovered that furnace walls even when in direct contact with the fire gases, and even the vault or roof of the furnace may be durably and satisfactorily made of magnesite bricks, of materials, which form slag in heat with the mortar or with the bricks, or with both with an increase in volume, in such a manner as to counteract the injurious effects of the shrinkage of the mortar and of the bricks. I have also discovered that excellent results are obtained by inserting pieces of iron or other difficultly fusible metal in the mortar, or by mixing such metal in a subdivided form, such as turnings, mill scale, forge scale, with the mortar.

In carrying out this invention it is also advisable to provide the surfaces of the furnace wall or roof, facing the fire, with a coat of fire-resisting mortar, with which likewise materials are mixed which form slag with the bricks in the heat. The primary object of this fire-resisting coat is to protect the interstitial mortar provided with filling pieces from outside influences until the filling pieces have formed a slag with the mortar or bricks. This coat further forms a protection for the ends or faces of the bricks.

The mortar employed for magnesite bricks may consist of sintered magnesite or other fire-resisting material, poor in silicon. Such mortar is mixed with the metallic additions as insertions with the aid of an addition of a suitable binding material (tar, lime-milk and the like).

In order to hold the coat firmly in place, it is advisable to let the filling pieces project somewhat beyond the joints between the bricks, and in the case of the roof, to construct the latter of specially shaped bricks having projections and recesses. In the heat the metallic insertions and the finely divided metallic particles form a slag with the bricks and the mortar constituents with a considerable increase in volume and thereby the shrinking of the mortar in the interstices and also of the bricks which so objectionable in furnace roofs, is counteracted, and the fire-resisting coat combines firmly with the bricks on their faces which are exposed to the fire. The crust formed by the said coat on the fire-exposed surfaces of the roof or walls is somewhat

less fire-resisting than the magnesite bricks, so that the said crust forms a closely adhering cohesive coat which, being decidedly basic, does not attack the bricks.

5 The accompanying drawing, which is a diagrammatic elevational view of an arch made in accordance with my invention, shows by way of example one embodiment of the present invention, in which 1 indicates the bricks, 2 the metallic insertions, 10 and 3 the aforesaid coat. At 4 is shown how the coat 3 is held firmly by the projecting metallic insertions. 5 shows the arrangement when specially shaped bricks are 15 employed.

It is obvious that those skilled in the art may vary the details of construction as well as the arrangement of parts without departing from the spirit of my invention and 20 therefore I do not wish to be limited to the above disclosure except as may be required by the claims.

What I claim is:—

25 1. In furnace walls of the character herein referred to the combination of bricks of basic refractory material; and mortar filling the joints between said bricks, said mortar containing metalliferous additions adapted to form a compound in the presence 30 of said mortar and bricks and to swell while forming said compound, substantially as described.

2. In walls of the character herein referred to the combination of bricks of basic refractory material; mortar filling the 35 joints between said bricks, said mortar containing metalliferous additions adapted to form a compound in the presence of the said mortar and thus increase the volume of said mortar; and a coat of the said mortar 40 on the fire side of the wall, substantially as described.

3. In walls of the character herein referred to the combination of bricks of basic refractory material; mortar filling the 45 joints between such bricks, such mortar containing metalliferous additions adapted to form a compound in the presence of the said mortar, thereby increasing the volume of said mortar during its formation; a coat 50 of the said mortar on the fire side of the wall; and some of said metallic additions being embedded in the mortar filling the joints between the bricks and projecting into the said coat, substantially as described. 55

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

JOSEF HEMMER.

Witnesses:

JOHANN BING,
AUGUST FUGGER.