A. McD. DUCKHAM.

TREATMENT OF FURNACE BRICKS.

APPLICATION FILED DEC. 5, 1913.

1,252,415. Patented Jan. 8, 1918.

FIG. 1

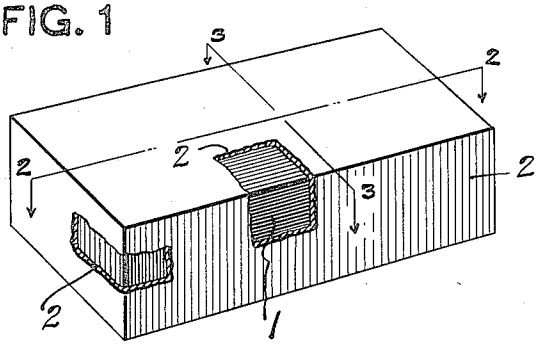



FIG. 2

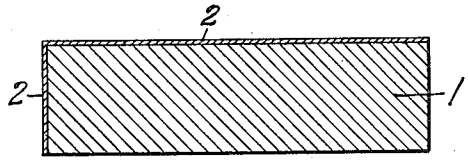



FIG. 3

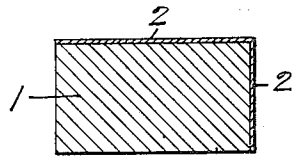



FIG. 4

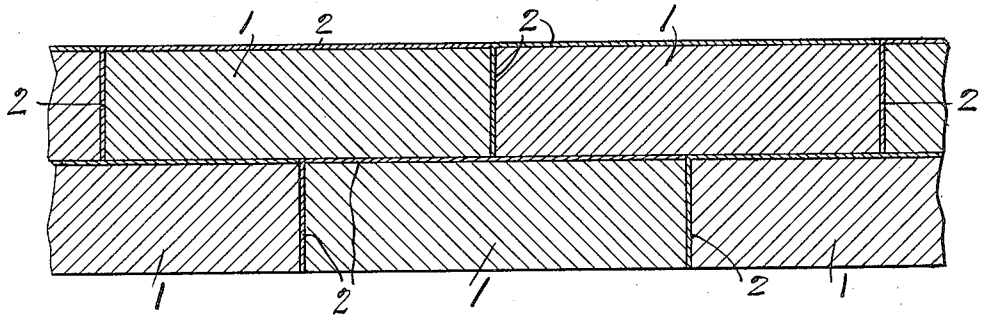



FIG. 5

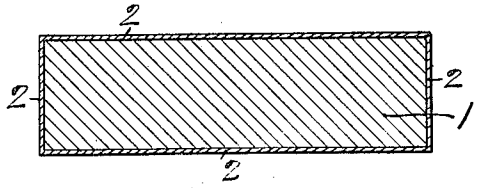
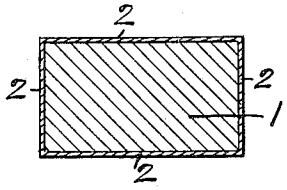



FIG. 6




WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## TREATMENT OF FURNACE-BRICKS.

1,252,415. Specification of Letters Patent. Patented Jan. 8, 1918.

Application filed December 5, 1913. Serial No. 804,936.

*To all whom it may concern:*

Be it known that I, ARTHUR McD. DUCKHAM, a subject of the King of England, and resident of Ashtead, in the county of Surrey, England, have invented a new and useful Improvement in Treatment of Furnace-Bricks; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to improvements in bricks for building coke ovens, furnaces, retorts and the like. The object of the invention is to provide means for allowing for the expansion of the brick due to the heating effects incident to such use. The so-called fire brick ordinarily used in America, and possibly in some other localities in the structure of ovens, furnaces, or retorts is what is known as a silica brick, which expands to quite an appreciable extent under the influence of heat.

It is customary, therefore, in building with such brick to interpose at intervals between adjacent bricks of the same course, or at intervals between adjacent courses some suitable material which will be consumed or destroyed, or will shrink when subjected to the heat of the furnace, or retort, as the case may be, thus allowing space for expansion of the bricks when the structure as a whole is heated. This method of procedure, however, is objectionable for the reason that in order to compensate for the total expansion of bricks within the area bounded by the layers or filling of destructible substance, these layers or filling must be of considerable thickness. Thus the movement of the bricks within such area due to expansion is considerable and is liable to impair the structure of the oven or furnace. To obviate this difficulty, I have conceived the idea of coating or covering each brick with a comparatively thin layer of combustible material which will be destroyed when the structure is heated, and will thus provide sufficient space between the bricks for expansion to take place without detriment to the efficiency of the structure as a whole.

In the accompanying drawings which illustrate preferred embodiments of the invention, Figure 1 is a perspective view of a fire brick embodying the invention. Fig. 2 is a longitudinal sectional view on the line 2—2, Fig. 1. Fig. 3 is a transverse section on the line 3—3 Fig. 1. Fig. 4 is a fragmentary view of a wall formed of the bricks showing the arrangement of the destructible material. Figs. 5 and 6 are longitudinal and transverse sectional views, respectively, of a modified arrangement of the invention.

In the embodiment of the invention illustrated in Figs. 1 to 4 inclusive, the brick 1 has three of its faces coated or covered with the destructible material, so that upon the destruction or consumption of this material under heat, the brick may be free to expand in all of its three dimensions.

While it is within the scope of my invention to employ any suitable material for the purpose, I preferably coat or cover the faces of the brick with paper or like destructible material as at 2, 2, 2. In order to provide for complete combustion of the destructible material throughout the area of the contacting faces of the bricks, it is necessary that there be a sufficient supply of oxygen at every point. To this end, I treat the paper or other covering with some suitable salt or substance which will give off oxygen when subjected to heat, thus these portions of the coating or covering on the intermediate areas of the faces of the bricks to which access of air is prevented when the bricks are in contact in the structure, may be adequately supplied with oxygen necessary to destroy the combustible constituents of the coating.

The thickness of the coating or layer of combustible material will be proportional to the coefficient of expansion of the particular character of brick to which it is applied. Where considerable room for expansion need be provided, in lieu of coating or covering only three faces of the brick with the material as heretofore described, I may coat all faces thereof so that when the bricks lie in contact the space for expansion provided will be double that of the thickness of the coating of each separate brick.

Treating the brick in the manner described does not in any manner interfere with plastering or cementing the bricks together. The coated bricks are simply laid in the ordinary way in the usual bed of cement or plaster. Moreover, by preparing each brick with means for permitting expansion, the expansion takes place uniformly throughout the structure, and then prevents any considerable movement within the structure. Also it is evident that the invention affords a much more convenient means of providing for such expansion and obviates all danger

of accidental omission thereof due to oversight on the part of the workmen in building the structure.

While I have herein used the term "brick" in designating the structural element, it is to be understood that this term is used broadly to comprehend an expansible structural element of any desired character for the purpose intended and the term may be applied with equal force to any ordinary fire brick, building block, or other structural elements.

What I claim is:

1. A brick or other structural element having a coating of combustible material containing oxygen, which oxygen will be liberated when the brick or element is subjected to heat, to provide space for expansion of said brick or element when the same is subjected to heat.

2. A brick or other structural element having a coating of combustible material impregnated with substance which liberates oxygen when subjected to heat to provide space for expansion of said brick when said brick is subjected to heat.

3. A brick or other structural element having its faces coated with combustible material impregnated with substance which liberates oxygen when subjected to heat, whereby when said structural element is embedded in the structure said coating may be destroyed throughout its entire area when subjected to heat to provide space for expansion of the structural element in the structure.

4. A brick or other structural element having a coating of paper impregnated with an oxygenizing substance to provide space for expansion of the brick when subjected to heat.

In testimony whereof, I the said ARTHUR McD. DUCKHAM have hereunto set my hand.

ARTHUR McD. DUCKHAM.

Witnesses:
JAMES I. KAY,
JOHN F. WILL.