June 8, 1965 J. A. CROOKSTON ETAL 3,187,694

METAL CASED REFRACTORY WITH PROTECTED SUSPENDING MEANS

Filed Oct. 3, 1963

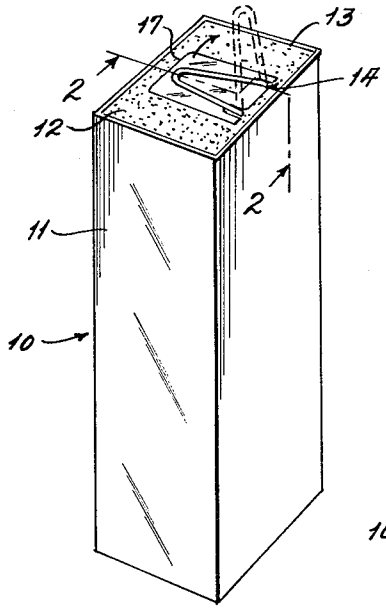


FIG. 1

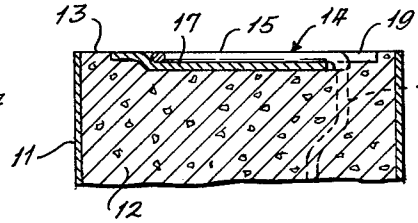


FIG. 2

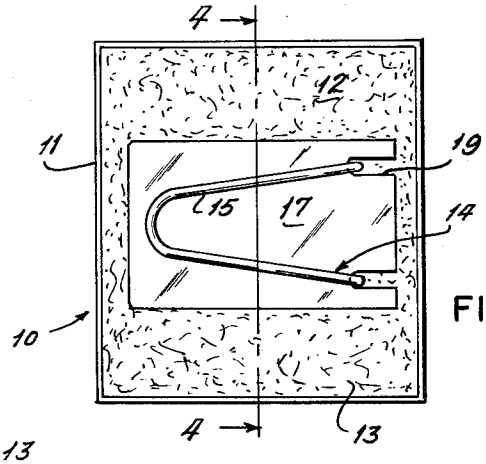


FIG. 3

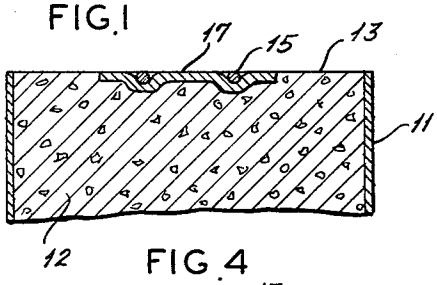


FIG. 4

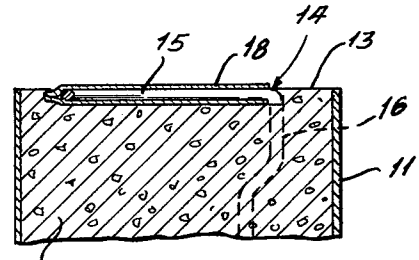


FIG. 6

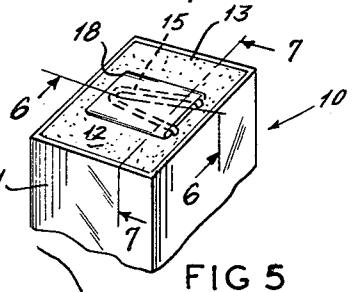


FIG. 5

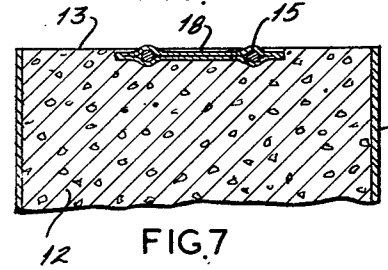


FIG. 7

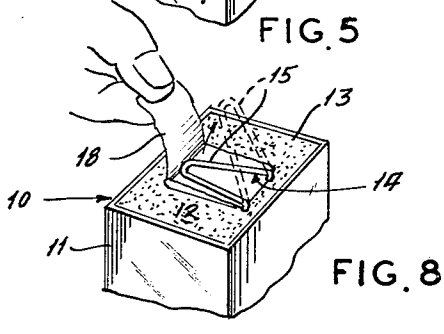


FIG. 8

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METAL CASED REFRACTORY WITH PROTECTED SUSPENDING MEANS

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7 Claims. (Cl. 110—99)

The present invention relates to a metal cased refractory having suspending means anchored in one end thereof and specifically relates to a means for separating the suspending portion of the hanger from the refractory mix.

The present invention is suitable for use with the basic brick making method described in U.S. Patent No. 3,100,677 and is a specific improvement useful wtih the structure and method described and claimed in Hodges and Boyer application Serial No. 227,494, filed October 1, 1962.

In application 227,494, there is shown a wire hanger having a hoop-shaped hanger portion embedded in the end of a rectangular metal cased brick and having an anchor portion extending into the refractory portion of the brick. Although the structure of Serial No. 227,494 is a decided improvement over present brick suspending means, it has been found that difficulty is incurred in the field in freeing the hoop-shaped hanger member from the refractory mix to bend it outwardly into position for engaging the member from which the brick is suspended in a furnace roof.

Accordingly, one of the principal objects of the present invention is to provide means for separating the hanger portion of the suspending means from the refractory mix to prevent the hanger from being embedded and secured to the refractory mix.

Another principal object of the present invention is to provide a brick having a hanger anchored in one end thereof with a suspending portion lying adjacent to the end face of the refractory mix, but separated from the refractory so that the hanger is freely bendable into an upstanding position when the brick is being installed in a furnace roof.

Another object of the present invention is to provide a paper sleeve adapted to fit over a hoop-shaped hanger to prevent the hanger from becoming embedded in the end of a refractory brick whereby the hanger is exposed and freely movable to its suspending position when the sleeve is torn.

Another object of the present invention is to provide a paperboard insert having slots in one end adapted to fit beneath a hoop-shaped hanger to space the same from the end of a refractory brick to which the hanger is attached, whereby the hanger portion is free of attachment to the refractory mix and can be easily bent outwardly with respect to the brick during installation of the brick in a furnace roof.

These and other objects and advantages will become apparent hereinafter.

The present invention comprises a refractory product having suspending means anchored in the cold end thereof with a right angular hanger portion lying adjacent to the refractory with a member separating the metal hanger from the refractory mix.

In the drawings wherein like figures refer to like parts wherever they occur:

FIG. 1 shows a perspective view of a metal cased refractory brick having one embodiment of the present invention applied thereto,

FIG. 2 is a fragmentary sectional view taken along line 2—2 of FIG. 1,

FIG. 3 is a plan view of the brick shown in FIG. 2,

FIG. 4 is a fragmentary sectional view taken along line 4—4 of FIG. 3,

FIG. 5 is a fragmentary perspective view of the one end of a refractory brick showing a modification of the present invention,

FIG. 6 is a fragmentary sectional view taken along line 6—6 of FIG. 5,

FIG. 7 is a fragmentary sectional view taken along line 7—7 of FIG. 5, and

FIG. 8 is a fragmentary perspective view showing the steps in exposing and bending the hoop-shaped suspending portion of the structure shown in FIG. 5.

FIG. 1 shows a metal cased refractory brick 10 comprising a metal casing 11 housing a compacted refractory mix 12 and having a cold face 13 in which a suspending means 14 is anchored. This structure is similar to that shown and described in application Serial No. 227,494 and will not be further described in detail here.

The suspending means 14 comprises a hoop-shaped hanger portion 15 positioned substantially flush with the cold face 13 of the refractory brick 10 and connected to anchor portions 16 embedded in the body of the refractory mix 12. The anchor portions 16 retain the suspending means 14 in the brick 10.

Suitable separating means, such as the paperboard member 17 (shown in FIGS. 1–4) and the paper sleeve 18 (shown in FIGS. 5–8) separate the hanger portion 15 from the refractory mix 12, and keep the metal hanger 15 from becoming embedded and secured to the refractory mix 12. To suspend the brick 10 from a furnace roof, the hanger member 15 is bent outwardly with respect to the cold face 13 of the brick 10 (in the direction of the arrows and as indicated by the broken lines in FIGS. 1 and 8) into an upright position. Heretofore, the hoop-shaped hanger portion 15 tended to be surrounded and attached to the refractory 12, and some difficulty has been incurred in attempting to free the metal hanger 15 from the refractory mix 12.

In fabricating the brick 10, the method shown in application Serial No. 227,494 and in Patent No. 3,100,667 is used, and the separator means 17 and 18 are positioned over the hoop-shaped hanger member 15 prior to positioning the refractory mix 12 within the case 11. In other respects, the method of making the brick 10 is similar to that described in application Serial No. 227,494 and Patent No. 3,100,667 and will not be described further herein.

The paperboard insert 17 is provided with spaced slots 19 in one end, and the slots 19 receive the anchor members 16 and securely position the separator means 17 with respect to the hanger 15. When the refractory mix 12 is compacted to final density, the separator 17 tends to conform to the contour of the hanger 15 as shown in FIG. 4. In the final brick 10, the hanger 15 is substantially flush with the cold face 13 of the brick 10, but is separated from the refractory mix 12 by the paperboard insert 17. Thus, the hanger 15 is freely bendable to its suspending position (FIG. 1).

The paper sleeve 18 shown in FIGS. 5–8 is positioned over the hoop-shaped hanger 15 prior to positioning the refractory mix 12 in the casing 11. Upon final compaction of the refractory mix 12, the paper sleeve 18 closely conforms to the contour of the hanger 15 (as shown in FIGS. 6 and 7) and separates the hanger 15 from the refractory mix 12. To expose the hanger 15, the paper sleeve 18 is ripped open (FIG. 8) and the hanger 15 is exposed and freely bendable outwardly with respect to the refractory 12 (indicated by the broken lines in FIG. 8).

In addition to possible damage to the end face 13 of the refractory brick 10 and to the hanger member 15, considerable time and effort may be expended in freeing the hanger 15, in the field, when it is in direct contact with the

refractory 12 and embedded therein. While paperboard and heavy paper have been indicated as being suitable for the separating means 17 and 18, other materials, such as cloth, wax, low melting point plastic, and other combustible materials may be used.

This invention is intended to cover all changes and modifications of the examples of the invention herein chosen for purposes of the disclosure, which do not constitute departures from the spirit and scope of the invention.

What is claimed is:

1. A refractory product comprising a compressed refractory mix, a hanger having an anchor portion embedded in the refractory mix and a hanger portion lying substantially flush with the end of the refractory product within the refractory mix, and means interposed between the hanger portion and the refractory mix separating the hanger portion from the refractory mix, said means being distended into the refractory mix adjacent to the hanger portion, the hanger portion being freely bendable outwardly away from the end of the refractory.

2. The structure of claim 1 wherein the means interposed between the hanger and the refractory mix is of a combustible material.

3. The structure of claim 1 wherein the means interposed between the hanger and the refractory mix is a heavy paper sleeve having an open end to receive the hanger and the sleeve portion surrounds the hanger portion to prevent the hanger from becoming attached to the refractory, the hanger being accessible upon tearing of the sleeve along its length.

4. The structure of claim 1 wherein the means interposed between the hanger portion and the refractory mix is a paperboard member positioned beneath the hanger portion.

5. The structure of claim 4 wherein the paperboard member is provided with spaced slots into which are positioned the ends of hanger portion at their juncture with the anchor portions of the wire hanger.

6. A refractory product comprising a metal casing, a compressed refractory mix within the casing, a wire hanger having a hoop-shaped hanger portion lying adjacent to an end of the refractory product and within the refractory mix and a pair of separated wire legs anchored in the body of the refractory, and a paper sleeve positioned around the hoop-shaped portion, said sleeve enclosing the hoop-shaped portion and separating the same from the refractory mix whereby the hanger is readily accessible for bending outwardly with respect to the end of the refractory upon tearing of the outer side of the sleeve, and the hanger portion is not in direct contact with the refractory mix, said means being distended into the refractory mix adjacent to the hanger portion.

7. A refractory product comprising a metal casing, a compressed refractory mix within the casing, a wire hanger having a hoop-shaped hanger portion lying adjacent to an end of the refractory product within the refractory mix and a pair of separated wire legs anchored in the body of the refractory, and a paperboard insert having spaced slots in one edge positioned beneath the hoop-shaped hanger with the legs being received in the slots, the paperboard insert separating the hanger from the refractory mix whereby the hanger is freely accessible and easily bent outwardly with respect to the end of the refractory, said means being distended into the refractory mix adjacent to the hanger portion.

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