

March 21, 1961

L. H. HOSBEIN
CO-MOULDED BRICKS

2,975,500

Filed Nov. 14, 1955

2 Sheets-Sheet 1

FIG. 1

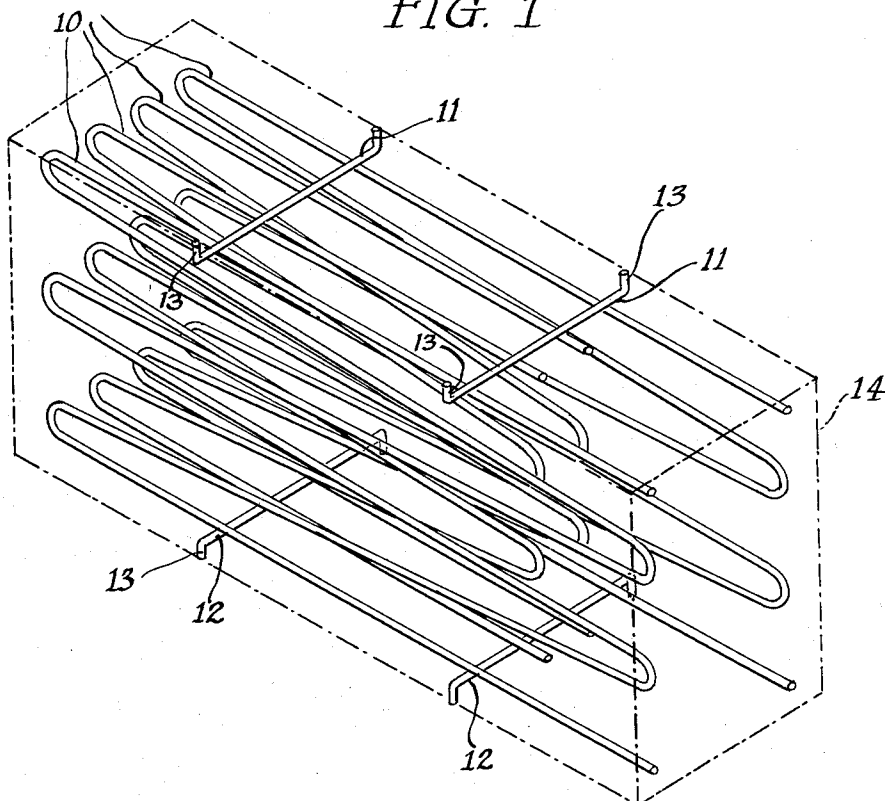


FIG. 2

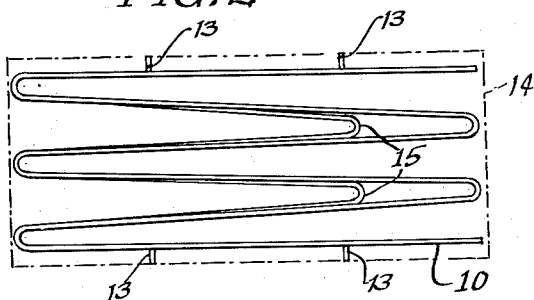


FIG. 3

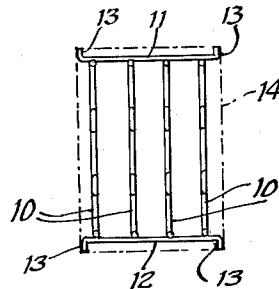
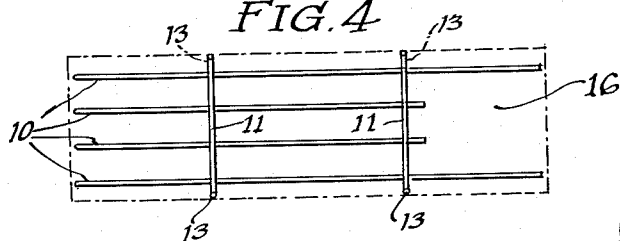


FIG. 4



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FIG. 5

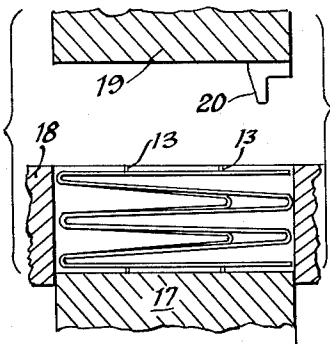


FIG. 6

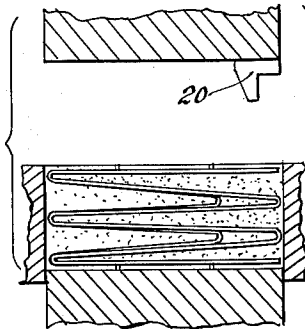


FIG. 7

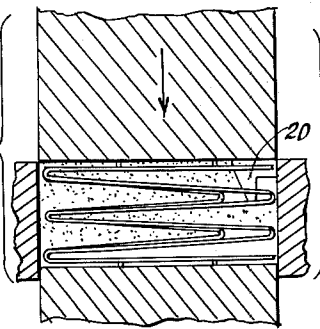


FIG. 8

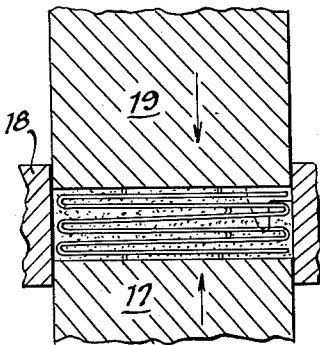


FIG. 9

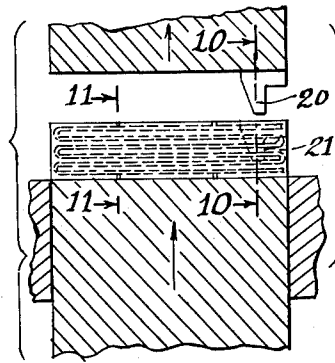


FIG. 10

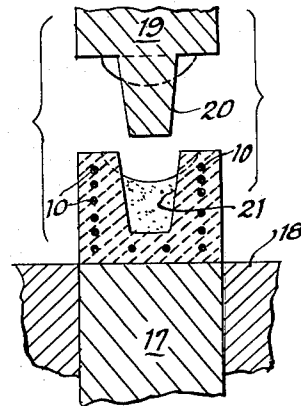


FIG. 12

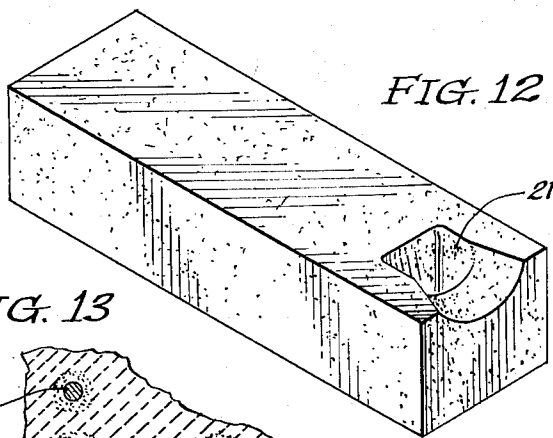


FIG. 13

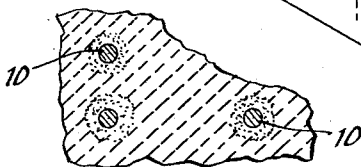
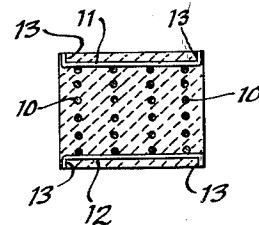


FIG. 11



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Filed Nov. 14, 1955, Ser. No. 546,462

3 Claims. (Cl. 25—154)

My invention relates to basic bricks and the production thereof for use in roofs and walls of furnaces.

An object of the invention is to provide bricks of this nature which shall have a high resistance to spalling and deterioration under the influence of heat.

Another object of the invention resides in the process of manufacturing such bricks.

The bricks are provided with means whereby they may be hung to form roofs, or held in place to form walls.

While bricks of this general nature have been provided with a spacer plate of metal embedded in the brick which is subject to oxidation to form a substantial binder between the metal plate and the brick material, my invention contemplates a plurality of oxidizable elements more or less uniformly or indiscriminately distributed throughout the cross-sectional area of the brick and running lengthwise thereof.

In one form my invention contemplates a resilient open-work metallic structure which, during production of the brick, is partially collapsed to bring about the aforesaid distribution of said oxidizable elements throughout the brick material.

Other advantages brought about by my invention will be apparent from the specific description of one form thereof in connection with the accompanying drawings, in which

Fig. 1 shows a distended metallic framework which is used in the production of the brick;

Fig. 2 is a side elevation of said framework;

Fig. 3 is an end elevation thereof;

Fig. 4 is a top view thereof showing the place at which a cavity is provided in the brick for hanging purposes;

Figs. 5 to 10 illustrate the manufacture of the completed brick; Fig. 5 showing the distended framework in a mould; Fig. 6 showing the same mould filled with damp sand; Fig. 7 showing the top plunger of the mould brought into alignment with the top surface of the mould; Fig. 8 showing the two plungers moving toward one another to compress the basic material and at the same time compress the framework; Fig. 9 showing the top plunger elevated so as to clear the finished brick; and Fig. 10 showing the manner of ejecting the finished brick from the mould;

Fig. 11 is a cross-sectional view showing the general distribution of the reinforcing elements of the framework;

Fig. 12 shows a completed brick in perspective; and

Fig. 13 shows the manner in which the oxidation of the framework elements provides a substantial union between them and the basic material.

In describing the process primarily rather than the brick, a mould is used into which a compressible framework is placed, which in one direction is preferably twice as large as the completed brick. After this framework is mounted in position in the mould on top of a lower plunger which is capable of being forced upwardly, the framework does not extend above the top surface of the mould. The mould is then filled with damp sand of a basic character which forms the refractory element of the

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completed brick. Thereupon the upper plunger is lowered and the lower plunger is raised, thereby compressing the loose basic material into roughly half of its original thickness and at the same time compressing the framework into position so that the elements of the framework are more or less uniformly distributed throughout the area of the brick.

It should be at once apparent that when I describe the relationship between the brick and these longitudinally placed elements as being "more or less uniformly distributed" it is quite unnecessary to have a really uniform distribution, and the words "substantially uniformly" or "more or less uniformly" are used to describe any distribution that would come within the spirit of this invention.

The theory underlying the invention resides in the production of a substantial plurality of elements running longitudinally of the brick which are made of oxidizable material, thus to provide a secure bond between them and the basic material.

In the form of the invention herein shown, I use a framework which consists of a plurality of elements in which each element is a compressible, resilient structure. It will be apparent that such resilience is not needed so long as any means are provided to have these elements distributed throughout the basic material when originally filled into the mould, to be thereafter compressed into the finished brick form.

Referring now more particularly to the resilient form of the invention, I refer to Fig. 1 in which four elements such as the element 10 consist of a single strip of resilient material bent back and forth upon itself to be of a size approximately the size of the mould after the sand has been filled in and before compression. These elements 10 are welded to cross pieces 11—11 at the upper portion thereof, and 12—12 at the lower. They are also provided with fingers such as the fingers 13, the fingers 13 being adapted to sit upon the lower plunger when it is in its initial position in the mould. The upper fingers 13 are adapted to be engaged by the upper plunger as it comes down to compress the basic material and by engaging the fingers to also compress the elements of the framework.

In Fig. 1, I show the framework as distended and in dotted lines, as at 14, show the amount of basic material originally introduced into the mould before compression.

It will be seen that two of these elements, necessarily the central ones, do not extend completely to the edge of the framework, but extend upwardly only, as shown at 15, thus to define a void space 16 which is presently deformed to form the hanger portion of the completed brick.

Reference to Figs. 5 through 10 will indicate the process of forming my improved bricks. The lower plunger 17 of the mould 18 is at the inception of the operation roughly in the position shown in Fig. 5. This leaves an open space in the mould above said plunger which roughly is equal to twice the thickness of the finished brick. Plunger 17 thus being in such position, the collapsible framework is introduced, as shown in Fig. 5. Thereupon a suitable quantity of basic refractory material is introduced into the mould, filling the mould completely to the top surface thereof, as shown in Fig. 6. Thereupon the upper plunger 19 is lowered, as shown in Fig. 7, to come into contact with the upper surface of the basic material and to engage the fingers 13. Both plungers 17 and 19 are thereupon actuated to move toward one another, as shown more clearly in Fig. 8, thus to compress the basic material and the framework into what will be their final positions.

The upper plunger has a projection 20, which as the upper plunger is being lowered will form in one end

portion of the brick a socket 21, by virtue of which the brick is suspended or otherwise held in place in the wall or roof of a furnace.

The upper plunger having been completely withdrawn and the lower plunger raised, as shown in Fig. 9, the finished brick is then moved forwardly or backwardly, thus to be ejected from the mould.

In Fig. 10, I show an end view of the finished brick on an enlarged scale, more clearly to show the distribution of the elements and also the hanging socket.

Fig. 11 is a cross-sectional view more clearly indicating the distribution of the framework elements throughout the brick. The invention merely contemplates that a plurality of such elements distributed throughout the area of the brick extend longitudinally thereof, whether they happen to be joined together as shown in this particular form or held in their initial position in some other manner. In referring to "initial position" I refer to the positions of Fig. 5.

The number and distribution of the elements will depend upon the character of use to which the finished brick is applied.

In Fig. 12, I show a perspective view of the finished brick and its socket portion.

In Fig. 13, I indicate the effect of the oxidation of the elements, in that such oxidation extends into the basis material and forms a better bond than would be obtained by compression alone.

My improved brick may of course be used in connection with the customary metallic side and center plates.

My invention may also be used in connection with vibratory means should it be found necessary to do so to avoid voids in the deposited refractory material.

From what has thus been described, it is thought that the nature of my invention will be clear to those skilled in the art and that variations of the specific structure herein shown may be made within the scope of the invention as set forth in the appended claims.

What I claim is:

1. The process of co-moulding basic refractory material with a plurality of oxidizable metal elements to produce a basic brick having said oxidizable elements running lengthwise of the completed brick in spaced relation to each other and to the exposed faces of the finished brick, which consists of placing a compressible framework larger than said completed brick and consisting of said elements and bendable connecting means between said elements into an empty mold cavity of a size larger than the completed brick with said lengthwise running elements spaced from the walls of said mould cavity and from each other, filling said mould cavity with all the refractory material required for said brick in a single continuous step while holding said elements in spaced relation to each other and to the walls of said moulds, and then compressing the material in said cavity into final brick size while simultaneously compressing

said framework to bend said connecting means so that said lengthwise running elements occupy their final aforesaid positions, said compression being accomplished by movement of a pair of opposed walls of the mould toward each other.

2. The process of co-moulding basic refractory material with a plurality of oxidizable metallic elements to produce a basic brick having said oxidizable elements extending longitudinally of the finished brick in spaced relation to each other and to the exposed faces of the finished brick, which consists of placing said elements in an empty mould cavity of a size larger than the completed brick with said elements held in spaced relation to the bottom of said mould cavity and to each other, filling said mould cavity with all the refractory material required for said brick in a single continuous step after said elements have been so placed therein while holding said elements in said spaced relation to said bottom and to each other, and then compressing said material into final brick size while holding said elements in spaced relation to the mould bottom and to each other.

3. The method of making an elongated substantially rectangular refractory brick having longitudinally extending oxidizable metallic elements embedded therein in a mould having a mould cavity having a pair of fixed end walls, a pair of fixed opposed side walls and a movable bottom wall and a top wall movable into said cavity, comprising placing said oxidizable elements in position in said empty cavity with said longitudinally extending elements held in spaced relation to said bottom wall and below the top of said cavity, filling said mould to the top of said cavity with refractory material in a single continuous filling step while holding said longitudinally extending elements in said position in said mould cavity, and relatively moving the top and the bottom walls of said mould to successively close said mould cavity and compress said refractory material in said cavity to finished brick size in completely surrounding relation to said longitudinally extending oxidizable elements.

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