June 20, 1950 E. R. RICHARDS 2,512,439

FURNACE DOOR

Filed June 8, 1948

FIG. 1.

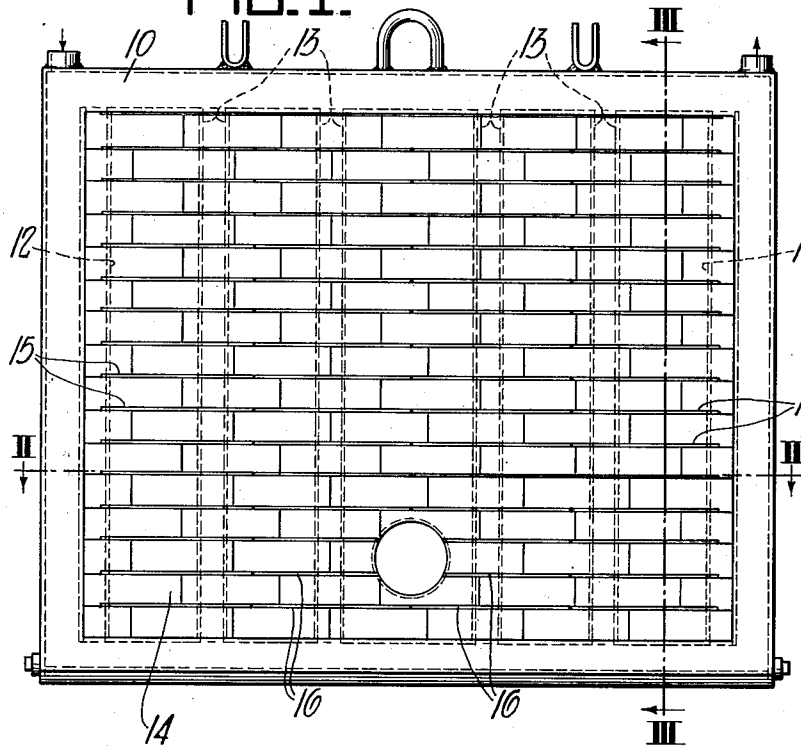


FIG. 3.

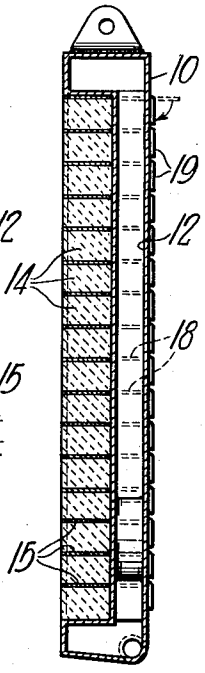


FIG. 2.

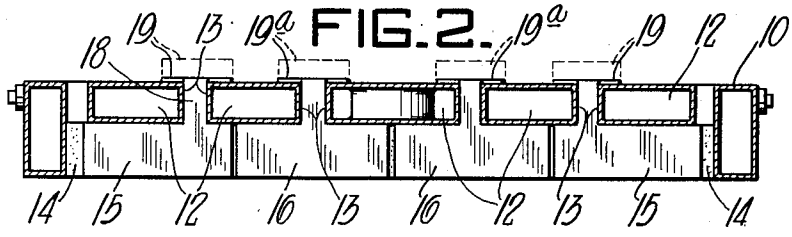


FIG. 4.

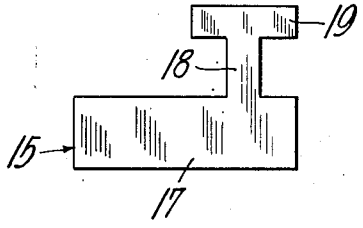
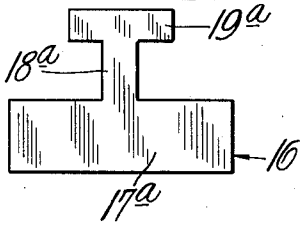


FIG. 5.



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UNITED STATES PATENT OFFICE

2,512,439

FURNACE DOOR

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Application June 8, 1948, Serial No. 31,800

2 Claims. (Cl. 122—498)

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This invention relates to improvements in furnace doors of the type which are water cooled and lined with refractory brickwork.

An object of the invention is to provide improved furnace doors of the aforementioned type in which the brickwork is fixed in place by a novel and efficient means, namely by metal plates which are placed between the courses of bricks and are mechanically interlocked with the water cooled door frame.

A further object of the invention is to provide improved furnace doors in which the courses of refractory bricks are alternated with steel plates that are mechanically interlocked with the door frame and secure the bricks in place initially by friction and after heating by bonding or fusion.

In accomplishing these and other objects of the invention, I have provided improved details of structure, a preferred form of which is shown in the accompanying drawing, in which:

Figure 1 is a side elevational view of the interior of a water cooled refractory lined furnace door embodying features of the present invention;

Figure 2 is a horizontal sectional view taken substantially on line II—II of Figure 1;

Figure 3 is a vertical sectional view taken substantially on line III—III of Figure 1; and

Figures 4 and 5 are top plan views of plates adapted to be laid between the courses of brickwork in the door.

Referring more in detail to the drawing:

There is shown at 10 a furnace door frame which has a plurality of vertical passages 12 for circulating cooling water. The passages are separated by vertical slots 13 which pass through the frame. The inside face of the door is lined with refractory brickwork 14 laid in horizontal courses. The structural details of the door frame and its mounting per se are not part of the present invention; hence they are not shown in greater detail.

In accordance with the present invention a series of horizontally disposed metal plates 15 and 16 are placed end to end between successive courses of bricks 14 as the bricks are laid. Said plates preferably are formed of steel sheet of 10 to 16 gauge cut or stamped to the proper configuration. The configurations of plates suitable for a typical design of door are shown in detail in

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Figures 4 and 5. Plates 15 (Figure 4) include a body portion 17 that separates the bricks, a neck 18 which passes through one of the slots 13 and a tab 19 adapted to be bent into the plane of the outer face of the door frames. Plate 16 (Figure 5) includes similar parts, namely a body 17a, a neck 18a and a tab 19a, but the neck and tab are positioned differently with respect to the length of the body. The positioning of the necks and tabs may be varied as required to enable the necks to match the position of the slots 13 in the door, the positions shown being those suitable for the particular design of door illustrated.

In constructing a furnace door according to the present invention, after each course of bricks is laid, a series of plates 15 and 16 are laid thereon. For the door illustrated two plates 15 and two plates 16 constitute the series, the plates 15 being laid at the ends of the series and the plates 16 in the center in order that necks 18 and 18a match slots 13. It is seen that the tabs may be inserted through the slots when plates are tilted from the horizontal. After the plates are installed, the tabs are bent into the plane of the outer face of the frame and provide a mechanical interlock therewith. Initially the plates frictionally retain the bricks in place. After the furnace is heated, the plates fuse with the bricks and thus furnish a solid fused refractory lining interlocked with the door frame.

While I have shown and described only a single embodiment of the structure, it is apparent that modifications may arise. Therefore, I do not wish to be limited to the disclosure set forth but only by the scope of the appended claims.

I claim:

1. In a furnace door, a metal frame having vertical passages for circulating cooling water and vertical slots between said passages, a lining of refractory brickwork laid in horizontal courses on the inner face of said frame, and horizontally disposed thin flat sheet metal plates between successive courses of said brickwork, said plates having necks extending through said slots and tabs on the outer extremities of said necks bent into the plane of the outer face of said frame and mechanically interlocking said plates with said frame.

2. In a furnace door, a metal frame having vertical passages for circulating cooling water and

vertical slots between said passages, a lining of refractory brickwork laid in horizontal courses on the inner face of said frame, and horizontally disposed thin flat sheet metal plates between successive courses of said brickwork, said plates having necks extending through said slots and tabs on the outer extremities of said necks bent into the plane of the outer face of said frame and mechanically interlocking said plates with said frame, said plates initially holding said brickwork in place frictionally and after heating holding said brickwork in place by being fused therewith.

EDWIN R. RICHARDS.

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