June 18, 1946. E. R. DRZEWIECKI 2,402,152

OPEN HEARTH FURNACE

Filed Dec. 7, 1942 5 Sheets-Sheet 1

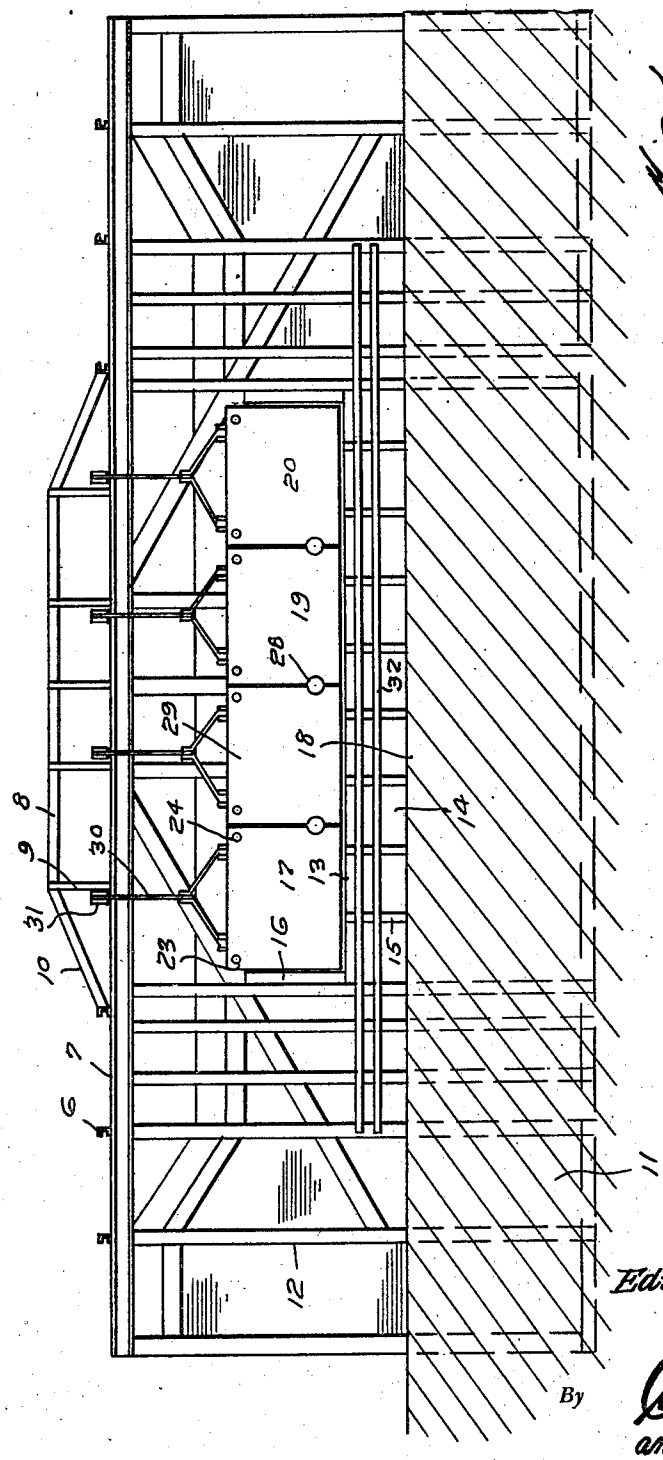


Fig. 1.

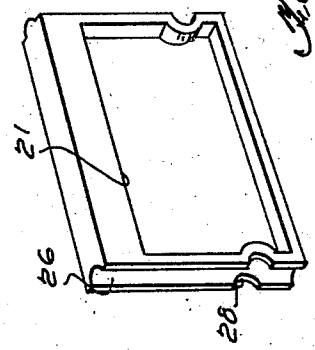


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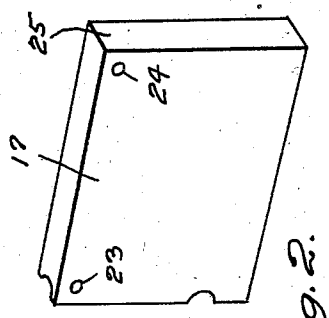


Fig. 2.

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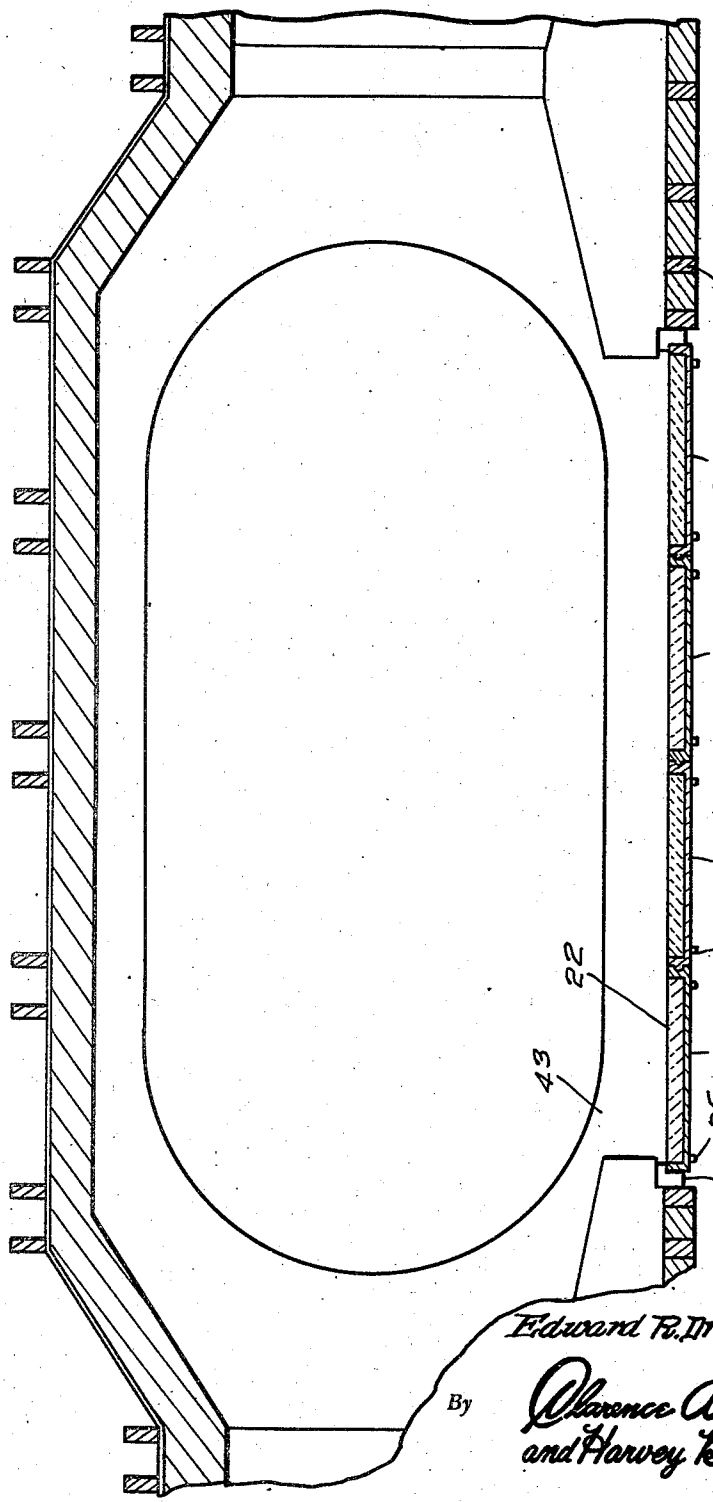


Fig. 4.

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OPEN HEARTH FURNACE

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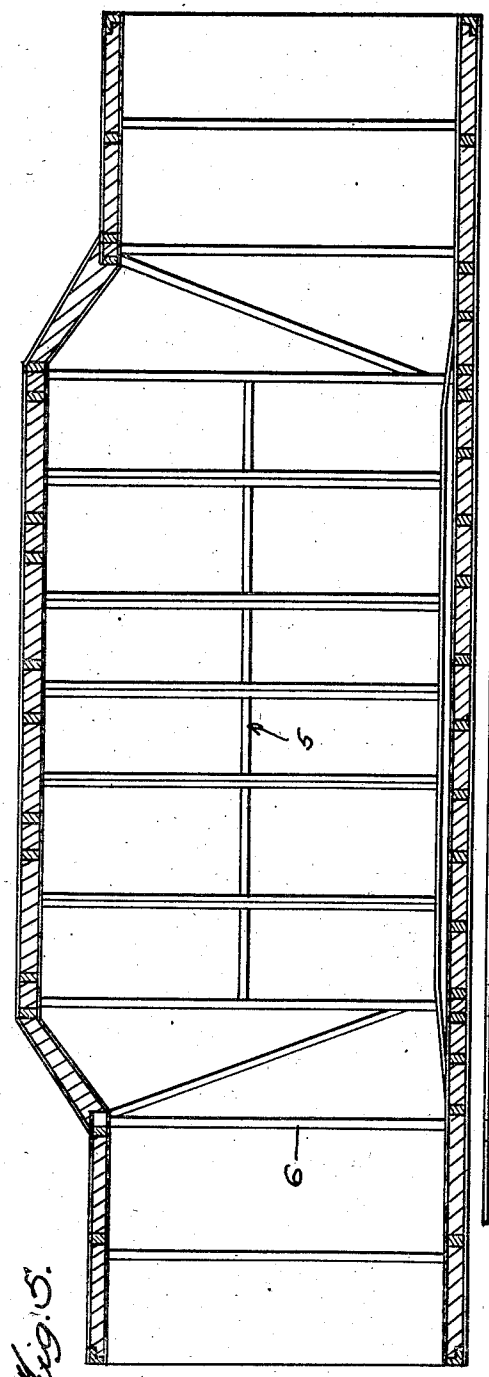


Fig. 5.

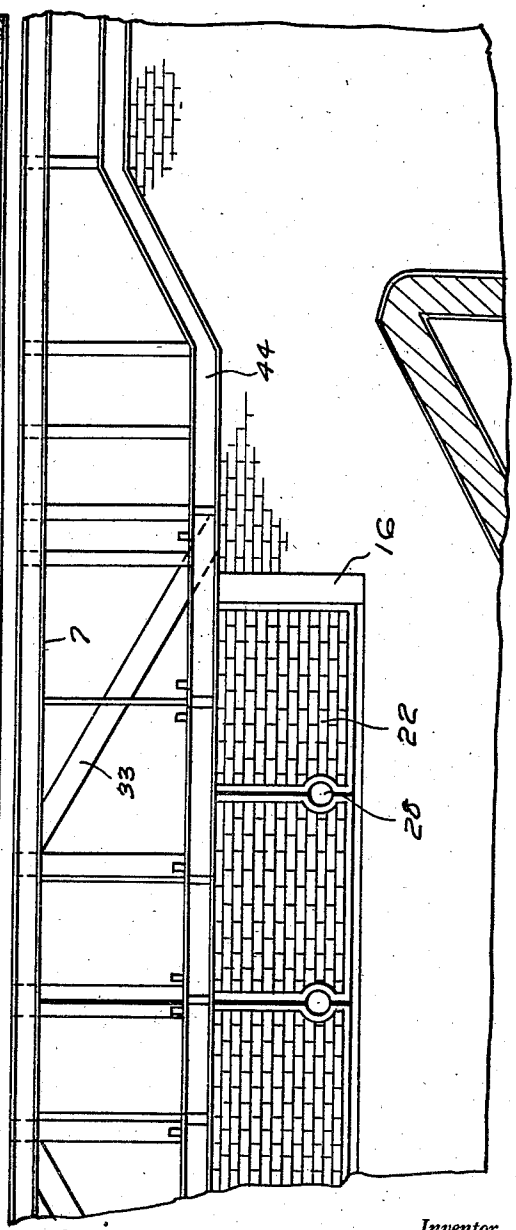


Fig. 6.

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OPEN HEARTH FURNACE

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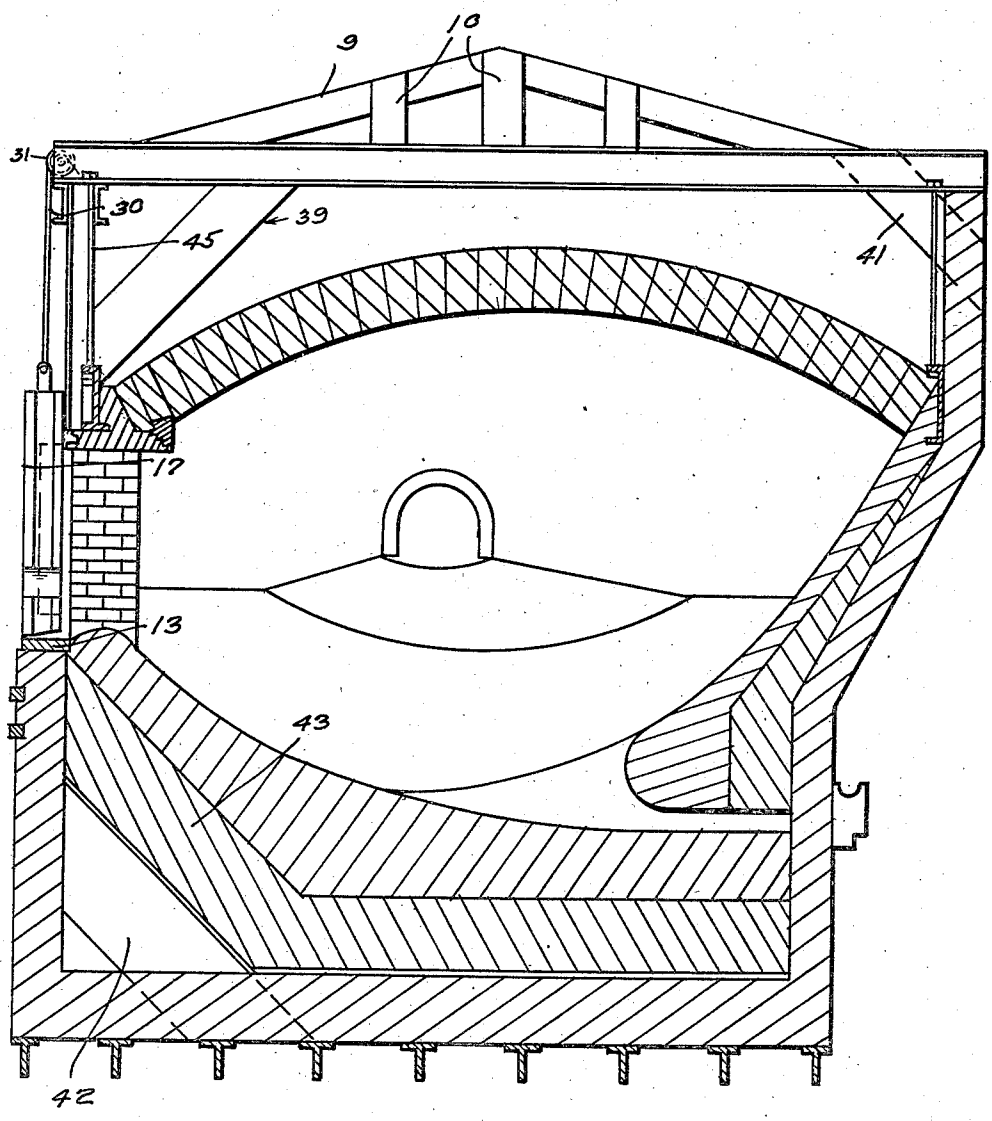


Fig. 7.

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OPEN HEARTH FURNACE

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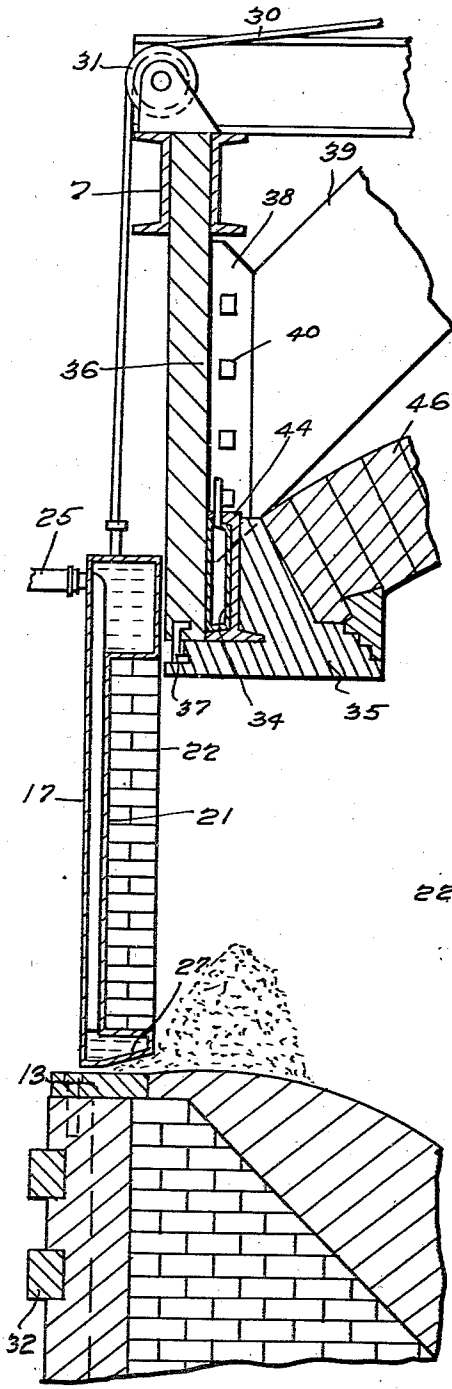


Fig. 8.

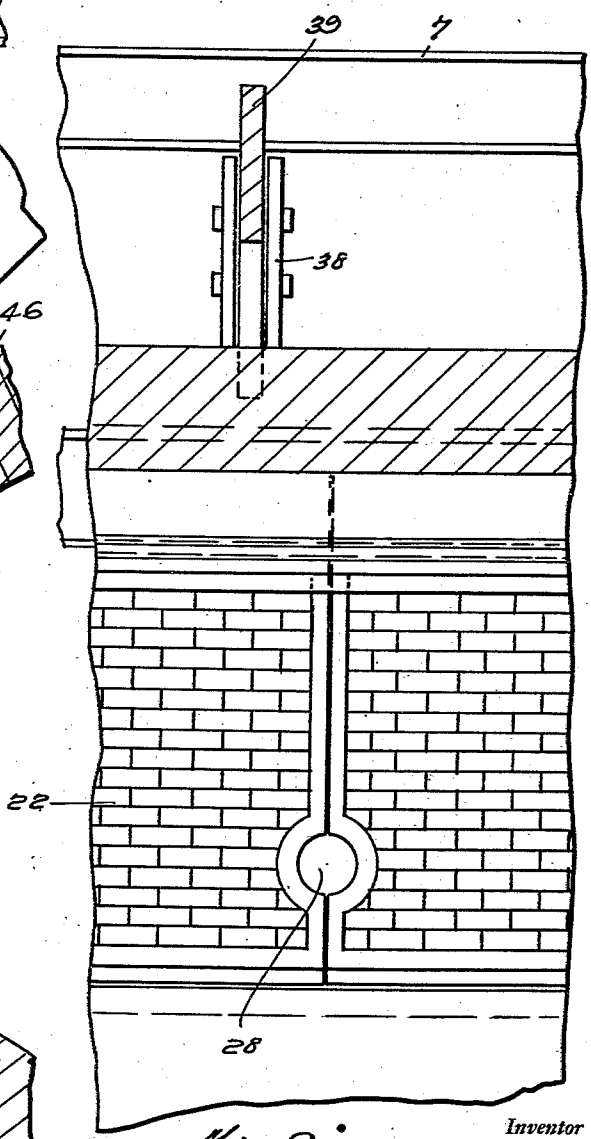


Fig. 9.

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2,402,152

UNITED STATES PATENT OFFICE

2,402,152

OPEN-HEARTH FURNACE

Edward R. Drzewiecki, Chicago, Ill.

Application December 7, 1942, Serial No. 468,135

2 Claims. (Cl. 266—33)

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The present invention relates to new and useful improvements in open hearth furnaces and has for its primary object to provide a furnace structure by means of which such conventional parts as the water castings, jambs and front wall are eliminated, thereby avoiding the usual objectionable features and expenses in repairing these parts of the apparatus.

An important object of the present invention is to provide a novel sliding door construction embodying water cooling means for the door, as well as water cooled guides for the ends of the door and cooling tanks in the furnace structure behind the upper portion of the door.

A further important object is to provide novel brace means for the front and top of the furnace and also to provide reinforcing means at the lower part of the furnace with which the charging cars come into contact to prevent injury to that part of the furnace.

A still further object is to provide an apparatus of this character of simple and practical construction, which is efficient and reliable in performance, relatively inexpensive to manufacture and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout and in which:

Figure 1 is a front elevational view.

Figure 2 is a perspective view showing the front of one of the doors.

Figure 3 is a similar view showing the rear of the door.

Figure 4 is a longitudinal horizontal sectional view looking into the bath of the furnace.

Figure 5 is a similar view looking upwardly toward the top of the furnace.

Figure 6 is a fragmentary view in elevation of the inner side of the front of the furnace.

Figure 7 is a transverse vertical sectional view of the furnace.

Figure 8 is an enlarged vertical sectional view through the front of the furnace, and

Figure 9 is an enlarged rear elevational view of the front of the furnace.

Referring now to the drawings in detail the numeral 5 designates the roof arch generally which includes the roof cross beams 6 resting on the main front beam 7 and the longitudinal reinforcing channel 8 and laterally and longitudinally inclined channels 9 and 10, respectively, connected thereto.

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Embedded in the foundation 11 are the vertical buckstays 12 on the upper ends of which the main front beam 7 is supported.

The charging opening at the front of the furnace includes a sill plate 13 resting on the castings 14 which are supported by the short vertical buckstays 15. At each end of the opening are the end cooling chambers 16 extending vertically at each side of the charging opening.

Positioned in the opening are a plurality of doors 17, 18, 19 and 20, the doors being of hollow construction and formed at their rear faces with a recess 21 within which is placed firebrick 22. Adjacent one upper corner of each door is an intake port 23 and adjacent an opposite upper corner is a discharge port 24, each port having a hose 25 attached thereto leading to a suitable supply of water for circulating cooling water through the door.

The adjacent edges of the doors are formed with interfitting ribs and grooves 26 and 26' adapted to substantially seal the edges of the doors.

The lower edges of the doors are beveled as shown at 27 to insure a tight fit with the sill plate 13.

At the vertical side edge of each door are cooperating notches 28 serving the purpose of test holes. Each door is provided with a plurality of rivets 29 passing through the water area therein to reinforce the front and rear walls of the door should the water become overheated and turn to steam.

The doors are raised and lowered by means of individual cables 30 extending upwardly from the door and over pulleys 31 carried by the main front beam 7. The chain or cable 30 leads to a suitable hoisting mechanism (not shown).

Recessed in the front edge of the short buckstays 15 are a plurality of horizontally extending bumper bars 32 protecting the lower part of the furnace from the constant bumping of the charging car. Directly behind the main buckstays 12 and extending upwardly to the main beam 7 are the main arch roof supports 33. These supports reinforce the roof and the roof channel at the front of the furnace. This construction eliminates the necessity of individual castings and door guides.

Behind the front of the furnace above the doors are a plurality of water tanks 34 to cool the main arch roof supports 33.

The firebrick 35 above the charging opening is

anchored to the upper buckstays 36 by clip members 37 to prevent jarring and loosening of the firebrick by the charging car.

The upper buckstays 36 are provided on their inner faces with spaced flanges 38 to which the ends of gusset braces 39 are secured by bolts 40, the braces 39 extending upwardly to the roof structure.

Similar gusset braces 41 are provided at the rear top portion of the furnace and the lower front portion of the furnace is provided with similar gusset braces 42. The gusset braces 42 serve as a foundation for the chrome brick 43 extending throughout the entire furnace floor.

Extending across the front of the furnace immediately above the charging opening is the main roof channel 44 held in place by the rods 45 and the main roof channel supports the firebrick 46 forming the arched top of the furnace as well as the firebrick 35.

The construction thus provided permits a limited flexibility of the roof to allow the same to breathe due to extreme variations in temperatures to which the furnace is subjected.

Having described the invention, what is claimed as new is:

1. A furnace of the class described comprising a front section and a rear section, said front section having a charging opening, buck stays for the front section and including short buck stays above and below the opening, an arched roof extending from the front buck stays at a point immediately above the charging opening to the rear section, a vertically movable door for the opening, a reinforcing open frame structure connecting the front and rear sections above the roof, and means carried by the frame structure for raising and lowering the door.

2. A furnace of the class described including front and rear walls said front wall having a charging opening extending throughout the greater portion of the width of the wall, buck stays for the front wall above and below the opening, vertically movable doors for the opening having interfitting edges, an arched roof extending from the buck stays of the front wall to the rear wall, fire brick forming a frame for the top of the opening and supporting the front edge of the roof, a channel beam extending along the top of the opening and having its edges embedded respectively in the front wall above the opening and in the fire brick frame to anchor the frame to the front wall and a reinforcing structure for the walls above the roof and including horizontal transverse beams connecting the front and rear walls and gusset braces extending from the buck stays above the opening to the horizontal beams.

EDWARD R. DRZEWIECKI.