March 10, 1925. 1,529,183

C. D. HOWREN

FIRE BRICK FOR FURNACE WALLS

Filed Feb. 4, 1924 2 Sheets-Sheet 1

Fig. 1.

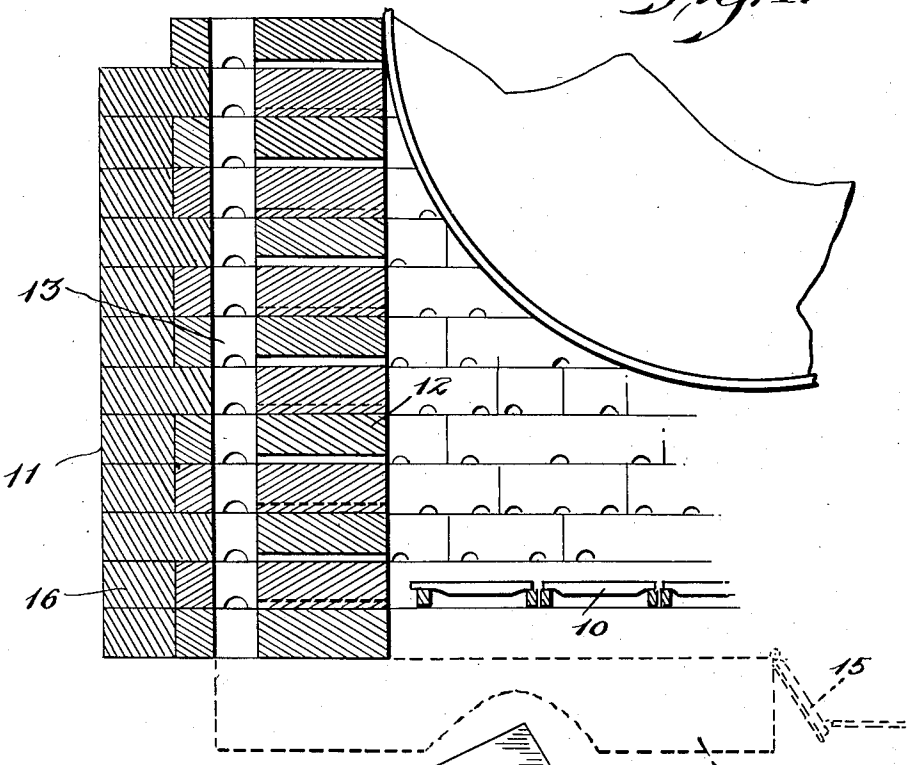
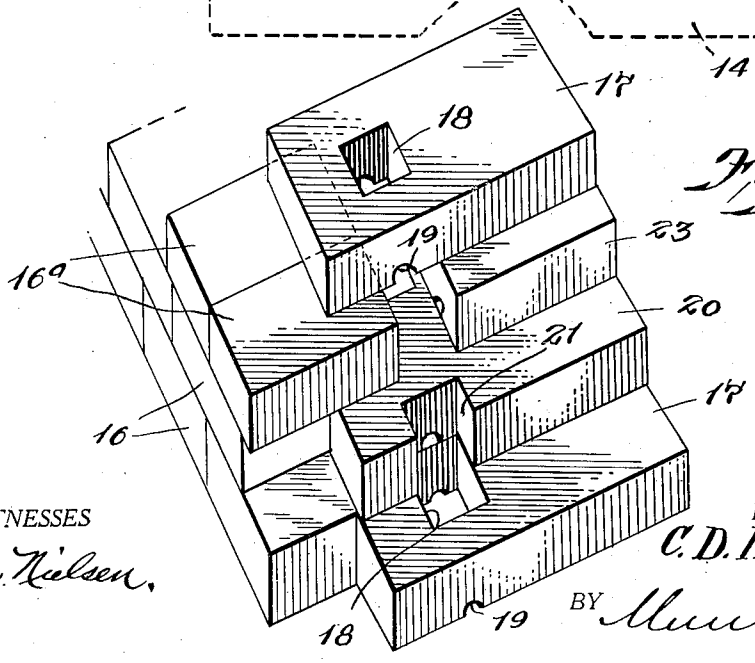


Fig. 2.



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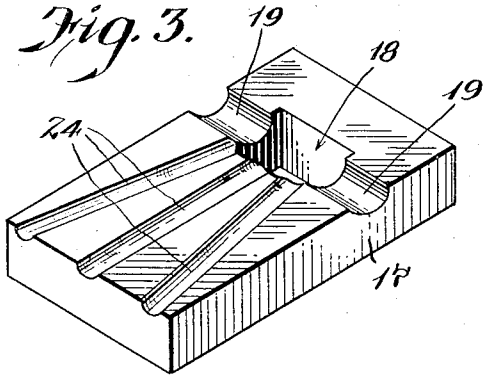
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Fig. 3.



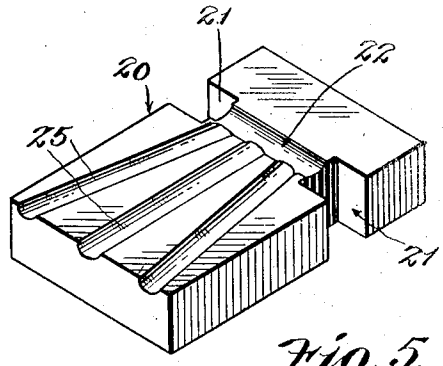


Fig. 5.

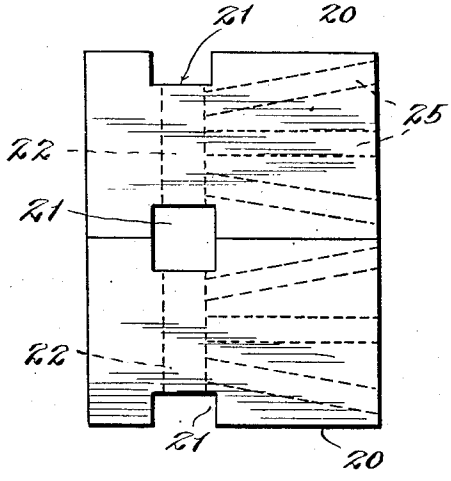


Fig. 6.

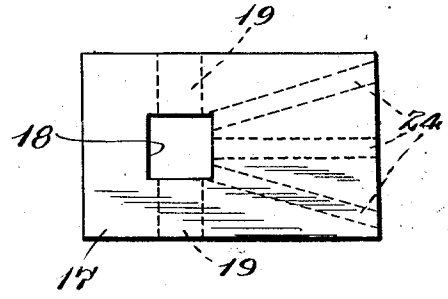


Fig. 4.

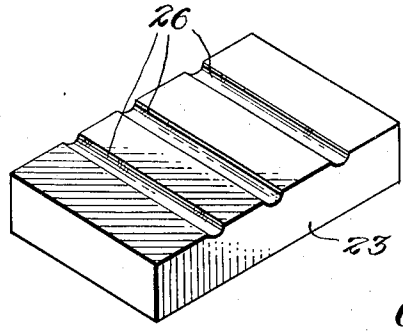


Fig. 7.

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UNITED STATES PATENT OFFICE.

CHARLES D. HOWREN, OF NORFOLK, VIRGINIA.

FIRE BRICK FOR FURNACE WALLS.

Application filed February 4, 1924. Serial No. 690,570.

To all whom it may concern:

Be it known that I, CHARLES D. HOWREN, a citizen of the United States, and a resident of Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Fire Brick for Furnace Walls, of which the following is a specification.

My present invention relates particularly to fire brick utilized in the refractory walls of furnaces, more especially furnaces in which such walls are utilized for the admission of air into the fuel bed and properly distributed along the side and bridge walls with the objects in view among others to prevent the formation of clinkers along such walls, and to prevent expansion and contraction of the furnace walls and in this way prolong the life thereof, to bring about more thorough combustion of the fuel so that nothing but cinders are left, which constitutes a saving in fuel in addition to the cutting down of operating expenses, and to secure the above advantages by means which insures that the air entering the fuel bed will be sufficiently hot so as not to affect the chart of the CO_2.

In the accompanying drawings which illustrate my present invention and form a part of this specification,

Figure 1 is a sectional view through a portion of a furnace illustrating the practical application of my invention,

Figure 2 is a perspective view showing several of the fire bricks forming the inner portion of the wall, with the outer wall brick bonded therewith,

Figures 3 and 4 are respectively a bottom perspective and top plan view of certain of the fire brick,

Figures 5 and 6 are respectively a bottom perspective and top plan view of another form of fire brick, and

Figure 7 is a bottom perspective view of still another fire brick.

Referring now to these figures I have shown in Figure 1 portions of a furnace including grates 10 and a furnace wall 11 which surrounds the fire bed on the grate 10, it being understood that my invention relates particularly to the side walls or bridge wall of a furnace or in fact any wall immediately thereadjacent to the fire bed.

The wall 11 with the side or bridge wall is formed of fire brick generally indicated at 12 in Figure 1 so constructed and arranged as to form in the wall series of vertical channels 13 for the upward passage of air from any suitable source as for instance a lower force feed channel indicated in dotted lines at 14 and preferably provided with any form of air controlling member as for instance a damper 15, the fire brick 12 forming the inner surface of the wall immediately adjacent to the fire bed on the grate 10 and being in bonded connection with outer ordinary brick 16 forming the outer surface of the wall away from the fire bed.

Each of the several fire brick are provided with means whereby the air in the vertical wall channels 13 may be fed to the fire bed or rather to the combustion chamber of the furnace and to the end that the joints of the fire brick may be lapped and these brick bonded with the outer ordinary brick 16, I utilize the specific forms of fire brick shown in Figures 3 to 7 inclusive.

The fire brick 17 shown in Figures 3 and 4 is employed in one tier of the wall, being of rectangular form with an opening 18 therethrough adjacent to one end and with a transverse groove of which portions 19 extend through the opposite sides of the brick from opposite sides of the opening 18. The opening 18 thus forms a part of one of the vertical air channels 13 while the transverse grooves 19 form part of a horizontal channel communicating between the several fire brick of this particular tier of the wall and in communication with the vertical openings 18 forming parts of the channels 13.

The fire brick 20 shown in Figures 5 and 6 have openings 21 at opposite sides with a transverse groove 22 in one surface extending between the openings 21, these fire brick 20 being of similar size to the fire brick 17 so that they are thus adapted to be utilized in tiers of the wall between tiers formed by the fire brick 17, the side openings 21 of juxtaposed brick 20 forming openings to coincide with the openings 18 of the fire brick 17 in the formation of the vertical channels 13. The transverse grooves 22 of the fire brick 20 thus form horizontal air channels in the respective tier of the wall, between the openings 21, in the same manner as the transverse grooves 19 of the fire brick 17.

In the formation of the wall according

to Figure 2 the outer ends of the fire brick 17 and 20 abut longitudinally laid ordinary outer wall brick 16 and every third tier of the wall includes transversely laid ordinary outer brick 16^a for which purpose every third layer of the inner surface of the wall includes rectangular fire brick 23 one of which is seen in Figure 7, of a depth substantially less than the fire brick 17 and 20 so that the outer ends of the fire brick 23 in the wall will be spaced from the adjacent ends of the transversely laid outer brick 16^a and thus form horizontal air passages which are in communication with the vertical wall channels 13 as clearly seen in Figure 2.

In this way I provide both vertical and horizontal channels in the furnace walls, communicating with one another so that each of the several fire brick may feed air into the combustion chamber from the said vertical and horizontal channels, each of the several fire brick being for this purpose provided with lengthwise grooves in one surface thereof of which the grooves 24 of the fire brick 17 diverge slightly from the vertical openings 18 thereof while the air feeding grooves 25 of the fire brick 20 diverge slightly from the transverse grooves 22. The air feeding grooves 26 of the fire brick 23 extend in straight lines from the inner to the outer ends of these brick so that it is obvious in every instance the brick feed air to the fuel bed or combustion chamber by means of surface grooves which grooves are in communication with the vertical and horizontal channels formed in the wall as a result of the openings 18 and 21 and transverse grooves 19 and 22 of the fire brick 17 and 20 as well as the spacing of the outer ends of the fire brick 23 from the adjacent ends of the outer wall brick 16^a, the last mentioned arrangement permitting the bonding of the inner fire brick with the outer ordinary brick.

I claim:

1. A furnace wall and the like having vertical and horizontal air channels, said wall being formed of fire brick having transverse openings intermediate the ends thereof of forming the vertical air channels, and transverse surface grooves connecting the said openings and forming the horizontal air channels, said brick also having surface grooves extending in the direction of their lengths, the latter grooves outletting through one end of the brick and communicating at their opposite ends with said air channels.

2. A furnace wall and the like consisting of fire brick having transverse openings intermediate the ends thereof and alining with one another to form vertical air channels said brick having transverse surface grooves connecting the said openings and forming horizontal air channels, each of said fire brick also having grooves lengthwise of one surface the latter grooves opening at one end through the inner end of the brick and communicating at the opposite ends thereof into the vertical and horizontal air channels.

3. A fire brick having a rectangular body provided with an opening transversely thereof and nearer to one end than the other, said brick also having a transverse groove in one face and in the same plane and in communication with said opening, said brick also having lengthwise grooves in the same face opening at one end through one end of the brick and communicating at their opposite ends with said transverse groove and said opening.

CHARLES D. HOWREN.