Mar. 3, 1925.

1,528,256

P. H. McKENZIE

FIRE ARCH CONSTRUCTION

Filed May 31, 1922 2 Sheets-Sheet 1

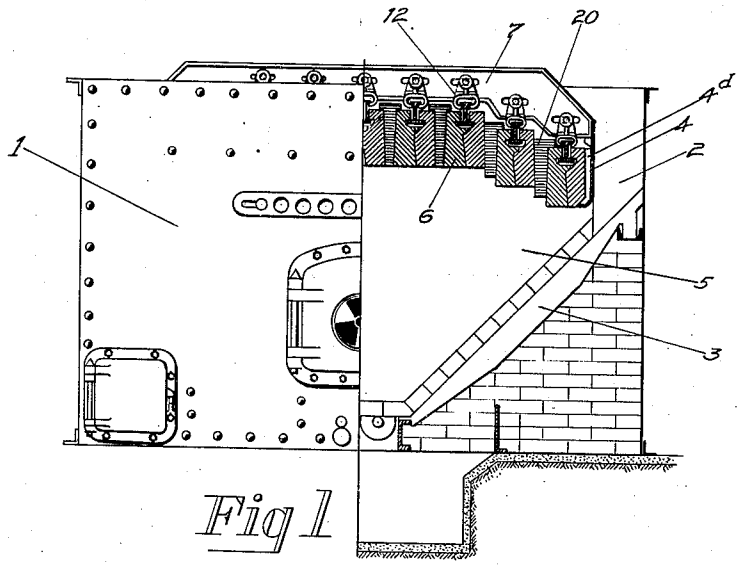


Fig 1

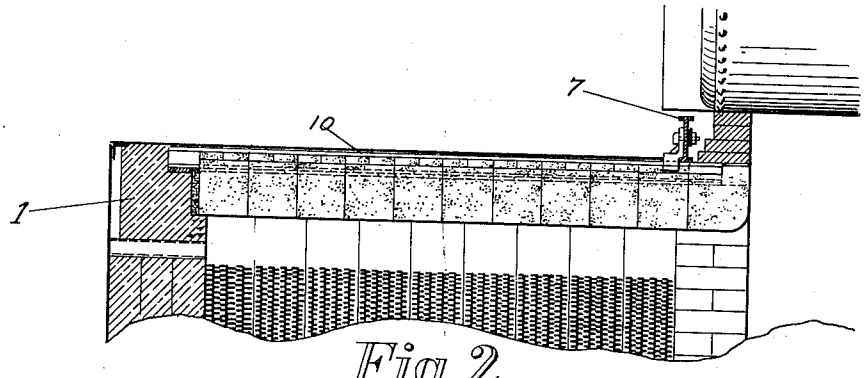


Fig 2

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2 Sheets-Sheet 2

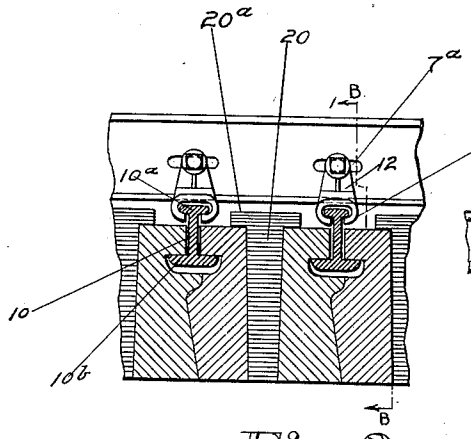


Fig 3

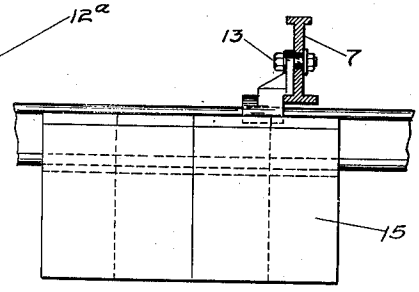


Fig 4

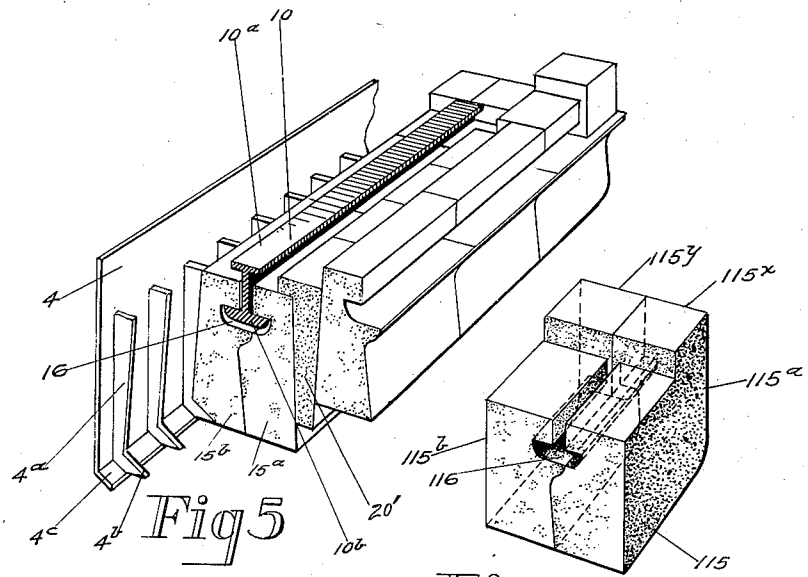


Fig 5

Fig 6

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Patented Mar. 3, 1925. 1,528,256

UNITED STATES PATENT OFFICE.

PETER H. McKENZIE, OF CHICAGO, ILLINOIS.

FIRE-ARCH CONSTRUCTION.

Application filed May 31, 1922. Serial No. 564,835.

To all whom it may concern:

Be it known that I, PETER H. McKENZIE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fire-Arch Constructions, of which the following is a specification.

This invention relates to improvements in fire arch construction, and has for its object to provide a new and improved arch comprising one or more transverse bracket members extending between the side walls of a furnace, longitudinal tile carrying members located therebeneath and secured thereto by an engaging member, and refractory tile formed in interfitting sections with refractory wedge or locking members placeable between adjacent rows of tile.

In the construction embodying my invention, should a portion of one tile break—for instance, at its point of support—the broken tile will be prevented from dropping into the fire by the locking member and its engagement with the complementary section.

By my construction, if it becomes necessary to supply a tile, it is simply necessary to remove the proper locking member, substitute a new section, and replace the locking member, thereby dispensing with the shutting down of the fire, which is extremely inconvenient and expensive.

I have shown my invention as applied to a Dutch oven, side feed type of furnace, but it will be understood that it may be utilized with other furnaces without departing from the spirit of the invention.

The above, and other objects, will be more fully described and set forth in the following specification, and shown in the accompanying drawings, in which—

Figure 1 is a front elevation of a furnace embodying my invention, a portion thereof being broken away for the purpose of illustration;

Fig. 2 is a vertical longitudinal section through the arch, and a portion of the furnace;

Fig. 3 is a transverse cross-section of a portion of the arch, drawn to an enlarged scale;

Fig. 4 is a longitudinal section taken along the line B—B of Fig. 3;

Fig. 5 is a perspective portion of the arch showing the construction and arrangement at the side of the combustion chamber; and

Fig. 6 is a perspective of one of the end tile.

Like numerals refer to like elements throughout the drawings, in which 1 indicates the front of the combustion chamber of a Dutch oven type of furnace, having the feeding magazines 2 at the sides thereof, of the inclined side grates 3, from which the fuel is fed from the magazines. The inner wall of each of said magazines 2 is formed by the plate 4, having the ribs 4^a formed on its inner side, the ribs being inturned at 4^b at the bottom, with the inturned lower edge 4^c of the side plate 4, see Figs. 1 and 5 for example.

Located in the upper portion of the combustion chamber 5, and forming the top thereof, is the crown-shaped suspended arch generally indicated by numeral 6. A transverse supporting member or bracket 7 extends across the furnace between the magazines 2 at the rear end of the combustion chamber, being supported in the form shown upon the lugs 4^d of the side plates 4, it being obvious that more than one bracket 7 may be provided, if necessary or desirable. Located below the bracket 7 and extending longitudinally of the arch are the tile carrying beams 10, shown as of I-section, with top flange 10^a and bottom flange 10^b. These tile carrying beams 10 are supported on the front wall 1 of the furnace at their front ends and are engaged by the securing members 12 adjacent their rear ends, these securing members being formed with claw-shaped lower extremities 12^a adapted to slide over and engage the upper flanges 10^a of the tile supporting beams 10. Slots 7^a are provided in the web of the bracket 7 and bolts 13 extend through suitable apertures in the securing members or hangers 12, and also through the slots 7^a, thereby serving to attach the hangers 12 to the supporting beam 7. slots 7^a permitting adjustment and self-alignment of the hangers 12 and tile 15, as necessary.

Secured upon the lower flanges 10^b of the tile carrying beams are rows of tile generally indicated by numeral 15, each tile being formed in complementary sections 15^a and 15^b, each section being provided with a

groove 16, fitted over one side of the flange 10^b. Tile sections 15^a are convexed on their contacting side to fit in the complementary concavity in the tile sections 15^b as shown, for example, in Figs. 3 and 5. The beams 10 are so located and the tile 15 so dimensioned that a space is left between each adjacent pair of tile rows. The outer sides of the tile sections are preferably tapered so that the spaces between adjacent rows of tile are convergent from top to bottom, as shown, for example, in Fig. 3. Into the space thus formed, fit wedging or locking refractory members or blocks 20, suitably tapered and formed with lateral extending flanges 20^a at the top, the construction being such that the body of each locking block will wedge the contacting tile sections firmly into contact with the respective beams, while the top flanges will rest on the adjacent tops of said tile sections. At the sides of the arch, the outer tile sections 15^b contact with and are locked in place by the ribs 4^a, which form air spaces between such tile sections and the side plates 4 of the magazines, so that the latter are maintained in a comparatively cool state in order to prevent premature combustion or ignition of the coal in the magazines.

In the crown construction shown, a stepped arrangement of the tile results at the side of the arch, and the locking blocks 20′ used in that location are provided with but a single flange to permit this stepped relation. By this construction I am enabled in the specific embodiment illustrated to utilize a radial or crowned type of arch in which the refractory blocks are suspended and not sprung.

The top flanges 20^a of the locking blocks or tile 20 are an important feature of my invention, as they prevent dropping of the blocks during cooling and contraction of the arch with resultant crushing stresses, when re-heated as will be obvious.

Should a tile section 15^a become broken at or below the groove 10^b, it is prevented from dropping into the fire by the interfitting relation with its complementary section and also by the wedging action of the locking blocks 20. Should a tile section 15^b become broken, the break must be below the apex of convexity of its complementary section in order that it may drop into the fire, in which event a substantial amount of refractory material remains interposed between the combustion chamber and the outside of the furnace.

When it becomes necessary or desirable to replace any of the tile sections, it is simply necessary to lift the proper locking blocks and knock off or remove the tile section to be replaced, after which a new tile section may be placed in engagement with and suspended by the corresponding beam 10, after which the locking block may be dropped into place, these operations being simple and capable of accomplishment in a relatively short time without shutting down the fire, and without danger or inconvenience to the repairman.

At the rear end of the beams 10 at the point where the gases of combustion pass around the end of the arch to the boiler in the top of the furnace shown, I construct the tile 115 with sections 115^a and 115^b, similar to sections 15^a and 15^b respectively, save that the grooves 116 terminate short of the rear end of the tile sections and the tops of the tile sections are shouldered as indicated at 115^x and 115^y to protect the ends of the beams 10, as will be readily understood.

It will be recognized that my invention is susceptible of application to other types of furnace and it will also be obvious that it many be modified without departing from the spirit of the invention, and I do not wish to be restricted to the form described and shown, save as defined in the appended claims.

What I claim is—

1. In combination in a furnace arch construction, a substantially vertically disposed side plate having outstanding ribs, the latter being inturned at their lower ends, a tile supporting member adjacent said plate, and refractory tile suspended from said member and engaging the edges of said ribs and resting down on the inturned ends thereof.

2. In combination in a furnace arch construction, a plurality of supporting members, spaced apart rows of tile detachably carried by said members; said tile being constructed in complementary sections, the outer side of each of said sections being inclined to form, with an adjacent section, a tapered seat, and a tapered locking tile fitting in said seat and wedging said sections together, said locking tile projecting above the tops of adjacent sections at its upper end and being provided with a lateral flange which extends partly over and above one of said sections in such wise as to be readily engageable for lifting said locking tile from said seat, said flange also serving to limit the downward movement of said tile.

In testimony whereof, I have subscribed my name.

PETER H. McKENZIE.