J. W. GATES.

FURNACE CONSTRUCTION.

APPLICATION FILED NOV. 26, 1918.

1,341,977. Patented June 1, 1920.

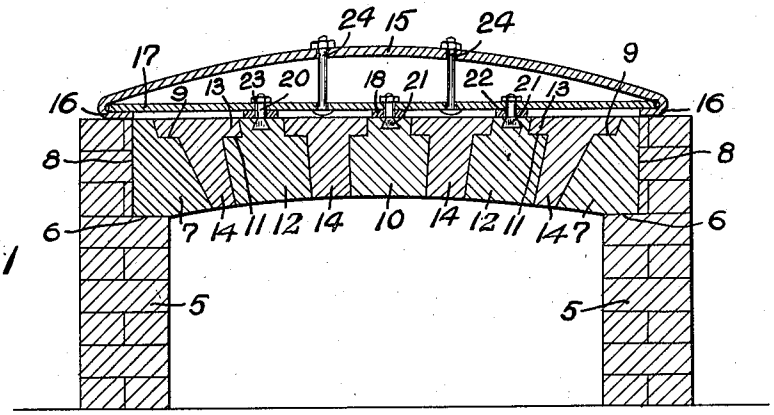


FIG. 1

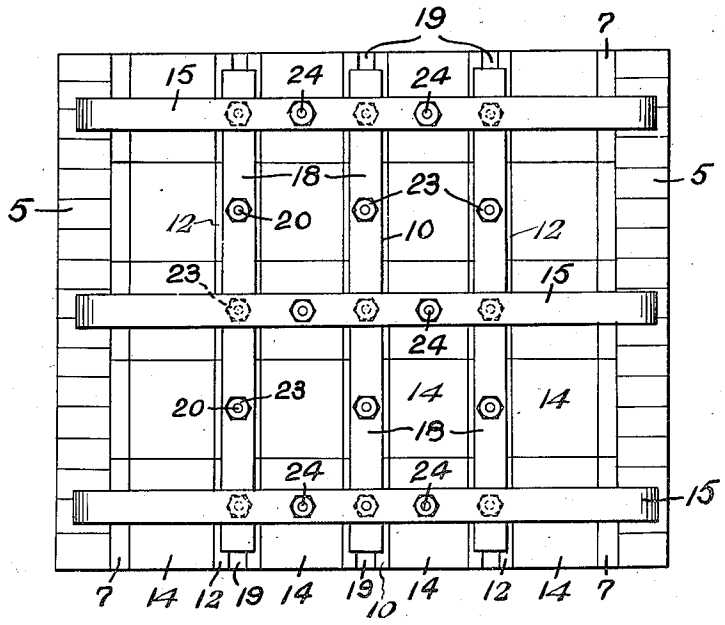


FIG. 2

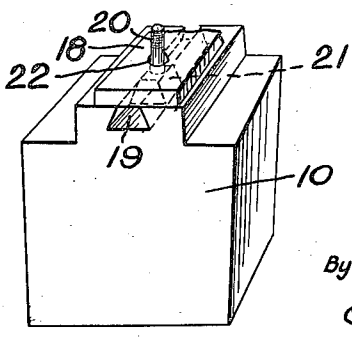


FIG. 3

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FURNACE CONSTRUCTION.

1,341,977. Specification of Letters Patent. Patented June 1, 1920.

Application filed November 26, 1918. Serial No. 264,219.

To all whom it may concern:

Be it known that I, JOHN WILLIAM GATES, a subject of the King of Great Britain, and resident of the city of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Furnace Construction, of which the following is a full, clear, and exact description.

This invention relates to improvements in furnaces, and the main object of the invention is to provide a furnace in which the fire bricks or blocks of the arch may be held in such position that the burned out portion may be readily removed and replaced, without disturbing the remainder of the arch.

It is well known that the blocks at the sides of the furnace arches fuse or burn out before the blocks at the center of the arch and, in most furnace arch constructions, it is necessary to take down the whole arch in order to remove and replace the burnt out blocks at each side.

According to my invention, I provide a resilient support for the arch blocks adapted to hold the center portion of the arch in suspension and without disturbance while the blocks at each side are being removed and replaced.

In the drawings;—

Figure 1 is a sectional elevation of a furnace arch constructed according to my invention.

Fig. 2 is a plan view of same.

Fig. 3 is a perspective view of one of the blocks 10 showing the slot and fastening device in the top thereof.

Referring to the drawings, 5 designates the side walls of a furnace constructed of any suitable refractory material and provided at the top with ledges 6 upon which the side blocks of the arch rest. The furnace arch is constructed of a series of correspondingly symmetrical blocks at each side of the center of the arch. The side blocks 7 rest upon the ledges 6 and project outwardly into the space above the fire grate. These side blocks 7 are widest at the bottom, being each provided with a vertical wall 8 at the back which rests against the side wall of the furnace and being tapered upwardly at the front and provided with ledges 9 upon which the adjoining blocks rest. The key blocks 10, which are adapted to be suspended from the supporting device, are provided near the top with ledges 11 similar to the ledges 9 upon which the shoulders of the adjacent blocks rest. Intermediate the blocks 7 and 10 are any suitable number of blocks 12 having ledges similar to the ledges of the key blocks and each adapted to be suspended from a supporting device. Alternate with the blocks 7, 10 and 12 are blocks 14 provided at the top with shoulders 13 on each side which rest upon the ledges 9 and 11 of the adjoining blocks. The flanks of the blocks 10,12 and 14 are sloped toward the center of the arch, the blocks 7, 10 and 12 holding the others in position.

As the points of greatest wear, owing to contraction, expansion and fusing, occur at the sides of the arch, the blocks 7 and frequently also the adjoining blocks 14 require renewal while the remainder of the arch is still in good condition. It becomes necessary, therefore, to remove the side blocks and to do this without disturbing the remainder of the arch I have provided a suspension device or harness. This suspension device consists of two or more resilient members 15, preferably arched steel plates, having their ends 16 bent over to lie upon the top of the side walls 5. These arched plates are located transversely of the furnace and are placed suitable distances apart, two or three being required in an ordinary sized furnace. Connecting the ends of the arched plates, I provide bars 17 which rest at each side upon the ends 16 of the arched plates and lie between the bent ends 16 and the tops of the arched plates, and are suspended from these plates by bolts 24. Below the connecting bars 17 and at right angles thereto I provide longitudinal supporting bars 18 secured to the arch bars 17 by any suitable means so that they will have the resilient support of the arched plates. From these bars 18 the arch blocks are suspended in the following manner:—The blocks 10 and 12 are provided in their upper surfaces with longitudinal slots 19, these slots being wider at the bottom than at the top, as clearly shown in Fig. 3. To hold the blocks in position, I provide suspension bolts 20, the bottom of each bolt having an enlarged head 21 adapted to fit into the slot 19. The head of the bolt is of the same shape and approximately the same size as the slot 19, so that it may be slipped into the slot and adjusted to any longitudinal position. The

upper ends of the bolts are slipped through apertures 22 in the bars 18 and are held in place by nuts 23.

It will thus be seen that the blocks 10 and 12 are suspended from the supporting arch independently of one another and that the blocks 14 are supported by the blocks 7, 10 and 12. The metal supporting bars have sufficient resiliency to take care of expansion and contraction of the blocks and any of the suspended blocks may be removed separately if desired. The side blocks 7, when worn, may be removed without disturbing the rest of the arch, the adjoining blocks 14, of course, being removed with the blocks 7. It is also possible to remove any of the blocks 14 directly or to remove the blocks 10 or 12 by first removing an adjoining block 14 and then disconnecting the desired block from the supporting harness. This construction offers great advantages in making repairs to the furnace arch, as it is never necessary to disturb other parts of the arch than those which it is necessary to remove. It will be obvious that instead of using three of the supporting arches 15 with corresponding transverse bars 17, I may use only two, or more, according to the design of the furnace. It will also be obvious that a furnace arch may be constructed with a single suspended block 10 and the adjoining blocks 14, or any suitable number of blocks 12 and 14 may be used as required by the width of the furnace, in which case a corresponding number of longitudinal supporting bars 18 will be employed.

Having thus described my invention, what I claim is:—

1. In furnace construction an arch including center, side and intermediate blocks, certain of said intermediate blocks being shouldered to rest upon the center, side and remaining intermediate blocks, and external means for supporting the center and remaining intermediate blocks whereby any one of the shouldered blocks or side blocks may be removed without collapse of the arch, said supporting means including a plurality of arched plates spanning the furnace arch, longitudinally disposed bars suspended from said arched plates and means for suspending individual blocks from said bars.

2. In furnace construction, an arch including center, side and intermediate blocks, certain of said intermediate blocks being shouldered to rest upon the center, side and remaining intermediate blocks, and external means for supporting the center and remaining intermediate blocks, whereby any one of the shouldered blocks or side blocks may be removed without collapsing of the arch, said supporting means comprising a plurality of arched bars, the ends of said bars being bent under, straight bars, the ends of the straight bars resting on the bent-under portions of the arched bars, bars suspended from and at right angles to said straight bars, and block supporting means depending from said suspended bars.

3. In furnace construction, an arch including a plurality of blocks, key blocks having means for supporting adjacent blocks and external means for supporting said key blocks comprising a plurality of arched bars, the ends of said bars being bent under, straight bars, the ends of the straight bars resting on the bent-under portions of the arched bars, bars suspended from and at right angles to said straight bars, and block supporting means depending from said suspended bars.

In witness whereof I have hereunto set my hand.

JOHN WILLIAM GATES.