May 27, 1930. B. DOBIE 1,760,121

REFRACTORY ARCH CONSTRUCTION

Filed Oct. 26, 1923 3 Sheets-Sheet 1

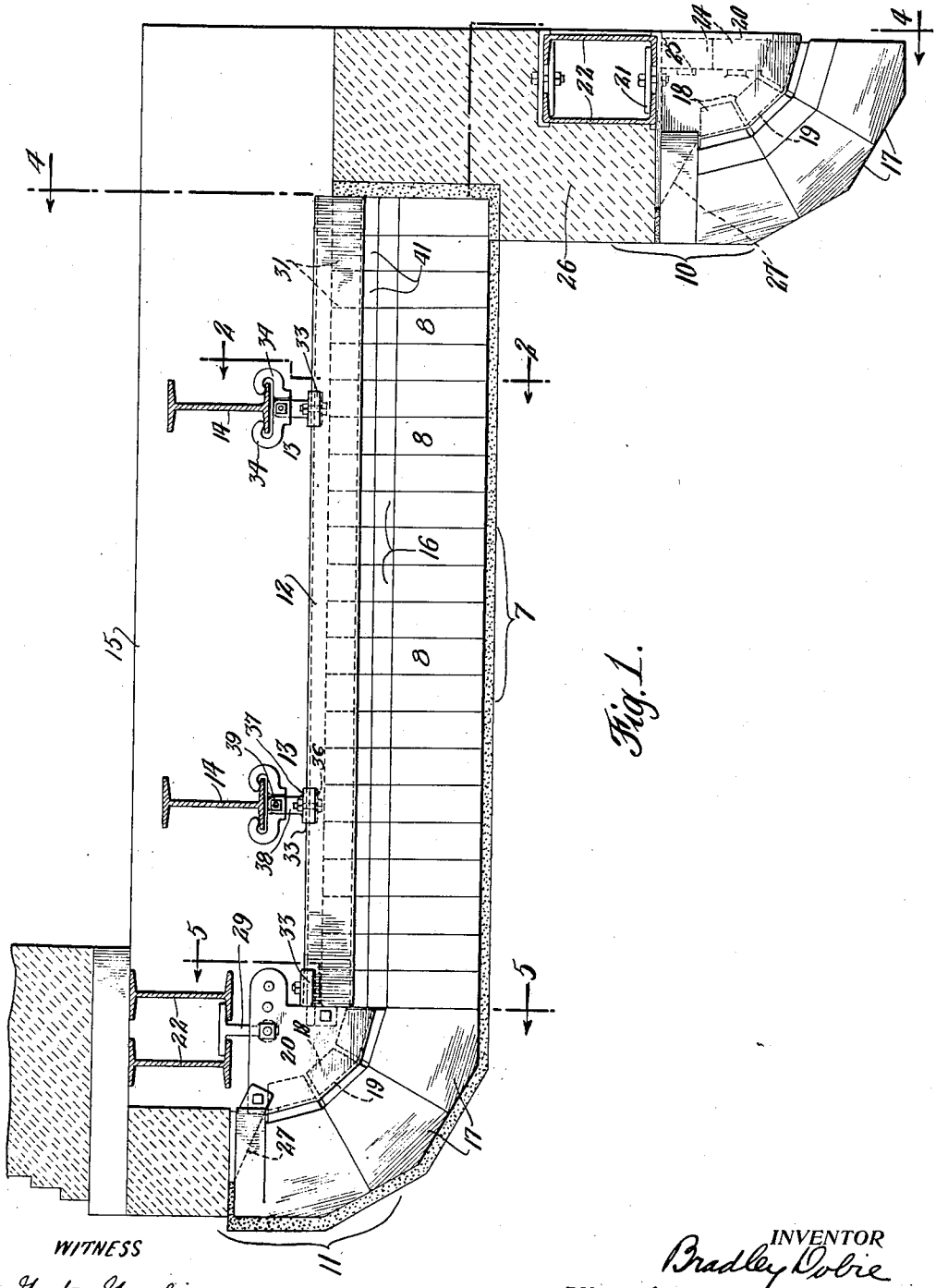


Fig. 1.

WITNESS
Gustav Genzlinger

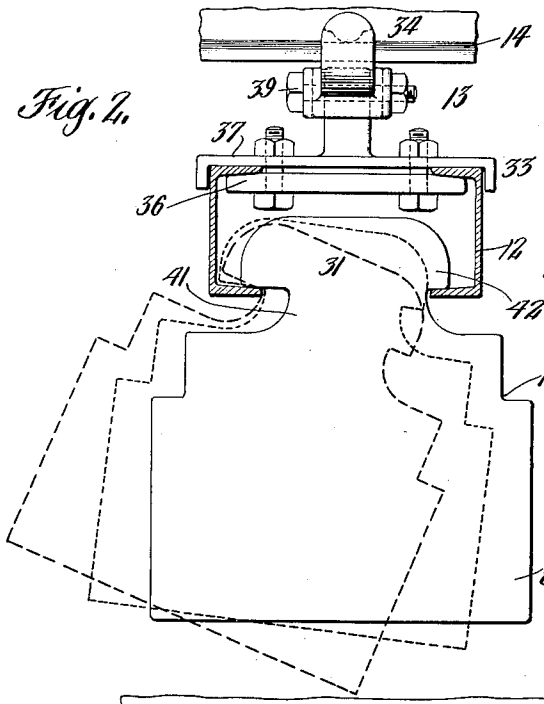
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REFRACTORY ARCH CONSTRUCTION

Filed Oct. 26, 1923 3 Sheets-Sheet 2

Fig. 4.



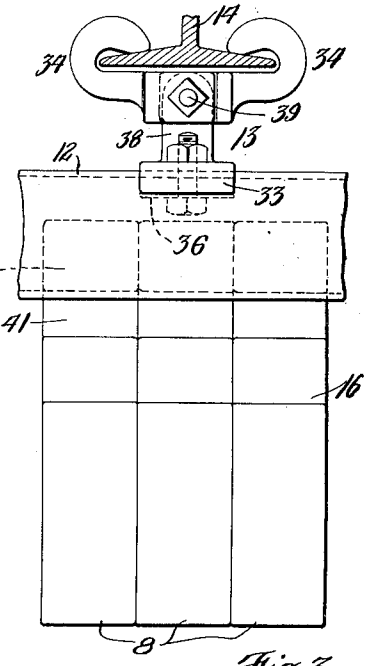


Fig. 3.

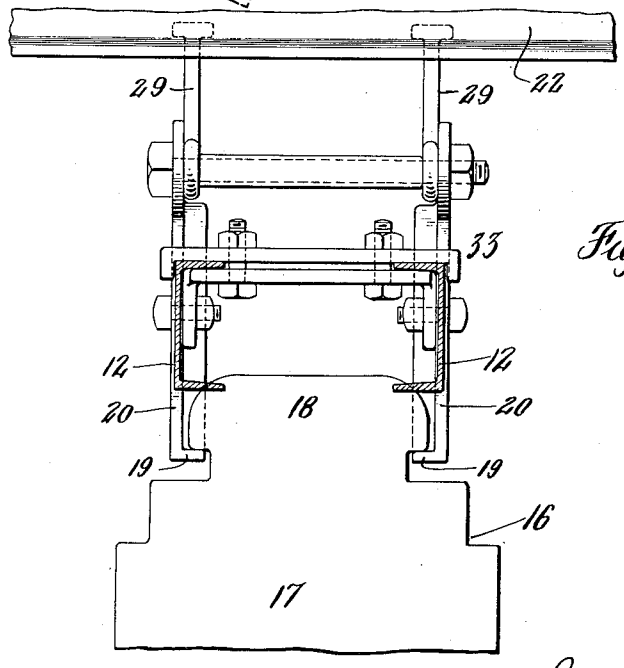


Fig. 5.

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REFRACTORY ARCH CONSTRUCTION

Filed Oct. 26, 1923 3 Sheets-Sheet 3

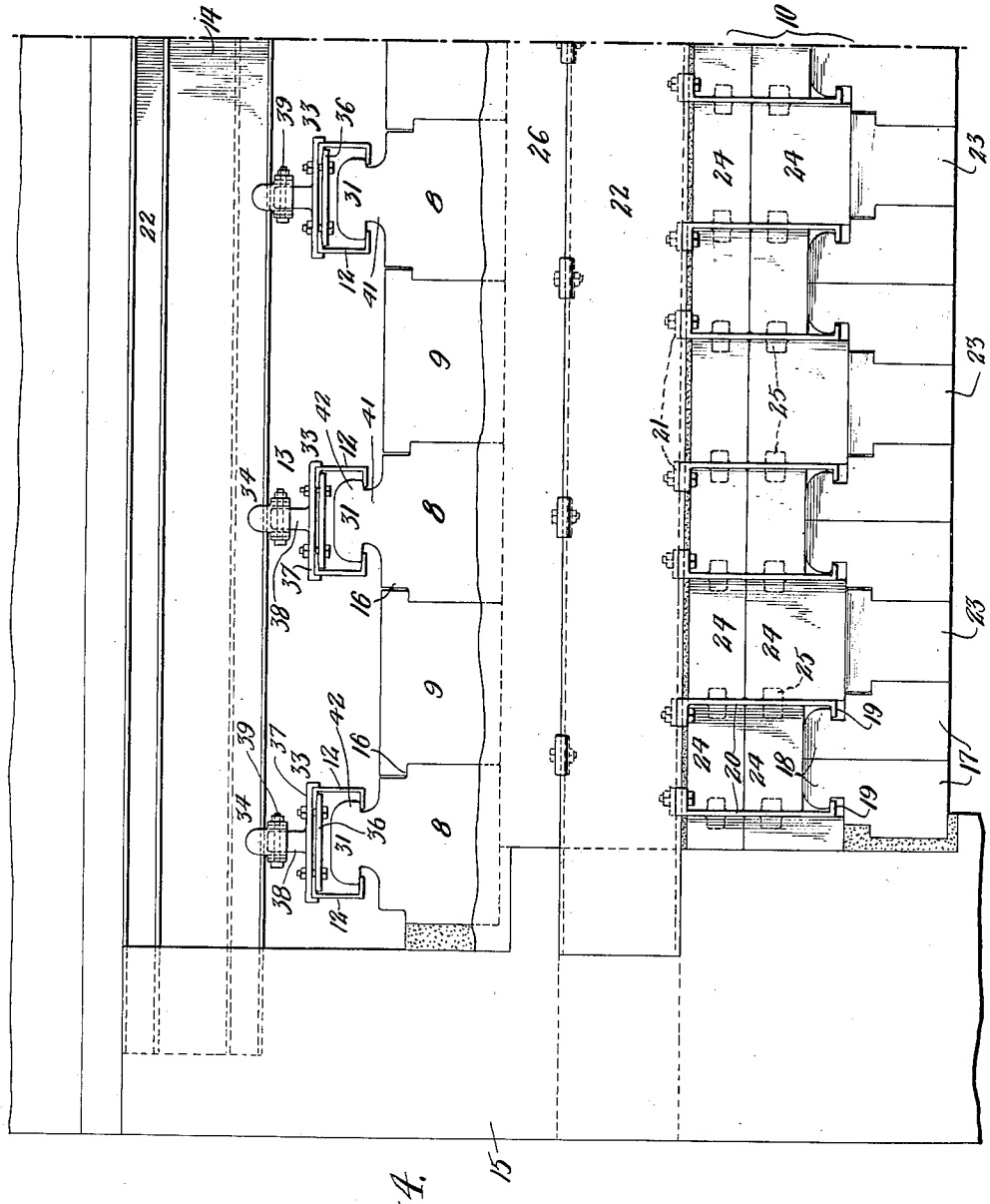


Fig. 4.

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Patented May 27, 1930 1,760,121

UNITED STATES PATENT OFFICE

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REFRACTORY ARCH CONSTRUCTION

Application filed October 26, 1923. Serial No. 671,058.

My invention relates to refractory arch construction, and is applicable, in particular, to steam boiler furnaces. It is especially concerned with the support of the arch. I aim to make the construction simple and rugged, and to provide for easy replacement of the brick of the arch when desired. In the particular construction embodying the invention which I have here illustrated, any brick in the arch can be removed and replaced at will without material disturbance of other brick, or of the supporting structure.

How these and other advantages can be realized through my invention will appear from my description hereinafter of the best embodiment of the invention known to me.

In the drawings, Fig. 1 shows a longitudinal section through a furnace arch constructed in accordance with my invention.

Fig. 2 is a fragmentary transverse sectional view taken as indicated by the line 2—2 in Fig. 1, and diagrammatically illustrating the removal of an arch brick.

Fig. 3 is a fragmentary sectional view similar to Fig. 1, but on a larger scale, illustrating details of the arch supporting structure.

Fig. 4 is a fragmentary view, partly in section as indicated by the line 4—4 in Fig. 1, illustrating especially the ignition portion of the arch.

Fig. 5 is a fragmentary transverse sectional view taken as indicated by the line 5—5 in Fig. 1, illustrating the construction of the arch nose.

Referring to Figs. 1, 2, 3 and 4, it will be seen that the main portion 7 of the arch comprises refractory bungs of hung brick 8 and filler brick 9 extending lengthwise of the furnace, from the ignition portion 10 of the arch to the nose 11. The brick 8 are engaged and supported by longitudinal runners 12 themselves suspended by hangers 13 from cross beams 14 shown as resting on or built into the side wall 15 of the furnace (Fig. 4). The brick 9 may be supported by the brick 8 through any suitable form of engagement, such as the shoulder and rabbet conformation indicated at 16.

As here shown (Figs. 1 and 4), the ignition 10 comprises brick 17 arranged fantailwise with their undercut heads 18 engaged by lateral flanges 19 on sector shaped supporting plates 20 secured by clamps 21 to cross beams 22, and also fantail sets of filler brick 23 arranged between the brick 17 and supported by them. The rear of the fantail sets 17, 23 is closed off by brick 24 resting on the brick 17, 23 and engaged with lateral lugs 25 on the plates 20. The overlying refractory structure 26 is supported by the beams 22 and by extensions 27 projecting from the plates 20. Brick 24 resting on the sets 17, 23 close the space between them and the structure 26 through which the brick 17, 23 are inserted and removed. The construction of the nose 11 is substantially the same, except that the plates 20 are suspended from their beams 22 by hangers 29, and the projections 27 are made separate to facilitate their renewal when burned out; also, the plates 20 are bolted to the corresponding ends of the runners 12. Preferably, there are openings through the side walls 15 from the spaces between the beams 22 (as indicated in dotted lines in Fig. 4), to permit circulation of air to cool the ignition and nose structures 10, 11.

The construction of the ignition 10 and the nose 11 forms the subject of my copending application Serial No. 694,318 filed February 21, 1924.

Referring, now, to Figs. 1, 2, and 3, it will be seen that the runners 12 shown have the form of channels, and are arranged in pairs facing one another. The brick 8 have laterally undercut or shouldered heads 31 between the channels 12, resting on their lower flanges. The hangers 13 (Figs. 2 and 3) comprise devices 33 secured to the runners 12 of each pair and holding them properly spaced, and also devices 34 engaging the opposed lower flanges of the transverse I beam supports 14. In the present instance, the devices 33 have the character of clamps, consisting of plates 36 with their ends engaged beneath the upper flanges of the channels 12 and longer plates 37 bolted to the plates 36, with their downturned ends engaged over the outsides or backs of the channels 12, while the devices 34 have the character of hooks or grapples, pivoted together and to upstanding lugs 38

on the clamp plates 37 by bolts 39. As indicated in Figs. 2 and 3, the pivoted ends of the grapples 34 are forked to embrace the lug 38. As shown in Fig. 1, clamp devices 33 without grapples serve to space and secure together the channels 12 at their "nose" ends, and also to space and secure the channel beams 22.

With a suitable interval between the channels 12 of each pair, any one or more of the brick 8 can be removed and replaced without disturbance of the others or of the channels themselves. Preferably, this is accomplished without provision of any auxiliary supporting means to narrow the interval between the channels, by so proportioning the brick heads 31 and their necks 41 that the brick 8 can be shifted laterally enough to permit the corner or shoulder 42 of the head to be swung down past the channel flange on which it formerly rested,—as indicated in dotted lines in Fig. 2. As shown in this figure, one of the shoulders 42 is wider than the other, to permit the brick 8 to be shifted in that direction far enough for this purpose. Normally, such lateral displacement of the brick 8 can be prevented by any suitable means laterally engaging them, preferably below the head 31. In the present instance, the filler brick 9 themselves serve this purpose.

I claim:

1. A refractory arch construction comprising spaced runners, and brick with unequal shoulders resting on said runners removable after lateral displacement in the direction of the wide shoulders.

2. In a refractory arch construction, the combination of alternate courses of hung and filler brick and pairs of spaced runners for supporting each course of said hung brick, said hung brick having heads engaging said runners and being removable transversely of said runners, after removal of filler brick on one side, by lateral displacement toward that side.

3. In an arch construction, the combination of alternate courses of hung and filler brick and supporting runners for said hung brick, said hung brick being removable from the runners transversely and toward one side thereof after removal of the filler brick on that side.

4. In a refractory arch construction, the combination of alternate courses of hung and filler brick and pairs of spaced runners for supporting each course of said hung brick, said hung brick having heads with unequal shoulders engaging said runners and being removable transversely of the runners, after removal of adjacent filler brick, by lateral displacement in the direction of the wide shoulders.

5. In a refractory arch construction the combination of a pair of spaced runners, bricks with heads each sustainingly engaging said runners but removable from between said runners transversely thereof without disturbing adjacent bricks longitudinally of the runners.

6. In refractory arch construction the combination of a pair of spaced runners, bricks having heads each sustainingly engaged by said runners, but removable from between said runners transversely thereof without disturbing bricks adjacent thereto longitudinally of the runners, and means for normally preventing such removal.

In testimony whereof, I have hereunto signed my name.

BRADLEY DOBIE.