

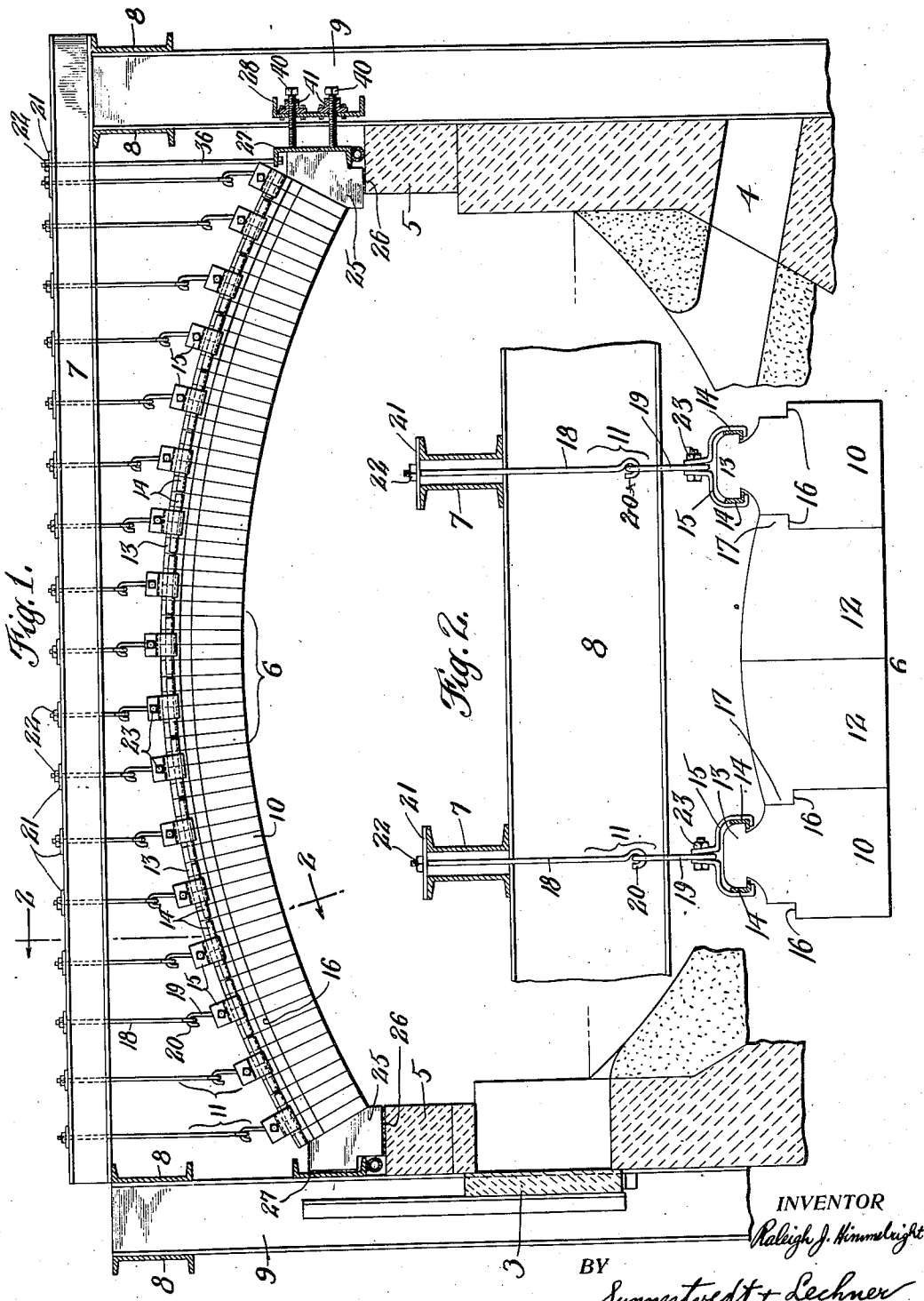
Dec. 10, 1929.

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1,738,580

FURNACE ARCH

Filed Aug. 15, 1924



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FURNACE ARCH

Application filed August 15, 1924. Serial No. 732,168.

My invention relates to furnace arches, and particularly arches of tilting furnaces, such as open hearth steel furnaces. The invention is especially concerned with the lateral support of such arches, and with obviating stresses or injury from temperature variations. How this and other advantages can be realized through my invention will appear from my description hereinafter of a selected and preferred embodiment.

In the drawings, Fig. 1 is a fragmentary end view of a furnace and an arch constructed in accordance with my invention.

Fig. 2 shows a section lengthwise of the arch, taken as indicated by the line 2—2 in Fig. 1.

In Fig. 1 appear the side walls 5, 5 and the arch 6. As shown, there is a charging door 3 in the left hand wall 5, and a tap opening 4 in the right hand wall. The roof 6 is suspended from a suitable supporting structure, such as cross beams 7 resting on longitudinal beams 8 at the upper ends of uprights 9, here shown as buckstays for the furnace walls 5. The roof 6 comprises a series of transverse bungs 10 suspended from the cross beam 7 by hangers 11, and intermediate filler bungs 12 between and supported by the directly hung bungs 10. The brick of the bungs 10 have undercut heads 13 which rest on short angle bars or rails 14,—in the present instance, four brick to each rail. The rails 14 are held by pairs of grapple-like clamps 15 that hook under the rails. The edges of the brick 10 are shouldered as indicated at 16, and the corresponding edges of the filler brick 12 have shoulders 17 that rest on the shoulder 16. In the present instance, the filler brick 12 are "split", and arranged in pairs between the bung brick 10. As shown, the bricks 12 bulge upward in the middle, so as to give higher bearing at their adjacent faces and so minimize the defects of gradual erosion on their security. Accordingly, the bricks 12 are considerably longer on their mating sides than on their supported sides.

The hangers 11 comprise sections 18, 19 flexibly and detachably interengaged by the hook-and-eye formation of their ends at 20, as illustrated in Figs. 1 and 2. The upper

hanger sections 18 extend through cap pieces 21 spanning the tops of pairs of channels 7 arranged back to back, and are adjustably secured by nuts 22 resting on said cap pieces. The lower hanger sections 19 are secured to the clamps 15 by the bolts 23 that hold the latter together. This sectional construction of the hangers 11 facilitates installation and taking down of the arch. As shown, there is one of the hangers 11 for each pair of the bars 14.

At the ends of the bungs 10, 12 are abutments in the form of skew brick or blocks 25 resting on top of the walls 5, 5, with an interposed layer of sand or the like 26 for sealing the joint. Laterally, the abutments 25 rest against longitudinal skew members or supporting channels 27. As here shown, the skew member 27 at the left of Fig. 1 rests or engages loosely against the corresponding buckstays 9, and may, if desired, be suitably secured thereto. The right end skew member 27 is laterally sustained from another longitudinal channel member 28 (or series of such members) attached to the buckstays 9. The right hand skew member 27 does not rest on the top of the wall 5 or on the brick 25 with which it is associated, but "floats" free, so to speak, so as to be easily shifted laterally upon occasion. As here shown, it is suspended from the transverse members 7 by hanger rods 36 extending through its upper flange. At their upper ends, the hangers 36 are secured by cap plates 21 and nuts 22, just as the hangers 11 are secured.

Having thus explained the general construction of the furnace illustrated, I will now explain the provisions for sustaining the arch laterally, even when tilted, so as to keep the arch brick tight at all times without trouble from expansion as the furnace heats up. In stationary furnaces, springs may be used for this purpose as described in the copending application of Bradley Dobie, Serial No. 732,631, filed Aug. 18, 1924, but with a tilting furnace, the use of a spring sustaining device applied to the member 27 to keep the bung brick pressed tightly together and permit expansion is impracticable, since at the charging side of the furnace the pro-

jection of such a device beyond the outer face of the wall would prevent the charging door from being raised and opened, while if it were applied at the tapping side, the weight of the arch would be thrown against it when the furnace is tilted, and to sustain this weight it would have to be so stiff as to exert excessive pressure on the arch when the furnace was not tilted.

As shown in Fig. 1 the right hand member 27 is sustained from the member 28 by means of adjusting screws 40 threaded through flanged hubs 41 fastened to the longitudinal member 28. These screws 40 can be backed off to allow the roof to expand while the bottom of the furnace is being "made", and it is being fired up. After the roof is fully expanded, the screws 40 can be tightened up firm against the skew member 27, so as to hold the brick of the bungs 10, 12 tightly together and to sustain the thrust firmly when the furnace is tilted.

I claim:

1. The combination with a tilting furnace of a suspended arch therefor, a floating suspended abutment for the arch at the tapping side of the furnace, and a non-yielding supporting means engaging said abutment and adjustable laterally.

2. The combination with a suspended arch of a tilting furnace, and a floating skew structure therefor at the tapping side of the furnace, of screws for laterally sustaining said structure adjustable to permit initial expansion of the arch and thereafter to afford it firm lateral support when the furnace tilts.

3. The combination with a suspended arch of a tilting furnace, of a movably suspended skew structure at the tapping side of the furnace, a fixed longitudinal frame member adjacent said skew structure, and adjustable screws through said frame member engaging and laterally sustaining said skew structure.

In testimony whereof, I have hereunto signed my name.

RALEIGH J. HIMMELRIGHT.

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