W. LEMB.

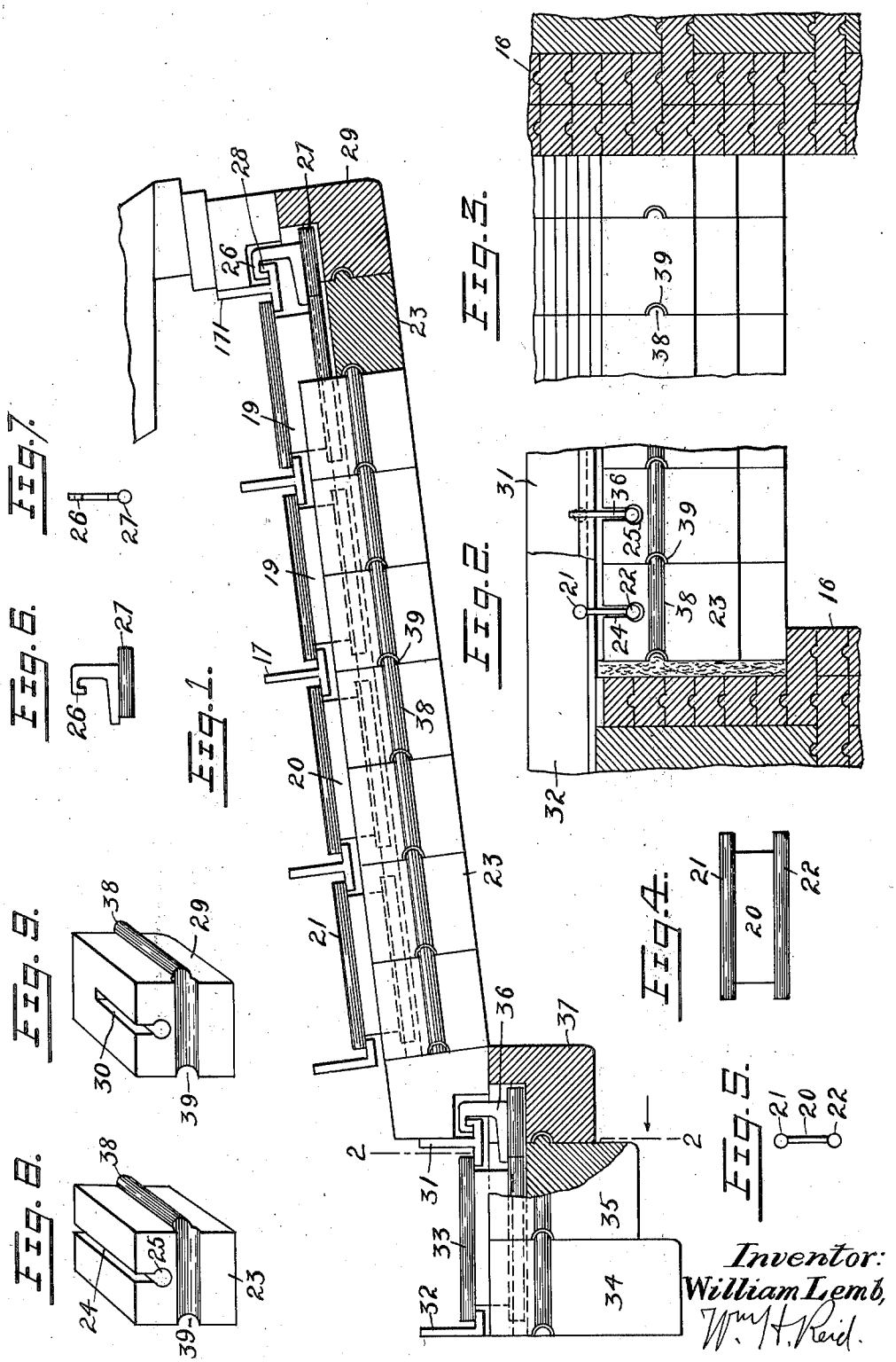
ARCH CONSTRUCTION FOR FURNACES.

APPLICATION FILED OCT. 24, 1917.

1,275,709.

Patented Aug. 13, 1918.

2 SHEETS—SHEET 1.



W. LEMB.

ARCH CONSTRUCTION FOR FURNACES.

APPLICATION FILED OCT. 24, 1917.

1,275,709.

Patented Aug. 13, 1918.

2 SHEETS—SHEET 2.

Fig. 18.

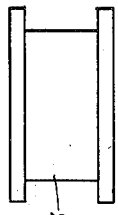


Fig. 17.

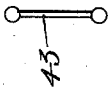


Fig. 13.

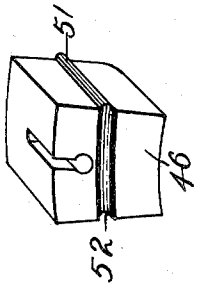


Fig. 12.

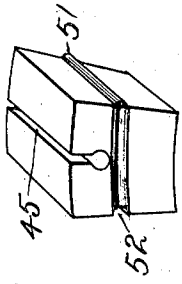


Fig. 15.

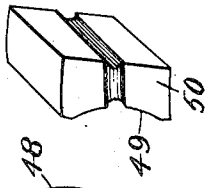


Fig. 14

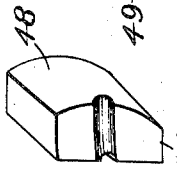


Fig. 11.

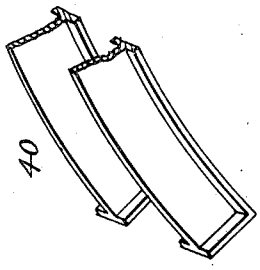
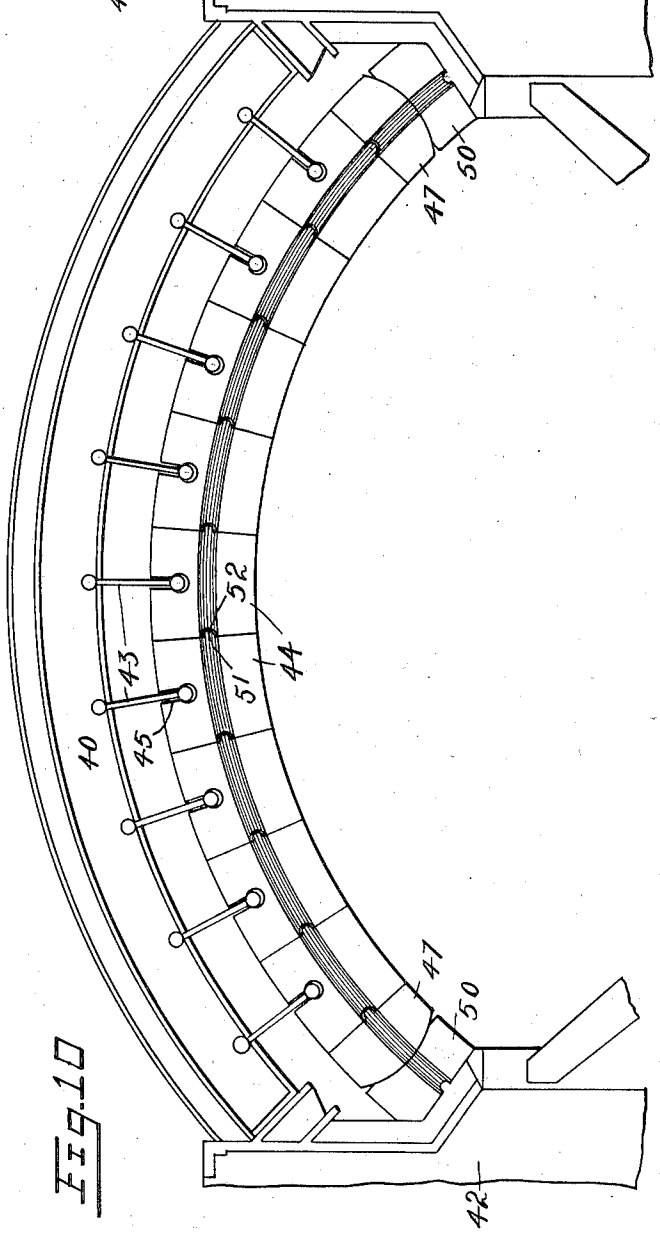


Fig. 10



Inventor:
William Lemb,
Wm. H. Reid.

UNITED STATES PATENT OFFICE.

WILLIAM LEMB, OF BROOKLYN, NEW YORK.

ARCH CONSTRUCTION FOR FURNACES.

1,275,709. Specification of Letters Patent. Patented Aug. 13, 1918.

Application filed October 24, 1917. Serial No. 198,347.

To all whom it may concern:

Be it known that I, WILLIAM LEMB, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Arch Constructions for Furnaces, of which the following is a specification.

The object of the present invention is to provide an improved construction for the arch or roof of a furnace for boilers or combustion chambers for any desired purpose; wherein the blocks or bricks forming the exposed portion of the arch or roof can be removed and readily replaced without tearing down the supporting members; and in which the supporting members can be readily replaced by the removal of only a few of the units composing the structure. A further object of the invention is to cause it to be adapted to either a flat arch or roof, or a curved one in the form of a true arch.

Another object of the invention is to provide an improved form of end member for the arch or roof that comprises one of the units of the system, and is not dependent upon special retaining means.

In the accompanying drawings showing embodiments of my invention, Figure 1 is a section through the top wall of the combustion chamber. Fig. 2 is a transverse section on the line 2—2 of Fig. 1. Fig. 3 is an end elevation of the parts shown in Fig. 1. Fig. 4 is a side view and Fig. 5 an end view of one of the hangers. Fig. 6 is a side view and Fig. 7 an end view of a special hanger. Fig. 8 shows one of the intermediate blocks and Fig. 9 shows an end block. Fig. 10 is a modification showing a curved roof for the formation. Fig. 11 is a fragmentary view of two adjacent beams for the arched roof. Fig. 12 shows one of the intermediate blocks, and Fig. 13 shows an end block. Fig. 14 shows one of the supporting blocks at the ends of the arch. Fig. 15 shows the complementary block for the latter; and Figs. 16 and 17 show the hanger for this form.

In the arrangement shown in Figs. 1–9, I show a number of beams extending parallel and supported at their ends by suitable walls 16. As shown, I provide a series of beams 17 that have ledges on their bottom, being substantially T-shaped and inverted. These are placed a comparatively small distance apart for the purpose of permitting the opposed ledges in adjacent beams to receive and support suitable hangers 19. These hangers are in the form of webs having lugs projecting at the top to rest on the ledges of the beams as shown, and the hangers are also provided with means at the lower portion for engagement with the blocks or bricks forming the top of the furnace chamber. As shown, the hangers comprise a web portion 20 having a rib or bar 21 at the top projecting at each end, the web being narrower than the distance apart of the beams, so that the hanger may be passed up between the beams and then turned transversely thereto, to cause the extremities of the bars 21 to engage the ledges of the beams and support the hangers. As shown, the hangers also have a rib or bar 22 at the lower edge that may correspond with the bars 21 and hence the hangers are reversible so that either end may engage the beams to support the hangers.

The bricks that are supported solely by these hangers, have a suitable slot therein. The brick 23 is shown as having a slot 24 in its upper edge that is cylindrically enlarged at the bottom as shown at 25. By this arrangement the brick can be caused to slide on the bar 22 of the hanger, and be suspended thereby, because of the bar 22 being slightly smaller than the slot 24, yet being of a size to slide in the enlarged portion 25. The hangers 19 are suspended from the beams a distance apart equal to the width of the bricks 23, and they are preferably arranged in alinement across the beams. By this means a row of the hangers extend in substantially the same vertical plane, and the bricks can be assembled and removed by sliding them lengthwise of the hanger until they contact on their side walls. It will be observed from Fig. 2 that each brick will have a slight rocking movement on the hanger by reason of the loose fit of the hanger bar in its slot. This is to allow for expansion of the hangers and of the construction generally, that might otherwise tend to fracture the brick. Furthermore, the cylindrical form of the projecting ends or bar 21 of the hanger permits a slight rocking movement on the beam, to further accommodate for expansion and distortion of the supports.

At the ends of alining rows of bricks and hangers I preferably arrange a special form

of hanger, shown separately in Figs. 6 and 7. This hanger has a hook portion 26 at the upper end, and a rib or bar 27 on the lower edge corresponding with the lower bar 22 of the hanger 19. The hook portion 26 rests on the flange of the beam, that may have an upwardly projecting rib 28 as shown in Fig. 1, that is engaged by the hook portion and thereby held in place. This hanger when placed on the beam 171 will abut the adjacent hanger 19, and is adapted to receive the end block 29, whose slot 30 does not extend all the way across the block, but only about one half of the distance. The adjacent brick 23 may receive the extremity of the rib 27 of this hanger as shown and serves to strengthen the supporting means. At the front end of the furnace a T-beam 31 is shown, opposite which is an L-beam 32. Between these rest a set of hangers 33 similar to the hangers 19, that support bricks 34 and 35 suitably slotted for this purpose. A hanger 36 is also provided similar to the hanger shown in Fig. 6, of hook formation, that is supported from the beam 31 having the rib on its ledge for this purpose. This hook hanger serves to support the block 37. It will be observed that these three blocks 34, 35 and 37 are of a step formation, but obviously any shape of brick could be employed, as long as they are suspended from the hangers by proper slotted portions.

With an arrangement of this character, should any of the blocks become broken or fall out, it is only necessary to remove the blocks between such place and one end of the alining row of hangers, then slide out the other blocks and slide in a new block, when the other blocks can be replaced. Or else merely the end block can be removed and the adjacent block advanced in place of the missing block, then the other blocks are slid along and one new block inserted, and then the end block replaced. Should a hanger become damaged or broken, it is only necessary to remove the blocks supported thereby and then the hanger can be turned at an angle with the beams and removed. Obviously a new hanger can be inserted in the same manner without disturbing any of the adjacent hangers or any of the blocks except those supported by this hanger, and possibly the blocks from that hanger to the end of the row. It will be seen that the beams do not have to be disturbed to make such replacements. It will be understood that no special fastening or securing means are employed such as bolts or pins, as the hangers are merely inserted and turned to rest on the ledges of the beams, and then the blocks slide into place, that will prevent displacement of the hangers, and hold them in their proper positions.

In Figs. 10–15, I show a very similar arrangement, but the roof or wall is of an arch formation. In this structure I provide beams 40 of T-shape, that are curved or arched from end to end, and rest on supporting walls 41 and 42. These beams are placed in a parallel series, and serve to support hangers 43 similar to the hangers 19 described, that rest on the projecting ledges of the adjacent beams. These hangers are arranged in alinement transversely of the beams, and serve to support blocks 44 provided with slots 45 therein enlarged at the lower portions, as shown in Fig. 12. These blocks have their contacting side faces inclined, that is, are of wedge shape, and the lower face is preferably slightly concave corresponding with the curvature of the arch. The end blocks 46 may have their slots extending only part way across, and hook-shaped hangers may be employed similar to those used with the straight form of furnace roof.

At the sides of the arch, special bricks may be provided to allow a slight rocking movement. As shown, I provide a divided block having a section 47 with a convex face 48 on one side, that engages the concave face 49 of the adjacent section 50, the latter resting on the wall 41. A similar pair of sections are shown on the other end of the arch. These two sections can have a slight movement one on the other and allow for expansion and contraction of the arch. With this arch arrangement, any of the blocks, or any of the hangers can be replaced with the same facility as with the other described arrangement.

It will be further observed that the blocks 23 and 29 are provided with tongues 38 and grooves 39 on the contacting side faces, that interlock and prevent passage of smoke and gases between the blocks. The wedge-shape blocks 44 and 45 are also provided with similar tongues 51 and grooves 52 in their side faces.

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

1. In a boiler furnace, the combination with a pair of opposed supporting walls, of a series of parallel spaced beams flanged at the lower edge and extending between the walls, sets of hangers between the beams, each comprising a flat web with a rib on the top and bottom edge projecting beyond the web at the ends, said projecting ribs resting on the beam flanges whereby the hangers are suspended in alining rows transverse to the beams, and blocks each having a slot in the upper edge that is enlarged in the block whereby each block may slide on the lower rib of the hanger and be suspended thereby to form a closed top wall for the furnace.

2. In a boiler furnace, the combination with a pair of opposed supporting walls, of a series of parallel spaced beams flanged at

the lower edge and extending between the walls, sets of hangers between the beams, each comprising a flat web with a cylindrically rounded bar on the top and bottom edge projecting beyond the web at the ends, said projecting bars resting on the beam flanges whereby the hangers are suspended in alining rows transverse to the beams, and blocks each having a slot in the upper edge that is cylindrically enlarged in the block considerably larger than said hanger bar, whereby each block may slide on the lower bar of the hanger and be suspended thereby to form a closed top wall for the furnace, said block having a swinging movement on the bar.

3. In a boiler furnace, the combination with a pair of opposed supporting walls, of a series of parallel spaced beams flanged at the lower edge and extending between the walls, sets of hangers between the beams, each comprising a flat web with a rib on the top and bottom edge projecting beyond the web at the ends, said projecting ribs resting on the beam flanges whereby the hangers are suspended in alining rows transverse to the beams, blocks each having a slot in the upper edge that is enlarged in the block whereby each block may slide on the lower rib of the hanger and be suspended thereby to form a closed wall for the furnace, and a special hanger comprising a web having a hook portion at the top adapted to rest on the beam flange and a bar at the lower portion arranged to aline with said hanger bars, whereby to support a slotted block substantially as set forth.

4. In a boiler furnace, the combination with a pair of opposed supporting walls, of a series of spaced beams flanged at the lower edge and extending between the walls, in the form of parallel arches, sets of hangers between the beams, each comprising a flat web with a rib on the top and bottom edge projecting beyond the web at the ends, said projecting ribs resting on the beam flanges whereby the hangers are suspended in alining rows transverse to the beams, and wedge-shaped blocks each having a slot in the upper edge that is enlarged in the block whereby each block may slide on the lower rib of the hanger and be suspended thereby to form a closed arched top wall for the furnace.

5. In a boiler furnace, the combination with a pair of opposed supporting walls, of a series of parallel spaced beams flanged at the lower edge and extending between the walls in the form of parallel arches, sets of hangers between the beams, each comprising a flat web with a cylindrically rounded bar on the top and bottom edge projecting beyond the web at the ends, said projecting bars resting on the beam flanges whereby the hangers are suspended in alining rows transverse to the beams, and wedge-shaped blocks each having a slot in the upper edge that is cylindrically enlarged in the block considerably larger than said hanger bar, whereby each block may slide on the lower bar of the hanger and be suspended thereby to form a closed arched top wall for the furnace, also whereby each block is arranged to swing on the bar.

6. In a boiler furnace, the combination with a pair of opposed supporting walls, of a series of parallel spaced beams flanged at the lower edge and extending between the walls, sets of hangers between the beams, each comprising a flat web with a lug on the top edge projecting beyond the web at the ends, said projecting lugs resting on the beam flanges whereby the hangers are suspended in alining rows transverse to the beams, lugs on the lower edges of the hangers, and blocks each having a ledge portion arranged to engage said latter lugs whereby blocks may be suspended on the lower lugs of the hanger in alining rows transverse to the beams to form a closed top wall for the furnace.

7. In a furnace arch construction, the combination with a series of wedge-shaped blocks arranged in the form of an arch, and supporting means for the extremities of the arch, of an end block for each end of the arch, that is composed of complemental sections engaging on their radial faces of the sections, one section having a cylindrical engaging face, and the other section being similarly inwardly curved on its engaging face, whereby the sections may have a relative movement in a radial direction.

8. In a furnace roof construction, the combination with supporting members, of hangers each provided with free overhanging end portions resting by rounded bottom faces on opposed supports respectively whereby each hanger can freely swing to each side of its longitudinal axis and blocks detachably carried by the hangers.

9. In a furnace roof construction, the combination with supporting members, of hangers each provided with free overhanging end portions resting by rounded bottom faces on opposed supports respectively whereby each hanger can freely swing to each side of its longitudinal axis, and blocks detachably carried by the hangers and having a free swinging movement thereon transverse to the longitudinal axes of the hanger and block.

Signed this 22nd day of October, 1917.

WILLIAM LEMB.