April 21, 1925. 1,534,281

C. N. MORGAN ET AL

ARCH FOR BOILER FURNACES

Filed April 13, 1923 2 Sheets-Sheet 1

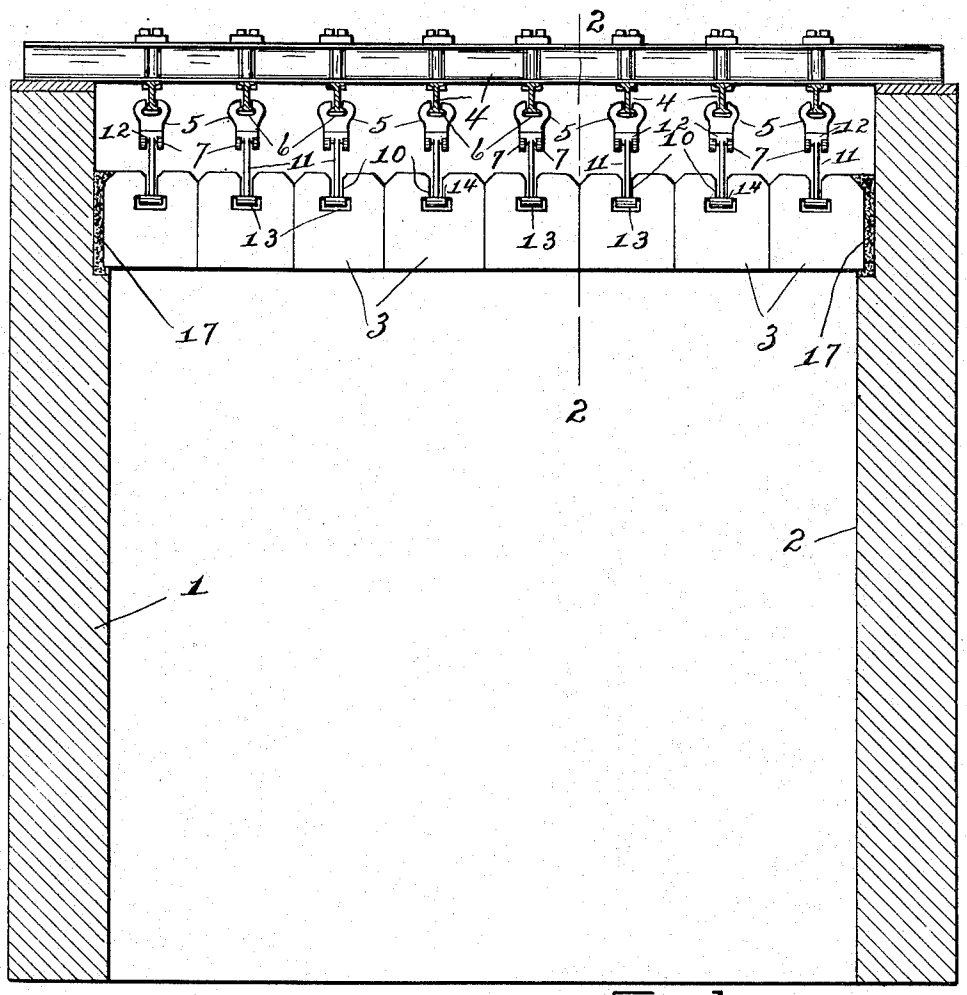


Fig. 1

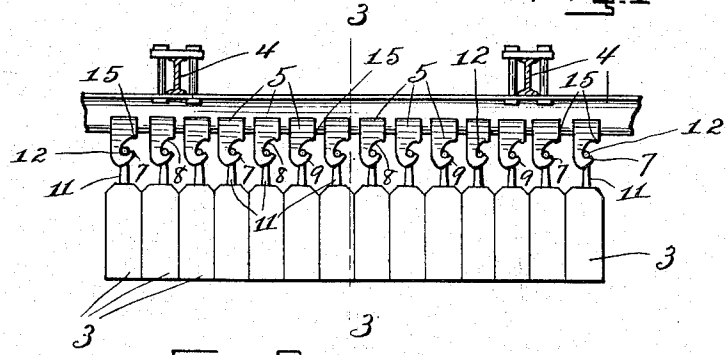


Fig. 2

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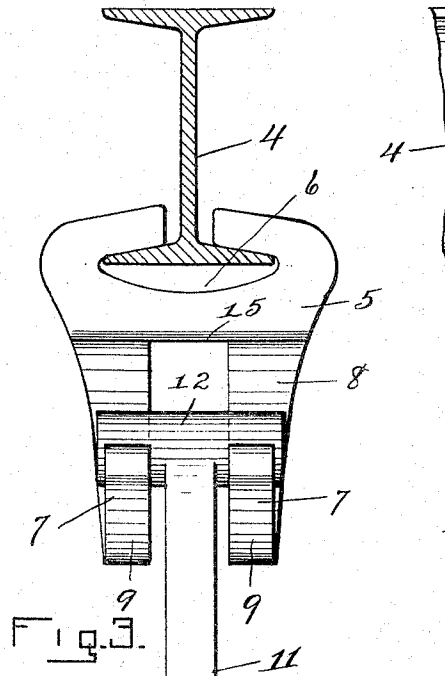


Fig. 3.

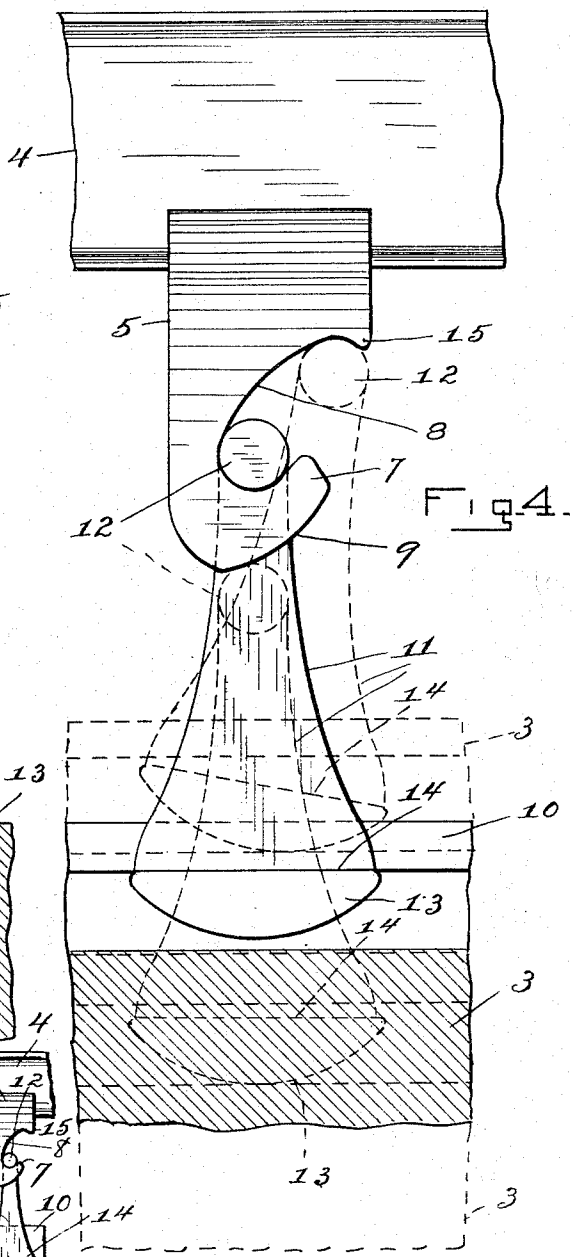


Fig. 4.

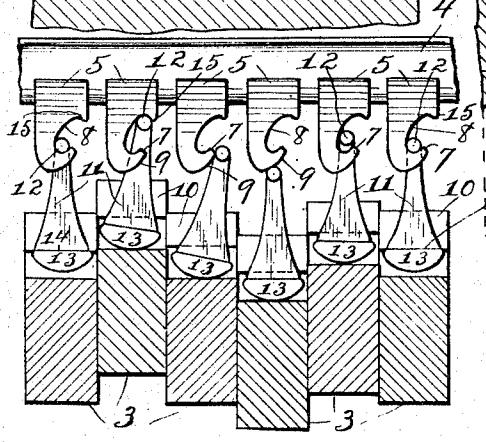


Fig. 5.

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Patented Apr. 21, 1925. 1,534,281

UNITED STATES PATENT OFFICE.

CHARLES N. MORGAN, OF ALBANY, AND ANDREW L. KEELER, OF TROY, NEW YORK.

ARCH FOR BOILER FURNACES.

Application filed April 13, 1923. Serial No. 631,935.

To all whom it may concern:

Be it known that we, CHARLES N. MORGAN and ANDREW L. KEELER, citizens of the United States, and residing, respectively, at Albany, in the county of Albany and State of New York, and at Troy, in the county of Rensselaer and State of New York, have invented new and useful Improvements in Arches for Boiler Furnaces, of which the following is a specification.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

The principal object of the invention is to facilitate the removal from and insertion in a furnace arch of arch-blocks severally without interfering with neighboring arch-blocks.

Other objects will appear in connection with the following description.

Fig. 1 of the drawings is a vertical cross section of a boiler furnace structure having an arch made in accordance with our invention.

Fig. 2 is a vertical longitudinal section of the same taken on the broken line 2—2 in Fig. 1.

Fig. 3 is a vertical section taken on the broken line 3—3 in Fig. 2, on an enlarged scale.

Fig. 4 is a view similar to Fig. 2 on an enlarged scale partly broken away and showing only one hanger, one block-supporting link and a portion of one of the blocks.

Fig. 5 is a view similar to Fig. 2 broken away illustrating the manner in which the locking links are actuated in inserting and removing the arch-blocks.

Referring to the drawings wherein the invention is shown in preferred form, 1 and 2 are side walls of a furnace structure between which walls is mounted an arch made up of a plurality of arch-blocks, 3, made of refractory material such as fire-brick.

The arch-blocks are supported by and below a beam or beams, 4, preferably in the form of an I-beam which may be mounted in any known manner directly or indirectly upon the furnace walls.

Mounted upon and depending from the I-beam, 4, are a plurality of hangers, 5, each having in its upper side an opening, 6, undercut on opposite sides to engage the bottom flanges of the I-beam, said hangers being slidably adjustable longitudinally of the I-beam.

Each of the hangers, 5, thus depending from the supporting I-beam, 4, has an inclined surface, 8, overhanging and extending outwardly beyond the hooks, 7, on its lower end. The bottoms of the respective hooks are formed with upwardly and outwardly inclined surfaces, 9, and the hooks open laterally as shown.

The arch-blocks, 3, are severally provided in their upper side with an opening, 10, which is undercut preferably on both sides, in which case the opening is of inverted T-shape in cross section. The arch-blocks have plain vertical sides, and are assembled side by side in forming the arch.

The several arch-blocks are supported by a hanger, 5, or a plurality of said hangers alined longitudinally of the block, being thus supported by means of links, 11, severally insertible in the space intervening between the pair of hooks on the hanger and having a T-head, 12, engageable with the respective hooks, 7, on the hanger through the lateral openings in the hooks. The lower ends of the links are engageable with the respective blocks with freedom of movement to permit the upper ends of the links to be engaged with, and disengaged from, the respective hooks through the lateral openings in the hooks.

The links, 11, severally have on their lower ends a T-head, 13, engageable with the respective undercut portions of the opening, 10, in the upper side of the supported block.

The lower end or T-head portion of the several links, 13, is convexed on its lower side, and is rockably engageable with the bottom of the respective opening, 10, in the block.

The upper side of the lower T-head portion of the link is preferably flat as shown at 14, whereby it forms a stable and substantial support by engagement with the undercut portion of the opening in the block.

The lower end of the several links, 11, is of sufficient weight to render the link rockably self-righting.

In inserting a block in a vacant space in the arch, the block having the desired number of links, 11, rockably mounted in the

opening in its upper side is forced upward between neighboring blocks of the arch until the upper T-heads of the links, 11, engage the bottom inclined surfaces, 9, on the respective hooks, 7.

Further upward movement of the block causes the T-heads on the respective links to be deflected outwardly with respect to the hooks on the hangers, which deflection is permitted by the rocking movement of which the links are capable.

The upward movement of the block being continued until the upper T-head portion, 12, of the several links, 11, reaches the mouth of the respective hooks, 9, the link is free to right itself causing said T-head to automatically enter the hook or hooks of the hanger, whereupon the block will be supported by said links from the hanger and the supporting I-beam, 4.

To remove a block mounted in the arch, the block is forced upward causing the upper ends of its supporting links, 11, to engage the upwardly and outwardly inclined surface or surfaces, 8, on the hanger which causes the upper T-heads of the links to pass outward beyond the entrance to the hook or hooks of the hanger due to the rockable mounting of the lower end of the links upon the block, whereupon by a quick downward movement of the block, and the links in engagement with the block, the upper T-head portions of the links can be drawn downward outside of and past the mouth of the hooks on the hangers, leaving the block free from its connection with the hangers.

If preferred, the block to be removed may be broken and removed piecemeal and the links, 11, thereafter removed preparatory to the insertion of a new block.

We have shown the inclined surface, 8, on the hanger, 5, terminating at its outer end in a bead or rib, 15, the engagement of which by the upper T-head on the link, 11, can be detected by the sense of feeling as the block is raised to indicate that said T-head has reached the mouth of the hook or hooks.

Between each end-block of the arch and the neighboring side-wall, 1 or 2, of the furnace is interposed a body of yielding refractory material, 17, such as asbestos to provide for expansion and contraction of the arch.

We do not wish to be limited to the constructions shown and above described, as, for certain purposes of the invention, various changes may be made in the form and arrangement of various parts of the device without departing from the spirit of the invention.

What we claim as new and desire to secure by Letters Patent is:

1. In a furnace having an arch, the combination with a support; of a hanger depending from said support said hanger having on its lower end a laterally open hook and having an inclined surface extending above and outwardly beyond the opening to the hook; an arch-block provided in its upper side with an undercut opening; a link detachably connecting said block with said hanger, said link having on its upper end a member engageable with the hook of the hanger, the upper end of said link being engageable with said inclined surface on the hanger, said link being rockably engageable with said opening in the block and having a member engageable with the undercut portion of said opening.

2. In a furnace having an arch, the combination with a support; of a laterally open hook mounted upon said support and having an upwardly and outwardly inclined bottom surface, and an inclined surface extending above and outwardly beyond the opening to the hook; an arch-block; a link detachably connecting said block with said hook, said link having on its upper end a member engageable with said inclined surfaces and engageable with, and disengageable from, the hook through said lateral opening.

3. In a furnace having an arch, the combination with a support; of a hanger depending from said support, said hanger having on its lower end a hook; an arch-block provided in its upper side with an undercut opening; and a link detachably connecting said block with said hanger, said link having on its upper end a member engageable with the hook on said hanger and on its lower end a member engageable with the undercut portion of the opening in the block, the lower end of the link being convexed and rockably engageable with the bottom of said opening and of sufficient weight to render the link self-rightable.

4. In a furnace having an arch, the combination with a support; of a hanger depending from said support, said hanger having on its lower end a hook; an arch-block provided in its upper side with an undercut opening; and a link detachably connecting said block with said hanger, said link having on its upper end a member engageable with the hook on said hanger and on its lower end a member having a flat surface engageable with the undercut portion of the opening in the block, the lower end of the link being convexed and rockably engageable with the bottom of said opening and of sufficient weight to render the link self-rightable.

5. In a furnace having an arch, the combination with a support; of a hanger depending from said support, said hanger having on its lower end a pair of hooks with an intervening space; an arch-block provided in its upper side with an opening undercut

on opposite sides; and a link detachably connecting said block with said hanger, said link being insertible between said hooks on the hanger and having a T-head engageable with the respective hooks, and having on its lower end a T-head engageable with the respective undercut portions of the opening in the block, the lower end of said link being convexed and rockably engageable with the bottom of said opening in the block, and of sufficient weight to render the link self-rightable.

6. In a furnace having an arch, the combination with a support; of a hanger depending from said support, said hanger having on its lower end a hook, the bottom of said hook being upwardly and outwardly inclined; an arch-block provided in its upper side with an undercut opening; and a link detachably connecting said block with said hanger, said link having on its upper end a member engageable with the inclined bottom of said hook and seatable in said hook, said link having on its lower end a member engageable with the undercut portion of the opening in said block, the lower end of said link being convexed and rockably engageable with the bottom of said opening and of sufficient weight to render the link self-rightable.

7. In a furnace having an arch the combination with a support; of a hanger depending from said support, said hanger having on its lower end a pair of hooks with an intervening space, the bottom of said hooks being upwardly and outwardly inclined; an arch-block provided in its upper side with an opening undercut on opposite sides; and a link detachably connecting said block with said hanger, said link being insertible in the space between said hooks and having on its upper end a T-head engageable with the inclined bottoms of the respective hooks and seatable in the respective hooks, said link having on its lower end a T-head engageable with the respective undercut portions of the opening in said block, the lower end of said link being convexed and rockably engageable with the bottom of said opening and of sufficient weight to render the link self-rightable.

8. In a furnace having an arch, the combination with a support; of a hanger depending from said support, said hanger having on its lower end a hook, the bottom of said hook being upwardly and outwardly inclined, said hanger having an inclined surface extending above and beyond said hook; an arch-block provided in its upper side with an undercut opening; and a link detachably connecting said block with said hanger, said link having on its upper end a member engageable with the inclined bottom of said opening and seatable in said hook, said link having on its lower end a member engageable with the undercut portion of the opening in said block, the lower end of said link being convexed and rockably engageable with the bottom of said opening and of sufficient weight to render the link self-rightable.

9. In a furnace having an arch, the combination with a support; of a hanger depending from said support, said hanger having on its lower end a pair of hooks with an intervening space, the bottom of said hooks being upwardly and outwardly inclined, said hanger having an inclined surface extending above and outwardly beyond said hooks; an arch-block provided in its upper side with an opening undercut on opposite sides; and a link detachably connecting said block with said hanger, said link being insertible in the space between said hooks and having on its upper end a T-head engageable with the inclined bottoms of the respective hooks and seatable in the respective hooks, said link having on its lower end a T-head engageable with the respective undercut portions of the opening in said block, the lower end of said link being convexed and rockably engageable with the bottom of said opening and of sufficient weight to render the link self-rightable.

In testimony whereof, I have hereunto set my hand this 9th day of April, 1923.

CHARLES N. MORGAN.
ANDREW L. KEELER.