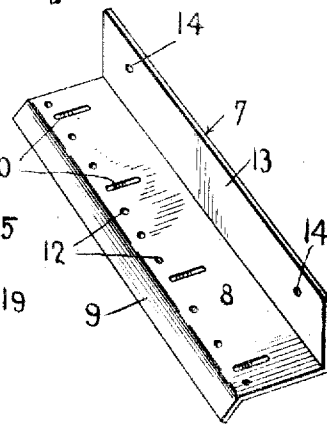
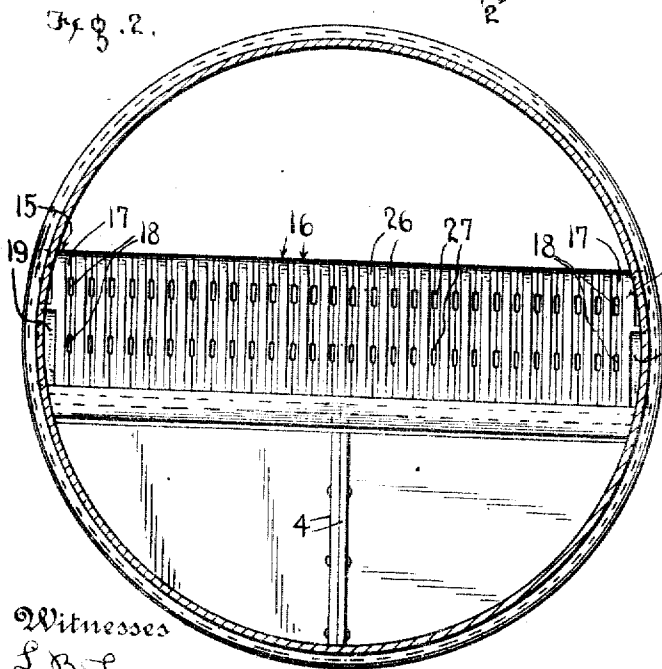
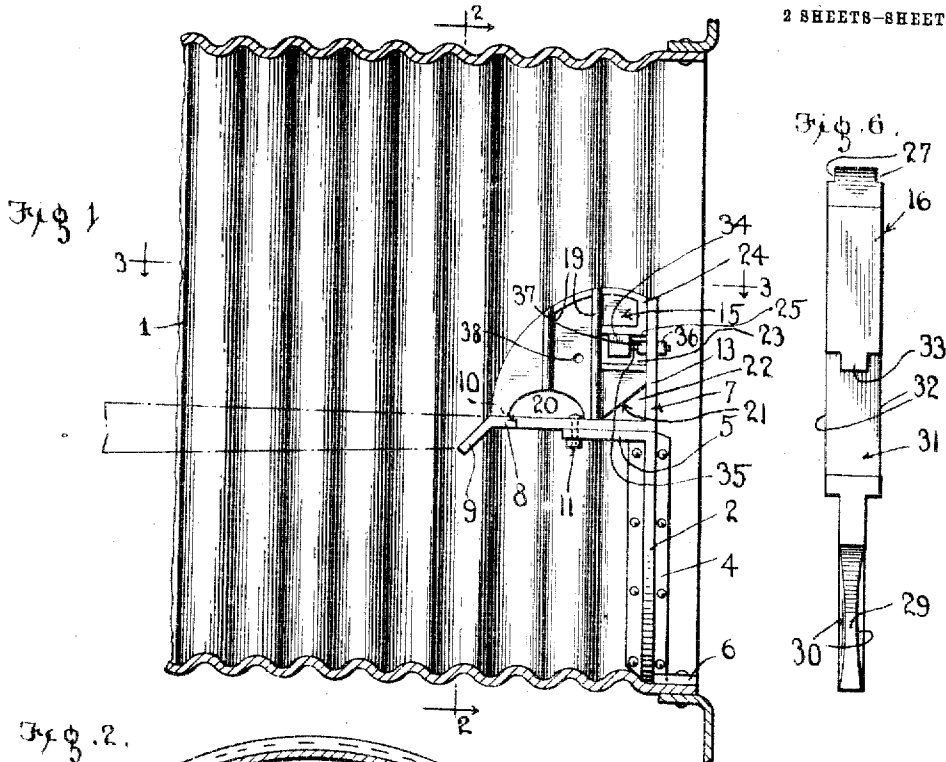


1,024,301.

Patented Apr. 23, 1912.

2 SHEETS-SHEET 1.



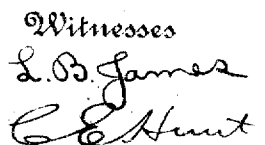
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2 SHEETS-SHEET 2.



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UNITED STATES PATENT OFFICE.

ROBERT WAGER, OF JERSEY CITY, NEW JERSEY.

BRIDGE-WALL FOR FURNACES.

1,024,301.

Specification of Letters Patent.

Patented Apr. 23, 1912.

Application filed August 10, 1911. Serial No. 643,424.

To all whom it may concern:

Be it known that I, ROBERT WAGER, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Bridge-Walls for Furnaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in bridge walls for furnaces.

The primary object of the invention is to provide an improved construction of bridge wall adapted to take the place of the usual fire brick wall and to be employed in connection with or attached to the back casting which formerly supported the brick wall, thereby enabling the invention to be easily installed at a very small cost in furnaces already built and in use.

Another object is to provide a bridge wall of this character formed of a plurality of detachably connected sections any one of which may be quickly and easily removed without removing any part of the back plate or supporting casting or disturbing any other sections and which are provided with ventilating means whereby air is permitted to circulate between and around the sections and to enter the fire box.

With these and other objects in view, the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings: Figure 1 is a central vertical longitudinal section through a portion of a boiler furnace illustrating the invention, the latter being shown in side elevation; Fig. 2 is a cross sectional view on the line 2-2 of Fig. 1; Fig. 3 is a horizontal sectional view on the line 3-3 of Fig. 1, showing a portion of the sections or members of the wall removed; Fig. 4 is a detail perspective view of one of the end members or sections of the wall; Fig. 5 is a similar view of one of the intermediate sections of the wall; Fig. 6 is an outer edge view of one of the intermediate sections of the wall; Fig. 7 is a detail perspective view of the back casting or wall supporting member; Fig. 8 is a similar view of the clamping bar for de-

tachably securing the sections of the wall to the back casting or supporting member.

Referring more particularly to the drawings, 1 denotes a portion of a boiler furnace, here shown as of cylindrical form and having its walls corrugated transversely. In the lower portion of the furnace near the rear end thereof is secured a bridge wall supporting plate 2, formed in segmental sections, the outer curved edges of which fit against the inner surface of the sides of the furnace while their inner engaging edges are provided with laterally projecting flanges 4 which are adapted to be bolted together as shown. On the upper edge of the plate 2 is formed a right angular inwardly projecting shelf or bracket 5 which extends transversely and in a horizontal position across the furnace. Secured to the inner side of the lower portion of the furnace is a fastening plate 6 having formed therein a notch which is adapted to receive the flanges 4 on the outer side of the plate 2 as shown which, with the corrugations of the furnace walls, hold the plate 2 in position.

Adjustably secured to the shelf or bracket 5 upon the upper edge of the plate 2 is a right angularly formed back or bridge supporting member or casting 7 on the edge of the horizontal portion 8 of which is formed a grate bar supporting flange 9, said flange being disposed at a suitable angle to receive the angular ends of the grate bar as shown. This adjustability of the horizontal portion 8 of the member or casting 7 with relation to the shelf or bracket 5 of the plate 2, permits of the adjustment of the flange 9 to fit against the angular ends of the grate bars of greater or less length. In the horizontal portion 8 of the casting is formed a series of transversely disposed slots 10 with which are engaged fastening bolts 11, said bolts being inserted through suitable apertures in the shelf or bracket 5 of the plate 2 whereby said portion 8 of the back casting is adjustably secured to the shelf. In the horizontal portion 8 of the casting between the slots are also preferably formed a suitable number of perforations or vertical air passages 12 through which air is permitted to circulate between the sections of the bridge wall as will be hereinafter more fully described. Formed in the vertical portion 13 of the back cast-

ing adjacent to the ends thereof are bolt holes 14 the purpose of which will also be hereinafter described.

The parts described in the foregoing may be of the usual or any suitable construction and the back casting 7 may have been formerly employed for supporting a fire brick bridge wall.

My improved bridge wall comprises end or outer sections 15 and a series of intermediate sections 16. These sections 15 and 16 are in the form of substantially segmental plates and the end or head sections 15 have formed on their inner sides segmental curved flanges 17 in which are formed upper and lower notches 18. On the outer side of the sections 15 are formed vertically disposed laterally projecting ribs 19 to enter the corrugation of the boiler for an obvious purpose, as clearly shown in Fig. 2. In the lower edges of the sections 15 are formed recesses 20 while the inner corners of said sections are cut off at an angle as at 21 to form spaces 22 between the same and the adjacent parts of the back casting as clearly shown in Fig. 1 of the drawings. The recesses 20 and the spaces 22 provide for a free circulation of air between the lower edges of the sections and the adjacent parts of the back casting.

In the inner edges of the sections 15 are formed rectangular notches 23 and the edges of the notches 23 and the adjacent inner and upper edges of the sections or plates 15 are provided with laterally projecting flanges 24 which extend on both sides of the plates or sections as shown. On the flanged upper edges of the recesses 23 adjacent to the inner edge of the upper portion of the plates or sections are formed stop lugs 25 the purpose of which will be hereinafter described.

The intermediate sections or plates 16 have formed on each side adjacent to the curved outer edge thereof curved spacing ribs 26 in each of which is formed a series of notches 27 which when the sections or plates are assembled will be brought into alinement as seen in Fig. 3 and thus form air passages through which air is permitted to circulate between the plates or sections and out into the fire box of the furnace. In the lower edge of the sections or plates 16 are formed segmental notches 28 while the inner corners of said plates or sections are cut off as at 29 to form spaces between the inner lower portions of the sections and the adjacent portions of the back casting. These spaces together with the spaces formed by the recesses 20 provide for a free circulation of air through the holes 19 in the bottom of the back casting and beneath the sections or plates of the bridge wall. By thus permitting of the free circulation of air the plates or sections are prevented from quickly burning out. In order to increase

the space between the plates or sections around the recesses or notches 28 and the cut off portions 29 I preferably recess the opposite sides of the plates or sections adjacent to these parts as shown at 30 in Fig. 5 of the drawings.

In the inner edges of the sections 16, Figs. 5 and 6, are formed notches 31 which correspond to the notches 23 of the end plates and on the edges of said notches 31 are formed laterally extending flanges 32 which project on opposite sides of the plates as shown. The flanges 32 form practically a continuation of the upper portion of the ribs 26 on the opposite sides of the sections. On the upper edges of the recess 31 adjacent to the inner edges of the plates are formed stop lugs 33 which correspond to and are for the same purpose as the lugs 25 hereinbefore referred to.

Arranged in the notches 23 and 31 and adapted to be engaged with the stop lugs 25 and 33 of the bridge wall is a section clamping bar 34 which extends the entire length of the bridge wall or through all of the sections thereof as shown. The bar 34 has arranged thereon adjacent to its ends laterally projecting clamping bolts 35 which are adapted to be inserted through the bolt holes 14 in the vertical portion of the back casting. On the outer ends of the bolts 35 are arranged clamping nuts 36 by means of which the bar 34 is drawn against the stop lugs 25 and 33 of the bridge walls or sections and the latter thus drawn back and clamped into operative engagement with the vertical wall of the back casting as clearly shown in Fig. 1 of the drawings. On the bolts 35 are also arranged jam nuts 37 whereby the bolts are locked after being adjusted to fasten the sections of the bridge wall in place. By thus fastening the sections of the bridge wall it will be readily seen that any of said sections may be quickly and easily removed by simply loosening the clamping nuts 36 and releasing the bar 34 whereupon the desired section may be lifted a sufficient distance to disengage the stop lug 25 or 33 thereon from between the clamping bar and adjacent part of the back casting whereupon the section may be slipped out and a new section inserted without disturbing any of the other sections or necessitating the removal of or interfering in any manner with the supporting plate 2 or the back casting 7.

In the sections are arranged transversely disposed apertures 38 which form air passages and which also serve as bolt holes with which if desired may be engaged section fastening bolts whereby one section may be fastened to the adjoining sections should the stop lugs 25 thereon fail to properly engage the space between the clamping bar 34 and the adjacent portion of the back casting.

In assembling the sections it will be noted

by reference to Fig. 3 of the drawings that the laterally projecting ribs 19 of the outer sides of the end sections of the bridge wall are engaged with the corrugated sides of the furnace and that this engagement of the ribs with the corrugations serves as an additional means for holding the bridge wall in place. The cut off inner corners 21 and 29 of the sections while ordinarily forming air spaces as herein described are also designed to permit the application of the bridge wall sections to back castings having angular or inclined rear walls.

By reason of the peculiar construction of my sectional bridge wall and the simple manner of mounting and fastening the sections, it will be noted that my invention may be installed in steam boilers now in use at a very small cost and with comparative ease. The peculiar construction of the fastening means for the sections of the wall enables the invention to be installed in boilers now in use without the necessity of removing the back casting of the boiler furnace. In fact, all that is necessary is to remove the ordinary fire brick and bore the two holes 14 in the back member or casting 8 which supports the wall. Because of the fact that it is unnecessary to alter or replace the back casting in the boiler furnace, it will be seen that my invention may be installed at a very low cost, in fact, the only cost being that of the plates or sections of the wall and the labor of removing the fire bricks and mounting the invention as above described. It will be further noted that the peculiar construction of the plates or sections of the wall permit of the free circulation of air through and around the wall so that the plates or sections are prevented from burning out, and the proper amount of air is supplied to the fire to insure perfect combustion of the fuel.

From the foregoing description taken in connection with the accompanying drawings the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as claimed.

Having thus described my invention, what I claim is:

1. In a boiler furnace, a transverse vertical bridge wall supporting plate provided at its upper end with a perforated horizontal, inwardly extending shelf, and a back casting having a vertical portion above and in substantially the vertical plane of the supporting plate, said back casting being also provided with a horizontal inwardly projecting portion resting on the shelf of the supporting plate having longitudinal slots, and bolts passing through these slots and the perforations of the horizontal shelf to adjustably and removably secure these parts together.

2. In a boiler furnace, a transverse vertical bridge wall supporting plate provided at its upper end with a perforated horizontal inwardly extending shelf, and a back casting having a vertical portion above and in substantially the vertical plane of the supporting plate, said back casting being also provided with a horizontal inwardly projecting portion resting on the shelf of the supporting plate having longitudinal slots, bolts passing through these slots and the perforations of the horizontal shelf to adjustably and removably secure these parts together, and vertical longitudinally disposed bridge wall sections resting upon the horizontal portion of the back section removably secured to the upper portion thereof and thereby adjustably and removably held with relation to the bridge wall supporting plate.

3. In a boiler furnace, a vertical transverse bridge wall supporting plate adapted to be secured to the furnace wall provided with an inwardly extending horizontal shelf, at its upper edge, a back casting having a vertical and a horizontal portion, the latter resting upon and removably and adjustably secured to the shelf and adapted to support the rear inner ends of the grate bars, and bridge wall sections arranged vertically side by side on the horizontal portion of the back casting and removably secured to the upright portion of said back casting.

4. In a boiler furnace provided with corrugated walls, a vertical transverse bridge wall supporting plate adapted to be secured to the furnace wall provided with an inwardly extending horizontal shelf at its upper edge, a back casting having a vertical and a horizontal portion, the latter resting upon and removably and adjustably secured to the shelf and adapted to support the rear inner ends of the grate bars, and bridge wall sections arranged vertically side by side on the horizontal portion of the back casting and removably secured to the upright portion of said back casting, the furnace wall being corrugated and the end sections of the bridge wall having vertical flanges adapted to fit into the corrugations of the wall.

5. In a boiler furnace, a vertical transverse bridge wall supporting plate adapted to be secured in the furnace and having a horizontal, inwardly extending shelf at its upper edge, a back casting having a horizontal portion resting upon and removably and adjustably secured to said shelf and shaped to support the rear inner ends of the grate bars, and a vertical portion in sub-

stantially the vertical plane of the supporting plate and provided with bolt holes, bridge wall sections arranged side by side resting upon the horizontal portion of the back casting and against the vertical portion thereof and provided with recesses in their rear edges and a depending lug in each recess, a single transverse clamping bar engaged in all of the recesses of the bridge wall sections inside of said lugs, and bolts projecting from the clamping bar out of the recesses and through the bolt holes of the vertical portion of the back casting.

6. As an article of manufacture, a bridge wall section comprising a cast plate of segmental shape formed with recesses in its

lower portion and laterally projecting flanges extending along its curved upper edge and formed with notches, the rear or outer end of the plate being formed with a rectangular recess to receive clamping means, and a lug formed on one wall of the said recess, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ROBERT WAGER.

Witnesses:

HARRY W. FARNHAM,
THOMAS W. CASEY.