

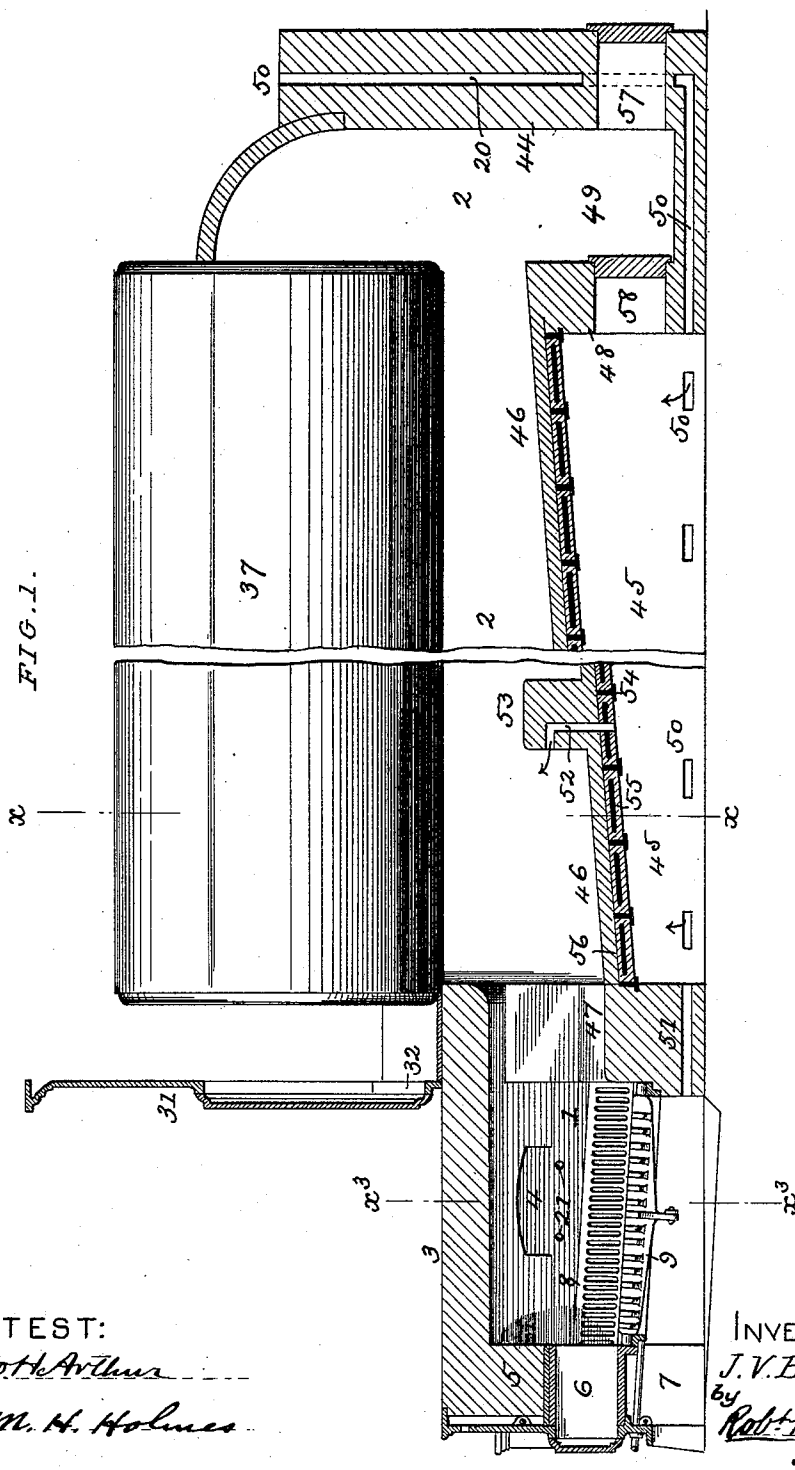
(No Model.)

3 Sheets—Sheet 1.

J. V. BURKE.
STEAM BOILER FURNACE.

No. 487,602.

Patented Dec. 6, 1892.



ATTEST:

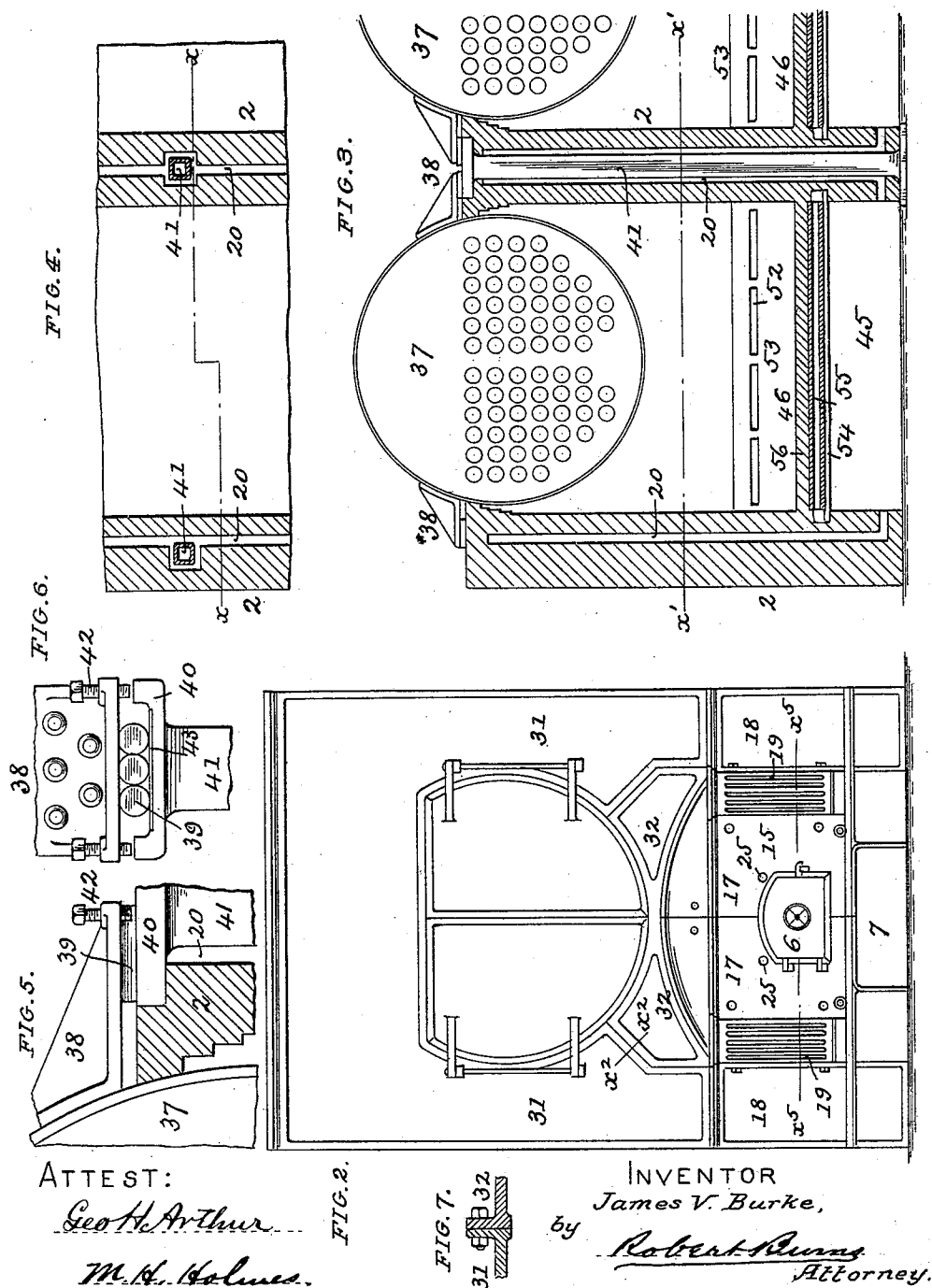
Geo. H. Arthur

M. H. Holmes

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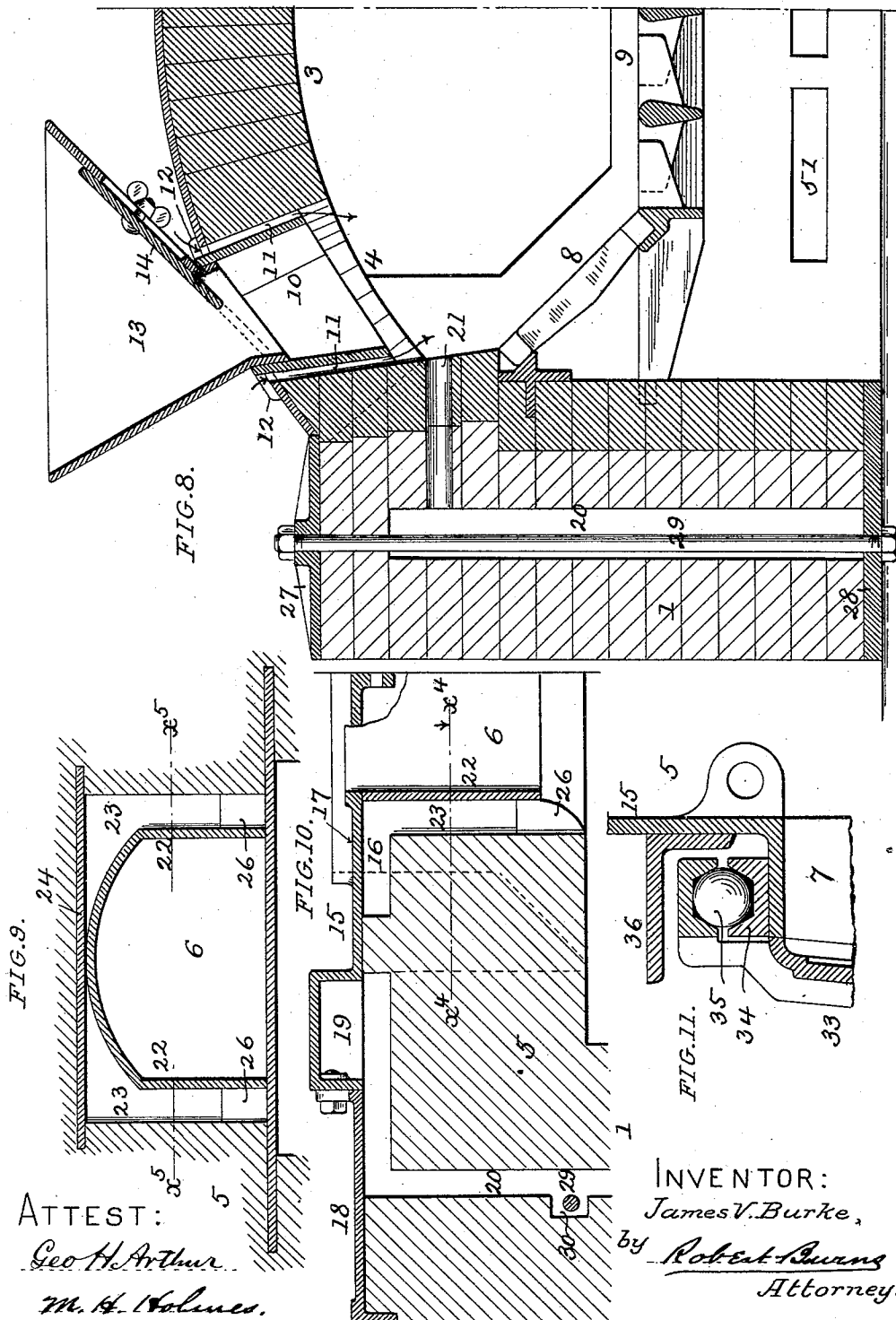
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UNITED STATES PATENT OFFICE.

JAMES V. BURKE, OF CHICAGO, ILLINOIS.

STEAM-BOILER FURNACE.

SPECIFICATION forming part of Letters Patent No. 487,602, dated December 6, 1892.

Application filed July 2, 1892. Serial No. 438,793. (No model.)

To all whom it may concern:

Be it known that I, JAMES V. BURKE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Steam-Boiler Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification.

The present invention relates to horizontal boiler-furnaces, and more especially to that type in which the furnace, of a basket-grate construction, is arranged forward of the boiler and is fed with fuel from the top through side pockets that feed the fuel onto the inclined side grates of the basket-grate formation, a suitable form of which forms the subject-matter of my companion application, Serial No. 451,797, the object of the present improvement being as follows: first, to afford an improved manner of supporting the boiler independent of the furnace-walls and in which the supporting columns and footings are kept cool and protected from injurious action due to the heat within the furnace fire-bed, &c., by the cooling action of air-currents that are drawn through the furnace-walls and around said columns, &c., to be discharged into the furnace to aid in the perfect combustion of the fuel; second, to provide an improved construction of the furnace proper whereby the supply of air required to effect a perfect combustion of the fuel is drawn in through the furnace-walls and parts, so as to keep the same from becoming overheated and destroyed and at the same time avoid the excessive radiation of heat usual to the present type of furnaces as heretofore constructed; third, to provide an improved sectional construction of the boiler-front, so as to admit of the ready removal of the portion of the same over the furnace-arch when access is required to same for repairing or rebuilding the same; fourth, to provide an improved sectional construction of the furnace-front whereby the air-currents entering the combustion-chamber at the forward end are more evenly distributed and the front can be readily and cheaply adapted to different widths of furnaces and adjusted to the proper position in an easy and

convenient manner; fifth, to afford an improved adjustable support for the boiler whereby its horizontal position can be adjusted to compensate for any irregular settling of its supports, &c., and an even and uniform bearing attained at the different points of support for the boiler; sixth, to provide an improved construction of sliding door for the ash-pit doorway to afford ready access to the same and with which a closure of the same, when required, can be effected in a very perfect manner; seventh, to provide an improved construction of the supporting side walls for the arched top of the furnace, so as to afford efficient means to resist the side-thrust of the arch and prevent lateral displacement of the top portion of such walls; eighth, to provide an improved construction of feed-hopper for the side fuel-feeding pockets to attain a regulated and controllable feed of the fuel onto the inclined side grates of the furnace. I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section of a steam-boiler furnace and setting embodying my present improvements; Fig. 2, a front elevation of the same; Fig. 3, a transverse section at line $x x$, Fig. 1; Fig. 4, a detail horizontal section at line $x' x'$, Fig. 3; Fig. 5, an enlarged detail side elevation of one of my improved supports for the boiler; Fig. 6, a detail sectional elevation of the same; Fig. 7, a detail section of the boiler-front at line $x^2 x^2$, Fig. 2; Fig. 8, an enlarged transverse section of the furnace at line $x^3 x^3$, Fig. 1; Fig. 9, a detail vertical section of the front wall of the furnace at line $x^4 x^4$, Fig. 10; Fig. 10, a detail horizontal section of the front wall of the furnace at line $x^5 x^5$, Figs. 2 and 3; and Fig. 11 an enlarged detail longitudinal section illustrating the sliding door for the ash-pit of the furnace.

Similar numerals of reference indicate like parts in the several views.

As represented in the drawings, the furnace proper consists of the side walls 1, usually an extension of the side walls 2 of the boiler-setting, arched top 3, having fuel-feeding pockets 4 at each side, and a front wall 5, hav-

ing the usual cleaning-doorway 6 and ash-pit doorway 7.

Within the furnace is the usual basket fire-grate, formed by inclined side grate-sections 8 and a central flat grate-section 9, preferably of the construction shown in my companion application, Serial No. 451,797—to wit, stationary inclined side grates 8 and longitudinally-extending rocking grate-sections forming the central grate 9.

In the present construction the fuel-feeding pockets 4 are provided with metal linings 10, ribbed or otherwise formed on their backs so as to leave air spaces or passages 11 between the same and the walls of the pockets, as shown, it being preferable to make the linings in sections and support them in position by top flanges or rims 12, that engage the rim or mouth of the pocket, as clearly illustrated in Fig. 8. This improved arrangement admits of a current of air passing into the interior of the furnace regardless of the condition or quantity of fuel contained in the pocket, and in consequence the lining is kept from being overheated at all times during the use of the furnace.

13 is a fuel-feeding hopper fitted in a fuel-pocket 4, with its inner flaring or oblique side provided with an adjustable slide 14, by means of which the capacity of the fuel-pocket can be increased or decreased in a ready and convenient manner to meet the different requirements between a very rapid and slow firing of the furnace.

The front wall 5 of the furnace is provided with the usual metal front 15, that forms the usual inclosed air-space 16 between the two, and in the present improvement said front is composed of main central sections 17 and outer sections 18, bolted together to form the complete front, the main sections being provided with hollow posts 19 to afford a ready means for the attachment of the side or outer sections 18, as shown in Fig. 10, and also afford a communication from the outer air to the air-space 20 in the side wall 1 of the furnace, and from which air is supplied to the fire-chamber at its sides to promote combustion through the air passages or orifices 21 in the side walls immediately beneath the fuel-feeding pockets 4. (See Figs. 1 and 8.)

The cleaning-doorway 6 in the front wall 5 of the furnace is formed by linings 22, between which and the brick work is left an air space or passage 23 for the passage of a current of air from the air-space 16 into the fire, the purpose being to protect such linings from the excessive heat of the fire by an inflow current of air. In the construction shown the air-space at the top of the lining is formed by a plate 24, that supports the brick-work over the doorway, 25 being openings or orifices in the furnace-front 15 for the double purpose of admitting air and forming peep-holes for viewing the condition of the fire. At the inner side of the front wall 5 the air-space will be bricked up, as shown at 26, so

as to prevent an entrance of the fuel into such space. (See Figs. 9 and 10.)

In order to strengthen the side walls 1 to better resist the excessive thrust of the arch due to alternate heating and cooling of the same, I tie the same together by means of cap and sole plates 27 and 28 and connecting tie-bolts 29, which bolts are arranged to pass down through the air-spaces 20 or an enlargement 30 thereof, so as to be in a measure isolated from the action of the heat within the furnace.

The boiler-front or breeching 31 is in the present improvement divided, so as to leave a central removable segment 32, capable of ready detachment and removal, so that free access is gained to the rear portion of the furnace-arch in repairing or replacing the same and without the necessity of disturbing the main portion of the breeching, as has heretofore been the case with this type of boiler-furnaces.

The ash-pit doorway 7 is closed by a sliding door 33, which in the present invention is hung from its top on a transverse track 34, extending the width of the furnace-front, by means of a roller or ball-bearing 35, as illustrated in Figs. 2 and 11, 36 being a shelf or bracket extending the transverse width of the furnace and arranged immediately above the track 34, so as to cover and protect the same and at the same time afford a convenient foot-rest for the fireman, &c., in reaching the top of the furnace and the firing-pockets 4 of the same.

The boiler 37 is supported in its proper horizontal position by lugs or brackets 38 on its sides, that in the present invention rest upon rollers 39 of a track 40, formed on the top of the supporting-posts 41, such brackets 37 being provided with jack-screws 42, by the adjustment of which the boiler can be raised, so as to admit of the insertion of a lining-piece 43 of the required thickness beneath the rollers 39 in effecting a proper adjustment or resting of the boiler in an even manner upon its different supports. The posts 41 are arranged in the air-spaces 20 of the side walls 2 of the boiler-setting or within an enlargement of the same where such air-space is of a restricted width, as illustrated in the drawings. Such air-spaces preferably extend the length of the side walls 2 and 1 and the rear wall 44 and are open to the air at different desired points, so as to obtain a uniform or other desired intake of air into the same at the different inlets, and the air will be discharged either directly into the fire-bed of the boiler or indirectly into the same through the air-chamber 45, extending beneath the fire-bed and formed by a horizontal floor or partition 46, extending the length of the boiler from the bridge-wall 47 to the wall 48 of the cinder-pit 49 at the rear of the boiler. Air is fed into this chamber through inlets 50 and discharged into the rear end of the ash-pit through passage 51 and into the fire-bed through the passage 52 in the secondary

bridge-wall 53. The horizontal floor or partition is formed by transverse beams 54, of an inverted-T form, that support hollow tiles 55, on which in turn is laid a facing of fire-brick or tile 56. With this arrangement of the horizontal partition 46 to form an air-space over the bottom of the boiler-settings, the footings, &c., of the same, as well as adjacent footings of adjacent walls or columns of the building, are isolated and protected from any injurious action due to an exposure to an excessive temperature from the boiler-furnace. Access is gained to the air-chamber 45 through the doorway 57 in the rear wall 44 and doorway 58 in the forward wall of the cinder-pit 49.

Having thus fully described my said invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an arched-top basket-grate furnace, of the fuel-pockets 4 at the opposite sides of the furnace and removable linings 10, arranged within the fuel-pockets to form air-spaces 11 and provided with top flanges or rims 12, by which they are supported in place, substantially as set forth.

2. The combination, in an arched-top basket-grate furnace, of the side wall 1, cap and sole plates 27 and 28, and tie-bolt 29, arranged within an air-space in the wall, substantially as set forth.

3. The combination, in an arched-top basket-grate furnace, of the side wall 1, cap and sole plates 27 and 28, and tie-bolt 29, arranged within an enlargement of the air-space in the wall, substantially as set forth.

4. The combination, in an arched-top basket-grate furnace and its side fuel-pockets 4, of the front wall 5 and metal front plate 15, formed with hollow posts 19, with the side walls 1, having an air-space 20 and air passages or orifices 21, located immediately beneath the pockets, substantially as set forth.

5. The combination, in an arched-top basket-grate furnace, of the front wall 5 and metal front plate 15, forming the inclosed air-space 16, and the doorway-linings 22, arranged within the front wall 5, so as to form air space or passage 23 between the lining and the front wall, the metal front plate 15 being provided with orifices 25, in line with the air-space 23, substantially as set forth.

6. The combination, in an arched-top basket-grate furnace and its front wall 5, of the metal front 15, formed in sections and provided with a hollow post 19, through which air is introduced into the air-space 20 in the

side wall of the furnace, substantially as set forth.

7. In a steam-boiler furnace or setting, the combination of the boiler 36 with the supporting-posts 40, arranged within an air-space in the furnace-walls, substantially as set forth.

8. In a steam-boiler furnace or setting, the combination of the boiler 36 and a column or post 40, arranged within an air-space 20 in the furnace-walls, that has communication with the outer air and with the interior of the furnace, substantially as set forth.

9. In a steam-boiler furnace or setting, the combination, with the boiler 36 and its supporting-brackets 37, of the supporting-track 40, bearing-rollers 39, jack-screws 42, and removable lining-piece 43, substantially as set forth.

10. In a steam-boiler furnace or setting, the combination of the boiler 36 and horizontal partition 46, forming an air-chamber beneath the fire-bed of the furnace, the side and rear walls of the furnace formed with air-spaces 20, open at the top of the walls and communicating with the air-chamber 45 by passages 50 through the side and end walls, and the bridge-wall 53, having an air-passage 52 connecting said chamber with the fire-bed, substantially as set forth.

11. In a steam-boiler furnace, the combination, with the metal front 15, having a doorway 7, formed by an outwardly-projecting flange or rim having an oblique bearing-face for the door 33, of the track 34, extending the transverse width of the furnace and supported upon the top of the doorway flange or rim, the door 33, and interposed antifricition rollers or balls 35, substantially as set forth.

12. In a steam-boiler furnace, the combination, with the metal front 15, having a doorway 7, formed by an outwardly-projecting flange or rim having an oblique bearing-face for the door 33, of the track 34, extending the transverse width of the furnace and supported upon the top of the doorway flange or rim, the door 33, and a bracket or shelf 36, arranged above the track and adapted to form a foot-step in gaining access to the top of the furnace, substantially as set forth.

In testimony whereof witness my hand this 24th day of June, 1892.

JAMES V. BURKE.

In presence of—

ROBERT BURNS,
GEO. H. ARTHUR.