(No Model.) 2 Sheets—Sheet 1.

J. V. BURKE.

SMOKELESS FURNACE.

No. 489,788. Patented Jan. 10, 1893.

FIG. 1.

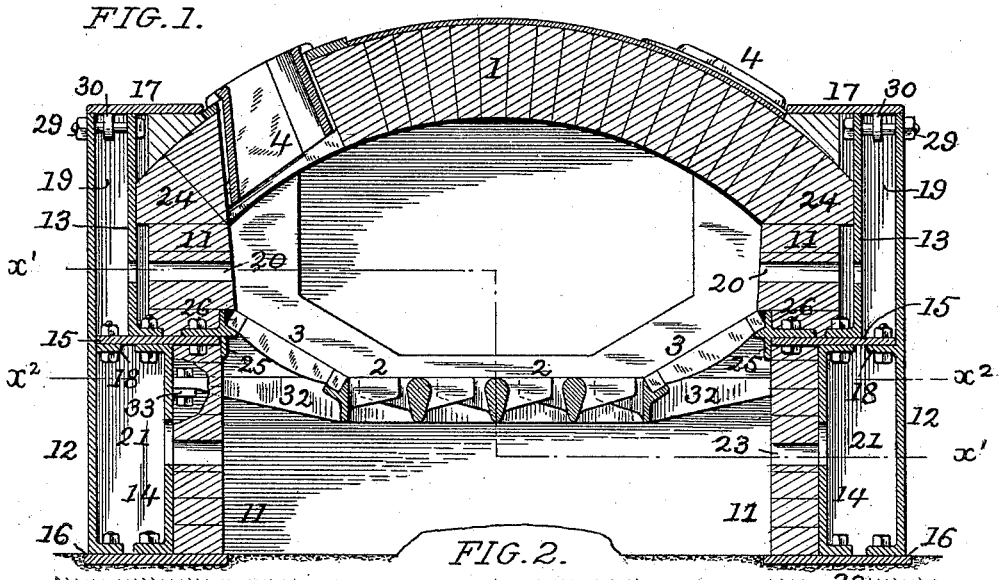
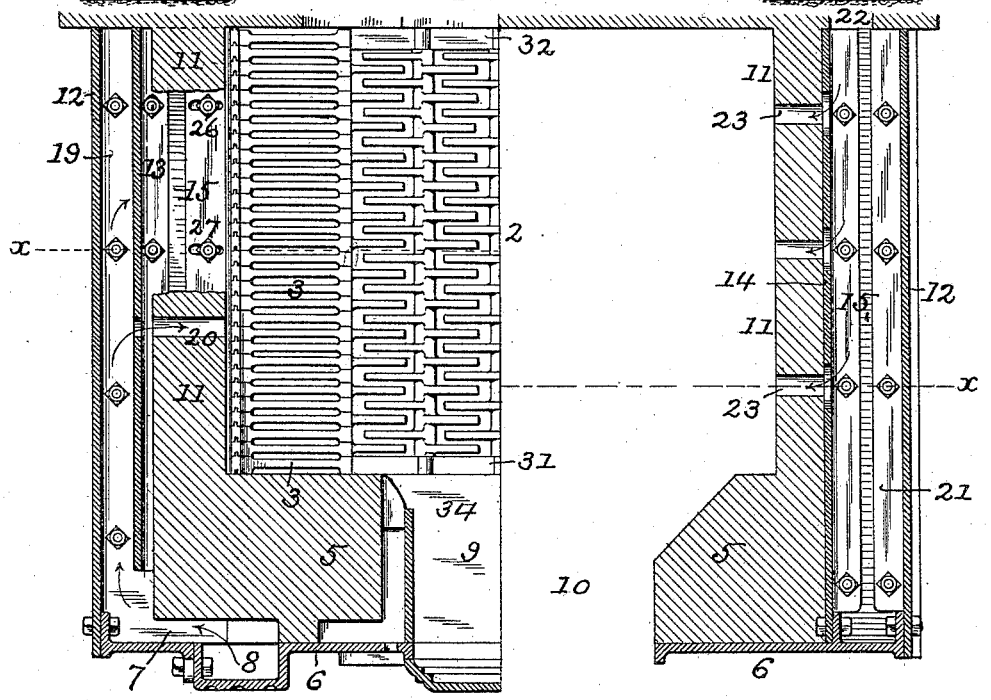


FIG. 2.



ATTEST:

Geo. H. Arthur

M. H. Holmes

INVENTOR:

James V. Burke,

by Robert Burns

Att'y.

No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

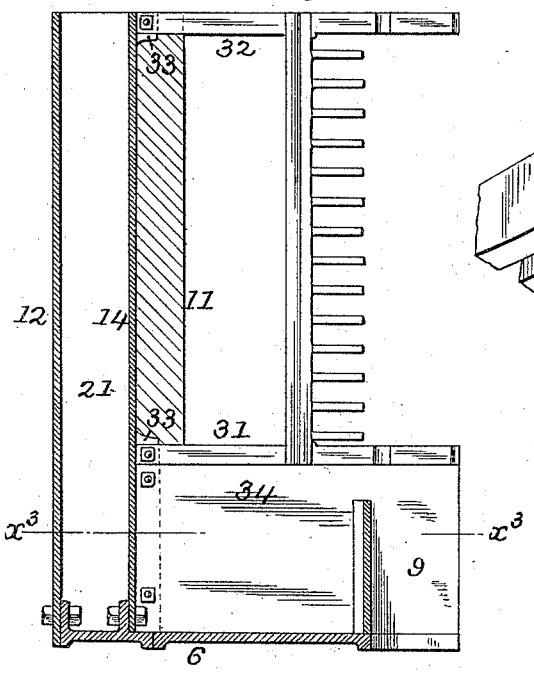


FIG. 9.

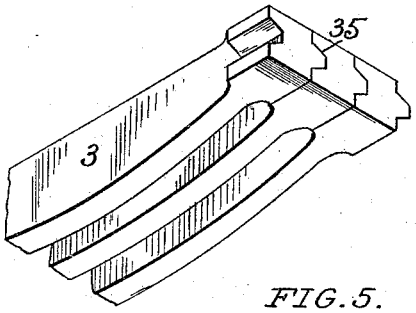


FIG. 5.

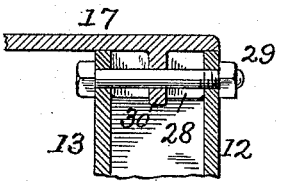


FIG. 6.

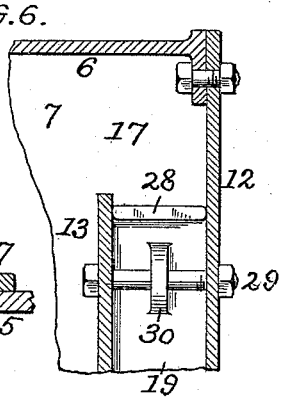


FIG. 4.

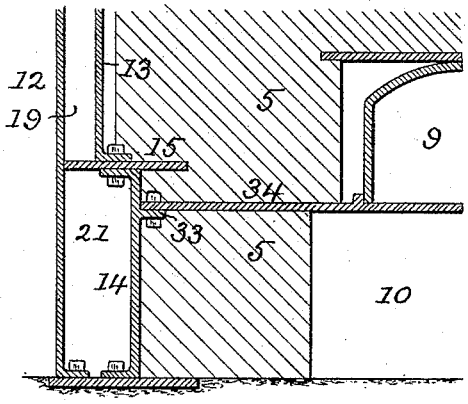
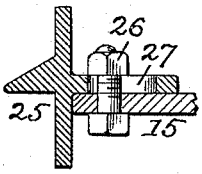


FIG. 7.



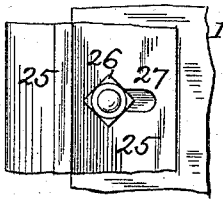


FIG. 8.

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UNITED STATES PATENT OFFICE.

JAMES V. BURKE, OF CHICAGO, ILLINOIS.

SMOKELESS FURNACE.

SPECIFICATION forming part of Letters Patent No. 489,788, dated January 10, 1893.

Application filed November 12, 1892. Serial No. 451,797. (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 certain new and useful Improvements in Smokeless 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 that class of steam boiler furnaces, in which the fuel is fed from the top of the furnace through side fuel pockets onto inclined side grates, from whence such fuel, as it becomes coked falls onto a horizontal central grate to be fully consumed, such type of furnace forming the subject matter of my previous application for Letters Patent Serial No. 438,798. filed July 2 1892. And the present improvement has for its object, to provide a simple and durable construction and arrangement of the side walls of the furnace whereby the same are tied in position so as to afford a strong and rigid support or abutment for the arched furnace top, and at the same time an effective arrangement of ducts or passages within such walls through which the air supply for the furnace is drawn, and which as it passes through such ducts absorbs the radiant heat from the furnace and prevents an undue heating of the metal portion of the present construction. I attain such objects by the construction and arrangement of parts illustrated in the accompanying drawings in which:

Figure 1, is a transverse sectional elevation of a furnace constructed in accordance with my present invention, such section being taken on line x—x, Fig. 2; Fig. 2, a horizontal section at line x'—x', Fig. 1; Fig. 3, a detail horizontal section at line x^2—x^2, Fig. 1; Fig. 4, a detail vertical section at line x^3—x^3, Fig. 3; Fig. 5, an enlarged detail section illustrating the connection of the vertical side wall plates with the top plate of the same; Fig. 6, an inverted horizontal section of the same; Fig. 7, an enlarged detail transverse section of the upper bearing bar for the side grates, and its attachments, Fig. 8, a detail plan of same; and, Fig. 9, a detail perspective view of three of the inclined side grates, illustrating the means for locking the same together.

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

As represented in the drawings, the furnace will have the usual arched top 1, supported on the side walls, and inclosing the fire grate, which in the present construction consists of a centrally arranged horizontal rocking grate section 2, and counterpart lateral inclined grate sections 3, onto which the fuel is fed by the side pockets 4, in the furnace arch, as in the former application.

The front wall of the furnace is also of a similar construction to that shown in such former application, and consists of an inner brick wall 5, and a metal front 6, between which a space is left to form air ducts 7 between the two; the open bottomed column or enlargement 8 on the front 6 as well as suitable openings through the same, forming the necessary air inlets to said ducts 7; the usual cleaning doorway 9 for the fire chamber, and doorway 10 for the ash pit being provided as usual in such front wall of the furnace.

In the present improvement the furnace side walls, consist each of an inner fire brick wall or lining 11, vertically arranged metal plates or partitions 12, 13 and 14, and an intermediate horizontal shelf or partition 15, as follows: The outer plate 12, extends the full length and height of the furnace, and at bottom is flanged and bolted or otherwise secured to the bottom plate 16, while its top edge is provided with means as hereinafter set forth, for connection with the top plate 17, and intermediate of its height, with a rib or flange 18, by which connection is made to the outer edge of the horizontal shelf or partition 15. The upper intermediate plate or partition 13, is attached to the top of the shelf 15 by a flange connection, and extends to the top of the furnace, and forms in connection with the outer plate 12, an upper air duct 19, that communicates at front with the front wall air duct 7, and discharges into the fire chamber of the furnace through the orifices 20 in the side wall, as shown in Figs. 1 and 2. The lower intermediate plate or partition 14 is attached to the bottom of the shelf 15, and to the base plate 16, by flange connections, and forms in

connection with the outer plate 12, a lower air duct 21, that receives its supply of air preferably from the air space in the rear inclosing walls 22 of the boiler, and discharges into the ash pit through orifices 23 in the side walls. The intermediate partition 15 supports the imposed portion of the side lining 11, and the skew back 24 of the arched top 1, and at its inner edge supports the upper bearing bar 25 of the inclined side grates 3, while the intermediate partition 13 affords an abutment for such skew back, to prevent a lateral displacement of the same; such bearing bars being attached to the plate or shelf 15 in a lateral adjustable manner by means of bolts 26, and elongated slot 27, so as to admit of an adjustment of the parts in erecting furnaces of slightly varying dimensions.

The plates or partitions 12 and 13, are held in proper relative position by cross lugs 28 on the bottom of the top plate 17, and the whole are tied together by the bolts 29 passing through both plates and through the pendent lugs 30, on the bottom of the top plate 17, as illustrated in Figs. 1, 5 and 6.

The front and rear bearing bars 31 and 32, extend the width of the furnace and their ends rest on and are bolted to lugs 33 on the sides of the partitions 14, so as to tie such plates together against lateral displacement. The dead plate 34, at the front of the furnace also extends the width of the furnace, and is similarly bolted to the partitions 14, so as to aid in tying the same together.

At front the plates 12 and 14, will be connected by flanges and bolts to the metal front 6, so as to tie the furnace casing together in a very effective manner.

In the present improvement the inclined side grates are of an individual formation, and are locked together by a tongue and groove formation 35, at their ends, so as to resist any tendency to individual displacement in the removal of clinkers, &c.

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 furnace of the arched top 1, and side walls composed of an inner brick lining 11, horizontal plate 15, and vertical plates 12 and 13 having air ducts 19 between them, substantially as set forth.

2. The combination in an arched top furnace of the arched top 1, and the side walls composed of an inner brick lining 11, horizontal plate 15, and vertical plates 12, 13 and 14, having air ducts 19, 21, between them, substantially as set forth.

3. The combination in an arched top furnace of the arched top 1, and side walls composed of an inner brick lining 11, vertical plates 12, 13 and 14, horizontal plates 15, 16 and 17, bolted together to form inclosing casings for the walls, substantially as set forth.

4. The combination in an arched top furnace of the arched top 1, and side walls, having horizontal plates 15, with the upper bearing bars of the inclined grates attached thereto by bolts 26 and elongated slots 27, substantially as set forth.

5. The combination in an arched top furnace of the side walls provided with vertical plates or partitions 14, and the rear bearing bar 32, attached to said plates, and connecting them together against lateral displacement, substantially as set forth.

6. The combination in an arched top furnace of the side walls provided with vertical plates or partitions 14, and the bearing bars 31 and 32 of the fire grates, secured to said plates by bolt and flange connection 33, substantially as set forth.

7. The combination in an arched top furnace of the side walls provided with vertical plates or partitions 14, and the dead plate 34, and bearing bars 31 and 32 of the fire grates secured to said plates by bolt and flange connection 33, substantially as set forth.

In testimony whereof witness my hand this 3d day of November, 1892.

JAMES V. BURKE.

In presence of—
ROBERT BURNS,
GEO. H. ARTHUR.