Dec. 14, 1926. 1,610,707

J. J. RATHGEB, JR

GRATE FOR BOILERS

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Fig. 1

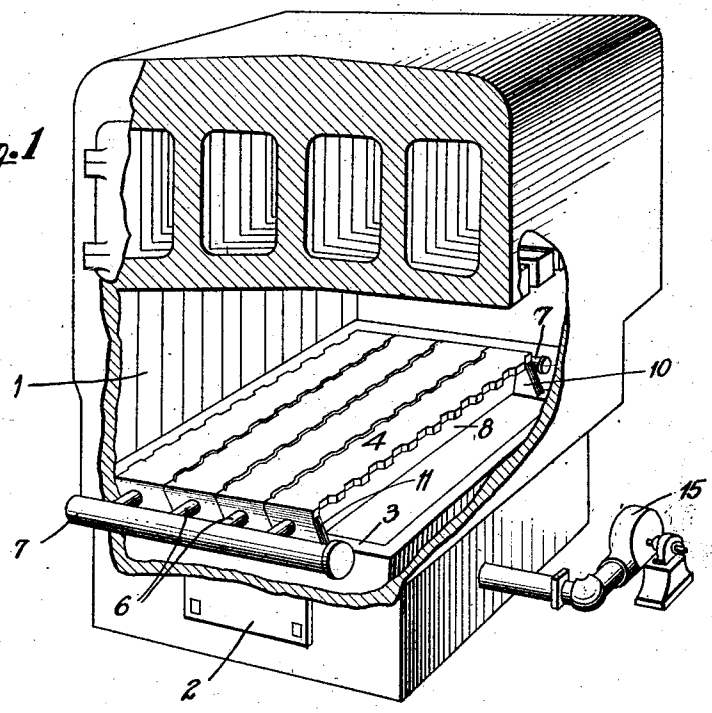
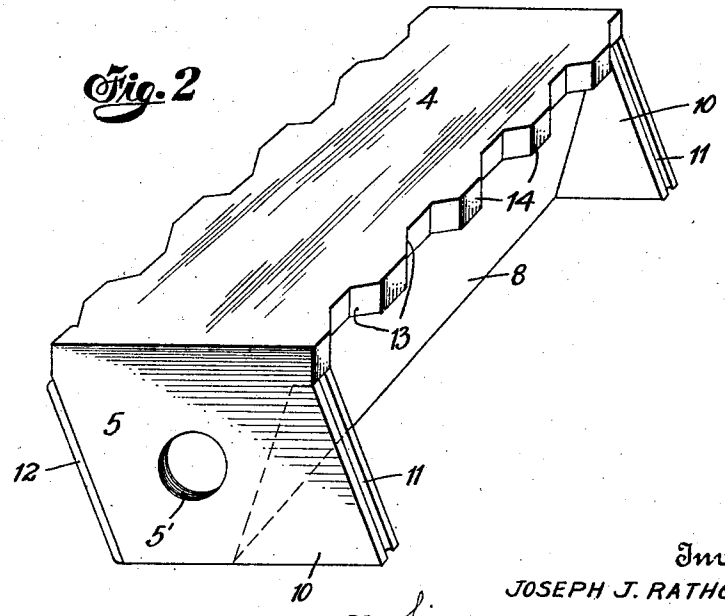


Fig. 2



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Fig. 3

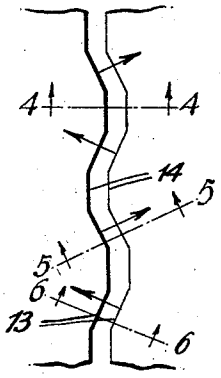


Fig. 4

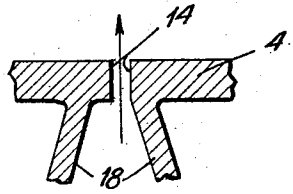


Fig. 5

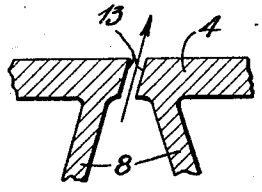
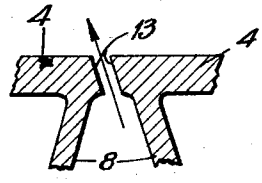


Fig. 6



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Patented Dec. 14, 1926. 1,610,707

UNITED STATES PATENT OFFICE.

JOSEPH J. RATHGEB, JR., OF NEW YORK, N. Y., ASSIGNOR TO RATHGEB GRATE COMPANY INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

GRATE FOR BOILERS.

Application filed October 27, 1923. Serial No. 671,100.

My invention relates to steam and hot water boilers employing an induced or forced draft.

The principal object of the invention is the production of a grate of simple construction and comprising a plurality of hollow separate grate bars which shall be adapted to interfit with each other and which shall be so constructed as to permit a maximum of draft to be furnished to the fire so as to insure a perfect combustion of the fuel, thus eliminating dead spots at various places in the fire box.

A further object of the invention is the production of the grate of the type specified, so constructed that the air draft will be forced in a plurality of different directions and at different angles towards the fire throughout the length of the grate thereby securing equal combustion of the fire at all points.

Other objects and advantages of the invention will appear from the accompanying description, the invention consisting in the novel grate construction and grate bars forming a part thereof hereinafter more particularly described and then specified in the claims.

In the accompanying drawings illustrating a practical embodiment of my invention:

Fig. 1 is a perspective view, partly broken away, of a conventional form of boiler showing a portion of the grate of the invention installed therein.

Fig. 2 is a perspective view of one of the grate bar units.

Fig. 3 is a more or less diagrammatic plan view of a fragmentary portion of two of the opposed grate units showing the direction of the different currents of air which are forced through the slot intermediate the opposed edges of the units.

Fig. 4 is a horizontal section on the line 4—4 of Fig. 3.

Fig. 5 is a horizontal section on the line 5—5 of Fig. 3

Fig. 6 is a horizontal section on the line 6—6 of Fig. 3.

Referring to the drawings:

1 indicates the combustion chamber of a conventional form of boiler, 2 the door of the ash pit and 3 the ledge within the combustion chamber on which the ends of the grate bars 4 forming the complete grate are seated. Said grate bars 4 are hollow for the circulation of water therethrough and are longitudinally disposed within the boiler as indicated in Fig. 1. Each of the ends of said grate bars indicated at 5 are provided with screw-threaded openings 5′ receiving pipes 6 connecting with the water manifolds 7 which in turn are connected with the circulating system of the boiler. The tops of the grate bars 4 are flat as illustrated and the sides thereof which are indicated at 8 are inclined outwardly as illustrated.

Forming a part of one side of the ends 5 are triangularly-shaped spacing blocks 10 each provided with a groove 11 therein. Said spacing blocks 10 are preferably cast as an integral part of the grate unit or they may be, if so desired, a separate part secured thereto in any desirable manner. The opposite side of each end of the grate bar is provided with a rib 12 adapted to enter the slot 11 in the spacing block 10 of the next succeeding bar when the bars are placed in apposition within the combustion chamber on the ledge 3 to form the complete grate. This engagement of the ribs with the slots of the next succeeding bar effects a detachable interlocking of the bars to prevent a relative endwise movement thereof.

The side edges of the flat tops of the grate bars overhang the inclined walls 8 and are serrated to form projections 14 and inclinations or angular portions 13 the portion of the top of the grate between the bases of the inclinations forming indentations to receive the corresponding projections of opposed grate bars. The walls of said projections 14 being straight while the walls of the inclinations 13 are alternately inclined inwardly and outwardly as will more clearly be shown in Figs 3 to 6 inclusive. Thus when the bars are placed side by side in position within the combustion chamber the serrated edge of one bar forms, with the serrated edge of the next succeeding bar, a zig-zag air slot through which slots the air may be forced by any suitable pump or blower indicated at 15. The zig-zag form of slots makes for a maximum amount of draft while the fact that portions of the opposed walls of said slots are straight, other portions are inclined in one direction while other portions are inclined in the other direction, as has been described, causes the air to sweep across the grates in a plurality of directions thus insuring a perfect and uniform combustion

of the fuel as is manifest. It will be apparent, furthermore, that the air, before passing through said slots, is first forced through air chambers formed by the inclined walls 8 and spacing blocks 11 and inasmuch as the side walls are inclined and taper inwardly toward the slots, the velocity of the air is greater when pasing through the slots than it would be if the walls were straight.

What I claim as my invention is:—

1. In a grate construction, a plurality of grate bars provided with top portions terminating in side edges, adjacent bars being formed with opposed and parallel side surfaces, portions of which extend angularly to the lengths of said bars and portions of which extend substantially parallel to the lengths of said bars, successive opposed angularly arranged portions on adjacent bars being correspondingly inclined in opposite directions with respect to the vertical and said parallel portions extending substantially vertically.

2. In a grate construction a plurality of grate bars including top portions each having its side edges provided with a series of projections with inclinations leading to said projections, the projections of the opposed edges of successive grate bars being alternately arranged to provide a zigzag slot between said grate bars, the side surfaces of said projections being substantially vertical and the side surfaces of the inclinations being inclined to the vertical alternately in opposite directions.

Signed at New York in the county of New York and State of New York this 26th day of October, A. D. 1923.

JOSEPH J. RATHGEB, JR.