J. C. SHERRY.

GRATE BAR.

APPLICATION FILED MAY 1, 1918.

1,304,393. Patented May 20, 1919.

Fig. 1.

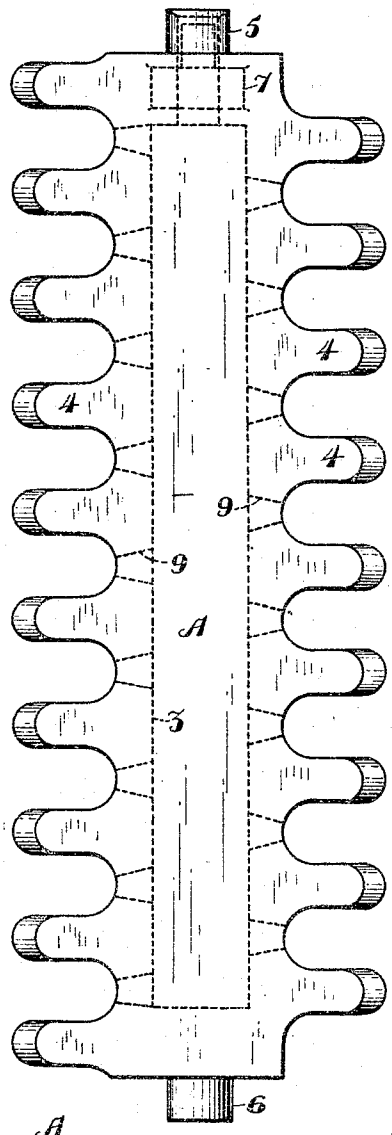
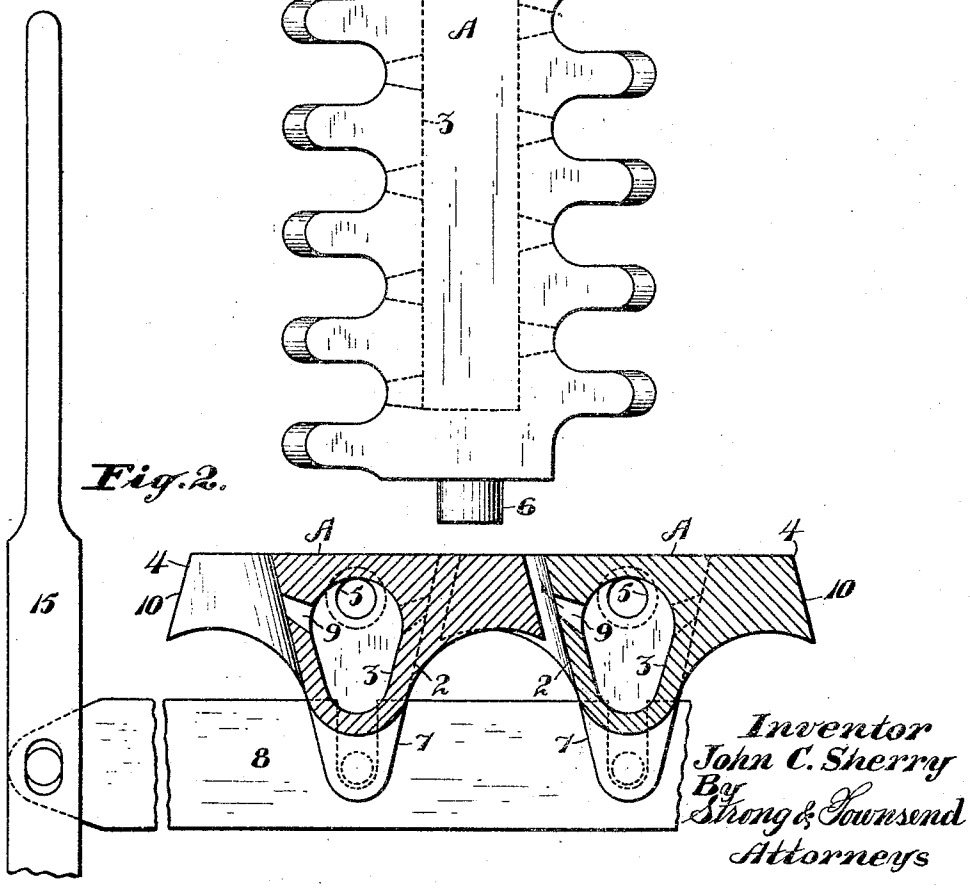


Fig. 2.



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UNITED STATES PATENT OFFICE.

JOHN C. SHERRY, OF SEATTLE, WASHINGTON, ASSIGNOR TO SHERRY WATER TUBE BOILER CO., OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

GRATE-BAR.

1,304,393. Specification of Letters Patent. Patented May 20, 1919.

Application filed May 1, 1918. Serial No. 231,791.

To all whom it may concern:

Be it known that I, JOHN C. SHERRY, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented new and useful Improvements in Grate-Bars, of which the following is a specification.

This invention relates to a grate bar.

One of the objects of the present invention is to provide a novel form of grate bar for use in coal burning furnaces, and particularly to provide a hollow grate bar through which air may be fed and evenly distributed under the coal bed supported thereby, thus mixing the oxygen in the air with the hydrogen in the coal at the proper point of combustion.

Another object of the invention is to provide a rocking support for each bar forming the grate and to provide means for rocking said bars in unison.

Another object of the invention is to form upwardly directed air discharging openings on each side of each bar, and in conjunction therewith to form deflecting faces on the adjacent bars which will further assist to direct the air upwardly through the coal bed and evenly distribute it.

Further objects will hereinafter appear.

The invention consists of the parts and the construction and combination of parts, as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a plan view of one of the grate bars.

Fig. 2 is a side elevation in section of a plurality of grate bars, showing their position in relation to each other and the means for rocking the same in unison.

Referring to the drawings in detail, A indicates, in general, the upper surface of a grate bar, 2 the sides and 3 a hollow passage formed interiorly of the bar and extending from end to end thereof. Formed on each side of the grate bar are outwardly projecting fingers or lugs 4, and formed at one end of the bar is a hollow pin or pintle 5, through which air is admitted to the longitudinal passage 3. The opposite end of the bar is also provided with a pintle, as shown at 6, but this is not hollow as it is not necessary to admit air except from one end.

The pintle 6 is provided with a downwardly projecting lever 7 and a pin secured on this lever is adapted to project into a slotted rack bar 8, which is adapted to be reciprocated, as will hereinafter be described. The fingers or lugs 4 are staggered with relation to each other on the opposite sides of the bar, as shown in Fig. 1, and the space between each pair of fingers is provided with an air discharge opening, such as shown at 9. In this manner there are a great number of air-discharging holes on each side of each bar and as these direct the air upwardly it can readily be seen that the air is evenly distributed before passing through the coal bed supported by the bars.

For the purpose of further directing the air and distributing same, I prefer to incline the outer faces of the fingers, as shown at 10. These faces being inclined as shown receive the air discharging from the openings 9 in the adjacent bar and even though the air is discharging upwardly from said openings it must be admitted that the air impinging against the faces 10 will be redirected and more evenly distributed in an upward direction.

The fingers on one bar, when the bars are assembled as shown in Fig. 2, pass between the fingers of the adjacent bar. The inclined face 10 will, therefore, always stand opposite to each air discharging opening 9 and an even distribution throughout the whole grate surface is obtained. This is of great importance as it permits a perfect combining of the oxygen with the products of combustion, such as the carbon and hydrogen contained in the coal, and it also permits a delivery of the air at the proper point and a more or less gradual heating of the air before it enters the area of combustion.

Actual practice has shown that a gained efficiency of practically 25% is in this manner obtained when the amount of coal consumed and the steam generated are compared. The air entering the hollow pintles 5 and the longitudinal passages 3 in each bar does not only pass through for the purpose of supplying air to the furnace but also to retain the grate bars comparatively cool; that is, the air during its passage through the grate bars is preheated and the grate bars 6 are kept from overheating and burning. In this manner it can be seen that two results are obtained, first, a saving of the grate bars and, second, a preheating of the air which certainly is ideal when the com-

bustion of the fuel is taken into consideration.

The air may be forced through the bars under pressure, if desired, this being accomplished by connecting the hollow pintles 5 with a pipe line supplied with air under pressure, or air may be permitted to pass through under a natural draft. A forced draft may, however, be utilized to advantage in the present instance as the even distribution of the air permits a considerable volume and pressure of air to be employed without danger of blowing through or lifting the coal bed. The grate bars, when assembled, will, of course, have a free rocking movement due to the fact that they are supported upon the pintles 5 and 6, and as each bar is provided with a rocking lever 7 it can readily be seen that the attachment of a hand lever 15 to the rack bar 8 will permit rocking of all of the grate bars in unison, the spacing between the bars being sufficient to permit the fingers to clear each other during such movement.

The materials and finish of the bars and the exact manner of mounting and supporting the same may otherwise be such as the experience and judgment of the manufacturer may dictate.

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

1. A furnace grate embodying a plurality of parallel bars each having a longitudinal air chamber and a series of lateral air discharge openings, a series of spaced fingers on each side of the bars arranged respectively on opposite sides of the discharge openings, the portions of the side walls of the grate bars at points adjacent said air discharge openings inclining upwardly and outwardly, and downwardly and outwardly inclined walls formed on the outer ends of the fingers and disposed opposite to and in spaced substantially parallel relation to said upwardly and outwardly inclined side wall portions of the adjacent grate bars whereby to form upwardly and outwardly inclined passages in conjunction therewith.

2. A furnace grate embodying a plurality of parallel bars each having a longitudinal air chamber and a series of lateral air discharge openings, a series of spaced fingers on each side of the bars arranged respectively on opposite sides of the discharge openings, the portions of the side walls of the grate bars at points adjacent said air discharge openings being flat and corresponding flat walls formed on the outer ends of the fingers and disposed opposite to and in spaced substantially parallel relation to said side wall portions of the adjacent grate bars whereby to form vertical passages of uniform width in conjunction with said side wall portions.

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

JOHN C. SHERRY.

Witnesses:
JOHN H. HERRING,
W. W. HEALEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."