Cone & Kelly,

Furnace Grate Bar.

No. 99642 Patented Feb. 8. 1870.

Fig. 1

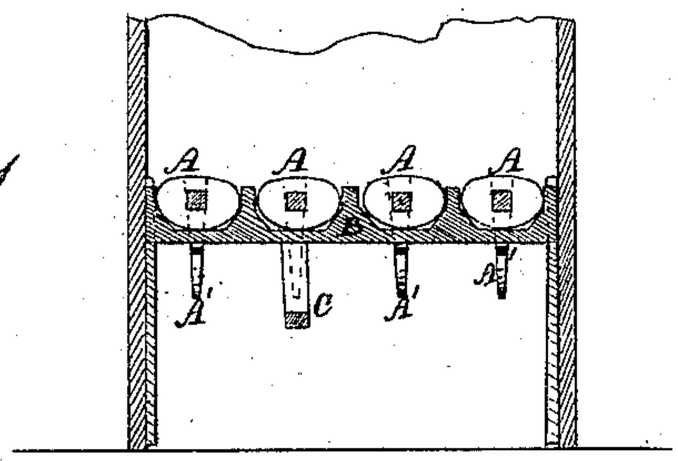


Fig. 2.

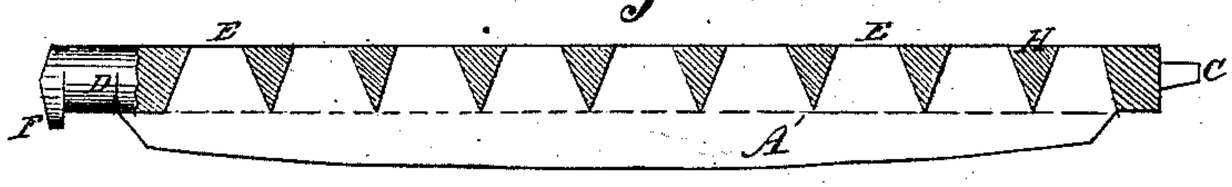


Fig. 4

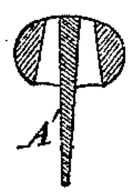
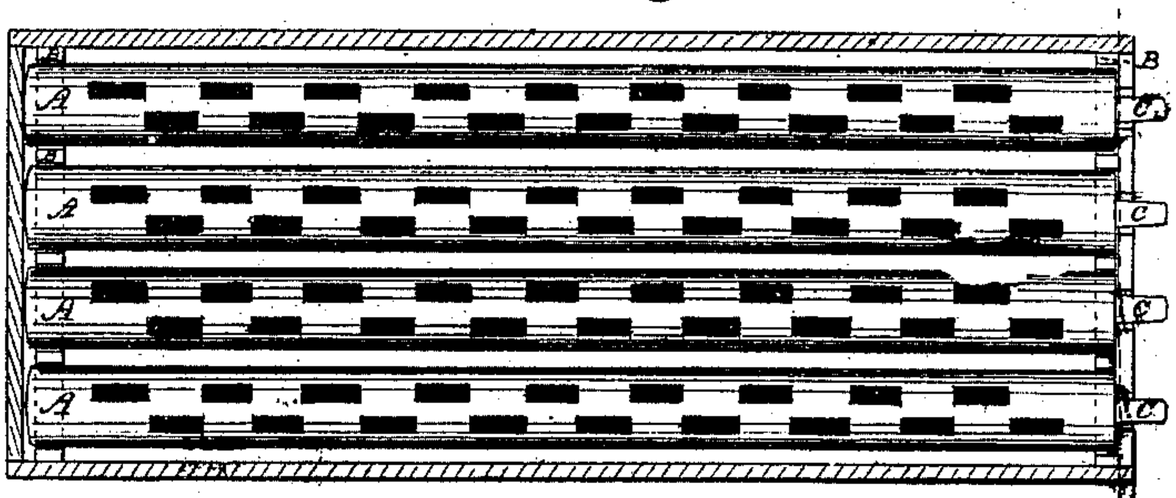


Fig. 3

Fig. 5.



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JONATHAN CONE AND WILLIAM K. KELLY, OF BRISTOL, PENNSYLVANIA.

Letters Patent No. 99,642, *dated February* 8, 1870.

FURNACE GRATE-BAR.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that we, JONATHAN CONE and WILLIAM K. KELLY, of Bristol, in the county of Bucks, and State of Pennsylvania, have invented certain Improvements in Furnace Grate-Bars; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the annexed drawings, making part of this specification, in which—

Figure 1 is an end elevation of a series of grate-bars and of the cradle in which they rest, together with a sectional elevation of the furnace in which they are placed.

Figure 2 is a longitudinal vertical section of a bar, showing the apertures through the same, the eccentric bearing upon its inner end, and the projection upon its outer end, for the reception of a crank or lever for rocking the bar.

Figure 3 is a perspective view of a complete bar, showing the apertures in its upper surface, the truss upon its lower surface, and a different form of projection for rocking the same.

Figure 4 is a sectional elevation on line *a a* of fig. 3, showing the form of the bar, its truss, and of the apertures through the same.

Figure 5 is a plan or top view of a series of bars, as they appear when placed in a furnace, the dotted lines showing the cradles upon which they rest.

Corresponding letters denote corresponding parts in the several figures.

This invention relates to grate-bars for furnaces, upon which coal or other fuel is to be burned.

To furnace-grates, as heretofore constructed, many objections exist, among which may be enumerated the great difficulty of removing the clinker therefrom, owing to the fact that when rocked or turned for that purpose, the openings or apertures are constructed, so that as the clinker enters, it is prevented from falling down through, and when rocked in the opposite direction, the bars are lifted out of their places, and coal is wasted as a consequence.

Our object in the present invention is to provide a remedy for the above-recited objection, and others not enumerated; and to this end,

It consists in providing a grate which has upon its under side two bearing-surfaces, which are eccentric to its axis, which, in this instance, is supposed to be a right line drawn longitudinally through the bar, and connecting the centres of the largest circles that could be inscribed in vertical sections of the bar, at the points where it rests upon the cradle, such circles to touch those points; and, further, in providing a flange upon the inner end of furnace-grates, to prevent their being moved longitudinally while being rocked; and, further, in providing a furnace-grate, having an eccentric bearing-surface, as described, in combination with a cradle, having flat surfaces for the eccentric portions of the grate to rest upon; and, further, in providing suitable projections upon the bars, to which to apply a lever or wrench, for rocking said bars, all as will be more fully described hereinafter.

To enable those skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

A, in the drawings, refers to a grate-bar for furnaces, upon which fuel is to be burned. The form of this grate-bar will be seen by referring to figs. 1, 2, and 3, of the drawings, it being designed to be made of cast-metal, with an elliptical upper surface, and having a truss formation, A′, upon its lower surface.

To the upper overhanging portions upon each side of the trussed portion there are to be formed a series of apertures, E E, of, say, one inch in length, more or less, the upper surface of which is smaller than the parts below it, so that any clinker or piece of coal which will enter at the top will readily pass out at the bottom. These openings serve both as a passage for the discharge of ashes and for the passage of air in jets to the burning fuel.

The truss formation upon the under side of the grate does not extend throughout its entire length, a sufficient space being left upon each end, upon which to form the eccentric journal or bearing-surface D, as shown in figs. 1 and 2.

The object of making the above referred to journal eccentric to the axis of the grate, is to increase the width of the spaces between the bar, which is being rocked, and those which are next to it, and to prevent the rocking grate from being lifted out of the cradle, while being rocked.

Another advantage arising from this form of journal is, that any clinker or clinkers which may pass into the spaces between the grates, when they are turned or rocked out of their normal position, will be crushed when they are turned in the opposite direction, and thus so reduced in size as to fall readily into the ash-pit, without danger of their clogging the lower portions of the grates.

Upon the outer ends of the bars which constitute the grate, there is to be formed a projection, C, which may be upon the extreme end of the grate, as shown in figs. 2 and 5, when the grate is placed on a level with the lower edges of the furnace-doors, or upon the lower side of the grate, as shown in fig. 3, when it becomes necessary to place them above such level. These bars rest in recesses formed in cradles B, which may consist of castings, which in turn may rest upon the brick-work of the furnace, or upon projections upon the plates, when iron is used for such furnaces. The form of these cradles is clearly shown in fig. 1 of the draw

ings, upon reference to which it will be seen that that portion upon which the bar rests is flat or horizontal, while a portion of the other surface is vertical, and a portion bevelled, which construction has been found to be necessary, in order to keep the bar from being lifted out of such recess. There are to be two of these cradles, one at each end of the bars.

Upon the inner ends of the bars A, or upon the end of the journal attached thereto, there is to be formed a downwardly-projecting flange, F, which will pass down over the edge of the cradle, and effectually prevent the longitudinal movement of the bars while being rocked.

By reference to figs. 3 and 5, it will be seen that between the spaces in the upper elliptical surface of each bar there is a continuous smooth surface, which form of construction admits of the "slice" or scraper being run under the fuel, for the purpose of removing the ashes, or for any other purpose, without being obstructed by any roughened surface, so that the operation of cleaning the fire in that way may be quickly performed, and without admitting a large quantity of cold air to the furnace, to reduce the temperature of the contents of the generator.

The extreme inner end of each bar is to be bevelled each way from its centre, as shown in fig. 2, in order to prevent its being obstructed in its movements by rivet-heads upon the generator.

Having thus described our invention,

What we claim, and desire to secure by Letters Patent, is—

1. A rocking grate for steam-generator and other furnaces, having its journals, or the points where it rests upon its supports, eccentric to its axis, substantially as and for the purpose set forth.

2. A furnace-grate, having an elliptical upper surface and a bearing-surface eccentric to its axis, substantially as and for the purpose set forth.

3. The flange F, upon the inner end of the bar A, ubstantially as and for the purpose set forth.

4. The combination of the cradle B, and the eccentric journal upon the end of the bar A, substantially as and for the purpose set forth.

5. A grate-bar, having an elliptical upper surface, in which there are two series of apertures parallel to each other, and an eccentric bearing-surface, and a projection at or near its end, for rocking said bar, all substantially as and for the purpose specified.

In testimony whereof, we have signed our names to this specification, in the presence of two subscribing witnesses.

J. CONE.
WM. K. KELLY.

Witnesses:
B. EDW. J. EILS,
A. RUPPERT.