A. E. BARTHEL & R. JAHR.

Supporting-Bar for Furnace-Grates.

No. 218,655. **Patented Aug. 19, 1879.**

Fig. 1

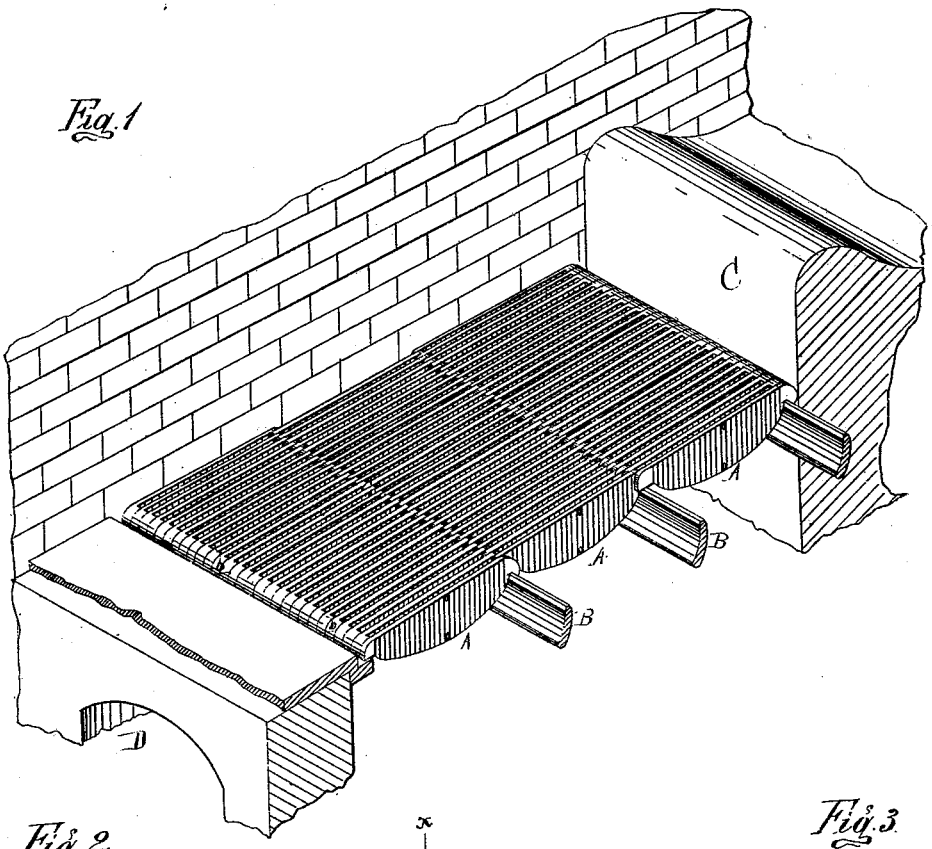


Fig. 2.

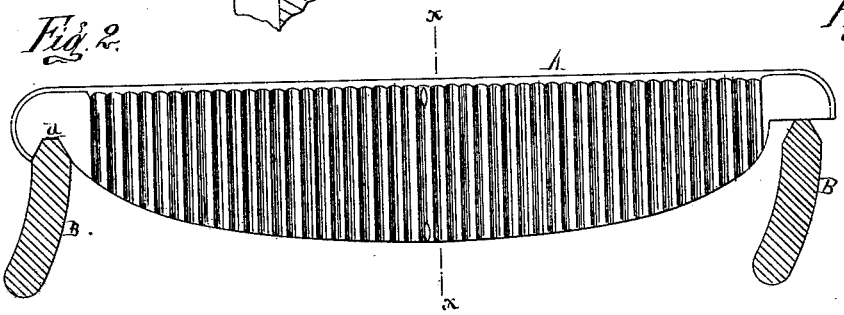
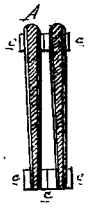


Fig. 3.



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ALBRECHT E. BARTHEL AND RUDOLF JAHR, OF DETROIT, MICHIGAN; SAID JAHR ASSIGNOR TO SAID BARTHEL.

IMPROVEMENT IN SUPPORTING-BARS FOR FURNACE-GRATES.

Specification forming part of Letters Patent No. **218,655**, dated August 19, 1879; application filed January 13, 1877.

To all whom it may concern:

Be it known that we, ALBRECHT E. BARTHEL and RUDOLF JAHR, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Supporting-Bars for Furnace-Grates; and we do declare that the following is a true and accurate description of the invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon, and being a part of this specification.

The nature of our invention relates to an improvement in supporting-bars for furnace-grates, so constructed and arranged as to produce very perfect combustion.

The invention therein consists in the peculiar supporting-bar, and in the combination of the same with a grate-bar, as fully hereinafter explained.

In the annexed drawings, Figure 1 is a perspective view of a boiler-furnace with a portion of the side wall broken away. Fig. 2 is a side elevation of one of the bars of a furnace with a section of its supports. Fig. 3 is a vertical cross-section through two adjacent bars on the line *x x* in Fig. 2.

The grate-bar A is of cast metal, preferably not more than three-sixteenths of an inch thick, provided with a hook, *a*, at one end, by means of which, when said hook is engaged with its support, the bar is held rigidly in place at one end, the other being free, so that the expansion and contraction are only in the direction of the free end of the grate-bar.

These grate-bars are designed to be only one foot in length, and weigh only about one pound each, and to be laid on the supports in overlapping sections, as shown in Fig. 1. The sides of these bars are corrugated in any desired direction.

Those bars that form the end of the series in the furnace are cast with thin lugs *b* on one side at their outer ends, said lugs being of the thickness of the bars which form the center section. At the center of their lengths, and upon each side, are cast small lugs *c*, each being half the thickness of the grate-bars, all these lugs being for the purpose of preserving the distances between the bars and preventing their warping.

The bars which form the center sections are not provided with any lugs upon their ends.

The supports B for these bars are cast in segments of curves, as shown, and when laid in place present concave surfaces toward the front of the furnace.

The supporting-bars are held transversely in the side walls of the furnace, and are inclined rearwardly, so as to present an inclined as well as a curved surface to the inflowing air, and thereby to more effectively divert the same and give it the desired upward direction between the grate-bars.

The corrugations upon the sides of these grate-bars present a larger surface to the action of the air, so that in its passage it draws the heat largely from them, so that they are not liable to burn out or warp out of place, while the thinness of the bars not only allows the heat to be drawn from them, as described, but also, in case of accident to one of them, allows another to be inserted without much loss in value of metal.

The hooks at the outer ends of the end bars of the series prevent contraction and expansion only in the direction of the free ends thereof, and as the bars overlap each other, as shown, no openings are made by such contraction and expansion to interfere with the free passage of a rake over the top surface.

The peculiar construction and arrangement of the bars admit the air to the fuel above in thin sheets, which is found to be very conducive to perfect combustion.

In ordinary supports for sectional grate-bars such supports are vertical. The air from the ash-pit door or draft-doors, striking these vertical supporting-bars, does not turn a sharp angle and pass vertically up the rear side of such bars, but takes an upward and rearward curve from their base, striking the fire at some inches in the rear of the front end of the grate-bars. So our improved grate-bar supports are curved and inclined, as described and shown, in order to let the air strike the fire at the front ends of the grate-bars. The opening for the draft-doors, if not immediately on a line with the bottom of the grate-bars, should be upwardly and inwardly curved, for the same purpose.

C is the bridge-wall, of any desired construction, and D is the draft-opening.

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

1. The combination, with sectional grate-bars, of the concavo-convex supporting-bars B, arranged with their concave sides toward the front of the furnace and inclined rearwardly, to divert the air of the draft, substantially as described and shown.

2. A fire-bed composed of curved and inclined transverse supporting-bars B and short and thin grate-bars A, with interlapping ends, each grate-bar having a hook at one end and an extension at the other end, and adapted to be held by the hook end upon one support, and to expand over the other support, the parts being constructed and combined substantially as described and shown.

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Witnesses:
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