S. Harrison,

Furnace-Grate Bar.

No. 58,252. Patented Sep. 25, 1866.

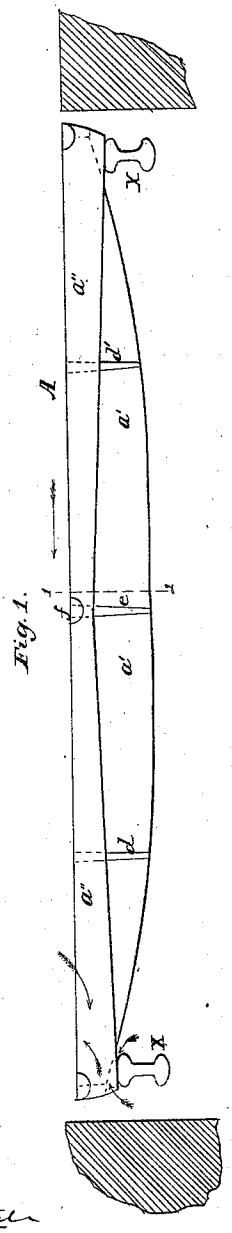

Fig. 1.

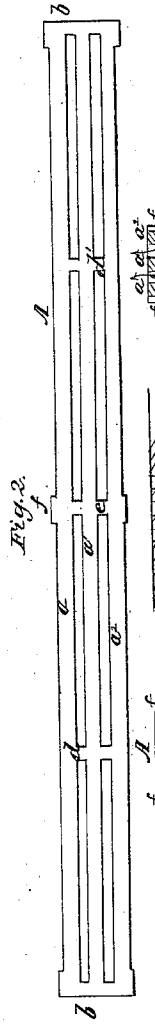

Fig. 2.

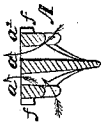

Fig. 3.

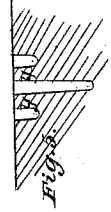

Fig. 5.

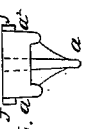

Fig 4.

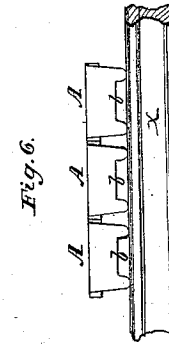

Fig. 6.

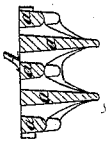

Fig. 7.

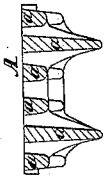

Fig. 8.

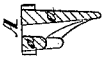

Fig. 9.

Fig. 10.

Witnesses:
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John Parker

Inventor:
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By his Atty
H. Howson

UNITED STATES PATENT OFFICE.

SAMUEL HARRISON, OF PHILADELPHIA, PENNSYLVANIA.

GRATE-BAR.

Specification forming part of Letters Patent No. **58,252**, dated September 25, 1866.

To all whom it may concern:

Be it known that I, SAMUEL HARRISON, of Philadelphia, Pennsylvania, have invented an Improved Grate-Bar for Boiler and other 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, and to the letters of reference marked thereon.

My invention relates to an improvement in that class of grate-bars which consist of a number or group of ribs cast together with spaces between the ribs; and my improved grate-bar consists of a deep and shallow rib or ribs combined in one casting, substantially as described hereainfter, so that the bar may be more easily molded and cast, may afford a better circulation of air between the ribs, may be less liable to be choked with cinders and slag, and lighter, and consequently more economical, than ordinary grate-bars having a number of ribs of uniform depth.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe several modes in which it may be carried out.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a side view of my improved grate-bar; Fig. 2, a plan view; Fig. 3, a transverse section on the line 1 2, Fig. 1; Fig. 4, an end view; Fig. 5, a diagram, illustrating one of the advantages of my invention; Fig. 6, an end view of two bars resting on a bearing; Figs. 7, 8, 9, and 10, modifications of my improved grate-bar.

Similar letters refer to similar parts throughout the several views.

On reference to Figs. 1, 2, 3, 4, and 6, A is the bar, which, in the present instance, is composed of the three ribs, *a*, *a'*, and *a''*, connected together at the opposite ends by webs *b b*, and at suitable intermediate points by webs *d*, *d'*, and *e*, the whole being cast in one piece.

The outside ribs, *a* and *a''*, are much shallower than the middle rib, and, as seen in Fig. 1, are made in the form of an arch on the under side. They may, however, be straight, or of the form shown in Fig. 10.

The middle rib is made much deeper than the outer ribs, and is made in the form of an inverted arch.

The ribs *a*, *a'*, and *a''* are arranged at a proper distance apart to suit the fuel which has to be used in the furnace, of which a number of these bars form the grate, and on the exterior of the outer ribs, *a* and *a''*, are the usual projections *f*, by means of which the bars are maintained at a proper distance apart from each other.

The advantages of my improved grate-bar may be enumerated and described as follows:

First, they can be molded and cast with greater facility than ordinary bars, in which a number of ribs of uniform depth are cast together. This will be readily understood by reference to the diagram, Fig. 5, which illustrates the impression in the sand made by a pattern of my improved bar. The walls *y y* of sand between the ribs being much more substantial than if the ribs were of uniform depth, there is consequently less danger of bad castings, as well as less manipulation required in dressing and finishing the mold.

Second, there will be a more free circulation of air through the spaces between the ribs of my improved bar than through bars having ribs of uniform depth, as the air has to pass through much shallower openings in the former than in the latter case. (See arrows, Fig. 3.)

Third, there is less liability of the spaces between the ribs becoming choked with slag and cinders, as will be readily understood without explanation.

Fourth, the intermediate rib *a'* of the form shown imparts the desired vertical rigidity to the bar; hence the outer ribs may be of the reduced depth illustrated and described, thereby effecting a corresponding reduction in the weight of the bar and a saving of material.

Although I prefer in ordinary cases a bar composed of three ribs, as described above, bars with five ribs, as seen in Fig. 6, or with six ribs, as shown in Fig. 7, or even with two ribs, as illustrated in Fig. 8, may be made and used with good results.

It will be seen on reference to Figs 1 and 6 that the outer ribs at each end of the bar project below the middle rib, the outer ribs only resting on the bearer X.

This arrangement possesses two advantages:

first, a more steady bearing is afforded to the bars than if the whole of the ribs rested on the bearers; second, openings *t t*, Fig. 6, are presented for the free passage of air in the direction pointed out by the arrows, Fig. 1.

Without confining myself to any specific number of deep and shallow ribs, or to the precise form of these ribs, I claim as my invention and desire to secure by Letters Patent—

A grate-bar consisting of a deep and shallow rib or ribs combined in one casting, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAML. HARRISON.

Witnesses:

H. HOWSON,

JOHN WHITE.