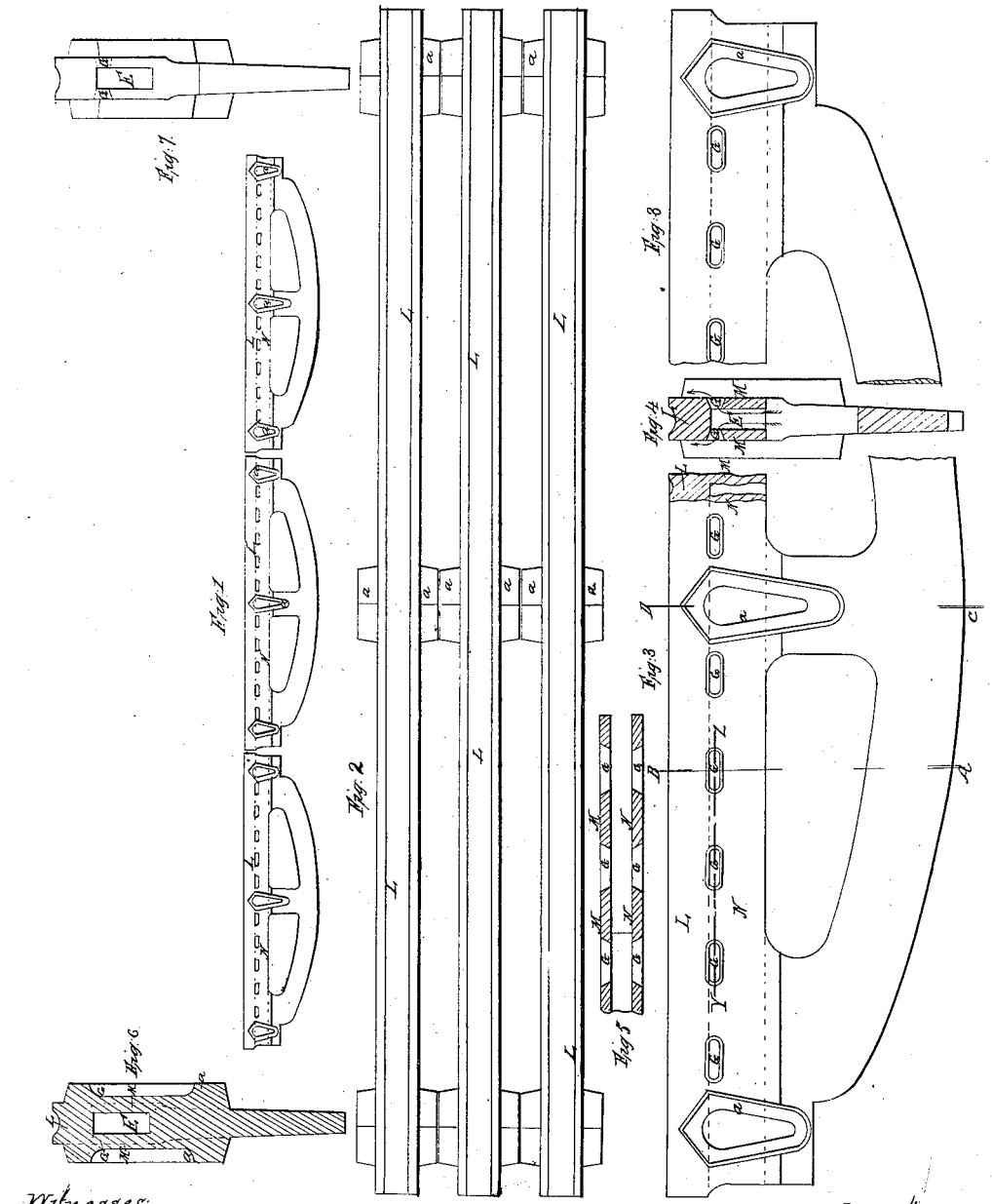
W. E. Hill,

Furnace Grate-Bar.

No. 51,455. Patented Dec. 12, 1865.



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WARREN E. HILL, OF BROOKLYN, NEW YORK.

GRATE-BAR.

Specification forming part of Letters Patent No. **51,455**, dated December 12, 1865.

To all whom it may concern:

Be it known that I, WARREN E. HILL, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Grate-Bars for Furnaces.

The following is a description of a grate-bar in which this invention is embodied, and the accompanying drawings form a part of this description.

Figure 1 is a side view of three sections or lengths of such grate-bar. Fig. 2 is a plan view, showing several bars side by side on a larger scale. Fig. 3 is a side view of a single bar, a part being removed at one point to allow room for Fig. 4. Fig. 4 is a cross-section of the same bar. Fig. 5 is a horizontal section of a portion of the bar. Fig. 6 is a cross-section of the bar through the center or deepest point, and Fig. 7 is an end view.

Similar letters of reference indicate like parts in all the figures.

The chief purpose of my invention is to keep the material of the bars cool. This is effected by leading currents of air through the interior of each grate-bar in the manner to be described below.

Referring to the drawings, L is the top or main upper surface of the bar, represented slightly hollow, as usual, to retain ashes, and M and N are thin lower portions, all cast in a single piece.

E is the space between the lower parts or sides, M and N.

G G, &c., are holes communicating from the upper part of the space E to the exterior of the bar at each side. The space E is, by preference, continuous from one end of the bar to the other, or for a considerable portion of the distance, though it may be interrupted by forming connection across at intervals, to stiffen and mutually brace the parts M and N. The holes G may be made a little larger or may be considerable smaller than is here represented without departing from the principle of the invention; but I prefer the form and proportions of all the parts here represented.

The heat communicated to the upper edge of each bar is conducted downward through the material of the bar, and is cooled by the ascending air, which passes up through the grate to supply the fire; but instead of finding only the two sides and the narrow lower edge from which to radiate or convect the heat into such air, this invention presents the additional surface of the whole inner faces of the sides M and N, as also the surfaces around the holes G, and is cooled more rapidly and effectually. In other words, currents of air, received in the bottom of each grate-bar and discharged through the holes G at the sides, cool the bar in addition to the ordinary currents which flow up past each side of the bar.

The hollow in the upper edge of the grate-bar to retain ashes is no part of my invention. It may be dispensed with altogether, if desired. The same is true of the deep truss-work represented below the sides M and N, which may be cast on the bar or not, as preferred, and also of the peculiar hollow side bearings, *a*, which perform the ordinary functions of holding the grate-bars at the proper distance apart.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

The longitudinal space E, in combination with the transverse air-passages G, and adapted to allow the ascent of air between the sides M and N and its discharge into the spaces at the sides of the bar, substantially in the manner and for the purpose herein specified.

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Witnesses:

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