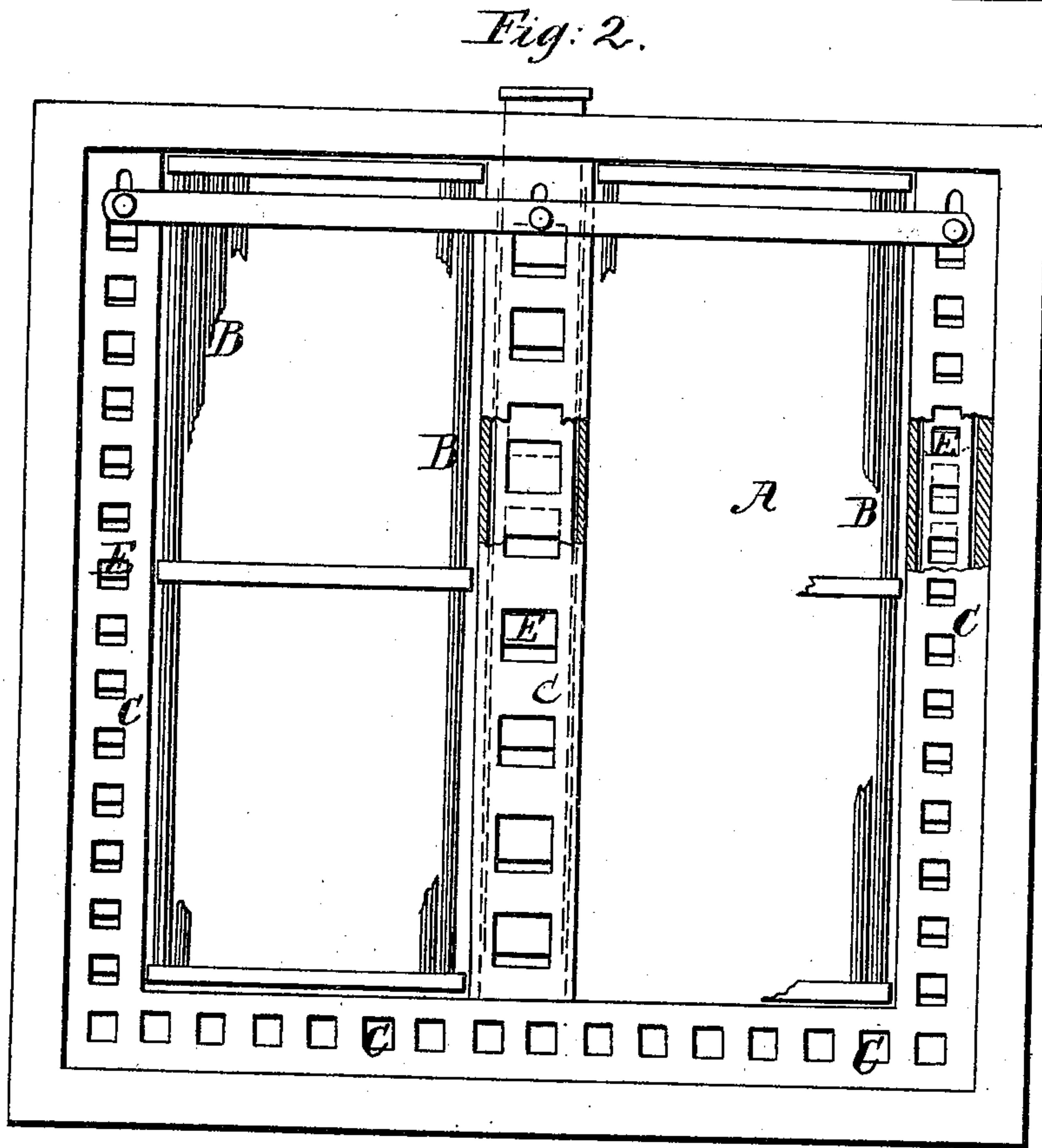
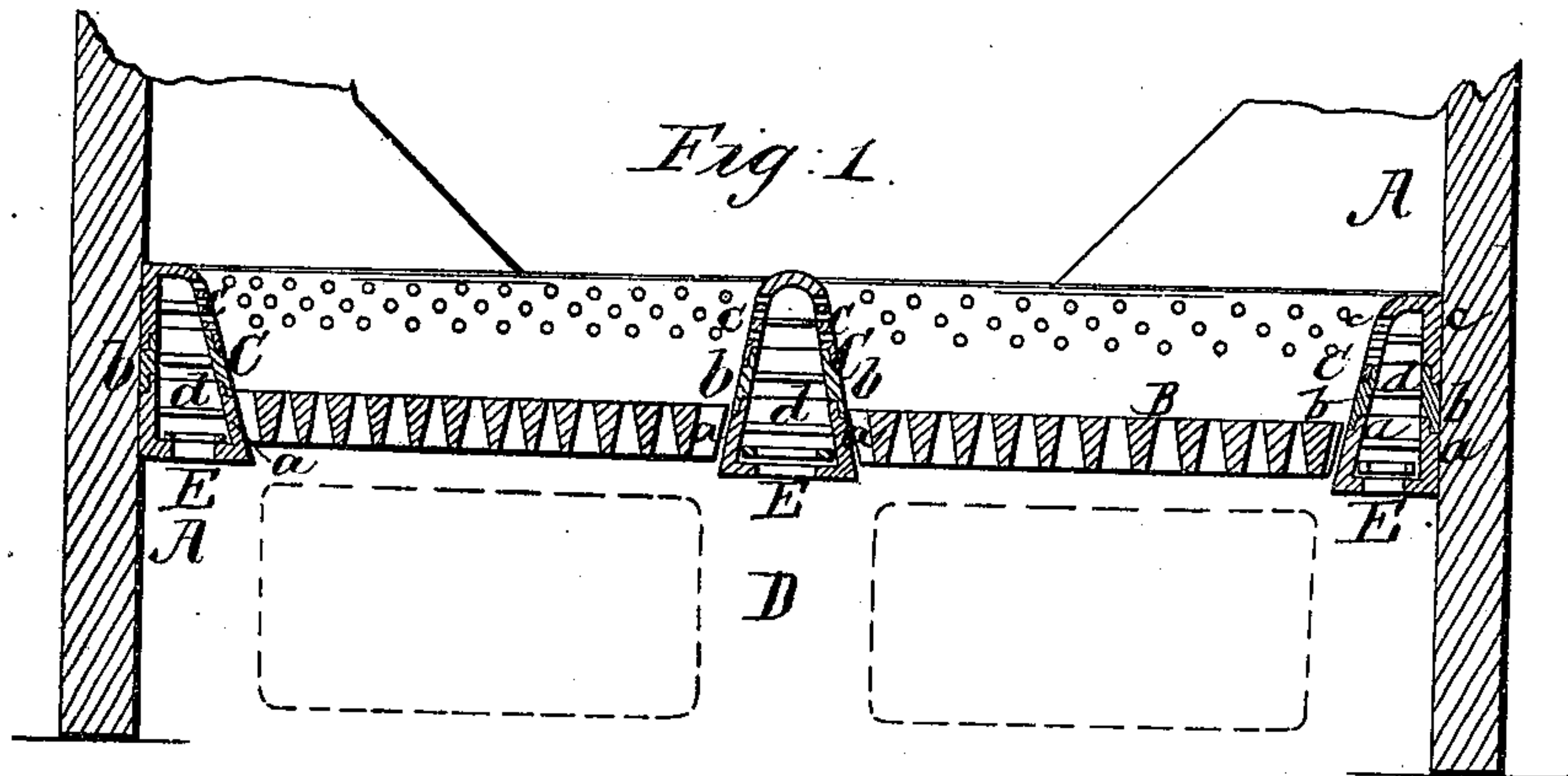


G. E. Turner

Grate Bar

Nº 98,321.

Patented Dec. 28, 1869.



Witnesses;
John Brooks
C. Tate

Inventor;
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PER *Mumford*

United States Patent Office.

GEORGE E. TURNER, OF CHICAGO, ILLINOIS.

Letters Patent No. 98,321, dated December 28, 1869.

HOLLOW GRATE-BAR FRAME.

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

To all whom it may concern:

Be it known that I, GEORGE E. TURNER, of Chicago, in the county of Cook, and State of Illinois, have invented a new and useful Improvement in Hollow Grate-Bar Frames; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a vertical transverse section of my improved hollow grate-bar frame.

Figure 2 is an inverted plan view, partly in section, of the same.

Similar letters of reference indicate corresponding parts.

This invention has for its object to so construct the hollow grate-bar frame, which conducts air from below the fire to the products of combustion, that the unequal temperature to which it is subjected at different heights may not injuriously affect the same.

Heretofore, such hollow frames were made of single pieces, and, as they extend from below the fire through the burning fuel, and above the same, they are very apt to break by unequal expansion. The lower parts are but slightly warm, while the middle is nearly at red heat, and the top also very hot. The unequal expansion produced by these different degrees of heat is certain to produce fracture of the frames. To avoid this, I construct such hollow grate-bar frames of two or more, preferably of three, horizontal sections, and join the same in such manner that each section is free to expand independently. I also stay or brace each section on the inside, to protect it from collapsing under the influence of the heat.

A, in the drawing, represents the furnace of a steam-boiler or other suitable machinery to be heated:

B B are the ordinary grate-bars.

C C are the hollow grate-bar frames, extending above the bars B, so as to project beyond the burning fuel.

These hollow frames are made in form of inverted

troughs, are perforated above the fuel, and open on the underside or end, so that they conduct air or oxygen from the draught-chamber D, to the products of combustion escaping from the burning fuel.

In the lower part, or in the end of each hollow grate-bar frame, is a sliding damper, E, or register, by which the amount of air passed through it is regulated.

Each hollow frame C is made of two or more horizontal sections, three being shown in the drawing.

The lower section, *a*, of each extends up to about the same height as the top of the bars B, and is but little heated.

The middle section *b* reaches about to the top of the fuel, and is considerably heated, while the upper perforated section *c* extends above the fuel to supply the air.

Each supporting section has its upper edge rabbeted, to receive the rabbeted lower edge of the section next above, as is clearly shown in fig. 1. Every section is, therefore, free to expand and contract without interfering with the others. The junction may be made different; thus, the upper edge of each supporting section may have a groove or channel of greater or less width and length for receiving the plain lower edge of the upper section.

Each section is, on the inside, provided with transverse or oblique braces or stays *d d*, which prevent the sagging out or in of the sides.

Having thus described my invention,

I claim as new, and desire to secure by Letters Patent—

1. The hollow grate-bar frame, made of two or more horizontal sections, substantially as set forth, to enable each section to expand independently of the others, as specified.

2. The stays or braces *d*, arranged in the sections of the hollow grate-bar frame, substantially as and for the purpose herein shown and described.

GEO. E. TURNER.

Witnesses:

M. A. LORING,

JNO. L. WOODCOCK.