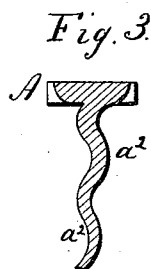
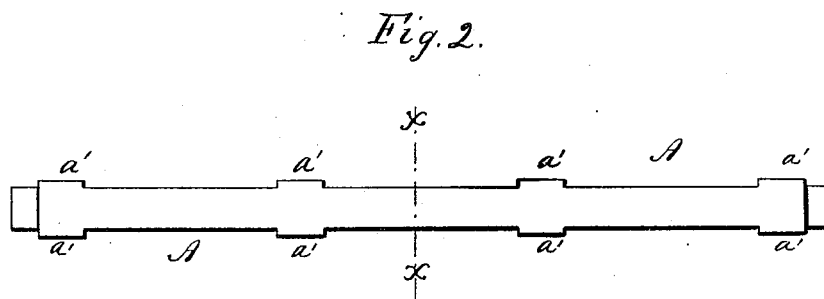
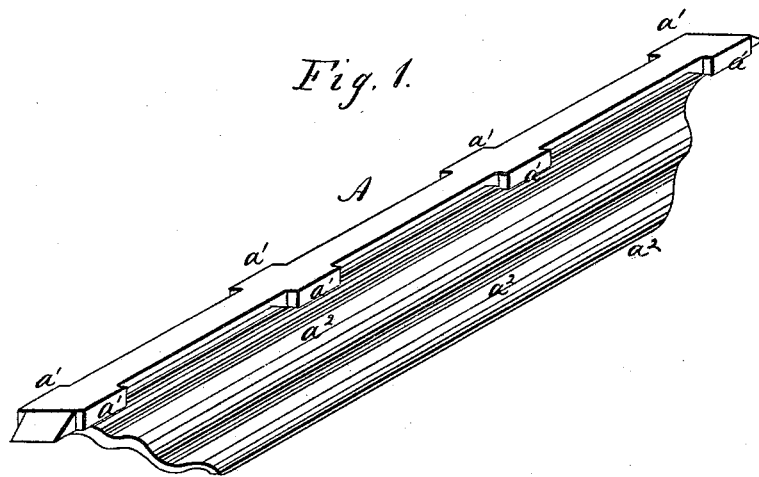


*G.O. Tupper,*  
*Furnace-Grate Bar.*  
*N<sup>o</sup> 53,903. Patented Apr. 10, 1866.*



*Witnesses;*

*J. W. B. Corington*  
*Gas. A. Service*

*Inventor;*

*Geo. O. Tupper*  
*per Mumt Co*  
*Attorneys*

# UNITED STATES PATENT OFFICE.

GEORGE O. TUPPER, OF NEW YORK, N. Y.

## FURNACE GRATE-BAR.

Specification forming part of Letters Patent No. 53,903, dated April 10, 1866.

*To all whom it may concern:*

Be it known that I, GEORGE O. TUPPER, of the city, county, and State of New York, have invented a new and useful Improvement in Furnace Grate-Bars; 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 is a perspective view of my improved grate-bar. Fig. 2 is a top view of the same. Fig. 3 is a cross-section of the same taken through the line *x x*, Fig. 2.

My invention has for its object to furnish an improved grate-bar for furnace-grates, simple and cheap in construction, and which will be protected against vertical pressure or lateral warping from the effects of heat; and it consists of a grate-bar the rib or lower part of which is corrugated longitudinally with one or more corrugations on each side, as hereinafter more fully described.

A is the grate-bar, the upper surface and ends of which are constructed in the ordinary manner. *a'* are lugs formed upon the upper-side edges of the bars A. These lugs *a'* rest against similar lugs on the sides of the adjacent bars, and they should be of a size proportioned to the size of the grate and to the size of the required space between the bars. The number of these lugs on each side of the bar will also depend upon the size of the grate in which the bars are to be used.

One great difficulty attending the use of grate-bars arises from the effect of heat, causing the bars to warp or spring laterally. This

difficulty has been sought to be remedied in various ways, but the most of the bars constructed for this purpose have been too complicated in their structure to answer a good purpose, and too costly for general use.

It is well known that if the same amount of metal is made into two bars, the one plain and the other corrugated longitudinally, the corrugated bar will sustain much the greatest pressure. For this reason I make the rib or lower part, *a*<sup>2</sup>, of the bar with one or more longitudinal corrugations on each side, as shown in Figs. 1 and 3. By this construction, without using so much metal as to make the bar cumbersome or to diminish the draft, I obtain a bar of sufficient strength to resist downward or lateral pressure, whether from the weight of the fire or the effect of the heat, or from both combined, and thus obtain a grate-bar light and simple in construction and of great durability. It may be observed that in the construction of grates for large furnaces two or more of these bars A may be placed end to end in the ordinary manner.

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

As a new article of manufacture, a furnace grate-bar the rib or lower part of which is corrugated longitudinally with one or more corrugations on each side, substantially as herein described, and for the purpose set forth.

The above specification of my invention signed by me this 9th day of February, 1866.

GEO. O. TUPPER.

Witnesses:

M. M. LIVINGSTON,  
JAMES T. GRAHAM.