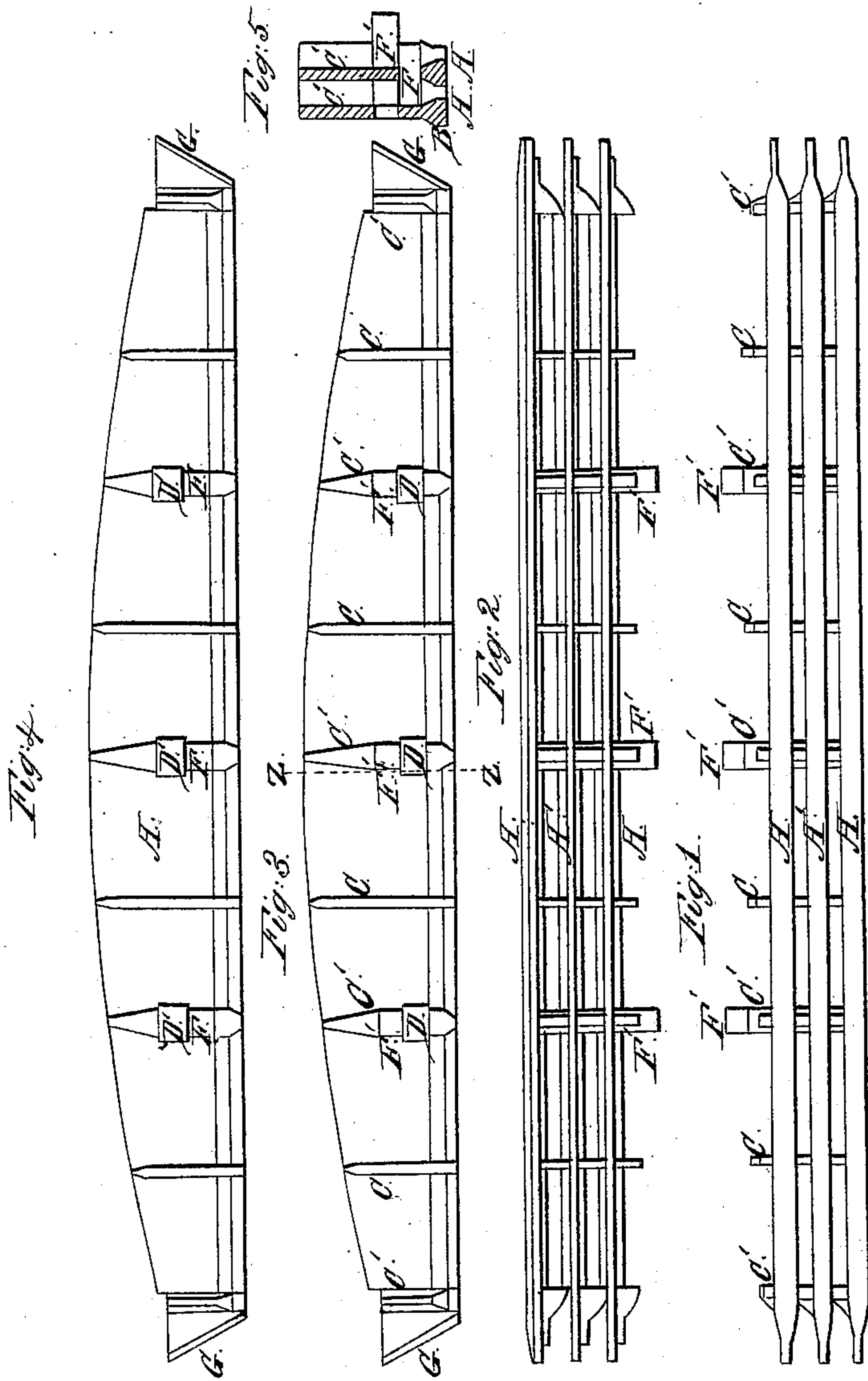


*J. Buzby,*

*Furnace-Grate Bar.*

*N<sup>o</sup> 25,720.*

*Patented Oct. 11, 1859.*



*Witnesses;*  
*A. Dennis Jr.*  
*Edw. P. Brown.*

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# UNITED STATES PATENT OFFICE.

JOHN BUZBY, OF MOORESTOWN, NEW JERSEY.

## GRATE-BAR.

Specification of Letters Patent No. 25,720, dated October 11, 1859.

*To all whom it may concern:*

Be it known that I, JOHN BUZBY, of Moorestown, in the county of Burlington and State of New Jersey, have invented certain new and useful Improvements in Grate-Bars; and I do hereby declare that the same are described and represented in the following specifications and drawings.

To enable others skilled in the art to make and use my improvements I will proceed to describe their construction and operation, referring to the drawings, in which the same letters indicate like parts in each of the figures.

Figure 1, is a top view of my grate bars. Fig. 2, is a bottom view of the same. Figs. 3, and 4 are side elevations. Fig. 5, is a section on the line  $z, z$ , Fig. 3.

Grate bars have been constructed in various ways which were more or less defective, they have always so far as I know been made with projections on each side, to keep them a proper distance apart when set, which projections have either been so wide as to intercept the draft and cause the fire to accumulate, and heat the bars more than is necessary, or so narrow that the bars would work one, one way and the other the other way, so that the projections would slip by each other, and let the bars come too near together and make wide spaces each side and let the coal fall through. To prevent their slipping endwise a mortise has been made in the projection on one side and a tenon on the projection on the opposite side opposite to the mortise so that the tenon on one bar would go into the mortises on the next, through the series of grates. But this mode was found objectionable as the tenons were necessarily short and the ashes would work in behind them and the shrinking and swelling of the iron would work the tenons out of the holes; besides the iron in different bars would shrink and expand unequally, and being locked together by mortise and tenon, they bind each other and must either bend or break and destroy each other. Some other modes of locking have been tried as the projections have been made dovetailing, so that when one bar was slipped down by the side of the other, they were locked together; but this was very objectionable, as the bars expand and contract unequally and bind, cramp, bend and break each other, worse than those with a mortise and tenon. My improvements are designed to remedy

the defects mentioned, and many others which I have not enumerated, by so constructing the bars that when they are put together to form a grate, they can contract and expand freely, without binding, cramping or bending one another, and without getting out of their proper places in the grate. Therefore the nature of my invention and improvements in grate bars, consists in making the mortises in, and the tenons on the bars alternate one above the other or one side of the other, so that the mortises may be made entirely through the bars without interfering with the tenons, and so that the tenons may extend entirely through the bar, without interfering with one another, and be made so long, as not to be drawn out of the mortises by the warping or springing of the grate bars.

In the accompanying drawings A, A, A' are grate bars made straight from end to end on one side as shown in Fig. 1, and in section Fig. 5, except that it projects over a little at B, so as to make the top wider or thicker than the lower part. The opposite side of the bar is in the same form except it has a series of projections C, C', to keep or hold it a proper distance from the next bar. The projections C', are thicker than the projections C, and they are divided by the mortises D, D', which are made entirely through the bars; and these projections C', also have the tenons F, F', projecting from them which tenons are put into the mortises D, D', when the bars are put together to form a grate.

The mortises D, D', are made longer than the thickness or width of the tenons F, F', to allow the bars to expand and contract freely endwise, without binding, bending or breaking each other. The mortises D, in the bar A, are nearer the top of the bar than the mortises D', in the bar A', and the tenons F, on the bar A', correspond with the mortises D, in the bar A, while the tenons F', on the bar A, correspond and fit into the mortises D', in the bar A'; each alternate bar having the mortise above the tenon, and the others the tenons above the mortises, so as to fit each other and go together, in alternate succession to form a grate.

I have found my improved bars to answer a good purpose and work well when made four feet long, one fourth of an inch wide at top and the lower edge or bottom one eighth of an inch thick,—three inches and one half



wide in the middle and one and one half, or two inches wide or deep at the ends,—the tenons half an inch or little more square, with mortises more than a quarter of an inch  
5 longer than the thickness of the tenons, and the projections C, one eighth of an inch thick, and wide enough to hold the bars one fourth of an inch apart. The ends of the bars are inclined or beveled off as shown at  
10 G, G, this beveling may be from the top or side or both, so that the ends of the bars as they expand will slip under or over, or one side of any matter that may be against them.

I have been using a furnace for generating  
15 steam with an area of thirty two square feet of surface, with the common old fashion grate bars, which did not work to suit me, and I took them out and substituted my improved grate bars, of the dimensions described, that is one fourth of an inch thick  
20 at the top, with one fourth of an inch space between them, so that I have one half of the area for draft less the projections between the bars; and I have reduced the area of my  
25 furnace about one fifth, and use a finer lower priced coal, and burn less in quantity than with the old bars; but the combustion and consumption of the coal is so much more perfect, that it is far less trouble to keep the  
30 steam at the height required, than it was before I put in my improved bars.

My improved bars are so thin, and the air

passes between them so rapidly that it prevents the lower edges from getting so hot, as thicker bars usually do in such furnaces. 35

Although I have described the mortises and tenons as being made one above the other alternately; I contemplate that they may be made alternately one side of the other, but when so made the tenons will obstruct the  
40 draft more, and hold more ashes than when made alternately one above the other.

I believe I have described and represented my improvements in grate bars so as to enable any person skilled in the art to make  
45 and use them, I will now state what I desire to secure by Letters Patent,

I claim—

Making the mortises in, and the tenons on the grate bars alternately one above the  
50 other, or one side of the other; so that the mortises may be made entirely through the bar without interfering with the tenons, and so the tenons may extend entirely through  
55 the bar without interfering with one another, and be made so long as not to be drawn out of the mortises by the warping or springing of the grate bars.

In testimony whereof I have hereunto signed my name.

JOHN BUZBY.

Witnesses:

J. DENNIS, Jr.,

EDW. F. BROWN.