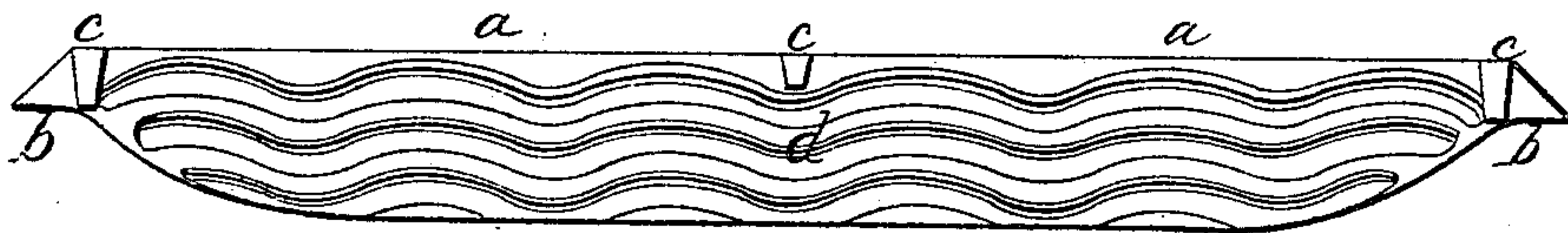


*L. B. Tupper,*  
*Furnace-Grate Bar.*  
*N<sup>o</sup> 57,411. Patented Aug. 21, 1866.*

*Fig. 1.*



*Fig. 2.*



*Witnesses;*  
*Geo. D. Warner*  
*Chas. Smith*

*Inventor;*  
*L. B. Tupper*

# UNITED STATES PATENT OFFICE.

LORENZO B. TUPPER, OF NEW YORK, N. Y.

## GRATE-BAR.

Specification forming part of Letters Patent No. 57,411, dated August 21, 1866.

*To all whom it may concern:*

Be it known that I, LORENZO B. TUPPER, of the city and State of New York, have invented, made, and applied to use a certain new and useful Improvement in Grate-Bars; and I do hereby declare the following to be a full, clear, and exact description of the said invention, reference being had to the annexed drawings, making part of this specification, wherein—

Figure 1 is a side elevation of my improved bar, and Fig. 2 is a cross-section of the same.

The same letters indicate like parts.

Grate-bars have heretofore been made in which the rib below the bar has been corrugated, the corrugations running in some instances longitudinally and in other instances vertically.

The difficulty that is generally experienced in grate-bars results from the heat causing the bars to rise in the center or arch upward, because the expansion of the top portion under the action of heat is much greater than that of the rib below.

The object of my invention is to equalize the expansive action so that the bar may remain straight, or nearly so, under different degrees of temperature, and be sufficiently strong to sustain the weight of the fuel.

My invention consists in a compound corrugated rib for the lower portion of a grate-bar, said corrugations being generally lengthwise of said bar, but at the same time in a waving or corrugated form, thus forming a compound

By this mode of construction the fire-surface of the grate-bar is stiffened, so that it will not warp sidewise or laterally, and the waving lines of the corrugations allow the bar to extend lengthwise under the action of heat, said corrugations in the two directions giving to the cast-metal rib a slight amount of elasticity sufficient to allow of expansion and contraction without injury to the parts.

In the drawings, *a* represents the upper or fire surface of the bar; *b b*, the ends that rest upon bearers, as usual; *c c*, the lugs to keep the grate-bars the desired distance apart. *d* is the corrugated rib of the bar, said corrugations running nearly from end to end, as seen in Fig. 1, in a waving form, and the rib is also corrugated in its sectional form, as seen in Fig. 2, so as to produce the compound corrugations aforesaid, acting in the manner specified.

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

The grate-bar formed with a straight, or nearly straight, surface for the fuel, and with a supporting-rib having compound corrugations, as and for the purposes set forth.

In witness whereof I have hereunto set my signature this 29th day of March, A. D. 1866.

L. B. TUPPER.

Witnesses:

CHAS. H. SMITH,  
GEO. D. WALKER.