W. H. Short,

Furnace-Grate Bar.

No. 45,760. Patented Jan. 3, 1865.

Fig. 1.

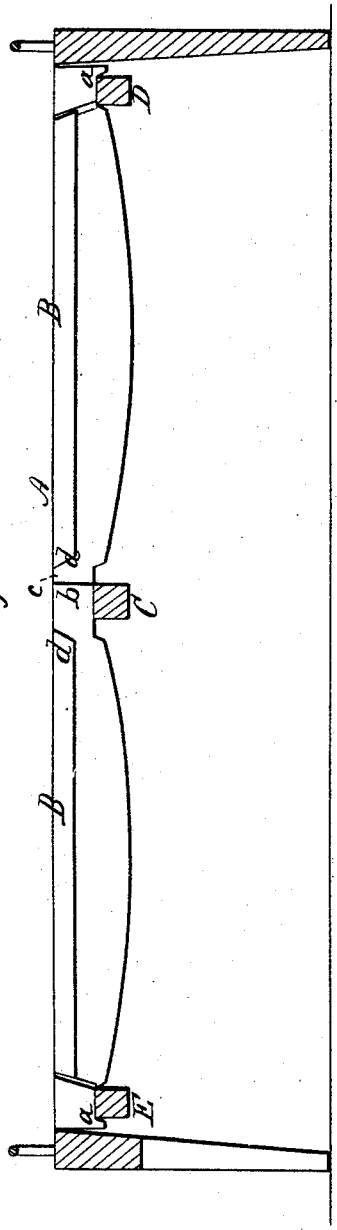
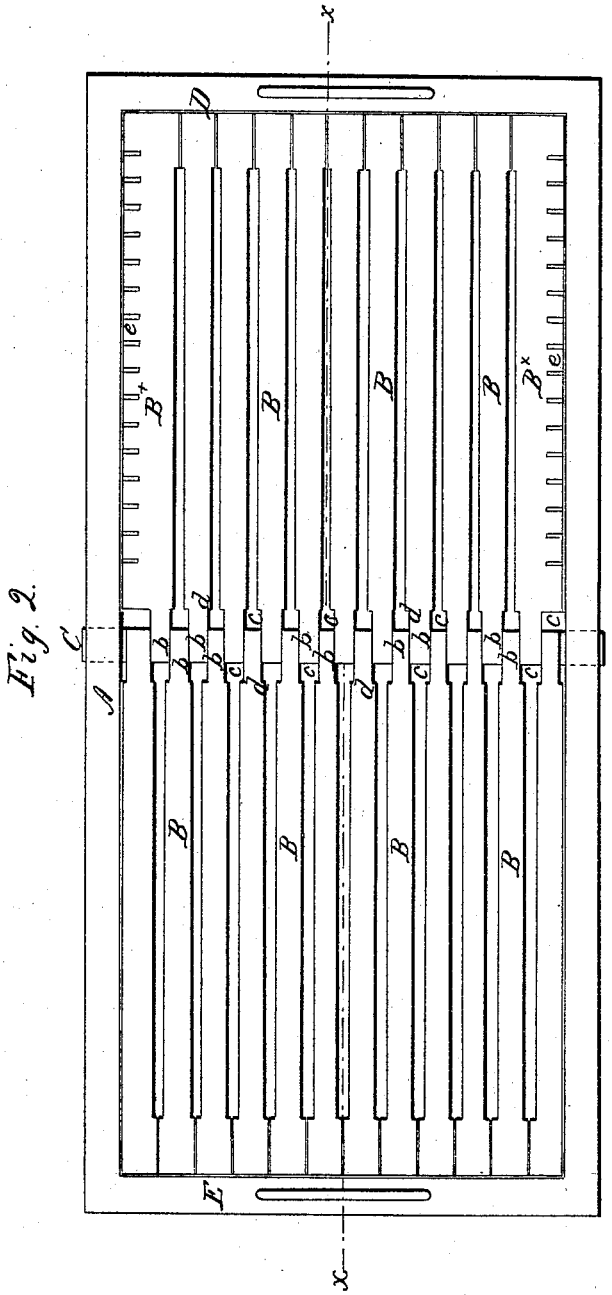


Fig. 2.



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UNITED STATES PATENT OFFICE.

WILLIAM H. SHORT, OF BROOKLYN, E. D., NEW YORK.

IMPROVEMENT IN GRATES FOR FURNACES.

Specification forming part of Letters Patent No. **45,760**, dated January 3, 1865; antedated August 19, 1863.

To all whom it may concern:

Be it known that I, WILLIAM H. SHORT, of Brooklyn, E. D., in the county of Kings 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 of the same, reference being had to the accompanying drawings, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my invention, the plane of section being indicated by the line *x x*, Fig 2. Fig. 2 is a plan or top view of the same.

Similar letters of reference in both views indicate corresponding parts.

The object of this invention is to prevent grate-bars from bending and buckling by the expansion when being heated.

The invention consists in the arrangement of spaces between the inner ends of divided grate-bars, their outer ends being held in place by hooks catching over the front plate and over the bridge-wall or over bearers connectde with or attached to said plate and wall in such a manner that each grate-bar can expand and contract without impediment or obstruction, and consequently said bars are not liable to injure the structure of the wall in which the boiler is set, neither are they liable to bend or buckle by the expansion.

To enable others skilled in the art to make and use my invention, I will proceed to describe it with reference to the drawings.

A represents a furnace-grate of the ordinary length and width, varying according to the size of the boiler and the grate-surface to be obtained. It is composed of a series of grate-bars, B, the length of each of which is equal to a little over one-half the length of the whole grate. They rest at the middle with their inner ends upon a cross-bar, C, and their outer ends are supported at the front of the grate by the front plate, D, and at the back by the bridge-wall E. Each grate-bar is cast with a hook, *a*, at its outer end, and these hooks, by catching over suitable bars or projections at the bridge-wal, and front plate, hold the grate-bars in placel permitting them to move by expansion only at the middle.

The inner ends, *b*, of the grate-bars are cast narrower than the rest, thus forming spaces *c* between their wide and narrow parts at the middle of the grate. Those spaces permit the bars, when heated, to slide longitudinally by the expansion of the metal, and they are thereby prevented from buckling or from injuring the brick-work in which the boiler is set. The spaces *c* must be made at the rate of one-eighth of an inch to a foot of length in the grate-bars, to allow for free expansion; or, in other words, if the grate-bars are one foot long the length of the spaces *c* must be one-eighth of an inch, and for every additional foot of length of the grate-bars one eighth of an inch must be added to the length of said spaces. That part of each bar adjoining the narrow ends *b* is cast with a bevel, *d*, so that coals or ashes which otherwise would be liable to clog up the spaces *c* discharge downward when the bars expand.

The side bars, B*, are made with projecting flanges *e*, to fill up the spaces which would otherwise exist between said bars and the side walls of the furnace, and said flanges are provided with notches for the discharge of ashes, &c.

This improvement is applicable to grates of every description and of all sizes, but it is of peculiar advantage for large furnace-grates of considerable length, where the expansion of the metal in grates of the ordinary construction is the source of great trouble and expense.

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

The combination and arrangement of the grate-bars B, so as to form spaces *c* between their inner ends in the middle of the grate A and the beveled shoulders of the adjoining bars, substantially as and for the purpose herein shown and described.

WILLIAM H. SHORT.

Witnesses:

M. S. PARTRIDGE,

DANIEL ROBERTSON.