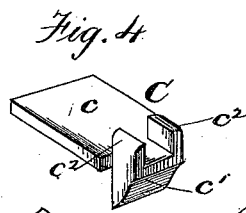
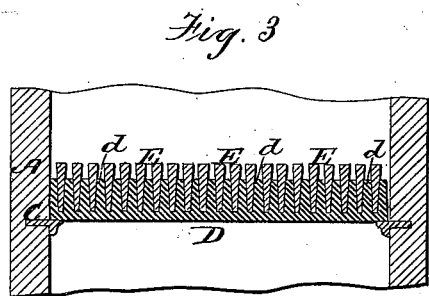
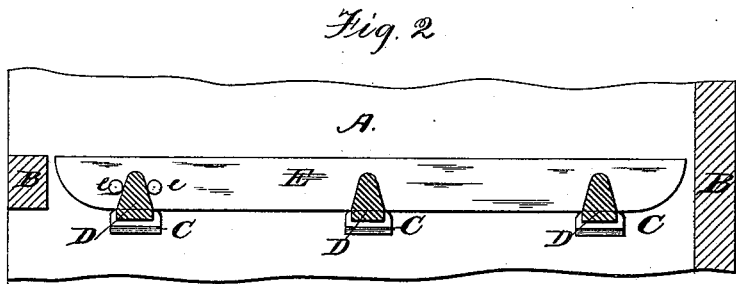
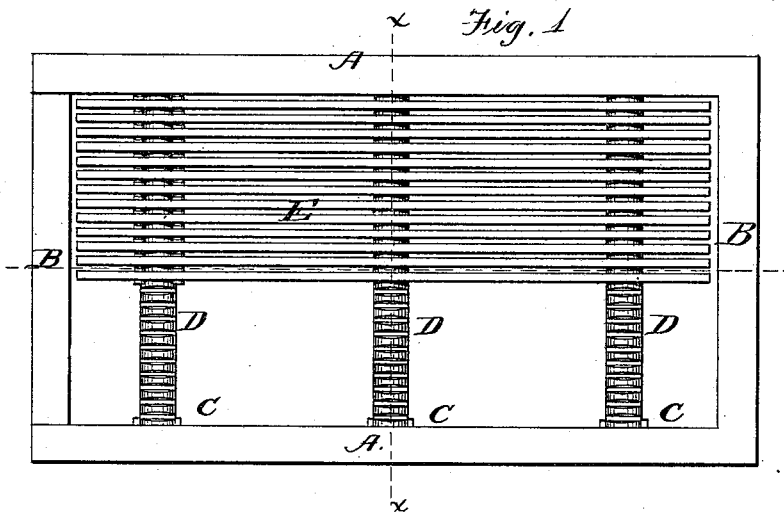


J. A. ALLEN.
Furnace-Grates.

No. 212,531.

Patented Feb. 25, 1879.



Witnesses;
McChurk
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UNITED STATES PATENT OFFICE.

JAMES A. ALLEN, OF SOUTH ADAMS, MASSACHUSETTS.

IMPROVEMENT IN FURNACE-GRATES.

Specification forming part of Letters Patent No. **212,531**, dated February 25, 1879; application filed August 14, 1878.

To all whom it may concern:

Be it known that I, JAMES A. ALLEN, of South Adams, in the State of Massachusetts, have invented certain new and useful Improvements in Furnace-Grates; and I do hereby declare the following to be a full and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a top-plan view; Fig. 2, a longitudinal sectional view; Fig. 3, a transverse sectional view, and Fig. 4 a perspective view of one of the supporting-blocks.

Similar letters of reference in the several figures denote the same parts.

This invention relates to that class of furnace-grates in which loose independent grate-bars are arranged upon supporting-bars provided with spacing and supporting cross-bars. In some of these structures heretofore the fingers have been formed in the shape of wide flanges projecting laterally from a supporting-bar toward the walls of the furnace, and constructing air-flues at the ends of the grate-bars, while in others the fingers have been constructed with sharp edges or angles arranged to bear against the sides of the grate-bars, in order to give additional space for the air-currents.

The object of my invention is to improve the construction of the supporting-bars and fingers, and thereby the construction and operation of the entire grate.

Another object of my invention is to improve the means for supporting the ends of the finger-bars.

To these ends my invention consists, first, in a finger-bar or supporting-bar provided with a series of fingers projecting vertically from its upper surface, the proximate faces of said fingers being flat and slightly inclined from each other from their lower to their upper ends, the outside or lateral faces of each finger inclining toward each other from their lower to their upper ends.

By this construction the grate-bars are properly spaced and are held firmly, while the upward draft of the air and the downward movement of the ashes are practically unobstructed.

By dispensing with the angular bearing-surfaces heretofore employed the supporting-bar fingers are rendered much more durable, because less liable to be destroyed or injured by the action of the heat.

By changing the construction of the fingers from that of lateral projections or flanges to that of the vertical tapering projections here shown, the necessity of arranging the supporting-bars at or near the walls of the furnace is avoided, the fingers are made stronger and are less liable to become warped by the action of the heat, and the supporting-bars are more easily balanced and held in position.

The second feature of the invention consists in combining, with the supporting-bars thus constructed and arranged, a series of independent grate-bars, made narrow, but deep, decreasing in thickness from their upper to their lower edge, and beveled downward and inward at their ends, as will be hereinafter described.

The third feature of my invention consists in the peculiar shape of a chair or block adapted to be inserted into the walls of the furnace, for the purpose of receiving and supporting the ends of the finger-bars above referred to.

In the drawings, A A represent the side walls, and B B the ends, of the furnace. Into the side walls, at the proper points, are inserted metallic castings C, each consisting of a flat plate or shank, *c*, having a vertical block or plate, *c'*, joined to its end, said vertical block having two lateral lugs or projections, *c'' c''*, between which its surface may be flush with the surface of the plate or shank *c*.

The shank or plate *c* is inserted horizontally into the side walls of the furnace, leaving the block *c'* projecting from the wall, whereby the space between the two lugs *c'' c''* forms a socket to receive and hold the ends of the supporting-bars of the furnace.

The supporting-bars D D, two or more in number, span the furnace from wall to wall at the proper distances from the ends B B. Each bar D is provided with a set or series of vertical fingers, *d d*. These fingers are arranged with narrow spaces between them, which spaces diminish slightly from the top to the bottom of the fingers.

The fingers, at their lower ends, are of substantially the same width as the supporting-bars, but taper upward till their width is reduced about one-half, and terminate in rounded upper ends. This construction of fingers gives a firm support to the grate-bars E, which fit somewhat loosely between them, so as to provide for possible expansion. It also, without obstructing the free movement of the ashes and of the air-currents, provides a considerable surface for the support of the grate-bars, and thereby prevents the heat from rapidly disintegrating and destroying said surface, and renders the whole structure much more durable.

The form of the fingers is such, it will be observed, as to give them the greatest possible strength in every direction laterally, and at the same time to bring the grate-bars close together, thus enabling the narrow-edged bars of the simple form and construction which I will now describe to be profitably employed.

These bars E, as shown in Fig. 3, are made with a width at their upper surface equal to about double the width at their lower edge, their vertical thickness being from four to six times the thickness of their upper edge. They are also beveled off at their ends from their upper edges downward and inward to their lower edges. They may be, if preferred, provided with lugs *e e*, projecting laterally from their sides or downward from their lower edges, so as to engage with one of the supporting-bars or its fingers, and thereby hold the grate-bars in their proper relative position during their alternate expansion and contraction. Thus

constructed, the grate-bars are dropped into place between the fingers, and when in place they present a smooth flat grate-surface, with narrow and sharply-defined air-spaces between them, which air-spaces widen from top to bottom, to give good clearance for the ashes and free passage for the air-currents, and with a free clearance and air-space around the ends of the grate-bars, as well as along their sides. The grate-bars may be separately removed and replaced.

Having thus described my invention, I claim as new—

1. In combination with a furnace-grate, the supporting-blocks C, having the flat horizontal shank-plate *c*, the projecting terminal block *c'*, and the lateral lugs *c''*, all arranged and adapted as and for the purpose described.

2. The supporting-bars D, adapted to span the furnace from side to side, and provided with vertical fingers *d*, having flat proximate faces and tapering or inclined sides, constructed and arranged substantially as described.

3. The combination of the supporting-bars, having the vertically-arranged and flat-sided fingers herein shown, with the narrow deep wedge-shaped grate bars E, provided with a bevel or clearance both along their sides and at their ends, constructed and arranged substantially as described.

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Witnesses:

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