# M. D. Wellman,

## Furnace Grate.

No 71,253 Patented Nov. 19, 1867.

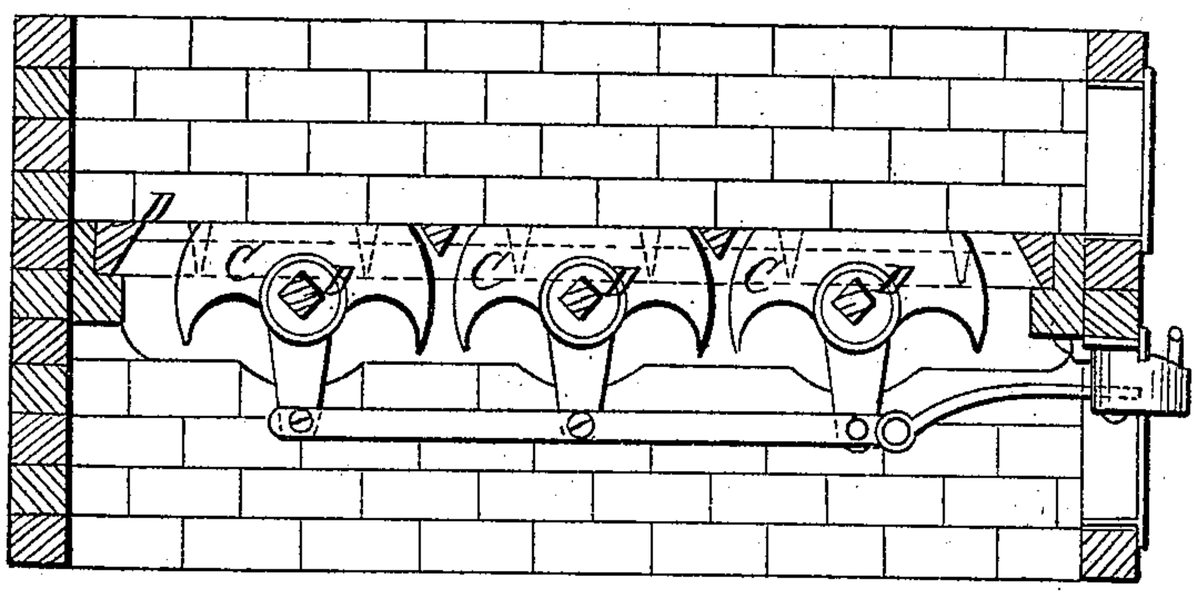


Fig: 1.

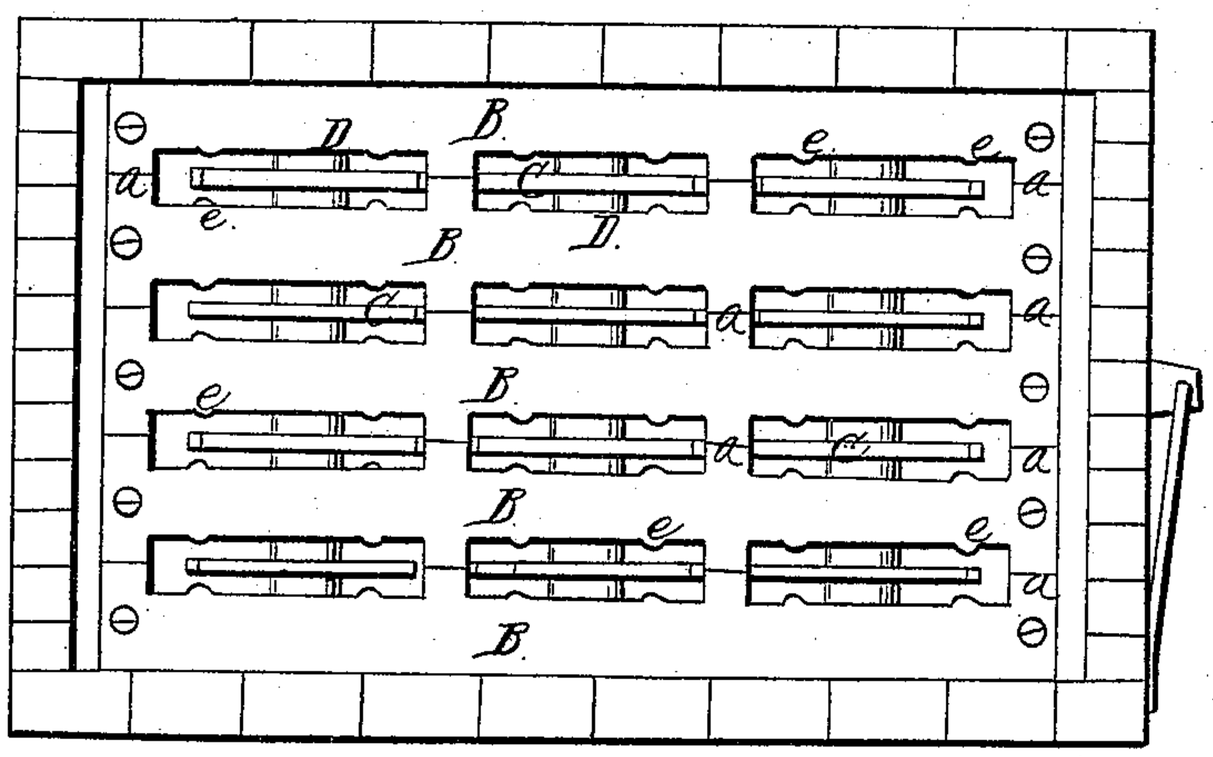


Fig: 2.

Witnesses:

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per

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# United States Patent Office.

MARSHALL D. WELLMAN, OF ALLEGHENY CITY, PENNSYLVANIA.

*Letters Patent No.* 71,253, *dated November* 19, 1867.

## GRATES.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, MARSHALL D. WELLMAN, of Allegheny City, in the county of Allegheny, and in the State of Pennsylvania, have invented certain new and useful improvements in Grates; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and letters of reference marked thereon.

In the annexed drawing, making part of this specification, A represents the furnace, within which is placed a bearing-frame to support the grate-bars. B B represent the grate-bars, which are cast separately and secured side by side within the furnace, with their ends resting upon the bearing-frame. These grate-bars are cast with lugs or projections upon their sides or edges, which pass under and connect with ribs, which are cast on their under sides or bottoms. When the bars are placed side by side, the projections *a a* of each bar meet those of the contiguous bars, while the projections *e e* do not meet, but leave a space between each other to receive the agitators. These projections are to keep the agitators parallel with the bars when at rest, and to prevent them from getting beneath the upper flange of bar B, when in motion. C C represent the agitators, which consist of metallic plates with straight edges upon their upper sides, having curved ends and a square opening in a hub at their centres, through which the shafts D D pass. The curve of the ends of the plates is determined by a radius from the centre of the shaft over which the agitators are passed. These agitators are placed between the grate-bars, with their straight edges flush or level with the upper surfaces of the said bars, and the agitators upon each shaft are connected to those of the next by means of a connecting-bar, which is pivoted to one of each of the series. By means of this connecting-bar the agitators are made to oscillate or rock their shafts, partially rotating backwards and forwards. The projections *a a* meeting, form partitions between the bars across the grate, and when the agitators are placed in position, their curved ends approximate to these partitions. The object in curving the ends of the agitators is, that when they are oscillated their ends will always be the same distance from the partitions, not varying the least to allow cinders or other matter to wedge in between them and the partitions, to clog the action of the agitators. There is no increasing and diminishing, but an unvarying space between the sides of the agitators and the grate-bars, between which they are placed, so that they cannot be clogged on their sides. The space between the grate-bars B B remaining the same, the width of the air-spaces may be increased or diminished by inserting agitators of different thicknesses, so as to control and regulate the admission of air to the fire through the air-channels between the grate-bars and the agitators, making it greater or less, as may be necessary or more desirable. An elbow-lever is connected in any suitable manner to the connecting-bar of the agitators, whereby the operator may oscillate all of the agitators at one time. Instead of the bars B B, a common square or flat bar may be substituted, in which case I dispense with the lugs *e e*, and construct the agitators with flanges on their edges, for the purpose of keeping them parallel when at rest, and to prevent them from getting below the bars when in motion.

I do not confine myself to grate-bars cast separately, nor to grates for any particular form of furnace or fireplace; for it is obvious that the bars may be made either separately or in sections of two or more together, or for small fire-chambers the entire grate may be cast together. By the arrangement above described, when the agitators C C are in position as supplemental grate-bars, I secure the fire-grate, through the openings of which the air rushes with great velocity, preventing, in a great measure, the heating of the bars, and at the same time retaining the fuel above the bars until its combustible elements are consumed. The ashes gradually close the air-spaces, and diminish the volume of air admitted to the fire. When the quantity of air admitted becomes too small, or the fire becomes foul and does not burn freely, the ashes, &c., can be discharged and the fire uniformly stirred by oscillating the agitators C C, the alternate elevations of the ends of the agitators stirring the fire, while the depression of the opposite ends leaves the whole width of the space between the bars free for passage of the ashes, clinkers, &c.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The agitators C C, constructed as described, and secured between the spaces in the grate B, with its projections *e e*, the whole being constructed and operating in the manner substantially as and for the purposes specified.

In testimony that I claim the foregoing improvement in grates, I have hereunto set my hand this 12th day of June, 1867.

MARSHALL D. WELLMAN.

Witnesses:

LEONARD S. JOHNS,

A. V. SCOTT.