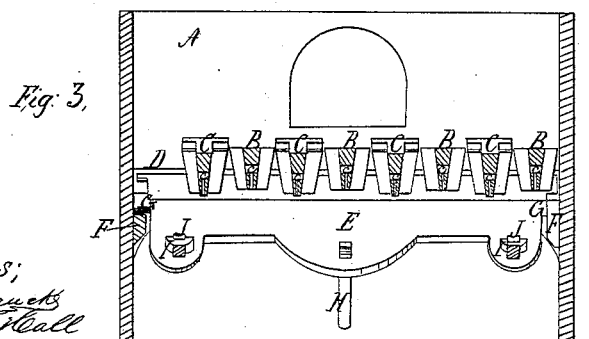
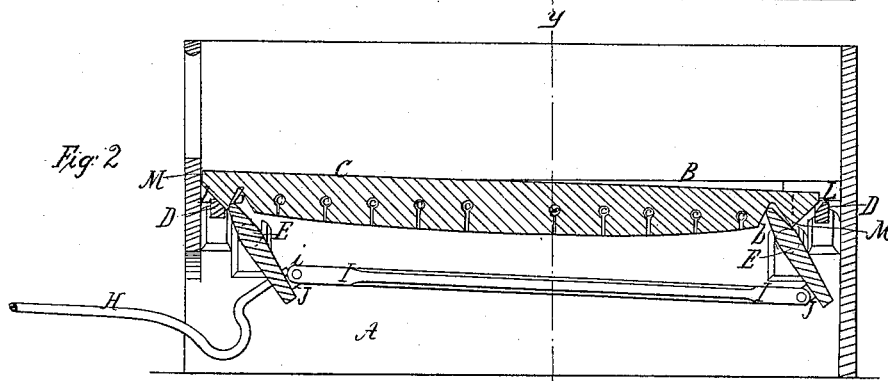
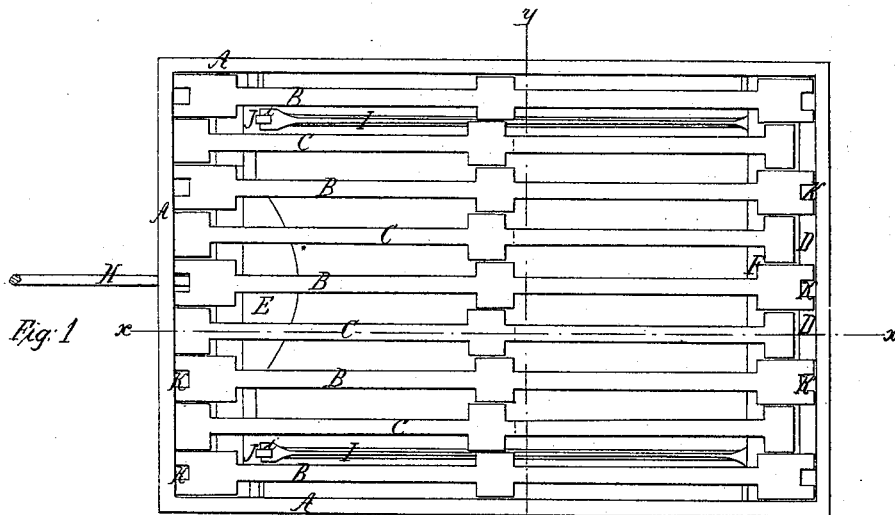


P. Murray,
Furnace Grate.

N^o 51,472.

Patented Dec. 12, 1865.



Witnesses;
Chas. A. & H. H. H. H.
W. F. Hall

Inventor
P. Murray
By *Munnell*
Attorneys

UNITED STATES PATENT OFFICE.

PETER MURRAY, OF MILWAUKEE, WISCONSIN.

IMPROVEMENT IN GRATES.

Specification forming part of Letters Patent No. 51,472, dated December 12, 1865.

To all whom it may concern:

Be it known that I, PETER MURRAY, of Milwaukee, in the county of Milwaukee and State of Wisconsin, have made new and useful Improvements in Grate-Shakers; and I do hereby declare the following to be a full, clear, and exact description of the nature, construction, and operation of the same, sufficient to enable one skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, which are made part of this specification, and in which—

Figure 1 is a plan or top view. Fig. 2 is a longitudinal vertical section on the line *x x*, Fig. 1. Fig. 3 is a transverse vertical section on the line *y y*, Fig. 1.

The invention is an improved shaker for the grates of coal-furnaces; and it consists in the combination of the rockers and the end supports, by which an undulating motion is imparted to the intermediate movable grate-bars as they are longitudinally vibrated.

A A are the walls of the furnace, and B C the grate-bars, with holes *c* to admit air, so as to temper the heat of the same. The grate-bars B are stationary and rest upon the cross-bars D D, which span the space between the sides of the furnace. The grate-bars C, which alternate with the bars B, have in their lower edges notches *b*, into which protrude the upper edges of the rocking bars E, which are journaled at F upon bearings G, and are moved by means of the vertically-vibrating lever H and the connecting-rod I, the latter being jointed at *i i* to the lugs J on the rock-bars E. At the ends of the stationary grate-bars B are notches K, which admit of the passage of air around their ends and prevent the aggregation of coal in such places remote from the influence of active combustion.

The operation of the shaker is as follows: Each alternate bar C C is primarily supported by the imposition of its inclined edges L L upon the oblique surfaces M M of the bars D D; but when the rock-bars E E are moved they strike against the sides of the notches *b* and make one end of the grate-bars C climb upon the bar D toward which they are moving, while the other end of the grate-bar C slides upon the incline of the other bar D, as seen in Fig. 2, the grate-bars having just been rocked to the left, or toward the front of the furnace. The return motion is the counterpart of the former action, and the effect is a combined longitudinal and alternate vertical elevation of the ends of the grate-bars C, which, acting in connection with the stationary bars B, breaks the clinker and discharges the ashes which accumulate under the incandescent mass of fuel, and which obstruct the free admission of air thereto.

The construction of the supporting and moving portions is the same at the front and at the back end of the furnace, and the tilting action of the ends is consequently identical. When the bars wear unequally at the ends they may be shifted end for end, transposed, or removed.

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

The combination of the supporting-bars D D and rocking bars E E, operating substantially as and for the purpose described.

PETER MURRAY.

Witnesses:

N. H. MUIR,
C. R. JONES.