(Model.)

P. REXFORD.

FIRE GRATE.

No. 283,144. Patented Aug. 14, 1883.

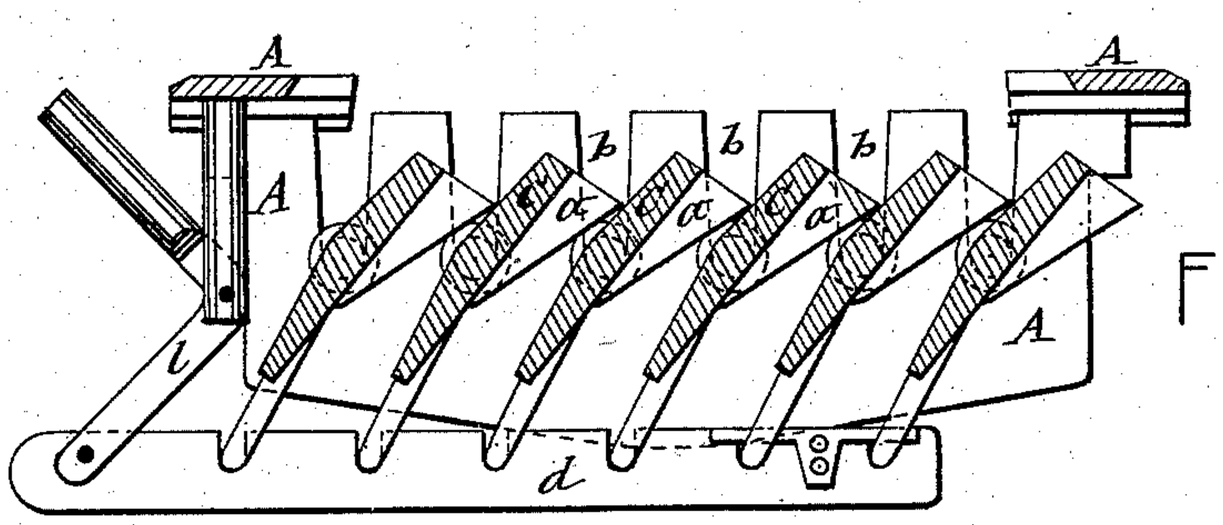

FIG-1-

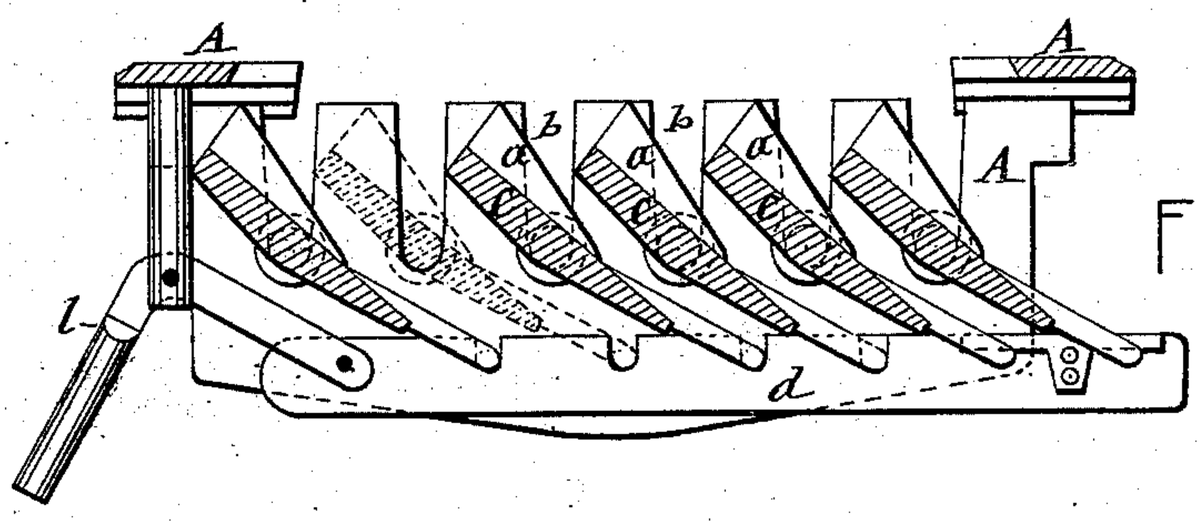

FIG-2-

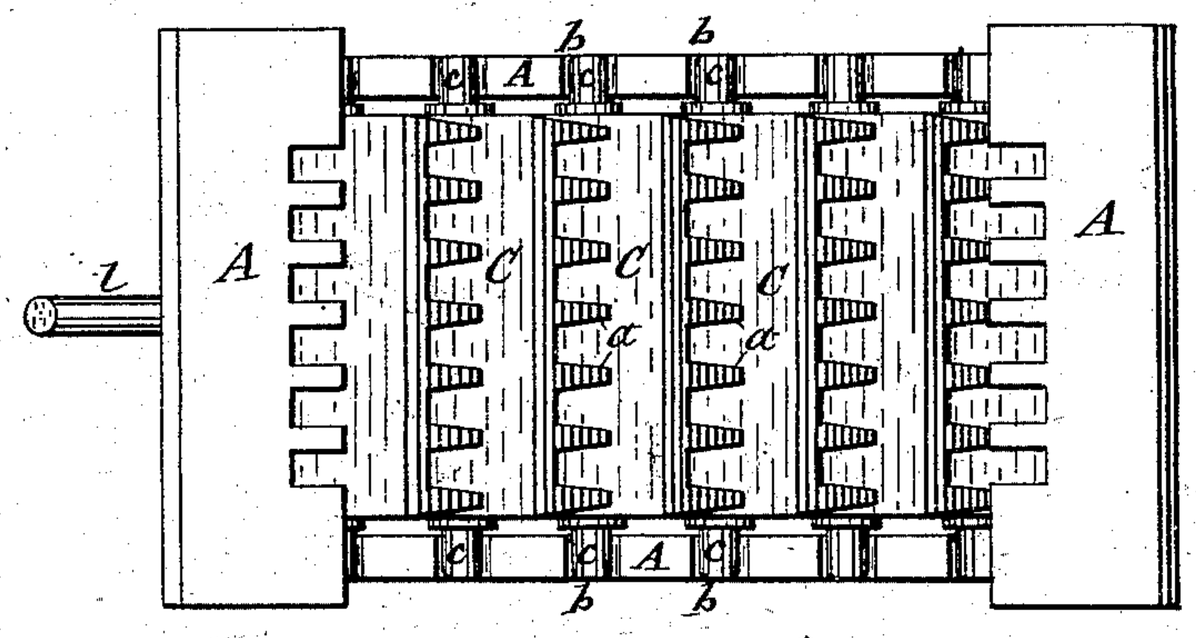

FIG-3-

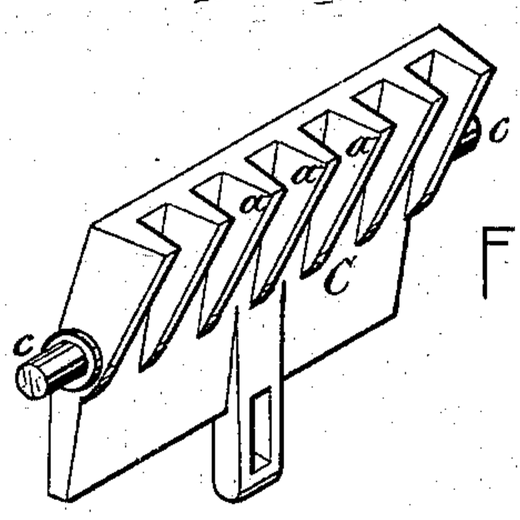

FIG-4-

WITNESSES—

Wm. C. Raymond.

C. Bevdixon

INVENTOR—

Philander Rexford

per Duell, Lass & Hay

his Attys

UNITED STATES PATENT OFFICE.

PHILANDER REXFORD, OF SYRACUSE, NEW YORK.

FIRE-GRATE.

SPECIFICATION forming part of Letters Patent No. 283,144, dated August 14, 1883.

Application filed May 21, 1883. (Model.)

To all whom it may concern:

Be it known that I, PHILANDER REXFORD, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Furnace-Grates, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to the class of fire-grates which are usually designated "shaking-grates."

The invention consists, essentially, in a novel construction and combination of grate-bars pivoted intermediately of their depth, and having projecting from the upper part of one and the same side a series of teeth or ribs. Said bars, when in their normal position, stand obliquely, and form with their upper portions a succession of troughs, one side of which is solid and plain, and serves to prevent too free escape of the lower stratum of the bed of fire, and thus adapts the grate for the use of fine coal, and while serving the aforesaid purposes said solid side of the trough forms an inclined chute under the ribbed side of the adjacent grate-bar, the latter affording sufficient ingress of air to the fire. Said grate, when shaken, causes the top of the several bars to rise and break up the bed of fire and scrape and stir the bottom stratum thereof, and at the same time said bars turn into a vertical position, and thereby enlarge the egress for the ashes and cinders and afford a freer escape for the same, all as hereinafter more fully described, and set forth in the claims.

In the annexed drawings, Figure 1 is a vertical longitudinal section of my improved fire-grate when in its normal position. Fig. 2 is the same view, showing the position into which the grate-bars are thrown when shaken. Fig. 3 is a plan view of the grate, and Fig. 4 is an isometric detached view of one of the grate-bars.

Similar letters of reference indicate corresponding parts.

A denotes the grate-supporting frame, having its two sides provided with suitable bearings, *b b*, for the grate-bars C C, which latter are provided at or near the center of their ends with trunnions *c c*, by which they are pivoted in the bearings *b b* aforesaid.

The several grate-bars are provided on one and the same side with teeth or ribs *a*, extending from the top edge of the bar part way downward, with gradually-diminishing projection. The opposite side or back of the bar is plain and preferably beveled toward the top and bottom of the bar. These grate-bars, when in their normal position, stand obliquely, each resting with the top of its teeth or ribs *a a* on the plain back of the adjacent bar, as illustrated in Fig. 1 of the drawings. It will be observed that this forms a succession of V-shaped troughs, one side of which is plain and solid, and the other side has perforations or ports formed by the interstices between the ribs *a a*. The solid side of said troughs, while forming an inclined chute toward the perforated side of the trough and under the ribs *a a*, at the same time presents a broad bearing-surface for the bottom stratum of the bed of fire, and thus prevents too rapid escape from said stratum, and admits of the use of fine anthracite coal as fuel, the perforated side of the trough affording sufficient ingress of air to the fire to supply the same with the requisite oxygen.

To the bottom of the several grate-bars is hinged a bar, *d*, extended the length of the grate and connected with a lever, *l*, by which to impart a reciprocating motion to the bar *d*, which transmits an oscillating motion to the grate-bars. In the oscillation of the grate-bars the alternate inclined solid backs and toothed tops presented by the bars tend to raise to some extent the bed of the fire, and thus stir and open it, to allow the ashes and clinkers to fall to the bottom and the air to freely permeate through the fire. As the bars attain a vertical position the egress for the ashes and cinders is enlarged and the escape of the same facilitated, and the further movement of the bars causes the toothed top thereof to scrape the bottom stratum of the bed of fire. At the same time the bars fall into an oblique position, as shown in Fig. 2 of the drawings, and thereby partly contract the openings between them, so as to prevent excessive escape of the loosened bottom stratum of the fire. Then, by swinging the bars back into their normal position, the bottom of the bed of fire receives another stirring and scraping, the ashes and cinders are allowed to escape from between the bars, and the fire is left clean, bright, and

loose, to admit of a free circulation of air through it.

By beveling the plain back of the bar toward the top and bottom thereof the upper portion of said back is caused to present a flatter surface, and the lower portion produces a downward flare in the space between the bars, the former increasing the capacity for supporting the fire, and the latter serving to keep clear the spaces between the bars.

I am aware that oscillating grate-bars have been constructed with lugs or teeth upon opposite sides thereof; but it is obvious that such bars do not, when in their normal position, form a succession of troughs one side of which is plain and solid and forms a partial support for the fire, and a smooth inclined plane extending the entire depth of the bar to allow the fine ashes and cinders to escape from the bottom of the fire without shaking the grate, and which plain side also presents a smooth and uninterrupted top edge, which, in the operation of shaking the grate, sweeps uniformly the entire width of the bottom of the fire without undue agitation of the same. Aside from the aforesaid improved result it will be observed that my improved grate-bar is of such a form as to greatly facilitate the molding and casting thereof.

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

1. The combination of grate-bars pivoted intermediately of their depth and having projecting from the upper part, on one and the same side, a series of teeth or ribs, substantially as set forth.

2. A grate-bar pivoted intermediately of its depth and having one side plain and provided on the upper part of its opposite side with a series of teeth or projections, in combination with a similarly constructed and pivoted bar disposed with its plain side adjacent to the toothed side of the first-described bar, substantially as shown and set forth.

3. A grate composed of grate-bars pivoted at about midway their depth, and having on one and the same side vertical ribs extending from the top of the bar part way the depth of the same, with gradually-reduced projection, substantially as shown.

4. A grate-bar pivoted intermediately of its depth and having one of its sides plain and the opposite side provided with vertical ribs extending from the top edge of the bar part way the depth thereof, with gradually-diminishing projection, in combination with a similarly constructed and pivoted bar standing with its plain side facing the ribs of the first-described bar, substantially as shown and described.

5. A grate-bar pivoted intermediately of its depth and provided at the upper portion of one side with teeth or projections and having the opposite side plain, with the upper portion thereof beveled toward the top of the bar, substantially as described and shown.

6. A grate-bar pivoted intermediately of its depth and having one side provided with teeth or projections at its upper portion and the opposite side plain and beveled toward the top and bottom of the bar, substantially as described and shown.

In testimony whereof I have hereunto signed my name and affixed my seal, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga and State of New York, this 20th day of February, 1883.

PHILANDER REXFORD. [L. S.]

Witnesses:

C. H. DUELL,

C. BENDIXON.