D. SMITH.

Grate.

No. 210,883. Patented Dec. 17, 1878.

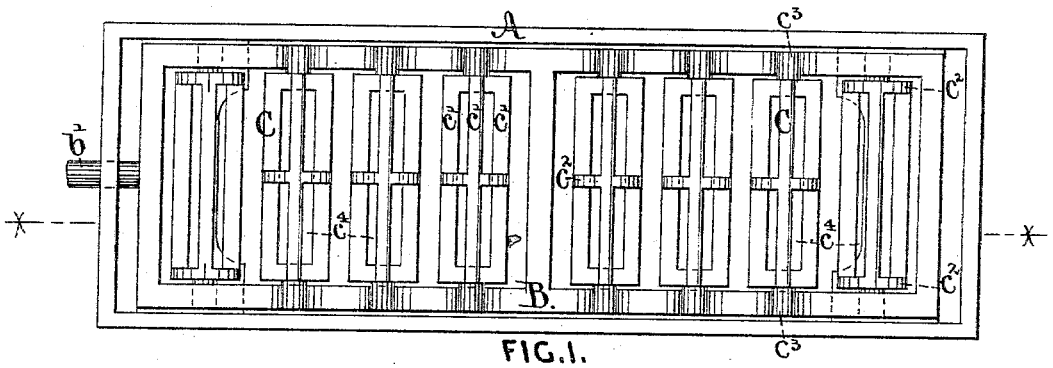

FIG. 1.

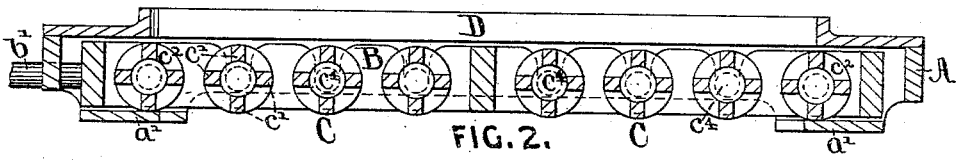

FIG. 2.

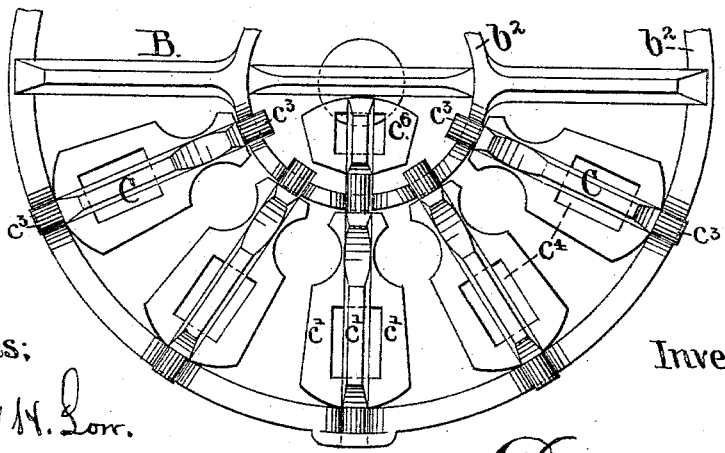

FIG. 3.

Witnesses;

William H. Lorr.

Wm. F. Hinne

Inventor;

David Smith

UNITED STATES PATENT OFFICE.

DAVID SMITH, OF ALBANY, NEW YORK.

IMPROVEMENT IN GRATES.

Specification forming part of Letters Patent No. **210,883**, dated December 17, 1878; application filed April 23, 1878.

To all whom it may concern:

Be it known that I, DAVID SMITH, of the city and county of Albany, and State of New York, have invented certain new and useful Improvements on Grates for the Fire-Boxes of Stoves, &c., of which the following is a full and exact description.

My invention consists in constructing the bars of the grates upon which the fuel is burned with radial wings. Each bar, being independent of the frame in which it is placed, is supported upon suitable bearings, so as to render it capable of being automatically or otherwise rotated or oscillated about its axial center, as herein set forth.

In the accompanying drawings, which form a part of this specification, and to which reference is herein made, Figure 1 is a plan view of one form of my improved grate as adapted to a cooking-stove; Fig. 2, a vertical section of the same at the line *x x;* and Fig. 3, a plan view of a portion of a circular grate, showing the manner of arranging these bars radially.

As shown in Figs. 1 and 2 of the drawings, A is the frame for receiving the grate, which may be modified in any way to adapt it to the required purpose. B is the grate-frame, which is provided with the stem b^1, extending out beyond the exterior casing of the stove, for the purpose of affording means for imparting an endwise or shaking movement to the grate.

The grate-bars C are made separately, and have projecting from their axial center the radial wings c^1, which, for the purpose of greater strength, may be connected by the circular flanges c^2, arranged either at the ends thereof, at the center, or at any intermediate part. As shown in the drawing, the two outer bars have these flanges at their ends, where they serve as rollers (on the plate a^1 of the frame A) for carrying the grate-frame B in the operation of shaking the grate. At each end of each bar a journal, c^3, is formed, for entering suitable openings in the frame B, so that each bar can rotate on its own axis.

As I preferably make them, these grate-bars have their centers cored out to form the openings c^4, for the purpose of admitting a greater volume of air to the burning fuel, and for the better protection of the metal of which the bar is made; but, when preferred, the center may be made solid.

D is a top frame, (omitted in Fig. 1 for the purpose of showing the underlying parts,) which forms a seat for the fire-brick in the fire-box, and a covering for the journals of the grate-bars, to prevent an accumulation of ashes thereon, which would impede their rotations.

As shown in Fig. 3, which is an adaptation of my invention to cylindrical fire-boxes, the grate-frame B is formed of connected concentric rings b^2, which contain the bearings for the journals c^3 of the grate-bars C. These grate-bars are arranged radially in the frame B. Two of them, placed at opposite sides of the frame, are provided with winged extensions c^6, passing into the central portion of the grate, where, as the grate-bars rotate or oscillate, they disturb the center of the fire so as to remove the ashes and clinkers therefrom. In this manner they produce an effect not attained by the ordinary circular grate moving on a central pivot, in which the central portion of the fuel remains undisturbed during the shaking of the grate, and from this cause the ashes accumulate at the center of the fire and seriously impede the combustion.

In shaking the grates of the forms shown in Figs. 1 and 3, as the frames B are moved back and forth, the bars C are forced, by the resistance of the superincumbent fuel, to rotate partially or entirely in a direction contrary to the movement of the frame B, thereby causing the radial wings of the bars to rapidly collide with the ashes and clinkers at the bottom of the fire, and producing a rapid discharge of them from the fire.

By making the bars with radial wings, as they oscillate or rotate the spaces between the wings of the contiguous bars are constantly varying, and by the action produced by the movement of the bars, combined with the expansion and contraction of the spaces between them, the ashes and clinkers are drawn down and forced out from the fire-box, and by this action much larger clinkers are discharged than can be passed through the stationary bars of an ordinary grate.

I claim as my invention—

1. The combination, with a grate-frame adapted to receive a reciprocating motion, as herein described, of a series of radially-winged grate-bars, C, arranged in said grate-frame transversely to its line of motion, and in such manner that the said bars will be automatically rotated upon their journals c^3 by the reciprocating motion of the grate-frame, as herein set forth.

2. The combination, with a circular grate-frame, of a series of radially-winged grate-bars, C, arranged as herein described, two or more of them being provided with winged portions c^6, extending into or near the center of the fire-bed, all of said grate-bars being automatically rotated by the motion derived from the movement of the grate-frame, as herein set forth.

DAVID SMITH.

Witnesses:
WILLIAM H. LOW,
WM. I. WINNE.