No. 664,704. Patented Dec. 25, 1900.

C. E. WYMAN.

FURNACE GRATE.

(Application filed Jan. 16, 1899.)

(No Model.) 3 Sheets—Sheet 1.

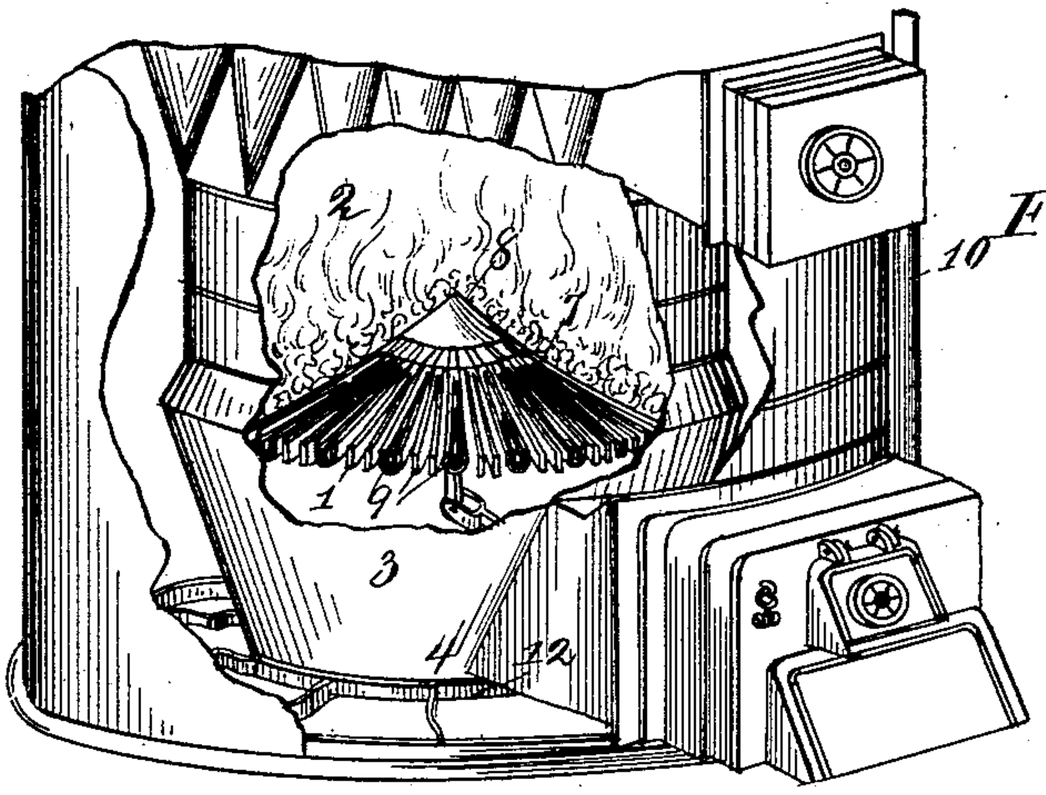

Fig. 1

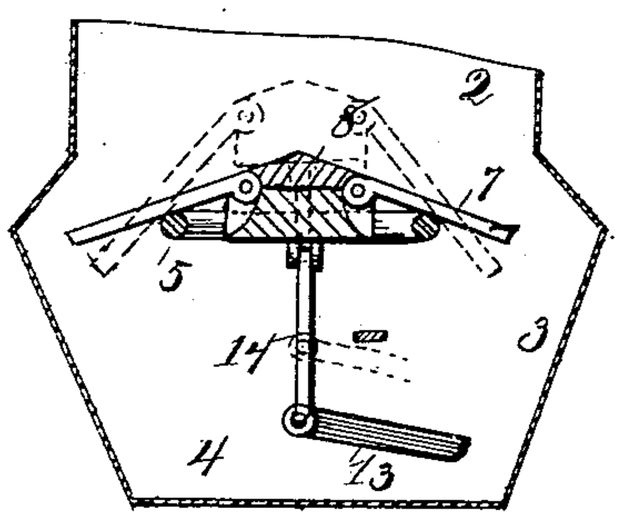

Fig. 6

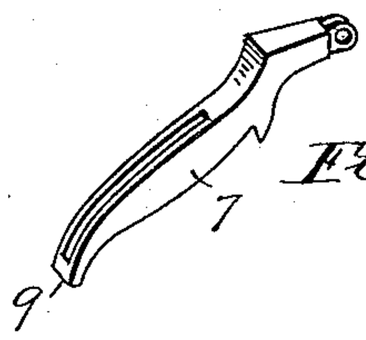

Fig. 5

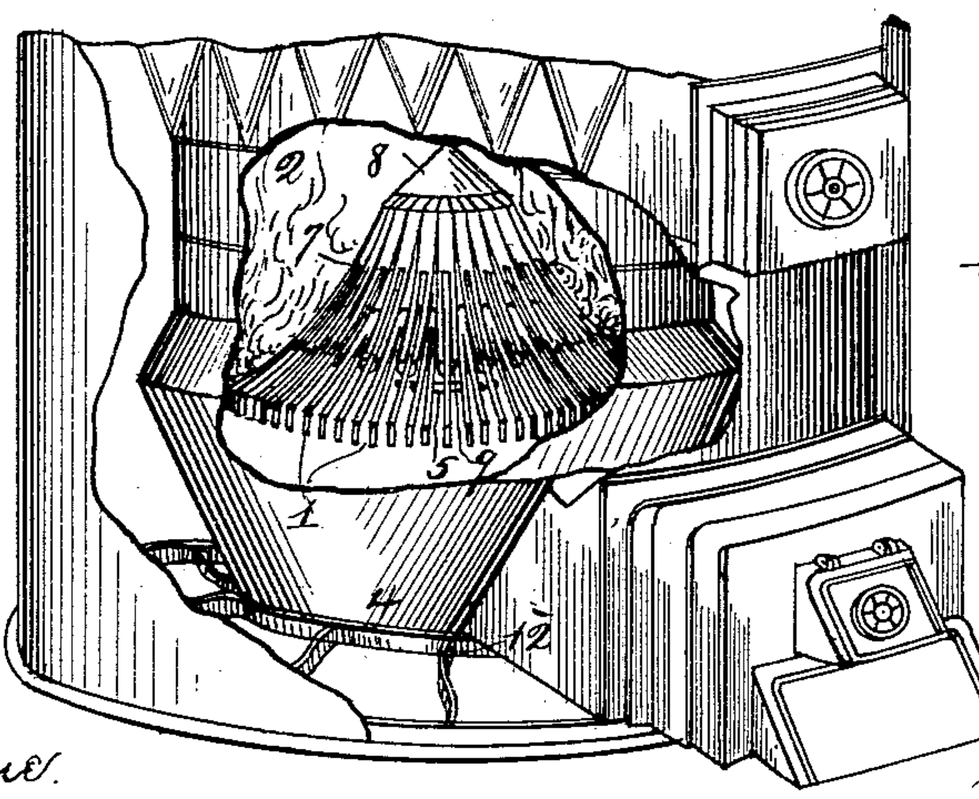

Fig. 2

Witnesses
Ruby M. Browne.
E. A. Nowell

Inventor
Charles E. Wyman

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 3.

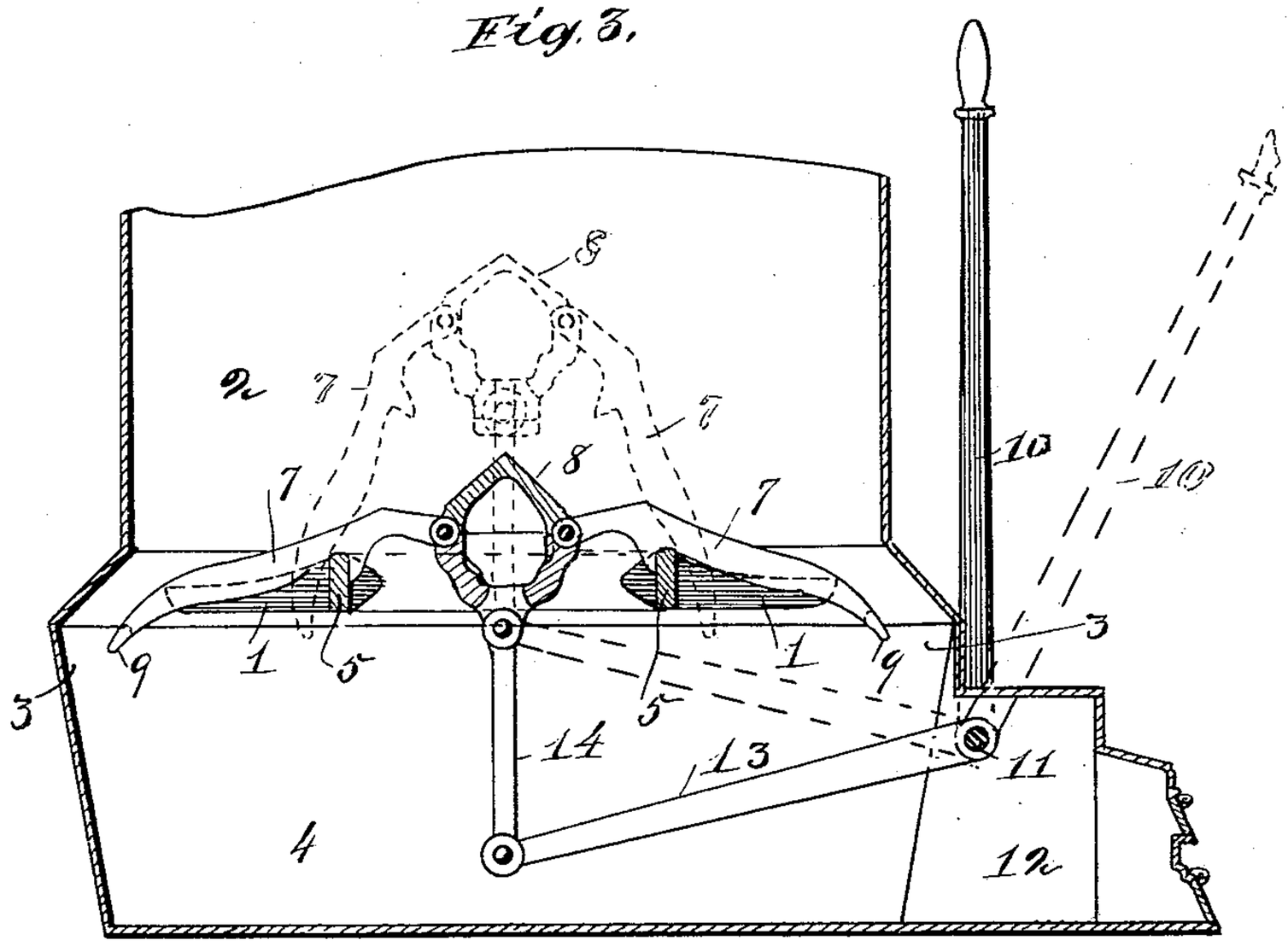
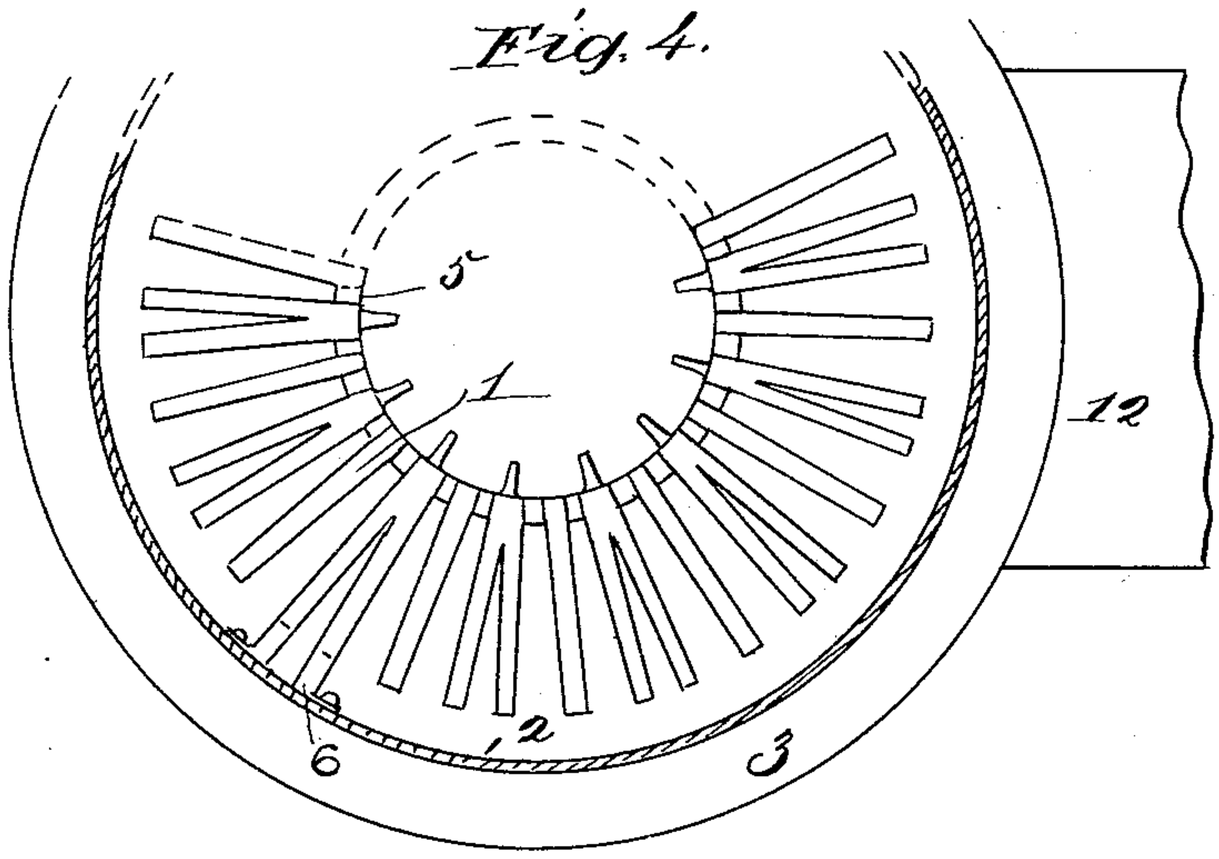


Fig. 4.



Witnesses
Percy E. Nevitt
Geo. O. Willett

Inventor
Charles E. Wyman
by Munn & Co.
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 3.

Fig. 7

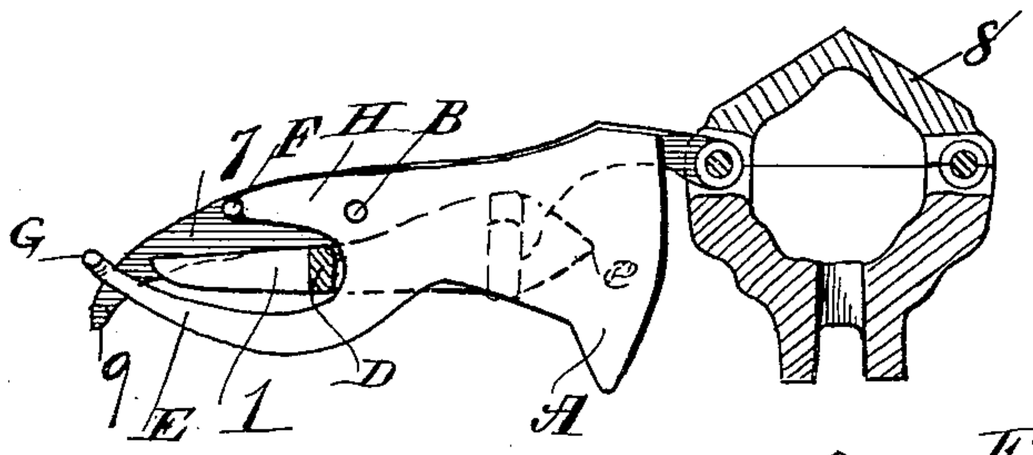


Fig. 8

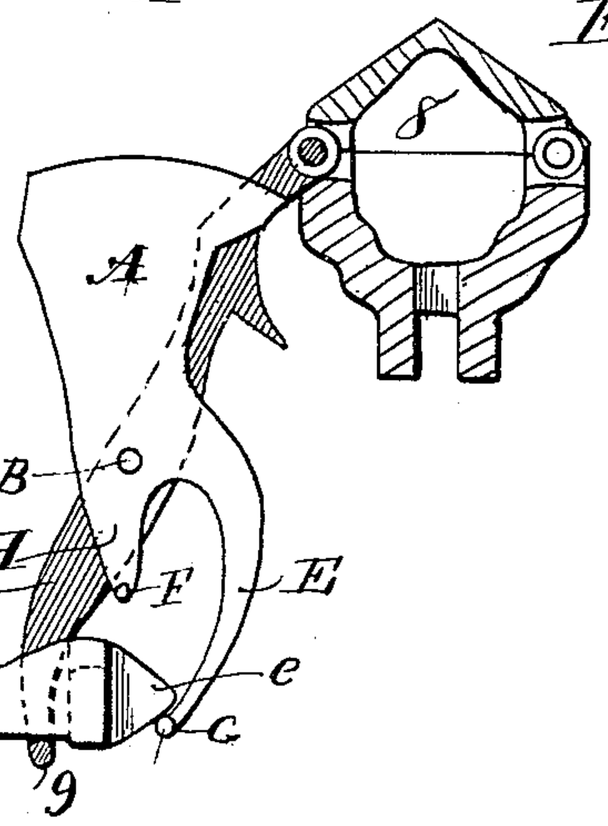
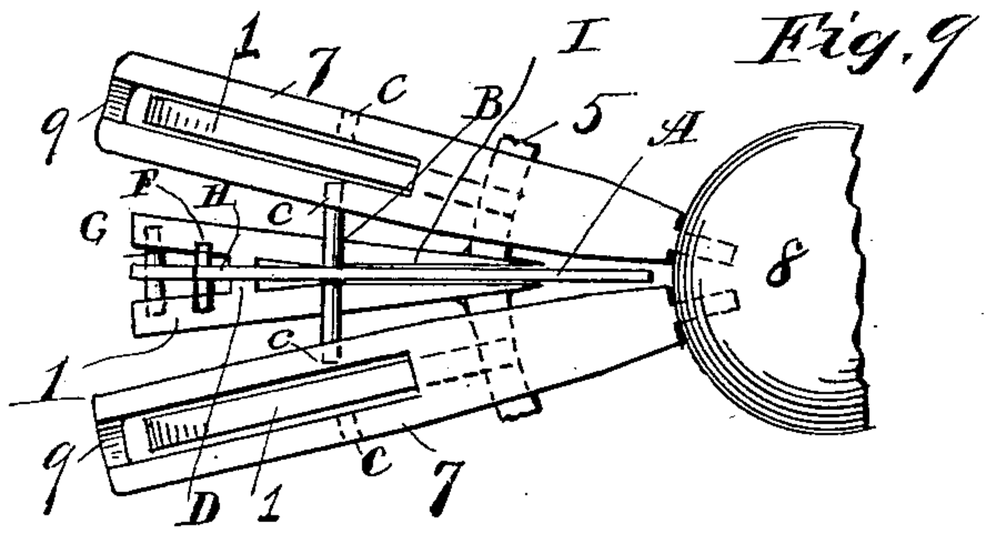


Fig. 9



Witnesses
Percy E. Neville
Geo. O. Willet.

Inventor
Charles E. Wyman
by Munn & Co.
Attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES E. WYMAN, OF CLEVELAND, OHIO.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 664,704, dated December 25, 1900.

Application filed January 16, 1899. Serial No. 702,317. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. WYMAN, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, State of Ohio, have invented certain new and useful Improvements in Furnace-Grates, of which I hereby declare the following to be a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in grates for furnaces; and the object of the invention is to provide a form of grate which will permit a central draft and is easily cleaned and to obtain complete combustion of the coal and consequent combustion of the smoke.

My invention consists in a vertically-movably grate portion in which the bars incline outward from a common central support, in connection with a lower annular support, and in the combination and arrangement of parts and construction of details, as hereinafter described, shown in the accompanying drawings, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 is a view of a furnace, a portion of the side being broken away to show the grate in position for use. Fig. 2 is a similar view showing the central portion of the grate raised to redistribute the coal. Fig. 3 is a vertical sectional view showing the grate in position. Fig. 4 is a plan view of the main or stationary grate. Fig. 5 is a detail view of movable grate-bars; and Fig. 6 is a view of a simpler form, in which the lower grate is omitted. Figs. 7 and 8 show an additional vibrating cleaning-plate between the grate-bars, and Fig. 9 is a plan of the same.

In these views, 1 is the main or stationary portion of the grate.

2 is the fuel-chamber, which is enlarged at 3 about the edge of the grate to give free access to clinkers and ashes to the ash-receiver 4 below. The bars of the grate 1 are slightly inclined toward this annular space, so that the ashes and clinkers will naturally gravitate that way. They are supported upon the intermediate ring 5, the ring and bars being rigidly secured together. Some of the bars, as 6, extend across the annular space and support the grate upon the walls of the furnace.

7 represents the movable portion of the grate, which is shown to consist of radially-arranged bars pivotally secured to a common central support 8. The bars rest upon the ring 5 at their lower extremities, and the support 8 is arranged to move vertically, thus forcing the bars to spread at their lower extremities over the ring as the support 8 descends and permitting them to come to nearly a vertical position as the support rises. As shown in the figures, the bars of the vertical portion of the grate may be provided with loops 9, which encircle bars in the horizontal portion and in this manner are kept in close contact therewith. These loops are not essential, however, to the invention, since the ring will serve to throw out the bars unaided, and they will drop back by means of gravity and the pressure of the coal upon them. The loops serve also as stops to limit the upward movement of the grate.

The means for raising the central portion is seen distinctly in Fig. 3, where 10 is a lever exterior to the furnace which is employed to rotate the shaft 11, pivoted in the extension 12 of the ash-pit 4. Upon this shaft is secured the arm 13, which in turn is pivotally secured to the vertical rod 14, secured to the cone.

The support 8 may be conical in shape, so as to penetrate the coal above more readily.

It will be seen that by raising the movable portion of the grate the burning coal can be thrust outward toward the side, and upon lowering it fresh coal will be deposited upon the central portion of the grate. The draft being central, the gases and smoke arising from the fresh coal must pass through the incandescent mass of live coal, and hence all the products of combustion will be utterly consumed, and a smokeless furnace will be the result. Again, the motion of the upper bars upon the lower will result in pushing all ashes and clinkers off from the outer edge of the stationary grate into the ash-pit, and a perfectly clean grate will be maintained at all times. The consumption of fuel will be so complete and easily accomplished that any kind of fuel, even slack

coal, can be employed, and the movement of the vertical portion will break up any collection of fuel massed together in the combustion-chamber and prevent caking, splitting it in fragments as the cone is raised.

In Fig. 6 is seen a simpler form in which the lower grate-bars are entirely dispensed with and the movable grate spread to provide the entire grate-surface. The annular ring 5 alone is preserved in the lower portion over which the grate-bars move, and a stop, as 20, is employed to prevent greater movement than would be required to merely shake and clean the grate. When, however, it is desired to dump the grate, the stop can be removed and the grate raised to its upward limit of movement, thus discharging the entire contents into the ash-pit below.

In Figs. 7, 8, and 9 is seen a thin vibrating plate A, which is adapted to assist in breaking up the mass of coal about the vertical portion of the grate when elevated. This plate is pivoted at B to each of the moving grate-bars 7 and by means of the curved tailpiece E, terminated by a cross-piece G, is thrown outward as the movable grate-bar rises, as shown in Fig. 8 in section. It will be seen that the tailpiece E engages the lower edge of the fixed grate-bar 1 throughout its length and also the projecting point *e*. A second projection H, terminated by a similar cross-piece F, engages the top of the fixed grate-bar and assists in returning the vibrating plate to its original position, as seen in Fig. 4. A slot, as I, is formed in the fixed grate-bar to accommodate this vibrating plate.

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

1. In a grate, the combination with a stationary portion, the bars in which are inclined outwardly from a supporting-ring, of a central vertical portion, comprising bars pivoted to a central support at their upper extremities and resting at their outer extremities upon said ring in the stationary portion of the grate, and means for raising and lowering said central portion, substantially as set forth.

2. In a grate, the combination with a main stationary portion of a central vertically-movable portion, the lower extremities of the bars of the said vertical portion being pivoted about a common central support and constructed and arranged to move outwardly over and between the bars of the lower portion as the central support descends, and to withdraw together about the center of the grate as the central support rises, substantially as described.

3. In a furnace, the combination with a fuel-chamber, provided with an enlargement near its lower extremity, of a fixed grate provided with bars inclined from the center toward said enlarged portion of the fuel-chamber, and of less diameter than said enlarged portion, and provided also with a supporting-ring, a central vertically-movable grate having its bars resting upon said ring and pivoted above to a common central support, and means for raising and lowering said central support, substantially as described.

4. In a grate, the combination with bars mounted upon a stationary ring of a central movable head, bars pivotally attached to said head at one extremity and the other extremity resting upon the ring in combination with vibrating plates pivotally secured to said pivoted bars and adapted to move outwardly as said pivoted bars rise toward the vertical position, substantially as described.

Signed by me at Cleveland, Ohio, this 13th day of December, A. D. 1898.

CHARLES E. WYMAN.

Witnesses:
WM. M. MONROE,
C. H. OLDS.