

(No Model.)

2 Sheets—Sheet 1.

C. MARTIN.
FURNACE GRATE.

No. 326,309.

Patented Sept. 15, 1885.

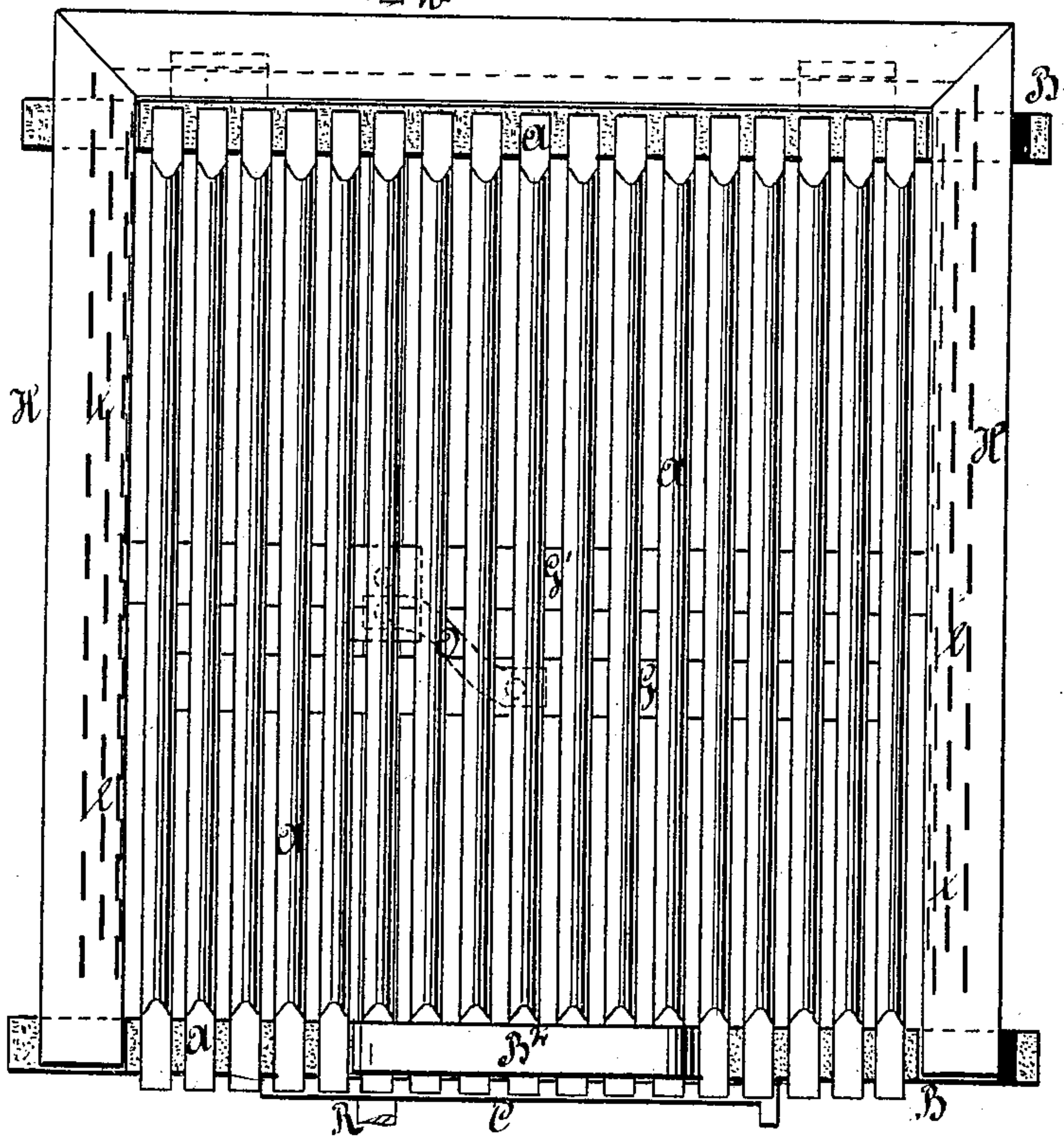
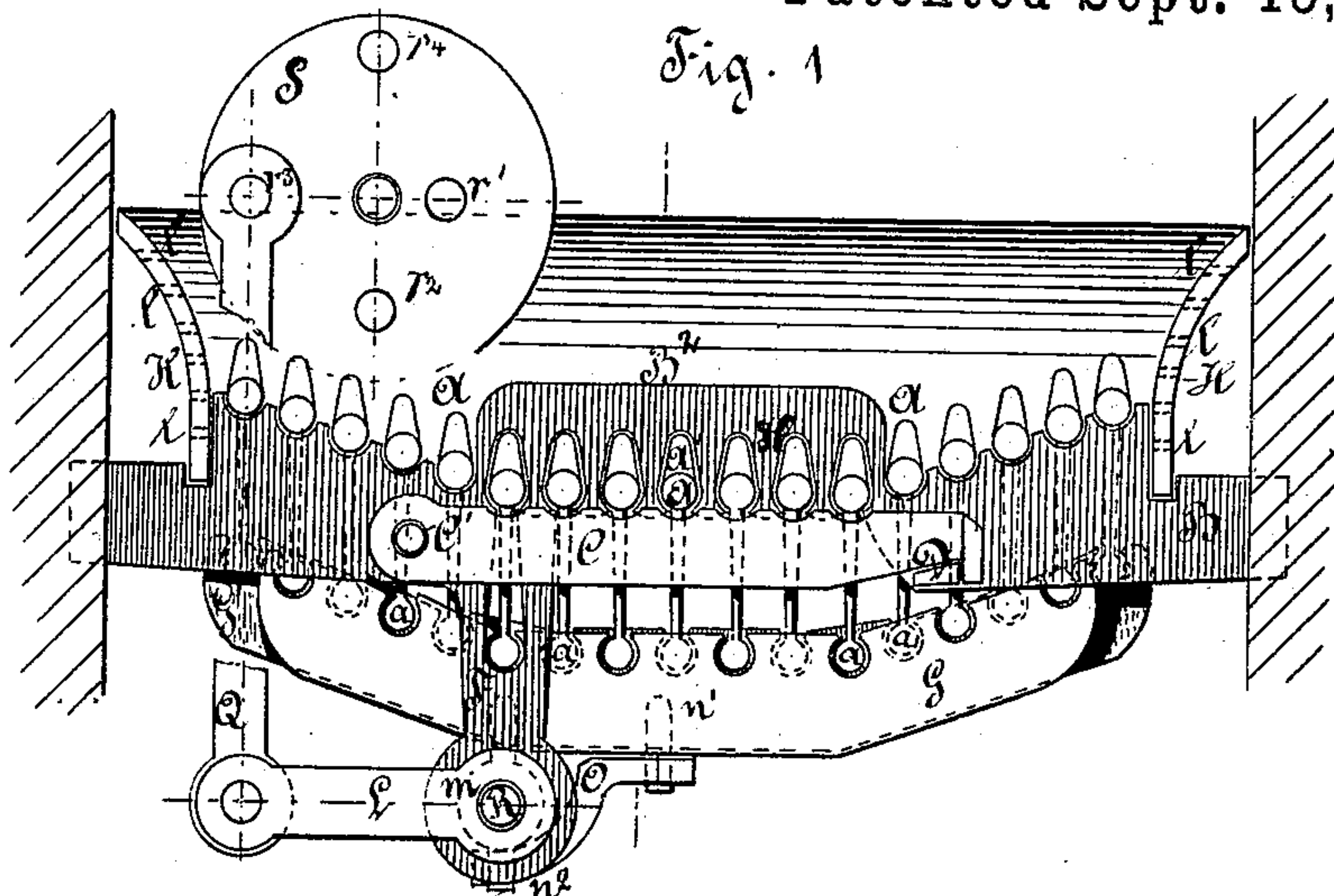


Fig. 2.

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Inventor:
Charles Martin
by Joseph Jaeger
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Fig. 3

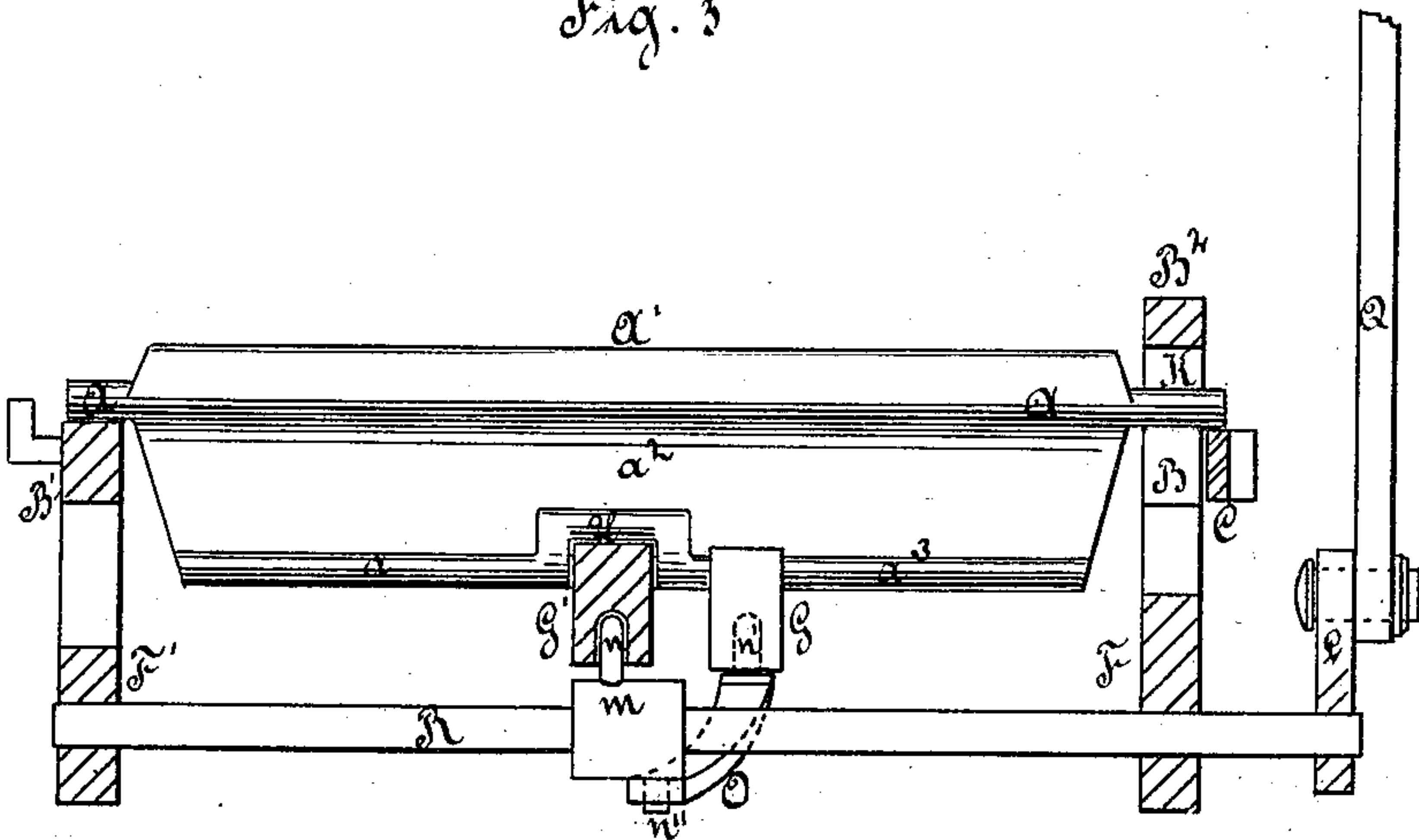
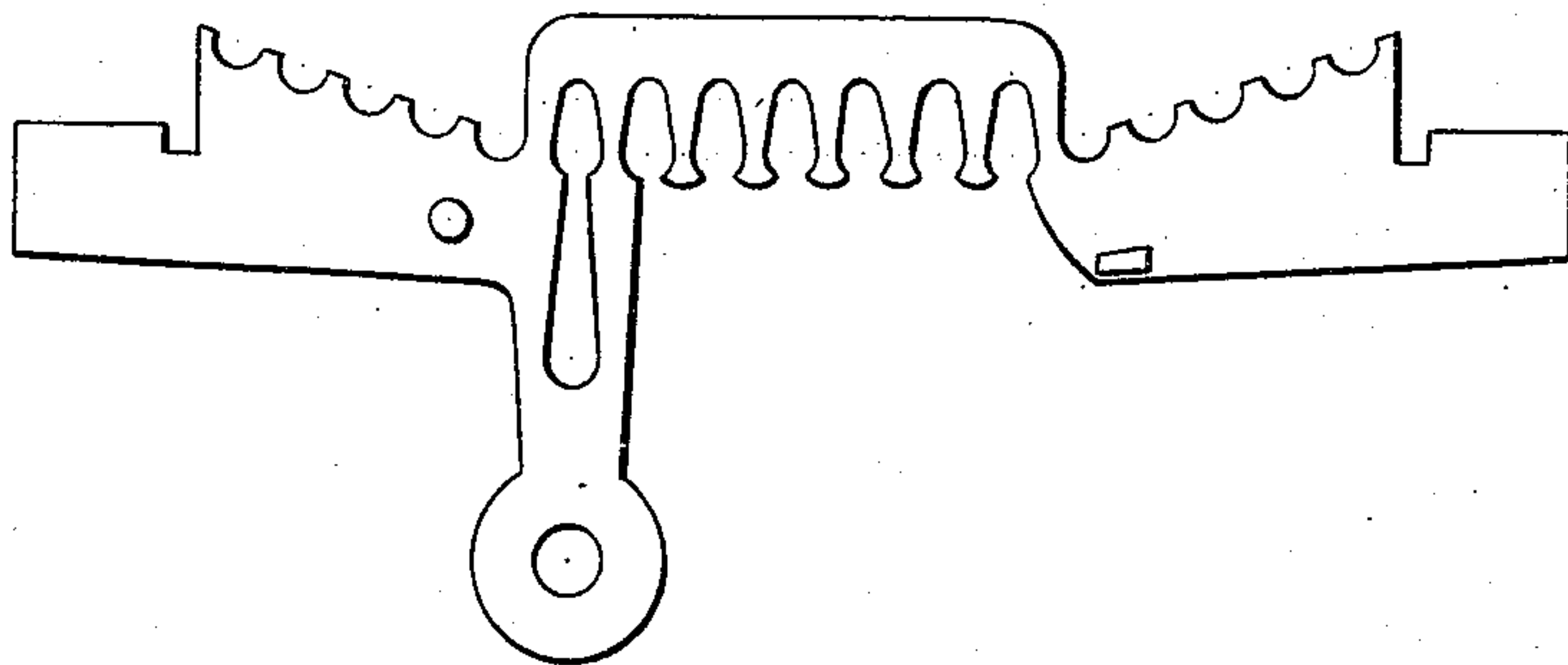


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES MARTIN, OF PARIS, FRANCE.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 326,309, dated September 15, 1885.

Application filed July 3, 1884. (No model.)

To all whom it may concern:

Be it known that I, CHARLES MARTIN, of Paris, in the Republic of France, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a specification.

This invention relates to an improved grate for steam-boiler and other furnaces of that class in which the grate-bars are made to oscillate on their longitudinal axes, so that the formation of clinkers is prevented, a uniform supply of atmospheric air obtained, and the frequent opening of the fire-door and cleaning the grate is dispensed with.

This invention is more especially designed to overcome some of the defects of grates with oscillating grate-bars by imparting to adjoining grate-bars an oscillating motion in opposite direction to each other, and by facilitating the removal of the grate-bars at the middle portion of the grate for cleaning the same without the necessity of opening the fire-doors.

The invention consists of a grate, the bars of which are pivoted to transverse main pieces having recesses for said pivots. The middle portion of said main pieces is horizontal, and the side portions are inclined, so that the fuel is shed toward the middle of the grate. The lower ends of the grate-bars are engaged by transverse rack-bars, to which laterally-oscillating motion in opposite direction to each other is imparted by an oscillating crank-shaft that is connected by pins and straps with the rack-bars. The front main piece has a middle arched portion which is recessed at the under side and re-enforced by a detachable front piece recessed at the upper edge, for supporting the front pivots of the middle grate-bars and admitting the removal of the same in longitudinal direction for cleaning the same.

In the accompanying drawings, Figure 1 represents a front elevation of my improved furnace-grate. Fig. 2 is a plan of the same; Fig. 3, a vertical longitudinal section showing one grate-bar with its bearings and oscillating mechanism; and Fig. 4 is a detail elevation of the front main piece that supports the grate-bars.

Similar letters of reference indicate corresponding parts.

In the drawings, *a a* represent the bars of my improved furnace-grate, which are composed of an upper rib, *a'*, and a lower rib, *a''*, connected by a web, *a'''*, said upper rib being provided with a tapering longitudinal fin extending upwardly. The journals of the bars *a* are supported in bearings of transverse main pieces *B B'*, which are set into the masonry of the furnace. The middle portions of the transverse pieces *B B'* are horizontal, while the side portions have an upward inclination. The middle grate-bars are thereby supported in a horizontal line and the side bars in rising lines at both sides of the same. The upper edges of the transverse pieces *B B'* have semicircular recesses for the pivots of the grate-bars *a*, whereby they are enabled to oscillate on said pivots.

The main pieces *B B'* are provided with downwardly-extending hangers *F F'*, for supporting a shaft, *R*. To said shaft *R* is secured a sleeve, *m*, which connects by an upwardly-extending pin, *n*, with a socket of a transverse bar, *G'*, of rack shape, and by a downwardly-extending bottom pin, *n''*, with a curved bar, *O*, having a pin, *n'*, which latter engages a bottom socket of a second transverse rack-bar, *G*, as shown clearly in Fig. 3. The rack-bars *G G'* are located below the grate-bars and intermediate between the transverse pieces *B B'*. The rack-bar *G'* is connected with the first, third, fifth bar, and the bar *G* with the second, fourth, sixth, &c., bar of the grate.

Oscillating motion is imparted to the shaft *R* by a crank-disk, *S*, having pins *r' r'' r''' r''''* at different distances from the center of the disk, for varying the stroke of the crank *L* of shaft *R*, said crank being connected by a rod, *Q*, with the pins of the crank-disk *S*. By the oscillating motion of shaft *R* and its connection with the rack-bars *G G'*, the latter are laterally reciprocated in opposite direction to each other, whereby the upper parts, *a'*, of two adjacent grate-bars are alternately close together and separated from each other, so that the fuel is squeezed between the upper tapering ends of the grate-bars, and thereby not only gradually moved from the side grate-bars to the middle grate-bars, but also the breaking up of the clinkers facilitated, so that they can drop

through between the grate-bars. The larger pieces of fuel pass gradually to the middle horizontal portion of the grate.

To admit the independent motion of bars G 5 G', the grate-bars *a a* are provided at the under side with recesses U, as shown in Fig. 3.

To clean the horizontal grate-bars from adhering clinkers, they can be removed from the grate without opening the fire-door. To accomplish this the front main piece, B, is constructed as follows: The inclined side portions of the same have recesses at their upper edge, upon which the side grate-bars are placed. The middle portion, B², of the front piece, B, 5 is made arched and recessed at the lower edge for the upper tapering parts, *a'*, of the grate-bars, as shown in Fig. 1. The lower parts of the middle grate-bars are thereby left free, so that they can be drawn out in longitudinal 20 direction. The side faces of the oval recesses of the middle portion, B², support to some extent the middle grate-bars, *a*, while the front pivots of the same rest on a detachable piece, C, that is applied at one end with a pivot, C', 25 and supported at its opposite end on a horizontal lug, D, of the front piece, B. The detachable re-enforcing piece C is provided with suitable recesses at its upper edge, and serves as the main support of the middle grate bars. 30 When one or more bars of the horizontal part of the grate are to be removed, the transverse piece C is detached and the bars withdrawn. To allow this the rack-shaped transverse pieces G and G', as well as the hanger F of the front 35 main piece, B, are provided with recesses corresponding to the shape of the grate-bars, as shown in Fig. 1.

The walls of the fire-chamber are protected

at both sides and at the rear of the grate with 40 arched metallic plates H, which are provided with opening *l* for admission of atmospheric air, by which a more effective combustion of the fuel at the sides and rear of the grate is obtained.

Having thus described my invention, I claim 45 as new and desire to secure by Letters Patent—

1. The combination of a series of grate-bars, each composed of two oval longitudinal ribs united by a vertical web, the upper rib being provided with an upwardly-projecting longitudinal fin, and means for oscillating the adjoining bars of the series in opposite directions, substantially as described. 50

2. The combination of a fixed transverse main piece having a horizontal middle portion and inclined side portions, grate-bars 55 supported thereon, said grate-bars being composed of two oval longitudinal ribs connected by a vertical web, the upper rib being provided with journals at its ends, and with an upwardly-projecting tapering longitudinal fin, transverse rack-bars engaging the lower ribs of alternating grate-bars, a crank-shaft supported in hangers of the main pieces and connected by crank-pins to said rack-bars, and 65 means for reciprocating the rack-bars simultaneously in opposite directions, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses. 70

CH. MARTIN.

Witnesses:

A. GOUJET,

C. S. BERNHARD.