

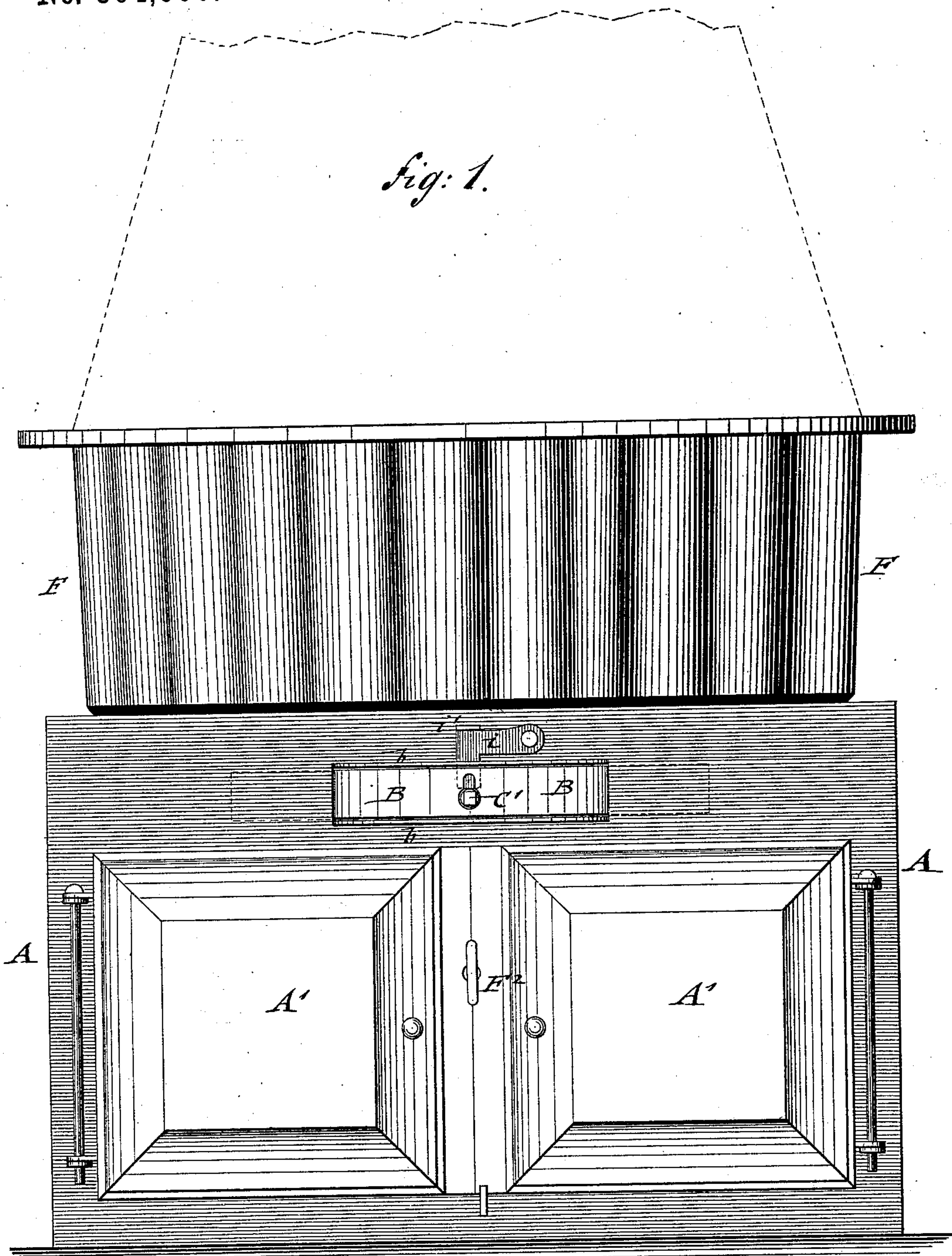
(No Model.)

3 Sheets—Sheet 1.

R. S. T. CISSEL
FURNACE GRATE.

No. 304,906.

Patented Sept. 9, 1884.



WITNESSES:

A. Schehl.
Otto Risch.

INVENTOR

Richard S. T. Cissel

BY

Loysel & Reger

ATTORNEYS.

(No Model.)

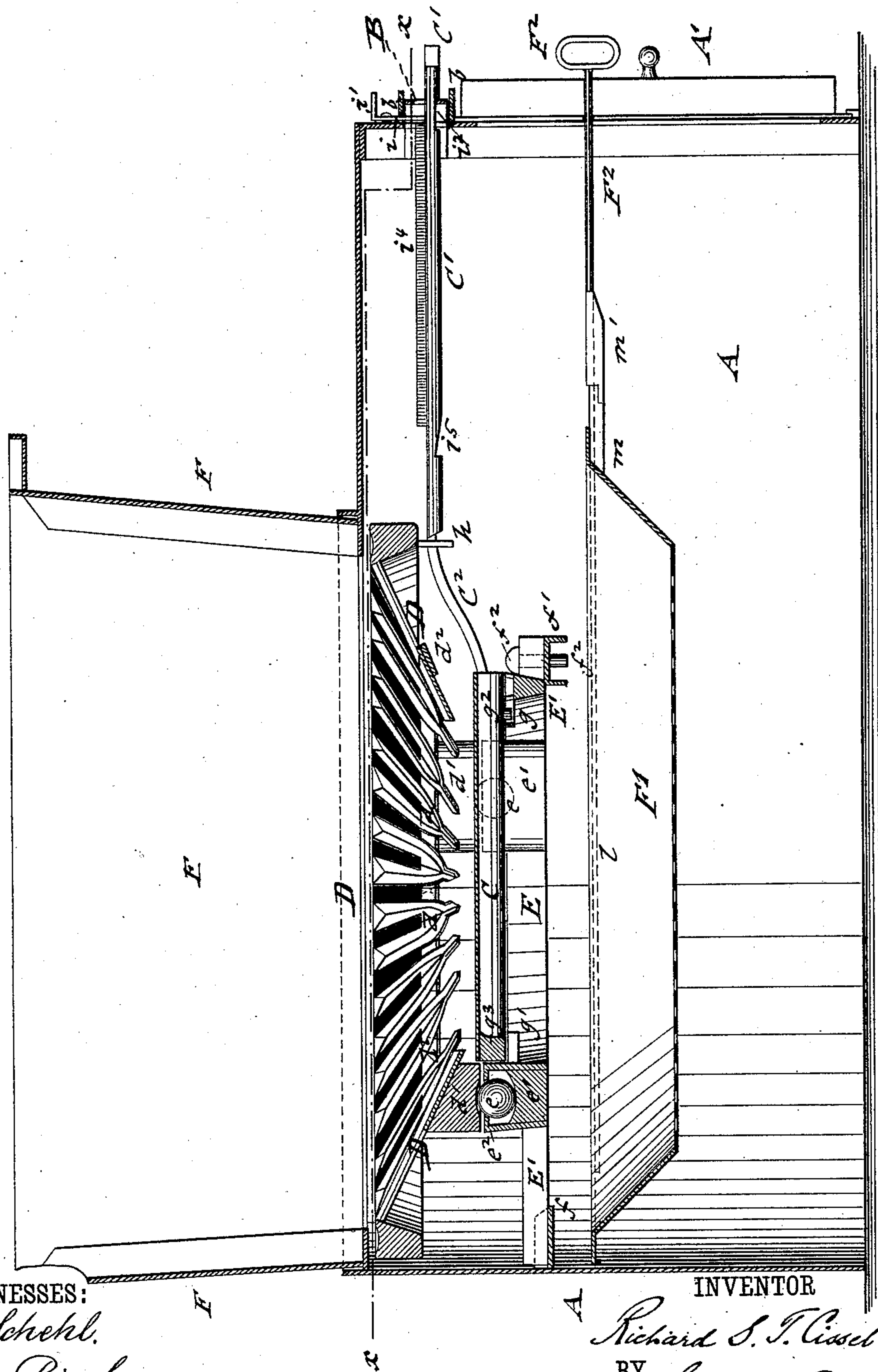
3 Sheets—Sheet 2.

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Fig. 2.



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(No Model.)

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UNITED STATES PATENT OFFICE.

RICHARD S. T. CISSEL, OF ELIZABETH, NEW JERSEY.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 304,906, dated September 9, 1884.

Application filed November 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, RICHARD S. T. CISSEL, of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a specification.

This invention has reference to an improved grate and screen for heating-furnaces, by which the ashes are quickly and conveniently separated from the coal or dumped with the coal.

In the accompanying drawings, Figure 1 represents a front elevation of a furnace with my improved grate. Fig. 2 is a vertical longitudinal section of the same; and Fig. 3 is a plan with the fire-pot removed, one-half being partly in horizontal section on line *xx*, Fig. 2.

Similar letters of reference indicate corresponding parts.

Referring to the drawings, A represents the cast-iron casing of the ash-pit, which in stationary furnaces is inclosed with bricks, while in portable furnaces the brick casing is dispensed with. The ash-pit A is provided at its front part with hinged doors A', and above the same with an opening which is closed by a segmental traveler, B, that is guided in slots of the front wall, so as to be capable of being oscillated from one side to the other in the usual manner. The traveler B is guided between horizontal segmental flanges *b b*, cast integral with the front wall, and is provided at its center with a hole, through which the rod C' of a dumping-section, C, projects to the outside of the traveler. At the rear part of the ash-pit is supported a circular grate, D, which is located directly below the corrugated fire pot or box, and provided with radial concaved grate-bars *d d*. The grate D rests by three blocks, *d'*, which are slightly concaved at their bottom, on anti-friction rollers *e e* of a circular grate-rest, E, the rollers *e e* being retained in pockets *e'* of said grate-rest by means of cap-plates *e''*, as shown clearly in Fig. 2. The circular grate-rest E is supported by means of three arms, E', that extend radially from the pockets or boxes *e'* of the anti-friction rollers *e e* on brackets *f f'* of the walls of the ash-pit, the rearwardly-extending arm E' being supported on the cup-shaped bracket *f* at the rear wall of the ash-pit, while the front arms, E', are supported on perforated brackets

f' f' of the side walls of the ash-pit, and secured to the same by headed pins *f''*, which are dropped through holes of the arms E' and brackets *f'*. The grate-rest E is rigidly locked into position in the ash-pit by the rear and side brackets, *f f'*, and the locking-pins *f'' f''*, while it may be readily removed therefrom, whenever required for repairs or otherwise, by withdrawing the locking-pins *f''* from the arms E' and side brackets, *f' f'*. On replacing the grate-rest into its position the rear arm is first placed into the cup-shaped bracket *f*, and the front arms then secured to the side brackets, *f'*, by the headed drop-pins *f''*. The grate-rest E is provided at its front part with an eye, *g*, and at its rear part with a projection or shoulder, *g'*, that are located at the points of intersection of the longitudinal axis of the ash-pit with the grate-rest. The eye *g* and shoulder *g'* serve to support the dumping-section C, which is provided at its under side and near its front end with a pivot-pin, *g''*, and at its rear end with a segmental flat-bottomed rail, *g'''*, that rests on the projection *g'* of the grate-rest. The eye *g* of the grate-rest E is open at the front part, to admit the disengagement of the pivot-pin *g''* from the same when moving the dumping-section backward.

The dumping-section or supplementary grate C is made preferably of oblong shape, its rear and front end being rounded off concentric to the grate-rest, and provided with longitudinal or transverse corrugations, which prevent warping and cut up the clinkers at the center of the fire. The dumping-section is cast either solid or in the nature of a grate, according to the fuel that is to be burned on the grate. It is provided at its sides and near its front end with indentations, which serve for the purpose of abutting against the rounded-off corners of the pockets *e'*, which thereby limit the lateral motion of the dumping-section. The rod of the dumping-section C' is made at its rear part in the shape of a downwardly-curved fork or yoke, C'', which yoke is connected at its ends to the front corners of the dumping-section C. Into the contracted portion of the yoke C'', next adjoining the paddle-rod C', takes a downwardly-projecting lug, *h*, at the front part of the grate

D, which lug is located at a point of intersection of the axis of the ash-pit with the exterior ring of the grate, so that when the paddle-rod is laterally oscillated with the traveler 5 the dumping-section is not only laterally oscillated, but also a rotary reciprocating motion imparted to the grate by the connection of the yoke C^2 with the lug h , the rotary reciprocating motion of the grate being in opposite direction to the laterally-oscillating motion of the paddle. 10

As the grate D rests by the concave blocks d' , the concaves of which grow shallower or diminish suddenly at the outer ends of the 15 box, on the anti-friction rollers $e e$, the motion of which is confined by the cap-plates of the pockets $e' e'$, the rollers, when arriving at either end of the pockets, will impart a sudden lifting and jarring motion to the grate, 20 which motion assists greatly in the freeing of the coal from clinkers and ashes, in connection with the return motion that is imparted at that moment to the grate.

The concaved grate-bars $d d$ are made wider 25 and slotted at their upper parts, and diminish in width toward a second inner ring, d^2 , that is cast integral with the grate-bars and concentric to the exterior main ring of the grate. The ring d^2 is made convex between the grate- 30 bars, the intermediate convex portions facilitating the passing off of clinkers from the dumping-section, and imparting strength and rigidity to the grate and a support for the blocks d' , which are also cast in one piece with 35 the grate-bars. The grate-bars $d d$ are extended from below the ring d^2 , the extensions d^3 being narrower than the upper parts, and also concaved and pointed at their ends, which are at some distance above the surface of the 40 dumping-section. The extensions of the grate-bars are longer at both sides of the dumping-section, but diminish gradually toward the ends of the same, being shortest at the rear end, as shown in Fig. 3. At the front part 45 of the grate D the grate-bars have no extensions at all, so that the poker can be inserted through the yoke C^2 and the open space between the grate and dumping-section, and thereby the paddle be cleared of clinkers of 50 larger size which would not pass through the spaces between the grate-bars. This space admits also the backward motion of the dumping-section for dumping the coal. The coals pass gradually down along the concaved grate- 55 bars to the dumping-section, while the ashes and cinders drop through the interstices between the grate-bars at both sides of the dumping-section. When the dumping-section is oscillated, the burning coals are shaken up and 60 cleared of ashes and cinders. The pointed ends of the grate-bars serve to cut or "slice" the clinkers when the latter are pushed against them by the oscillating motion of the dumping-section, so that they pass with greater facility through the openings between the grate- 65 bars at both sides of the dumping-section.

Owing to the support of the grate on the anti-friction rollers of the grate-rest, it is moved with but little effort with the dumping-section, their simultaneous oscillations producing the quick and reliable removal of the ashes 70 from the fire obtained.

The fire-pot F is made corrugated and bolted to a ring-shaped corrugated flange in the top wall of the ash-pit, in the usual manner. 75

The outer end of the rod C' of the dumping-section is provided with a square head for attaching thereto the square socket of the shaker. The front end of the rod C' of the 80 dumping-section is locked to the traveler B by a drop-key, i , that is pivoted to the front wall of the ash-pit, and provided with a forward projecting flange, i' , by which the drop-key is readily raised. The front end of the rod C' of the dumping-section is recessed at 85 its under side, as shown in Fig. 2, the recess i^2 engaging the traveler B, so that the rod C' of the dumping-section is rigidly held in position thereon when the drop-key i is lowered. In this position of the drop-key i a longitudinal 90 tongue, i^4 , of the rod of the dumping-section abuts against the same, as shown clearly in Fig. 2.

When it is desired to dump the ashes and clinkers entirely from the grate, the drop-key 95 is raised, and the rod of the dumping-section drawn forward in longitudinal direction, during which motion the dumping-section is prevented from being turned to either side by the tongue i^4 at the upper part of the rod C' 100 of the dumping-section, said tongue being guided in a recess of the traveler, as shown in Fig. 2. When the paddle-rod is drawn out to its full extent, a notch, i^5 , at its under side, near the rear end of the tongue i^4 , engages 105 the traveler B, so that the dumping-section is stopped thereby, and can then be tilted to either side, so as to dump the coal thereon into the ash-pit.

Below the fixed grate-rest E is supported on 110 longitudinal guide-rails l , extending along the side walls of the ash-pit, a pan-shaped screen, F' , which is connected by a square center rod, m , with a socket, m' , at the inner end of a screen-handle, F^2 , which passes through a 115 semicircular recess of the ash-pit door to the outside, so that the screen can be moved forward and back on the guide-rails $l l$ by the screen-handle F^2 without opening the ash-pit doors. The ashes can thus be screened off 120 from the unburned coal particles without any escape of dust to the outside, as the entire ash-pit is tightly closed by means of the traveler and ash-pit doors.

As nearly all the parts of my improved grate 125 are made of cast-iron and of such a construction that they can be quickly assembled, the cost of manufacturing the grate is reduced, while by the simultaneous lateral motion of the grate and dumping-section the shaking of the coal 130 is facilitated, and by the backward motion of the dumping-section, the coal is dumped at the

front part of the ash-pit, whence it can be readily removed. The screen facilitates the screening of the ashes, so that an easily manipulated, economical, and effective grate for heating-furnaces of dwellings and other buildings is obtained.

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

1. The combination of a grate, a corrugated dumping-section at the center of the grate, a grate-rest supporting the grate and dumping-section, and means whereby the dumping-section is oscillated simultaneously with and in opposite direction to the grate, substantially as and for the purpose set forth.

2. The combination of a grate having radial grate-bars, a grate-rest having anti-friction rollers, a central corrugated dumping-section pivoted to the grate-rest, and provided with a yoke-shaped rod that engages a lug of the grate, whereby rotary reciprocating motion is imparted to the grate simultaneously with the laterally-oscillating motion of the dumping-section, substantially as and for the purpose set forth.

3. The combination of a grate having radial grate-bars and rest-blocks with concave bottoms, a grate-rest having pockets with anti-friction rollers and retaining cap-plates, said grate-rest being connected by radial arms to brackets of the ash-pit, substantially as specified.

4. The combination of a grate-rest, E , provided with an inwardly-projecting eye, g , at its front part, and a shoulder, g' , at its rear part, a dumping-section, C , having a pivot-pin, g^2 , at its front end, a flat-bottomed rail at its rear end, and a forward-extending dumping-section rod, C^2 , substantially as set forth.

5. A grate for heating-furnaces, having concaved radial grate-bars that are slotted at their upper wider parts, connected by a stiffening-ring, and provided with concave and pointed extensions below the ring at the sides and rear end, substantially as specified.

6. A grate composed of an exterior ring, an

interior corrugated ring, radial concaved grate-bars having upper wider and slotted portions, and concaved and pointed extensions, longer at the sides and shorter at the rear of the grate, substantially as set forth.

7. The combination of a grate having radial grate-bars connected by an inner ring, a corrugated dumping-section having a yoke-shaped dumping-section rod, a grate-rest having pockets with anti-friction rollers, and means for supporting the dumping-section, said grate-bars being extended below the ring at both sides and at the rear end of the dumping-section, but stopped short at the front part of the dumping-section, substantially as and for the purpose described.

8. The combination, with a grate having radial concaved grate-bars and rest-blocks, a central corrugated dumping-section having indentations at the sides, a grate-rest having pockets with anti-friction rollers and means for supporting the dumping-section, and a forked dumping-section rod that engages the grate and imparts oscillating motion to the grate and dumping-section, substantially as set forth.

9. The combination, with a furnace-grate, of a corrugated dumping or supplementary grate of oblong shape, provided with arc-shaped ends, substantially as described.

10. The combination of a grate, D , a dumping-section, C , a rod, C' , connected by a yoke, C^2 , to the dumping-section, said rod being provided with a front recess, i^2 , a longitudinal tongue, i^4 , and a bottom notch, i^5 , at the rear end of the tongue, a segmental traveler, B , guided in the front wall of the ash-pit, and having a recessed opening for guiding the rod in its forward motion for dumping the section, substantially as set forth.

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

RICHARD S. T. CISSEL.

Witnesses:

PAUL GOEPEL,
SIDNEY MANN.