

M. E. HANSELL.

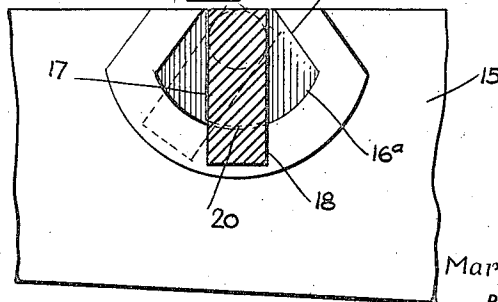
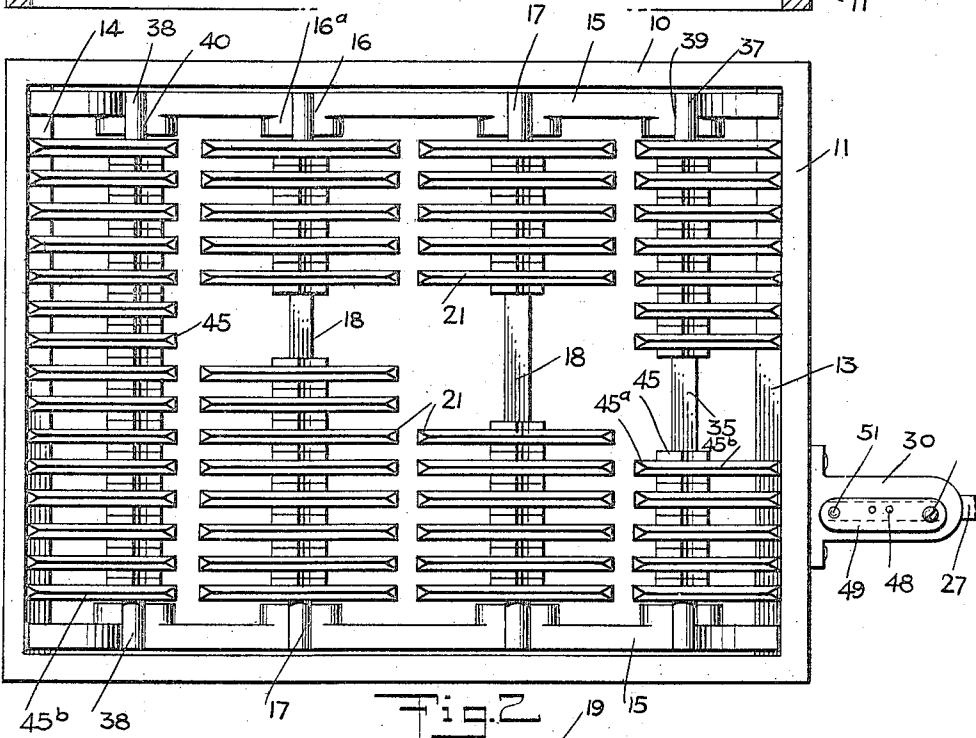
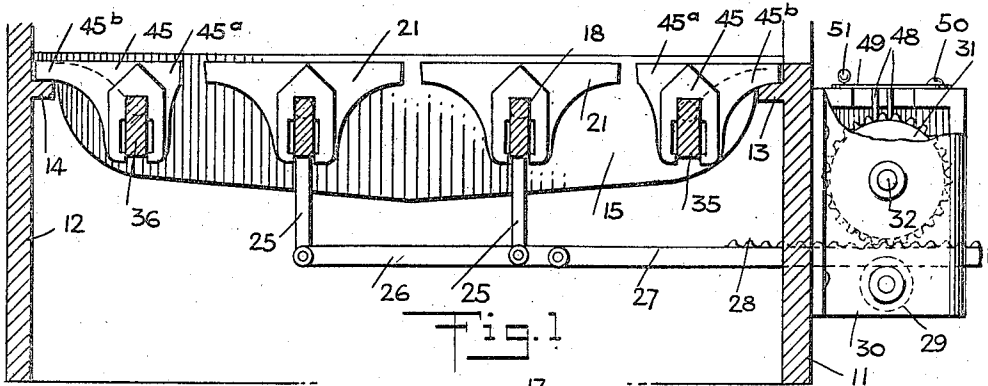
FURNACE GRATE.

APPLICATION FILED APR. 17, 1912.

1,045,704.

Patented Nov. 26, 1912.

2 SHEETS—SHEET 1.



WITNESSES
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J. L. McEliff

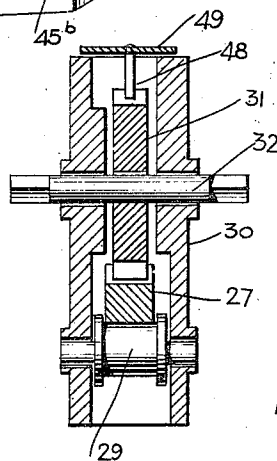
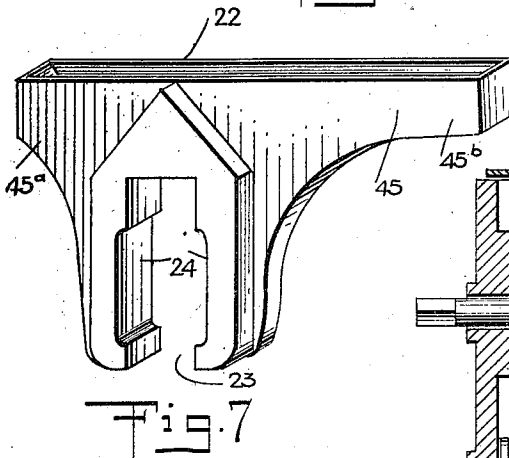
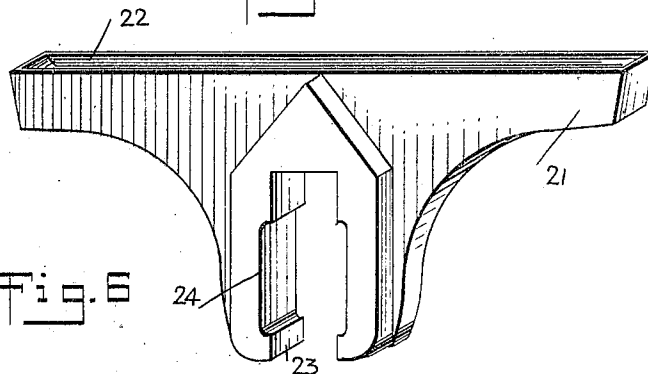
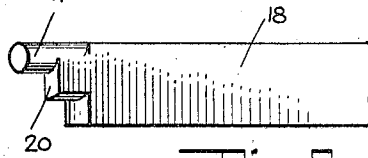
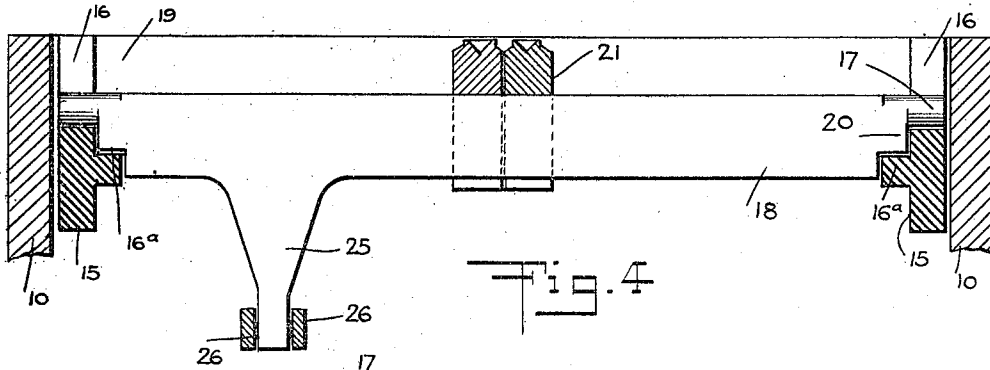
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FURNACE GRATE.
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2 SHEETS-SHEET 2.



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UNITED STATES PATENT OFFICE.

MARCUS EARENEST HANSELL, OF ANAMOSA, IOWA.

FURNACE-GRATE.

1,045,704.

Specification of Letters Patent.

Patented Nov. 26, 1912.

Application filed April 17, 1912. Serial No. 691,364.

To all whom it may concern:

Be it known that I, MARCUS E. HANSELL, a citizen of the United States, and a resident of Anamosa, in the county of Jones and State of Iowa, have invented a new and Improved Furnace-Grate, of which the following is a full, clear, and exact description.

My invention is intended more particularly for embodiment in the grates of steam boiler furnaces, and it relates to that type of grate in which removable grate sections are provided.

An object of my invention is to improve the grates in various particulars to the end that the grate sections, the grate bars, and the rest bars on which the grate bars are removably supported, may be conveniently removed and renewed when desired; and a further object is to minimize the possibility of clinkers causing the breakage of grate sections in the rocking of grate elements.

Further objects of the invention will appear from the specific description herein-after to be given.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a vertical section taken through the grate transversely of the grate bars, and showing the same in position; Fig. 2 is a plan view with some of the grate sections removed; Fig. 3 is a detail transverse vertical section of one of the grate bars on an enlarged scale, showing the end bar therefor; Fig. 4 is a vertical section taken parallel with the grate bars; Fig. 5 is a fragmentary perspective view of one end of the grate bar; Fig. 6 is a perspective view of one of the removable rocking grate sections; Fig. 7 is a perspective view of one of the removable non-rockable end sections of the grate; and Fig. 8 is a vertical section taken through the actuating device for the rocking lever of the grate.

The furnace may have any approved arrangement of vertical side walls 10 and front wall 11, and in practice has the usual bridge wall at the rear of the firebox, and conventionally represented in the drawings at 12. The furnace is provided with the usual front rest 13 and rear rest 14 in the form of ledges, and on these I removably mount rest bars 15, ranging at the sides of the firebox from front to rear, said rest bars being formed with ver-

tical bearings 16 in which the ends 17 of rockable grate bars 18 are journaled. Auxiliary bearings 16^a are provided in connection with bearings 16 and inward therefrom, said auxiliary bearings being undercut so as to provide overhanging side walls 19, the auxiliary bearings thus being wider at the bottom and having concave lower sides, as clearly shown in Fig. 2. In addition to the journal 17, rockable grate bars 18 are formed, with members 20 on the under side which, when the bars 18 are rocked, move in an arc between the walls of the auxiliary bearings 16^a, but should the journal break, then the members 20 will serve to constitute journals and find bearings in the auxiliary bearings 16^a. During the movement of the rock bars 18 on the journals 17, the members 20 have limited movement, upon any undue rocking movement of the grate bar, the members 20 will contact with the overhanging walls 19 and limit the rocking of the grate bar. On the bars 18 are fitted removable grate sections 21, which in practice are formed, as best shown in Fig. 6, with recesses 22 in the top surfaces to receive fine ashes which will prevent slag-forming impurities from adhering to the top surface of the grate bars. The grate bars have essentially flat sides, and the grate sections 21 are forked at the under side to produce slots 23, the side walls of which are enlarged as at 24 to provide recesses for the circulation of the air, and preventing the grate bars from binding. The grate bars 18 are provided with depending arms 25 united by a link 26, to which is connected an actuating bar 27, said bar being provided on the upper edge with a rack 28, and extends through the front wall of the furnace, and rests upon a supporting roller 29 in a housing 30, suitably supported outside the front wall of the furnace. Meshing with the rack teeth is a vertical pinion 31 that is mounted on the rock shaft 32 adapted to receive any suitable rock handle, so that the rocking of the shaft will move the toothed actuating bar 27 longitudinally, and rocking the grate bars 18 through the medium of the arms 25.

Only the central grate bars are rockable in my improved grate, and in connection therewith I provide non-rockable front and rear grate bars 35, 36, which are formed similarly to the bars 18, but are not provided with rock arms. The ends 37, 38 of the front and rear bars are received in vertical

slots 39, 40, in the removable end supports 15. In connection with the non-rockable grate bars 35, 36, removable grate sections 45 are employed, formed in all respects like the grate bars 21, except that the inner arm 45^a of said bars 45, or that arm adjacent to the rockable grate sections 21, is formed shorter than the opposite arm 45^b, which arms 45^b are received respectively on the front and rear ledges 13, 14, on which the end supports 15 rest.

In connection with the pinion 31, a latch device is provided to lock the rack bar 27, 28, and consequently lock the grate bars 17 and their grate sections 21 in a given position. The latch device in the present instance consists of pins 48 on a plate 49 that swings around its securing pin or screw 50, and is provided with an operating knob 51, so that the lateral rocking of the plate 49 will engage the pins 48 between the teeth of the pinion 31, or disengage the pins from said pinion.

By providing stationary front and rear grates with removable sections, co-acting with rockable grate sections, a distinct advantage is obtained in the cleaning of the fires and in keeping the fires clear, as the sections will clear themselves of clinkers.

The form of the described construction of the removable grate sections and rocking grate bars permits of the grate sections being removed and replaced by simply sliding the grate sections on the bars without there being any necessity of tilting the grate bars from their horizontal position. With my construction, a broken grate section may be removed and a new one put in place while the fire is in the furnace, since it may be done by a slight rocking of the grate bar, which will afford convenient working space for the attendant to insert the new grate bar promptly and conveniently. In practice, a suitable tool is employed for lifting a grate section out of place and placing a new section in position.

The stationary or non-rockable grate bar is wider than the solid dead plate usually used, and can be wider because it is ventilated. The distance between the advancing points of the rocking and grate bars and the bridge wall or furnace front above the non-

rocking grate bar weakens the clinkers' resistance and breaks them upward with less power used and consequently with less chance of the clinkers forming such an obstacle as to arrest the movement of the rocking bar.

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

1. In a grate, the combination of end supports and grate bars, the said supports having a main bearing and an auxiliary bearing for the adjacent end of a grate bar, both of said bearings being open at the top, and the auxiliary bearing being within the vertical plane of the main bearing and below the same, the auxiliary bearing being undercut, presenting overhanging side walls converging in an upward direction and being wider at the bottom, the lower wall of the bearing being concave and the grate bar being formed at each end with main journals in axial alinement and adapted to the mentioned main bearings, and provided with auxiliary members depending from the under side thereof, inward from the main bearings and normally out of contact with the auxiliary bearings, said auxiliary members of the grate bars being adapted to rock with the grate bar within the limits of the converging side walls of the auxiliary bearings.

2. In combination with rockable grate bars having depending arms, a reciprocating rack bar connected with said arms, a pinion having a horizontal axis and meshing with said rack bar at its outer end, a housing for the pinion and the adjacent outer end of the rack bar, a plate pivoted on the housing to swing transversely in a horizontal plane parallel with the axis of the pinion, and a depending pin on the under side of the plate movable into engagement with the teeth of the pinion by a movement of the pivoted plate.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

MARCUS EARENEST HANSELL.

Witnesses:

EARL BOYER,
JAMES E. REMLEY.