(No Model.)

# O. C. BANNISTER.

## ROCKING GRATE.

No. 346,455. Patented Aug. 3, 1886.

Fig. 1.

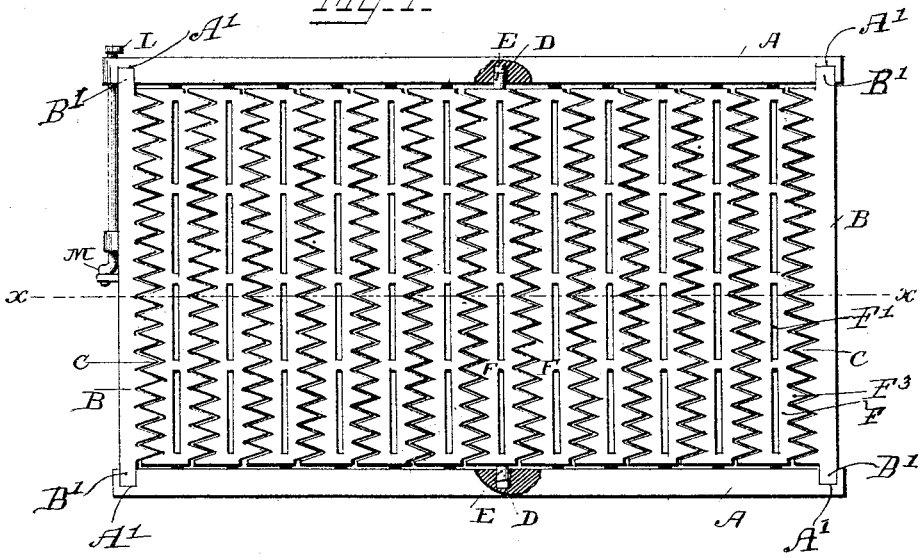



Fig. 2.

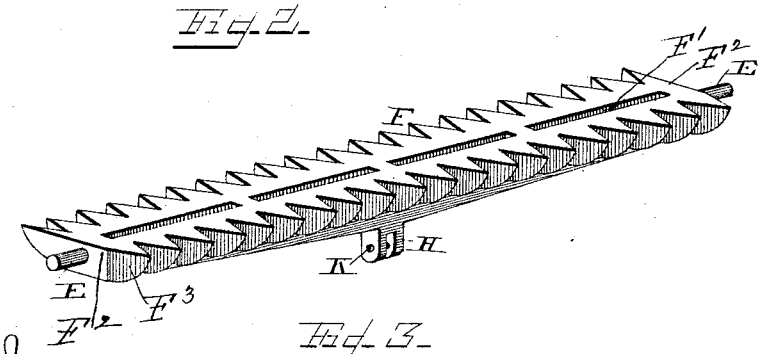
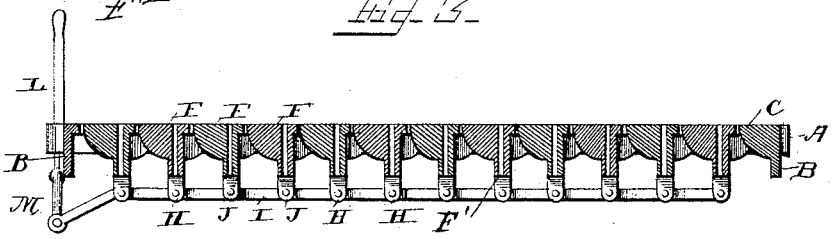



Fig. 3.




WITNESSES

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# UNITED STATES PATENT OFFICE.

OLIVER C. BANNISTER, OF COUNCIL BLUFFS, IOWA, ASSIGNOR OF ONE-HALF TO THOMAS J. EVANS, OF SAME PLACE.

## ROCKING GRATE.

SPECIFICATION forming part of Letters Patent No. 346,455, dated August 3, 1886.

Application filed June 9, 1884. Serial No. 134,347. (No model.)

*To all whom it may concern:*

Be it known that I, OLIVER C. BANNISTER, of Council Bluffs, in the county of Pottawattamie and State of Iowa, have invented certain new and useful Improvements in Rocking Grates; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of rocking grates which are pivotally mounted in complete cylindrical bearings located below the upper surface of the grate-frame; and my invention consists in certain features of construction, hereinafter specified, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a plan of my improved grate. Fig. 2 is a perspective of one of the bars, and Fig. 3 is a section taken on the line *x x* of Fig. 1.

The grate-frame consists, essentially, of the sides A and ends B, the latter provided with inwardly projecting teeth C, which conform in shape to and intermesh with the teeth of the adjacent grate-bars. The ends $F^2$ of each of the grate-bars are of such form that when arranged adjacent to others of the same formation they form straight lines. No angular openings exist between said ends and the inner adjacent surface of the frame, so that a snug fit of the bars and frame at the ends of the former is secured. The openings between the bars and sides A (see Fig. 1) are intentionally exaggerated for clearness of illustration, while in actual practice the ends $F^2$ of the bars nearly abut against the sides, so that no coal or cinders can possibly fall between the ends and the frame. Now, in order to secure this advantage of retaining the unconsumed fuel from falling between the frame and the grate, it is necessary to provide a frame constructed to permit of longitudinal expansion of the bars. This I do by mortising the side rails, as at A′—that is, the mouth of the mortise is projected toward the opposite side rail, and the mortises in each rail are opposite those in the other rail, so as to receive the ends B, which are tenoned, as at B′, to loosely fit the mortises. The sides are provided on their inner faces, below the upper edges, with a series of small sockets, D, adapted to receive the reduced cylindrical ends of the grate-bars F. The sockets D are not only deeper than the length of the cylindrical bearings E of the bars F, but said bearings are reduced to fit said sockets loosely, thus permitting vertical curvature in either direction as well as longitudinal contraction and expansion in the bars and ends B, and yet preserving the relatively snug fit between the ends of the bars and the frame, the end B being also capable of independent expansion and contraction in the mortises.

The grate-bars are provided with long narrow centrally located openings F′, for furnishing additional draft, and with laterally-projecting teeth $F^3$, which intermesh with the teeth of the adjacent grate-bars. These grate-bars are also centrally provided on their lower faces with depending bifurcated arms or lugs H, to which is pivotally secured the connecting-bar I by means of the pivot-bolts J, which pass through corresponding perforations, K, in the arms H; or, if desired, the connecting-rod may be pivotally attached in any other approved manner.

The lever L is pivotally secured to the frame A, and is provided with a crank-arm, M, rigidly secured thereto or formed integral therewith, the said crank being pivotally secured to the grate-frame and to the connecting-bar, by means of which the grate-bars are operated and caused to rock, thus effectually grating and disposing of ashes and cinders.

By making the portions of the bars between the cylindrical ends slightly shorter than the width of the grate-frame sufficient play is left between the frame and bars to permit the latter to expand without interference, and by locating the sockets for the cylindrical ends of the bars on the inner faces of the sides of the grate-frame, instead of on the upper edges of said frame, the sockets are out of the way or protected from the dust and ashes, and hence the parts do not become clogged.

I am aware that it is not new to construct a grate with a series of parallel bars having intermeshing teeth, said bars being pivoted in a frame formed of a single piece, the end bars

of said frame being provided with teeth intermeshing with the teeth of the adjacent grate-bars. I am also aware that it is not broadly new in a grate to provide end bars with teeth and side bars with recesses in their upper faces for the reception of the trunnions of the grate-bars; hence I make no claim, broadly, to these constructions.

Grate-bars of this class are usually set lengthwise in the fire-box portion of a boiler-furnace, so that what are hereinbefore denominated as "sides A" and "ends B" are located reversely—that is to say, the sides A of the grate-frame are at the front and back, and the ends B are at the sides of said fire-box; therefore in using these words reference is not had to any particular arrangement of the grate-bars in a boiler-furnace or fire-box.

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

1. In a rocking grate of the class described, the combination of side rails having completely cylindrical bearing-sockets wholly within the sides thereof, rocking grate-bars having reduced cylindrical bearings, and end rails mounted in mortises formed transversely in said side rails, substantially as specified.

2. The combination of the frame consisting of the sides A, transversely mortised at each end, as at A′, and recessed or having sockets, as at D, the ends B, longitudinally tenoned at each end, as at B′, and the grate-bars F, having bearings E, and ends forming in series straight lines, substantially as specified.

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

OLIVER C. BANNISTER.

Witnesses:
W. B. MAYES,
GEO. CARSON.