

(No Model.)

F. F. LANDIS.  
GRATE AND GRATE BAR.

No. 341,924.

Fig. 1. Patented May 18, 1886.

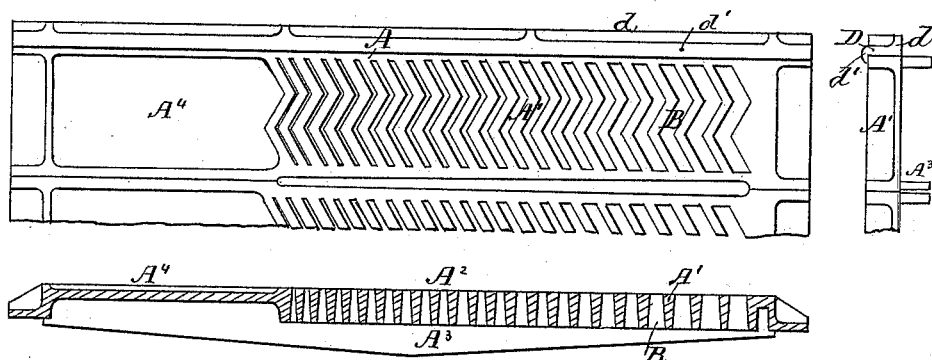


Fig. 2.

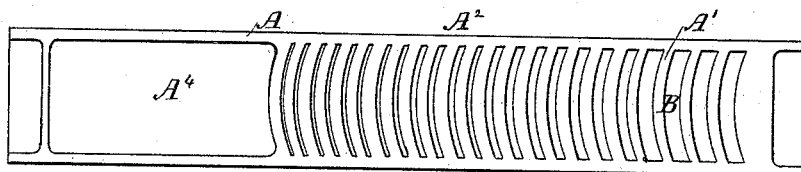
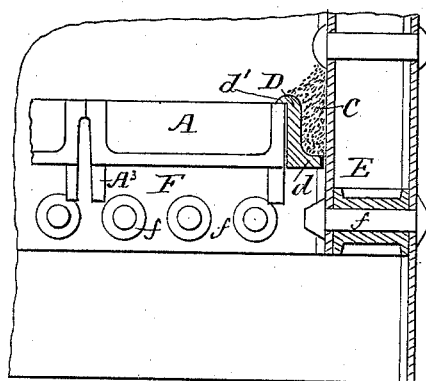


Fig. 3.



Witnesses:

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att'y.

# UNITED STATES PATENT OFFICE.

FRANK F. LANDIS, OF WAYNESBOROUGH, PENNSYLVANIA.

## GRATE AND GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 341,924, dated May 18, 1886.

Application filed February 23, 1886. Serial No. 192,836. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK F. LANDIS, a citizen of the United States, residing at Waynesborough, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Grates and Grate-Bars, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to improvements in grates and grate-bars having the air-openings wider at the front than at the rear; and the objects of my improvements are to provide grate and grate-bars having this characteristic with a solid or closed portion at the rear and transverse zigzag, angular, or curved bars connecting the sides of each grate-bar, and to provide the outer grate-bars forming the grate with loosely-fitting L-shaped bars to permit lateral expansion of the grate, but retain ashes against its sides to close the interstices between it and its supporting-frame or the side of the fire-box. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 represents in top view, end view, and longitudinal vertical section a grate-bar constructed in accordance with my invention. Fig. 2 is a top view of a modification of said grate-bar. Fig. 3 is a transverse vertical section through the side of a fire-box having a grate-bar and side bar constructed in accordance with my invention.

A represents the longitudinal side bars, and A' the transverse bars uniting them to form a narrow grate, A<sup>2</sup>, and a series of them may be placed side by side to form the entire grate of a fire-box. The longitudinal sides A have pendent ribs A<sup>3</sup> extending the whole length thereof to strengthen them. The transverse bars A' are either of zigzag, angular, or of curved form, to permit them to slightly bend while highly heated or expanded without spreading the sides A apart. The spaces B between these transverse bars are wider at the front or adjoining the fire-door than the body of said transverse bars; but said spaces gradually diminish in size until at a distance toward the rear end equal to about one-third or one-fourth of the length of the grate these spaces B are much less in width than the body of the

transverse bars, and these spaces or openings stop altogether, and a solid surface, A<sup>4</sup>, remains adjoining the bridge or back part of the grate, upon which the fuel can be banked, and very little loss of combustible ensues.

To prevent air from passing between the side of the grate-bars and the side walls, E, of the fire-box without fitting them tightly against said walls, and therefore making allowance for the lateral expansion of the grate-bars, filling-bars D are used. They are provided with a horizontal flange, d, near the bottom, which extends nearly to the side walls of the fire-box, and forms a shelf, upon which cinders and ashes C will collect and render that part of the grate substantially air-tight. The upper edge of the filling-bar D is preferably provided with a lateral lip, d', extending its whole length, to bear upon the adjoining grate-bar and prevent sagging of said bar D. The ends of the grate-bars rest, as usual, upon end bars, F, secured by rivets f, or otherwise, to the walls of the fire-box.

Having now fully described my invention, I claim—

1. A grate consisting of a series of grate-bars, each having longitudinal side bars, A, and curved transverse bars A' integral therewith, and spaces B between the latter, wider at the front end than at the rear end of said grate, substantially as and for the purpose described.

2. A grate consisting of a series of grate-bars, each having longitudinal side bars, A, and zigzag transverse bars A' integral therewith, and spaces B between the latter, wider at the front end than at the rear end, and at said rear end a closed solid surface, A<sup>4</sup>, substantially as and for the purpose described.

3. In combination with the walls of a fire-box and the grate-bars thereof, the filling-bars D, provided with a horizontal flange, d, and fitting loosely between said walls and grate-bars, substantially as and for the purpose described.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK F. LANDIS.

Witnesses:

DAVID W. GOOD,  
ALF. N. RUSSELL.