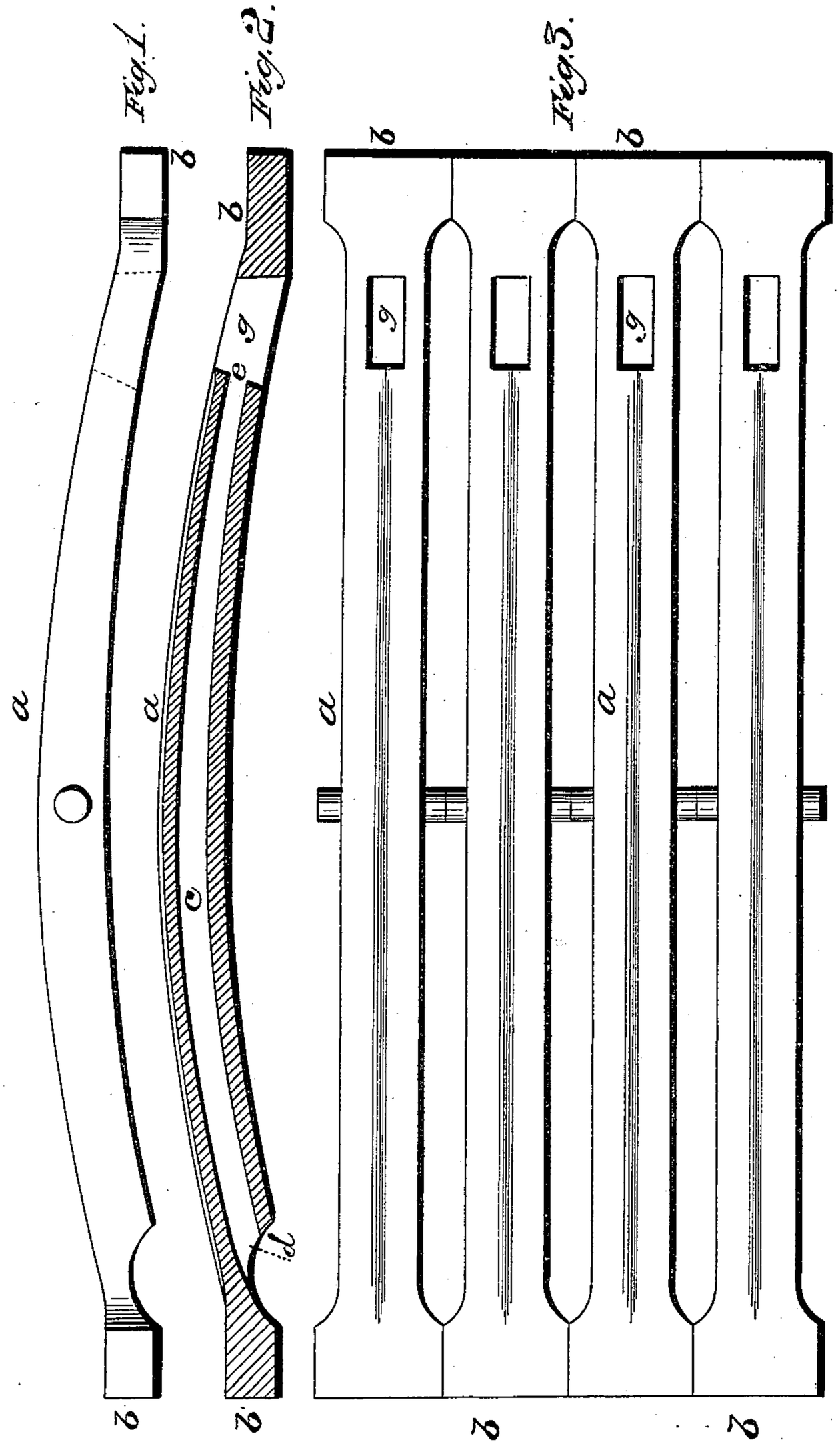
(No Model.)

J. F. NEWTON, Jr.

GRATE BAR FOR FURNACES, &c.

No. 271,508. Patented Jan. 30, 1883.



WITNESSES

Emory M. Bates.

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UNITED STATES PATENT OFFICE.

JOHN F. NEWTON, JR., OF BOSTON, MASSACHUSETTS, ASSIGNOR TO EDWARD BERTRAM NEWTON, OF SAME PLACE.

GRATE-BAR FOR FURNACES, &c.

SPECIFICATION forming part of Letters Patent No. 271,508, dated January 30, 1883.

Application filed April 24, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. NEWTON, Jr., a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and valuable Improvement in Grate-Bars for Boiler-Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side view of one of the grate-bars. Fig. 2 is a vertical sectional view of the same. Fig. 3 is a top or plan view, and Fig. 4 is a cross-sectional view.

This invention has relation to grate-bars for use in boiler-furnaces, whether stationary or locomotive; and it consists in the construction hereinafter fully described, and pointed out in the claim.

In the accompanying drawings, the letters *a a* designate the grate-bars, which are arched upward from end bearing to end bearing, the bars being usually cast tapering a little vertically from front to rear to save weight. The end bearings, *b*, project laterally, so that when the bars are placed side by side the abutment of the end bearings against each other will provide for the intermediate spaces between the coal-bearing arched portions of the bars. In constructing a shaking-grate such as may be required in connection with the boiler-furnaces of locomotives several bars may be cast with a common end bearing having a pivotal lug at each end. Each grate-bar *a* is cast with an arched air-passage, *c*, open at each end, and extending from end to end of the arched or coal-bearing portion of the bar, the front opening being located back of the front-end bearing and underneath the bar, as indicated at *d*. The rear opening, *e*, of the air-passage communicates with a vertical opening or air-passage, *g*, through the rear portion of the grate-bar. This opening *g* is made larger at the bottom than at the top, its walls being beveled downward, so that ashes will be prevented from settling therein or in the lower portion of the opening *e*. For a similar reason, and in order to save weight in the construction, the sides of the arched portion of the grate-bar are beveled from top to bottom, as indicated at *h*, so that the lower edge of the bar is narrower than its upper or bearing surface. In order to provide for retaining ashes on the top of the grate-bar, it is made slightly concave from side to side, as indicated in the drawings. The ashes serve as a non-conducting covering, and in great measure prevent the heat from injuring the bar.

This bar is designed to be much stronger and more durable than a straight hollow grate-bar of the same weight. An increased air-space is provided within the bar, and in rear an air-passage is provided through the grate-bar to its bearing-surface or top. The general arched form of a grate made up of such bars provides for a large amount of heated air under the grate and fuel thereon, which is designed to improve the draft and facilitate the consumption of the fuel. The air entering by the opening *d*, near the front end of the grate-bar, passes through the arched passage *c*, and, while protecting the upper surface of the bar by rapidly conducting the heat therefrom, becomes itself highly heated, so that it is in suitable condition to facilitate the consumption of the fuel and combustible gases over the rear portion of the bar, where it passes out in an upward direction through the vertical outlet-passage *g*.

I am aware that it is common to cast straight iron grate-bars with straight passages therein having openings at or near each end, and having concave or grooved bearing-surfaces, and I do not therefore claim such devices, broadly.

A straight, tapering, hollow grate-bar having a valve at one end and a perforated cylinder at the other is old. A solid arched bar is also old, and neither of these inventions is claimed herein.

What I claim, and desire to secure by Letters Patent, is—

An upwardly-arched cast-iron grate-bar, tapering downwardly and inwardly from its top, which is concave in cross-section, and having the arched air-passage *c*, tapering from

front to rear, and extending nearly the entire length of the coal-bearing portion, the front opening, *d*, in its lower face, the rear vertical outlet-passage, *g*, extending through the bar, and beveled downwardly and outwardly from its top, and the broad flat end bearings *b*, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN F. NEWTON, JR.

Witnesses:
RICHARD F. ANDREWS,
WALTER S. FROST.