

(No Model.)

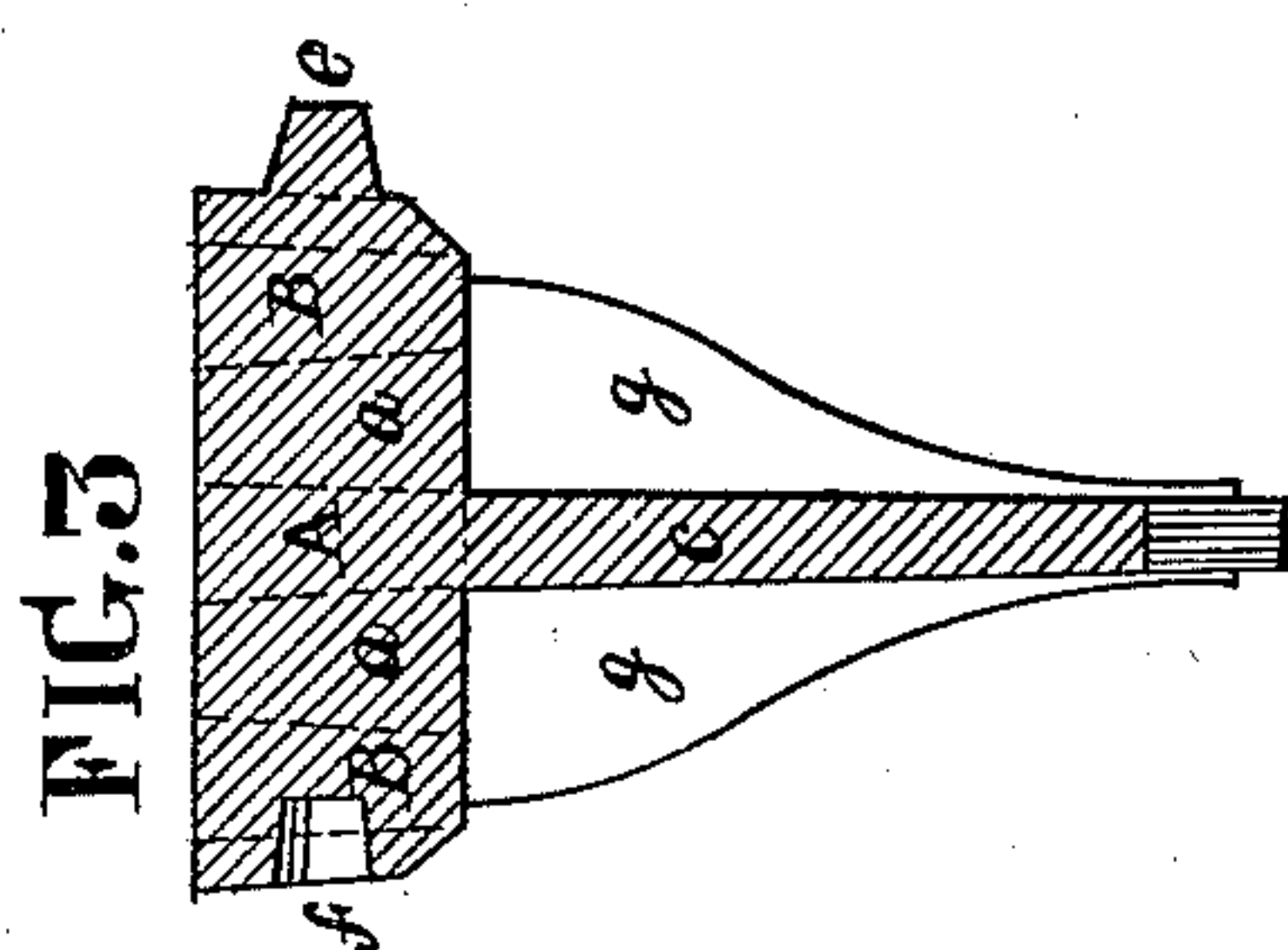
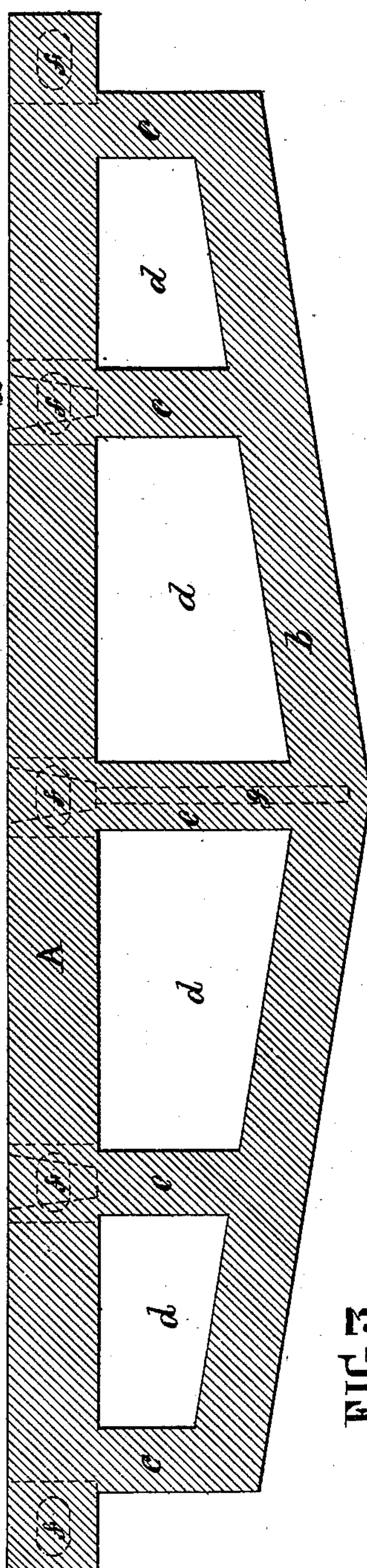
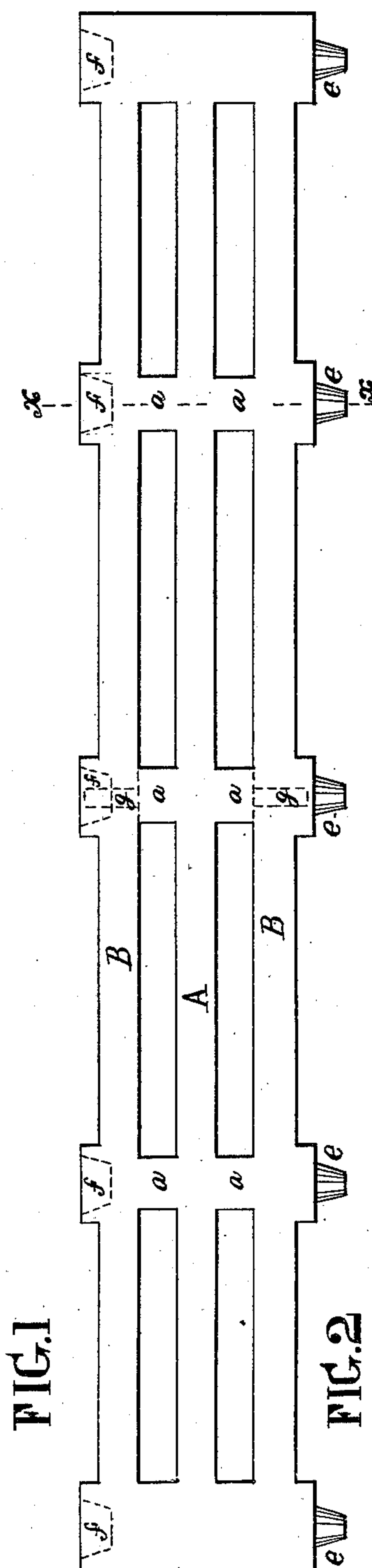
2 Sheets—Sheet 1.

J. CAIRNS.

GRATE BAR FOR FURNACES.

No. 300,209.

Patented June 10, 1884.



Witnesses.

Thomas F. Hawley
E. J. Roberts.

Inventor.

James Cairns.
per Stephen Natick, atty.

(No Model.)

2 Sheets—Sheet 2.

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FIG. 4

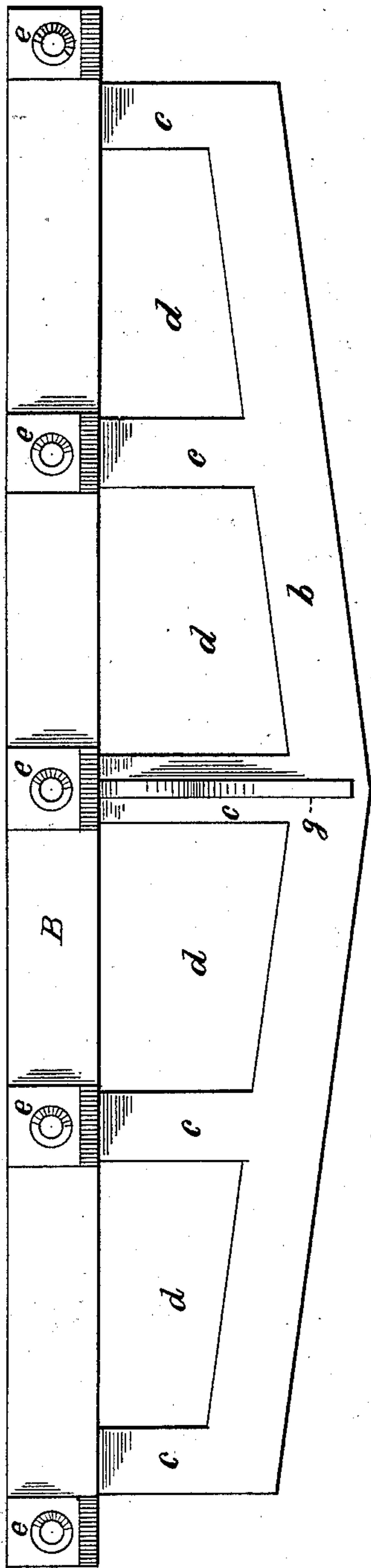
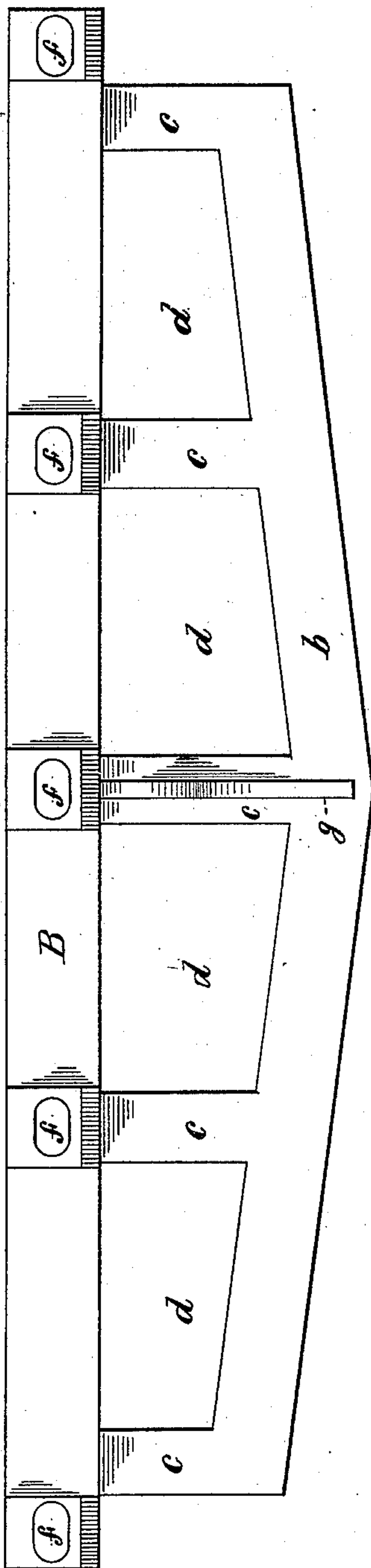


FIG. 5



Witnesses.

Thomas J. Bewley.

E. J. Roberts

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per Stephen A. Stick, Att'y

UNITED STATES PATENT OFFICE.

JAMES CAIRNS, OF PHILADELPHIA, PENNSYLVANIA.

GRATE-BAR FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 300,209, dated June 10, 1884.

Application filed February 6, 1884. (No model.)

To all whom it may concern:

Be it known that I, JAMES CAIRNS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Grate-Bars for Furnaces, &c., of which the following is a specification.

The nature of my invention will be understood by the following description and claims.
10 In the accompanying drawings, Figure 1 is a plan view of my improved sectional bar. Fig. 2 is a longitudinal section of the same. Fig. 3 is a transverse section at the line *x x* of Fig. 1. Fig. 4 is a side elevation of the combined bar, representing the lugs *e*. Fig. 5 is a
15 like view representing the slots *f*.

Like letters of reference in all the figures indicate the same parts.

A represents the central longitudinal bar, 20 and B B side bars, connected therewith by means of cross-ties *a*. The central bar, A, is projected below the lower edges of the bars B B by means of the longitudinal bar *b* and vertical ties *c c c*, whereby horizontal openings
25 *d d d d* are formed, which decrease the weight

of the bar and, in addition, provide for the free circulation of air through the grate.

In order to hold the different castings together vertically, and also in adaptation to unequal expansion and contraction, one of the side bars B on its vertical side is provided with lugs *e*, and the other with slots *f*, as seen clearly in Figs. 4 and 5. There are brackets
30 *g* connected with the middle vertical tie *c* and cross-ties *a a* in the vertical plane of the latter, for strengthening the combined bars A and B B; and, if desired, like brackets may be connected with the other ties.
35

I claim as my invention—

1. The middle bar, A, having a longitudinal bottom bar, *b*, connected therewith by means of vertical ties *c* in the same vertical plane, substantially as described. 40

2. The side bars, B B, having side lugs, *e*, and elongated openings *f*, substantially as and 45 for the purpose set forth.

JAMES CAIRNS.

Witnesses:

THOMAS J. BEWLEY,
STEPHEN USTICK.