

(Model.)

L. BANNISTER.

GRATE.

No. 291,864.

Patented Jan. 15, 1884.

Fig. 1.

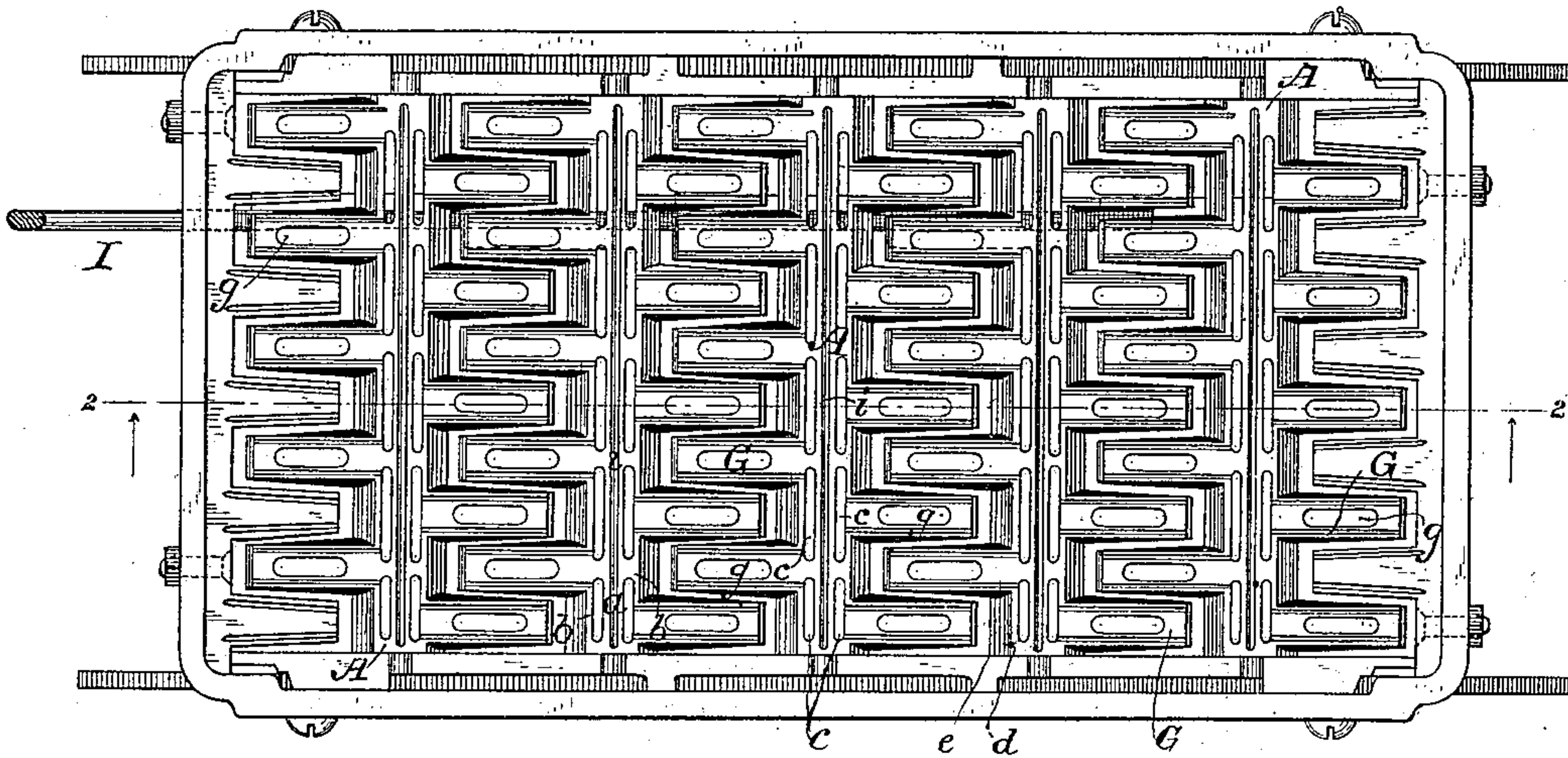


Fig. 5.

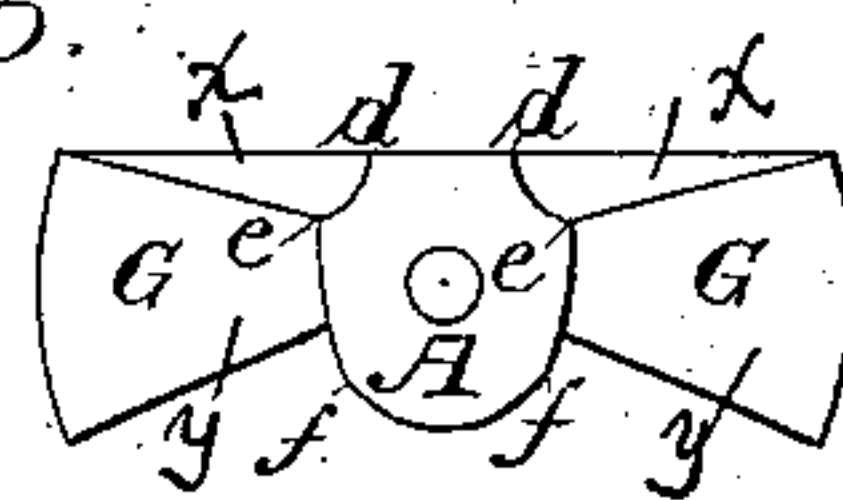


Fig. 2.

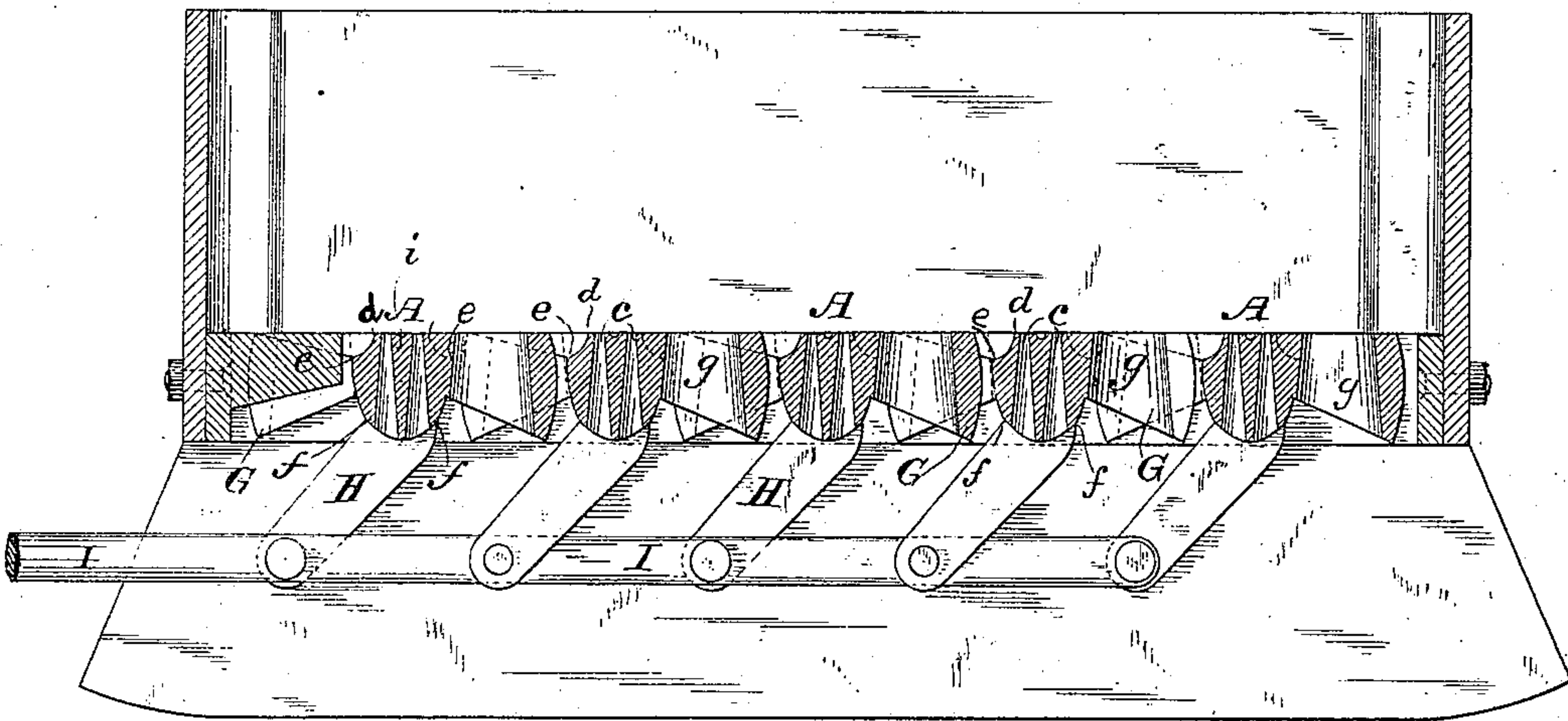


Fig. 3.

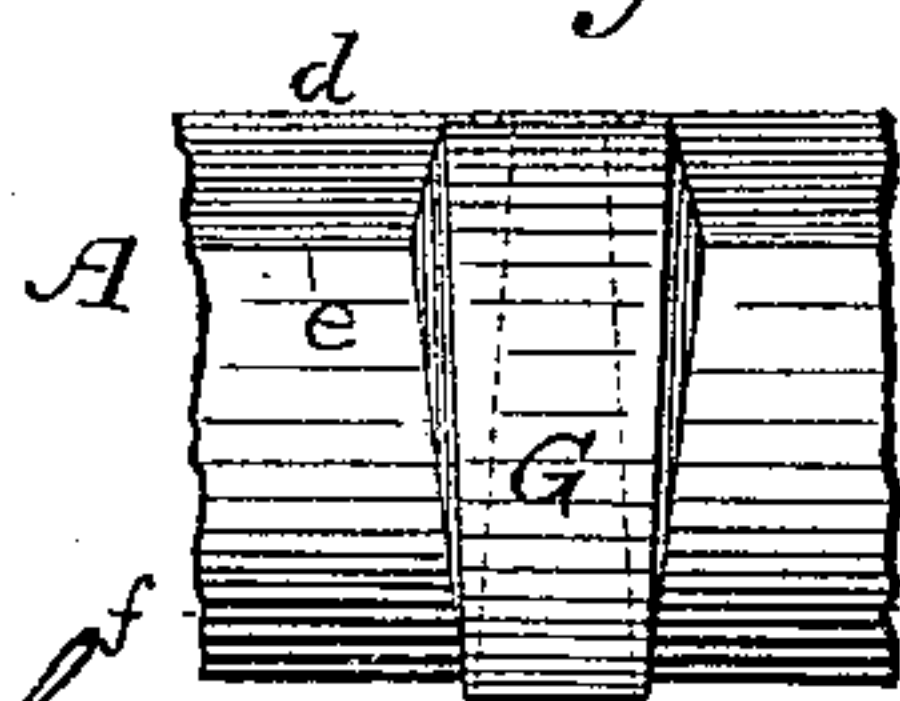
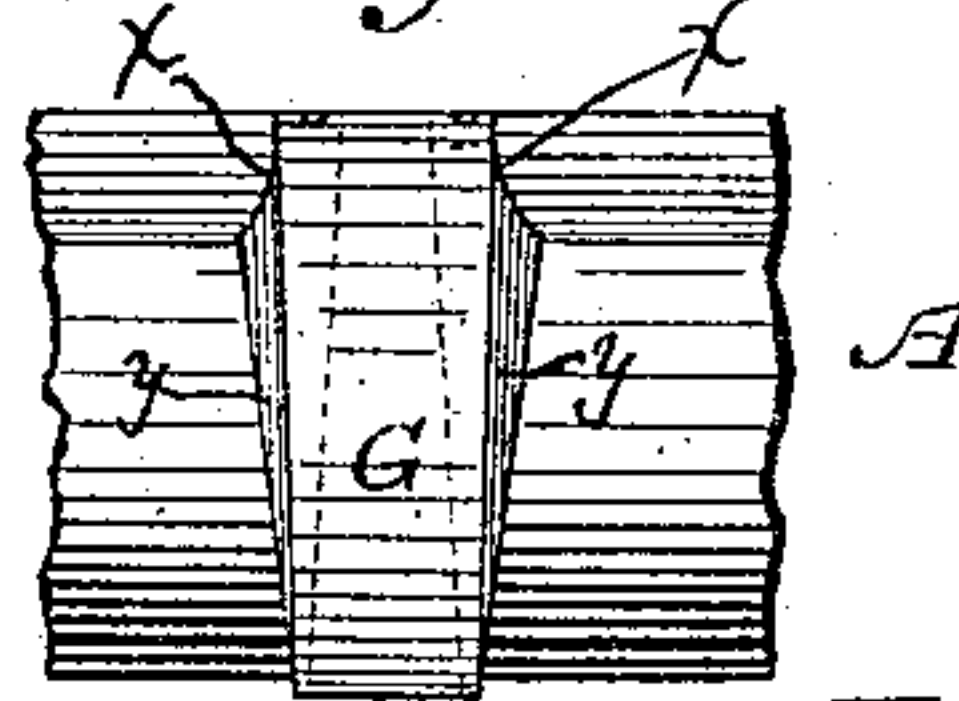


Fig. 4.



WITNESSES

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GRATE.

SPECIFICATION forming part of Letters Patent No. 291,864, dated January 15, 1884.

Application filed September 8, 1883. (Model.)

To all whom it may concern:

Be it known that I, LEMUEL BANNISTER, a citizen of the United States, residing in the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Grates, of which the following is a specification.

My invention more especially relates to that class of grates the bars of which are capable of being rocked separately or simultaneously for the purpose of agitating the fuel.

The object of my invention is thoroughly to agitate and consume the fuel, to crush the clinkers, and to secure an effective draft, which ends I attain by a peculiar construction of the grate-bars and teeth, hereinafter set forth, and their organization for joint operation.

The accompanying drawings, which represent so much only of the apparatus as is necessary to illustrate the subject-matter claimed, show my improvements as adapted to a rectangular grate, they being clearly applicable, however, to other forms of grates.

Figure 1 represents a plan or top view of the grate; Fig. 2, a longitudinal section there-through on the line 2 2 of Fig. 1; Fig. 3, an end view of one of the side lugs or teeth, showing it as made with a straight upper bevel or taper; Fig. 4, a similar view, showing it as made with a concave upper bevel or taper; and Fig. 5, an end view of one of the bars, showing its contour or outline, and also the double bevel on the sides of the teeth.

Grate-bars have been constructed of various outlines and contours in cross-section; but, so far as my knowledge extends, they have heretofore been made with either curved or straight beveled upper surfaces. Grate-bars octagonal in cross-section, with flat surfaces and straight bevel sides, are shown in Letters Patent No. 273,437, granted to me March 6, 1883.

My present improvement consists, mainly, in constructing the grate-bar with a flat upper surface, and with its upper parts of its sides concave, and also in constructing the laterally-projecting lugs or teeth with upper concave bevels or tapers. My improved grate-bar is shown as perforated vertically, and constructed with a flat upper surface having a longitudinal groove or grooves therein, and with its upper parts of its sides concave, extending

down between the teeth, the portion below the concaves being convex or of circular form, but with a gradual taper toward the bottom, to facilitate the casting, the bottom portion of the bar being rounded. In this instance the bar A is shown as constructed with a central and two side webs, *a b*, with a double row of perforations, *c*, on each side of the central web, to admit air freely to the fuel. From the point *d* to *e*, Fig. 2, each side of the bar is made concave. From *e* to *f* it is made in the form of a flat curve, say, on a radius of about twelve inches, with a gradual taper toward the bottom, which from *f* to *f* is round. These bars are provided with lateral lugs or teeth G, having vertical longitudinal perforations or air-passages *g*. These teeth are preferably arranged to alternate with each other, instead of being opposite to each other on the bar. They are also made to taper gradually from top to bottom, and from their inner ends outward, as shown in Figs. 3 and 4, to facilitate drawing from the sand, and to permit the free discharge of the ashes. They are also formed on each side with double bevels, as shown at *x* and *y* in Figs. 4 and 5. The upper bevel is concave and serves to catch and hold the fine coal, so that it is more effectively consumed, and the straight lower bevel, *y*, permits the ashes to readily pass through the grate. The inner edge of the upper concave bevel coincides with or is of the same width as the concave bevel on the grate-bar, and tapers toward the outer upper corner of the tooth, as shown clearly in Fig. 5. These teeth interlock with each other, allowing sufficient clearance in passing each other, and their bottoms extend to a point so far below the normal upper surface of the grate that in rocking they do not pass above it. Owing to their tapering or wedge-shaped form, the sides of the teeth alternately approximate and recede from each other as they are rocked, and thus crush or grind the clinkers.

This form of grate is particularly adapted to fine coal, as it catches on the concave upper surfaces of the bar and the concave bevels of the teeth, and is burned there, instead of dropping directly through, as it would on ordinary straight bevels. Longitudinal grooves *i* in the bars also serve to retain fine coal. Each bar is provided with a pendant or crank-arm,

H, united to a coupling-bar, I, so that all the bars may be rocked together in well-known ways. Any desired number of these bars may be united in a suitable frame to constitute a grate of the form and size desired.

I claim as of my own invention—

1. A grate-bar constructed, as described, with a flat top, and the upper part of its sides concave.
2. A grate-bar constructed, as described, with a flat top, vertical perforations therein, and the upper parts of its sides concave.
3. A grate-bar constructed, as described, with a flat top, longitudinal grooves and vertical perforations therein, and the upper parts of its sides concave.
4. A grate-bar constructed, as described, with a flat top, the upper parts of its sides concave, and downwardly-tapering convex lower sides.
5. A grate-bar constructed, as described, with a flat top, laterally-projecting lugs or teeth, the upper parts of its sides concave between teeth, and downwardly-tapering convex lower sides.
6. A grate-bar constructed, as described, with a flat top, vertical perforations, laterally-projecting lugs or teeth, the upper parts of its sides concave between the teeth, and downwardly-tapering convex lower sides.
7. A grate-bar constructed, as described,

with a flat top, vertical perforations, laterally-projecting vertically-perforated lugs or teeth, the upper parts of its sides concave between the teeth, and downwardly-tapering convex lower sides, and a rounded bottom.

8. The combination, substantially as herein set forth, of a series of grate-bars constructed, as described, with flat tops, vertical perforations, laterally-projecting interlapping lugs or teeth, the upper parts of its sides concave between the teeth, and downwardly-tapering lower sides.

9. The combination, substantially as set forth, of the bar and the laterally-projecting teeth formed with a double bevel on each side.

10. The combination, substantially as set forth, of the bar and the laterally-projecting teeth formed on each side with a bevel, y , and a concave bevel, x .

11. The combination of the bar formed with the upper parts of its sides concave, and the laterally-projecting teeth formed with concave bevels x , substantially as and for the purpose specified.

In testimony whereof I have hereunto subscribed my name this 6th day of September, A. D. 1883.

LEMUEL BANNISTER.

Witnesses:

GEO. A. MORSE,
PELHAM BONNEY.