(No Model.) 2 Sheets—Sheet 1.

W. SOLT, Sr. & W. D. KLINE.

GRATE BAR.

No. 333,687. Patented Jan. 5, 1886.

Fig. 1.

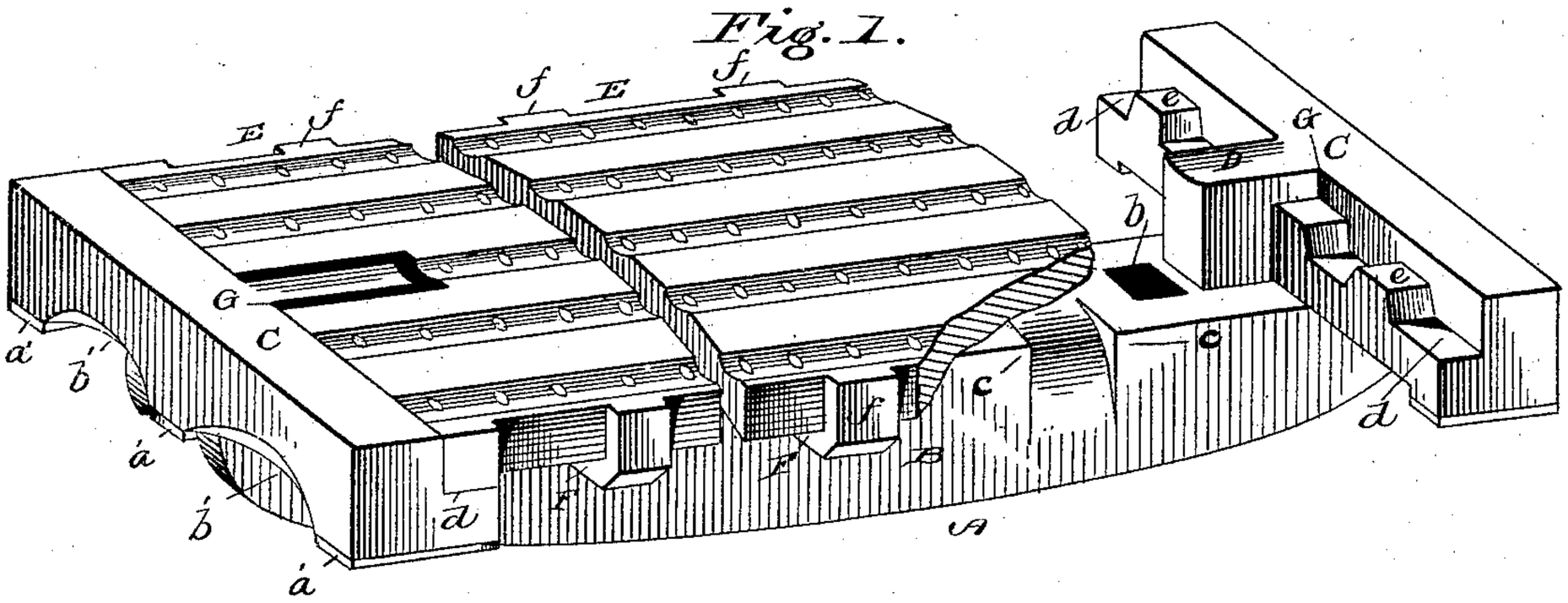


Fig. 2.

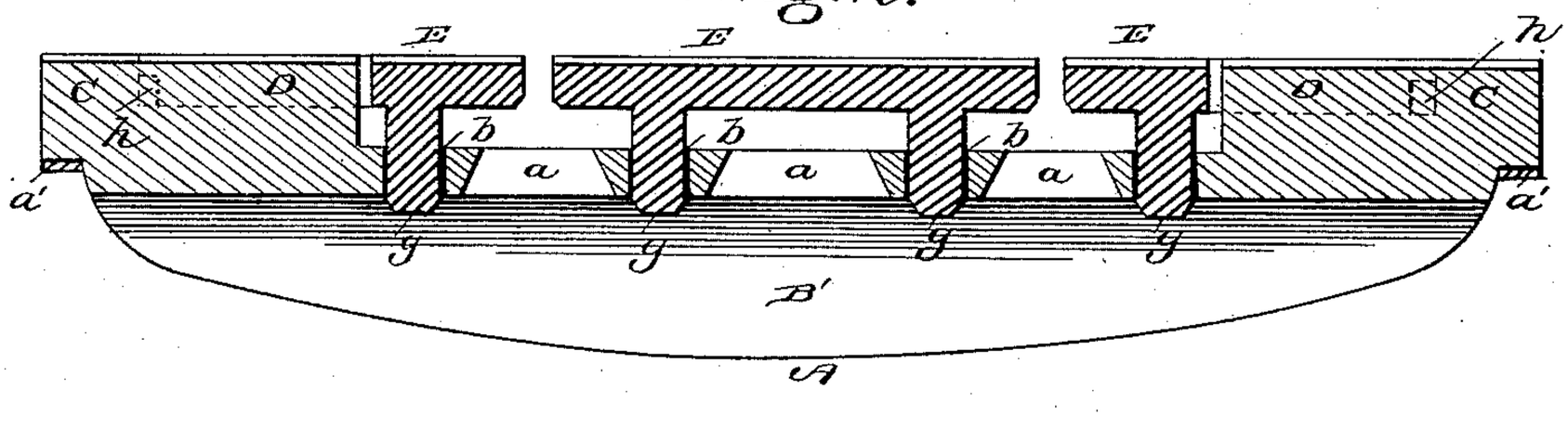


Fig. 3.

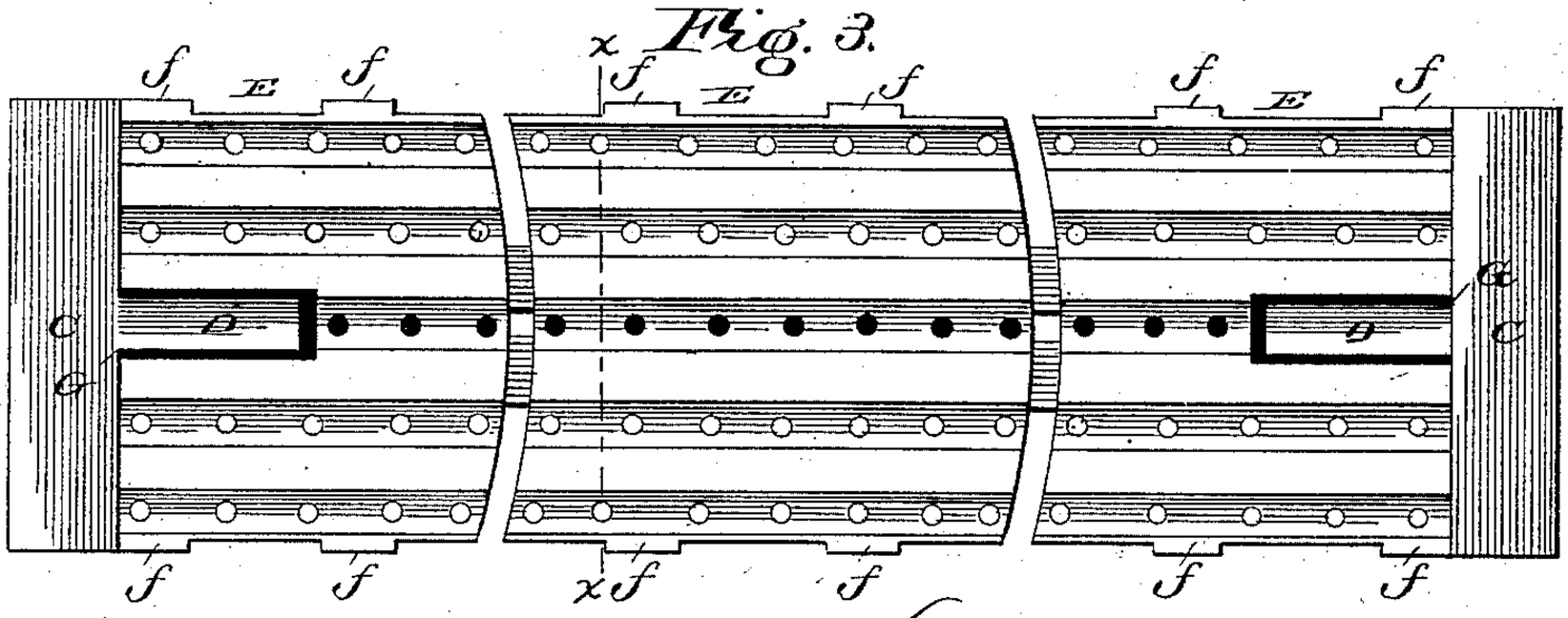
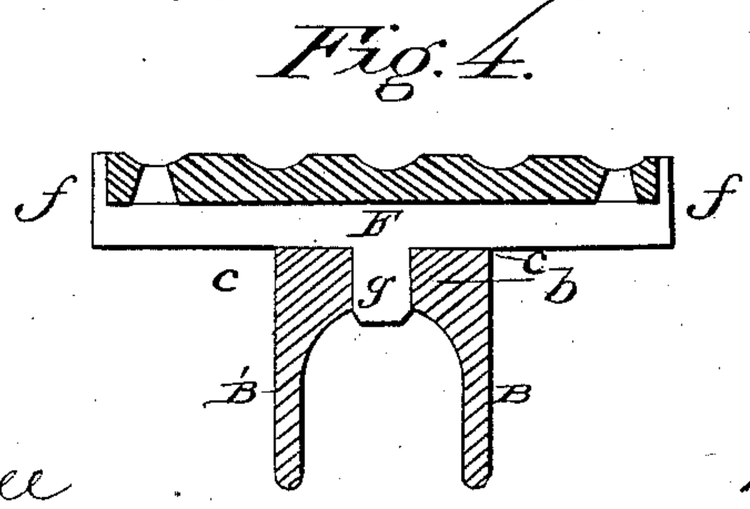


Fig. 4.



WITNESSES

C. A. Snow & Co.

E. G. Siggers.

INVENTORS

Wm. Solt, Sr. W. D. Kline

By, C. A. Snow & Co.

Attorneys

(No Model.) 2 Sheets—Sheet 2.

W. SOLT, Sr. & W. D. KLINE.

GRATE BAR.

No. 333,687. Patented Jan. 5, 1886.

Fig. 5.

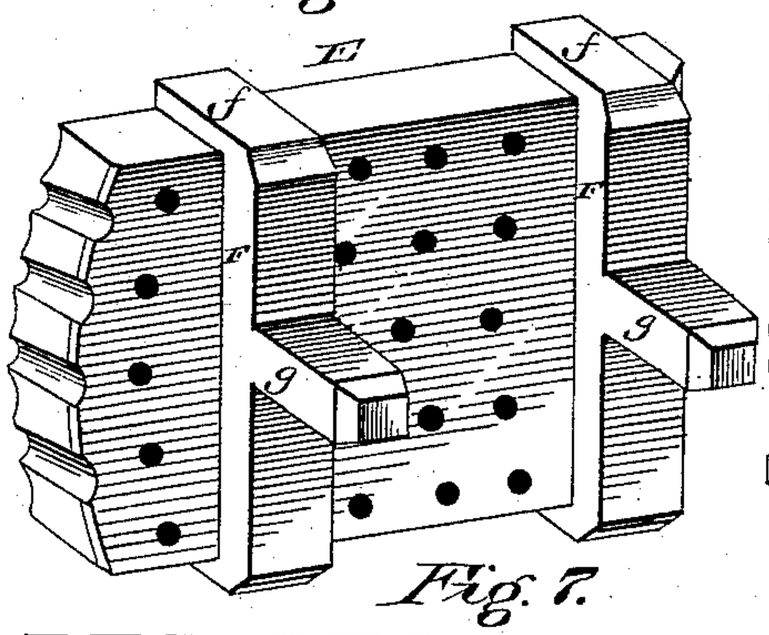


Fig. 6.

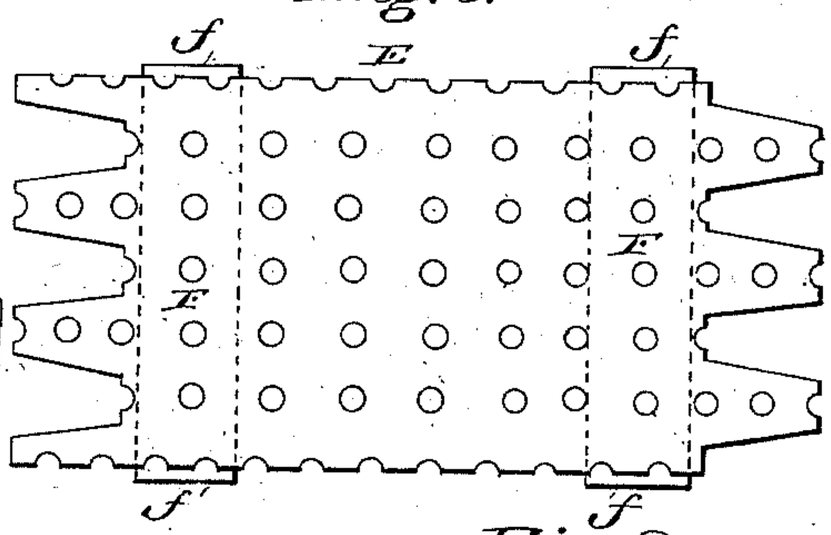


Fig. 7.

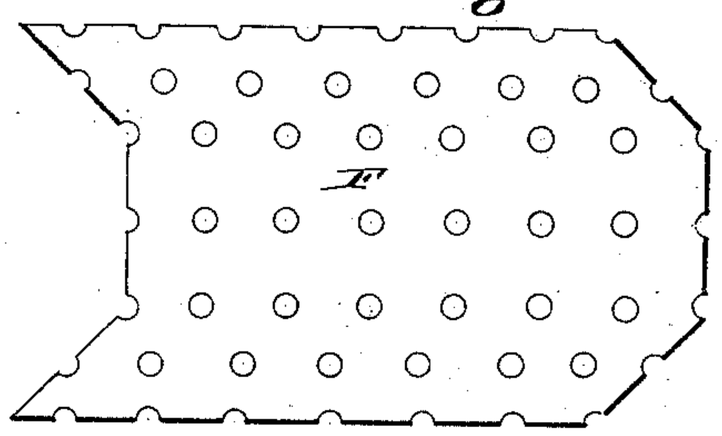


Fig. 8.

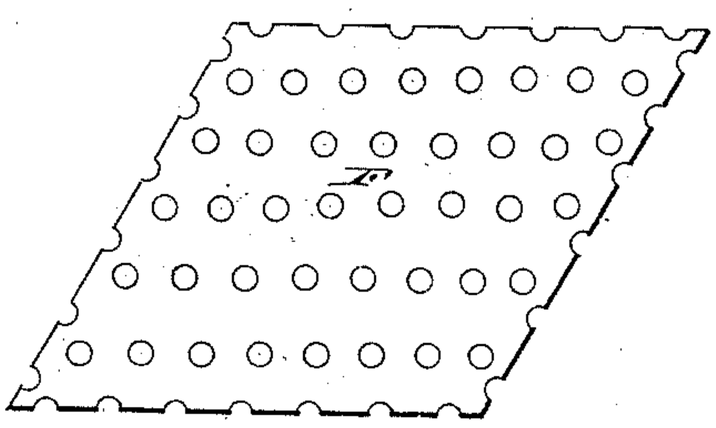


Fig. 9.

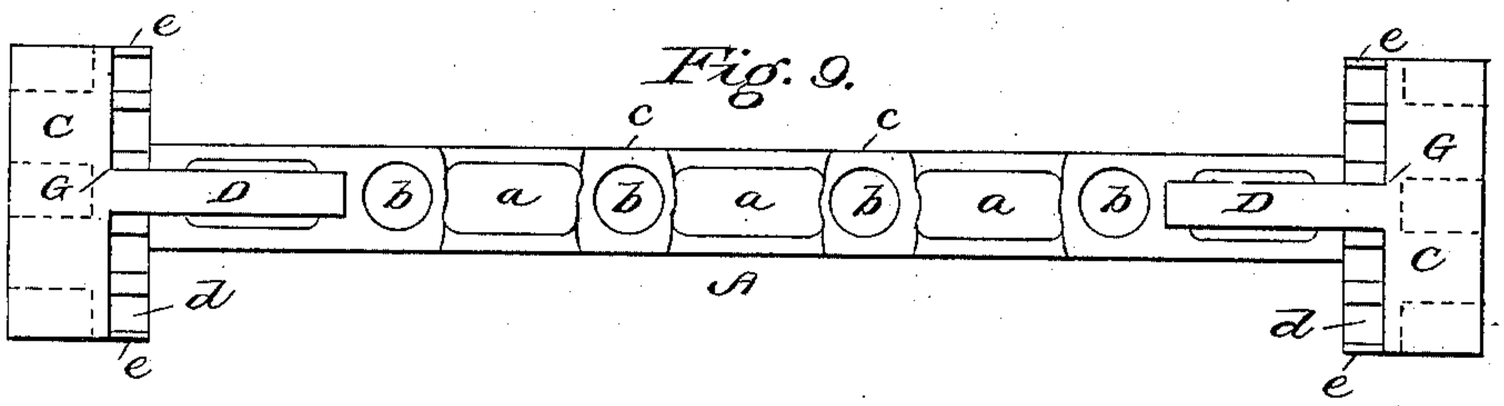


Fig. 10.

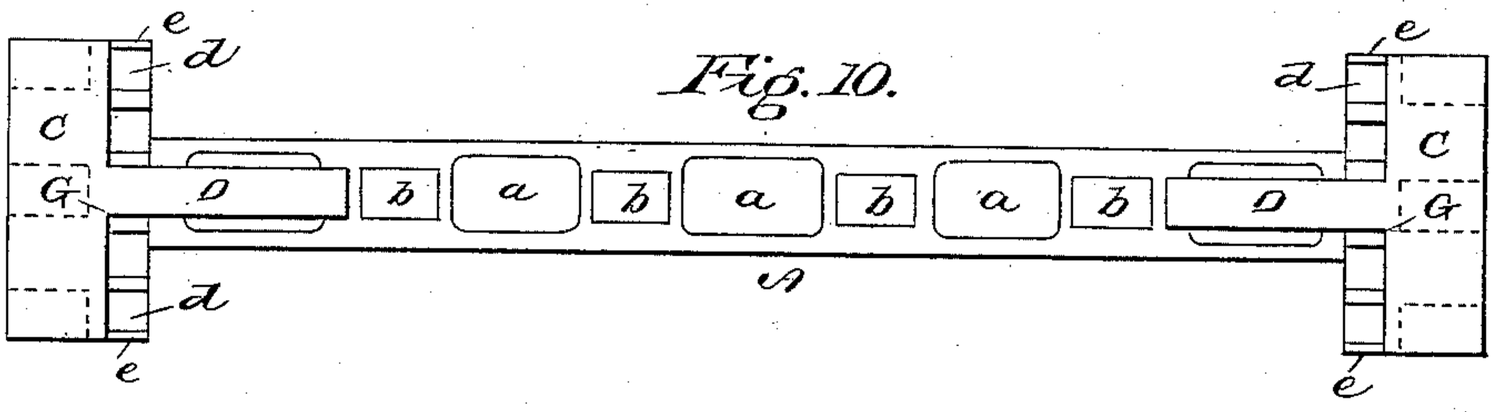
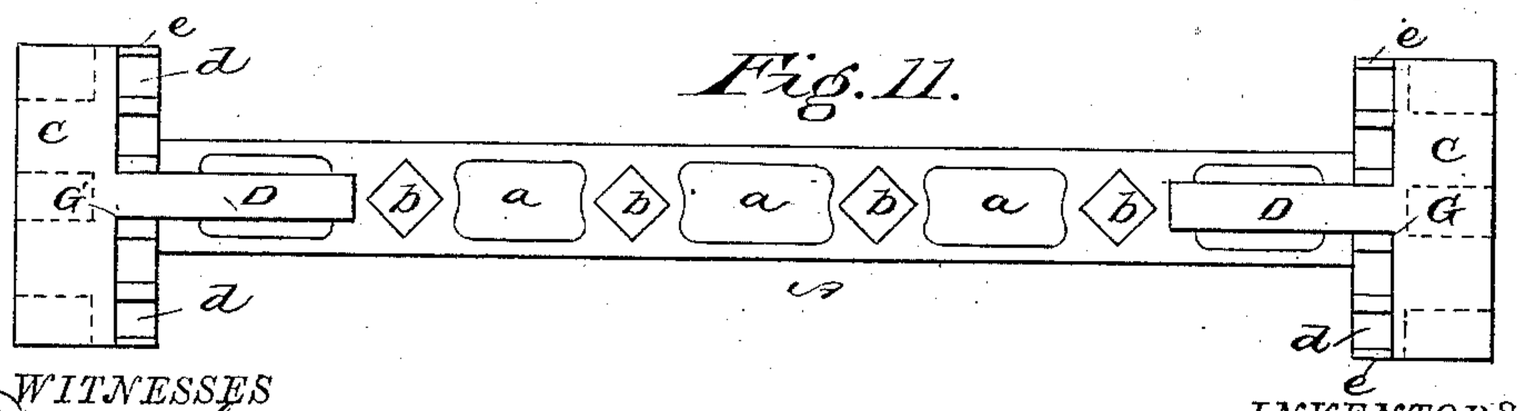


Fig. 11.



WITNESSES

E. G. Siggers.

INVENTORS

Wm. Solt, Sr. & W. D. Kline

By C. A. Snow & Co.

Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM SOLT, SR., AND WILLIAM D. KLINE, OF FREELAND, PENNSYLVANIA.

GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 333,687, dated January 5, 1886.

Application filed October 6, 1885. Serial No. 179,176. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM SOLT, Sr., and WILLIAM D. KLINE, citizens of the United States, residing at Freeland, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Improvement in Grate-Bars, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to an improvement in grate-bars, the object being to provide a device of this character which will be light and durable, and have allowance for expansion and contraction, so as to prevent warping.

A further object of the invention is to provide a grate-bar with detachable sections, which can be renewed while the fire is in progress; and a further object is to provide a grate-bar which will have increased ventilation, thereby securing a more perfect combustion with a corresponding decrease in the amount of fuel consumed.

With these ends in view the said invention consists in the peculiar construction, combination, and arrangement of parts, all as hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a perspective view of our improved grate-bar, one of the end grate-sections being removed. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a plan view of the grate-bar complete. Fig. 4 is a transverse vertical section on the line *x x*, Fig. 3. Fig. 5 is a detailed perspective view of one of the grate-sections. Figs. 6, 7, and 8 are plan views of different forms of grate-sections. Figs. 9, 10, and 11 are plan views of the bearing-bar for the grate-sections, with different forms of mortises and ventilating-openings.

Like letters are used to indicate corresponding parts in the several figures of the drawings.

Referring to the drawings, A designates the ventilator-bar, which is in the shape of a U in cross-section, having side walls, B B′, connected together at the top, all being cast in one piece. The top of the bar A is slotted longitudinally at *a a*, to provide ventilating-openings, and between the latter are formed mortises *b b*. When the bearing-bar is curved at the top, as shown in the drawings, laterally-extending shoulders *c c* should be provided on each side of the mortises *b* for the support of the grate-sections; but the top of the bar A may be made flat, as in Figs. 10 and 11, and open either partly or throughout, with braces or cross-pieces to connect the side walls, and in that case the said shoulders may be dispensed with.

At the ends of the bar A are located bearing-plates C C, which are supported in the walls of the furnace in the usual manner, and are provided with supporting-blocks *a′*, (three in number,) secured to or formed integral therewith on the under side of the plates to raise them above the walls of the furnace. Between the blocks *a′* the plates C C are provided with recesses or depressions *b′*, which form passage-ways for the air to circulate therein. The combination of the blocks *a′* with the recesses *b′* thus allows for the ventilation of the bearing-plates, so as to prevent them from burning out, and also enables said plates to be readily handled in removing and replacing them. Said plates C are provided with an integral finger, D, extending inwardly from the center over the bar A, and also formed with a ledge, *d*, on their inner sides, from which ledge extend blocks or lugs *e*, spaces or intervals being left between the lugs.

The bar A, with the bearing-plates C, is of one casting, and since the bar A is hollow or channeled, and the ends thereof are the points of greatest strain, it is necessary to provide means to compensate for this. We effect the desired end by casting the middle finger, D, integral with the bearing-plates, thereby imparting the necessary strength to the ends of the bar, and not increasing the weight thereof to any appreciable extent; but the sectional finger D may be dispensed with by forming the ends of the side walls, B B′, thicker or deeper to the desired extent and the same object obtained.

E designates the grate-sections, which in the present instance are constructed of perforated plates having grooves running longitudinally along the upper face thereof, the ends of the plates being curved substantially in the arc of a circle. On the under side of the plates are cast at intervals depending transverse flanges F, which are extended outward and upward on

each side of the grate-sections, and form projections *f* at intervals, as shown. Projecting downwardly from the flanges F, near the center, are tenons *g*, which are adapted to fit in the mortises *b* of the ventilator-bar, the flanges resting on the shoulders *c*, so as to support the grate-sections in a horizontal position and on a line with each other. The end grate-sections adjacent to the bearing-plates C are cut out at G to receive the middle finger D, and on the under side of the extreme ends are provided with recesses *h* to receive the blocks or lugs *e*, the ledge *d* supporting the ends of said sections, as will be readily seen. When in position, the grate-section should come on the same horizontal plane as the bearing-plates C C.

It will be understood that by the tenon-and-mortise connection between the grate-sections and the ventilator-bar the sections may be detached therefrom for the purpose of renewal, when desired. This tenon-and-mortise connection has been claimed by William Solt, one of the present applicants, in his Patent No. 303,675, dated August 19, 1884, to which reference is hereby made.

The object of providing the projections *f* on the sides of the grate-sections is to form a space between the horizontal series of grate-bars to allow the insertion of the handle-tongs on each side of the grate-sections when removing the same from the bearing or ventilator bar.

The curved ends of the grate-sections avoid the objections found to exist in the straight ends, in that the raker, when drawn transversely across the top of the sections, will not catch or drop down in the space between the ends thereof. The grooves in the top of the grate-sections enable the clinkers and other matter to be readily removed therefrom and without sticking, as would be the case with a plain-surface bar. Sufficient space is left between the meeting ends of the grate-sections to allow for contraction and expansion.

The slots *a*, in the bearing or ventilator-bar A, combined with the openings or perforations in the grate-sections, provide increased ventilating-surface, retaining the grate-bar at an even temperature, and thus avoiding the burning out of the sections. It also affords a constant draft for the fire, thereby obtaining for a small amount of fuel a greater degree of heat than would be possible otherwise.

In Figs. 6, 7, and 8 we have illustrated various forms of grate-sections, each of which possesses superior advantages over the "straight-end" sections, for the reasons stated. The tenons are cast on the under side of these sections similarly to the curved ends, as before described.

We may also change the form of the mortises *b* or the ventilating-slots *a* to the various shapes seen in Figs. 9, 10, and 11 without departing from the spirit of our invention, either of the forms effecting the desired end.

In place of the projections *f* on the sides of the grate-sections, we may provide recesses in lieu thereof, this change enabling the handle-tongs to be received on each side of the sections when removing the same.

Having described our invention, we claim—

1. The ventilator-bar A, having side walls, B B, slots or ventilating-openings *b*, and mortises *a*, in combination with the perforated plate grate-section E, having depending flanges F and tenons *g*, as and for the purpose set forth.

2. The ventilator-bar A, having side walls, B B, slots or ventilating-openings *a*, and mortises *b* between the slots, in combination with the perforated plate grate-sections having depending flanges F, extensions or projections *f*, and tenons *g*, as set forth.

3. The ventilating-bar A, having side walls, B B, slots or openings *a*, mortises *b* between the slots, and bearing-plates C at the ends of the bar, all cast in one piece, said plates having a ledge, *d*, provided with blocks or lugs *e*, and the integral middle finger, D, in combination with the perforated plate grate-sections having depending flanges F, projections or extensions *f*, and recesses *h* in the under side of the end grate-sections, as set forth.

4. The bearing-plates C, provided with the ledge *d*, formed with blocks or lugs *e*, in combination with the perforated plate grate-sections having recesses *b* in the ends thereof to receive the blocks or lugs, as set forth.

5. The ventilator grate-bar A, in combination with the bearing-plates C, extending transversely across the ends of the bar, and of greater length than the width of said bar, and recesses or depressions *b'*, provided in the under side of the bearing-plates on each side of the point of juncture with the bar A, as set forth.

In testimony that we claim the foregoing as our own we have hereto affixed our signatures in presence of two witnesses.

WILLIAM SOLT, SR.
WILLIAM D. KLINE.

Witnesses:
EDW. G. SIGGERS,
WM. N. MOORE.