

(No Model.)

J. C. KNOEPPPEL.

GRATE BAR.

No. 246,016.

Patented Aug. 23, 1881.

Fig. 1.

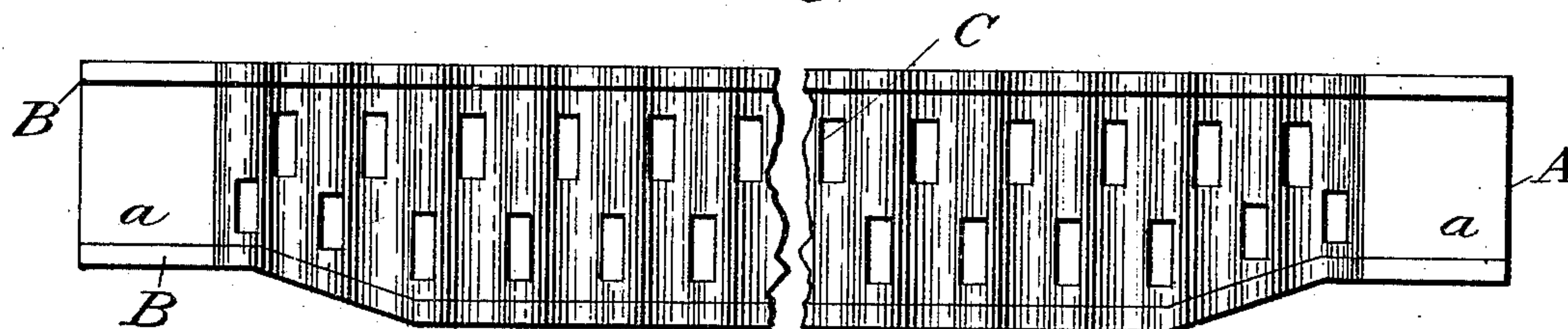


Fig. 2.

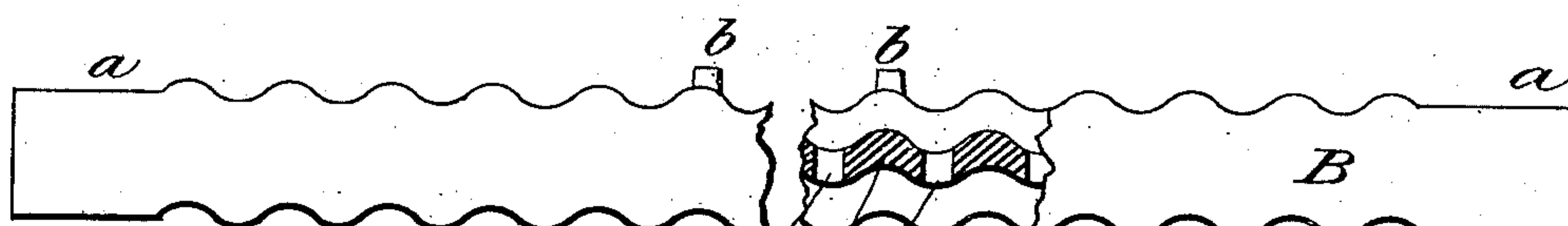


Fig. 5. A.

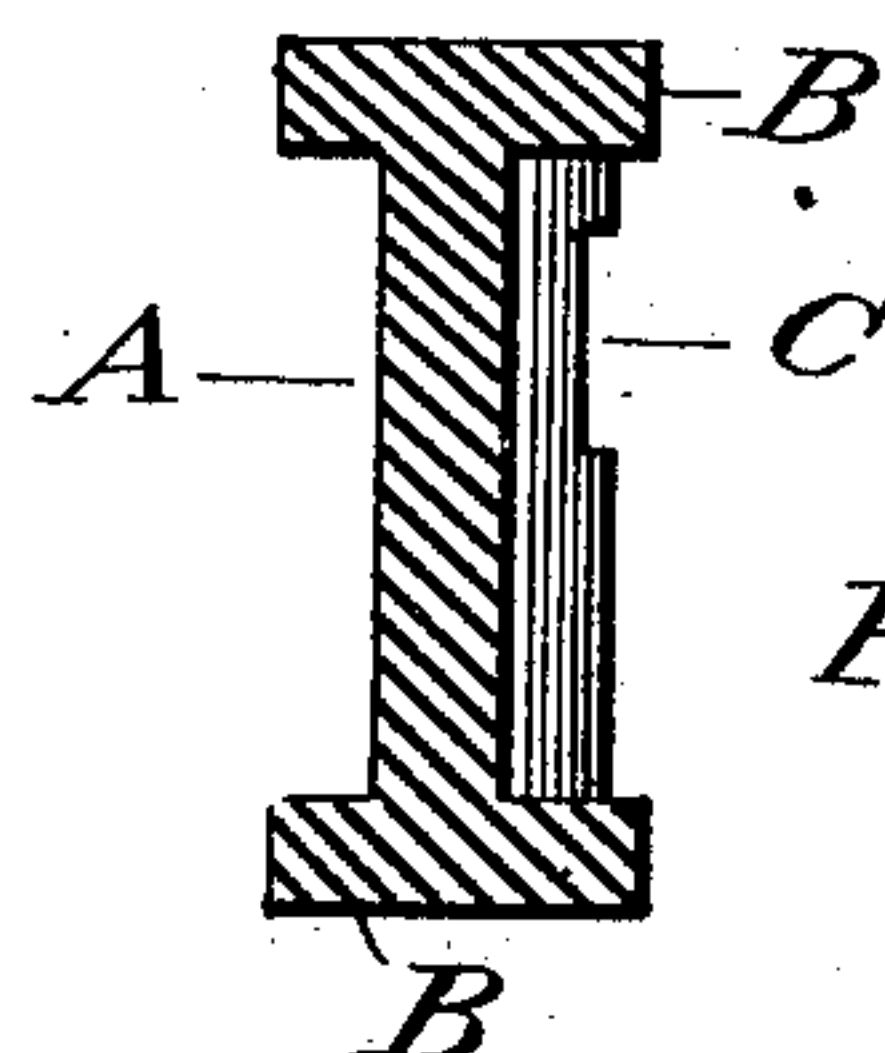
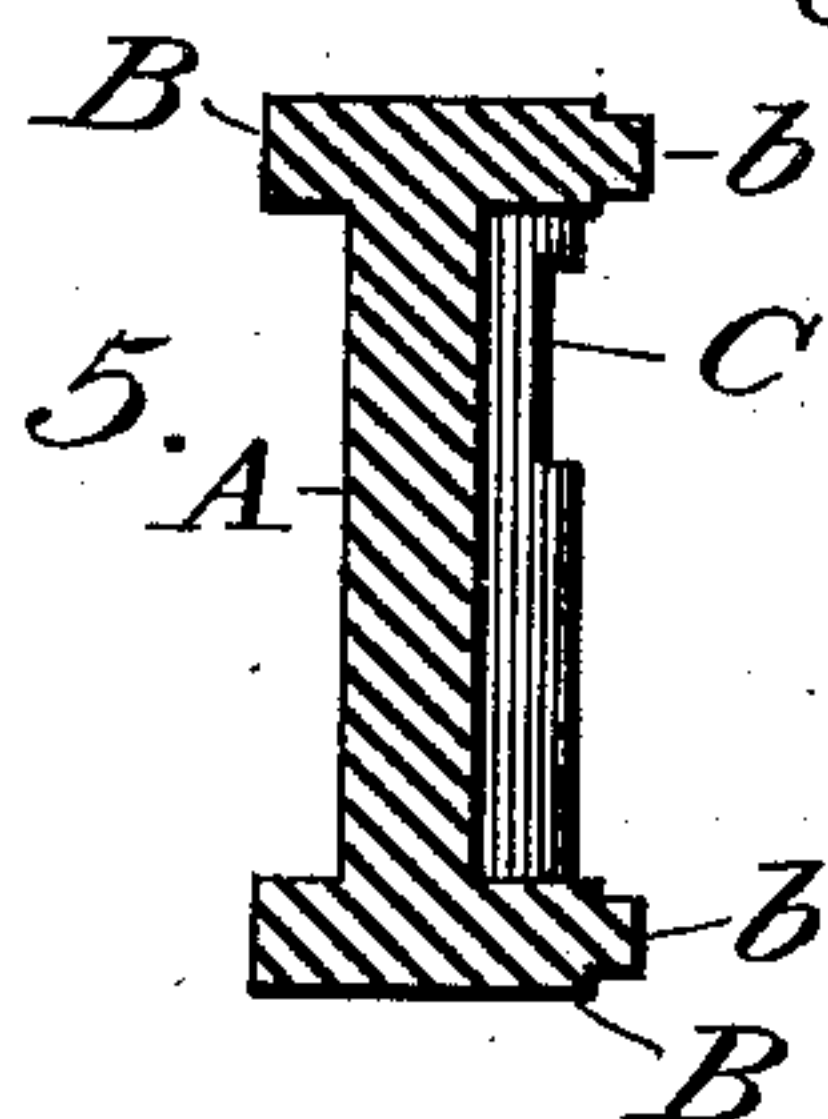
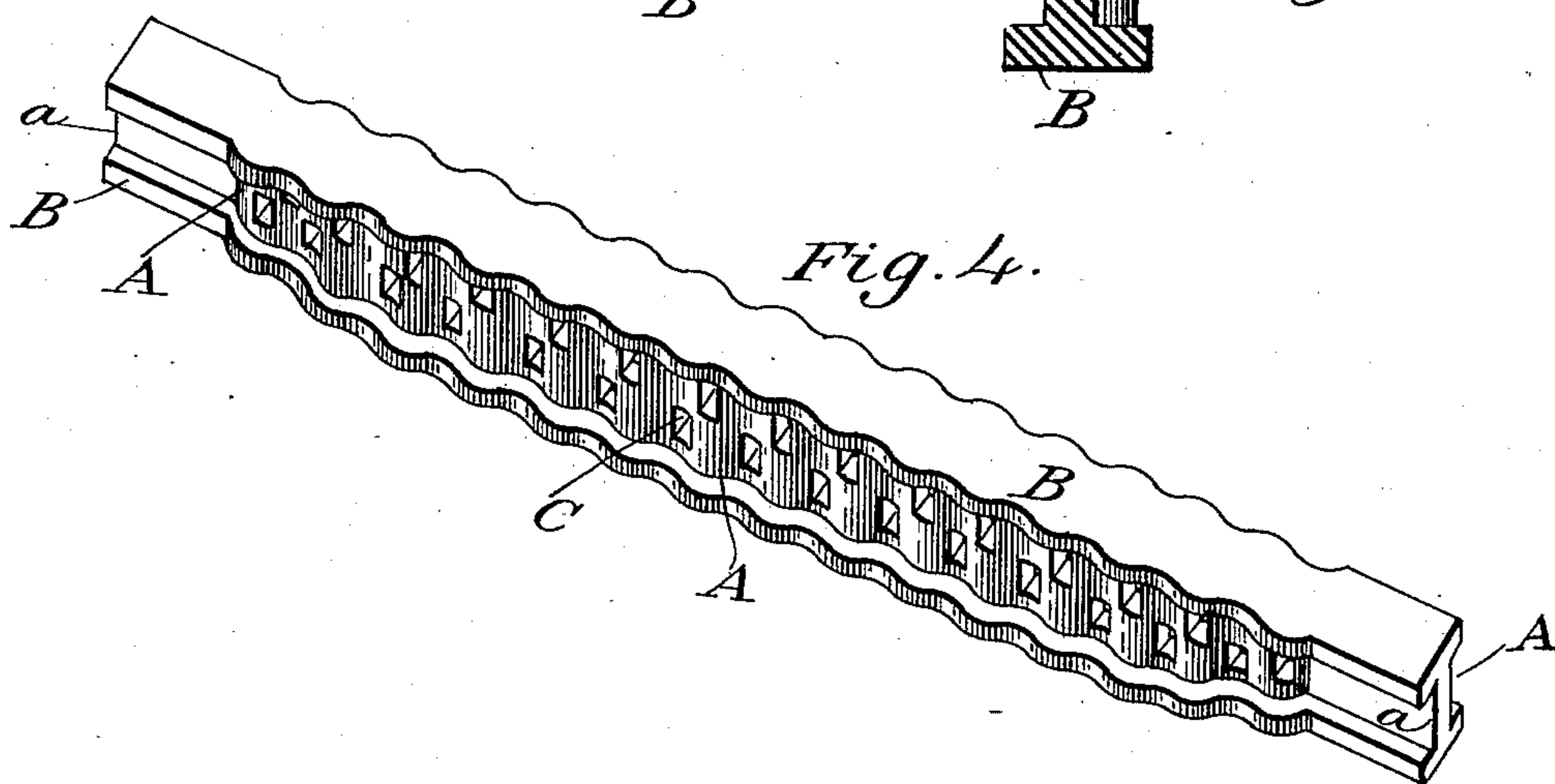


Fig. 3.

Fig. 4.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN C. KNOEPPPEL, OF MILWAUKEE, WISCONSIN.

GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 246,016, dated August 23, 1881.

Application filed June 14, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. KNOEPPPEL, of Milwaukee, in the county of Milwaukee, and in the State of Wisconsin, have invented certain new and useful Improvements in Grate-Bars; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to grate-bars, and will be fully described hereinafter.

In the drawings, Figure 1 is a side view of my improved grate-bar. Fig. 2 is a top view, with part of the top flange broken away. Fig. 3 is a sectional view. Fig. 4 is a perspective view, and Fig. 5 is a detail.

A is the web of the bar, which is straight at its ends *a a*, but is waved or corrugated midway to permit the bar to expand or contract under varying temperatures without warping laterally, and to restrain any tendency to warp vertically I provide the web with flanges B, which may be either straight or corrugated. These flanges B also serve to make up the fire-bed, and render it unnecessary to place the bars as near together as formerly, and also do away with the necessity of using thick bars, as the flanges supply the requisite strength to a bar much thinner than could formerly be used, and in addition to the saving of material by reason of making the bars thin and placing them farther apart, I get more draft, which is always a great consideration.

To keep down the temperature of my grate-bars I provide each one with perforations or slots C, and I preferably arrange these slots so that they shall break joints with each other, as shown in the drawings; but they may be on a line with each other, and at either frequent or remote intervals. These slots permit a constant draft through the bars from end to end, which carries off the heat and prevents the bars from being burned out rapidly, as grate-bars usually are. My improved bars may be set in their places with either flange exposed to the fire, and when that flange has been rendered unserviceable from long exposure to the heat the bar may be reversed and its other flange exposed, and therefore one of my bars will outlast two of ordinary construction.

In order to more effectually brace and strengthen my bars when in position for use,

I preferably cast lugs *b* on one side of each flange, as shown in Figs. 2 and 5, which will abut against the flanges of the bar next thereto, and so on throughout the entire grate.

My improved grate-bars cost less to manufacture than the ordinary thick bars, are not liable to warp or crack, and, being reversible, one of these bars is more than equal to two of the old pattern.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a furnace grate-bar, the combination of a waved or corrugated web and top and bottom flanges, as set forth.

2. In a furnace grate-bar, the combination of a waved or corrugated web provided with transverse slots or perforations, with top and bottom flanges, as shown and described.

3. In a furnace grate-bar, a waved or corrugated web provided with two or more series of transverse slots or perforations, arranged alternately, as shown, in combination with top and bottom flanges, as set forth.

4. A reversible furnace grate-bar having a waved or corrugated web, straight at each end, and provided with transverse slots or perforations and top and bottom flanges, as set forth.

5. A reversible furnace grate-bar having top and bottom flanges, and a waved or corrugated web, straight at each end, and provided with two or more series of transverse slots or perforations, arranged alternately, as shown and described.

6. A reversible furnace grate-bar with straight web and flanges at each end, and intermediate waved or corrugated web, and waved top and bottom flanges, as shown and described.

7. A reversible furnace grate-bar with straight web and flanges at each end, and intermediate waved top and bottom flanges, and waved or corrugated web provided with transverse slots or perforations, as set forth.

8. A reversible furnace grate-bar with straight web and flanges at each end, and intermediate waved top and bottom flanges, and waved or corrugated web provided with two or more series of transverse slots or perforations, arranged alternately, as shown and described.

9. A reversible furnace grate-bar provided

with top and bottom flanges, having lugs cast thereon, and a waved or corrugated web, as set forth.

10. A reversible furnace grate-bar provided
5 with top and bottom flanges, having lugs cast thereon, and a waved or corrugated web, having transverse slots or perforations, as set forth.

11. A reversible furnace grate-bar provided
10 with top and bottom flanges, having lugs cast thereon, and a waved or corrugated web, having two or more series of transverse slots or perforations, arranged alternately, as shown and described.

12. A reversible furnace grate-bar with

straight web and flanges at each end, and in- 15
termediate waved top and bottom flanges, hav-
ing lugs cast thereon, and waved or corrugated
web, having two or more series of transverse
slots or perforations, arranged alternately, as
shown and described. 20

In testimony that I claim the foregoing I
have hereunto set my hand this 2d day of June,
1881.

JOHN C. KNOEPPEL.

Witnesses:

S. S. STOUT,

HAROLD G. UNDERWOOD.