(No Model.)

# J. A. DUNCAN.

## GRATE BAR.

No. 474,116. Patented May 3, 1892.

Fig. 1.

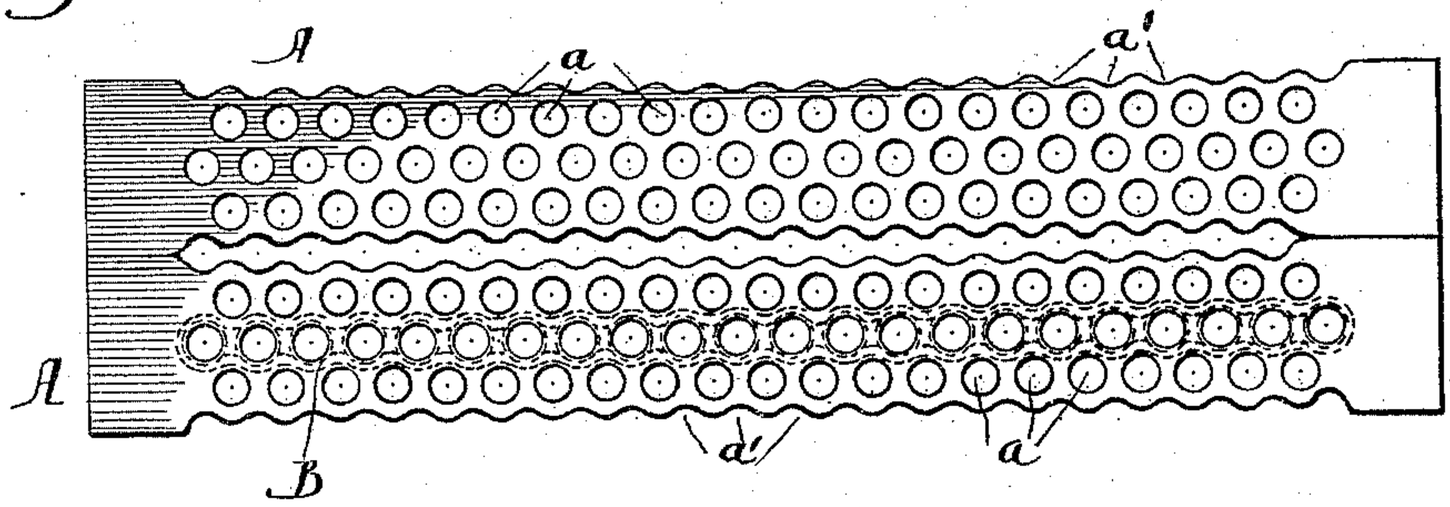



Fig. 2.

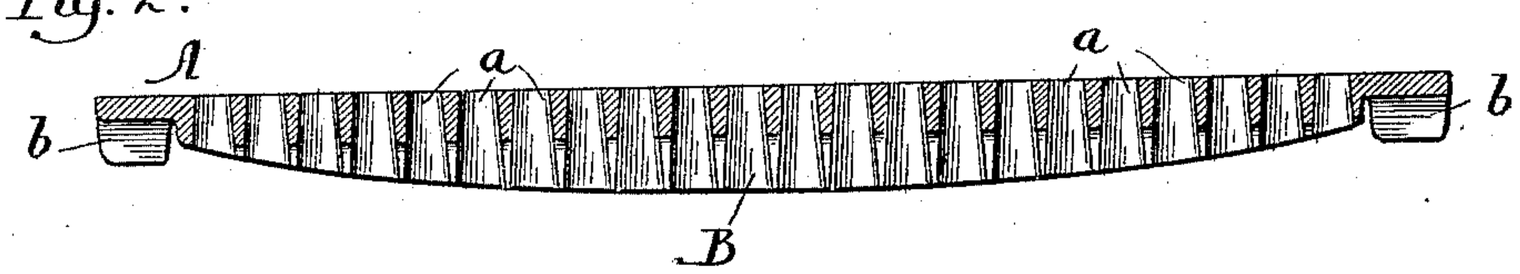



Fig. 3.

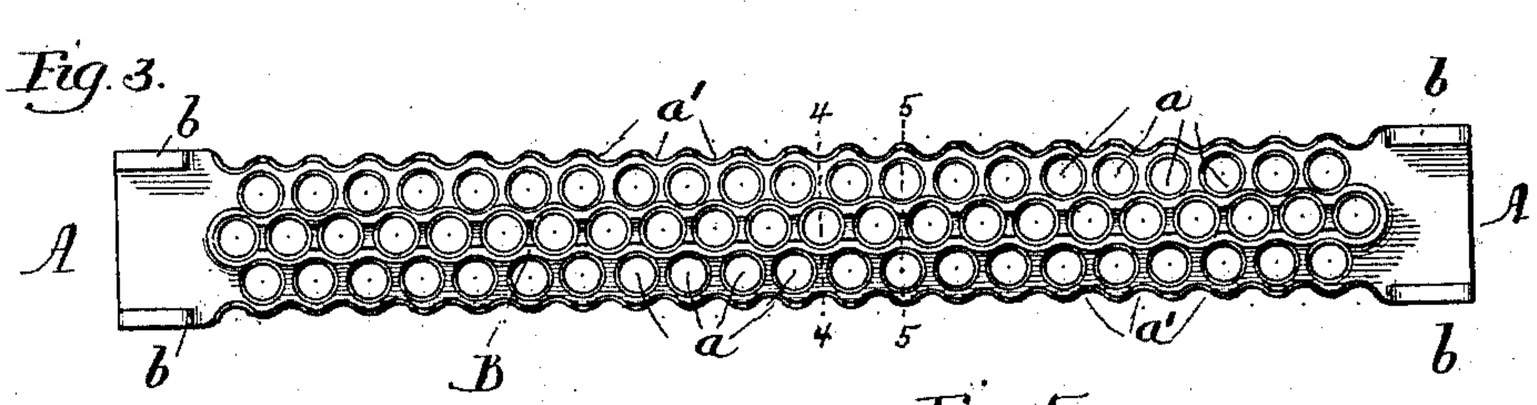



Fig. 4.

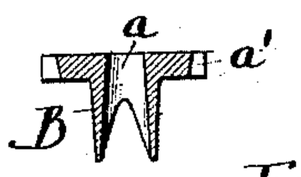



Fig. 5.

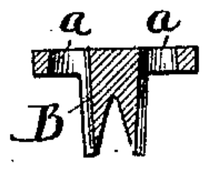
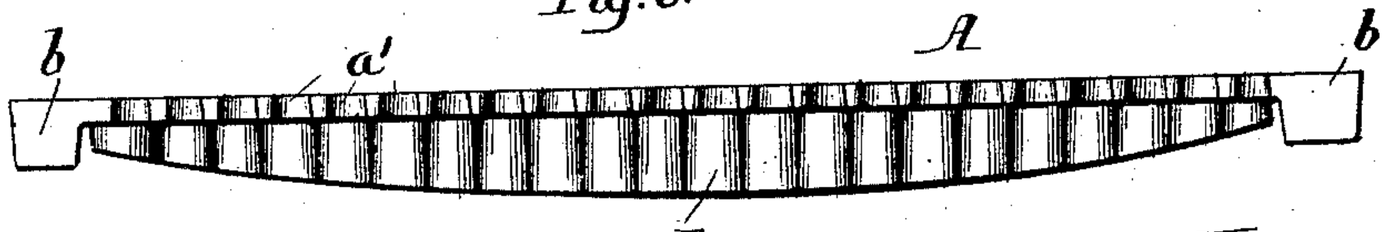



Fig. 6.

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# UNITED STATES PATENT OFFICE.

JOHN A. DUNCAN, OF KANSAS CITY, MISSOURI.

## GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 474,116, dated May 3, 1892.

Application filed June 24, 1891. Serial No. 397,340. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN A. DUNCAN, residing at Kansas City, in the county of Jackson, State of Missouri, have invented certain new and useful Improvements in Grate-Bars, of which I do declare the following to be a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My present invention has for its object to provide an improved form of grate-bar that shall be simple, cheap, and durable in construction, that shall permit a uniform and thorough combustion of the fuel, whether this fuel be coal, wood, "coal-slack," or sawdust, and that can be readily cleaned, and which without unnecessary weight of material shall effectively resist all tendency to warp under the intense heat to which such bars are subjected.

With this object in view my invention consists in the novel construction of grate-bars hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the claim at the end of this specification.

Figure 1 is a plan view of two adjacent grate-bars embodying my invention, Fig. 2 is a view in central vertical section through one or the grate-bars. Fig. 3 is an inverted plan view. Fig. 4 is a view in vertical transverse section on line 4 4 of Fig. 3. Fig. 5 is a view in vertical transverse section on line 5 5 of Fig. 3. Fig. 6 is a view in side elevation.

The upper portion of my improved grate-bar A consists of a plate provided with several rows of perforations *a*, extending approximately from end to end of the grate-bar, these perforations being tapering, as shown—that is to say, being slightly larger at the bottom—so as to permit the more ready discharge of cinders and ashes therefrom. The rows of perforations are preferably so arranged that the perforations of one row shall come coindent with the spaces of the next adjacent row, this arrangement permitting the perforations to be set very close together, so as to afford as large an area for the passage of air as possible. So, also, the side edges of the grate-bar A are formed with approximately semicircular spaces *a'*, so that when the grate-bars are set side by side, as illustrated in Fig. 1 of the drawings, the entire surface of the grate shall be very nearly uniform in appearance, and as a consequence a uniform draft of air will be admitted to the fuel throughout the entire area of the grate.

The grate-bar A is provided at each end with suitable lugs or projections *b*, that will rest upon the usual supports of the grate-bar. In order to give the desired strength to the grate-bar, I form the under side of the bar with the central perforated rib B, that extends approximately from end to end of the grate-bar. This rib B has its sides shaped to conform to the spaces between the perforations of the grate-bar, so that the ribs, while affording the desired strength, shall not interfere in any manner with the draft of air through the perforations of the grate-bars. Preferably the perforated rib B is tapering from end to end, and the sides of this rib are, preferably, also beveled or reduced toward their bottom, so as to afford no obstruction to the ready passage of the ashes or clinkers through the grate-bar. By thus arranging the sides of the rib B so as to conform to the spaces between the perforations I am enabled to locate this rib centrally and at the same time provide a central row of perforations for the grate-bar. In fact, the surface of the grate-bar may be uniformly perforated, as shown, and this feature is of importance not only because it allows for a uniform draft of air, but because it allows, also, for a more uniform heating of the grate-bar, and consequently avoids the danger of warping, which is apt to occur where the grate-bars are not perforated uniformly. Moreover, it will be seen that when the grate-bars are set in series, as illustrated in Fig. 1 of the drawings, their upper faces present a plain surface entirely free from all sharp angles, corners, or the like, so that the surface of the grate can be readily cleaned with the ordinary tools.

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

A grate-bar provided with at least three

rows of perforations alternately arranged, substantially as shown, and provided upon its under side with a central longitudinal perforated rib extending between the perforations of the central row, the sides of said rib extending along the spaces between the inner and outer rows of perforations and being shaped to conform to the metal between the rows of perforations, substantially as described.

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