(No Model.)

C. E. GETCHELL.

GRATE BAR.

No. 423,603. Patented Mar. 18, 1890.

Fig. 1,

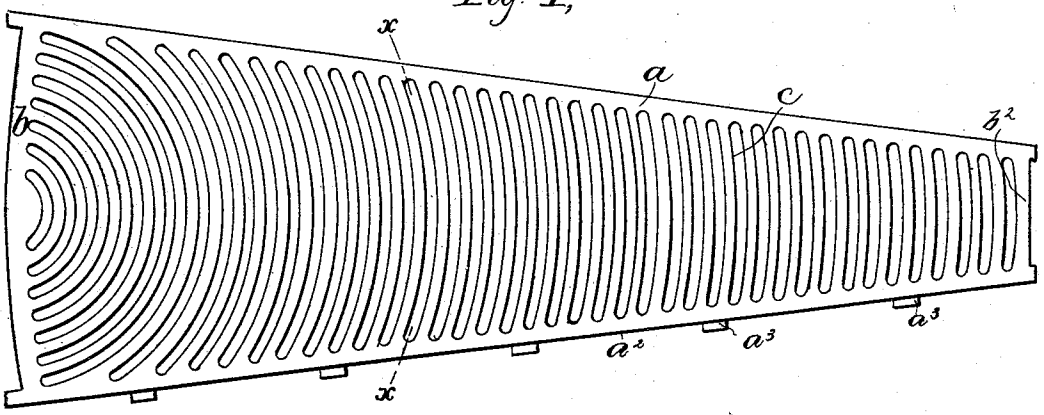


Fig. 2,

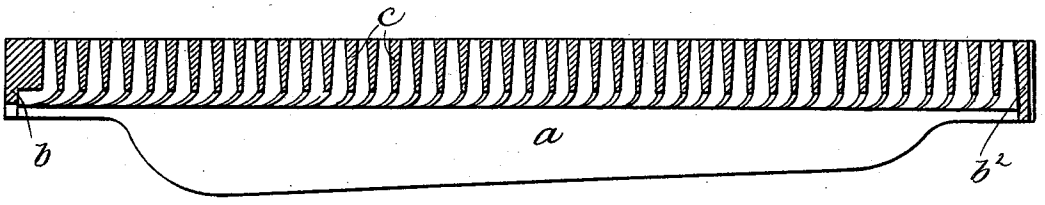


Fig. 3.

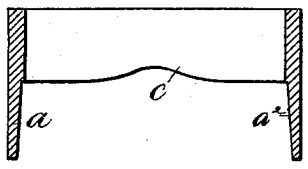


Fig. 4,

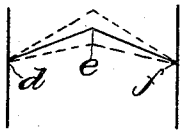
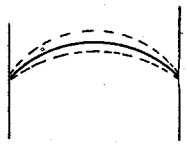


Fig. 5.



Witnesses
Jas. J. Maloney.
A. J. Locke

Inventor,
Charles E. Getchell,
by Jos. P. Livermore
Atty.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

CHARLES E. GETCHELL, OF PALMER, ASSIGNOR TO JAMES M. KILGORE, ISAAC H. BULLARD, AND ANTHONY CURTIN, ALL OF WALTHAM, MASSACHUSETTS.

GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 423,603, dated March 18, 1890.

Application filed December 2, 1889. Serial No. 332,229. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. GETCHELL, of Palmer, county of Hampden, State of Massachusetts, have invented an Improvement in Grate-Bars, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is embodied in a grate-bar of that class which is made in the form of a grating or frame provided with bars or ribs that support the fuel and have spaces between them for the passage of air.

The object of the invention is to produce a grate-bar for circular grates more desirable than has heretofore been made of this class; and the invention consists, mainly, in a novel arrangement of the portions of the bar whereby the strains due to expansion and contraction are equalized or distributed throughout the parts of the bar, which is thus enabled to withstand such strains without breakage.

Figure 1 is a plan view of a grate-bar embodying this invention; Fig. 2, a central longitudinal section thereof; Fig. 3, a transverse section on line $x\ x$, Fig. 1, showing one of the transverse bars or ribs in elevation; Figs. 4 and 5, illustrative diagrams to be referred to.

The grate-bar consists, essentially, of a strong frame portion composed of longitudinal side webs $a\ a^2$, connected at their ends by transverse ribs $b\ b^2$, the said webs $a\ a^2$ being deep and constituting a beam of sufficient strength to sustain the weight of the fuel resting on the area between them when the said beam or bar is supported only under its ends $b\ b^2$. One at least of the longitudinal members $a\ a^2$ is provided with lateral projections a^3 to butt against the side of the adjoining bar, so as to make a slight air-space between the two adjoining bars. The space between the longitudinal members $a\ a^2$ is traversed by cross-ribs c, which are curved instead of extending directly across from one to the other side of the bar, and each rib is of substantially uniform curvature from end to end, although the curvature of the different ribs varies, being the largest at the wider end of the bar, which is tapering in shape for use in a circular grate for an upright boiler. By making the transverse ribs c uniformly curved from end to end, as shown, the longitudinal strain due to expansion and contraction is accommodated by a slight lateral springing of the rib in one direction or the other, expansion tending to throw the convex side of the rib outward or to increase the curvature of the rib, and contraction tending to draw the convex side inward or decrease the curvature of the rib, and experience has shown that with this construction the ribs will undergo the various strains arising from expansion and contraction for a very long period of time without breakage, while bars in which the ribs are straight, extending directly across at right angles to the longitudinal members or diagonally across, or extending in a V shape from one side to the other, the strains due to contraction and expansion produce a direct thrust or pull in the rib, which in a comparatively short time results in breakage of the rib.

The difference in the effect of the expansion and contraction on the curved ribs and V-shaped ribs will be readily understood from the exaggerated diagrams, Figs. 4 and 5. Expansion and contraction on the V-shaped ribs tend to throw the same from the full-line position toward the dotted-line positions, Fig. 4, and the bend or strain of the metal to accommodate this movement is thrown at all three points $d\ e\ f$, and the continual working back and forth of the rib from one toward the other dotted-line position soon breaks the rib at some one of these points. With the curved ribs, however, the expansion and contraction tends to throw the same from the full toward the dotted line position shown in Fig. 5, and the lateral bend to accommodate such movement is distributed throughout the entire length of the bar, instead of being all thrown to three points, so that the bending at any point in the length of the bar is extremely small, and it can undergo the constant bending back and forth from one toward the other dotted-line position for an indefinite length of time.

When the width between the side members of the bar varies from end to end of the bar,

as is required for a circular grate, the curvature of the different cross-ribs should be varied in accordance with the strains that come upon them, and long experiment has shown that the curvature represented in Fig. 1 affords an extremely durable bar, the longest ribs being of the greatest curvature.

I claim—

In a grate-bar, the combination of the longitudinal converging side members with cross-ribs extending from one to the other of said side members, the said cross-ribs being curved, and those spanning the wider space between the longitudinal members being of greater curvature than those spanning the shorter space, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES E. GETCHELL.

Witnesses:

LOUIS E. MOORE,

WILLIAM W. LEACH.