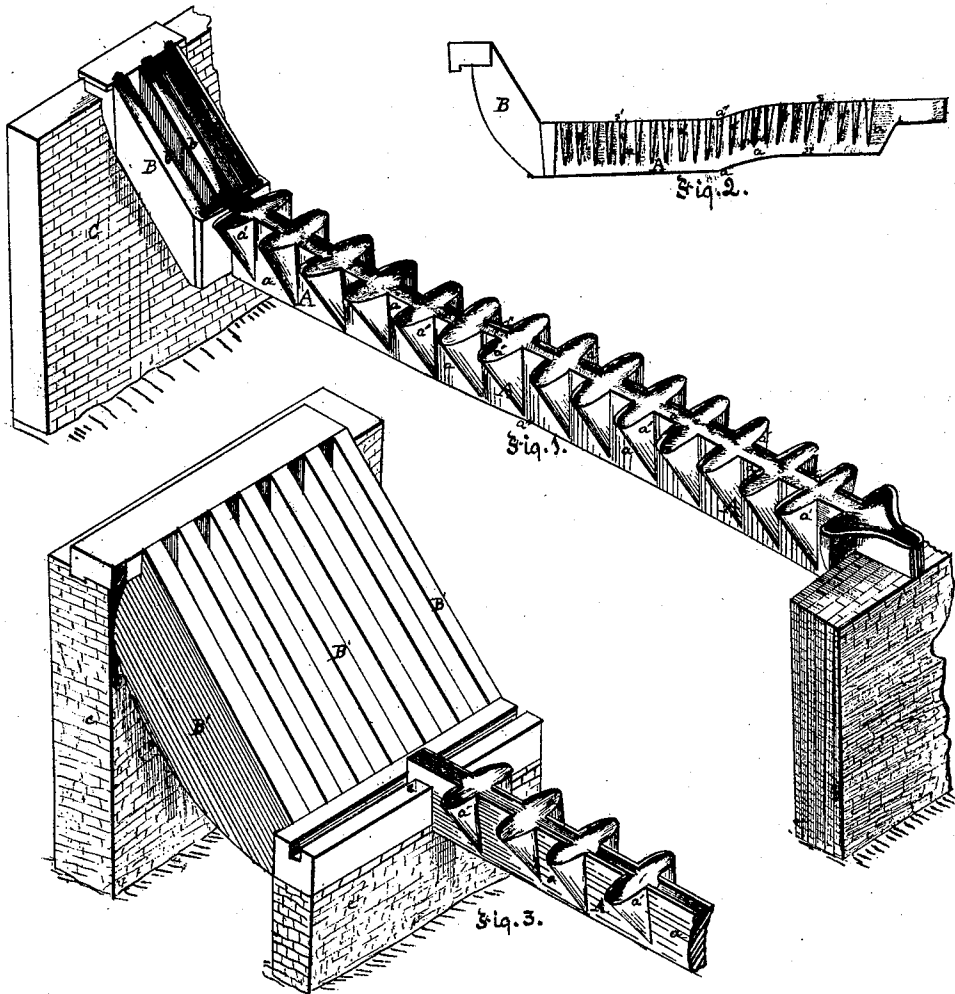


J. Cuthbert,

Furnace Grate Bar.

No. 102,233,

Patented Apr. 26, 1870.



Witnesses:
R. Wrenshall
Thos. Wren

Inventor:
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UNITED STATES PATENT OFFICE.

JOHN CUTHBERT, OF PITTSBURG, PENNSYLVANIA.

FURNACE GRATE-BAR AND GRATING.

Specification forming part of Letters Patent No. 102,233, dated April 26, 1870.

To all whom it may concern:

Be it known that that I, JOHN CUTHBERT, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Furnace Grate-Bars and Grating; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my improved grate-bar and grating, showing the construction thereof and the arrangement with reference to the furnace bridge-wall. Fig. 2 by a side view illustrates the same, and Fig. 3 illustrates by a perspective view the arrangement of a rear grating and separate grate bar.

Like letters of reference indicate like parts in each.

My invention relates to an improved construction and arrangement of grate-bars and grating for steam-boiler, puddling, and other large furnaces; and it consists in making the bar of an improved form and in combining with it an inclined rear grating, such grating being made separate or cast with the main bar, so as to form a part thereof.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and mode of operation.

The main bar A is cast in any of the ways known to the art, with a series of side ribs, *a'*, projecting from a central web, *a*, the upper faces of both being grooved or fluted to receive and retain a layer of ashes as a protection to the bar against the heat of the fire.

In furnace-fires the maximum of combustion and heat is secured at the rear part and with the ordinary straight-faced bars. The upper faces of such bars at the rear ends are commonly burned away in a short time till the level of such rear faces becomes about an inch (more or less) lower than the front faces, and then the burning-away action of the fire on the grate-bars becomes much less destructive and comparatively ceases. To obviate this defect, and as an improvement on the ordinary straight-faced bars, I make the bar A with a downward curve, as at *a''*, about midway between its ends, so that its rear face, *s'*, when in use, shall be a little lower than its front face, *s*. The bar then burns away more uniformly over the whole of its fire-surface with a consequent

increase in its durability. This construction also enables me to secure another desirable end—viz., the more perfect combustion of the smoke and gases evolved by the fire. The fresh fuel is fed in through the furnace-door on the front or higher face, *s*, of the bars, and as it becomes ignited it is pushed back onto the rear or lower face, *s'*. I thus secure in the rear of the furnace a thicker bed of burning fuel, and with a greater evolution of heat therefrom secure a more perfect combustion of the smoke, carbon, &c., which are driven off from the fuel in front and pass back through the smoke-flues. This is especially the case with the soft or bituminous coal used as fuel in many parts of the country.

The better to secure the complete combustion of the smoke, carbon gases, &c., from the fire, I use, in connection with the main bar A, a grating, B, either cast as a part thereof, as in Fig. 1, or cast separate, as in Fig. 3, their relation to each other in either case being the same. This grating B B' extends from the rear end of the bar A, with an upward slope to the top of the bridge-wall *c*, the angle of inclination being greater or less, as may be desired.

As shown in Fig. 1, the number of bars *b* is such as to give, with the bar A, a continuous bar of a width nearly or exactly uniform.

As shown in Fig. 3, the gratings B' are mounted on walls *c c'*, with a groove, *e'*, in the end bar, *b'*, which engages a hook, *e*, on the end of the bar A. The bars A are then arranged at any desired distance from each other, with their hooks *e* resting in the groove *e'* to the number required in the furnace.

With the ordinary furnace-grating and bridge-wall at the rear end the fuel employed, as it is pushed back, is apt to coke and clinker on the bridge-wall. By my arrangement of inclined rear grating, B or B', extending at any desired angle from the rear end of the main bar A to the top of the bridge-wall, I wholly obviate this objection and increase the heat-producing capacity of the furnace at an inconsiderable expense.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A grate-bar made with a rear surface, *s'*, depressed below or lower than the front surface, *s*, substantially as described.
2. A grate-bar the main part of which, A,

is of the ordinary or any known form, and the rear end of which, B, is inclined backward and upward, so as when in use to rest on a bridge-wall, c, substantially as shown and described with reference to Fig. 1.

3. In the construction of furnace-grates, an inclined grating, B', arranged next the bridge-wall at the rear of the fire-chamber, substan-

tially as shown and described with reference to Fig. 3.

In testimony whereof I, the said JOHN CUTHBERT, have hereunto set my hand.

JOHN CUTHBERT.

Witnesses:

JOHN GLENN,
THOS. W. KERR.