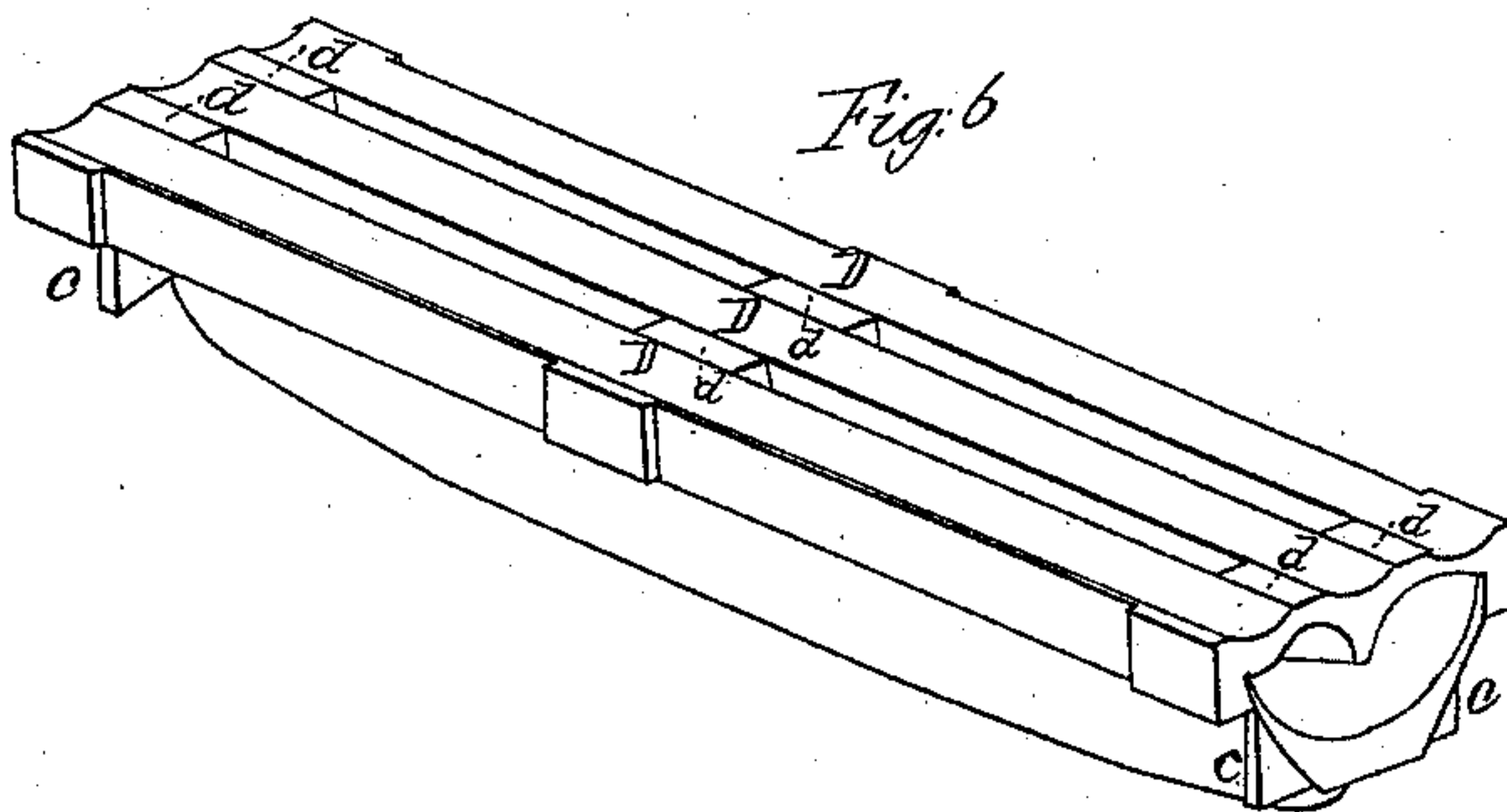
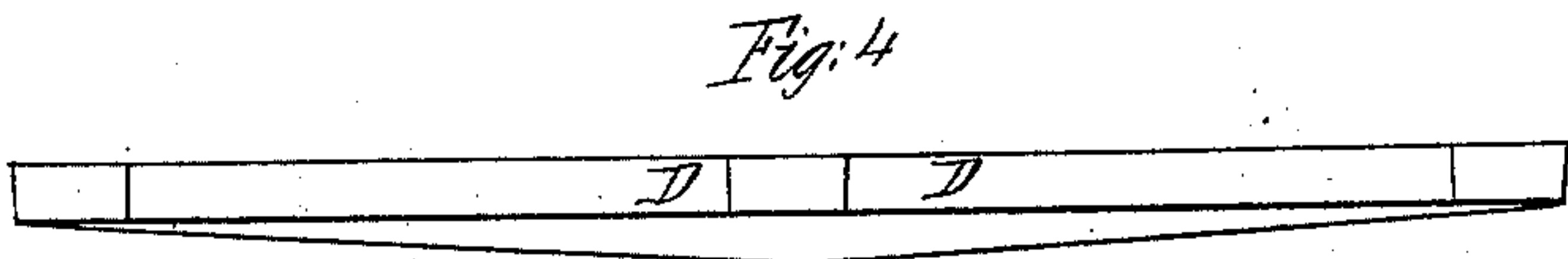
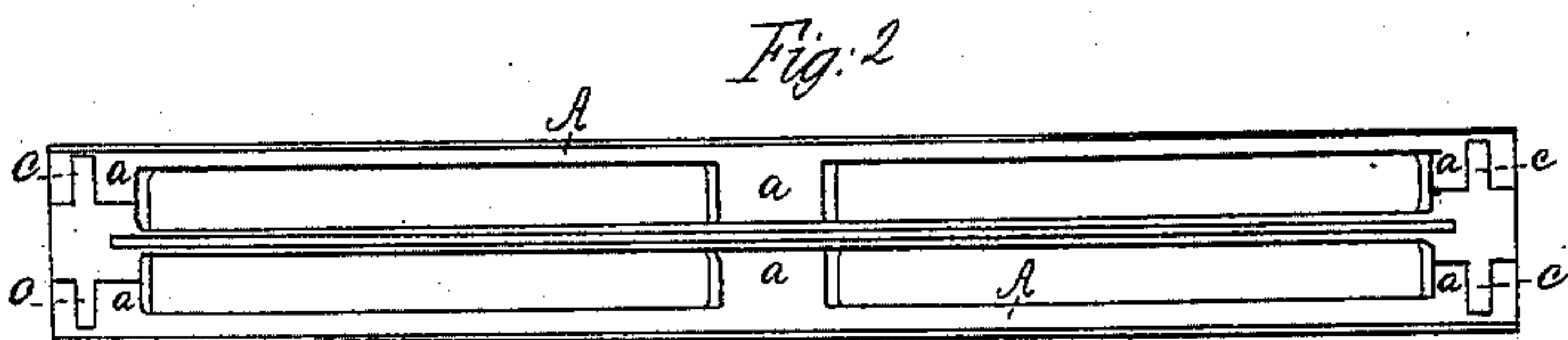
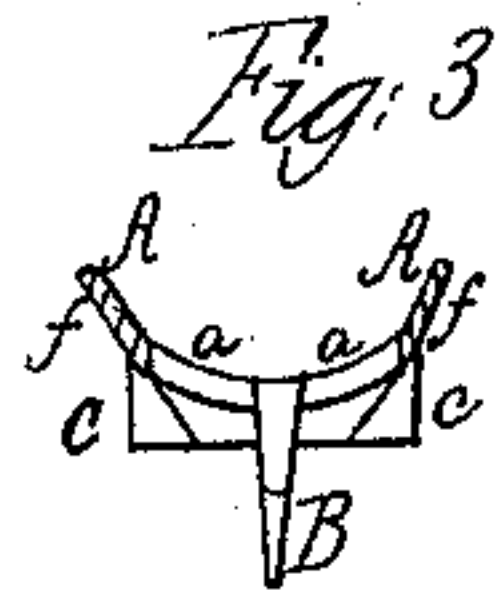
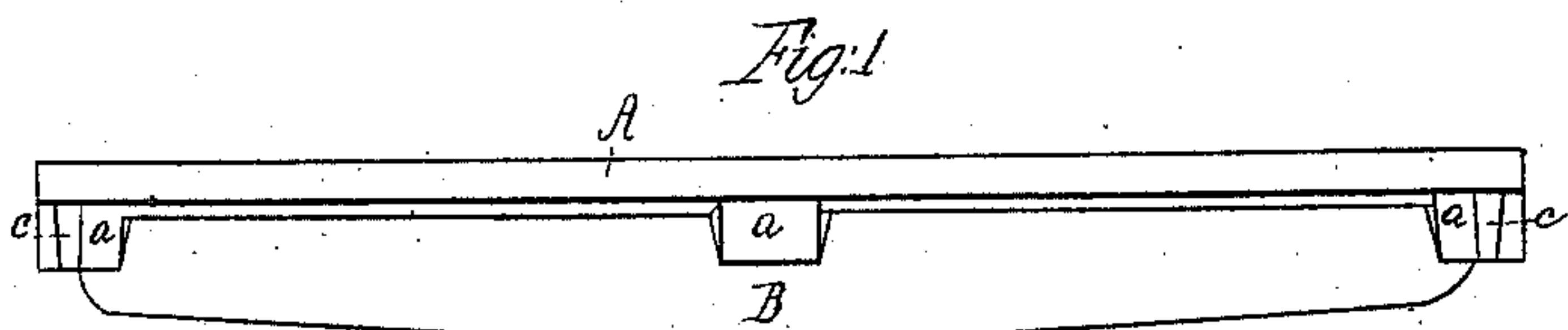


G. W. Pierce,
Furnace-Grate Bar.

N^o 58,474.

Patented Oct. 2, 1866.



Witnesses:

R. W. De Witt
A. V. De Witt

Inventor:

G. W. Pierce

UNITED STATES PATENT OFFICE

CHARLES W. PIERCE, OF ALBANY, NEW YORK.

GRATE-BAR.

Specification forming part of Letters Patent No. 58,474, dated October 2, 1866.

To all whom it may concern:

Be it known that I, CHARLES W. PIERCE, of the city of Albany, State of New York, have invented a new and improved method of constructing Grates for Burning Coal, adapted for service with steam-boilers, malt-kilns, or any other duty in which coal is extensively used.

In the use of grates, as at present generally constructed and arranged, the bars, after a period varying with the habitual intensity of the heat, but at best not very long, become so warped and burned as to require replacement with new ones. It is to reduce the expense of this proceeding, by diminishing the frequency of these repairs, and to make the replacing bars cheaper in themselves, that I propose to effect by my invention.

My plan consists of a combination of a lower and upper grate, as fully described in the following specification, with the drawings, forming part thereof.

Figure 1 represents in profile view, Fig. 2 in plan view reversed, and Fig. 3 in cross-section, the lower grate with bars. Fig. 4 represents in profile view, Fig. 5 in cross-section, the upper grate with its bars. Fig. 6 shows in perspective the upper and lower grates combined.

Similar letters denote the same parts of the apparatus.

The lower grate consists of A A, two light side bars, shaped as shown in the drawings, united by oblique cross-pieces *a a* at the ends and at suitable intervals to a central drop, bar or keel, B, lying below the range of the side bars. Its upper edge is straight and on a line with the lower edges of the side bars, its lower edge being a reversed arch or fish-belly shape, (so called,) its object being to stiffen the structure.

C C are square shoulders to give the grate a firm bearing in its settings. This grate is a permanent foundation for an upper grate, which is replaceable by another upon it when unfit for service.

The upper grate consists of three bars, D D D, shaped as shown in the drawings, united by cross-pieces *d d* at the ends and suitable intervals, the center bar being on its lower edge fish-belly shape, in order to stiffen it.

The side bars are formed at their lower edges, *e e*, so as to make, with the upper outer

edges of the lower grate, at *f f*, a dovetail joint, (see Fig. 6,) so that the upper bars are to be slid upon the lower ones, where they rest firmly, and cannot be lifted or pressed off them, thus combining the two sets of bars, so as to prevent warpage and a consequent separation of them.

The strength of this combined fabric is such that the upper grate need not be made to weigh more than two-thirds of weight due to three bars of ordinary construction.

The upper grate is alone intended to hold the fuel, and it will be seen, from the relative positions of the bars of the upper and lower grates, that the ashes and cinders that pass through the upper bars will clear the lower ones, so that there will be no obstruction to a free draft; and the practical consequence of this is that the lower grate remains almost cool at all times, indestructible by ordinary use, and, consequently, need not be replaced.

The upper grate having its side bars resting their entire length upon the lower ones, are thus protected from settling and warping, so that they must be burned out before they become unserviceable. This will prolong their duration much longer than ordinary grates. In addition to this, their light comparative weight—not to exceed two-thirds—makes the cost of replacing them much less, so that, as a matter of economy, the cost of keeping up these grates will not be one-half of that of the ordinary ones.

The facility with which any of the sets of upper grates can be replaced upon the lower ones is a convenience worth calculating in the management of furnaces.

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

A compound grate, made by the combination of an upper grate, D, formed as shown, resting by its outer bars upon the entire upper surface of the outer bars of a lower grate, A, formed as shown, the grates being held to each other by dovetailed joints formed along the outer edges of their outer bars, at *f*, in the manner and for the purposes set forth in this specification.

C. W. PIERCE.

Witnesses:

RICHD. VARICK DEWITT,
A. V. DEWITT.