B. F. Penny and J. Jones.

Grate-Bar.

No. 92,351. Patented July 6, 1869.

Fig. 1.

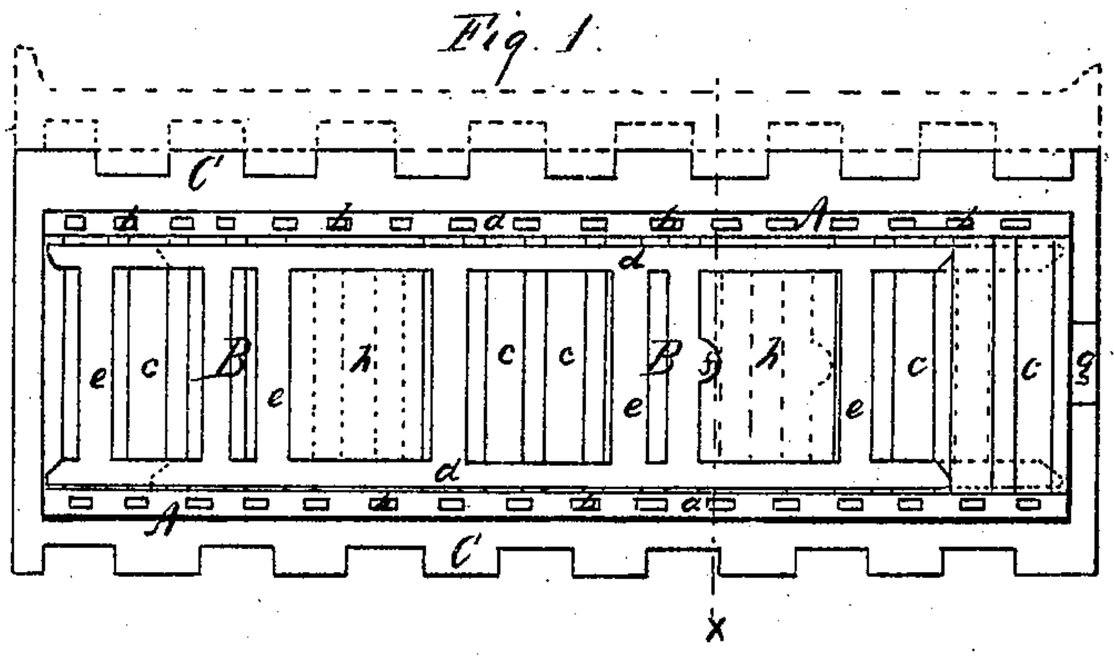
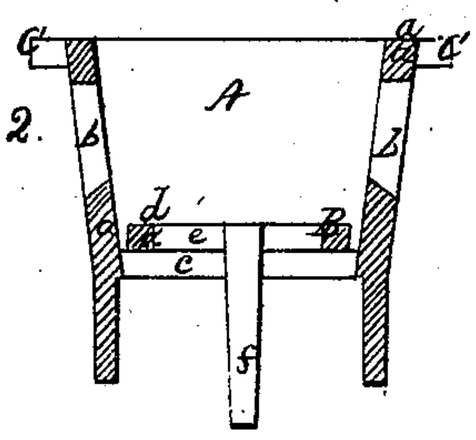


Fig. 2.



Witnesses

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BENJAMIN F. PENNY AND JAMES JONES, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN GRATE-BARS.

Specification forming part of Letters Patent No. 92,351, *dated July* 6, 1869.

To all whom it may concern:

Be it known that we, BENJAMIN F. PENNY and JAMES JONES, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Grate-Bars; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a top view of our invention, the dotted lines showing a part of an adjacent bar, and the situation of the flange-openings. Fig. 2 is a transverse section through line *x*.

The object of our invention, the nature of which will be understood by reference to the drawings and specification, is to provide a simple arrangement for burning coal-dust, small coal, or other fine fuel, most of which has heretofore been valueless.

To enable others to make and use our invention, we will describe its construction and operation.

In the perfect combustion of coal-dust we find it absolutely essential that atmospheric air be evenly distributed through the entire mass, and also that the grate upon which it is burned be fine enough to prevent waste, and sufficiently open to discharge fine ashes and admit the required supply of air. To accomplish these objects, we construct the grate A in the form of a narrow box, having the oblique sides *a*, provided with openings *b*, for the admission of air. The bottom is formed by transverse bars *c*, cast upon the grate at suitable distances apart. It is obvious that the narrower the grate A is made the more perfect will be the distribution of oxygen among the fuel contained in it, since air is introduced upon three sides. We find in practice from two and a half to four inches to be a proper width for the grate at the bottom.

Upon the bottom of the grate A we use the auxiliary sliding grate B, composed of side bars *d* and transverse bars *e*, and so proportioned as to slide freely within the grate longitudinally. The transverse bars *c* of the box grate are not located at equal distances throughout its length, but one or more of them are omitted at proper points leaving openings *h*, Fig. 1, for the removal of clinker, and the transverse bars of the slide B are arranged in a similar manner, so that the openings *h* shall register when the slide is at one extremity of its movement. When the grate is in operation, the slide B is moved to the position shown in Fig. 1. The slide B has a spur, *f*, cast upon it, projecting below the grate, as shown in Fig. 2. The object of this arrangement of the slide is to provide a means of freeing the grate from ashes, clinker, and other waste matter when reciprocated upon the bottom of the latter.

Upon the upper edge of the grate-bar A we provide flanges C, having notches cut in them at such points that, when the bars are arranged side by side, openings for the admission of air are formed in each flange alternately, as shown in Fig. 1. We prefer to make our grate-bar with closed ends, with the exception of the recess *g* at the front for the insertion of a rod or poker.

The operation of our invention is as follows: After starting a fire, we fill the furnace with fine coal or dust, thoroughly wetted down, several inches above the elevated portions of the grates. After this is partly consumed it forms a crust over the grates, when the latter may be cleaned by agitating the slide B, the unconsumed portion of the fuel remaining above the arched crust. By inserting a poker through the recesses *g*, this is let down into the grates, and fresh fuel supplied as before.

We find by experiment that a furnace supplied with our grates needs very little attention in firing, and that the durability of the latter equals that of any grate in common use. We also find it advantageous in some cases to use a blast, but it is not essential.

A connecting-bar may be attached to the spurs of the slides, so that all may be operated simultaneously by a lever provided outside of the furnace.

What we claim as our invention, and desire to secure by Letters Patent, is—

The box-grate A, with openings *b*, in combination with the auxiliary grate B, constructed and arranged substantially as described.

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