J. B. MILLER.

Grate-Bars.

No. 212,966. Patented Mar. 4, 1879.

Fig. 1.

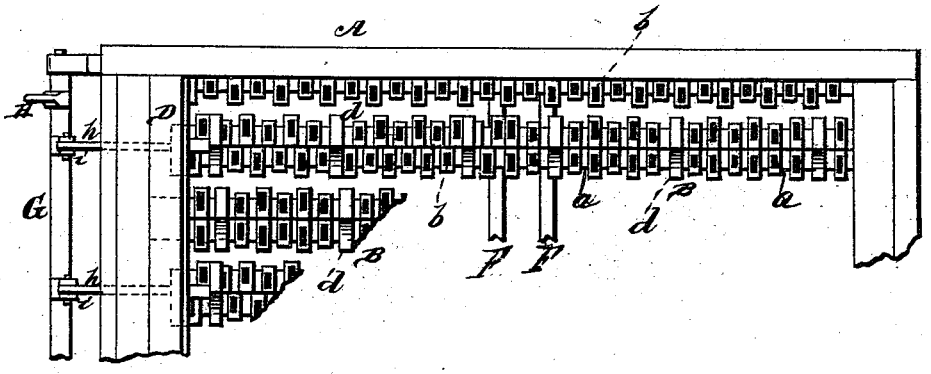


Fig. 2.

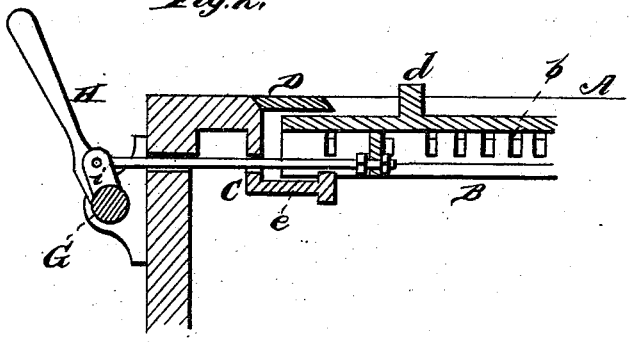
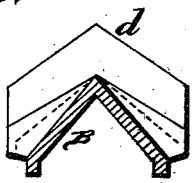


Fig. 3.



WITNESSES

Robt Everett

Jas. J. Stuchy.

INVENTOR.

Joseph B. Miller.

By Gilmore, Sandford & Co.

ATTORNEYS

UNITED STATES PATENT OFFICE.

JOSEPH B. MILLER, OF WILKESBARRE, PENNSYLVANIA.

IMPROVEMENT IN GRATE-BARS.

Specification forming part of Letters Patent No. **212,966**, dated March 4, 1879; application filed July 20, 1878.

To all whom it may concern:

Be it known that I, JOSEPH B. MILLER, of Wilkesbarre, in the county of Luzerne and State of Pennsylvania, have invented a new and valuable Improvement in Grate-Bars; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a top plan of my grate. Figs. 2 and 3 are details of the same.

The nature of my invention consists in the construction and arrangement of a grate for furnaces for marine and other boilers, as will be hereinafter more fully set forth.

The annexed drawings, to which reference is made, fully illustrate my invention.

A represents a portion of the fire-box of a boiler-furnace, and B B are the grate-bars placed in the same. These grate-bars are made triangular in shape, hollow on the under sides, and formed with grooves *a a* on their two inclined sides, and between said grooves are perforations *b b* through the grate-bars. The portions or divisions of the grate-bar having the perforations are not flush or even, but alternate higher and lower, as shown; and at suitable intervals the grate-bars are on their upper sides provided with projections *d*.

In the front end of the fire-box is a cross-bar or hanger, C, with pockets at *e* for the bars to slide in and out, which cross-bar may be cast in or fastened to the boiler-front, and the bars at this end covered with a plate, D. A similar cross-bar, with pockets and covering-plate, is arranged at the rear end of the fire-box for the other ends of the grate-bars. In the center the bars are supported by one or more cross-bars, *f*.

Every alternate grate-bar is made stationary in its supports, while the other alternate bars are movable lengthwise. These movable bars are at their forward ends, by rods *h*, connected with short arms *i* on a rocking shaft, G, provided with a lever, H.

The rods *h* pass through the front of the fire-box, and the shaft G is located at the front thereof. By the use of the lever H, the shaft G can be rocked in its bearings so as to move the alternate grate-bars back and forth.

By the construction of the grate-bars they are kept cool and prevented from bending or warping. The movable bars are easily operated back and forth, and the projections *d* on them crush the cinders and remove all ashes and cinders.

With my invention the fire can be cleaned out without opening the furnace-door, and hence there is no rush of cold air in under the boilers, which is a great advantage in the proper working of a steam-boiler.

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

The triangular hollow grate-bars B, provided with grooves *a*, perforations *b*, and projections *d*, substantially as and for the purpose herein set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOSEPH B. MILLER.

Witnesses:
SAMUEL BRADER,
LEONARD ROLL.