(No Model.)

P. REILLY.
Grate Bar.

No. 237,322. Patented Feb. 1, 1881.

Fig. 1

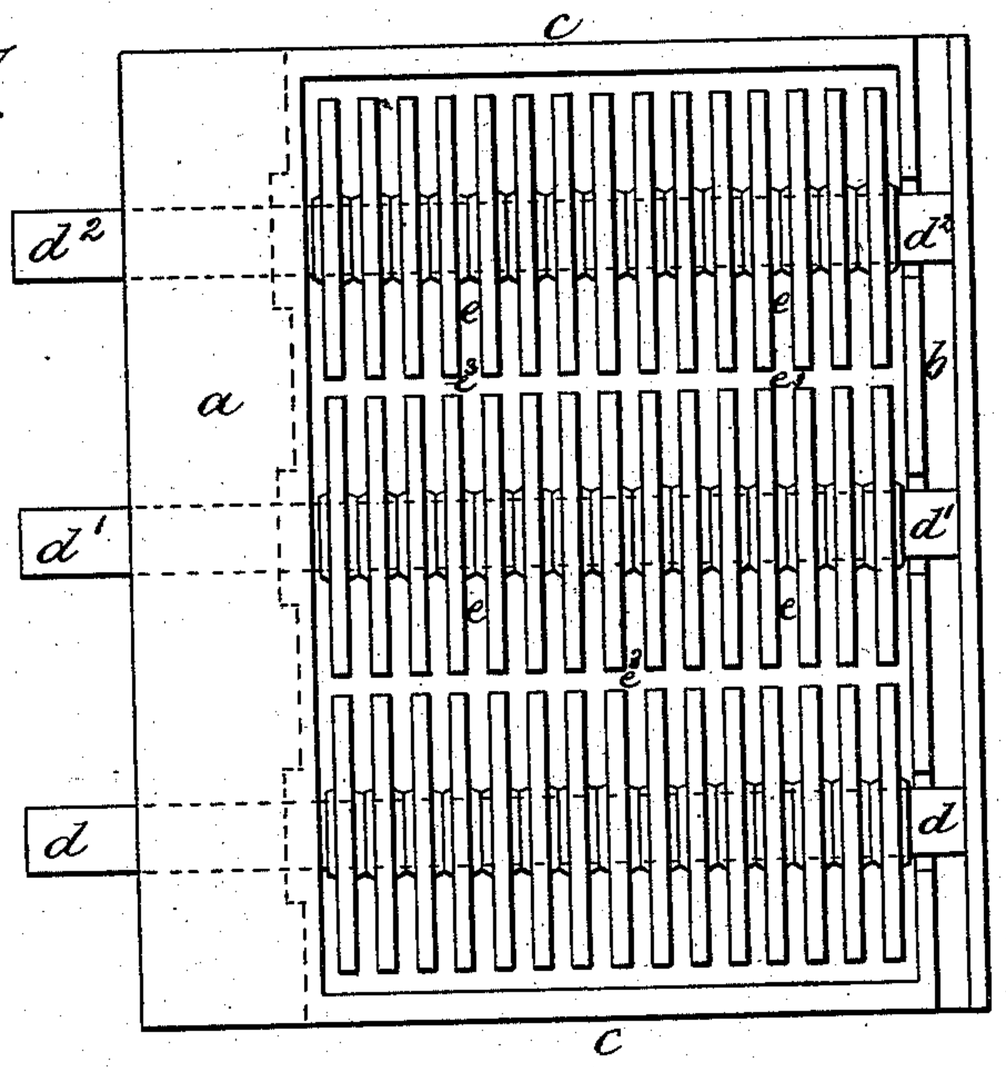


Fig. 2

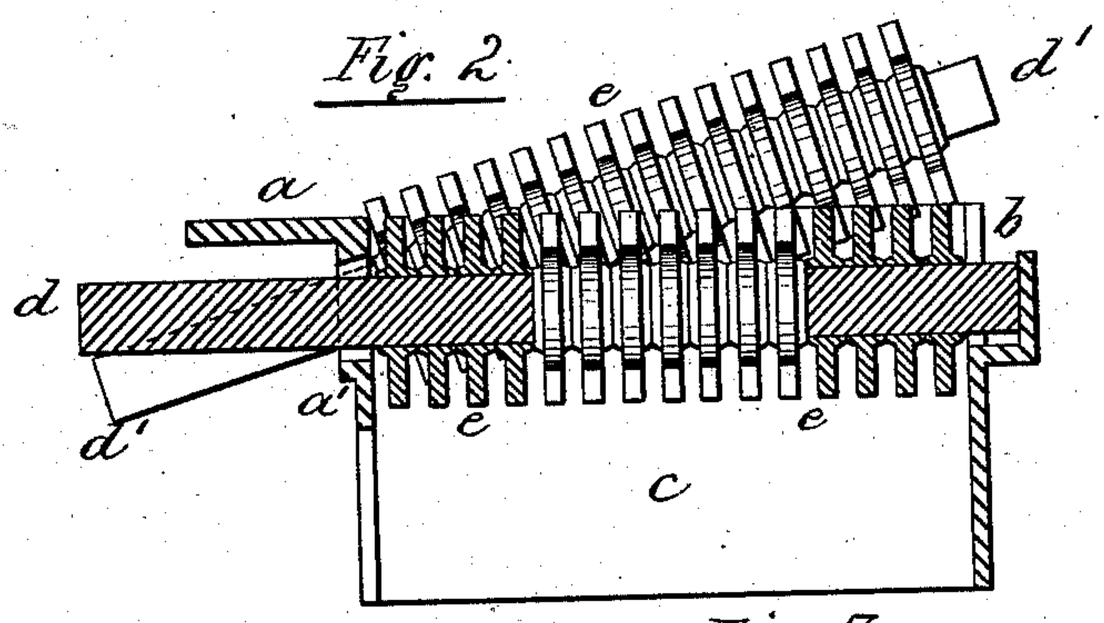


Fig. 4

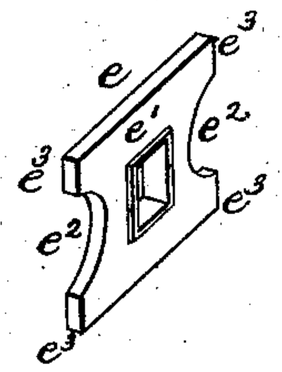
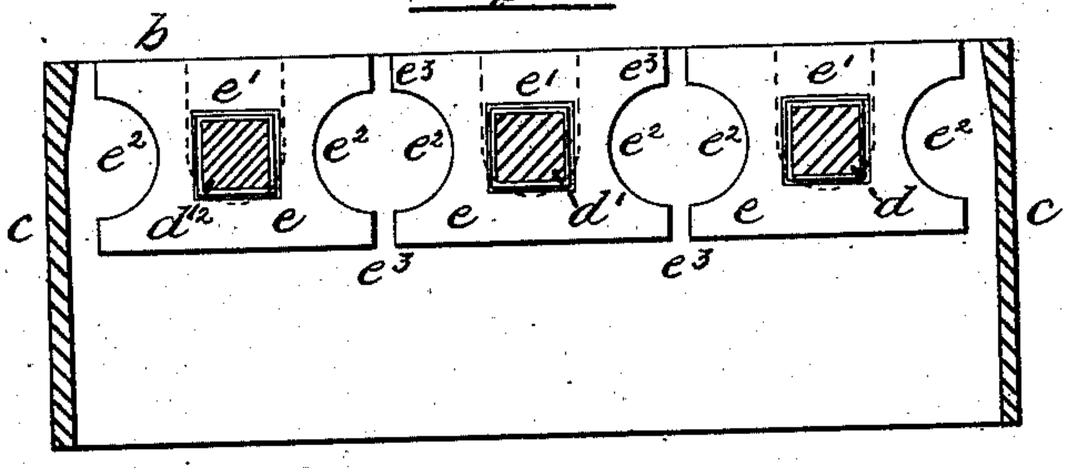


Fig. 3



Witnesses.
H. D. Williams.
John C. Davidson

Patrick Reilly.
Inventor.
per Alfred Shedlock. atty.

UNITED STATES PATENT OFFICE.

PATRICK REILLY, OF BROOKLYN, NEW YORK.

GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 237,322, dated February 1, 1881.

Application filed December 10, 1880. (No model.)

To all whom it may concern:

Be it known that I, PATRICK REILLY, of Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Grate-Bars, of which the following is a specification.

This invention relates to that class of grate-bars for furnaces which are composed of a number of cast-iron plates placed on a square or other polygonal-shaped rod.

It consists in making the plates rectangular in form, with semicircular openings at their ends, leaving sufficient metal at the corners to withstand the heat of the fire for a long time. The semicircular openings at the ends of the plates of adjacent bars form longitudinal cylindrical chambers joining the transverse air-spaces between the plates, thus providing for a free and perfectly uniform circulation of air to all parts of the grate-surface, which is an even plane produced by the upper edges of the plates. Each bar is adapted to be reversed, so that both the upper and the lower edges of the plates may alternately form the grate-surface, and the bars are fitted in the furnace in such a manner that worn plates may be taken off the square rods and replaced by new ones without removing the rods from the furnace, all of which will be fully understood by the following description of the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of a furnace, the bars of which are composed of square rods provided with my improved plates. Fig. 2 is a longitudinal section of the same, showing one of the bars partly in section with some of its plates in full, and one of the grate-bars in position to have the plates removed therefrom or placed thereon. Fig. 3 is a transverse section of Fig. 1, and Fig. 4 is a perspective view of one of the plates, detached.

a represents the dead-plate, and *b* the back-bearer, of the furnace. They are shown in the drawings as connected together by the side pieces, *c c*, but would, in ordinary circumstances, be separate, the dead-plate *a* being bolted to the front of the furnace of the boiler, and the back-bearer resting on the back wall of the ash-pit, as is well understood by those skilled in the art to which this invention appertains. The square rods *d d' d²* pass through holes provided therefor in a downwardly-projecting flange, *a'*, of dead-plate *a*. Their rear ends rest in open slots formed in the back-bearer *b*, and butt against the flange *b'*. The holes in the flange *a'* and slots in the back-bearer *b* are sufficiently large to allow the square bars *d d' d²* to rotate therein, and the holes in flange *a'* are further enlarged to admit of the bars being raised at their rear ends, as shown at *d'*, Fig. 2. The parts of the square bars *d d' d²* between the back-bearer *b* and dead-plate *a* are entirely covered by the rectangular plates *e e*, the upper edges of which form a flat grate-surface. The width of the air-spaces between the plates on each of the square rods is about equal to the thickness of the plates, as is also the width of the air-spaces between the adjacent ends of each series of plates. Each series of plates with the square rod passing through their centers constitutes a grate-bar. The form of the plates *e e* is clearly shown at Fig. 4, which is a perspective view of one of them, detached. It is of even thickness throughout with the exception of the bosses *e' e'* surrounding the square hole through its center, which corresponds to the cross-section of the square rods *d d' d²*, and it is cut away at its ends, forming the semicircular openings *e² e²*, thus reducing its weight to a minimum, and at the same time providing for a perfect circulation of air by forming large longitudinal chambers between the adjacent series of plates when placed in the furnace, as shown at Fig. 3. The bosses *e' e'* which determine the width of the air-spaces between the plates *e e* are made as narrow as practicable on all their sides, so as to obstruct the air in circulating between the plates as little as possible. Especially is this freedom of circulation necessary at the central part of the plates over the bosses *e' e'*.

Considerable metal is left at the corners *e³ e³* of the plates by the semicircular openings *e² e²* formed in their sides, thus enabling the plates to withstand long usage before burning away sufficiently to allow the fuel to fall down between their adjacent ends. The semicircular openings *e² e²* in the sides of the plates *e e* also allow the corners of the plates of the adjoining bars to clear when said adjoining bars are rotated.

It will be observed that the upper and lower

halves of the plates are uniform in shape, thus admitting of the bars being reversed as often as desired, by applying a wrench to the ends of the rods *d d' d²* projecting beyond the dead-plate *a*. The bars are also independently shaken by this means.

By reason of the rear bearings of the bars being open slots the rear ends of the bars may be raised, as shown at *d'*, Fig. 2, to allow old plates to be slipped off the rear ends of the square rods and replaced by new plates, thus obviating the necessity of removing the bars from the furnace for this purpose.

Having now described my invention, I wish it understood that I do not claim, broadly, a grate-bar composed of a series of plates placed on a supporting-rod, as such is shown and described in Letters Patent of the United States No. 213,730, dated April 1, 1879, and No. 221,657, dated November 18, 1879, granted to J. Ashcroft, and No. 216,708, dated June 17, 1879, granted to F. Steele; but

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

1. As an improvement in grate-bars composed of detachable plates and a central supporting-rod, the rectangular plates *e e*, provided with the semicircular openings e^2 e^2 at their ends, and the uniformly narrow spacing-bosses *e' e'*, in combination with the square rods *d d' d²*, substantially in the manner shown and specified, that when placed in the furnace the grate-surface formed thereby is a flat plane, and the air-spaces between the plates of each bar and between the ends of the plates of adjacent bars is of uniform width throughout, as set forth.

2. The grate-bars composed of the rods *d d' d²* and detachable plates *e e*, in combination with the flange *a'*, provided with holes to support the front ends of the rods *d d' d²*, and the back-bearer *b*, provided with open slots, substantially as and for the purpose hereinbefore set forth.

In testimony whereof I have hereunto set my hand this 8th day of December, A. D. 1880.

PATRICK REILLY.

Witnesses:

H. D. WILLIAMS,

ALFRED SHEDLOCK.