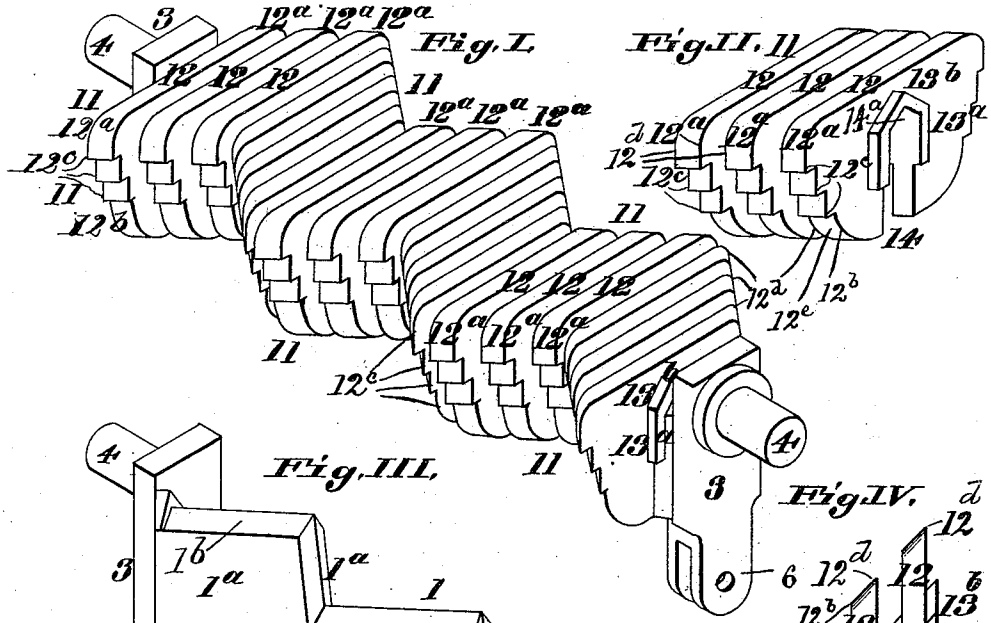
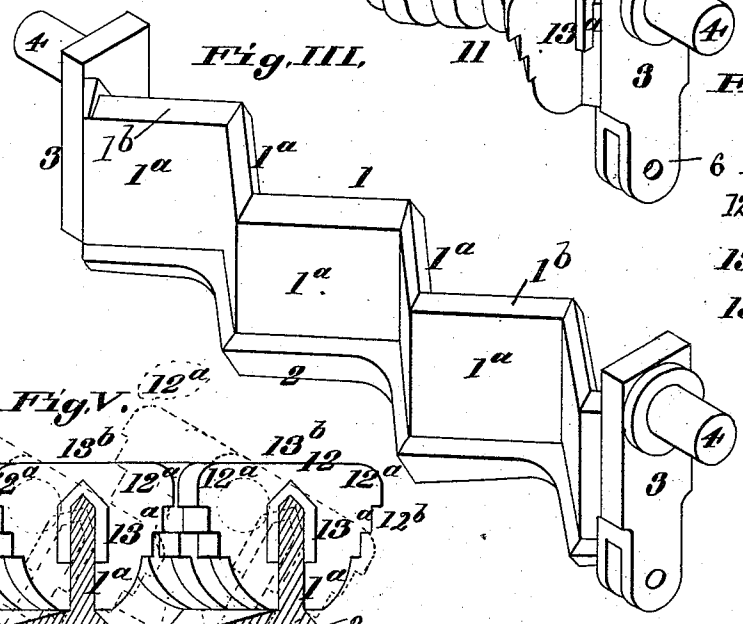
(No Model.)

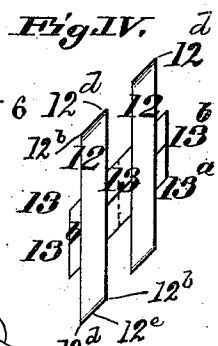
E. BOILEAU.

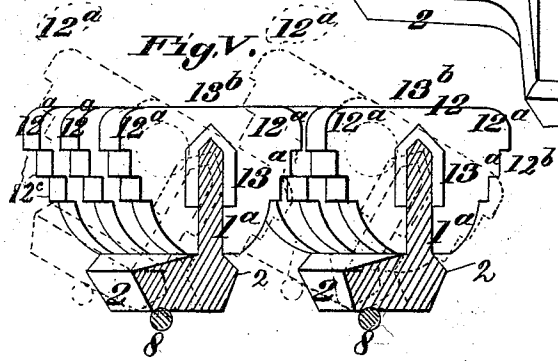
FURNACE GRATE BAR.

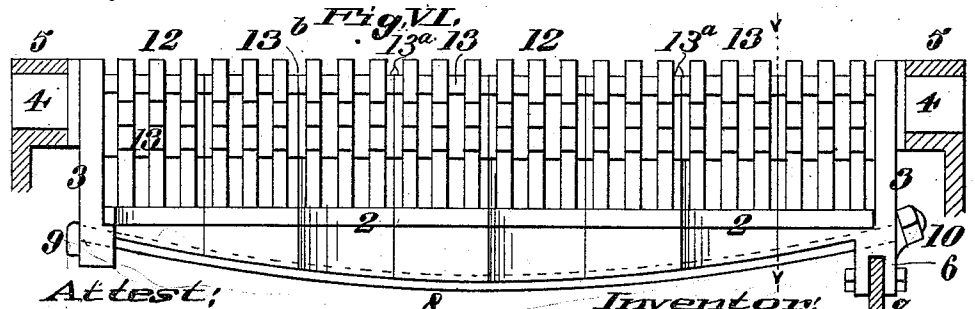
No. 485,527. Patented Nov. 1, 1892.











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UNITED STATES PATENT OFFICE.

ETIENNE BOILEAU, OF ST. LOUIS, MISSOURI, ASSIGNOR TO THE IMPROVED ZIGZAG GRATE BAR COMPANY, OF MISSOURI.

FURNACE GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 485,527, dated November 1, 1892.

Application filed July 2, 1891. Serial No. 398,287. (No model.)

To all whom it may concern:

Be it known that I, ETIENNE BOILEAU, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Furnace Grate-Bars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

My grate-bar belongs to that class of rocking grate-bars having a zigzag form.

My present improvement consists especially in making the head or crown of the grate-bar of detachable sections straddling the core or body of the grate-bar and in the form given to the ends of the cross-leaves, the same being beveled, inwardly inclined toward the core or body, made with teeth adapted to break up the slag, and having rounded or curved upper corners to prevent the catching of the poker against them. The invention also includes a supporting or truss bar for giving support to the zigzag grate-bar, which is weakened by making its head or crown of removable sections.

Figure I is a perspective view of one of the grate-bars. Fig. II is a perspective view of one of the head-sections. Fig. III is a perspective view of the body of a grate-bar. Fig. IV is a top view of one of the head-sections. Fig. V is a transverse section taken at V V, Fig. VI, the rocked position of the grate-bar being indicated by dotted lines. Fig. VI is a side view of a grate-bar in position.

The central part, body, or spine 1 of the grate-bar is zigzag in form, being composed of a number of straight portions 1^a, set at a right or other angle with each other, and is preferably narrowed at the top by a double-beveled edge 1^a, and is widened at the lower edge or bottom by ribs 2, one on each side thereof, following pretty closely to the convolutions of the part above. The ends 3 of the grate-bar have gudgeons 4, fitting in bearings 5 at the sides or ends of the fire-grate. It is preferred that the grate-bars should be placed transversely to the furnace—that is to say, parallel with the fire front—but this position is not essential, as the grate-bars may be in line with the furnace, if desired.

6 is a slotted ear on one of the ends 3 of the grate-bar for connection with an operating-bar 7, by whose endwise reciprocation the grate-bars may be shaken to dislodge the ashes and clinkers and stir the coals.

Where the grate-bar is of ordinary length for boiler-furnaces, I prefer to make the lower edge curved, as seen in Fig. VI.

8 is a supporting or truss bar, whose ends pass through the ends 3 of the grate-bar and are secured therein by the head 9 and nut 10. Where the grate-bars are short this curving of the lower edge and the supporting or truss bar may be dispensed with. In place of the nut 10 or head 9 and nut the supporting-bar may be riveted in the end or ends 3. The head or crown of the grate-bar is formed of a number of removable sections 11, each having two or more obliquely-arranged cross-leaves 12, connected at their mid-lengths by the necks or distance-pieces 13, the leaves of the section being cast in one piece. The number of the leaves 12 of each section 11 may vary according to the condition of the coal or other fuel. In all of the figures except Fig. IV the sections 11 are shown with three of the leaves 12. In Fig. IV there are two of these leaves. The sections 11 may be made with a single leaf 12, as indicated by dotted lines in Fig. IV, the neck 13 being of course dispensed with and a projection 13^a being on each side of the single leaf of the section.

There is a channel 14 and an angular recess 14^a above the channel made through the sections obliquely to the leaves 12, conforming to the shape of the body and passing through the necks 13. In this channel fits the portion 1^a and the double-beveled edge 1^b of the body of the grate-bar.

The ends 12^e of the leaves 12 are parallel with the channel 14, so as to provide beveled cutting-edges 12^d, extending in opposite directions at each end and on adjacent grate-bars. The upper corners 12^a of the leaves 12 are shown rounded to avoid engagement with the poker in stirring the fire. The edges 12^b and 12^d of the leaves 12 incline inwardly toward the core or body of the grate-bar from the rounded or curved corners 12^a to the bottom, and are furnished with teeth 12^c, that act with the cutting-edges when the grate-bars

are rocked to break up any clinkers that may fall between them. The necks 13 and the projections 13^a (at the ends of the sections 11) come to an edge 13^b at top, from which they slope downward, the construction favoring the escape of ashes. The upper edges of the leaves 12 extend above the necks 13, so that there is open space between the leaves. The projections 13^a at each end of each section have the form of the neck 13 and serve to keep the sections 11 asunder and to cover the parts of the body 1 at those points.

The head of the grate-bar is the only part liable to injury by heat, and this may be cheaply and quickly renewed by substitution of one or more of the removable sections 11. Thus local injury may be remedied without discarding the whole grate-bar or its removal from the furnace, and in most cases without the removal of more than a portion of the head.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. The combination of a grate-bar formed with a body 1, having straight portion 1^a, double-beveled edge 1^b at the top, and ribs 2, one on each side at the bottom, and with the ends 3, having gudgeons 4, and removable sections having channels 14, and angular recesses 14^a, conforming to the straight portions and double-beveled edge, substantially as described.

2. A grate-bar having a zigzag body or spine and a supporting-bar secured at the ends to the body of the grate-bar and having bearing beneath the lower edge of the body, substantially as described.

3. The combination, in a rocking grate-bar, of the gudgeons, the zigzag body, and the supporting-bar secured to the ends of the grate-bar and bearing against the bottom of the grate-bar, substantially as described.

4. A rocking grate-bar deeper at the middle portion than at the ends, having a zigzag spine or body provided with side projections, and a supporting-bar running from end to end of the grate-bar beneath the zigzag spine or body, substantially as described.

5. The combination of a grate-bar having a zigzag body and obliquely-arranged cross-leaves having their ends parallel with the body providing cutting-edges, substantially as described.

6. The combination of the zigzag grate-bar formed with a body 1, having straight portions 1^a and a double-beveled edge 1^b, and the oblique cross-leaf 12, having ends 12^e, parallel with the body, the neck 13, and the oblique channel 14 and angular recesses 14^a, substantially as described.

7. The combination of the zigzag grate-bar formed with a body 1, having straight portions 1^a and double-beveled edge 1^b, and the sections 11, formed with oblique cross-leaves 12, having ends 12^e, parallel with the body, the necks 13, and the oblique channels 14 and angular recesses 14^a, substantially as described.

8. The combination, with the grate-bar, of the cross-leaves 12, each leaf being formed with beveled ends 12^e, parallel with the grate-bar, providing inwardly and downwardly inclined edges 12^b and cutting-edges 12^d, the curved upper corners 12^a, and the teeth 12^c, substantially as described.

ETIENNE BOILEAU.

In presence of—
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