

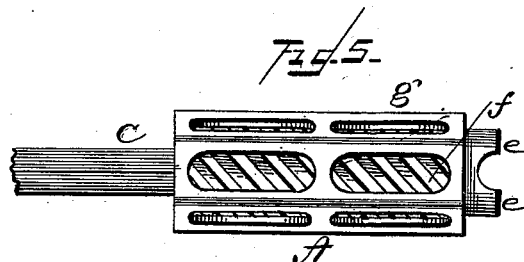
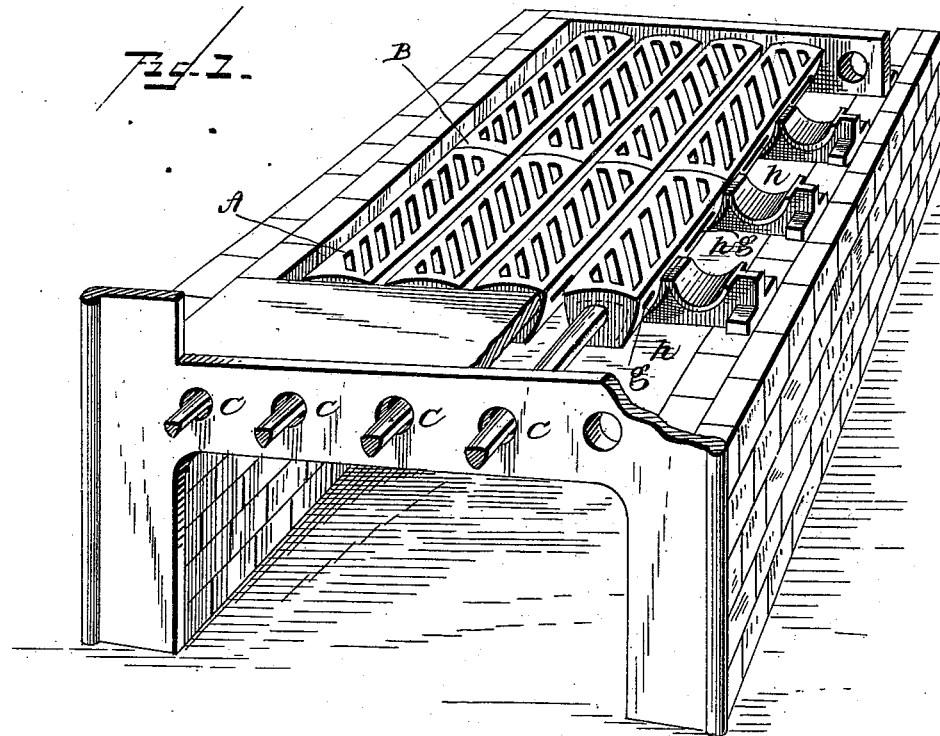
(No Model.)

2 Sheets—Sheet 1.

J. ASHCROFT.
GRATE BAR.

No. 423,465.

Patented Mar. 18, 1890.



WITNESSES
F. L. Curand
H. M. Sterling

INVENTOR
John Ashcroft
By
E. M. Finsburgh
Attorney

(No Model.)

2 Sheets—Sheet 2.

J. ASHCROFT.
GRATE BAR.

No. 423,465.

Patented Mar. 18, 1890.

Fig. 2.

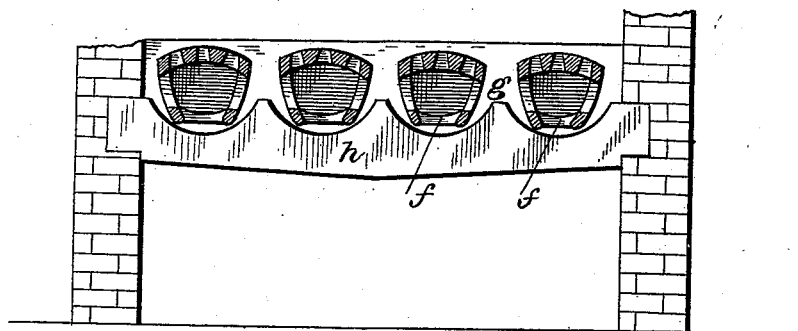


Fig. 3.

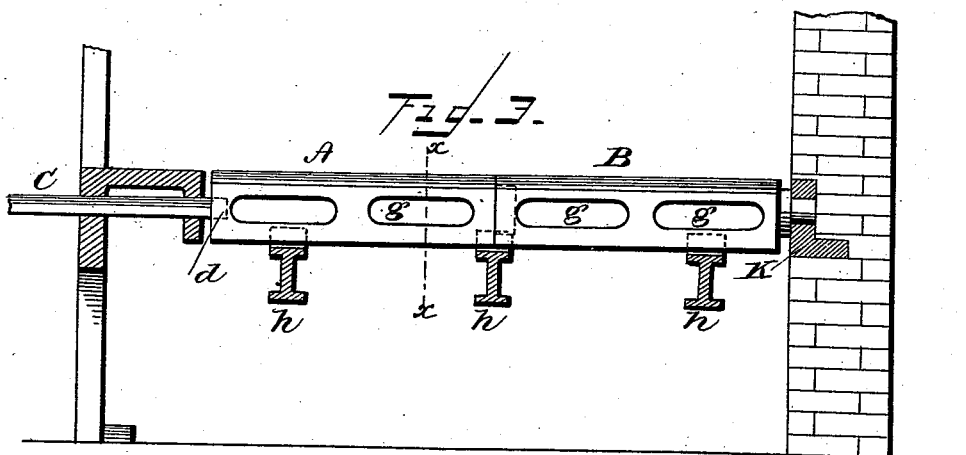
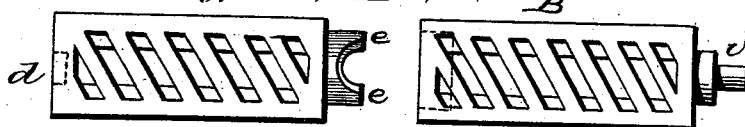


Fig. 4.



WITNESSES
P. L. Ourand
H. M. Sterling

INVENTOR
John Ashcroft
By
J. M. Gannabough
Attorney

UNITED STATES PATENT OFFICE.

JOHN ASHCROFT, OF NEW YORK, N. Y.

GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 423,465, dated March 18, 1890.

Application filed April 16, 1889. Serial No. 307,471. (No model.)

To all whom it may concern:

Be it known that I, JOHN ASHCROFT, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Grate-Bars; and I do hereby declare the following to be a full, clear, and exact description of said invention, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in grate-bars for steam-boiler furnaces and for other purposes.

The object of my invention is to produce a grate-bar which will burn to the best advantage finely-broken coal and coal-dust, for which purpose it is necessary to have not only the interstices between or in the grate-bar narrow, and yet have the greatest possible amount of opening for the supply of air at the point of combustion, but to be able to break up the fuel and keep it free from ashes and clinkers.

My invention consists in a hollow skeleton bar which in cross-section shows outlines approximating a reversed truncated cone, with proper connections which will rock or revolve either singly or in unison. These bars are hollow and the tops preferably have a slightly-rounding surface of about four and one-half inches in width, perforated by a series of openings narrow enough to prevent the escape of fuel, while the sides and bottom are open, as is consistent with requisite strength.

Referring to the drawings, Figure 1 is a perspective view of a furnace, showing my improved grate-bars broken to show the bearings. Fig. 2 is a cross-section of the furnace on the line *xx* of Fig. 3. Fig. 3 is a longitudinal section of the furnace, giving a side view of the bar with its bearings. Fig. 4 is a top view of two sections of my bar, showing the connections between them and the spindle of the inner section. Fig. 5 is a bottom view of one section of my bar.

I show the bar composed of longitudinal sections for the reason that when so made they are easier to make and handle and are not so liable to warp and twist, the loosely-fitting connections enabling me to guard against the

effects of expansion and contraction, while the expense of renewal may be less; but the making of the bars in sections is optional.

I will describe my invention as employing sections, as I expect to so use it in ordinary furnaces.

In the drawings, A and B are sections, Fig. 4 showing the surface, Fig. 3 the sides, and Fig. 5 the bottom portion. The thickness of the metal on the surface I make about one inch and a quarter, but the sides are thinner and the bottom still thinner, obtaining, as I do, the best results in that way, besides saving metal and reducing the weight of my bar, although it is not essential to do so. The sides and bottom I construct with openings *g g* in the sides and *f f* in the bottom, of such dimensions that it resembles a skeleton frame, the object being to allow of the freest possible admission of air and the greatest possible discharge of ashes through the openings.

The section A has at one end a shoulder and spindle *i*, to set into and revolve or rock in a recess in the bridge-wall, or a bearing *h* located therein. At the other end it is open to receive the lugs *e e* on the end of section A, which loosely fits therein and forms a connection by which both are made to turn together. The form of connection shown is, however, not essential, although well arranged for the purpose. Any suitable coupling may be employed. The other end of the section A is intended to abut against the dead-plate of the furnace and is provided with a recess *d*, into which fits a bar *c*, which may be secured thereto, said bar *c* extending outward under the dead-plate and through the furnace front through holes made for the purpose.

I have made the recess *d* and the bar *c* triangular in shape, so that a key of corresponding shape applied to the end of bar *c* outside of the furnace can be used to revolve or rock the whole bar. Any means, however, may be employed by which the bar *c* can be secured to the grate-bar, and these bars *c c* may be coupled with gearing and appliances to rock and revolve all the grate-bars together; but such arrangements are not new.

These grate-bars are supported at intervals in the furnace in cross bearing-bars *h h*, which are scalloped to receive them and enable them

to revolve without disturbing their positions. This bearing-bar is already the subject of Letters Patent granted to me.

In circular furnaces my grate-bars, while of the same cross-section, would of course taper from circumference to the center of the furnace.

In operation I revolve my bars, as better results are thereby obtained. In a complete turn the edges of the bars describe a considerable circle and disturb and break up the accumulated ashes and clinkers, which, as the sides and bottom come uppermost, fall into the interior of the bar and are discharged into the ash-pit as they return to their proper position.

My said grate, if used as a stationary bar, can be made cheaply and light, employing a minimum amount of metal in its construction, while it will freely admit air to the point of combustion and be readily freed of ashes. It will also not be liable to be destroyed, warped, or twisted, especially when in sections, because of the ease with which expansion and contraction can be provided against.

Having described my invention, what I claim to be new is—

1. A skeleton hollow grate-bar, the surface upon which the fuel rests having a series of apertures and the sides and bottom being of an open frame-work construction, substantially as set forth.

2. A skeleton hollow grate-bar in cross-sectional outline approximating a reversed truncated cone, the surface upon which the fuel rests having a series of openings, and the sides and bottom being of an open frame-work construction, substantially as specified.

3. A skeleton hollow grate in cross-sectional outline approximating a reversed truncated cone having a rounded upper surface provided with a series of apertures or openings, the bottom and sides being of an open frame-work construction, substantially as set forth.

4. A skeleton hollow grate-bar, substantially as described, with its upper surface perforated and its sides and bottom open, and of a cross-section approximating a reversed truncated cone, so arranged that it may be revolved or rocked, and when so turned its edges will disturb and break up the ashes resting upon it, which, when released, will fall into the sides and bottom as they come uppermost and be discharged into the ash-pit as they return to their original position, substantially as described.

5. The sectional grate-bar in cross-sectional outline approximating a reversed truncated cone, in combination with the bearing-bar applied to one end of one section, the studs connecting the sections, a spindle applied to the rear end of the other section, and means to support said parts in position, substantially as set forth.

6. The combination of the grate-bar in cross-sectional outline approximating a reversed truncated cone with the scalloped bearing-bar and means for journaling said bar, substantially as specified.

In testimony whereof I affix my signature in the presence of two subscribing witnesses.

JOHN ASHCROFT.

Witnesses:

WILLIAM LOGAN,
JAMES DEMAREST.