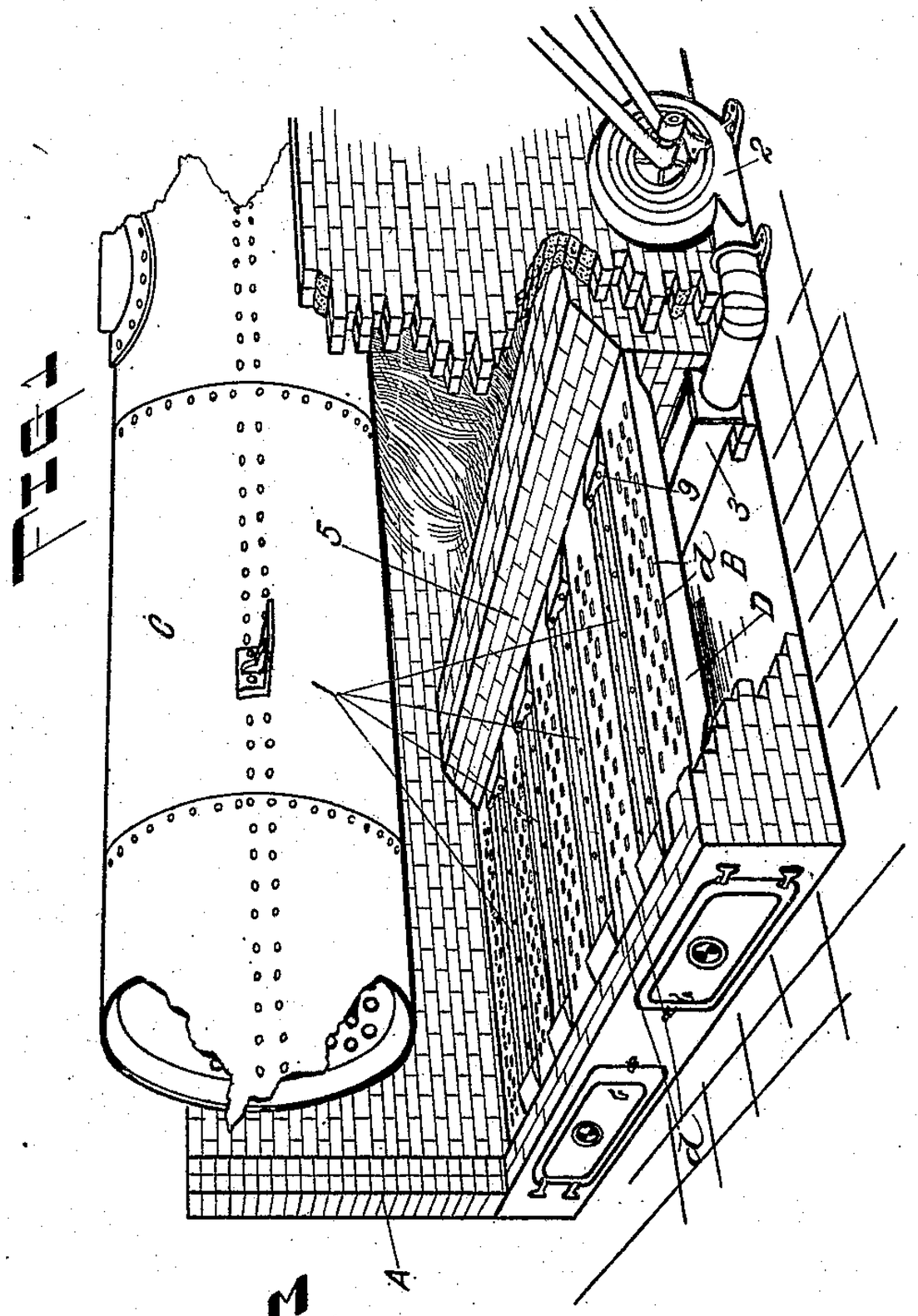
E. J. GORDON.

HOLLOW GRATE BAR.

APPLICATION FILED MAY 23, 1908.

915,852. Patented Mar. 23, 1909.



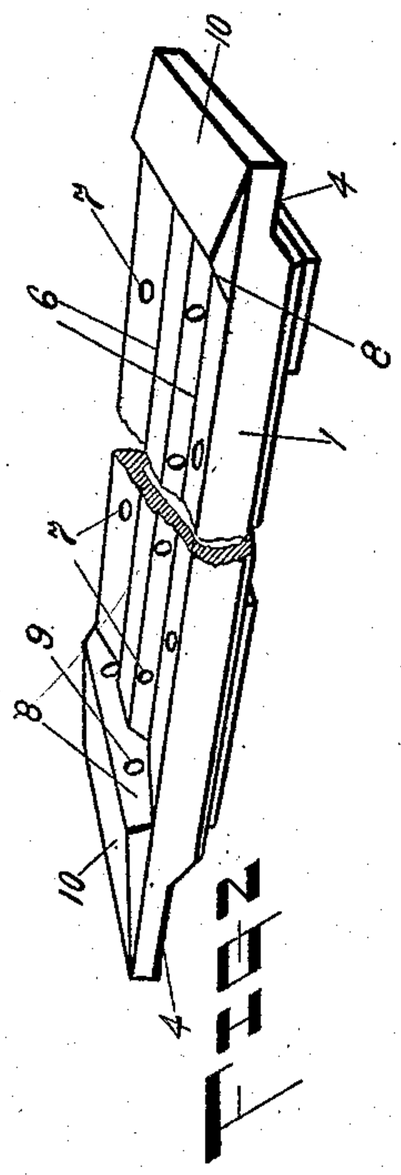


FIG 2

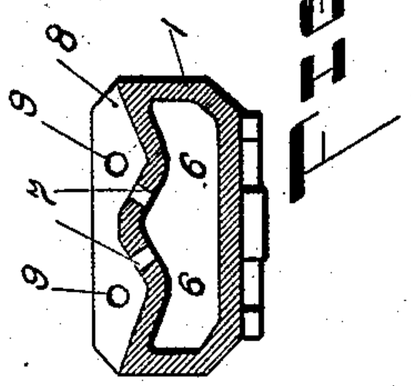


FIG 3

WITNESSES:

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HOLLOW GRATE-BAR.

No. 915,852. Specification of Letters Patent. Patented March 23, 1909.

Application filed May 23, 1908. Serial No. 434,619.

To all whom it may concern:

Be it known that I, ELONSO J. GORDON, a citizen of the United States, residing at Big Rapids, in the county of Mecosta and State of Michigan, have invented certain new and useful Improvements in Hollow Grate-Bars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in hollow grate bars for furnaces adapted to burn fine fuel, as saw dust, coke breeze and the like.

One object of my invention is to provide means for preventing the draft of the stack from removing the smoke and gases from the fire box before the combustible elements are thoroughly consumed.

Another object is to supply oxygen to the smoke and gases to facilitate their combustion.

Still another object is to provide means for preventing the boiler front from becoming overheated.

To these ends, therefore, my invention consists in certain novel features and combinations such as will be more fully described hereinafter and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a furnace broken away to show the grate, Fig. 2 is a detail perspective view of a grate bar embodying my improvements and Fig. 3 is a transverse cross sectional view through a grate bar.

This invention is an improvement over the grate bar shown in my Patent No. 824,716, dated July 3d, 1906.

In the drawings A, indicates a boiler setting, B, an ash pit, C, a boiler and D, the grate provided at intervals with the hollow blast grate bars (1), (1), supplied with air by means of a fan (2) and conduit (3). The grate D is equipped with openings *d*, *d*. The hollow grate bars each consist of a rectangular body portion reduced at its opposite ends as at (4), (4). These reduced ends may be seated in the front and bridgewalls respectively, the bridgewall being shown at (5). The upper face of each bar is longitudinally grooved as at (6), (6), the diverging walls of the respective grooves being provided with blast openings (7), (7), arranged in staggered relation and communicating with the hollow interior of the bar. The blast openings are distributed in at least four rows lengthwise of each blast bar. The blasts or air jets from the outside rows converge and the blasts from the inside rows diverge relative to each other. It is obvious that the blasts from the inside rows pass between each two of the blasts from the respective adjacent outside rows. The object of this arrangement of blast openings is to fully diffuse the air through the combustible material on the grate, and cause it to burn more freely as well as operating to consume the smoke and gases driven off from the burning material.

It has been found that in an ordinary grate, the draft has a natural tendency to draw a considerable amount of the unconsumed smoke and gases away from the fire, over the bridgewall and up the stack which results in black and heavy smoke issuing from the stack, to avoid which as well as to obtain the additional heat to be gained by burning such escaping smoke and gas, I provide the following devices. Near the opposite ends of each blast bar is formed an inclined wall (8), extending transversely across the face of the bar, the walls diverging relative to each other and being provided with one or more twyers (9), communicating with the hollow interior of the bar. These twyers are located in front of the bridgewall and immediately back of the front wall of the boiler setting respectively. The object of the twyers (9) in front of the bridgewall is to emit jets of oxygen-bearing air constituting what I may term a forward blast which forces the escaping gases back over the fire and supplies oxygen for their thorough combustion.

The purpose of the blast from the twyers at the opposite or front end of the bar is to prevent the boiler front from becoming overheated besides aiding the combustion of the gases arising from the burning material. It will be noted that the air jets do not impinge directly against the boiler and that the inclination of the outside rows of openings (7) extending longitudinally of the bars prevents the escape of air between the bars. The twyers at the opposite ends of the bars are located in a plane above the openings (7), (7), and the upper faces of the reduced ends (4), (4), are beveled as at (10) to increase their strength and rigidity. The inclination of the walls (8) facilitates cleaning the bars.

Having thus fully disclosed my invention, what I claim as new is:—

1. The combination in a furnace having a bridge wall, of a hollow blast grate bar, the upper face of which is equipped with blast openings and is provided at opposite ends with divergent apertured walls rising above the upper face of and integral with the bar, the walls extending transversely of the bar.

2. A hollow blast grate bar comprising a body portion having openings therein and an apertured wall at the rear end of the bar, the wall being inclined at an obtuse angle to the face of the body portion and formed integral therewith.

3. A horizontally disposed hollow blast grate bar comprising a body portion having longitudinally extending corrugations, the walls of the corrugations being provided with opposed openings, the body portion having divergently inclined apertured end walls extending transversely across the face of the bar and integral therewith, the walls rising above the face of the bar.

4. A hollow blast grate bar comprising a body portion having openings therein and an apertured wall at the rear end of the bar, the wall being inclined at an obtuse angle to the face of the body portion and formed integral therewith, the upper face of the inclined wall being sloped down to the plane of the upper face of the body portion of the bar.

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

ELONSO J. GORDON.

Witnesses:

RALPH S. WARFIELD,

J. RAY ABBEY.