

(No Model.)

2 Sheets—Sheet 1.

J. L. WHITE.
HOLLOW BLAST ROCKING GRATE.

No. 554,556.

Patented Feb. 11, 1896.

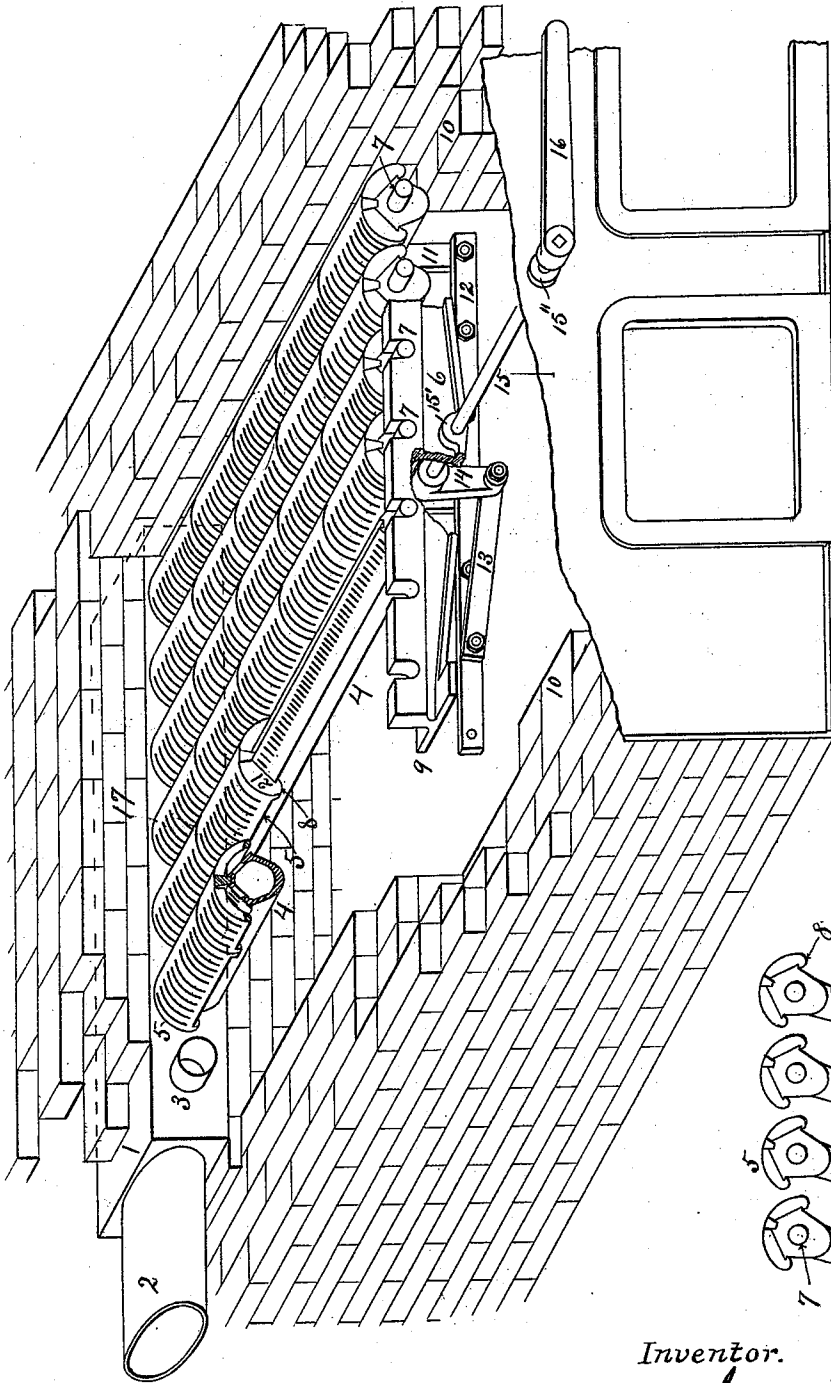


Fig. 1.

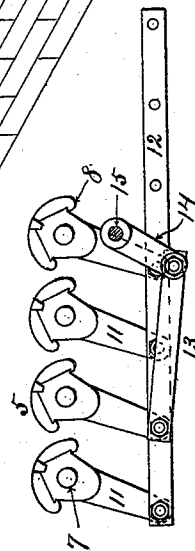


Fig. 2.

Witnesses.
Henry L. Chase
Frank Hayes

Inventor.
James L. White
by Francis L. Loper
Attorney.

(No Model.)

2 Sheets—Sheet 2.

J. L. WHITE.
HOLLOW BLAST ROCKING GRATE.

No. 554,556.

Patented Feb. 11, 1896.

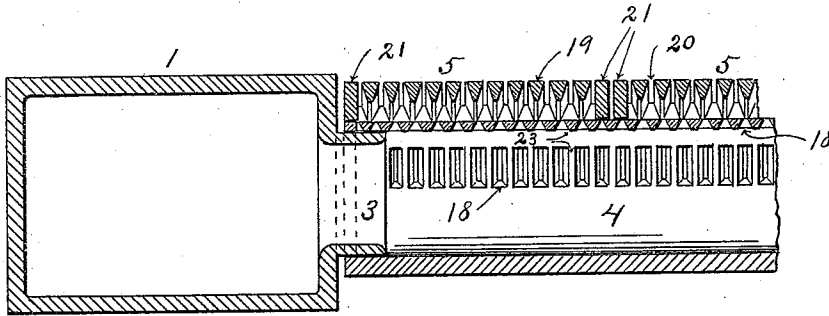


Fig. 3.

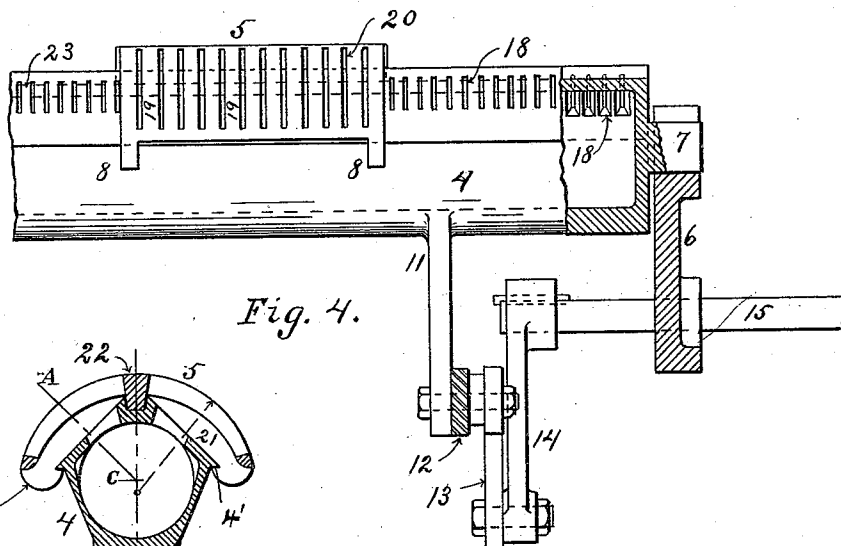


Fig. 4.

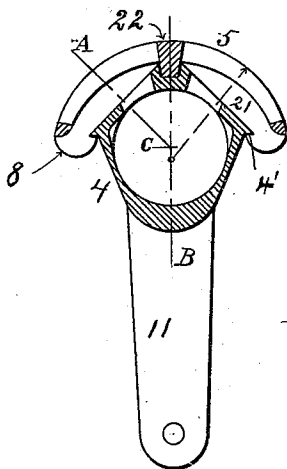


Fig. 5.

Witnesses.
Henry L. Chase
Frank Hayes.

Inventor.
James L. White
by George L. Ayer
Attorney.

UNITED STATES PATENT OFFICE.

JAMES L. WHITE, OF WEST SUPERIOR, WISCONSIN, ASSIGNOR OF ONE-HALF TO HENRY L. CHASE, OF SAME PLACE.

HOLLOW BLAST ROCKING GRATE.

SPECIFICATION forming part of Letters Patent No. 554,556, dated February 11, 1896.

Application filed April 16, 1895. Serial No. 545,940. (No model.)

To all whom it may concern:

Be it known that I, JAMES L. WHITE, a citizen of the United States, residing at West Superior, in the county of Douglas and State of Wisconsin, have invented certain new and useful Improvements in Hollow Blast Rocking Grates; and I do hereby declare the following to be a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to various new and useful improvements in furnace-grates.

The object of the invention is to provide an improved form of furnace-grate which is adapted for burning fine screenings or other finely-divided fuel.

To this end the invention broadly consists in employing a series of grate-bars normally closely arranged together, and through which air under pressure may be forced for supplying the necessary oxygen to the flame, said grate-bars being capable of being rocked when necessary, so as to enlarge the openings between the same when the ashes are to be removed, all as I will hereinafter describe and claim.

The invention further relates to various improved details of construction which will be also explained and embodied in the claims.

For a better comprehension of the invention attention is directed to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective view, partly in section, of a portion of a furnace of ordinary construction provided with my improved grate; Fig. 2, a detached front elevation of four grate-bars, illustrating a convenient form of mechanism for rocking the same. Fig. 3 is an enlarged sectional view of a portion of one of the grate-bars and air-box; Fig. 4, an enlarged side elevation, partly in section, of a portion of one of the grate-bars, illustrating the same form of mechanism for rocking the same; and Fig. 5 is an enlarged sectional view of one of the complete grate-bars.

In all of the above views corresponding

parts are represented by the same characters 50 of reference.

In Fig. 1 I show a portion of an ordinary furnace embodying my present invention, it being understood that the device may be made use of with many other varieties and types of 55 furnaces and fire-boxes.

1 is an air-box made preferably of cast-iron or other suitable material, which is set into the bridge-wall of the furnace, its front side being preferably flush with the same. 60 2 is an air-pipe leading into this air-box for supplying air to the same under pressure from a fan or blower.

3 3 are short tubular bearings for the grate-bars communicating with the interior of the 65 air-box and through which air is supplied to the grate-bars.

4 represents the main portion of the grate-bars made preferably of the shape shown in Fig. 5 in cross-section. It will be observed 70 from an inspection of this view that the main portion of each grate-bar is provided with a generally semicylindrical lower portion of greater thickness than the other parts, so as to insure strength, with tangential sides 75 extending from the same and with a peaked upper portion. A lug 4' is formed at each side for securing the auxiliary grates in position, as I will hereinafter describe.

The rear end of each grate-bar 4 is supported on one of the tubular bearings 3, and the front end of each grate-bar is closed and is provided with an integral bearing-pin 7, which works in a slot or open bearing formed in the cross-bar 6. This cross-bar 6 is provided at each end with a supporting foot or 85 web 9, which rests upon a pier 10 at each side of the furnace and near the front end thereof. By means of this construction the grate-bars can be very easily removed when necessary. 90

The main portion 4 of each grate-bar is provided near its front end with a depending arm 11, and connecting these depending arms is a cross-bar 12, adapted to rock back and forth.

15 is a short shaft mounted in a bearing 15', formed in a cross-piece 6 and in a bearing 15'' in the front wall of the furnace. 16 is a 95

hand-lever on the outside of the furnace for rocking this shaft. 14 is an arm keyed rigidly to this shaft 15 behind the cross-bar 6, and connecting the lower end of this arm 14 with the rocking bar 12 is a link 13.

5 5 represent removable auxiliary sections which are applied to the upper part of each grate-bar and on which the fuel is consumed. The upper portion of each grate-bar 4 is provided with a groove therein, (see Fig. 5,) which receives the longitudinal web 22 on each auxiliary section 5. These auxiliary sections 5 are made of any desired length, five of such sections being shown in Fig. 1 for each grate-bar. Each auxiliary section 5 is of a generally semicylindrical shape, being provided with webs 21 21 at each end and with turned-in fingers 8, which engage beneath the lugs 4' on the grate-bars 4, so that the auxiliary sections will be held firmly in position. By making these auxiliary sections of a generally semicylindrical shape in cross-section, as explained, great strength is obtained, and I am further enabled to secure a very large surface in which to form air-passages, as I will describe, by supplying the necessary air to the fire. This shape for the auxiliary sections is also of advantage, as it enables the sections to be quickly and effectively freed of ashes when shaken only to a slight extent.

The upper inclined surfaces of each grate-bar 4 are each provided with a series of slots 18 therein, separated by wedge-shaped pieces 23, Fig. 3, whereby the slots 18 will be contracted toward the upper end, and the main portion on each side of the auxiliary sections 5 are provided with other slots 20 therein, separated by a wedge-shaped piece 19, so as to be also contracted toward the upper end, whereby ashes and fine particles will be prevented from entering said slots. The slot 20 in the auxiliary sections are preferably considerably longer than the slots 18 in the grate-bars, whereby the air passing through the longer slots will have been expanded, more or less, and its pressure reduced. In this way a large amount of air can be supplied to the fuel without being of sufficient pressure to disturb the fine particles which are being consumed.

By forcing the air-jets upwardly into the fuel a draft will be formed upward between the several grate-bars, by which air from beneath the grate-bars will be caused to travel through the fuel, thereby materially augmenting the supply of oxygen to the same.

In actual practice when the grate-bars are in their normal position the auxiliary sections 5 will occupy substantially horizontal planes and will be arranged very closely side by side, so as to prevent the fine fuel from passing between them.

The fire is built on the auxiliary sections in the usual way, and air is forced through the air-pipe 2 into the air-box 1. This air under pressure passes into the tubular bearings 3, into the main portions 4 of the grate-

bars, and thence through the slots 18 and 19 into the fuel, where it supplies the necessary oxygen to insure the proper combustion. This air in passing from the slots 18 through the slots 20 will have suffered a more or less reduction in pressure for the purpose stated. When the fire is shaken, the lever 16 is operated by an up-and-down movement, which rocks the bar 12 back and forth and oscillates the different grate-bars simultaneously, so as to separate the auxiliary portions 5 and incline the same, as shown in Fig. 1, first to one side and then to the other. The ashes will therefore drop to one side or the other of each grate-bar, after which the bars are returned to their normal position.

By making use of auxiliary sections 5 for each grate-bar they may be easily removed when burned out by simply elevating the front end of the grate-bar and sliding said sections toward the front thereof. It will be obvious that instead of making use of the particular mechanism for rocking the various grate-bars, as described, the bar 12 may be continued through the side of the furnace and be provided with a handle thereon, by which it may be actuated.

By making use of auxiliary sections on which the fire is built it is evident that the grate-bars proper cannot be damaged in any way, since the two elements are always insulated by an air-space. When the auxiliary sections are burned out, they may be quickly and easily removed, and, owing to the preferred shape of these sections, they may be made very cheaply.

Although I have particularly described my improved construction of grate-bars as being used with a forced draft, it is to be understood that they may be advantageously and effectively used with a natural draft, and unless specifically stated to the contrary I desire to have my claims so construed.

The mechanism above described for rocking the grate-bars is only one of the many forms of devices for effecting that end, and I make no claim to the same herein.

It is to be understood, of course, that other devices can be employed for rocking the grate-bars and that the grate-bars may be stationary, if desired.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is as follows:

1. As a new article of manufacture, an improved grate comprising a slotted main portion and a slotted removable upper portion secured thereto with an air-space between the two portions, substantially as set forth.

2. As a new article of manufacture, an improved grate comprising a hollow main portion having slots therein, a removable auxiliary portion secured thereto above said slots, and slots in said removable auxiliary portion, substantially as set forth.

3. As a new article of manufacture, an improved grate comprising a slotted main por-

tion 4, a slotted removable auxiliary section 5 made semicircular in cross-section, substantially as set forth.

4. As a new article of manufacture, an improved grate comprising a main portion 4 having inclined slotted upper faces a removable auxiliary section 5 secured to said main portion 4 and provided with slots therein, substantially as set forth.

10 5. As a new article of manufacture, an improved grate-bar composed of a main portion having inclined slotted upper sections, and provided with a lug 4' at each side; removable auxiliary sections 5 provided with a longi-

tudinal bearing 22, supported by the upper 15 portion of the grate-bar 4, and with turned-in fingers 8 engaging beneath said lugs 4'; a strengthening-web 21 for said sections; and slots in the inclined portions of the grate-bars and in said auxiliary sections, substantially 20 as set forth.

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

JAMES L. WHITE.

Witnesses:

N. B. ARNOLD,
FRANK HAYES.