

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN FURNACES.

Specification forming part of Letters Patent No. 58,863, dated October 16, 1866.

To all whom it may concern:

Be it known that I, J. H. MEARNS, of Philadelphia, Pennsylvania, have invented certain Improvements in Heaters; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in certain devices constructed and arranged within the ash-pit of a heater, as fully described hereinafter, so that the fire may be raked and the ashes sifted and sorted with little labor, and without the necessity of opening the doors.

My invention further consists of certain flues communicating with the ash-pit and with the cylinder above the fire-box, so that the finer dust and ashes may be carried from the ash-pit to the chimney.

In order to enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a sectional elevation of my improved heater; Fig. 2, a section on the line 1 2, Fig. 1; and Fig. 3, a section on the line 3 4, Fig. 1.

A A' B B' are the brick walls of the heater, and to the front wall, A, are hung doors $a a'$, the former closing the entrance to the fire-box C, and the latter the entrance to the ash-pit D, below the fire-box.

The interior of the fire-box is oval in form, as shown in Fig. 3, and above the same is a metal cylinder or casing, E, which communicates through a pipe, F, with the chimney.

On ledges x , Fig. 1, in the sides $c c'$ of the ash-pit rest the ends of a rod or bar, G, which is connected by a link, d , to an arm, e , on a shaft, H, the latter extending through the side wall, B, and having secured to its outer end an arm, f .

The grate P of the heater consists of detachable bars $i i i$, which are connected at their rear ends to the rod G, the forward ends of the bars resting on the cranked portion of a crank-shaft, I, which extends through the side wall, B, and has secured to its outer end an arm, j .

To an arm, e' , attached to the shaft H, is secured a cross-bar, G', to which is hung the rear end of a grate, J, the latter being inclined

toward the front of the ash-pit, where it rests on a bar, K. The bar K is hinged at one end to a plate at one side of the ash-pit, the opposite end resting on a lug, k , at the opposite side of the ash-pit, for a purpose described hereinafter.

With each side of the ash-pit communicates an opening, m , which extends through the side walls of the fire-place, and communicates with the interior of the casing E; and in each opening is a slide-valve or damper, n , which is operated by means of a rod, o , extending through the front wall, A. The ash-pit D extends beyond the front wall, A, and in this portion of the pit, which is covered by a door, a^2 , is a bucket, L.

When the fire requires to be raked, the attendant closes the doors $a a'$ of the fire-place and ash-pit, draws out the rods o , so as to afford a free communication between the ash-pit and casing through the opening m , and imparts a vibrating motion to the shaft H by means of the arm f , so as to move the grate J and the grate-bars $i i$ rapidly back and forth. As the coals in the fire-box are shaken by the movement of the bars, the cinders are broken up and fall, with the loose dust and ashes, between the bars onto the inclined grate or sifter J, the ashes falling through the latter to the bottom of the ash-pit, while the half-burned cinders or coals slide down the inclined grate, and from the latter into the bucket L. The finer particles of dust which are not carried directly downward by their weight are carried by the draft into the openings m , and through the latter into the casing E, from which they pass through the pipe F to the chimney.

When the fire-box is to be cleaned, the crank-shaft I is turned by means of the arm j , so that the front ends of the bars $i i$ will be lowered to the position shown in red lines, Fig. 1. The arm f is then moved back and forth, when the coals will be shaken from the bars, and will fall onto the grate or sifter J and into the bucket L, the smaller particles passing through the grate and into the ash-pit, as before described.

When the ash-pit is to be cleaned, the front end of the grate J is raised, and the bar K is turned upward against the side of the ash-pit, so as to support the grate in its elevated position, as shown in red lines, Fig. 1. Suitable

implements for withdrawing the ashes may then be introduced into the pit below the grate.

It will be seen that by means of the devices above described the fire may be thoroughly raked and the ashes sifted and sorted with little labor, and without the necessity of opening the doors during the operation, the escape of the dust from the ash-pit being thus prevented.

Without confining myself to the precise devices herein described for operating the bars and grate,

I claim as my invention and desire to secure by Letters Patent—

1. The grates P and J, in combination with the shaft H, its arms *e e'*, and link *d*, or their equivalent, the whole being arranged within

the ash-pit of a heater, and operating substantially as and for the purpose described.

2. The flues or openings *mm*, communicating with the ash-pit, and with the casing above the fire-place, for the purpose specified.

3. The combination of the crank-shaft I, the sliding bars *i i*, and the shaft H, its arms *e e'*, and link *d*, as and for the purpose set forth.

4. The adjustable bar K, in combination with the lower grate or sifter, J, substantially as and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES H. MEARNS.

Witnesses:

CHARLES E. FOSTER,

JOHN WHITE.