(No Model.)

W. BOWERS.

GRATE FOR BOILER FURNACES.

No. 263,470. Patented Aug. 29, 1882.

Fig. 1.

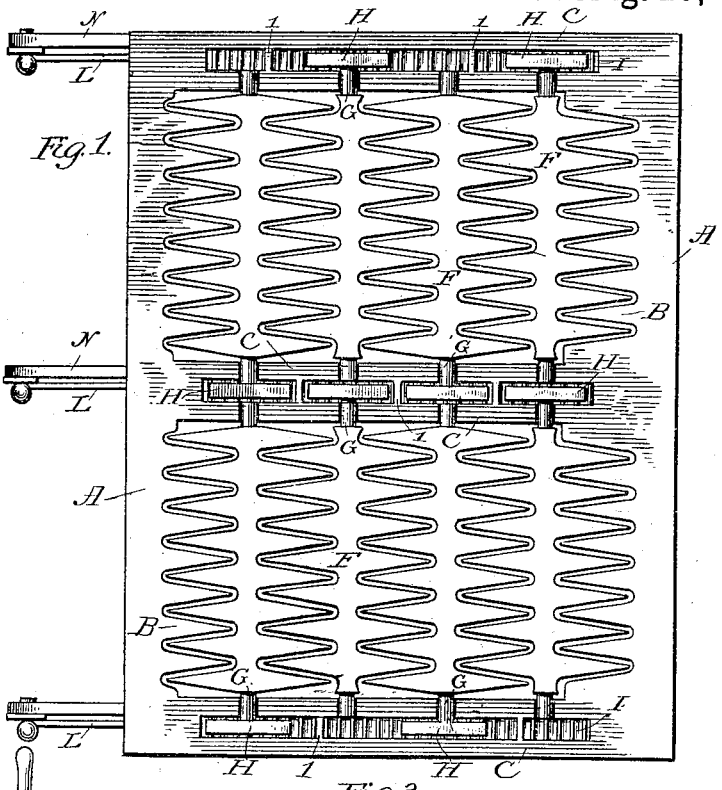


Fig. 2.

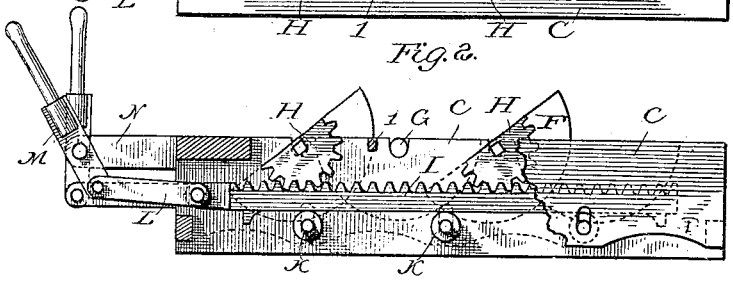
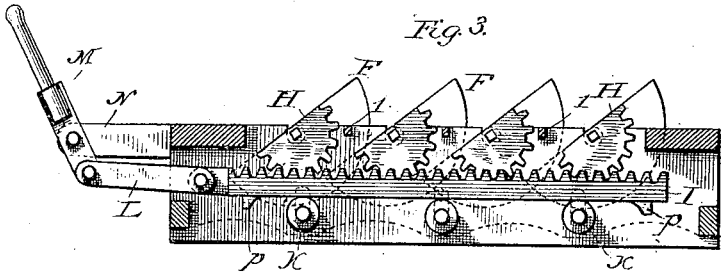


Fig. 3.



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UNITED STATES PATENT OFFICE.

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GRATE FOR BOILER-FURNACES.

SPECIFICATION forming part of Letters Patent No. 263,470, dated August 29, 1882.

Application filed July 22, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BOWERS, of Carbondale, in the county of Lackawanna and State of Pennsylvania, have invented a new and useful Improvement in Grates for Boiler-Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to improvements in moving grates for boiler-furnaces; and it consists partly in the improved means for oscillating the bars composing the grate; further, in an improved framing or bearing-bar in which the sections are journaled; further, in the means for protecting and securing the gearing; and, finally, in the general improvements in details of construction, all of which will be more fully hereinafter described and claimed.

My invention is an improvement upon that forming the subject of a certain application for Letters Patent filed by me June 22, 1882. In that application I showed a series of interlocking bars each having oppositely-set quadrant-shaped teeth, such bars being journaled in a peculiar side piece of the frame and oscillated simultaneously by hangers and a compound lever. In my present invention I use the same shape of bar, in connection with improved moving devices.

In the accompanying drawings, Figure 1 is a plan view of a furnace-grate composed of two beds or sections. Fig. 2 is a side elevation, the outer side of one of the bearing-bars being removed. Fig. 3 is a modification.

It should be premised that the grates for boiler-furnaces are of large size, while the individual oscillating bars are composed of teeth not over eight inches in length. It being impracticable on a drawing to indicate the relative proportions of the frame and bars, I have shown only four of such bars in each section or division of the grate. Ordinarily the grate would be composed of a number of such sections. I have here, however, shown two only. Each section is composed of end bars, A A, with which are cast the stationary quadrant-shaped teeth B, Fig. 1.

C C represent the peculiar open side or bearing bars. These bars may be cast of one piece, if desired, and have a longitudinal slot extending throughout their whole length, as shown. On each side of this slot are corresponding grooves or bearings for the spindles or journals of the grate-bars belonging to opposite sections, and at a point between these bearings are braces 1, Fig. 1.

The grate-bars F F are constructed as in my application referred to. They consist of a central rib and a series of semicircular projections, each forming two oppositely-projecting quadrant-teeth. Each bar is of a flat narrow lozenge shape on top and tapers to a comparatively sharp curved edge below, so that air is freely admitted and clinkers and ashes are prevented from obstructing the openings. These bars are provided with trunnions G, which bear in the grooves in the side bar, each side bar supporting the end of grate-bars belonging to adjacent sections. Ordinarily I prefer to oscillate only every alternate bar of a section in shaking the grate, and this is accomplished in the following manner: The end of the trunnion of each bar is squared, and on this squared end is slipped a segmental gear, H, which is thus inclosed within the slot in the side bar. It is unnecessary to key the gearing on the squared end, since it is prevented from slipping off by the wall of the slot in the side bar. The segments are of the same shape as the grate-bars themselves, and when oscillated perform the functions of a grate-bar, since the fuel lies upon them and will be agitated by their upward and downward movement. The gears H are placed alternately on opposite ends of the bars, as shown in Fig. 1.

Since the gears form part of the grate and are intended to be oscillated in concert with the bars, and since all the bars are intended to be moved in the same direction, as explained in my former application, means must be provided for giving this simultaneous oscillation in the same direction to the segments and bars. This is accomplished by means of the toothed racks I, which slide in the bottom of the slots in the side bars. Friction-rollers K K are journaled in the walls of the slot, and upon such rollers rests the rack, the teeth meshing with the segments. To the end of the rack is attached the operating device, preferably by means of a link, L, pivoted to a lever, M, which is in turn pivoted to a standard, N, secured to the frame. The movement of the lever backward and forward produces a direct reciprocating motion of the rack, and as such rack meshes with seg-

ments on alternate grate-bars (of each section) it follows that every other grate-bar will be oscillated in the same direction. Sufficient movement is permitted the gearing to allow the bars to be turned a full quarter-rotation for the purpose of dumping the fuel. Of course the levers at opposite sides of the same section may be operated together, in which case all the bars might be operated at once in the same or in opposite directions.

In the modification shown in Fig. 3 the segments are placed upon the same end of all the bars in a section, while the rack engages with them all. Hence only a single rack is necessary to oscillate all the bars in a single section.

The advantages of the slotted side or bearing bar will be readily apparent. It permits the air to have access to the fire, while at the same time it is broad enough to afford bearing-surface for the bars of separate sections of the grate. It forms a protection to the gearing and prevents the segments from working off the trunnions, while it is an exceedingly light and yet strong support for the parts.

If preferred, the segments may be cast with the bars; but I prefer to make them removable, since if warped or otherwise injured by heat the bar may be lifted out and the gearing replaced by a new one. I may also prefer to make each tooth of the grate-bar removable from its central rib for the same purpose.

The racks are provided also with stops *p p*, which prevent them from being moved too far in either direction.

Having described my invention, I claim—

1. In a grate, the combination of the pivoted interlocking bars, segmental gears, and a sliding rack.

2. The combination of the slotted side or bearing bars, the interlocking grate-bars journaled therein, segments attached to said grate-bars, and a rack engaging with said segments.

3. In a grate composed of two or more sections, the combination, with the interlocking teeth, of the slotted bearing-bars adapted to separate the sections, the sliding racks, and the segments placed on opposite ends of alternate bars.

4. In a grate, the combination of two or more sections composed of pivoted interlocking bars, with segments connected to such bars and adapted to be moved in concert therewith, whereby such segments operate as grate-bars, as described.

5. A side or bearing bar for a grate having a central slot, in combination with the segments inclosed thereby and the rack.

6. In a grate, the combination of the pivoted bars, the segments, the rack and its operating-lever, and the rollers journaled in the slotted side bar.

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

WILLIAM BOWERS.

Witnesses:
P. E. BOWERS,
WM. G. BOWERS.