2 Sheets—Sheet 1.

L. P. RIDER.

GRATES FOR FURNACES.

No. 193,180. Patented July 17, 1877.

fig 1

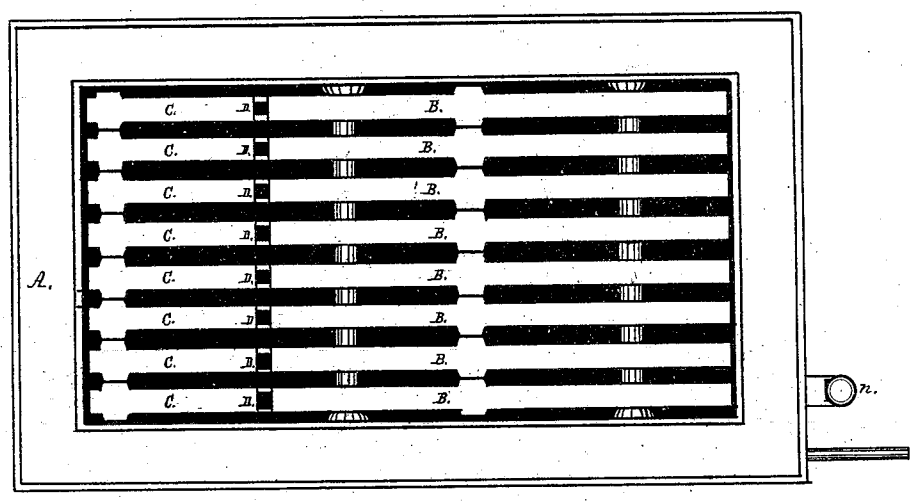
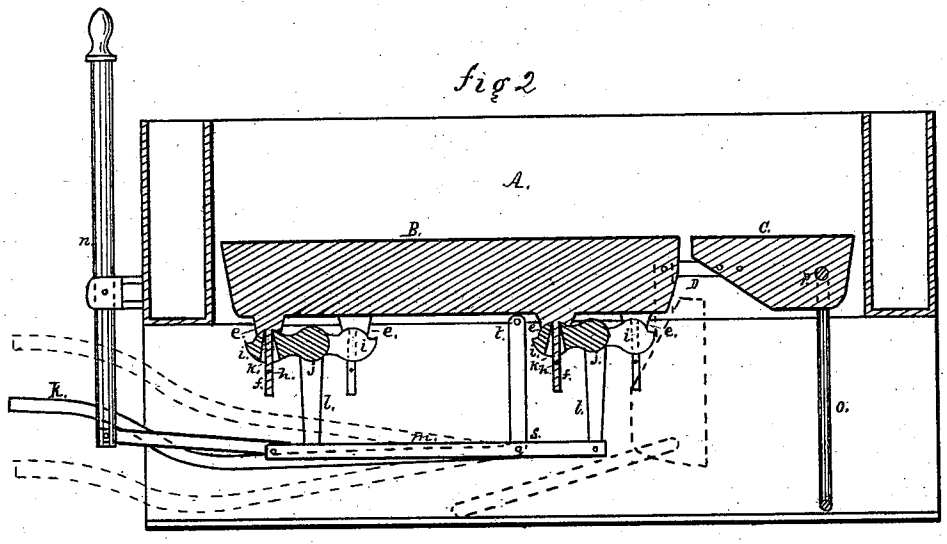


fig 2



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2 Sheets—Sheet 2.

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fig 3

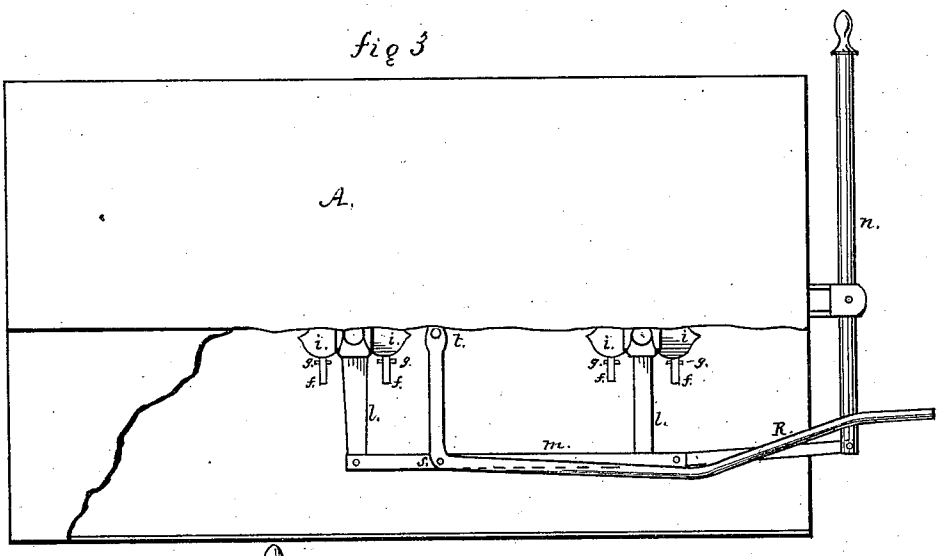


fig 4

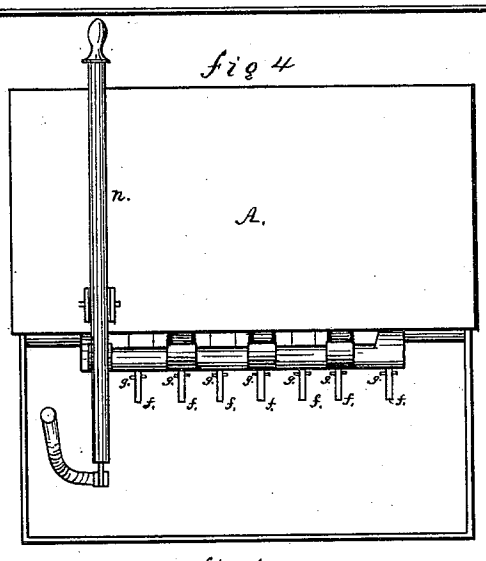
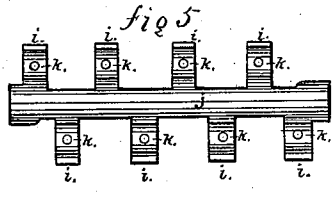


fig 5



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UNITED STATES PATENT OFFICE.

LEMAN P. RIDER, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN GRATES FOR FURNACES.

Specification forming part of Letters Patent No. 193,180, dated July 17, 1877; application filed February 8, 1877.

CASE B.

To all whom it may concern:

Be it known that I, LEMAN P. RIDER, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Grates for Furnaces; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to an improvement in grates for furnaces, and consists in the manner of suspending the grate-bars in the fire-chamber and in the mode of operating them, whereby results and advantages are obtained similar to those set forth in my application for Letters Patent, which were granted January 23, 1877, with the additional advantage of less obstruction to the ingress of air between the grate-bars.

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

In the accompanying drawings, which form part of my specification, Figure 1 is a top view or plan of my improvement in grates for furnaces. Fig. 2 is a vertical section at line *y* of Fig. 1. Fig. 3 is a side elevation of the furnace, representing a portion of the wall broken away for the purpose of showing the levers used for operating the grate-bars. Fig. 4 is an end view of the furnace. Fig. 5 is a top view of one of the bars used for suspending the grate-bars.

My improvement in grates is particularly adapted to locomotive-furnaces, but it is also suitable for all classes of furnaces, the different kind and sizes of furnaces simply requiring a difference in the length, thickness, and number of the grate-bars.

In the accompanying drawings, A represents the furnace. B represents the grate-bars, which, in the present case, each bar is made in two sections, marked B and C, hinged together at D, as described in my former application, hereinbefore recited, and are arranged with relation to the walls of the furnace, and are operated in the same manner and for like purpose as set forth in said application.

The section C of the grate-bars B may be dispensed with when desired. In such case the grate would then consist of bars like section B, simply elongated.

The bars B are provided with pendants *e*, having pins *f*, in each of which is a transverse opening, *h*, for a key, *g*. The base of the pendants are concave, and rest on a convexity of the arms *i* of the rock-shaft *j*. In each of the arms *i* is an opening, *k*, into which the pins *f* are placed and provided with keys *g*, whereby the bars are held in juxtaposition with the arms *i* of the rock-shaft *j*. From the under side of the rock-shaft *j* project downward arms *l*, which are pivoted to a connecting-rod, *m*, which is pivoted to a vertical lever, *n*. The rock-shaft *j* is journaled in suitable bearings, placed in or on the side walls of the furnace. By imparting a reciprocating motion to the lever *n* a rocking motion will be imparted to the rock-shaft *j*, whereby alternate grate-bars will be elevated above the normal plane of the grate, the object of which is to agitate the burning fuel and free it from the refuse of combustion; and also for securing a free and unincumbered admission of air to and among the consuming particles of fuel and a complete admixture and commingling of air with the gases of the furnace.

The section C is held in position through the medium of yoke *o*, which is hinged on the ends of the bar *p*, which passes through openings in the forward end of the section C. By means of this arrangement of the yoke *o* the section C of the grate can be dropped and raised with ease and facility at either end of the ash-pit or pan of the locomotive-furnace.

The grate-bars may be operated by means of an L-shaped lever, as indicated at R, which is pivoted at *s* to the connecting-rod *m* and at *t* to the furnace-wall. The motion of the lever R is indicated by dotted lines in Fig. 2.

The improvement hereinbefore described, and that described in Case A, are modifications of the means for suspending and agitating the grate-bars described in the application for which Letters Patent were allowed me December 8, 1876.

Having thus described my improvement, what I claim as of my invention is—

1. The rock-shaft *j*, having arms *i*, forming

the bearing-surfaces of the pendants *e* of the bars B, which, when at rest, are on the same horizontal plane with the axis of the journal of said shaft, in combination with the grate-bars B, constructed, arranged, and operated so that a vertical motion only is imparted to the latter, as herein described.

2. The grate-bar B, having pendants *e* and pins *f*, in combination with a rock-shaft, *j*, having arms *i*, provided with openings *g*, whereby the pendants are held in juxtaposition with the arms *i* through the medium of a key, substantially as herein described, and for the purpose set forth.

L. P. RIDER.

Witnesses:
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WESLEY JOHNSTON.