

J. G. Trotter.

Making Iron and Steel.

No. 87,889.

Patented Mar. 16, 1869.

Fig. 2.

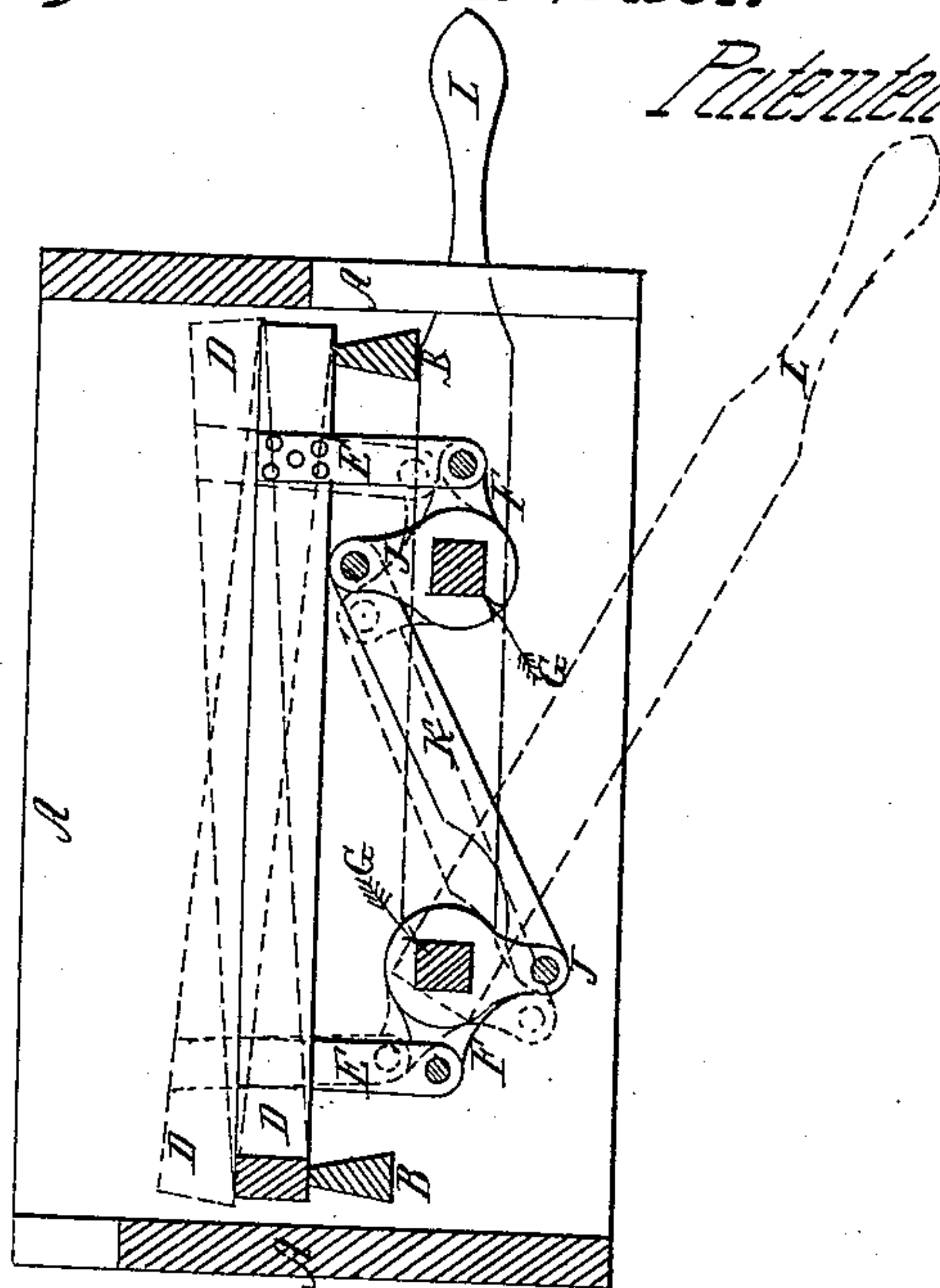
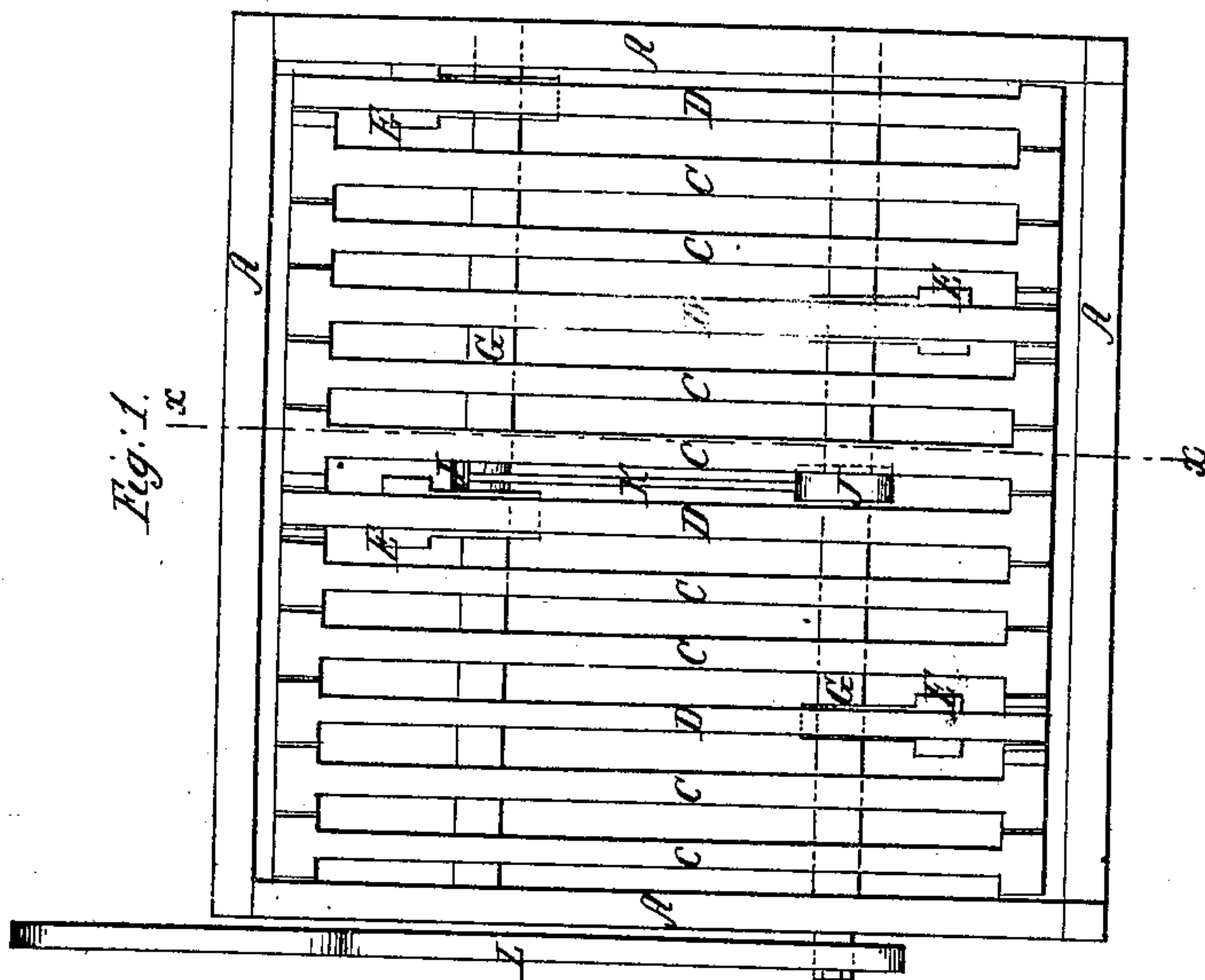


Fig. 1.



Witnesses;
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United States Patent Office.

JONATHAN G. TROTTER, OF NEWARK, NEW JERSEY.

Letters Patent No. 87,889, dated March 16, 1869.

IMPROVEMENT IN FURNACES FOR MAKING IRON AND STEEL.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern :

Be it known that I, JONATHAN G. TROTTER, of Newark, Essex county, and State of New Jersey, have invented certain new and useful Improvements in the Construction of Grates for Furnaces Used in Making Steel, Iron, and for other purposes; and I do hereby declare that the following is a full description of the same.

The objects of my invention are—

First, to overcome the difficulty of keeping up a quick and lively fire in furnaces used for making steel or iron.

Second, to obtain a perfect combustion of the coal, by keeping it well open for the admission of oxygen-gas, and thereby prevent any gases, liberated from the fuel, escaping unconsumed, to mingle with the metal, to delay, in the process of converting it into steel, or impair its quality; and

Third, to prevent cooling down the fire, by opening the door of the furnace, to rake, or stir up, as is practised with the furnaces generally used, when stirring up the fire, to make it burn more rapidly; and

The nature of my invention consists in making each alternate grate-bar (or section, as may be desired,) loose, and combining therewith an agitating-apparatus, operating from the lower sides, and composed of one or more rock-shafts, having suitable cranks attached thereto, whereby an attendant may agitate and stir up the fire, without the necessity of opening the doors of the furnace for that purpose.

But, to describe my invention more particularly, I will refer to the accompanying drawings, forming a part of this specification, the same letters of reference, wherever they occur, referring to like parts.

Figure 1 is a plan view of the grate, or fire-box of a furnace.

Figure 2 is a longitudinal cut section of the same, through the line *x x*, fig. 1.

Letter A represents the walls, or sides of the fire-box, in which is arranged, upon suitable supports, B, extending across the front and back ends of the fire-box, a series of fixed and loose, or working grate-bars, C and D.

The object of this arrangement of the grate-bars is to admit of a stirring, or agitating motion, in a portion of the grate, to keep the bed of coals thereon free from ashes and clinker, and thus allow a full supply of oxy-

gen, to keep up a constant, steady, and uniform temperature in the furnace.

To accomplish this operation, hangers, or arms, E, are formed on or secured to the under side of the loose, or movable grate-bars D, at their opposite ends, alternately, that is, one hanger only on a grate-bar.

The lower ends of these hangers are jointed to a lever, F, secured on the rock-shafts G, which are operated simultaneously, by means of levers, J, secured thereon, and connected together by means of a connecting-rod, K, so as to give a simultaneous motion to the two rock-shafts.

These rock-shafts are arranged transversely of the ash-pit, and having their ends project through the sides thereof, so as to admit of being agitated by means of a hand-lever, L.

It will thus be seen, from this description, that every alternate grate-bar (or section of grate-bars, as the case may be,) will be tilted up, and bodily carried forward, the length of the throw of the crank, in an opposite direction to the similar movements of the adjoining movable grate-bar. Thus, while one section of the grate-bars opens the bed of coals, and rakes, or tends to carry them back toward the back of the fire-box, the other section, by precisely a similar operation, is simultaneously operating to open and carry the coals toward the front of the grate, or fire-box.

The effects of this combined and simultaneous motion in the grate-bars, are obvious, and thus is obtained, by the simple operation of working a hand-lever at the outside of the furnace, a perfect control over the fire, without the necessity of opening the doors of the furnace to rake the fire, as is required in furnaces generally used for making steel or iron.

Having now described my invention, I will proceed to set forth what I claim, and desire to secure by Letters Patent of the United States.

I claim the arms, or hangers E, in combination with the grate-bars D, substantially as described.

I also claim the combination of the grate-bars D, having hangers E attached thereto, with the rock-shafts and levers in connection therewith, operating for the purposes hereinbefore described, and substantially in the mode of construction as set forth.

Witnesses:

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