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(No Model.)

2 Sheets—Sheet 2.

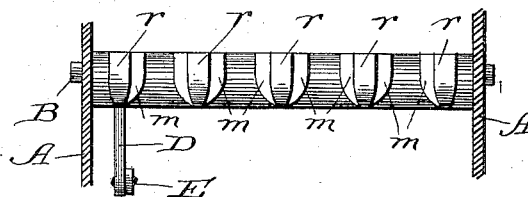
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GRATE.

No. 344,766.

Patented June 29, 1886.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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GRATE.

SPECIFICATION forming part of Letters Patent No. 344,766, dated June 29, 1886.

Application filed February 13, 1886. Serial No. 192,362. (No model.)

To all whom it may concern:

Be it known that I, LEWIS T. BURNHAM, a citizen of the United States, residing at Hyde Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Grates; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of rocking grates for supporting the fuel in combustion-chambers in which finger bars or points are supported to be oscillated for dumping or shaking purposes upon oscillatory bearing-bars and alternate across the base of the fire-chamber on adjacent bars, to leave air-spaces and permit independent and mutually unobstructed oscillation of the bearing-bars with the finger-bars supported on each bearing-bar.

A very important, if not the principal, object to be accomplished in the construction of grates is the attainment of the largest possible aggregate air-space to produce the greatest amount of combustion without injuriously weakening the grate or rendering the spaces for the passage of air sufficiently large to permit the fuel to fall through. Also, grate-bars of the class to which my improvement relates are ordinarily constructed to produce the transverse adjustment of the finger-bars upon the bearing-bars by causing the former to straddle the latter by means of suitable lugs provided for the purpose. I employ this same construction, preferably, however, without bolting or otherwise securing the finger-bars individually in set position, as is most commonly practiced.

Various modes are resorted to for holding the finger-bars in their relative positions to each other upon a bearing-bar other than by bolting or strapping them down, which generally have the effect of weakening the bearing-bar, and, like the bolting and strapping means, which are also cumbersome and entail considerable extra labor and annoyance, materially add to the expense of manufacturing the article.

It is my object to provide a grate of the kind named, by the construction of which the largest possible aggregate area of air-space is provided without detriment to the required strength of the device, and whereby there shall be considerable saving in material for manu-

facturing the bars, and the consequent saving in handling the finished article, as in freight and cartage.

It is also my object to provide a grate of the kind named, the finger-bars of which for each bearing-bar shall readily be adjusted in proper relative position to each other without the possibility of becoming displaced or disarranged by use with the wedging between them and their companion finger-bars on an adjacent bearing-bar of the fuel or cinders or clinkers therefrom, or with other causes incident to such use; and to this end my invention consists in the general construction by means of which my object is attained; and it also consists in certain details of construction and combinations of parts, all as hereinafter more fully set forth.

Referring to the drawings, Figure 1 is a plan view of a furnace-grate of my improved construction; Fig. 2, a side elevation of the shaking and dumping mechanism; Fig. 3, a transverse section taken on the line 3 3 of Fig. 1; Fig. 4, a longitudinal section taken on the line *x x* of Fig. 3, and showing the manner of seating the finger-bars upon the bearing-bars; and Fig. 5, a cross-section taken through Fig. 1 to one side of a bearing-bar, showing the tapering form of the under part of each finger-bar.

A designates the inner sides of the base of a furnace, affording the journal-bearings for the transverse bearing-bars B.

C C are the finger-bars, comprising thin finger portions *r*, preferably tapering on their under sides, and projecting from opposite sides of the central body portion, *q*, affording the bearing part and in line with the same, and provided with lateral lugs *m*, intermeshing between adjacent finger-bars. Each of the finger-bars C, except the extreme lateral ones, which are denoted by C', and are provided with lateral lugs *m* only on their inner sides, is recessed on its under side below the central part, *q*, as shown in Fig. 4, or provided with lugs, if preferred, to afford a socket, whereby it may embrace the bearing-bar B, upon which it is seated, and each of the bearing-bars is recessed, as shown at *x* in Fig. 3, near its opposite ends, to receive a lug, *p*, projecting from the lower side of the central or body portion, *q*, of each extreme lateral finger-bar C',

whereby the intermediate finger-bars, C, when adjusted with their body portions *q* contiguous to each other, may be maintained in their adjusted positions, and thus be prevented from becoming displaced or disarranged from the various causes tending to produce such effect. If desired, the bearing-bars may be threaded near their extremities, and provided with nuts *o*, to afford additional security against the displacement of the finger-bars C', and consequent disarrangement of the intermediate finger-bars, C, and this provision avoids the necessity of making the body portions *q* of alternate finger-bars C' as long as those of the adjacent finger-bars C', which bear at their outer extremities against the inner sides of the parts A.

For shaking and dumping the grate, common means are provided in the form of arms D, preferably cast upon the bearing-bars B, and connected together at their free ends by being pivotally secured to a bar, E, which in turn is similarly secured to a lever, F, of the second class.

The construction and adjustment of the finger-bars provide air-spaces *n*, having a combined area greater than that covered by the mechanism, and which in all cases is amply sufficient to permit the necessary amount of draft for affording combustion of the fuel readily and in a high degree. By making the lugs *m* so long as nearly to touch the sides of adjacent finger-bars they prevent crowding by possible bending or warping of the finger portions and breaking thereof by any lateral strain from wedging of the fuel. Of course, the lateral lugs *m* may vary from the size and form shown, also in the positions they occupy with relation to each other, to permit their use with any particular kind of fuel, whether coarser or finer in its nature, the body portions or spaces *q* to be made for particular fuel, to permit the setting of the finger-bars more or less closely together. By casting the lugs *m* at differing distances apart air-spaces may be provided, for instance, of one-quarter of an inch wide, and from one-quarter to one-half an inch long, or one-half or five-eighths of an inch wide; and various other arrangements might be suggested for enabling the attainment of increased air-space for particular instances. By this form of construction as high as seventy-five per cent. of air-space may be provided in a grate by affording a large number of smaller spaces or a comparatively small number of larger spaces, and to produce the result T-shaped lugs *m* may, if desired, be used, which render a very large aggregate air-space possible, besides affording considerable saving of material in the manufacture of the grate.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a rocking grate, the combination, with

the oscillatory bearing-bars, of finger-bars provided with lateral lugs, substantially as and for the purpose set forth.

2. In a rocking grate, the combination, with the oscillatory bearing-bars, of finger-bars tapering on their under sides and seated transversely on the bearing-bars, and provided with lateral lugs *m*, substantially as and for the purpose set forth.

3. In a rocking grate, the oscillatory bearing-bars recessed near their opposite ends, intermediate finger-bars, C, enlarged near their centers, forming the bearing portions, and provided with lateral lugs *m*, and lateral finger-bars C', provided with lateral lugs *m*, and having lugs *p*, to enter the recesses in the bearing-bars, and thereby hold the intermediate finger-bars in place on the bearing-bars, substantially as and for the purpose set forth.

4. In a rocking grate, the combination of oscillatory bearing-bars B, recessed near their opposite ends, intermediate finger-bars, C, having the bearing portions *q*, provided with sockets on their lower sides, and finger portions *r*, extending from the body portions and provided with lateral lugs *m*, and lateral finger-bars C', having lugs *p*, to enter the recesses in the bearing-bars, and thereby hold the finger-bars C in position, and provided with lateral lugs *m*, substantially as and for the purpose set forth.

5. A grate comprising, in combination, oscillatory bearing-bars B, recessed and threaded near their opposite ends, intermediate finger-bars, C, having bearing portions *q*, provided with sockets on their lower sides, and finger portions *r*, extending from the body portions and provided with lateral lugs *m*, lateral finger-bars C', having lugs *p*, to enter the recesses in the bearing-bars, and thereby hold the finger-bars C in position, and provided with lateral lugs *m*, and nuts *o* on the threaded bearing-bars, substantially as and for the purpose set forth.

6. The combination, with the base of a combustion-chamber, of a rocking grate comprising, in combination, bearing-bars B, recessed and threaded near their opposite ends, nuts *o*, intermediate finger-bars, C, having bearing portions *q*, provided with sockets on their lower sides, and finger portions *r*, extending from the body portions and provided with lateral lugs *m*, lateral finger-bars C', enlarged near their centers and provided with lugs *p*, to enter the recesses in the bearing-bars, and thereby hold the finger-bars C in position, and having lateral lugs *m*, and means, substantially as described, for oscillating the bearing-bars, substantially as and for the purpose set forth.

LEWIS T. BURNHAM.

In presence of—

HENRY HUDSON,
J. W. DYRENFORTH.