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W. REDPATH & A. H. REID.

GRATE.

(Application filed May 9, 1899.)

(No Model.)

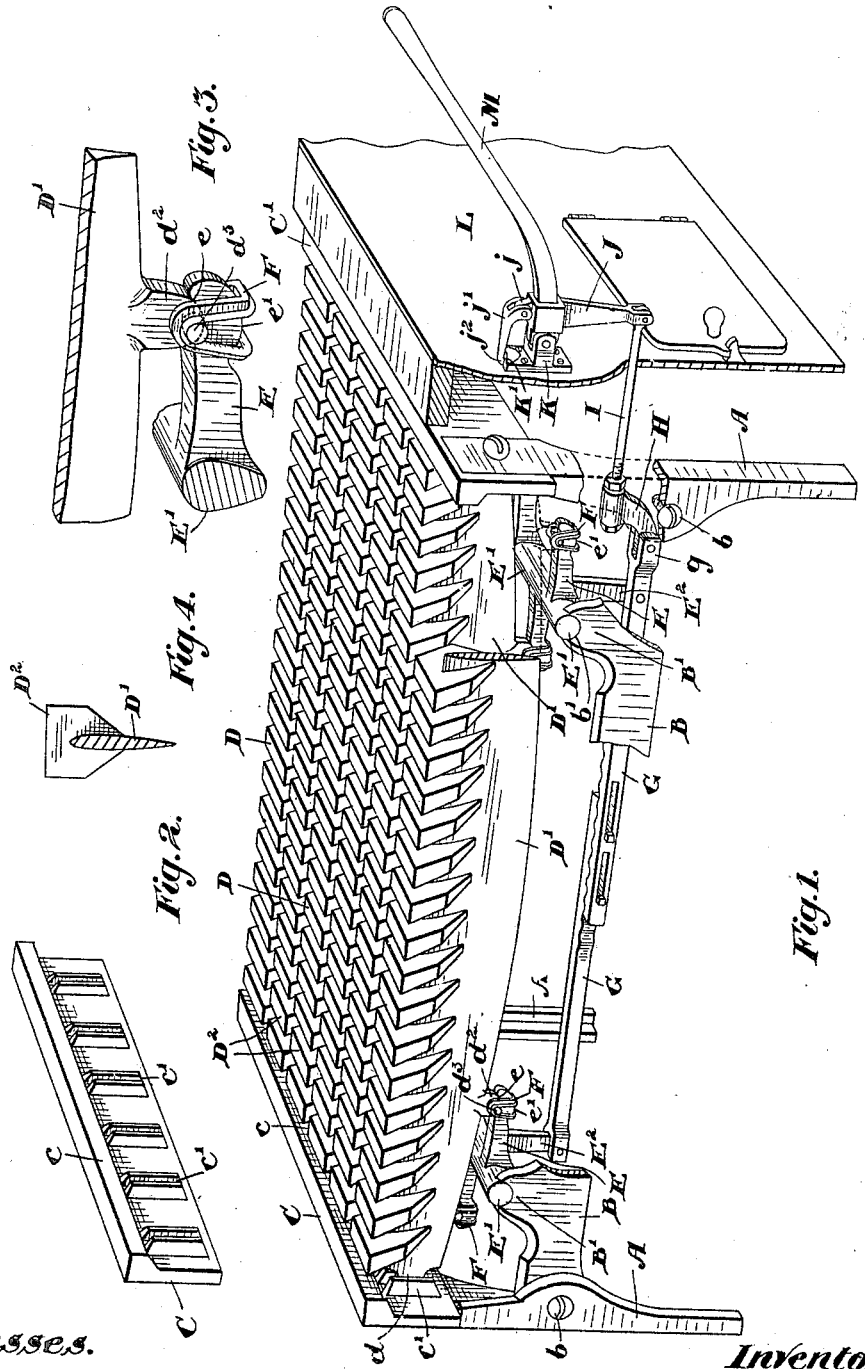

Fig. 1.

Fig. 2.

Fig. 4.

Fig. 3.

Witnesses.

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GRATE.

SPECIFICATION forming part of Letters Patent No. 649,478, dated May 15, 1900.

Application filed May 9, 1899. Serial No. 716,178. (No model.)

To all whom it may concern:

Be it known that we, WALTER REDPATH and ANDREW HUGH REID, of the city of Toronto, in the county of York, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Grates, of which the following is a specification.

Our invention relates to improvements in grates; and the objects of the invention are, first, to design a form of grate in which the grate-bars will present the greatest possible surface for the admission of the air and also allow of the most natural course of the draft, and thereby effect an economy in the amount of fuel consumed and allow of a cheaper quality being used; secondly, to provide a simple means for supporting and detachably holding in position each grate-bar, and, thirdly, to provide a simple means for locking the grate-bars in position; and it consists, essentially, first, of making each grate-bar at the top preferably with lateral obliquely-extending wings forming a series of rectangular-shaped tops extending above the top and from end to end of the longitudinal portion of the bar, the said wings being designed to extend vertically downward at the side portion of the way and the remaining portion with a downward taper at each side to the bar and being inclined from top to bottom toward the front of the grate and so arranged as to produce tapered openings between the wings at each side of the bar, the widest portion of the taper being at the bottom of the opening; secondly, of vertical guides formed on the ends of the frame, within which guides the ends of the grate-bars are caused to have vertical movement, and also of a gravity-catch for connecting the lugs at the bottom of the bar to the rocking arms, and, thirdly, of an operating-bar connected to the arms on the rock-shaft and by a rod to the shaking-crank, which is locked by a pivoted arm on the crank with a bent end extending into a recess in the crank-supporting bracket, as hereinafter more particularly explained.

Figure 1 is a perspective view of a grate constructed in accordance with our invention, portions being broken away to exhibit the construction. Fig. 2 is an inside view of one end of the frame, showing the vertical guides for the grate-bars. Fig. 3 is a perspective detail showing the gravity-lock for connecting the grate-bar to the rocking arm. Fig. 4 is a cross-section of the grate-bar.

In the drawings like letters of reference indicate corresponding parts in each figure.

A represents the legs of the grate-bar frame.

B represents the side bars of the frame, which are secured to the legs by the bolts *b*.

C and C′ are the end bars of the grate, which are secured to the top of the legs A. The end bars are provided at the top with a flange *c* and underneath the flange with a series of pairs of sockets *c*′.

D represents the grate-bars, each of which is composed of a central bar D′, pointed at the top to prevent the lodgment of dust, ashes, or cinders upon the top of this portion of the bar. The ends *d* of the bars D are reduced in size and fitted within the guides *c*′.

D^2 represents a series of double wings, flat and rectangular at the top and extending crosswise of the bar D′ and above the level of such bar. The wings extend equally from each side of the bar and are cast on same. The distance between the wings running from end to end of the bar is the same. Each wing D^2 is of the same width down to a point below the level of the top of the bar D′, at which point the wings taper into the bar D′. The wings D^2 are also broader at the top than at the bottom and form a perfect taper from top to bottom. They are arranged to extend obliquely downwardly, so that their lower ends are nearer to the front of the grate than their upper ends. It will thus be understood that such wings D^2 form, as will be seen in the drawings, a series of inclined tapered openings at each side of the longitudinal bar D′, such openings being broader at the bottom and narrower at the top. The wings are formed obliquely, so as to have the openings substantially in the course or direction of the draft from the front of the ash-pit. The spaces between the wings being narrower at the top, the force of the draft is increased. The longitudinal portions of the bar D′ have downwardly-projecting lugs d^2, which are semicircular at the bottom and rest in corresponding recesses *e* in the arms E, which are connected to or form part of the rocking shafts E′. The rocking shafts E′ are supported and journaled at each end in notches *b*′ in the

bearings B′, forming part of the side bars. The ends of the arms E are formed with a concentric lower portion e', and the lugs d^2 are formed with trunnions d^3.

F represents gravity-loops bent at each side at right angles and having the bottom portion concentric to the portion e'. The upper ends of the loops fit over the trunnions d^3. It will thus be seen that the bar is securely held by the gravity-loops in the recess, and in order to detach or attach them it is simply necessary to turn the loops around, so that they are substantially at right angles to the position shown, when the bars may be readily removed or secured in position.

It will be noticed that each alternate bar is connected to arms E on the opposite side of the rocking shaft, so that when the grate is shaken, as hereinafter described, one bar will move up while the alternate bar moves downwardly. Attached to or forming part of each rocking bar E is a hanger E^2, which hangers are connected together by a suitable jointed bar G. On the front end of the bar G is formed a jaw g, which has pivotally connected to it the arm H, which is connected by the adjustable rod I to the lower end of the shaking crank-arm J, which is pivoted in the bracket K, attached to the front L of the furnace. At the top of the bell-crank arm J is formed a lug j.

j' is a catch pivotally connected to the lug j and having a bent end j^2, which fits into a socket K′, formed at the top of the bracket.

M is an arm fitting into a socket in the crank-arm J and designed to form a means to shake the grate. Of course in the position that the pivoted arm J′ is shown in the drawings the grate is locked; but in order to shake it it is simply necessary to throw the pivoted arm backwardly, when the grate may be shaken with facility.

As each alternate grate-bar is connected to the rocking arms on opposite sides, as described, and consequently each alternate bar is thrown up while the other is simultaneously thrown down, it will be seen that the grate is shaken in such a manner that only the lower stratum of ashes is disturbed, instead of the whole fire-pot, and in practice we find that this shaking effectually clears the fire and permits of a perfect utilization of the draft. It will also be noticed that on account of the oblique arrangement of the wings, as shown, and their inclining toward the end of the furnace, the draft is substantially admitted through the grate-bars in its natural course of direction, thereby serving to produce a most perfect draft and one by which we are enabled to use upon the grates with the best results a very much inferior grade of coal.

What we claim as our invention is—

1. In a grate for stoves, furnaces and heaters having each alternate bar arranged to rise while the other falls when the grate is being shaken, a plurality of grate-bars of narrow width extending from end to end of the fire-pot and provided with a plurality of alined wings extending upwardly beyond the top of the bar and laterally beyond the side of the bar, so as to form rectangular tops crosswise and above the bar, the opposite edges of the said wings being parallel to each other to a point below the top of the bar and vertically underneath the near edge of the next wing, and then tapering inwardly to the bar all the wings being of greater thickness at the top tapering to the bottom and arranged obliquely on the bar from end to end as specified.

2. The combination with the grate-bar held in position at each end in suitable guides and provided with downwardly-extending lugs and laterally-extending trunnions having concentric bottom portions, of the rocking shaft provided with arms having a concentric recess and a concentric bottom portion and the gravity-loops depending from the lugs and embracing the concentric portion of the arms as and for the purpose specified.

3. The combination with the grate-bars having downwardly-extending lugs, the rocking bar and rocking arms, said bar suitably journaled in the frame, bearings formed on the end of the rocking arms and the gravity-hooks held on the lugs of the grate-bars and designed to drop and swing beneath the said bearings so as to hold the bars in position.

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