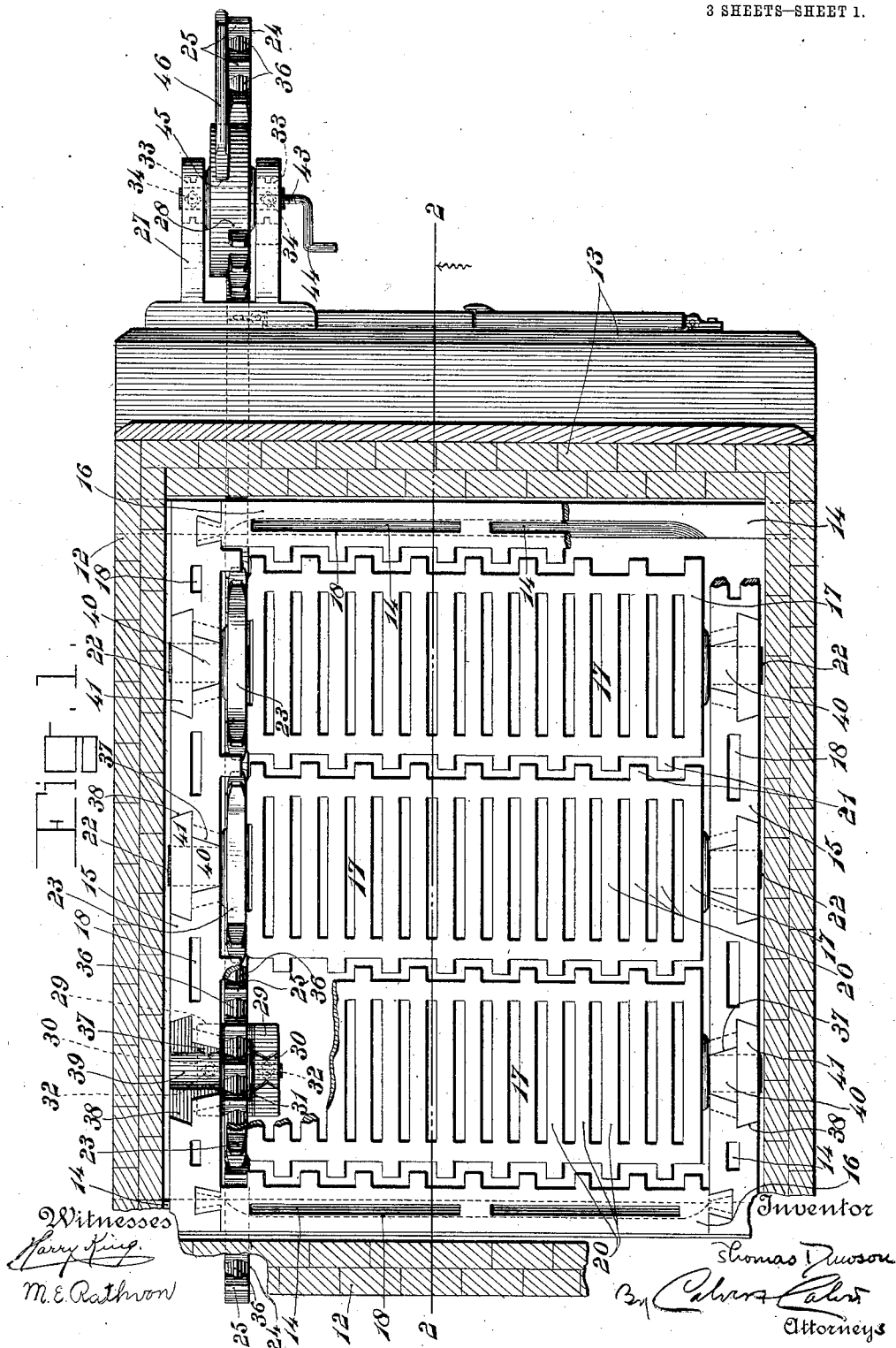


T. DAWSON.
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1,050,619.

Patented Jan. 14, 1913.

3 SHEETS—SHEET 1.

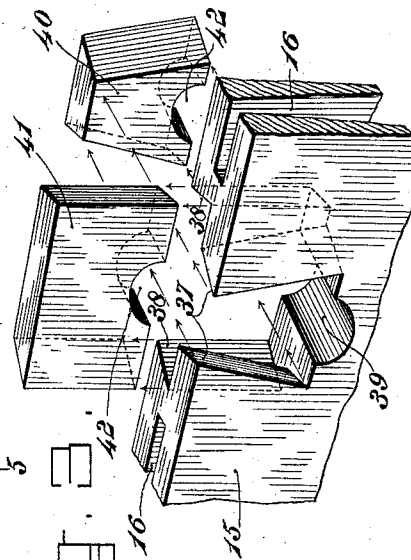
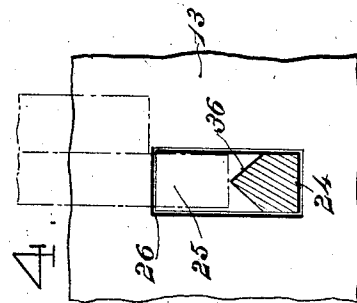
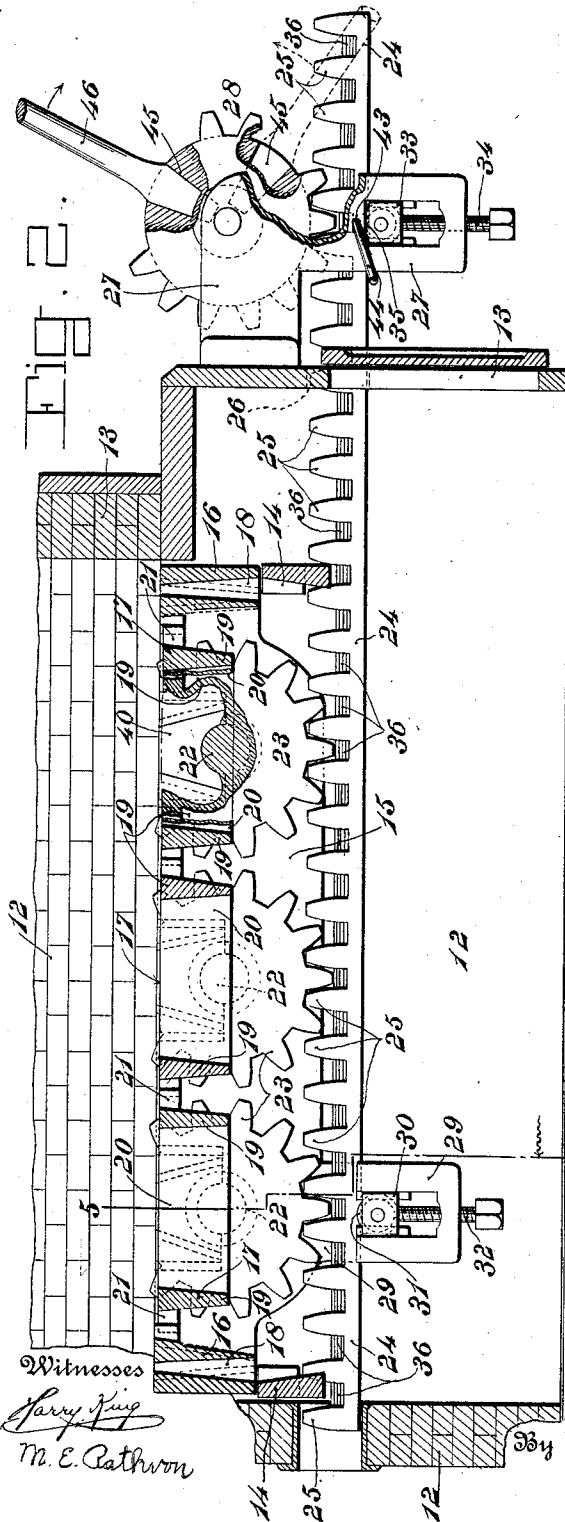


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3 SHEETS-SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 5.

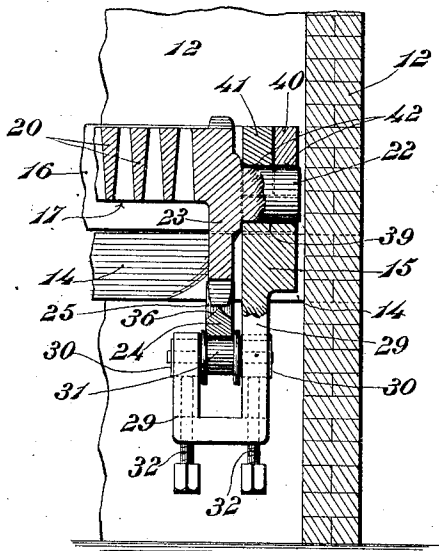
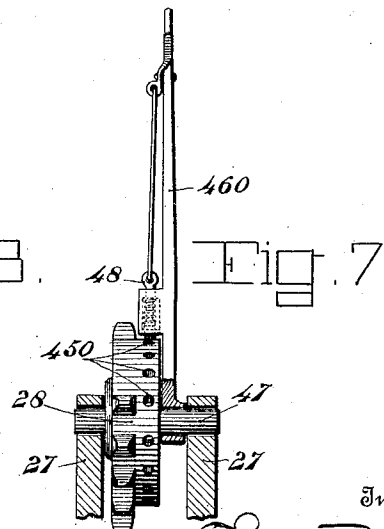
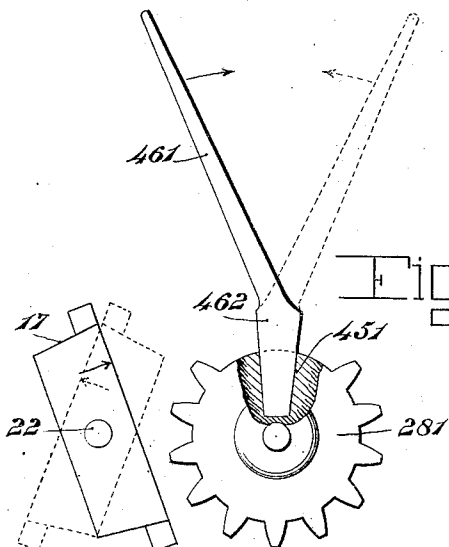
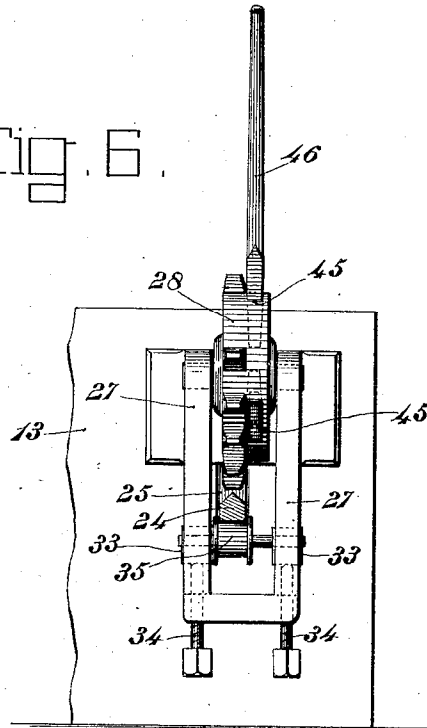


Fig. 6.



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UNITED STATES PATENT OFFICE.

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FURNACE-GRATE.

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Specification of Letters Patent.

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Application filed December 12, 1911. Serial No. 665,290.

To all whom it may concern:

Be it known that I, THOMAS DAWSON, a citizen of the United States, residing at Livingston Manor, in the county of Sullivan and State of New York, have invented or discovered certain new and useful Improvements in Furnace-Grates, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to grates of the rocking bar or rocking section type and has for its general objects to provide improved operating means for shaking and dumping the grate sections which will be easy and convenient of manipulation, which will not interfere materially with any desired design of furnace or grate, nor with the efficient performance of the functions thereof, which will not become clogged, jammed or otherwise difficult of operation, and which when not in use will retain the grate sections in their proper position; and also to provide improved means for supporting the grate sections and securing the same in place without possibility of accidental displacement, said means however permitting the ready removal of said sections when necessary for purposes of repair or otherwise. These and other more particular objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following description of certain forms or embodiments thereof illustrated in the accompanying drawings. It will be understood, however, that the constructions described and shown have been chosen for illustrative purposes merely, and that the invention may be embodied in other forms without departing from the spirit and scope thereof.

In said drawings: Figure 1 is a plan view, partly broken away, of the grate and operating mechanism, the furnace wall being shown in horizontal section. Fig. 2 is a vertical section taken substantially on the line 2—2, Fig. 1. Fig. 3 is a detail perspective view of the means for securing the grate sections in place, the directions of removal of the locking blocks being indicated by arrows. Fig. 4 is a detail elevation of a portion of the front wall of the furnace showing the operating rack bar in section and the operating gear in dotted lines. Fig. 5 is a detail sectional view taken substantially on the line 5—5, Fig. 2. Fig. 6 is an elevation, looking from the front of the fur-

nace, of the rack bar guiding and operating means. Fig. 7 is an elevation, partly in section, of a modified form of operating device and lever. Fig. 8 is a side elevation, partly broken away, of a further modification and illustrating diagrammatically the direction of operation of the grate sections for each position of the shaking lever.

Referring to the drawings, 12 denotes the furnace wall, the same comprising side and rear portions and a front portion specifically indicated by the numeral 13. Secured to or built into said furnace wall are suitable supporting bars or brackets 14 upon which rests the grate frame, herein shown as of rectangular form and comprising end bars 16 and side bars 15 suitably joined thereto and in which side bars are journaled the rocking grate sections 17. As shown the side and end bars of the frame are all of hollow construction, being provided with openings 18 extending vertically therethrough to facilitate the circulation of air through the grate and prevent warping of the frame.

As shown each of the rocking grate sections comprises a substantially rectangular frame 19 and a series of suitably spaced grate bars 20. Said grate sections may, if desired, be provided on their lateral edges with projecting teeth 21 coöperating with similar teeth on the adjacent sections and on the end bars 16 of the frame, the teeth on adjacent sections being offset with respect to one another, as shown. The grate section frames 19 are provided on their ends with trunnions 22 suitably journaled in the grate frame, as by means hereinafter described. Each grate section is further provided with a segmental gear 23, which, in the case of a rectangular grate, is preferably secured to the end of the corresponding frame 19.

Extending longitudinally of the grate, beneath the sections 17, is a horizontally reciprocating operating bar 24 provided on its upper surface with rack-teeth 25 meshing with the teeth on the gears 23, said rack bar extending through an opening 26 in the front wall 13 of the furnace. 27 denotes a bracket secured to said front wall 13 at the exterior thereof and in which is pivoted an operating device 28 in the form of a gear meshing with said rack bar 24. As will be seen, oscillation of the operating gear will cause a rectilinear reciprocation of the rack bar 24 and a consequent shaking of the

rocking grate sections 17. By this construction the only moving part extending through the furnace wall is the operating bar 24 whose movement is entirely longitudinal, so that the opening 26 need be only of a size sufficient to permit the passage of this bar, thereby obviating the necessity, usually encountered in grates of this character in which the shaking is performed by an oscillating operating device, of providing the furnace wall with an elongated slot to accommodate an operating or connecting member having a vertical or horizontal movement transverse to said wall.

29 denotes a bracket which, in the case of a rectangular grate, preferably depends from one of the side bars 15 near the rear end thereof. Guided for vertical movement in the bracket 29 are a pair of slides 30 in which is journaled a roller 31 engaging the under surface of the operating bar 24, said slides being capable of vertical adjustment in said bracket and being retained in adjusted position therein by means of adjusting screws 32.

33 denotes slides, similar to the slides 30, mounted for vertical adjustment in the bracket 27 by means of adjusting screws 34, said slides 33 having journaled therein a roller 35 engaging the operating bar 24 at the exterior of the furnace wall.

By means of the vertically adjustable guides for the operating bar 24 any straining or warping of this bar which might tend to cause binding between the various parts may be readily compensated for. Furthermore by mounting the guide roller 35 and operating device 28 in the same rigid bracket 27 secured to the furnace wall said operating device and bar 24 will at all times be retained in the proper relative position.

The upper surface of the rack bar 24 between the teeth 25 is preferably inclined or beveled, as indicated at 36, to prevent the retention thereon, between said teeth 25, of ashes or cinders which might drop thereon and interfere with the proper coöperation of said rack bar with the gears 23 by clogging the teeth of said bar.

The means for pivotally securing the rocking grate sections in the side bars of the frame will now be described, reference being had particularly to Fig. 3. Adjacent the end of each of the grate sections each of said side bars is provided at its inner face with a downwardly and outwardly undercut or dovetailed recess 37 and at its outer face with an inwardly undercut recess 38 communicating with said recess 37, and of substantially the same vertical depth.

As viewed in plan, the recesses 37 and 38 are oppositely undercut and have their wider sides adjacent one another. In elevation, the recess 37 is wider at the bottom than at the top, while the recess 38 is of the same

width throughout, said width being equal to or greater than the maximum width of the recess 37. Across the bottoms of said recesses extends a substantially cylindrical socket 39 in which rests the lower portion of the corresponding trunnion 22 on the adjacent grate section.

40 denotes a removable block fitted in the recess 37, and 41 a second removable block fitted in the recess 38, said blocks 40 and 41 having similar sockets 42 to receive the upper portion of the trunnions 22.

It will be observed that, when the blocks 40 and 41 are in position, the form of the recess 37 and block 40 will prevent this block from moving either vertically or in a horizontal direction inwardly of the grate, so that said block will serve securely to hold the trunnion 22 against vertical movement out of the socket 39. Said block 40 may be removed from the recess 37 only by moving the same in a horizontal direction outwardly of the grate, and this movement is normally prevented by the block 41 which, by reason of its form and the form of the recess 38, is held against any movement except an upward one. When it is desired to remove any of the grate sections the corresponding blocks 41 are first moved vertically out of the recesses 38, and the blocks 40 thereafter moved laterally into said recesses 38 from which they may be lifted vertically, thereby releasing the trunnions 22.

43 denotes a locking screw having threaded engagement with the wall of the bracket 27 and provided with an operating crank 44. By turning said screw 43 the same may be brought into locking engagement with the operating bar 24 to hold the same against longitudinal movement, thereby rigidly securing the grate sections against displacement from their normal position except when it is desired to shake or dump the grate.

As shown in Figs. 1, 2 and 6 the operating gear 28 is formed of a width somewhat greater than the width of the teeth, the lateral untoothed portion of said operating gear being provided with a plurality of recesses or sockets 45 each adapted to receive the end of an operating or shaking lever 46. With said lever in the position shown in full lines in Fig. 2, the principal movement of said lever in shaking the grate will be downwardly from its normal position, thereby causing the grate sections to be rocked upon their pivots principally in a forward direction from their horizontal position. With the lever 46 in the position shown in dotted lines in said figure the principal movement thereof will be upwardly from its normal position, thereby causing the grate sections to be tipped rearwardly.

In the construction shown in Fig. 7 of the drawings the operating lever 460 is pivoted upon the shaft 47 of the operating gear and is provided with a locking dog 48 adapted to engage any one of a plurality of recesses 450 in the untoothed portion of the operating gear, and by means of which said lever and gear may be operatively connected in any desired relative position.

10 In Fig. 8 is shown a further modification employing a shaking lever 461 having a bent end 462 adapted to engage a recess 451 in the operating gear 281. As will be obvious by engaging the lever 461 with the
15 operating gear in the position shown in full lines in said figure the principal movement of the gear from its normal position will be chiefly in one direction, while by placing said lever in the position shown in dotted
20 lines in said figure said movement will be principally in the opposite direction.

Having thus described my invention I claim and desire to secure by Letters Patent:

1. A furnace grate comprising a series of
25 rocking grate sections, a horizontally reciprocating operating bar extending beneath said sections and operatively engaged therewith, and means for adjusting the normal engagement of said bar and sections comprising vertically adjustable guides for said
30 bar and means for retaining said guides in any desired position of vertical adjustment.

2. A furnace grate comprising a series of rocking grate sections, a horizontally reciprocating operating bar extending beneath
35 said sections and operatively engaged therewith, and means for adjusting the normal engagement of said bar and sections comprising a bracket, slides guided for vertical movement in said bracket, adjusting screws
40 for operating said slides and retaining the same in adjusted position, and a roller journaled in said slides and engaging said operating bar.

3. In a furnace, the combination with a furnace wall, of a series of rocking grate sections, a rigid horizontally reciprocating operating bar operatively connected with
45 said sections and extending through said wall, a bracket secured to the exterior of said wall, a guide for said bar carried by said bracket, and an operating device for said bar carried by said bracket.

4. In a furnace, the combination with a
55 furnace wall, of a series of rocking grate sections provided with segmental gears, a rigid horizontally reciprocating rack bar meshing with said gears and extending through said wall, a bracket secured to the exterior of
60 said wall, a guide for said rack bar carried by said bracket, and an operating gear carried by said bracket and meshing with said rack bar.

5. In a furnace, the combination with a
65 furnace wall, of a series of rocking grate

sections, a horizontally reciprocating operating bar operatively connected with said sections and extending through said wall, a bracket secured to the exterior of said wall, a normally fixed but vertically adjustable
70 guide for said bar carried by said bracket, and an operating device for said bar carried by said bracket.

6. In a furnace, the combination with a furnace wall, of a grate comprising side bars and a series of rocking grate sections journaled in said side bars, a rigid horizontally reciprocating operating bar operatively connected with said sections and extending
75 through said wall, a bracket depending from one of said side bars, a guide for said operating bar carried by said bracket, a second bracket secured to the exterior of said furnace wall, and a second guide for said bar carried by said last-named bracket.
80

7. In a furnace, the combination with a furnace wall, of a series of rocking grate sections, a horizontally reciprocating operating bar operatively connected with said sections and extending through said wall, a bracket secured to the exterior of said wall, an operating device for said bar carried by
85 said bracket, and a vertically adjustable roller journaled in said bracket and engaging said operating bar.

8. A furnace grate comprising side bars having sockets and a pair of communicating, oppositely undercut recesses arranged in different planes transversely of said bars above each of said sockets, rocking grate sections
90 having trunnions resting in said sockets, a removable block fitting in one of the recesses of each pair for locking the corresponding trunnion in its socket, and a second removable block fitting in the other recess of each pair for locking said first block in place.
95

9. In a furnace grate, a side bar having a downwardly and outwardly undercut recess in its inner face, an inwardly undercut recess in its outer face communicating with
100 said first-named recess, and a socket extending across the bottoms of both said recesses, a rocking grate section having a trunnion the lower portion of which rests in said socket, a horizontally removable block fitted in said first-named recess for locking said
105 trunnion against vertical movement, and a vertically removable block fitted in said last-named recess for locking said first-named block against horizontal movement.
110

10. In a furnace, the combination with a furnace wall, of a series of rocking grate sections, a horizontally reciprocating operating bar operatively engaging said sections and extending through said wall, a bracket
115 secured to the exterior of said wall, a guide for said bar carried by said bracket, an operating device for said bar carried by said bracket, and a locking device on said bracket adapted to engage said operating bar and
120
125
130

hold the same against longitudinal movement.

11. In a furnace, the combination with a furnace wall, of a series of rocking grate
5 sections, a horizontally reciprocating operating bar operatively engaging said sections and extending through said wall, a bracket secured to the exterior of said wall, means mounted on said bracket for guiding and
10 operating said bar, and a locking screw provided with an operating crank and having

threaded engagement with the wall of said bracket, said screw being adapted to engage said operating bar and hold the same against longitudinal movement.

In testimony whereof I affix my signature, in presence of two witnesses.

THOMAS DAWSON.

Witnesses:

PHIL EASTMAN,

GEORGE F. NEUMANN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."