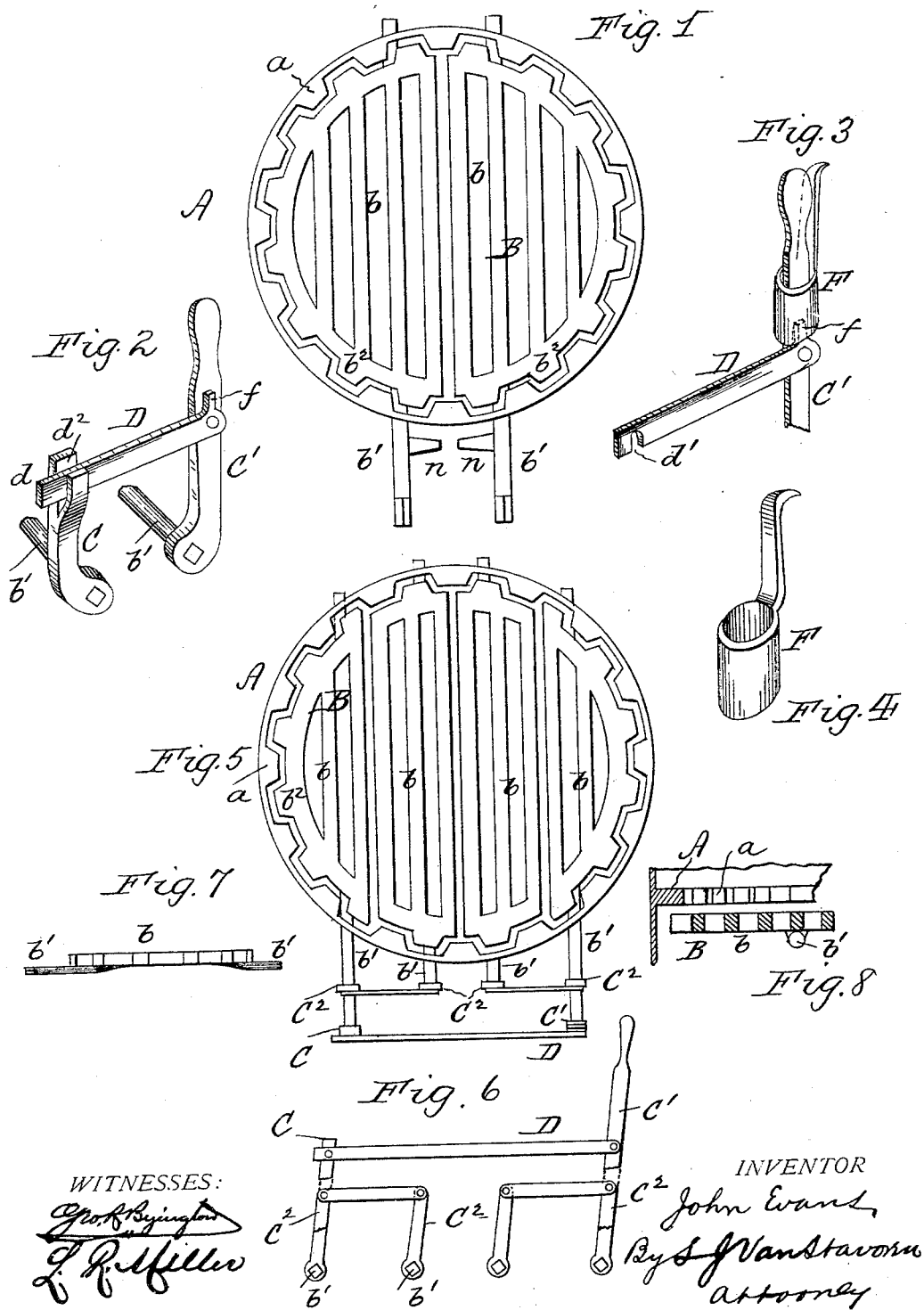


J. EVANS.
GRATE.

No. 454,464.

Patented June 23, 1891.



(No Model.)

2 Sheets—Sheet 2.

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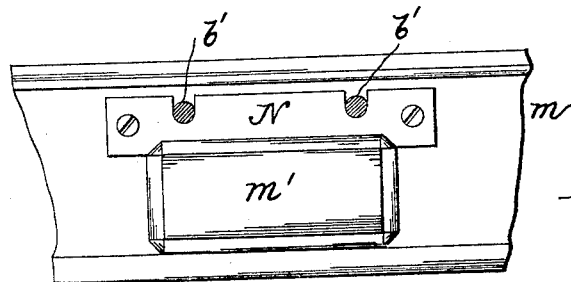
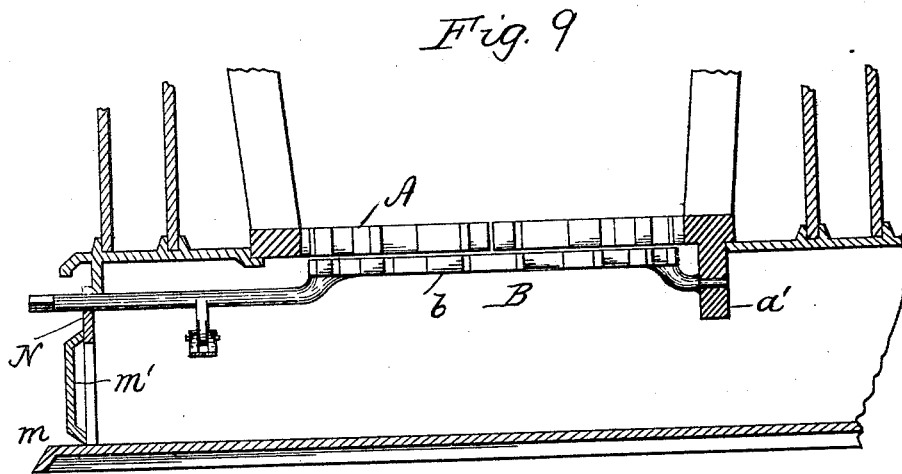


Fig. 10

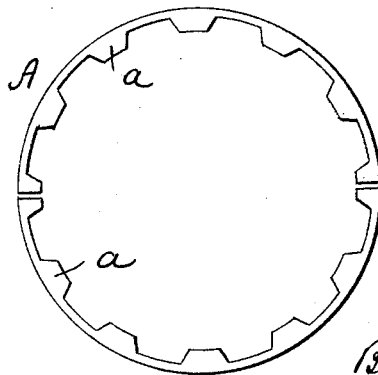


Fig. 11

WITNESSES:
Geo. B. Johnson
L. R. Miller

INVENTOR,
John Evans
By *S. J. Vanstavern*
Attorney.

UNITED STATES PATENT OFFICE.

JOHN EVANS, OF PHILADELPHIA, PENNSYLVANIA.

GRATE.

SPECIFICATION forming part of Letters Patent No. 454,464, dated June 23, 1891.

Application filed October 26, 1889. Serial No. 328,228. (No model.)

To all whom it may concern:

Be it known that I, JOHN EVANS, a citizen of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Grates, of which the following is a specification.

My invention relates to a combined shaking and dumping grate adapted for use in stoves, ranges, hot-air and other somewhat analogous heating appliances.

The principal object of the invention is to provide a grate of comparatively simple construction for thoroughly and effectually shaking or raking the fire-bed without waste of live coal, and a grate of the type that may be dumped and reset by devices operated from the outside of the appliance.

My invention consists of a grate constructed and the parts and mechanism for actuating the same adapted for operation substantially in the manner hereinafter described.

The nature and particular characteristic features of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, and in which—

Figure 1 is a top or plan view of a two-part sectional grate embodying features of my present invention. Fig. 2 is a perspective view of the devices adapted to control the shaking and dumping of the sectional grate, shown detached therefrom for making clear the construction and arrangement thereof. Fig. 3 is a perspective view of a part of the controlling devices of the shaking and dumping sectional grate, showing the locking devices thereof adapted to maintain the grate-sections in their normal positions against accidental displacement. Fig. 4 is a perspective view of a sliding sleeve connected with the locking device, but shown detached therefrom. Fig. 5 is a plan view of a four-part sectional grate and the shaking and controlling devices therefor. Fig. 6 is a side elevation of said controlling devices detached from the sectional grate. Fig. 7 is a longitudinal elevation showing a section of the grate and pintles thereof. Fig. 8 is a sectional view of a portion of the grate and fire-box, showing the position of the grate with relation to the

internal projecting lugs of the fire-box. Fig. 9 is a longitudinal section of the lower part of a hot-air furnace with the grate-sections and bearings therefor detached to readily remove a grate-section for the replacing of another therefor. Fig. 10 is a front view, partly in section, of the lower part of a furnace, showing my invention in application thereto; and Fig. 11 is a top or plan view of a sectional form of fire-box base-plate.

Referring to the drawings, A represents the fire-box base of a heating appliance, having formed integral therewith inwardly-projecting lugs *a*, which not only aid in supporting the fire-bed or heated mass but also present means whereby between the peripheral portion of the sectional grate (to be presently more fully described) and the internal wall of the fire-pot upward currents or passages of air to the heated mass are afforded and the heated mass or fire-bed maintained in such condition as that in the actuation of the sectional grate the accumulating ash, cinder, or other extraneous matter will be largely discharged in the ash box or pit beneath the grate from a median point, and any tendency of the entire mass to fall suddenly downward through the openings in the grate is thereby obviated.

In Fig. 1 two sections are shown of a semi-circular form and each of which has a pintle or shaft *b'* disposed lengthwise thereof and eccentric to the center line of the section, and with peripheral lugs *b*² arranged intermediate of the lugs *a* of the base-plate A. These grate-sections are arranged at a slight distance below the lugs *a* of the base A, as clearly illustrated in Fig. 8, to admit of the lugs *a* and *b*² assisting in supporting the edge or rim of the fire-bed, and at the same time to leave ample space between the lugs *a* and peripheral lugs *b*² for the free admission of air to the heated mass or fire-bed, and also of the free escape of ash, cinder, or burned fuel at the rim of the grate by the simple actuation thereof in any preferred manner. The pintles or shafts *b'* of each grate-section are cast or otherwise secured to the same, as illustrated in Fig. 7, and having their bearings in the base A. The forward shafts or pintles *b'* extend beyond the exterior surface of the heating or other appliance, as shown at Fig.

2, whereat they are provided with vertical cranks C and C', the arm C' forming the shaking and dumping crank arm or lever of the grate. To the lever C' is pivoted a link D. 5 The opposite end d is notched at d', as illustrated in Fig. 3, in order to engage with a pin or with the bifurcated end d² of the crank-arm C, and thus to connect the respective crank-arms with one another for shaking the 10 respective sections of the grate.

To prevent accidental displacement of the link D, any suitable locking device may be employed; but in the drawings have been illustrated a locking device comprising a stud 15 f on the pivoted end of the link D, and a sliding sleeve F surrounds said stud and the handle portion of the lever C' for preventing the link D from being raised on its pivotal point to disconnect the crank-arms C and C', 20 except when said sleeve F is out of engagement with the stud f. This locking device, however, may or may not be used as desired.

To shake the grate-sections, the lever or crank arm C' is oscillated back and forth, 25 and its motion by the link D is communicated to the crank-arm C to simultaneously rock the respective sections of the grate. As the respective pintles or shafts b' are eccentric to the center lines of the sections, all parts of 30 the surface of each of the sections of the grate will be moved to cause a riddling motion throughout the entire area thereof for agitating the fire-bed. As the pintles b' are nearer the center of the grate than to other 35 parts thereof the outer part of the grate-sections will be rocked to a greater extent than the other portions, and hence will the matter around or about the rim of the fire-bed be more thoroughly shaken, being the portion 40 usually needing the greatest amount of agitating or raking, while the central portion of the mass will be shaken the least, as a matter of fact, in the practical operation of the grate of my invention.

45 To dump a section or sections of the grate, the link D is unlatched from the crank-arm C, and each of the crank-arms C and C' is moved to turn each section of the grate to a vertical position. When a number of grate- 50 sections b are used, as illustrated in Fig. 5, wherein a four-part sectional grate is shown, there may be employed among other known devices crank-arms C² for the inner sections, having a permanent link-connection D' with 55 like crank-arms C² on the pintles b' for the outer sections of the grate, in addition to the crank-arms C and C' and link-connection D for said outer sections, in which case the crank-arms C² and link D' are located within 60 the outer jacket or casing of the hot-air furnace or other appliance and the crank-arms C and C' and link D are outside of the same, as hereinbefore described. If preferred, suitable lateral stops n may be secured to or 65 formed integral with the pintles or shafts b' at any suitable location, and which impinge against the top plate of the ash-pit to limit

the upward movement of the sections of the grate. These stops do not in any manner interfere with the dumping movement of the 70 grate-sections.

While it has been stated that any form of bearings may be used for the shafts of the sectional grate, yet it is preferred to employ bearings therefor, such as shown in Fig. 9, 75 as good results in practice have been obtained by the use of such type of bearings.

The base-plate A has on its under rear side or surface depending lugs a', in which the 80 rear pintles b' of the sections of the grate have their bearings, and the front pintles b' of the sections of the grate having their bearings in the plate N, suitably secured to the bottom or base m of the heating appliance 85 and over the ash-pit door m', as clearly illustrated in Fig. 10, so that by removing the plate N the grate-sections are removable from and can be inserted in position through the ash-pit door. For convenience of inserting 90 the ring or base A into the fire-box in furnaces in course of erection or those in use the said plate A is preferably made in sections, as indicated in Fig. 11.

From the foregoing description it will be observed that each section of the grate has 95 its individual shaft, pivot, or pintle, and that the latter are eccentric to the longitudinal center-line of each section; that the shafts or pintles of all the sections are normally connected to correspondingly connect all the 100 sections of the grate for shaking purposes; that all or part of said sections may be disconnected to admit of dumping said sections or the fire-bed of the appliance; that the operations of shaking and dumping the grate 105 are made from the exterior and that no direct manual handling of the sections of the grate is required in the dumping operation and in returning the said sections to their normal position; that the entire surface of each grate- 110 section is in motion to effect the shaking by a riddling action; that the outer sides or rims of the sections may have more movement given them than the inner sides or rims for agitating or shaking the outer rim of the fire-bed more completely than the central portion 115 thereof, and thereby more effectually shaking the fire-bed; that all the sections are simultaneously shaken and separately dumped; that, as the grate is located below the fire-pot 120 or its base-plate lugs a, ample space is provided between the rim of the grate and said lugs for not only to permit of the free admission of air in an upward direction adjacent to the wall of the fire-pot for effecting a complete combustion of the fuel about the internal wall of the fire-pot, but said lugs also 125 present a most efficient means whereby an escape of the shakings or accumulations may be effected around about the wall of the fire-pot in the direction of a median point to and through the openings in the sectional grate. 130 It will be further observed that the sections of the grate are removable and can be in-

serted into position through the ash pit or box door and that such removal and insertion is easily and quickly effected by simply detaching the door or plate N.

5 It will be obvious to those skilled in the art to which my invention appertains that modifications may be made in the details thereof without departing from the true spirit of the invention, and hence I do not confine myself
10 to the exact arrangement of parts hereinbefore described, as, for example, the pintles for the sections of the grate may be located more or less centrally to the middle portion thereof and still be within the gist or pur-
15 view of my invention.

Having thus described the nature and objects of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a shaking and
20 dumping grate provided with peripheral lugs and recesses and front and rear pintles or shafts, of a heating appliance provided with

a base-plate having lugs and recesses, the lugs and recesses of said grate being below the lugs and recesses of said base-plate, arms 25 or levers applied to the front pintles or shafts, and means binding said arms or levers to one another, substantially as and for the purposes set forth.

2. The combination, with a shaking and 30 dumping sectional grate provided with front and rear shafts or pintles, of arms or levers attached to the front shafts or pintles, a recessed link provided with a lug, and a detachable device connected with one of said 35 arms or levers to prevent displacement of said link during actuation of the grate, substantially as and for the purposes set forth.

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

JOHN EVANS.

Witnesses:

FRANK H. MASSEY,
WILLIAM EVANS.