

(No Model.)

E. FALES.
GRATE.

2 Sheets—Sheet 1.

No. 499,914.

Patented June 20, 1893.

Fig. 1.

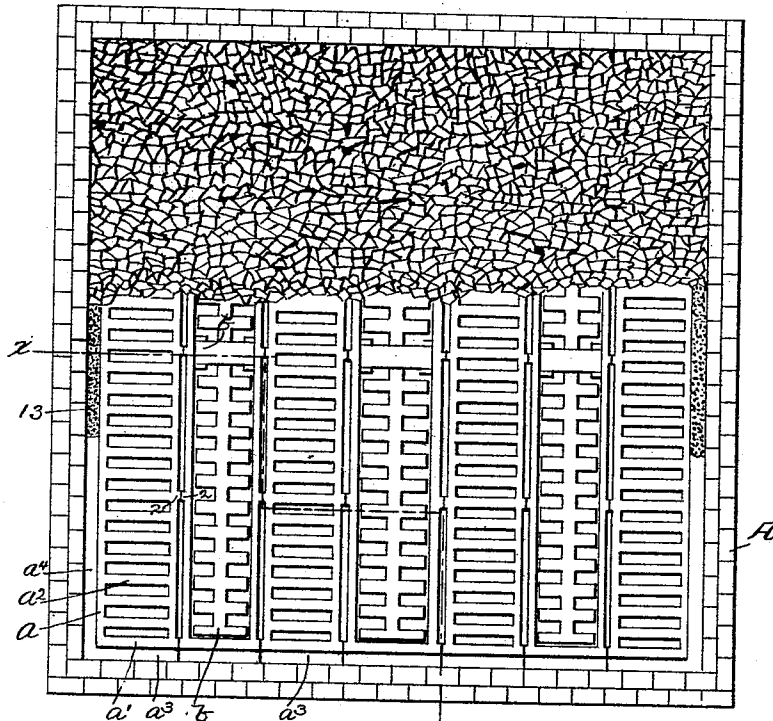


Fig. 2.

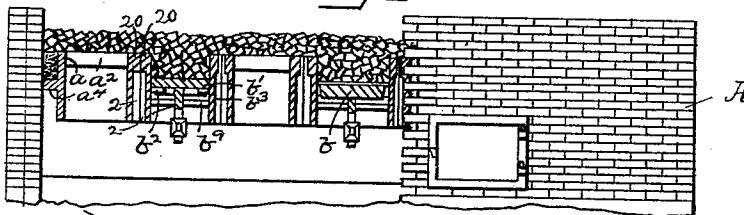
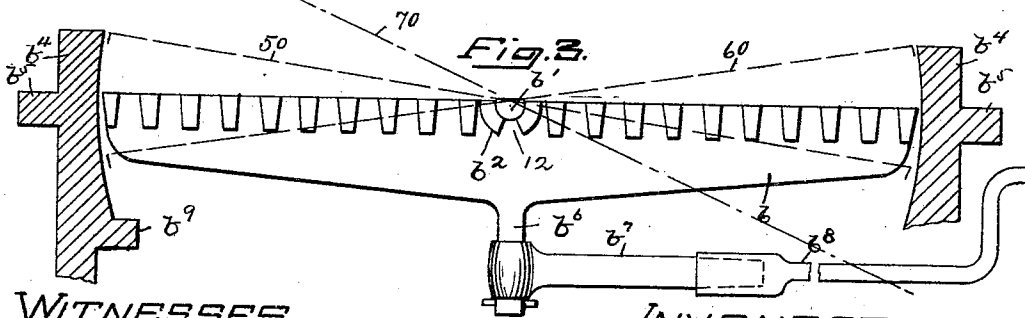


Fig. 3.



WITNESSES

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GRATE.

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Fig. 4.

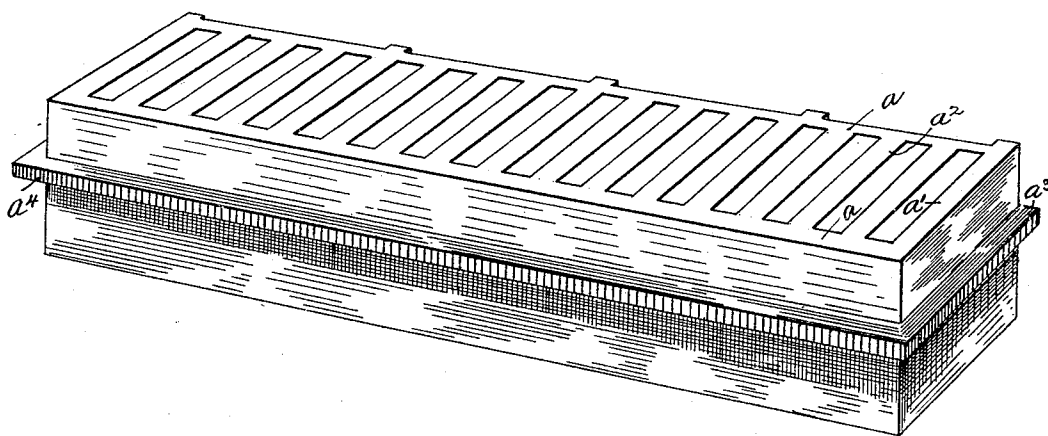
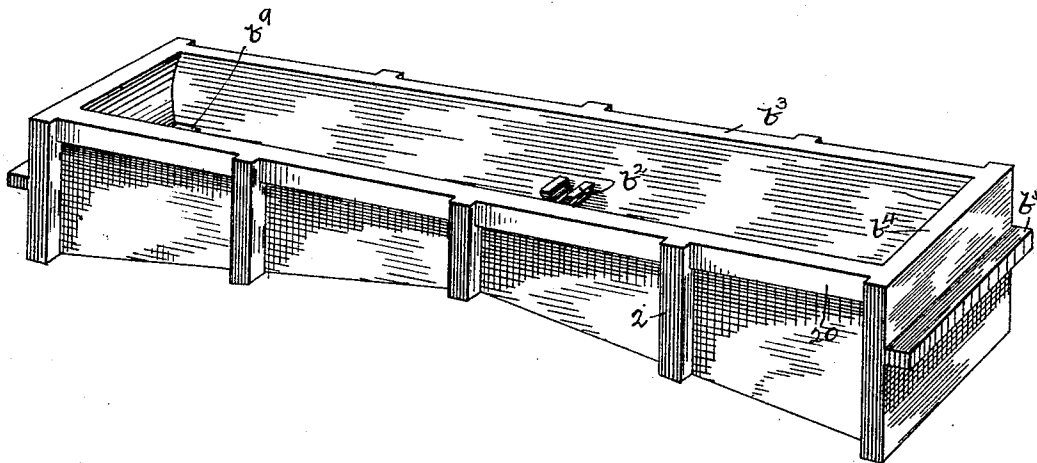


Fig. 5.



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UNITED STATES PATENT OFFICE.

EDWARD FALES, OF BOSTON, MASSACHUSETTS.

GRATE.

SPECIFICATION forming part of Letters Patent No. 499,914, dated June 20, 1893.

Application filed August 24, 1892. Serial No. 443,934. (No model.)

To all whom it may concern:

Be it known that I, EDWARD FALES, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Grates, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve the construction of grates, and is an improvement upon the grate shown in Letters Patent No. 485,684, dated November 8, 1892. In accordance with this invention the Stationary and movable grate bars or grated portions, are arranged alternately and in parallelism and in different horizontal planes. The stationary bars are made as boxes or frames, preferably rectangular in shape, on the tops of which the grated portions are formed or secured, and external flanges are provided for said boxes or frames by means of which they are supported on a flange fixed in the masonry. The movable grate bars are provided with trunnions at points about midway between their ends, which rest in trunnion supports or bearings formed integral with or secured to the interior of the side walls of the bottomless boxes or frames made to receive them. The trunnion supports are formed at or near the lower edges of the bottomless boxes, so that the grate bars serve as grated bottoms therefor. These bottomless boxes or frames are made similar to the boxes or frames having the stationary grate bars, and have flanges at the ends by means of which they are supported. Suitable means are provided for rocking or tilting said grate bars on their trunnions, as pivots, for the purpose of shaking or dumping the bed of coal.

Figure 1, shows in plan view a grate embodying this invention; Fig. 2, a vertical section of the grate shown in Fig. 1, taken on the dotted line $x-x$; Fig. 3, a side view of one of the rocking or tilting grate bars; Fig. 4, a perspective view of one of the outside grate bars, and Fig. 5, a perspective view of one of the bottomless boxes which receive and support the tilting or rocking grate bars.

The masonry A, of any usual or suitable shape and construction, contains within it the stationary and movable grate bars, which in

this instance are arranged alternately and in parallelism.

The stationary grate bars, see Fig. 4, are made like boxes, rectangular in shape, and having side walls a , and end walls a' , and a grated top a^2 , which is formed integral with or secured to said side and end walls. A flange a^3 , is formed on the outside of each end wall a' , and on the endmost boxes flanges a^4 , are formed on the outside of the outer side wall.

As represented in Fig. 1, I have shown four stationary grate bars, the two intermediate ones of which will have flanges a^3 , on the ends, while the two outside ones will have flanges a^3 , on the ends, and flanges a^4 , on the outside walls. These stationary grate bars are set some little distance apart, sufficient to admit of the introduction between them of the movable grate bars, which are arranged alternately with relation thereto. The movable grate bars, which are made substantially alike, consist of longitudinal grate bars b , provided at each side, at a point about midway between their ends, with trunnions b' , which rest in suitable supports or bearings b^2 , formed on the interior of the side walls b^3 , of the bottomless boxes or frames made to receive the said movable grate bars, and represented in Fig. 5. These bottomless boxes or frames comprise the side walls b^3 , and end walls b^4 , which latter have formed on them exteriorly, flanges b^5 , by means of which they are supported. The trunnion supports b^2 on the interior of the side walls are located at or near the lower edges, so that the movable grate bars form grated bottoms for said boxes or frames.

The movable grate bars b , resting in their supports or bearings intermediate the stationary bars are provided each at a point beneath the trunnions with a downwardly projecting lug b^6 , upon which is swiveled a lever b^7 , which projects toward the front of the apparatus, and is accessible through doors at said front end, to be engaged by a hand wrench or other suitable implement b^8 , as represented in Fig. 3. By depressing said hand wrench it will be seen that the grate bars b will be rocked or tilted, as represented by dotted line 50, Fig. 3, and by lifting said hand wrench,

the said grate bars will be moved in the opposite direction, represented by dotted line 60, until the rear ends thereof strike the bumpers or projections b^9 , formed on the interior of the rear end wall of the boxes containing said grate bars. By removing said hand wrench from its engagement with the lever b^7 , and pressing said lever down, the movable grate bar will be depressed sufficiently to dump the bed of coal, or that part of it resting thereon, represented by dotted line 70.

The interior of the end walls of the boxes which contain the movable grate bars, are curved concentric to the axis of the trunnions, so that as the grate bars are rocked or tilted the ends thereof will occupy the same relative position or distance from said ends, in order to prevent the coal from entering between said ends of the grate bar and said end walls, and thereby preventing free movement of the bar.

The supports or bearings for the trunnions are made with openings 12 at the bottom, to permit the escape of any ashes which may accumulate therein. The trunnion bearings or supports b^2 , being located below the tops of the bottomless boxes or frames the movable grate bars will lie in a horizontal plane considerably below the plane of the stationary grate bars, to thereby present pockets for the bed of coal.

The flanges on the ends of the boxes or frames rest on a flange set in the masonry, and thereby support said boxes or frames, as well as close the passage between the ends of said boxes or frames, and the masonry, to prevent the upward passage of air at such point, which if permitted would have a tendency to deaden the fire at the sides, and the flanges formed on the outer sides of the endmost boxes or frames act to close the passage at such point. The flanges on the ends and sides of the boxes or frames are located a short distance below the tops of said boxes, so that a narrow recess is presented around the entire grate which may be filled with ashes, or similar material to insure tightness, as shown at 13.

The boxes or frames are provided each at their abutting sides, at the top, with a longitudinal rib or flange 20, so that the space between said boxes will be much greater at the bottoms than at the tops. This permits the free passage of any coal which will pass through the narrow openings, at the top, and if any coal should lodge in said narrow openings at the top it would be consumed. The boxes or frames are also provided on their abutting sides with vertical ribs 2, so that the boxes will contact with each other only at such points; the spaces between said vertical ribs being open and acting as a part of the grate, as additional air passes up through said spaces or openings, and thence through the bed of coal. These vertical ribs, bearing against each other prevent the sides of the boxes containing the movable grates from warping while the spaces

between said ribs also act to aid in carrying out said result.

By providing independent boxes or frames for themovable grate bars it will be seen that said bars may be readily removed as well as the boxes or frames containing them, and so also the stationary grate bars may be readily removed if desired.

I do not desire to limit my invention to making the stationary grated tops integral with the boxes or supports, although such form I deem preferable.

The side walls of the boxes or frames which support the rocking or tilting grate bars are imperforate, to thereby form imperforate side walls for the pockets.

I do not desire to confine myself to the particular number of stationary and movable grate bars which may be employed as more or less may be employed as deemed necessary. The bed of coal in this instance it will be seen will be divided in different thicknesses, that on the upper grates being much thinner than that on the lower grates, or pockets, and by such a distribution of the coal I am enabled to materially increase the intensity of the heat without destruction of the grate. With such a bed of coal the columns of heated air rising from it at different points, materially vary in temperature, as the currents of air may pass up through the inner portions quite freely, while they are retarded in passing up through the thicker portions or pockets, so that the heat rising from the thinner portions of the bed of coal will be of greater intensity than that rising from the thicker portions or pockets. As these currents of heated air rising from the bed of coal at different temperatures come in contact with each other, explosions occur which have a tendency to form a partial vacuum above the thicker portions or pockets, which materially increases the draft, and retards the progress of the gases until they have been consumed.

I claim—

1. The grate comprising rectangular boxes or frames having imperforate side walls, and end walls, and movable grated bottoms detachably connected to and supported by said frames, substantially as described.

2. A grate comprising independent bottomless boxes or frames having imperforate side walls, and interior trunnion supports near their lower edges, and movable grate bars in said boxes or frames forming grated bottoms therefor, and having trunnions at points midway between their ends, which rest in said trunnion supports, substantially as described.

3. A grate comprising independent bottomless boxes or frames having imperforate side walls, and interior trunnion supports near their lower edges, and movable grate bars contained in said boxes or frames, forming grated bottoms therefor, and having trunnions at points midway between their ends which rest in said trunnion supports, means for rocking or tilting said grate bars on their trunnions

as pivots, and the bumpers b^9 , for limiting the movement of said grate bars in one direction, substantially as described.

4. A grate comprising several independent rectangular bottomless boxes or frames having imperforate side walls and external flanges by means of which they are supported, and interior trunnion supports near the lower edges, and grate bars contained in said boxes or frames forming the grated bottom therefor, and having trunnions which rest in said trunnion supports, and means for rocking or tilting said grate bars, substantially as described.

5. A grate comprising a series of parallel arranged independent boxes or frames having external flanges by means of which they are supported, located at points below the tops of said boxes, and grated portions formed integral with or supported by said boxes or frames, substantially as described.

6. A grate comprising independent rectangular bottomless boxes or frames having imperforate side walls, external flanges by means of which they are supported, interior trunnion supports near the lower edges, and interiorly curved end walls, and grate bars contained in said bottomless boxes or frames, forming grated bottoms therefor, trunnions located on said grate bars at points midway between their ends, which rest in said trunnion supports, substantially as described.

7. A grate comprising independent bottomless rectangular boxes or frames having imperforate side walls and end walls, the external longitudinal rib or flange at the upper end of one, or both side walls, and the external vertical ribs 2, and removable grate bars pivoted in said boxes or frames, forming grated bottoms therefor, and means for rocking or tilting said grate bars on their pivots, substantially as described.

8. In a grate, several rectangular boxes comprising side walls and end walls with grated tops formed integral therewith or secured thereto, and flanges on the ends of said boxes

which support them, combined with several rectangular boxes, comprising side and end walls, with flanges on the ends, which support them, and grate bars pivoted in each of said boxes at a point between their ends adapted to occupy a plane below the level of said grated tops, and means for rocking or tilting said grate bars, substantially as described.

9. In a grate, several rectangular boxes, comprising side and end walls with grated tops formed integral therewith or secured thereto, and means for supporting them, combined with several bottomless boxes or frames arranged alternately with relation to the aforesaid boxes, having imperforate side walls means for supporting them, grate bars pivoted in said bottomless boxes or frames at their lower ends, thereby forming grated bottoms therefor, and occupying a plane below the level of the grated tops of the other boxes, substantially as described.

10. In a grate, several rectangular boxes, comprising side and end walls with tops formed integral therewith, or secured thereto, and means for supporting them, combined with several bottomless rectangular boxes or frames arranged alternately with relation to the aforesaid boxes, and having imperforate side walls, means for supporting them, and interior trunnion supports at or near the lower edges, and grate bars contained in said bottomless boxes or frames, having trunnions at points midway between their ends, which rest in said trunnion supports, and form grated bottoms for said boxes, and means for rocking or tilting said grate bars, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD FALES.

Witnesses:

DANIEL STEINMETZ, Jr.,
BERNICE J. NOYES.