

(No Model.)

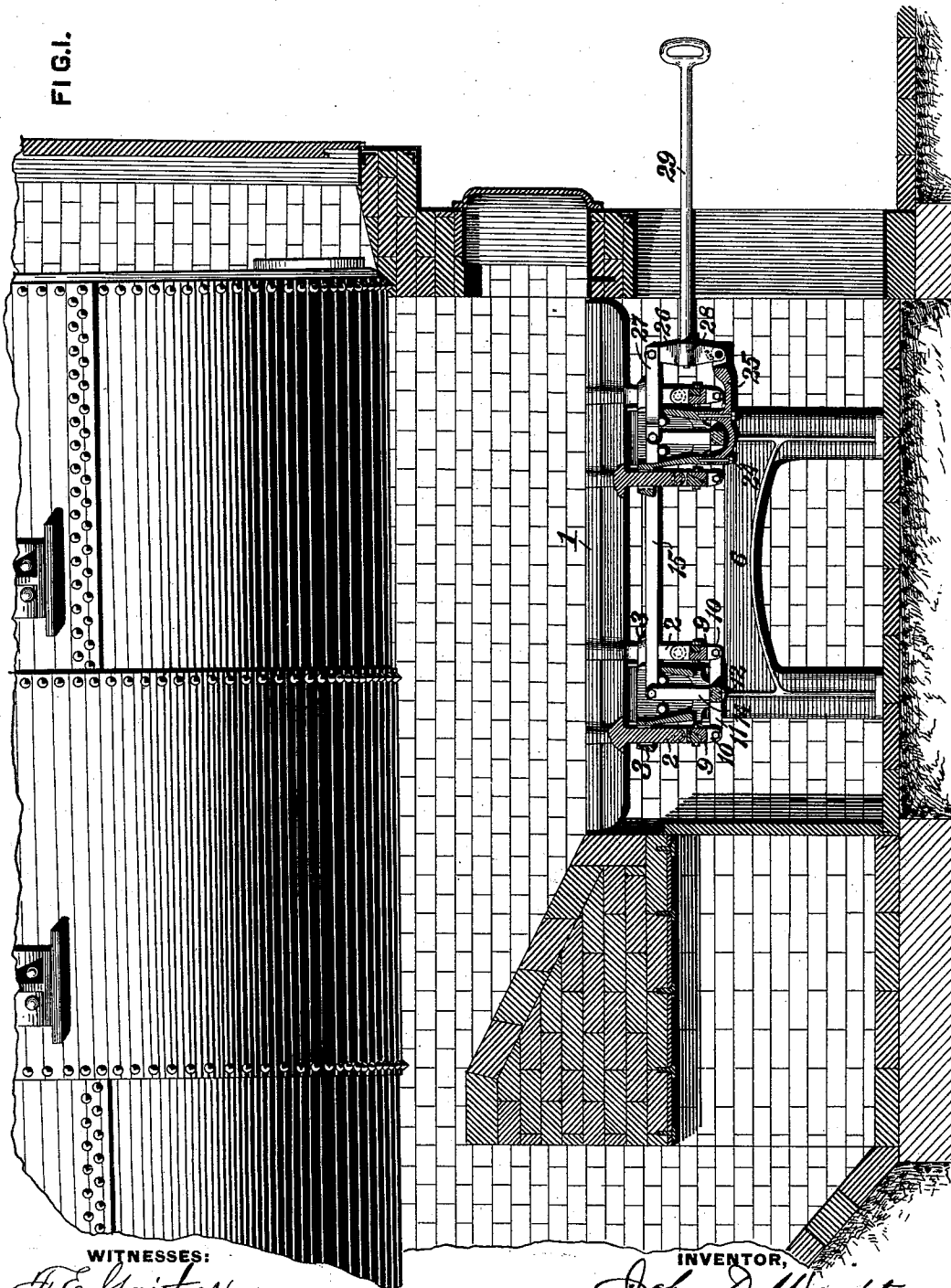
3 Sheets—Sheet 1.

J. D. WRIGHT.
FURNACE GRATE.

No. 535,973.

Patented Mar. 19, 1895.

FIG. 1.



WITNESSES:

F. E. Gaither
Chas F. Miller

INVENTOR,

John D. Wright
by J. Howard Bell
Att'y.

(No Model.)

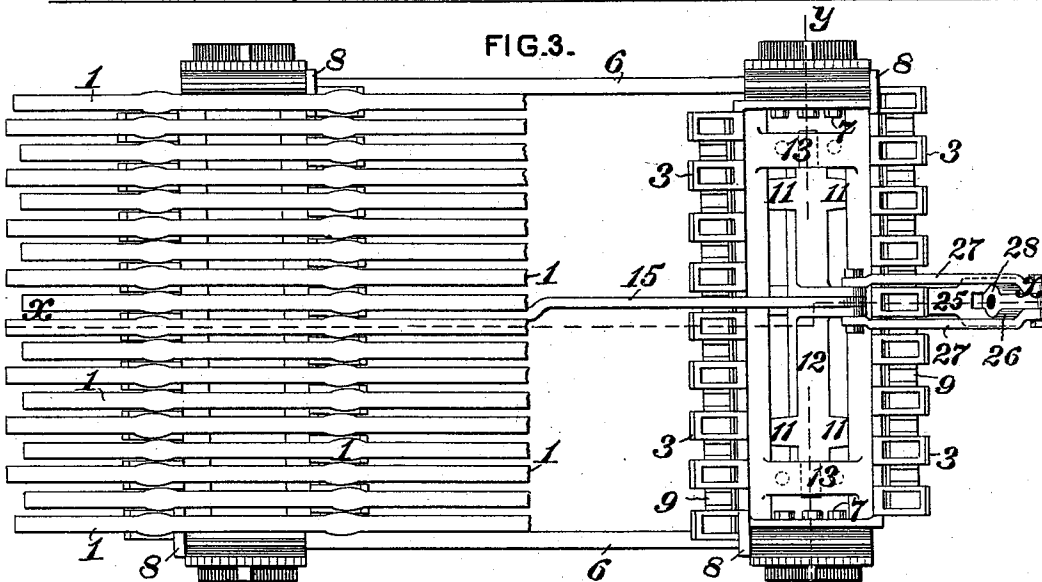
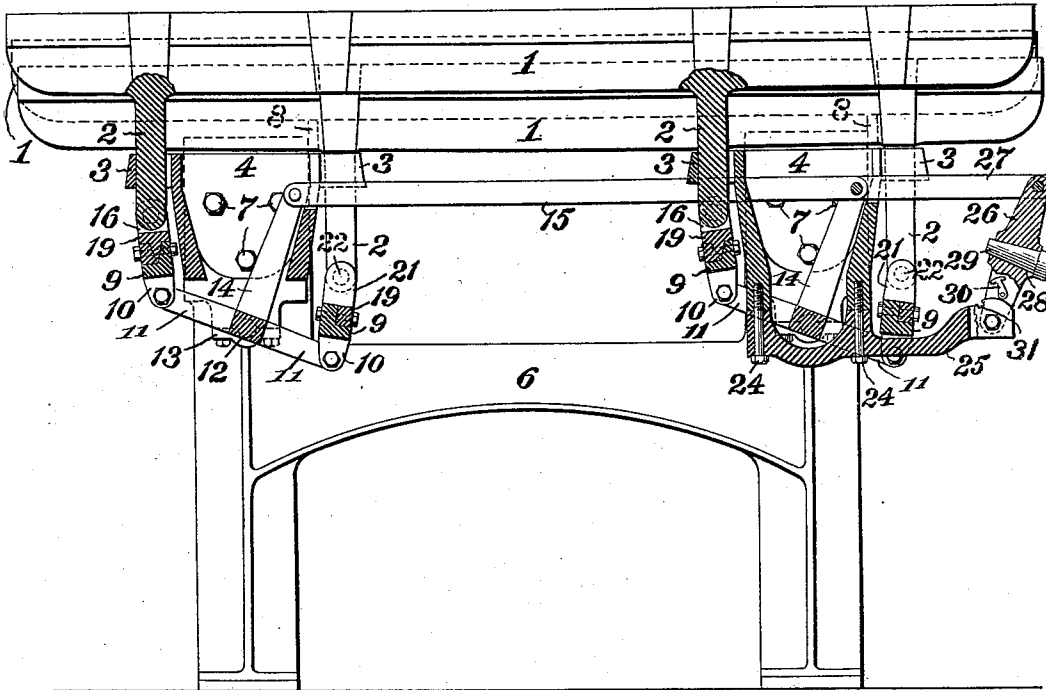
3 Sheets—Sheet 2.

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FIG. 2.



WITNESSES:

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FIG. 4.

FIG. 5.

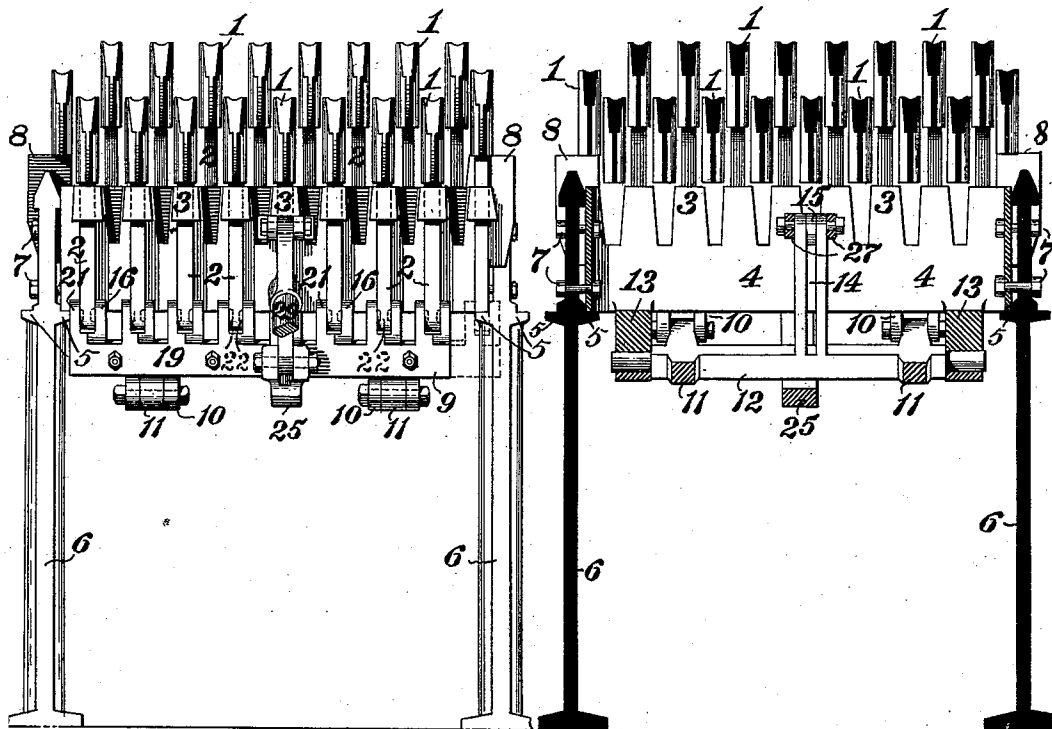


FIG. 6.

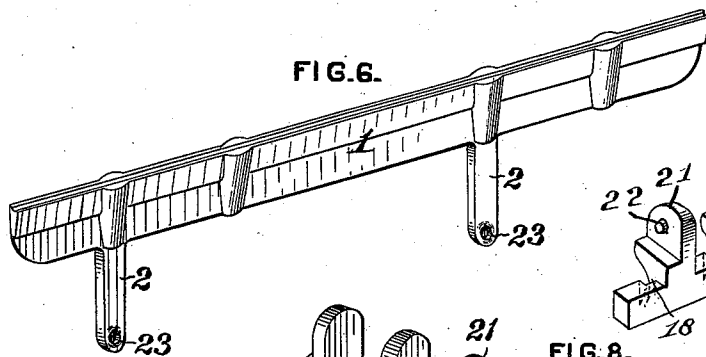


FIG. 8.

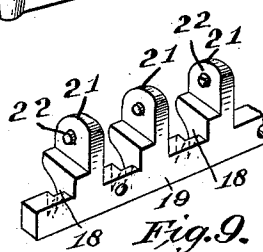
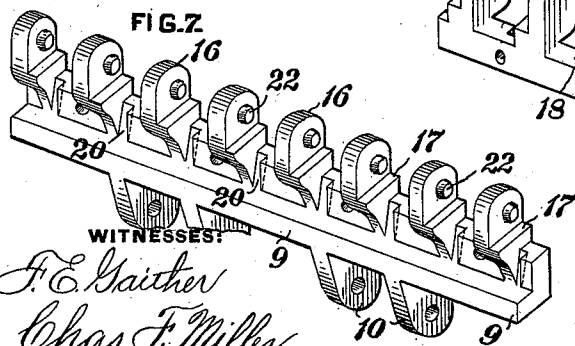


FIG. 7



WITNESSES:

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UNITED STATES PATENT OFFICE.

JOHN D. WRIGHT, OF PITTSBURG, PENNSYLVANIA.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 535,973, dated March 19, 1895.

Application filed September 1, 1894. Serial No. 521,892. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. WRIGHT, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Furnace-Grates, of which improvement the following is a specification.

My improvement relates to the class of shaking grates for steam boiler and other furnaces, wherein means are provided whereby the alternate grate bars may be raised and lowered simultaneously, and its object is to provide an apparatus by means of which an even distribution of the fuel can be secured, the fire agitated, the clinkers which accumulate, readily broken up, and the crushed clinkers and ashes be allowed free access to the ash-pit.

A further object of my invention is to provide an apparatus wherein the weight of the grate bars is so distributed, as to easily permit the alternate grate bars to be raised and lowered simultaneously when so desired.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings: Figure 1 is a longitudinal section through a steam boiler furnace illustrating an application of my invention, the bars being shown in their normal or level position; Fig. 2, a similar section, on an enlarged scale, at the line *x, x*, of Fig. 3, through the grate, the bars being shown in their shifted or alternated positions; Fig. 3, a plan or top view, portions of the grate bars being broken away in order to show one of the guide boxes and operating mechanism; Fig. 4, an end view of the apparatus; Fig. 5, a transverse section, at the line *y, y*, of Fig. 3; Fig. 6, a view, in perspective, of one of the grate bars detached; Fig. 7, a similar view of one of the rocker bars; Fig. 8, a similar view of the corresponding locking bar, and Fig. 9, a similar view of a portion of the same as seen from the opposite side.

In the practice of my invention I provide a series of movable grate bars 1, which may be of any preferred form, and are provided with downwardly projecting arms 2, which pass through guides 3, formed integral with the upper outside edges of the rectangular guide boxes 4. The guide boxes 4 are open at top and bottom and are supported upon flanges

5, formed on the sides of vertical main frames 6, and are held firmly in position by means of bolts 7, which pass through the ends of the guide boxes 4, and through the main frames 6, thus forming a substantial support for the apparatus within the furnace.

The two outer grate bars of the series 1, remain stationary and rest upon projections 8, formed upon the diametrically opposite upper edges of the guide boxes 4. They are held in position by means of their downwardly projecting arms 2, which pass through the outer guides 3, of the guide boxes 4, but do not connect with the rocker bars 9, as will be seen by Fig. 4. The intermediate bars which are movable vertically, are divided, alternately, into two sets, as shown in Figs. 4 and 5, one of which sets may be raised while the set of alternate bars is being lowered, for the purpose of stirring the fire, effecting an equal distribution of the fuel throughout the area of the grate, and crushing any clinkers which may have collected, ample space being afforded between the bars, for the crushed clinkers and ashes to pass through to the ash-pit.

The downwardly projecting arms 2 upon one set of bars are so located as to pass through the guides 3, upon the left hand or rear sides of the guide boxes 4, while the corresponding arms upon the set of alternate bars pass through the guides upon the right or front sides of the guide boxes 4.

The lower ends of the downwardly projecting arms 2 are pivotally connected to transverse rocker bars 9, in a manner to be presently described. Said rocker bars 9, are provided near their outer ends with downwardly projecting lugs 10, which are pivotally connected to rocker arms 11, projecting at right angles to, and formed integral with, transverse rock shafts 12, which are journaled at their ends in bearings 13, formed upon the lower sides of the guide boxes 4. The rock shafts 12 are located centrally beneath the guide boxes 4, and their arms 11 project beyond the sides of the guide boxes 4 to points in line with the centers of the downwardly projecting arms 2, when the grate bars are in their normal or level position. As the weight of one set of grate bars is supported upon the arms 11 which project to the left of the centers of the rock shafts 12, through the me-

dium of the rock bars 9 and arms 2 which form link connections between the rock shafts and grate bars; and the weight of the set of alternate bars is supported upon the arms 11, which project to the right of said rock shafts 12, it will be obvious that the two sets of grate bars will be counterbalanced, and the bars may be readily raised and lowered as required with a reciprocating movement. The rock shafts 12 are provided, at or near their centers, with upwardly projecting arms 14, which are connected by a longitudinal link 15, whereby the movements of the two rock shafts are rendered coincident.

The rocker bars 9 are L shaped in cross section and are provided with upwardly projecting lugs 16, which are of a width about equal to the lower or horizontal portion of the rocker bars. The lugs 16 have shoulders 17 formed upon one of their sides near their bottoms; and that portion of the lugs below the shoulders is made inclined or wedge shaped, to fit in corresponding grooves 18 formed in locking bars 19, adapted to be secured to the rocker bars 9. The vertical portion of the rocker bars 9 is provided with grooves 20, adjacent to the lugs 16 for the reception of inclined or wedge shaped portions of the locking bars 19. The locking bars 19 are of substantially similar form to the rocking bars 9, except as to the lower or horizontal portion, and are provided with lugs 21, which fit against the lugs 16 of the rocker bars, when the two bars are secured together. The lugs 16 and 21 are provided upon their inner faces with pivot points 22, which fit in depressions 23, formed in the lower ends of the arms 2 of the grate bars 1. The arms 2 are placed upon the rocker bars 9 with the depressions 23, bearing against the pivot points 22. The locking bars 19 are then placed in position with the pivot points 22 of the lugs 21 bearing against the arms 2 on the opposite side from the pivot points 22 on the lugs 16. The two bars are then bolted firmly together, thus pivotally connecting the arms 2, with the rocker bars 9.

Upon the lower side of one of the guide boxes 4, there is secured, by means of bolts 24, a bracket or support 25, which projects beyond the outer end of the main frames 6, and has journaled in its outer end an upwardly projecting arm 26, which is connected to one of the arms 14, by a link 27. The arm 26 is provided, at or near its central portion, with a socket 28, for the reception of the operating bar or lever 29. Upon one side of the arm 26 is secured a pawl 30, which engages a notch 31 in the bracket 25, when the grate bars are in their normal or level position, and prevents any displacement of the apparatus.

If, for any reason, it is desired to place two or more guide boxes transversely in one furnace, the support 8 on one side of the guide boxes may be dispensed with and the rocker bars 9 lengthened as indicated by dotted lines in Fig. 4, in order to raise and lower the outer

bar of the first apparatus; as it is only necessary that the two outer bars of the entire series should remain stationary. The guide boxes for the next set of bars, in such case, rest upon the flanges 5 formed upon the outer side of the main frames 6, and are secured in place by means of bolts 7.

I claim as my invention and desire to secure by Letters Patent—

1. The combination, in a furnace grate, of a series of grate bars provided with downwardly projecting arms, guides in which said arms are fitted to move vertically, rocker bars, each pivotally connected to the arms of alternate grate bars, rock shafts having oppositely projecting arms coupled to said rocker bars, and means for imparting rocking movement to the rock shafts, substantially as set forth.

2. The combination, in a furnace grate, of a series of grate bars provided with downwardly projecting arms, guides in which said arms are fitted to move vertically, rocker bars each provided with pivot projections to fit depressions in the arms of alternate grate bars, lock bars each provided with corresponding pivot projections and bolted to one of the rocker bars, rock shafts having oppositely projecting arms coupled to the rocker bars, and means for imparting rocking movement to the rock shafts, substantially as set forth.

3. The combination, in a furnace grate, of a series of grate bars provided with downwardly projecting arms, guides in which said arms are fitted to move vertically, rock shafts having oppositely projecting arms, connections coupling the arms of the grate bars alternately to opposite arms of the rock shafts, means for imparting rocking movement to the rock shafts, and a lock for retaining the grate bars in normal position, substantially as set forth.

4. The combination, in a furnace grate, of a series of grate bars provided with downwardly projecting arms, pivot sockets or depressions on the lower ends of said arms, a rocker bar having pivot projections fitting said pivot depressions, a rock shaft coupled to said rocker bar, and means for imparting rocking movement to the rock shaft, substantially as set forth.

5. The combination, in a furnace grate, of a series of grate bars provided with downwardly projecting arms, pivot sockets or depressions on the lower ends of said arms, a rocker bar having pivot projections fitting said pivot depressions, a lock bar having similar pivot projections and secured to the rocker bar so as to prevent displacement of the pivot depressions, a rock shaft coupled to the rocker bar or lock bar, and means for imparting rocking movement to the rock shaft, substantially as set forth.

6. The combination, in a furnace grate, of supporting frames, transverse guide boxes fixed thereto, a series of guides formed or fixed on each side of said guide boxes, a series of movable grate bars having two sets of

downwardly projecting arms adjacent to each
of their ends, the arms of the sets at each end
of the grate bars fitting alternately in guides
on opposite sides of the adjacent guide box,
5 two rock shafts each journaled below one of
the guide boxes and provided with oppositely
projecting arms, connections coupling the
arms of the grate bars alternately to opposite
arms of the rock shafts, and means for simul-

taneously imparting rocking movement to the
rock shafts, substantially as set forth.

In testimony whereof I have hereunto set
my hand.

JOHN D. WRIGHT.

Witnesses:

E. NEWELL,

F. E. GAITHER.