

(No Model.)

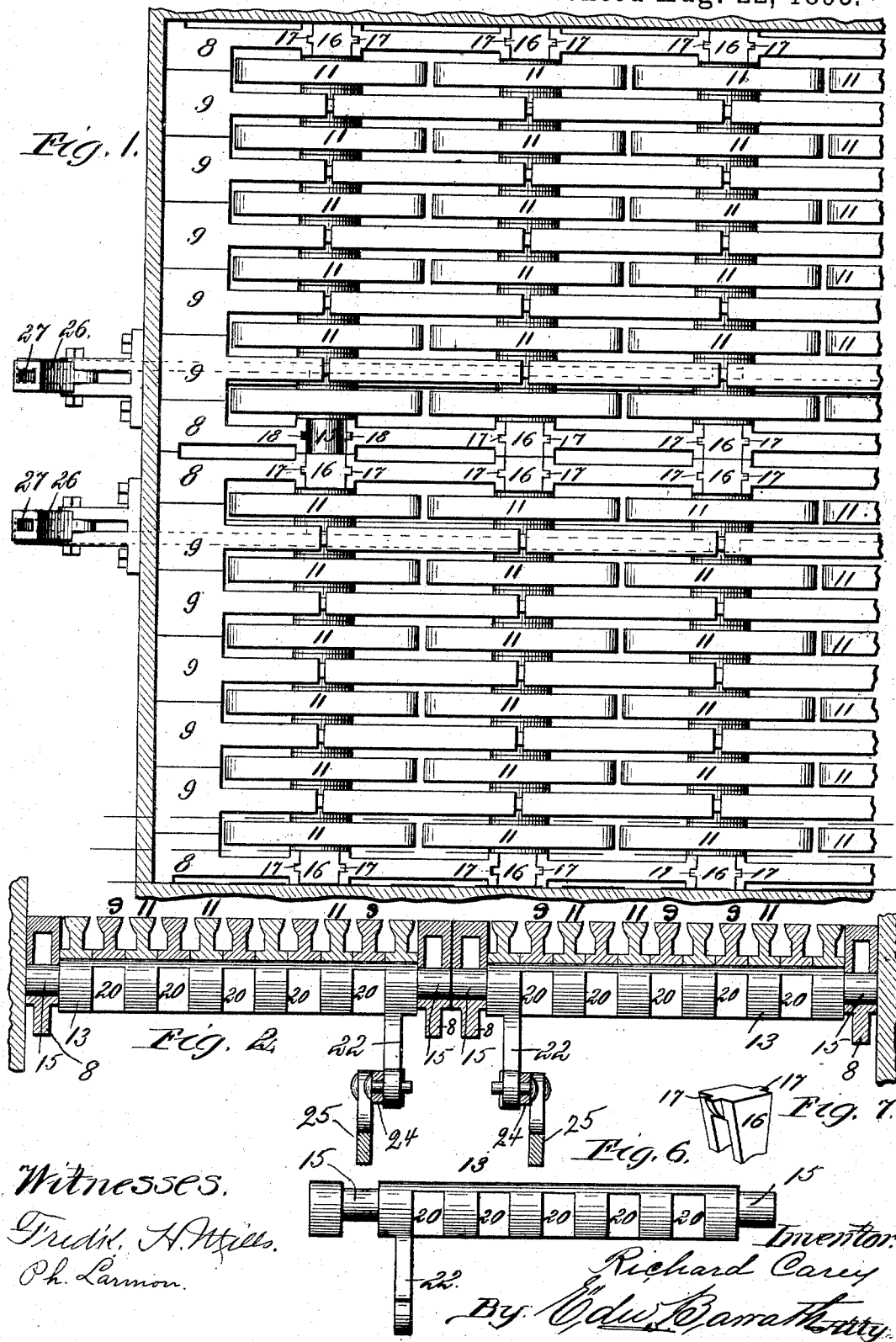
3 Sheets—Sheet 1.

R. CAREY.

INTERLOCKING AND INTERCHANGEABLE ROCKING GRATE BARS.

No. 503,578.

Patented Aug. 22, 1893.



Witnesses.
Frederick H. Mills.
Ph. Lamm.

Inventor:
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(No Model.)

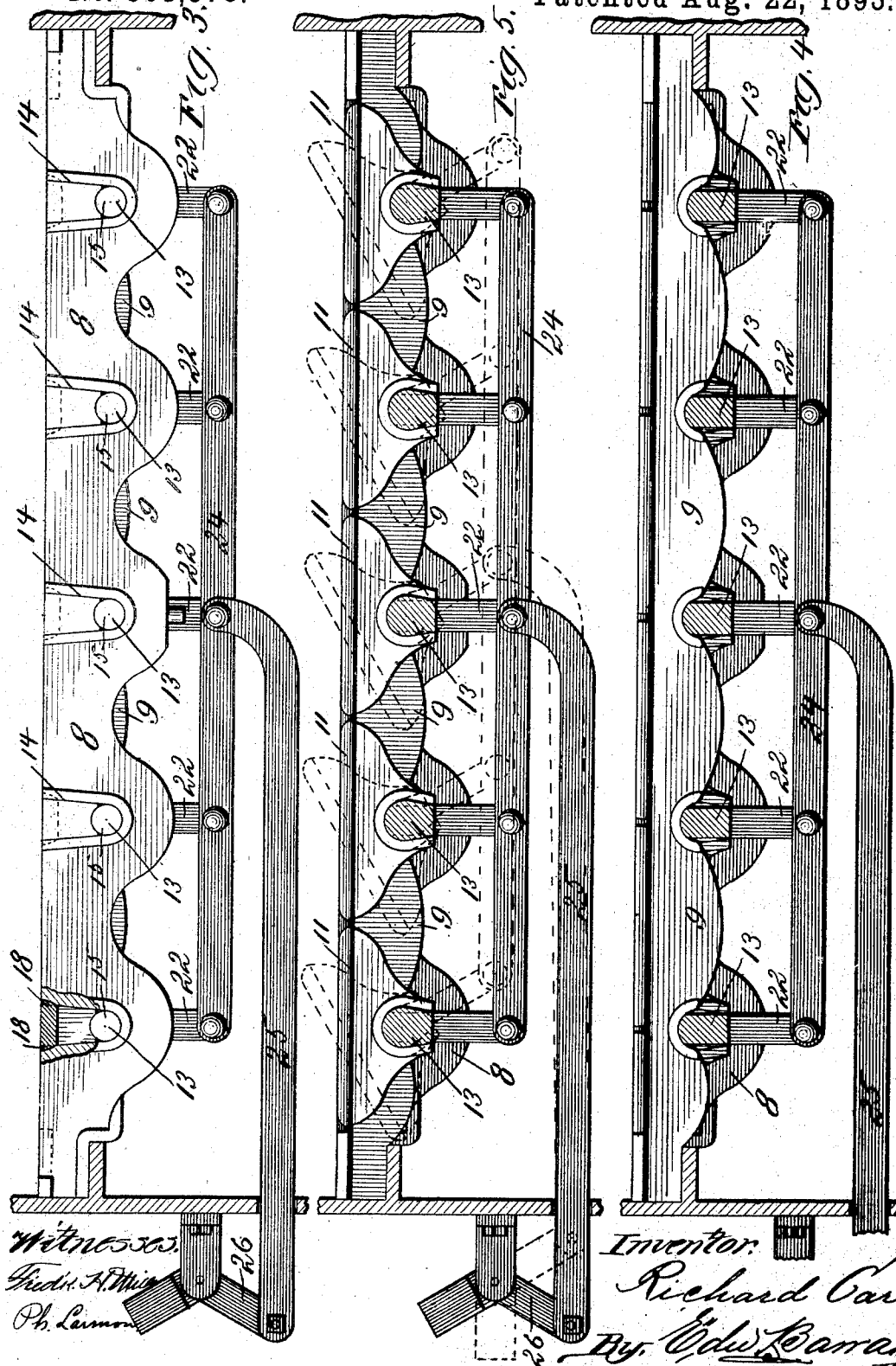
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3 Sheets—Sheet 3.

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Fig. 8 Patented Aug. 22, 1893.

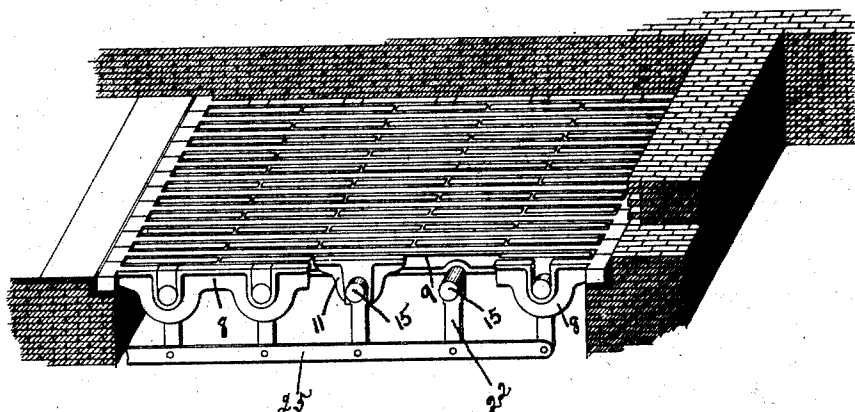
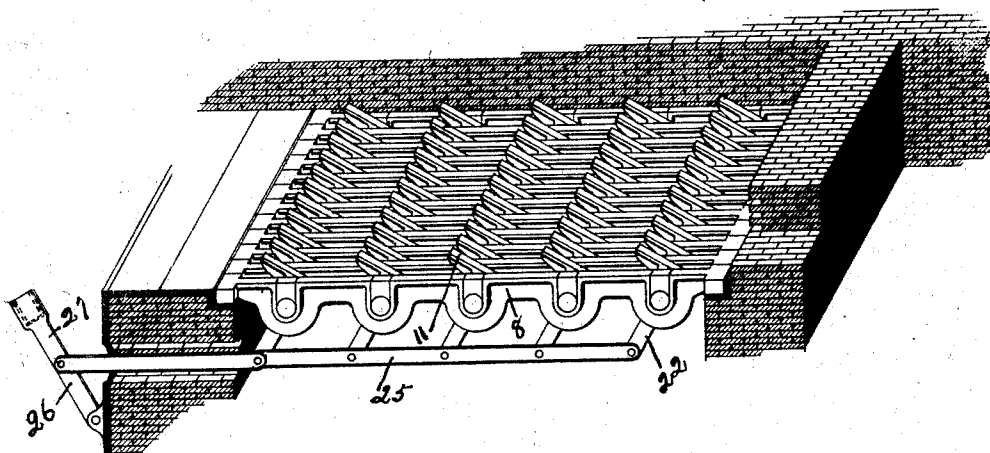


Fig. 9



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UNITED STATES PATENT OFFICE.

RICHARD CAREY, OF CHICAGO, ILLINOIS.

INTERLOCKING AND INTERCHANGEABLE ROCKING GRATE-BAR.

SPECIFICATION forming part of Letters Patent No. 503,578, dated August 22, 1893.

Application filed May 9, 1892. Serial No. 432,302. (No model.)

To all whom it may concern:

Be it known that I, RICHARD CAREY, a citizen of the United States of America, residing in Chicago, in the county of Cook, State of Illinois, have invented a new and useful Interlocking and Interchangeable Rocking Grate-Bar for Steam-Boilers, for which the following is a complete description and specification.

My invention relates to improvements in rocking grate bars for boiler and other furnaces, and its objects are, first, to produce a grate in which the usual screw and bolt fastenings are dispensed with, whereby the breaking or giving away of the grate fastenings, by which the unconsumed fuel is allowed to pass through, and the consequent bending and twisting out of shape of the grate parts by the action of the fire, are avoided; and, second, to provide a grate bar so constructed that its several parts can be easily replaced by new parts when desired without the necessity of taking the whole grate apart, and which is readily accessible for cleaning.

In the accompanying drawings, Figure 1 is a top view of the grate; Fig. 2 a vertical cross section showing the relative position of the rockers and rocker shafts and their bearings; Fig. 3 a side view showing the framing bar with its bearings for the rocker axles; Fig. 4 a longitudinal cross section close to one of the stationary bars; Fig. 5 a longitudinal cross sectional view close to the rocking bars, showing the relative position when at rest and also showing by dotted lines the relative position of the rockers when operated for the purpose of cleaning and shaking the fire; Fig. 6 a side view of one of the rocking shafts, which carry the rocking bars. Fig. 7 represents the shape of the wedges used in closing up the slot after the rocking axle has been placed in its bearing, said wedges forming the upper part of the rocking axle journal and thereby preventing cinders from entering said journals and obstructing their free working. Figs. 8 and 9 are plan views partly in elevation, showing the relative arrangement of the stationary bars and the rocking bars by which the rocking bars are held in their normal position while the grate is being rocked.

Similar figures refer to similar parts throughout the several views.

The grate consists principally of four parts,

the stationary bars 9, rocking bars 11, frame bars 8, and rocking axle 13, which when put together form alternating rocking and stationary bars. The frame bar 8 is shown in Fig. 3 and in practice resting with its one end on the fire bridge and the other on the furnace front. In said bar slots 14, are provided, the number of slots being in relation to the length of the bar. Fig. 3 shows five but can be made for as many as desired. Two frame bars are required for each grate, each bar supporting an end of a rocking axle 13, which axle is provided with two journals 15, which rest in the bearings formed by the lower portion of the slot 14, and the separate wedge block 16, the latter forming the upper portion of the bearing and preventing coal and cinders from dropping into the journals. The wedge block 16 is supplied with two lugs 17 fitting into recesses 18 made in the slot 14 of the frame bar 8. Stationary bars 9 fit immediately over the upper side of the rocking axle 13, and form an upper bearing for preventing said rocking axles from accidentally being lifted out of their bearings in the side bars 8. Rocking axle 13 is shown in Fig. 6 and consists of a wedge-shaped bar having its upper side or thickest part of the wedge rounded to a half circle. One or both of the wedge sides of said axle are cast with slots 20 and projecting portions, the latter being between each slot as shown. One end of each rocking axle is supplied with a lug 22, to which a link is attached for oscillating same. This rocking axle is cast with recesses 20 in its side or sides which are adapted to receive the slotted portions of the rocking bars when it is desired to slip said bars on the axle in operative position on the portions between the slots. As the rocking axle is constructed approximately of wedge shape, tapering from its lower to its upper surface, it is evident that the rocking bars could not be passed over the said upper surface of the same and have their slotted portions resting about centrally of the axle and still be held securely in position. For this reason I construct the rocking bars with a slot of approximately the same size as the rocking axle, said slot tapering from bottom to top. When it is desired to place the bars in operative position on the axle, the ends of the slotted portions of said bars are slipped over the axle at the

point where the recess or slot in said axle is formed, and then forced toward and upon the portion between the slots, and the recessed portion of the bars, being of the same or nearly the same size as the upper half of the rocking axle, fits snugly and, except by forcing it back to the slotted portion of the axle, and moving it upward upon the same, the bars cannot be removed or slipped out of place.

Each rocking axle is supplied with two journals 15, and in cases where a further extension of the grate bar is desired or more than one single set, an extra elongation of the rocking axle is made on either side of said journals as shown in Fig. 6, which shows elongation for one set more of rockers, but it is evident that such elongation could be continued as far as desired, and hence all the rockers placed upon said rocking axle would be operated at one time when said axle was oscillated by the forward and backward motion of the end of the lug 22.

When all the rocking bars have been placed in position upon the rocking axle 13, then the stationary bar 9 is placed between the intermediate space left between the rocking bars, namely the portion between the slots, by which a larger oscillatory movement of the rocking axle without interfering with its sides is permitted.

Fig. 5 illustrates the rockers as they are placed upon the rocking axle 13. This view illustrates very clearly the interlocking of the rocking bars with the rocking axle. When it is desired that all of the rockers should be operated at one time, and by one movement the lugs 22 are connected together by links 24, said links combining them all, and hence by only oscillating either one of the lugs, it will cause all the rockers to be operated at one time. Any mechanism for operating said rocking arms may be used. In Fig. 5 one end of a link 25 is connected to a center rocker lug 22 and the other to a bell crank 26 supplied with a hole 27, (Fig. 1,) for inserting an operating bar. If, as shown in Fig. 5, said bell crank is thrown into position indicated by dotted lines, the motion will be transmitted to the connecting link 24 and from thence to all the lugs 20 and so on to the rocking axles 13, producing a position of the rocking bars 11 shown by dotted lines.

The *modus operandi* of constructing the grate is as follows: The frame bars 8 are placed in a parallel position and at proper

distances from each other, one end of the two frame bars resting on a lug on inside of the furnace front, or on brick work provided for same on the other end of the fire bridge; the requisite number of rocking axles 13, are then placed in position as shown in illustration, Fig. 3. Said axles are placed in the slots 14 provided in the framing axles, all arranged so that the lugs 22 will all be one side of the grate, then the rocking bars or rockers 11 are slid over the slotted parts of the rocking axle 13 and thence into their position on the wedge shaped part of the rocking axle, namely the portions between the slots. When this is done, the stationary bars 9 are slipped into their respective places between the rocking bars and the wedge shaped blocks 16 are inserted into the slots of the frame bars to protect the journals from cinders and from the action of the fire. All of the lugs of the rocking axles are then connected by link 24 and then either of said links secured to the bell crank 26 or to intermediate link 25, and the grate is ready for operation.

It is evident from above description that when all the parts are so placed, none of them can separate from each other the rockers being held in position by the stationary bars, which prevent them from moving sidewise. Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a grate, the combination with suitable supporting frame bars, of a rocking axle provided with slots or recesses and projecting portions between said recesses, rocking bars having slotted portions adapted to be slipped on said axle and its slotted part and upon the projecting portion between the slots, the slotted bars being of approximately the size of said projecting portion of the axle; stationary bars adapted to be placed immediately over the slotted portion of the rocking axle and between the rocking bars, and means connected with said rocking axle and suitable mechanism for rocking the grate sections, substantially as described and for the purpose set forth.

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

RICHARD CAREY.

Witnesses:

FRANK J. LEONARD,
W. E. HARRIS.