(No Model.)

E. OEHRLE & J. R. PERKINS.

GRATE.

No. 364,035. Patented May 31, 1887.

Fig. 1.

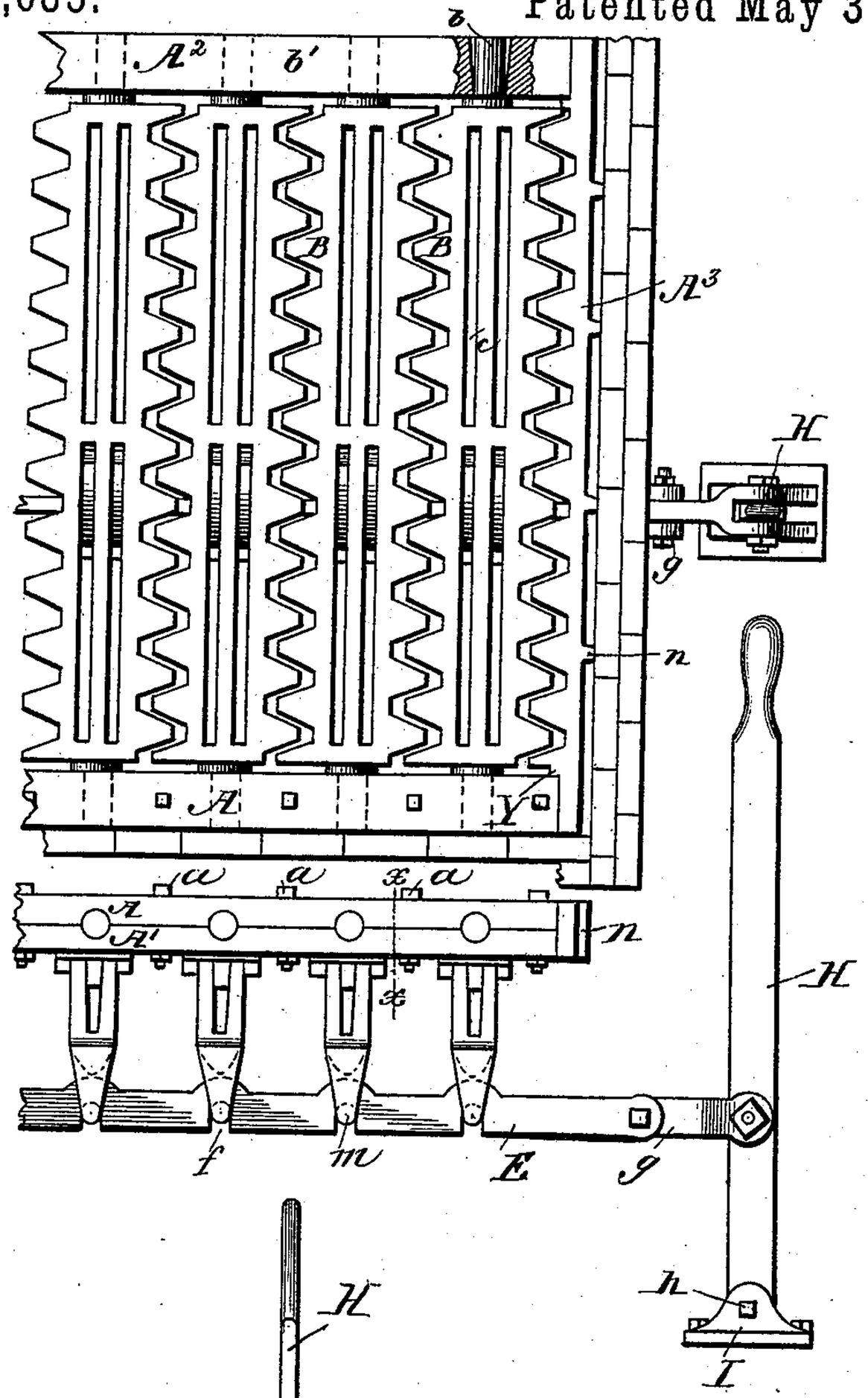


Fig. 2.

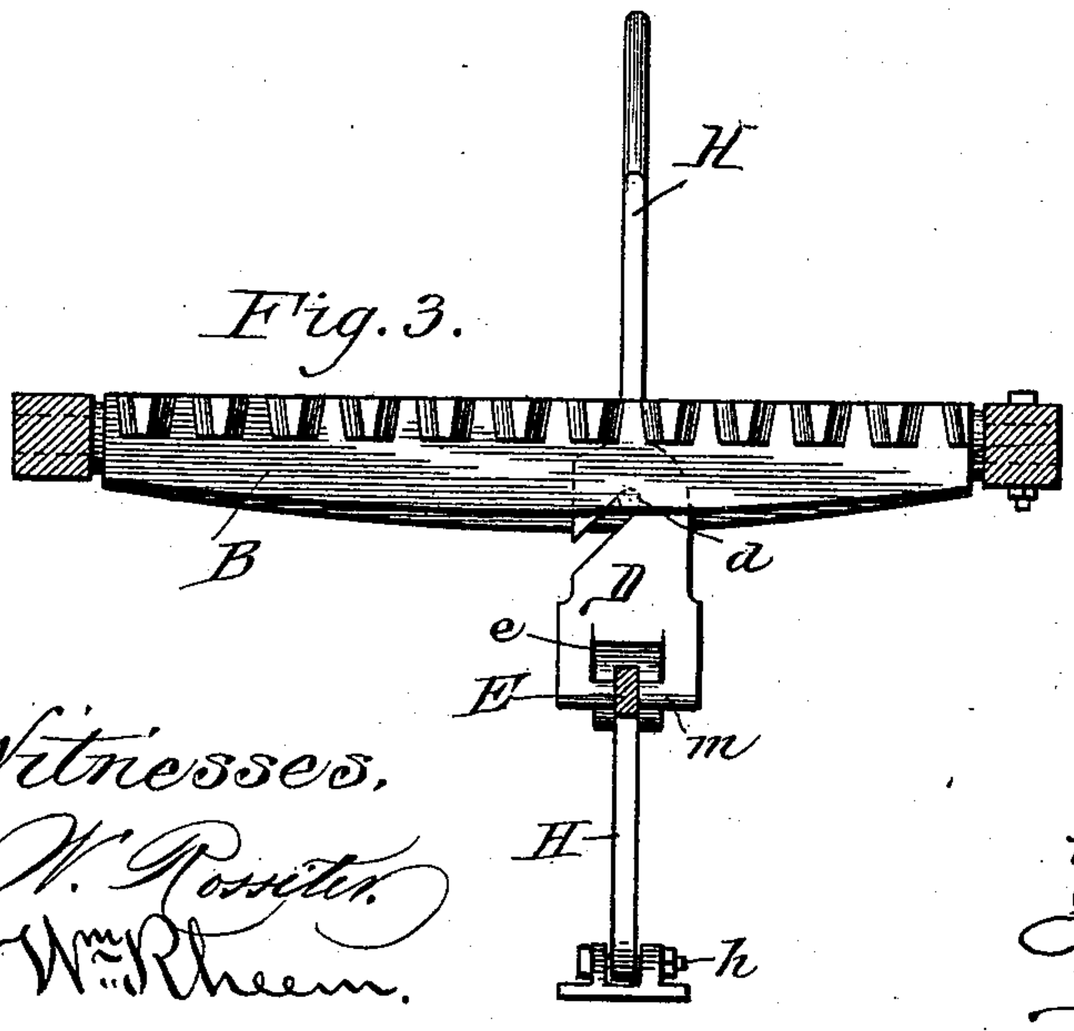
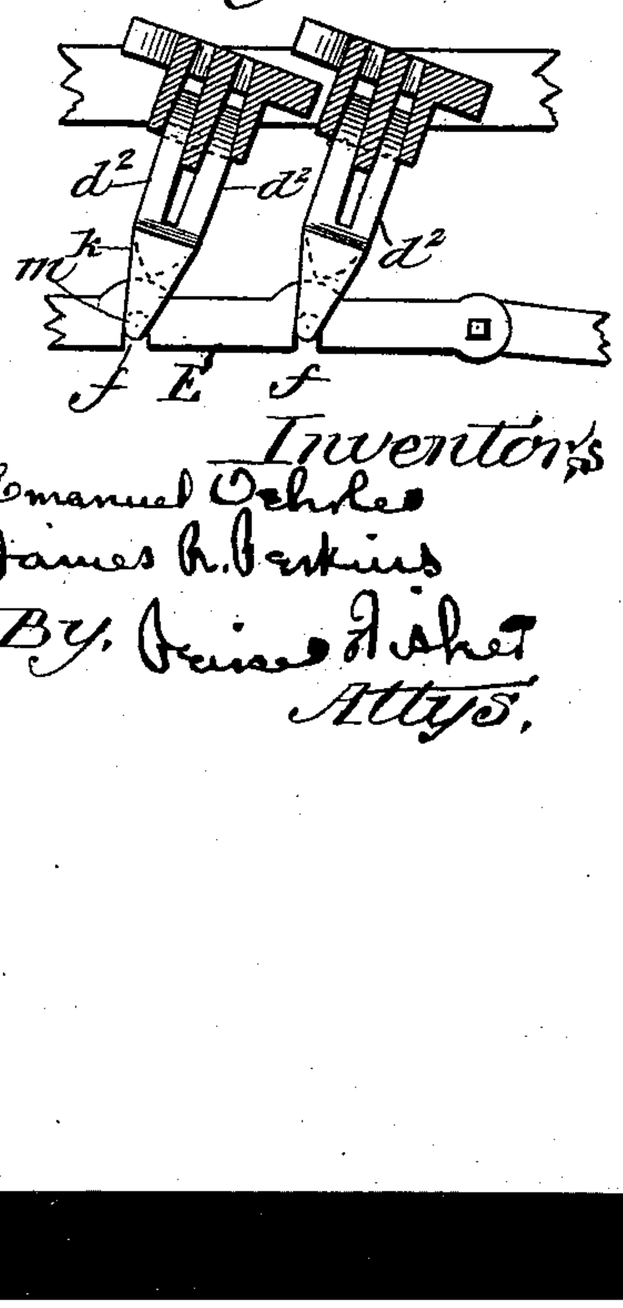


Fig. 3.

Fig. 4.



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EMANUEL OEHRLE AND JAMES R. PERKINS, OF OMAHA, NEBRASKA.

GRATE.

SPECIFICATION forming part of Letters Patent No. 364,035, dated May 31, 1887.

Application filed December 16, 1886. Serial No. 221,746 (No model.)

To all whom it may concern:

Be it know that we, EMANUEL OEHRLE and JAMES R. PERKINS, of Omaha, in the county of Douglas, State of Nebraska, have invented certain new and useful Improvements in Rocking Grates, of which the following is hereby declared to be a full, clear, and exact description, sufficient to enable others skilled in the art to make and use the same.

Our invention relates to that class of grates employed in boiler and other furnaces wherein the grate is made up of several bars or sections arranged side and side in even plane to sustain the fuel, such bars being rocked or otherwise shifted to break the clinker or fuel matt and clear the fire of ashes and refuse.

Heretofore rocking grate-bars have ordinarily been made with the dependent driver for the bar cast in one piece therewith, or, if separate, then secured to the bar by bolt-and-nut fastening, which latter device has also been the customary expedient for connecting the series of drivers to the driving-bar. Should any defect exist either in the grate-bar or the driver, both must be discarded if cast together. If separately made, each can be removed and replaced at will, but the drilling and fitting necessary in the use of the bolt-and-nut fastening renders the use of this device tedious and troublesome.

In some instances the drivers were detachable from the rocking bars and were made to interlock therewith directly, dispensing thus with the drilling and with the bolt-and-nut fastenings usually employed; and for like purpose the connecting-bar common to the series of dependent drivers has also been made to directly lock with and detach from the drivers, to avoid the expense of drilling and of the bolt-fastenings. Our improvements pertain more especially to devices of this class wherein the grate-bars, dependent drivers, and the connecting-bar are separate and are capable of being directly joined and set up in position without drilling and without the use of bolt-fastenings.

The nature of the invention will fully appear from the following specification thereof, reference being had to the accompanying drawings, forming part of the same, in which like letters of reference denote like parts of structure throughout.

Figure 1 is a plan view of a portion of a grate embodying our improvements. Fig. 2 is a front elevation thereof; and Fig. 3, a side elevation, partly in section, on line *x x*, Fig. 2. Fig. 4 is a sectional view in detail, showing the position of the grate-bars when rocked into inclined position.

Conveniently mounted at the front and back of the fuel-chamber of the furnace are the bearers A, A′ and A², respectively, which extend along the chamber and furnish supports at suitable intervals for the journals or pivots of the series of grate-bars B. One of the bearers, as at A², is cast entire with the holes or bearings therein ready to receive the journals of the grate-bars. The other bearer, as at A A′, is divided longitudinally, as shown, each section thereof being provided with part-seats to inclose the corresponding journals of the grate-bars. By this provision the bearers A² and the lower division, A′, of the other bearer may be secured in place within the furnace-walls, and the series of grate-bars, or any thereof, set up or removed at will by slipping the opposite journals into the seats in the bearers A² and A′, designed to receive them, after which the upper section of the divided bearer may be mounted in place and securely bolted to its companion section, as at *a*, thus furnishing a quick and convenient means for replacing defective grate-bars when desired, at the same time that such bars are firmly held in position within the fuel-chamber.

A side bar, A³, supported at each end of the fuel-chamber, engages the abutting end of the front and back bearers to keep the same in position and yet allow for the necessary expansion of the grate-bars under the influence of the furnace heat. The side bars, A³, are furnished with projecting fuel-points, which intermesh with the corresponding fuel-points projecting from the sides of the grate-bars B.

The grate-bars B, next to their journal end *b*, are furnished with enlarged bosses or collars *b′*, to ride against the front and back bearers and to allow the grate-bars to rock easily about their pivots without interference. The body of each grate-bar B is provided with fuel tips or projections at each side of the bar and intermeshing with the companion tips of the grate-bar next adjacent. The long slots or inlets *c* are formed through each of the grate-

bars B for the admission of a free supply of air to the fire, and serving, also, thereby to cool the bars and prevent the same from becoming warped.

Extending across the flanged lower portions of each bar B is a lateral pin, *d*, cast in one piece with the bar and its flanges and designed to receive and sustain the hooked head or end of the drivers D. The drivers D are preferably bifurcated or forked, as shown at f^2, Fig. 4, in the upper portion thereof, so as to pass snugly between the flanges of the grate-bars B, whereby the drivers are firmly sustained in place.

By inserting the forked head or end of the driver D between the ribs of the grate-bar B, with the hooked slot of the driver-face uppermost, the driver may then be drawn along until such slot engages with the pin *d*, whereupon the driver D may be forced in and turned about the pin *d*; thus bringing said driver upright beneath the grate-bars, as shown by the drawings. By thus providing the driver and grate-bar with the interlocking device described these parts may be secured firmly together without the use of bolts and nuts or the need of drilling and fitting holes for the same, which latter is a troublesome and annoying operation. Each driver D, near its lower end, is provided with an elongated opening, *e*, of size sufficient to receive the driving-bar E when the same is inserted flatwise through such opening. At the upper side each opening *e* is preferably made of bevel-face, as at *k*, to direct the driving-bar E and to allow for its ready insertion through the opening *e* of the driver. The series of drivers D having been mounted in position beneath the grate-bars B, as already described, the driving-bar E is thrust endwise, flat face down, through the openings *e* of the series of drivers D, and then by a quarter-turn is interlocked with each driver, said driving-bar thus standing in vertical position, with the notches *f* therein seated within the rests or bearings *m* formed at the lower ends of the drivers D. The upper external face of each indent or notch *f* next in contact with the bevel-edge *k* is conveniently curved in outline from the rest *m* as a center, so as to insure a snug bearing between the connecting-bar and drivers during the operation of shaking the grate, thus preventing lost motion and rickety play between the parts. By this means the driving-bar is connected simultaneously with all of the drivers, and may be easily disconnected therefrom, thus avoiding the need of the usual bolts or rivets, as heretofore employed. A link, *g*, connects the outer end of the driving-bar E with the hand-lever H, pivoted, as at *h*, to the bracket I. By actuating the hand-lever H the drivers D will cause the grate-bars to rock back and forth about their pivots *b* far enough to permit the escape of the ashes from the grate-bars into the pit below at the same time that the clinker is loosened, and may be withdrawn by the use of a hooked poker or like tool.

In burning straw, shavings, or other like refuse requiring the free admission of an increased volume of air it is only necessary to reverse the grate-bars B to inclined position, as shown in Fig. 4 of the drawings, in which relation such bars will furnish sufficient support for the light fuel, and at the same time will admit the air in volume sufficient to accomplish complete and rapid combustion. It will be noted that the lugs *n*, extending from the side bars, A^3, cause said bars to be maintained at a distance from the walls of the furnace, so that ventage is furnished for the incoming air in addition to that supplied by the ports *c*. The side bars, A^8, are furnished with a shoulder, Y, next against the bearer A′, so that the parts of such bearer are better retained in place, and thus under expansion do not impede the free rotation of the grate-bars about their pivots *b*.

It will be understood that the several details of structure heretofore set forth may be varied without departing from the spirit of the invention, which is not confined to such details, but should be understood to include the equivalents thereof.

Having thus described the invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the rocking grate-bar and its dependent flange, having lateral pin thereon, of the hook-headed driver detachably interlocking with said pin and retained between the dependent flanges of said rocking bar, substantially as described.

2. The combination, with the rocking grate-bar and its dependent flange, having lateral pin thereon, of the bifurcated hook-headed driver detachably interlocking with said pin and retained between the dependent flanges of said rocking bar, substantially as described.

3. The combination, with the rocking grate-bars and with the drivers dependent therefrom, having an elongated opening and a seat or rest in the lower part thereof, of the connecting-bar common to said drivers insertible endwise through such opening, and provided with a series of indents or notches to detachably interlock with said seats, substantially as described.

4. The combination, with the rocking grate-bars, of the front and back bearers to receive the terminal journals thereof, one of said bearers being divided longitudinally and provided with part journal-seats in each division, and the side bars resting against the abutting ends of said bearers and having back lugs to space said side bars from the furnace-walls, substantially as set forth.

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