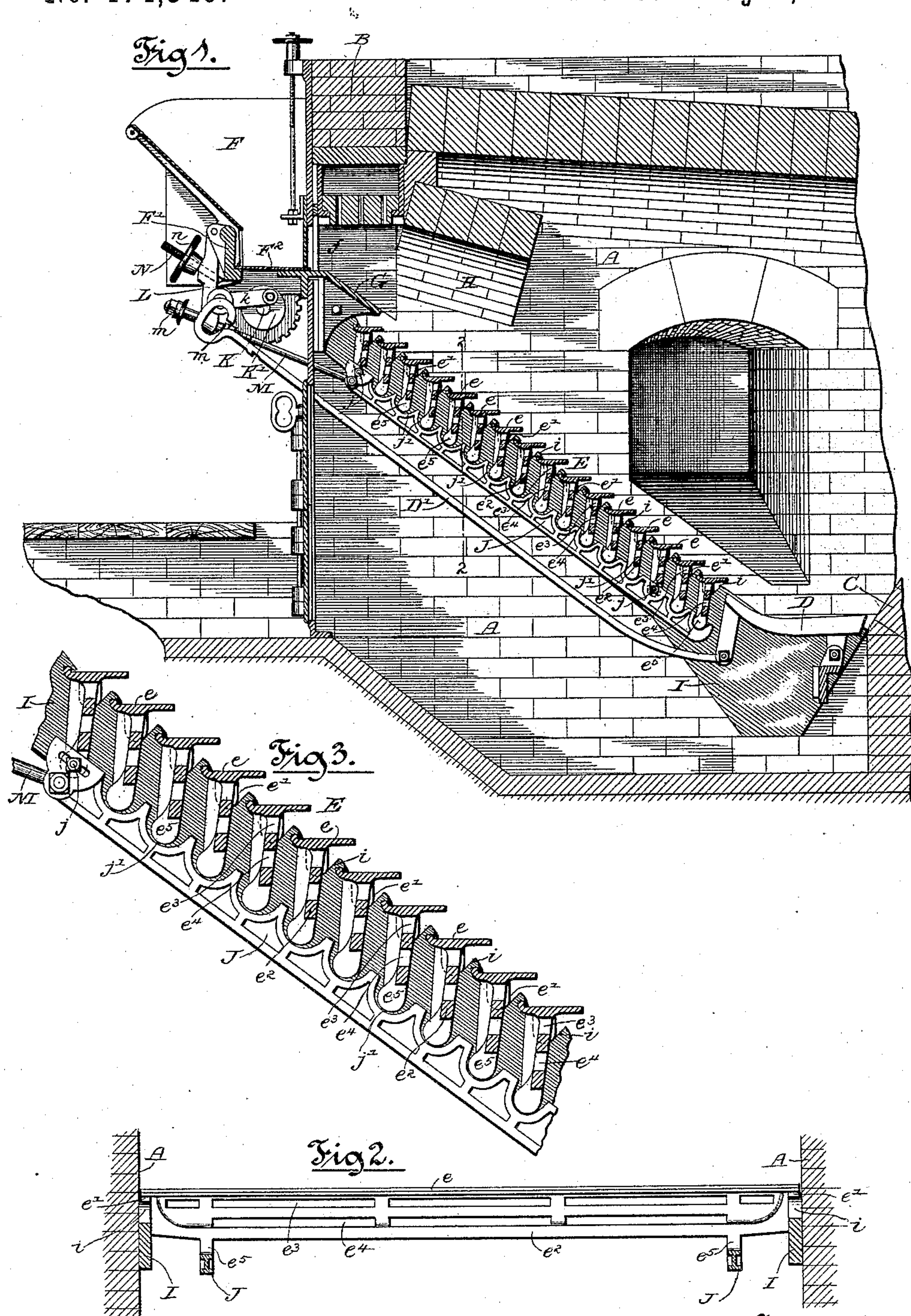


(No Model.)

W. R. RONEY
FURNACE GRATE.

No. 474,346.

Patented May 3, 1892.



Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM R. RONEY, OF CHICAGO, ILLINOIS.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 474,346, dated May 3, 1892.

Application filed July 25, 1890. Renewed February 23, 1892. Serial No. 422,361. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. RONEY, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful
5 Improvements in Furnace-Grates; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which
10 form a part of this specification.

This invention relates to improvements in furnace-grates of the general character shown in Letters Patent No. 409,304, granted to me August 20, 1889. The grate therein shown
15 comprises a series of transverse rocking bars arranged upon inclined supports to give an inclined position to the grate as a whole, and devices for operating the rocking bars from the exterior of the furnace.

20 The present invention relates to certain features of construction in connections through which the rocking bars of the grate are actuated. In the grate shown in said prior patent these several rocking bars are actuated by means
25 of a reciprocating part or bar engaging all of the grate-bars and giving to them an equal range of movement. I have found in practice that with some kinds of coal a more rapid movement of the fuel downward over the
30 grate is desirable at one part of the grate than at another, certain kinds of bituminous or "steam" coal containing volatile matters in large quantities requiring a more rapid movement at the lower than at the upper part of
35 the grate. In the use of grate-bars all of which are moved to an equal extent the rate of feed is the same in all parts of the grate, and in order to produce a variable feed, giving a more rapid movement of the fuel in one
40 part of the grate than in another, I employ actuating devices for the rocking grate-bars, which give a greater rocking movement to the bars in that part of the grate in which the most rapid downward movement of the
45 fuel is desired, as hereinafter fully set forth.

In the accompanying drawings, illustrating my invention, Figure 1 is a central vertical section from front to rear of a steam-boiler furnace provided with a grate constructed in
50 accordance with my invention. Fig. 2 is a cross-sectional view of the grate, taken upon line 2 2 of Fig. 1. Fig. 3 is an enlarged de-

tail section of the grate-bars, showing in side view the upper portion of the reciprocating bar by which rocking motion is given to the
55 grate-bars.

As shown in the said drawings, A A indicate the side walls of a fire-box, B the front wall thereof, and C the rear or bridge wall.

D is a dropping or dumping grate located
60 at the rear part of the fire-box.

E is an inclined grate located in front of and arranged to deliver upon the grate D, and F is an external hopper or magazine situated in position for the delivery of its con-
65 tents upon the upper end of the inclined grate through a passage *f* in the front wall B of the fire-box.

G is an angular plate situated at the bottom of the passage *f* and extending over the
70 uppermost bar of the grate E.

H is a fire-brick hood or arch overhanging the upper portion of the grate E and extending rearwardly and downwardly from the front wall of the fire-box above the pas-
75 sage *f*.

The grate E is composed of a series of transversely-arranged horizontal bars *e e*, extending across the fire-box from side to side thereof and provided at their ends with projecting
80 trunnions *e' e'*, which rest in notches *ii*, formed in inclined supporting-plates I I, located at opposite sides of the furnace adjacent to the side walls A A thereof. The upper surfaces of the grate-bars *e* are flat and the edges
85 thereof are continuous or non-fingered. Said bars are arranged in a stepped or overlapping position, so that the rear edge of one bar projects over the edge of a subjacent bar, sufficient vertical spaces being provided between
90 the overlapping edges to allow the proper influx of air and to give a desired inclination to the grate as a whole.

The several grate-bars are provided with depending webs or flanges *e² e²* for giving the
95 necessary strength or stiffness to the bars, and said flanges are herein shown as provided with longitudinal slots or apertures *e³ e⁴* to allow the stoking of the fire or removal of clinkers by means of a slicing-bar or other
100 implement inserted through said apertures from the front of the furnace and to afford a more direct and abundant supply of air to the fire, as set forth in a separate application

for patent filed by myself and J. T. Arnold on the 23d day of June, 1890.

The grate-bars *e e* are severally provided with depending arms *e⁵*, which are engaged with a reciprocating rod or bar J, through the medium of which the grate-bars are rocked on their bearings in the plates I. In the construction illustrated the bar J is pivoted at *j j* to grate-bars at the upper and lower parts of the grate, whereby the said bar J is upheld, and the arms of the intermediate grate-bars are arranged to engage notches *j' j'* in the said bar J. The rocking movement of the grate-bars accomplished by the endwise reciprocation of the bar J is adjusted to bring the upper faces of said grate-bars at one extremity of their movement into a substantially horizontal position, as shown in Figs. 1 and 3, and at the opposite extremity of their throw into an inclined position, this rocking movement of the bars tending to feed or carry forward the fuel downwardly along the inclined grate, as fully set forth in said prior patent, No. 409,304.

To give a more extended rocking movement to the lower than to the upper grate-bars, (which is the variation from uniformity most commonly required) the notches *j' j'* in the upper part of the bar J may be made considerably wider than the arms *e⁵*, as shown in Figs. 1 and 3, so as to afford lost motion between the bar J and the said arms of the grate-bars at this point. On the other hand, the notches *j'* at the lower part of the bar J are made of the same width as the arms *e⁵*, so as to engage the latter at all times during the movement of the bar. The variation in the width of the notches may be gradual from one end of the bar to the other, as shown, or there may be several notches of each of two or more widths. It follows from this construction that the grate-bars at the lower part of the grate will be rocked to a greater extent than at the upper part of the grate, with the result of feeding or carrying forward the fuel more slowly at the upper than at the lower part of the grate.

If desired, in the use of certain kinds of coal the more rapid movement of the fuel may be imparted at the upper part of the grate by making the notches *j'* narrower in the adjacent part of the bar J.

Devices are herein shown for feeding the fuel to the top of the grate and for giving a rocking movement to the grate substantially like those shown in said prior patent, said parts being made as follows: The lower part of the magazine or hopper F is provided with an inwardly and outwardly movable front piece, follower, or pusher F', hinged or pivoted at its upper end to the hopper and having attached to its lower edge a horizontal

bottom plate F², which shares the inward and outward movement of the pusher, these parts being operated in the same manner as described in said prior patent to force the fuel from the bottom of the hopper inwardly upon the inclined grate at each advance movement of the pusher. K is a horizontal rotating shaft mounted beneath the hopper and provided with a crank-disk K'. Said crank-disk is connected by a rod *k* with a vibrating vertical arm L, which is pivoted at its upper end to the pusher F' and is connected at its lower end with the bar J by means of a connecting-rod M. Said connecting-rod passes through a slot in the lower end of the arm L and is provided with nuts *m m* on opposite sides of the said arm to allow of lost motion between the bar J and its actuating devices and to provide adjustment of the throw of said bar J. A screw N is secured to the pusher F' and passes through a slot or opening in the said arm L. Said screw is provided with a hand-wheel *n*, the hub of which bears against the outer surface of the arm L, and a lug or projection on the lower end of the pusher bears against the inner surface of said arm L, so that the pusher moves with the arm when the latter is vibrated, the hand-wheel *n* affording a means for adjusting the extent to which said pusher is moved by the arm. D' is an operating-rod attached to the grate D and extending upwardly to the front of the ash-pit for the purpose of lifting and lowering the said grate D.

While I have shown the notches or bearings *j'* of the bar J to be larger at the upper or forward end of the bar, yet it is obvious that with some kinds of fuel it may be desirable to make said notches larger at the lower or rear end of the bar than at the upper—that is, reversing the construction shown in the drawings. This obviously-mechanical change from the construction illustrated herein may be employed without departing from the spirit of my invention.

I claim as my invention—

The combination, with an inclined grate consisting of a series of horizontal transversely-arranged movable grate-bars, of a reciprocating actuating-bar provided with notches to engage the grate-bars, said notches being of unequal widths to give to the bars a greater movement in one part of the grate than to those in another, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

WILLIAM R. RONEY.

Witnesses:

TAYLOR E. BROWN,
GEORGE W. HIGGINS, Jr.