

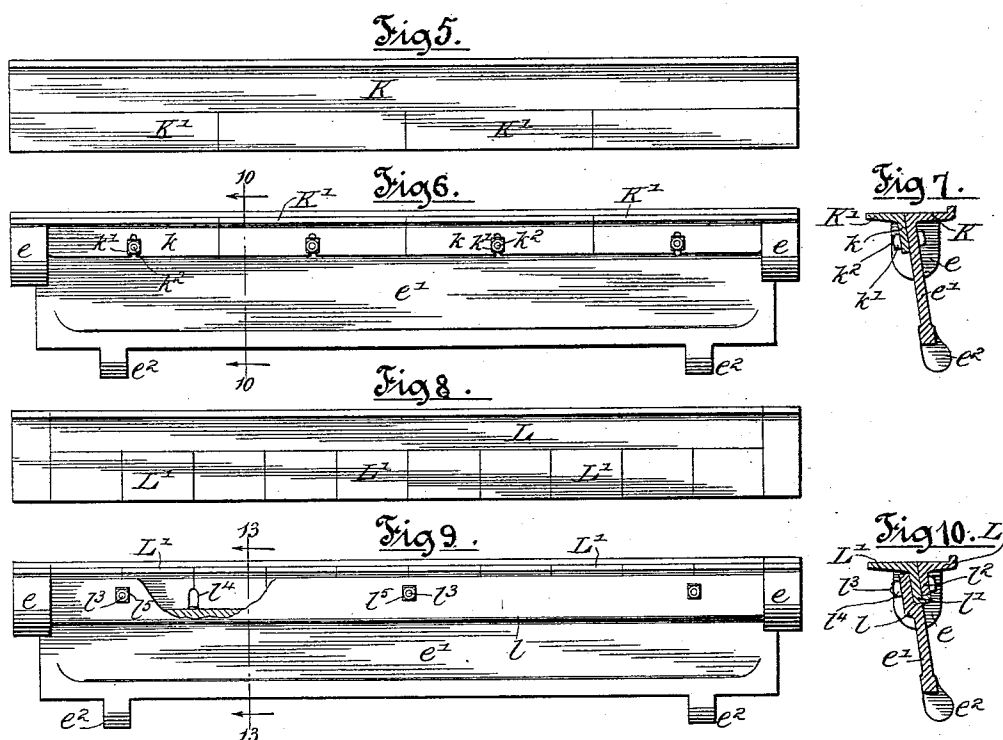
(No Model.)

3 Sheets—Sheet 2.

W. R. RONEY.
FURNACE GRATE.

No. 569,353.

Patented Oct. 13, 1896.



Witnesses

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(No Model.)

3 Sheets—Sheet 3.

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Fig. 11

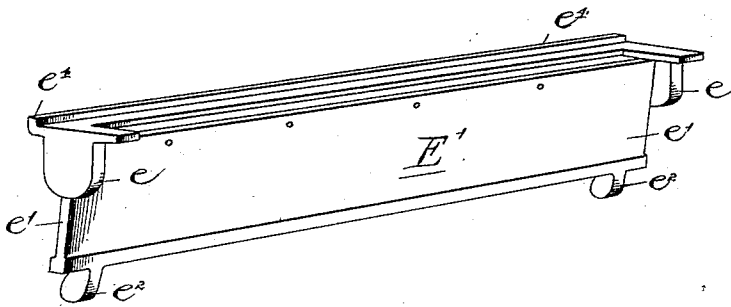
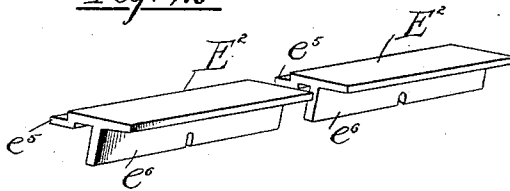


Fig. 12



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UNITED STATES PATENT OFFICE.

WILLIAM R. RONEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTINGHOUSE, CHURCH, KERR & COMPANY, OF NEW YORK, N. Y.

FURNACE-GRATE.

SPECIFICATION forming part of Letters Patent No. 569,353, dated October 13, 1896.

Application filed December 8, 1890. Serial No. 373,941. (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 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 form a part of this specification.

This invention relates to improvements in grate-bars of that class illustrated in Letters Patent Nos. 409,304, 409,305, and 409,650, heretofore granted to me and in which each bar comprises a longitudinal vertical web and a top plate presenting a broad, flat, and continuous fire-surface, the grate being made up of a number of these bars arranged with the front edge of one bar overlapping the rear edge of the next to form an inclined grate with air-spaces between the overlapping parts of adjacent bars. It has been found in the use of this form of furnace-grate that the upper parts or plates of the bars are more rapidly burned out than the lower parts and also that portions of the top plates are more rapidly destroyed than others. It has also been found that by reason of the integrality of the top plate with the web or body of the grate-bar as heretofore constructed the warping of the top plate by continued and excessive heating causes the web to warp or break and that warping of the front portion of the top plate is similarly transmitted to the rear portion thereof or to such rear portion and to the web, with the result of unfitting the entire bar for use, although only the top plate or but a small part of the top plate has been in fact directly injured by the fire.

It is the object of this invention to provide a construction in which these difficulties are obviated; and to this end my present improvement consists in a construction in which a part or parts of the top plate may be removed and replaced at pleasure and by which construction the transmission of warping action from one part to another is obviated.

In the accompanying drawings I have illustrated my invention in several forms in which it may be constructed.

Figure 1 of said drawings is a vertical sec-

tion of the entire grate and of the furnace and its accessories in which said grate has been usually employed. Fig. 2 is a plan or top view of one of the grate-bars of Fig. 1 enlarged and detached. Fig. 3 is a front elevation of the same grate-bar detached and on the same scale as Fig. 2. Fig. 4 is a transverse vertical section in the line 4 4 of Fig. 3. The foregoing figures illustrate a preferred form in which my invention may be embodied. The remaining figures illustrate modifications of said invention, Figs. 5 and 8 being plan views, 6 and 9 front elevations, and 7 and 10 transverse sections, respectively, of two several forms or modifications, the sectional views of corresponding constructions being taken, respectively, on the lines 10 10 of Fig. 6 and 13 13 of Fig. 9. Fig. 11 is a perspective view of the grate-bar shown in Figs. 1 to 4, with the front top-plate section removed. Fig. 12 is a similar view of two of said removable sections.

First referring briefly to the general illustration given in Fig. 1, A indicates one of the side walls of the fire-box, B the front wall thereof, and C the rear or bridge wall. D is a dumping-grate; D', a rod for operating the latter; E, an inclined grate composed of rocking bars of the character to which my invention belongs and containing one form of said invention; F, an external coal hopper or magazine; G, an angular plate at the head of the inclined grate E; H, a fire-brick arch overhanging the upper portion of the grate, and J a reciprocating rod which engages a depending arm e^2 upon each of the webs e' , through the medium of which the grate-bars are simultaneously rocked in their bearings in the plates I.

The grate E, as will be seen from Fig. 1, is composed of a series of transverse horizontal bars E' , arranged in stepped order with the front edge of one bar overhanging the rear edge of the next bar below it, each of said grate-bars being provided at its ends with trunnions e , which rest in notches i , formed in the inclined supporting-plates I, which are fixed at the opposite sides of the fire-box, adjacent to the side walls A of the latter.

Each of the several grate-bars consists of a central vertical web e' , with which the end

trunnions e are connected, and a broad flat top plate presenting a continuous fire-surface and having a raised rib along its rear margin.

5 Now describing several forms in which I have shown that my invention may be embodied, Figs. 1, 2, 3, and 4 illustrate the grate-bar (here lettered E') as having a top plate composed of several parts, the rear or back
10 part e^3 extending the entire length of the bar and being integrally connected at its ends with the web e' . The front part of the top plate is shown as composed of a series of transversely-divided removable sections E^2 , here
15 shown as four in number, abutting each other at their ends, so as to occupy the entire space between the transverse end portions of the bar e^3 , and also abutting said bar at its front edge, so as to form with said bar a continuous
20 flat fire-surface practically as in the case of the bar as formerly constructed integrally. Each section E^2 is, in these Figs. 2, 3, and 4, shown as being provided at its rear edge with a downwardly and rearwardly directed flange
25 e^5 , adapted to enter the space or slot between the upper edge of the web e' and the front edge of the bar e^3 and to extend beneath the latter, as more clearly shown in Fig. 4. Each of the sections E^2 is also shown as having a downwardly-projecting flange e^6 , arranged to fit
30 against the front face of the web e' , so as to form a medium of attachment of the section to the web by a bolt and nut e^7 . The flange e^6 is preferably slotted to receive said bolt, so that
35 each removable section of the top plate may be detached by loosening the nut e^8 upon said bolt and without withdrawing the latter. In this construction either of the sections E^2 may be removed and a new section inserted
40 in its place without disturbing the other sections and without removing the bar from its position in the grate.

In Figs. 5, 6, and 7 the continuous top plate (here marked K) is shown as having a fixed
45 rear portion cast integrally with the web e' throughout its length and several separately removable front parts K' , each provided with a depending flange k at its rear edge, by which it may be secured directly to the web e' by
50 bolts k^2 and nuts k' .

In Figs. 8, 9, and 10 the continuous top plate is shown as being entirely removable in sections and as consisting of a single longitudinal removable rear bar L and a plurality of
55 removable front sections L' , each of the removable parts having a downwardly-directed flange by which it may be bolted to the web. Said web is also shown as being provided near its upper edge with an offset or shoulder l ,
60 against which the lower edges of the flanges upon the removable parts may be supported. As here indicated, the flanges l' on the front parts L' alone bear directly against this shoulder, being themselves provided with a lateral offset forming a shoulder upon which the
65 flange l^2 on the back section L rests. Bolts l^3 , provided with nuts l^4 , pass through slots

or holes in flanges of the removable portions and through the upper part of the web to hold the said removable parts in place.

70 It is obvious that the construction above set forth in a variety of forms has the advantage of preventing the transmission of warping strain from the front portion or edge of the grate-bar to the rear part and web thereof (which is an incident peculiar to the integral form of such grate-bar as previously constructed) while preserving the continuous
75 character of the fire-surface. It also has the further economic advantage of permitting replacement of an injured portion only of the grate and of rendering such replacement easy and convenient.

While in all the forms shown the front portion of the top plate is made in sections divided transversely, it is obvious that said transversely-divided sections may be connected integrally or otherwise with each other at their ends, so as to form in effect a single detachable front portion of the top plate, and
85 that in any case, besides that the more rapidly destructible portion is removable and separately renewable, the web or body of the grate-bar is unaffected by the warping of the more exposed detachable part or parts. The
90 making of the front portion of the top plate in transversely-divided sections is, however, the preferable construction, for the reason that the injury to this first-affected portion of the grate-bar more frequently occurs in a
95 limited portion of its length, and its repair is therefore made more cheaply and expeditiously.

It is evident that the invention may be embodied in still other forms than those illustrated in the drawings and that the details of construction may be greatly varied without departing from the spirit of said invention.

I am aware that in "fingered" grate-bars, by which I mean those having lateral projections at their upper portions proceeding from a web or body part, the fingers have been made detachable from the body. This is not my invention, which, on the other hand, is an improvement in the particular class of
110 grate-bars used for stepped and inclined grates and in which the upper portion is a top plate having a continuous surface and in which the warping of the exposed edge of the top plate from excessive heat is not limited
115 to itself, as in the case of a finger or fingers of such fingered bars, but by reason of the integrality of the top plate and of its integral connection with the web as heretofore constructed a warping or breaking strain is peculiarly transmissible to the body or web
120 from the warped or expanded part of the top plate.

I claim as my invention—

1. A flat-topped grate-bar for inclined or stepped furnace-grates consisting of a cast
130 vertical web or body and a top plate, the front and rear parts of which are longitudinally separable, the front portion or edge of said

top plate consisting of one or more detachable parts, substantially as described.

2. In a flat-topped grate-bar, the combination, with a cast vertical web or body part, 5 of a cast top plate consisting of a rear portion cast integral with the web and a front portion composed of a plurality of separately-detachable sections.

3. In a flat-topped grate-bar, the combination, with a cast vertical web or body part, 10 of a cast top plate composed of a rear portion having integral connection with the web at its ends and separated from said web be-

tween its ends by a slot, and a front, detachable portion provided with one or more projections extending through said slot, and with 15 a downwardly-directed flange arranged in front of the web, whereby it may be bolted to the latter.

In testimony that I claim the foregoing as 20 my invention I affix my signature in presence of two witnesses.

WILLIAM R. RONEY.

Witnesses:

H. E. LONGWELL,
WILL T. FRIEL.