May 22, 1928. 1,670,642

J. VAN BRUNT

FURNACE GRATE STRUCTURE

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Fig. 1

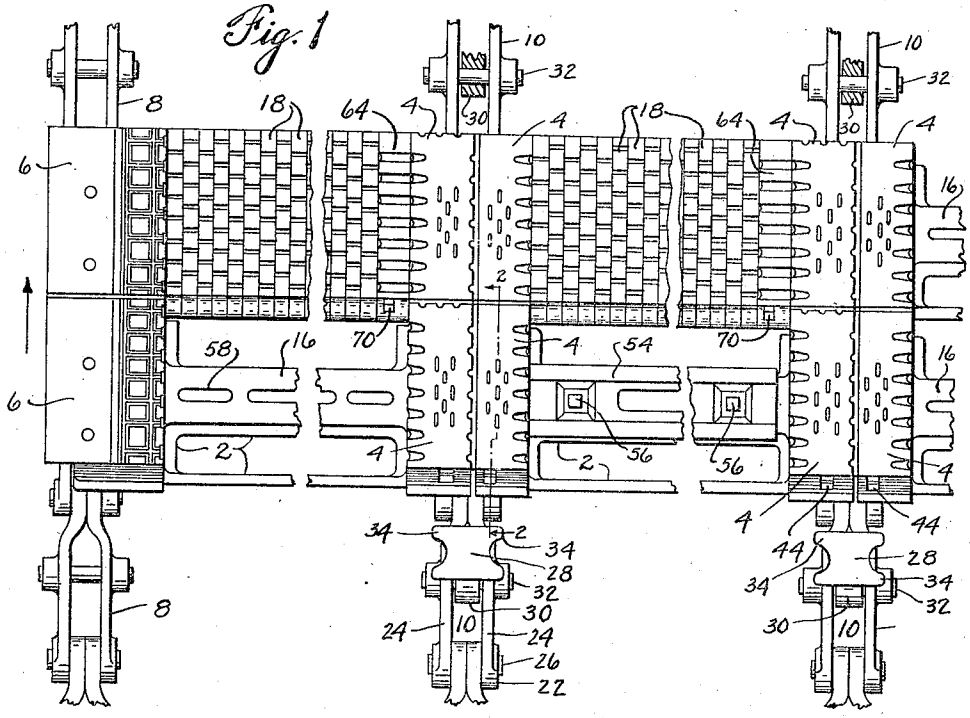
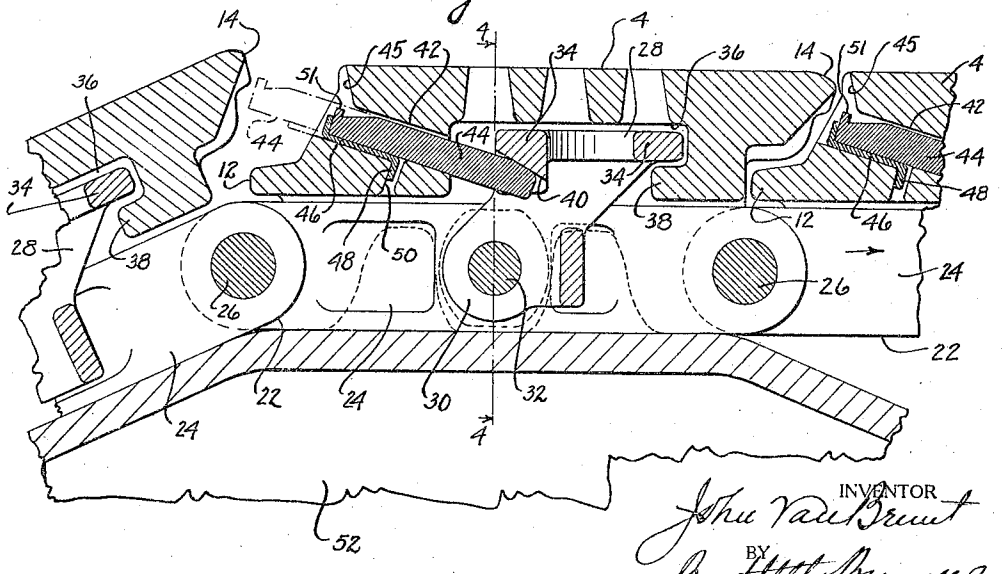


Fig. 2



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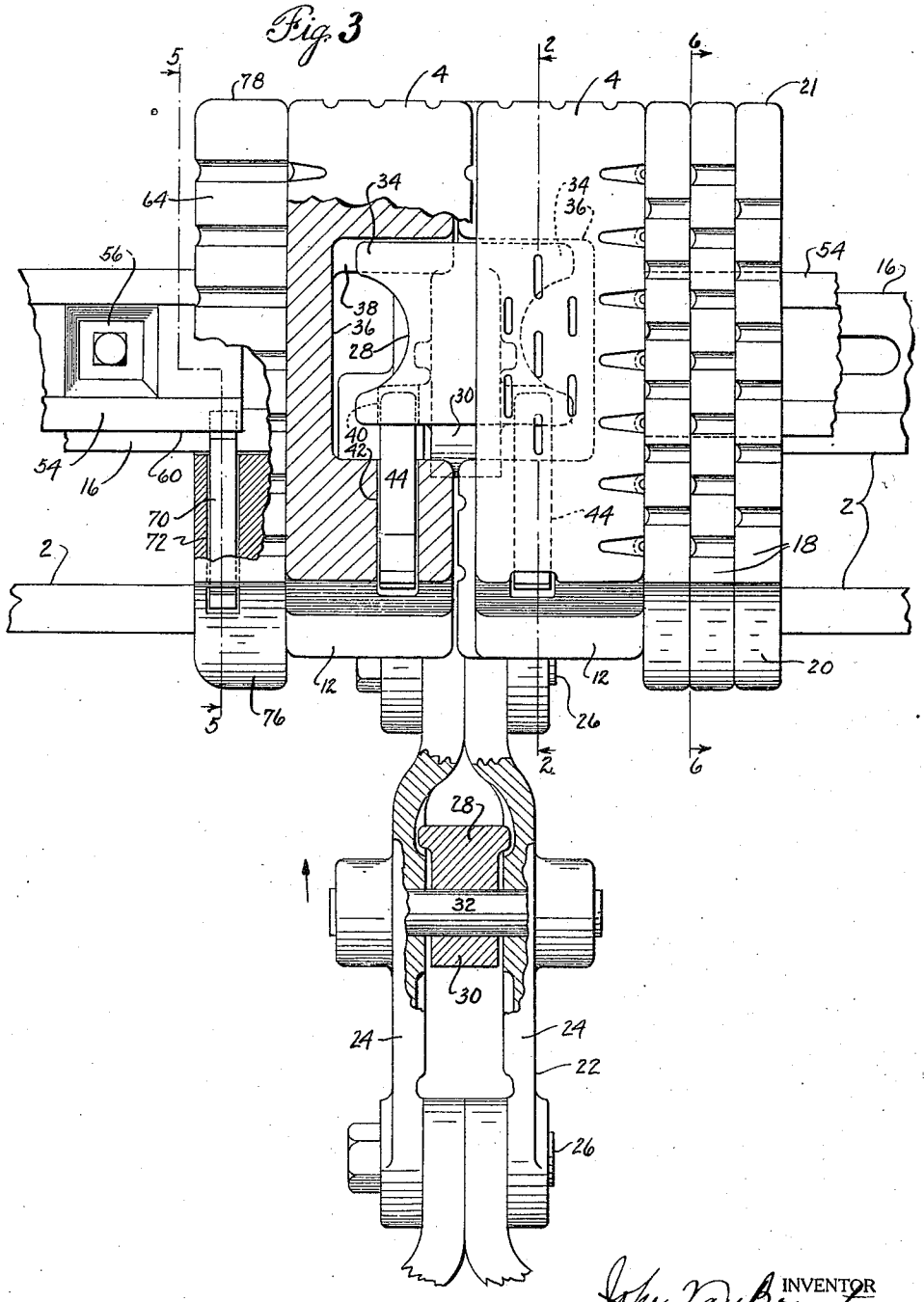
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Fig. 3



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FURNACE GRATE STRUCTURE

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Fig. 4

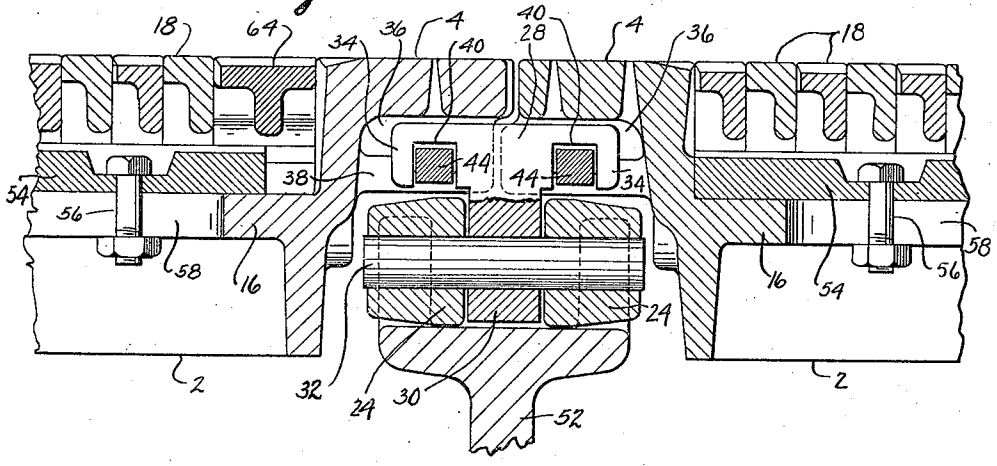


Fig. 5

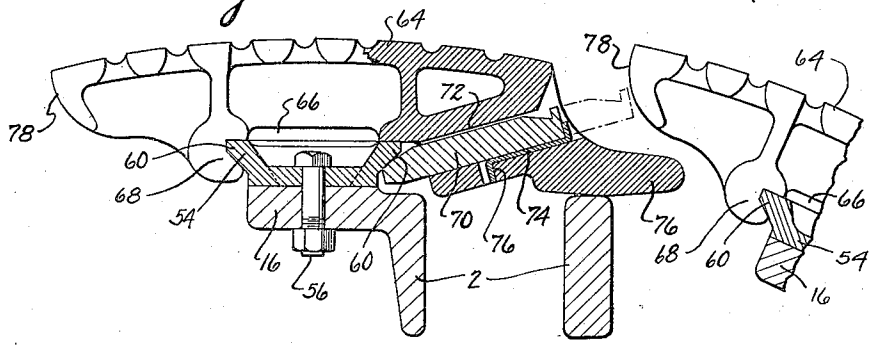
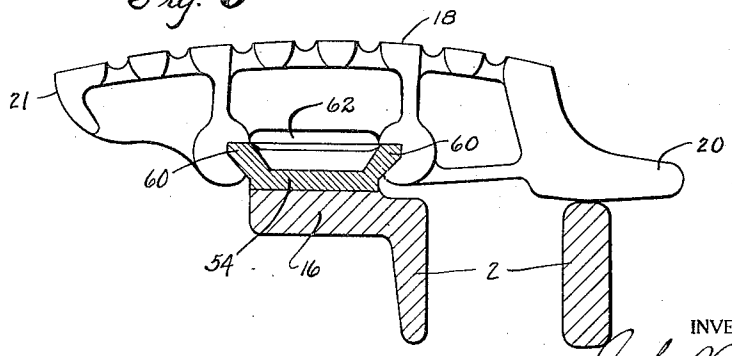


Fig. 6



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FURNACE GRATE STRUCTURE

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Fig 7

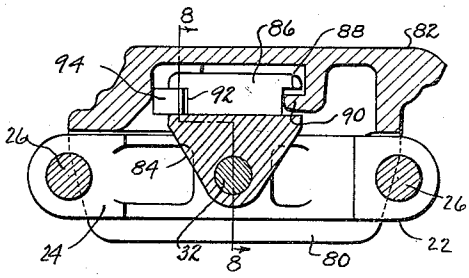


Fig 8

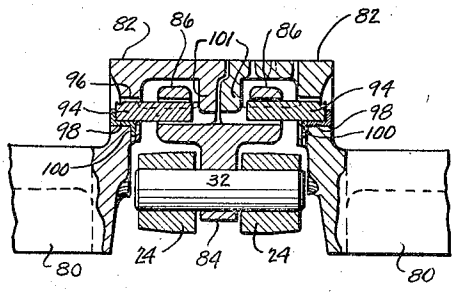


Fig 9

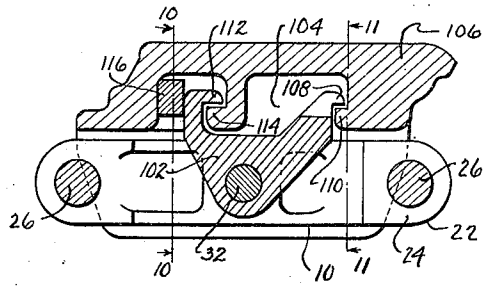


Fig 10

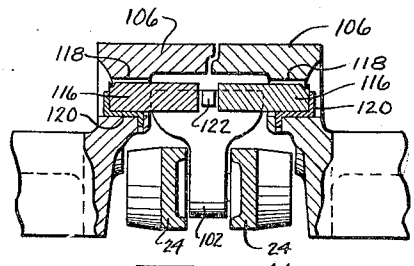


Fig 12

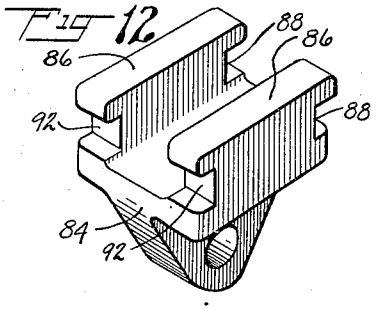


Fig 11

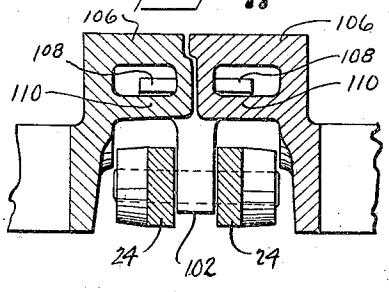
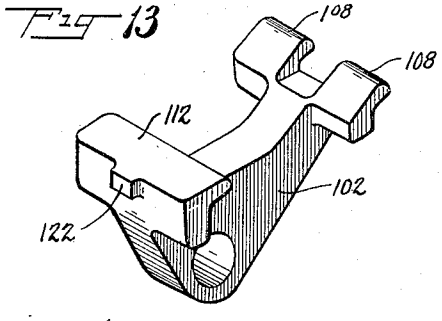


Fig 13



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Patented May 22, 1928. 1,670,642

UNITED STATES PATENT OFFICE.

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FURNACE-GRATE STRUCTURE.

Application filed October 16, 1923. Serial No. 668,841.

My invention relates to furnace grate structures, and has special reference to such structures of the chain grate type.

An object of the invention is to provide a chain grate of novel and improved construction.

Another object of the invention is to provide a chain grate which may be easily assembled and taken apart and which may be easily extended to any desired width.

Another object of the invention is to provide novel and improved means for mounting the carrier bars of a chain grate on the sprocket chains.

Another object of the invention is to provide novel and improved means for securing a fuel supporting member of a grate, particularly of a chain grate, to its support.

Another object of the invention is to provide means for mounting the fuel supporting keys of a chain grate on their carrier bars whereby the keys may be easily removed and replaced without interrupting the operation of the grate.

With these and other objects in view, the features of the invention consist in certain constructions, arrangements and combinations of parts hereinafter described and claimed, the advantages of which will be obvious to those skilled in the art.

The several features of the invention will be clearly understood from the following description and accompanying drawings, in which,

Figure 1 is a plan view, partly in section and with parts removed, of a portion of a chain grate embodying the features of the invention in their preferred form;

Fig. 2 is a sectional view of the rear end portion of the grate showing a portion of a driving sprocket wheel thereof, the section being taken substantially on the line 2—2 of Figs. 1 and 3;

Fig. 3 is a detail sectional plan view, on an enlarged scale, of a portion of the grate illustrated in Fig. 1;

Fig. 4 is a sectional view, partly in elevation, taken on the line 4—4 of Fig. 2;

Fig. 5 is a detail sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a detail sectional elevation taken on the line 6—6 of Fig. 3;

Fig. 7 is a sectional view similar to a portion of Fig. 2 but showing a modified form of means for securing the ends of carrier bars to one of the sprocket chains;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7;

Fig. 9 is a view similar to Fig. 7 but showing another modified form;

Figs. 10 and 11 are sectional views taken on the lines 10—10 and 11—11, respectively, of Fig. 9;

Fig. 12 is a detail view in perspective of a component part of the construction illustrated in Fig. 7; and

Fig. 13 is a similar view of the corresponding part of the construction illustrated in Fig. 9.

The chain grate illustrated in Fig. 1 of the drawings is made in a plurality of sections arranged side by side so as to provide a relatively wide fuel supporting surface. Each grate section is provided with grate or carrier bars 2 extending transversely thereof with the bars of adjacent sections arranged end to end. The end of each bar of each intermediate section and the inner end of each bar of the outer sections are provided with fuel supporting portions 4, and the outer ends of the latter bars are provided with similar fuel supporting portions 6. The outer end portions 6 of the carrier bars of each outer section are mounted upon a sprocket chain 8, and the adjacent fuel supporting portions 4 of the bars of each two adjacent sections are mounted on a sprocket chain 10. The fuel supporting portions 4 of each section are arranged end to end, and the lower portion of the rear or left end, viewing Fig. 2 of each portion is provided with a rearward projection or apron 12 which extends under a forward projection 14 on the forward end of the succeeding head, the grate traveling in the direction of the arrow shown in Fig. 2. Each carrier bar 2 is provided with a web 16 extending between the fuel supporting portions on the ends thereof upon which are supported, as hereinafter described, a series of fuel supporting keys 18 which extend longitudinally of the grate and are arranged side by side with their top surfaces in the plane of the top surfaces of the fuel supporting portions 4 and 6. The keys 18 supported on adjacent carrier bars of each section are arranged end to end, and the lower portion of the rear end of each key is provided with a

rearward projection or apron 20 that extends beneath a projection 21 on the forward end of the succeeding key.

In the illustrated construction novel and improved means is provided for securing the carrier bar portions 4 to their supporting sprocket chains 10 whereby the carrier bars may be easily removed and replaced and the width of the grate easily extended as desired, each portion 6 being detachably secured in a well known manner to its associated sprocket chain 8. As shown each sprocket chain 10 is made up of links 22, each comprising side members 24 which are spaced apart except for their forward ends which are brought together and are positioned between the rear ends of the side members of the preceding link, the links being pivotally connected by means of pivot pins 26. A carrier block 28 is pivotally mounted on each link 22 by means of a lug 30 on the under side thereof that is positioned between the side members 24 intermediate their ends, and a pivot pin 32 extends through apertures in said side members and lug. The upper portion of the block 28 is provided with laterally and longitudinally extending lugs 34 which extend into opposed recesses 36 on the under sides of the adjacent portions 4. The forward end portions of the lugs 34 extend over rearwardly projecting lugs 38 on the forward walls of the recesses 36. The under sides of the rear end portions of the lugs 34 are provided with downwardly and forwardly inclined slots 40 and the rear end walls of each portion 4 is provided with a downwardly and forwardly inclined squared aperture 42. A pin 44 which is square in cross-section extends through each aperture 42 with its inner end inserted in the slot 40, the upper side of the inner end portion of the pin being bevelled off so as to fit the upper wall of the slot. The outer end of each pin 44 is spaced a slight distance from the outer end of its aperture 42 and the outer end of the upper wall of the aperture is cut away at 45 to permit access to the head of the pin, the outer end of the aperture 42 being spaced above the apron 12.

With this construction it will be apparent that the pins 44 by engagement with the walls of the slots 40 cooperate with the lugs 34 and 38 to provide a dove-tail connection that securely holds the portions 4 in place.

In the illustrated construction means is provided for securely holding the pins 44 in position, but permitting them to be easily removed and replaced. As shown, this means comprises metal strips 46 each having one end portion 48 bent at right angles. The strips 46 are inserted in the apertures 42 previously to inserting the pins 44, and their ends 48 are each hooked over a shoulder 50 constituting the rear wall of an aperture leading downwardly from the bottom wall of each aperture 42, the portion of the bottom wall of the aperture 42 back of the shoulder 50 being depressed below the remaining portion of the surface of the wall so that when the strip 46 is positioned in the aperture 42 its top surface is substantially in the plane of said remaining portion of the wall. After a locking pin 44 has been inserted through the aperture 42 and into holding engagement with the pivoted block 28, the outer end of the strip 46 is bent upwardly at right angles over the outer end or head of the locking pin so as to securely hold the pin in place. To remove the locking pin 44 from the aperture it is only necessary to bend back the outer end of the strip 46 from the head of the pin, whereupon the pin may be easily pulled outwardly a sufficient distance to disengage it from the pivoted block 28, the outer end of the pin being provided with a shoulder 51 to permit a suitable implement to be employed in removing the pin. It will be apparent that the construction is such that a locking pin may be retracted out of engagement with the pivoted block 28 while the carrier bar is passing over one of the sprocket wheels 52 of the grate, the overlapping relation of the adjacent ends of the bar portions 4 permitting this to be accomplished as indicated in Fig. 2, the retracted position of a locking pin being indicated by broken lines in this figure. The arrangement of the locking pin 44 with its head positioned at the rear end of the fuel supporting heads 4 and covered by the projecting end of the succeeding head, effectively prevents the burning fuel from coming into contact with the head of the pin.

In Figs. 1, 5 and 6 there is illustrated means for securing the keys 18 on the carrier bars 2, whereby the keys may be easily removed and replaced without interrupting the operation of the grate. As shown, this means comprises supporting bars 54, each of which is secured on the web 16, extending between the fuel supporting end portions of each carrier bar, by means of bolts 56 extending through apertures in the bar 54 and through slots 58 in the web 16. Each bar 54 has dove-tail projections 60 on its longitudinal edges, and one end of the bar is spaced a distance from one of the fuel supporting portions 4 of the associated carrier bar 2. The fuel supporting keys 18, above referred to, are of a width less than said space between the end of the bar 54 and said portion 4, and each key is provided with a transverse notch 62 on its under side so as to permit the keys of each carrier bar 2 to be successively passed through said space and threaded over the dove-tail bar 54 and into side by side relation on the bar.

In order to hold the keys 18 from slipping off of said spaced end of their supporting bar 54, a key 64 is provided for filling

the space between the last key 18 and the adjacent-fuel supporting portion 4, and means is provided for securely locking the key in place. As shown this key 64 is provided with a transverse recess or slot 66 on its under side having its forward wall provided with a dove-tail projection 68 and having the dove-tail projection omitted on its rear wall so as to permit the key to be placed over the end of the bar 54 projecting from the last key 18 thereon, the dove-tail projection 68 engaging beneath the corresponding projection on the forward longitudinal edge of the bar 54. The means for securing each key 64 in position comprises a pin 70 corresponding to the locking pin 44 of the carrier bar heads 4. The pin 70 is inserted through an aperture 72 in the rear end wall of the key 64 so as to position its inner end in engagement with the under side of the dove-tail projection 60 on the rear longitudinal edge of the supporting bar 54, the pin 70 cooperating with the dove-tail projection 68 to hold the key 64 in place. The pin 70 is removably secured in position by means of a locking strip 74 corresponding to the locking strip 46 of the pin 44, the strip 74 having its inner end bent at right angles so as to engage a shoulder 76 constituting the rear wall of an aperture leading from the aperture 72 and having its outer end bent upwardly at right angles over the head of the pin 70. The keys 64 are each provided on their rear end with a rearward projection or apron 76 which underlies a forward projection 78 on the forward end of the succeeding key, the projections 76 and 78 corresponding to the projections 20 and 21, respectively, of the keys 18.

With this construction it will be apparent that as a row of keys and their carrier bar 2 are passing over a sprocket wheel of the grate, that a sufficient space is provided between adjacent ends of the keys 64 to permit the pin 70 to be retracted a sufficient distance, as indicated in Fig. 5, to be disengaged from the dove-tail bar 54 so as to permit the keys 64 to be removed and replaced, and in case one of the keys 18 becomes broken a new key may be slipped over the end of the bar and into position, and such removal and replacement of both the keys 18 and 64 may be accomplished without interrupting the operation of the grate. The outer ends of the pins 70 are positioned below the fuel supporting surfaces of the keys 64 and are well protected from the burning fuel by the forward projections 78 on the succeeding keys so that the danger of clinkers forming over the ends of the pins is reduced to a minimum.

Figs. 7, 8 and 12 illustrate means, of a slightly different construction from that illustrated in Figs. 1 and 2, for securing the adjacent ends of two carrier bars to one of the sprocket chains 10. These carrier bars which are indicated at 80 are provided with fuel supporting portions 82 on their adjacent ends which are similar to the portions 4. As shown, this means comprises a supporting block 84 having its lower end pivotally mounted on the pivot pin 32 of a link of the chain 10, and having longitudinally extending ribs 86 on its upper portion which project into recesses in the under sides of the portions 82, respectively. The forward ends of the ribs 86 are provided with transverse slots 88 which receive rearwardly projecting lugs 90 on the forward walls of the recesses in the portions 82, and the rearward ends of the ribs 86 are provided with transverse slots 92 which receive the inner ends of locking pins 94 which extend through apertures 96 in the outer longitudinal walls of the portions 82, the pins 94 cooperating with the lugs 90 to hold the portions 82 in position on the pivoted block 84. The pins 94 are removably held in position by means of metal strips 98 which are similar to the strips 46 of the locking pins 44, each of them having their inner ends bent at right angles and engaging a shoulder 100 constituting a wall of an aperture leading from the aperture 96 and having its outer end bent upwardly at right angles over the outer end or head of the pin, the inner position of the pins being limited by stop lugs 101 formed on the portions 82.

In the construction illustrated in Figs. 9, 10, 11 and 13 the means for securing adjacent ends of two carrier bars to the sprocket chain 10 comprises a block 102 having its lower portion pivotally mounted on the pivot pin 32 of a link of the chain and having its upper portion projecting into recesses 104 in the under sides of fuel supporting heads 106 of these carrier bars. The upper end of the forward side of the block 102 is provided with forwardly projecting lugs 108 that extend over rearwardly projecting lugs 110 on the rear wall of the recesses 104, and the rear portion of the block 102 is provided with a forwardly projecting lug 112 that extends over rearwardly projecting lugs 114 on the wall of the recesses 104. The upper portion of the rear side of the block 102 is engaged by pins 116 that extend through apertures 118 in the outer longitudinal side walls of the heads 106 so as to cooperate with the lugs 108 and 112 to securely hold the heads 106 on the pivoted supporting block 102. The pins 116 are removably held from outward movement by means of metal strips 120 corresponding to the strips 98 of the construction illustrated in Figs. 7 and 8. The inward position of the pins 116 is limited by a stop lug 122 on the rear side of the pivoted block 102.

As will be evident to those skilled in the art my invention permits of various modifications without departing from the spirit thereof or the scope of the appended claims.

What I claim is:

1. A furnace grate structure having, in combination, a fuel supporting member having a recess in its under side and an aperture, a support for said member having a portion thereof extending into said recess and provided with a projection, one wall of said recess having a projection extending beneath the projection on said support, a pin removably inserted through said aperture and into engagement with said support so as to cooperate with said projections to detachably secure said fuel supporting member on said support, and means for detachably securing said pin in position comprising a member having a portion extending over the outer end of said pin and adapted to be displaced from said position to permit removal of the pin.

2. A furnace grate structure having, in combination, a fuel supporting member having an aperture therein. a support therefor, and means for detachably securing said fuel supporting member on said support comprising a pin inserted through said aperture in the fuel supporting member and into position to engage said support, and means for holding said pin in position comprising a member having one end extending into and secured in said aperture and having its other end bent over the outer end of said pin.

3. A furnace grate structure having, in combination, a fuel supporting member having an aperture therein with the wall of said aperture provided with a shoulder, a support therefor, and means for detachably securing said fuel supporting member on said support comprising a pin inserted through said aperture in said fuel supporting member and into position to engage said support, and means for holding said pin in position comprising a metal strip having one end bent at an angle, inserted a distance through said aperture and hooked over said shoulder, and having its outer end bent over the outer end of said pin.

4. A traveling grate having, in combination, carrier bars arranged end to end and extending transversely of the grate, adjacent carrier bars having fuel supporting portions on their adjacent ends, and each of said portions having a recess in its underside, a chain for supporting adjacent ends of said bars, and connections between said bars and said chain comprising a block pivotally mounted on said chain and extending into the recesses in both of said adjacent portions, and means for securing said portions to said block.

5. A traveling grate having, in combination, an elongated fuel supporting member extending longitudinally of the grate having a recess in its under side, a support extending into said recess, said member having an aperture in one end, and a pin extending through said aperture having its outer end spaced a distance below the fuel supporting surface of said member and having its inner end positioned in engagement with said support, an upper portion of the outer end of the wall of said aperture being cut away to enable access to be had to the head of said pin.

6. A furnace grate structure having, in combination, a fuel supporting member having an aperture therein, the wall of said aperture being provided with a shoulder spaced from its outer end, a support for said member, and means for securing said member on said support, comprising a pin inserted through said aperture with its inner end positioned beneath a portion of said support, and a metal strip having one end bent at right angles inserted a distance through said aperture along side of said pin and hooked over said shoulder, the outer end of said strip being bent over the outer end of said pin.

7. A furnace grate structure having, in combination, a fuel supporting member having an aperture therein, a support for said member, and means for securing said member to said support, comprising a pin inserted through said aperture with its inner end positioned adjacent a portion of said support, and means for detachably securing said pin in position comprising a member having one end portion secured in said aperture and having its outer end portion engaging the outer end of said pin and adapted to be displaced from said position to permit removal of the pin.

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