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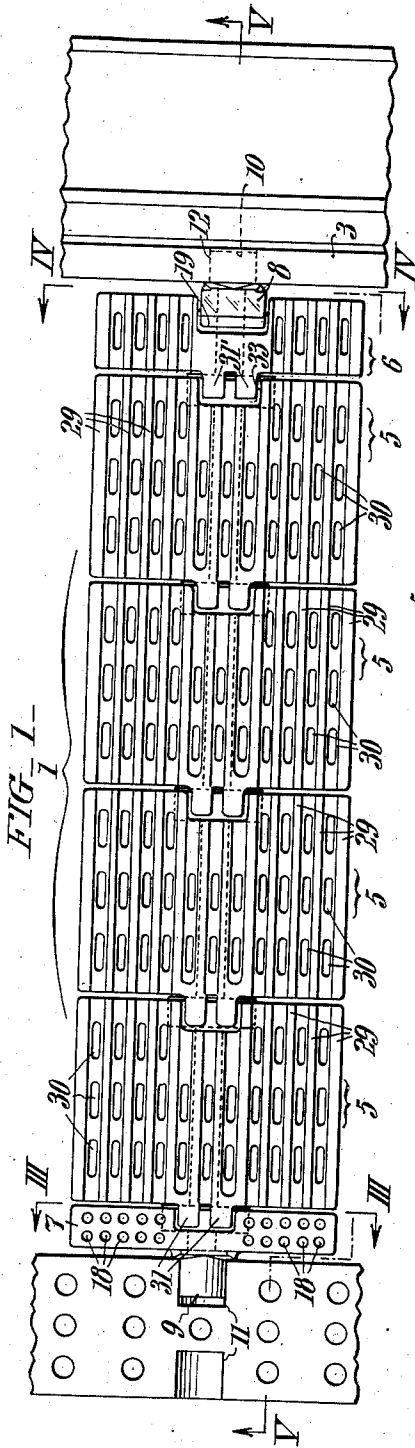
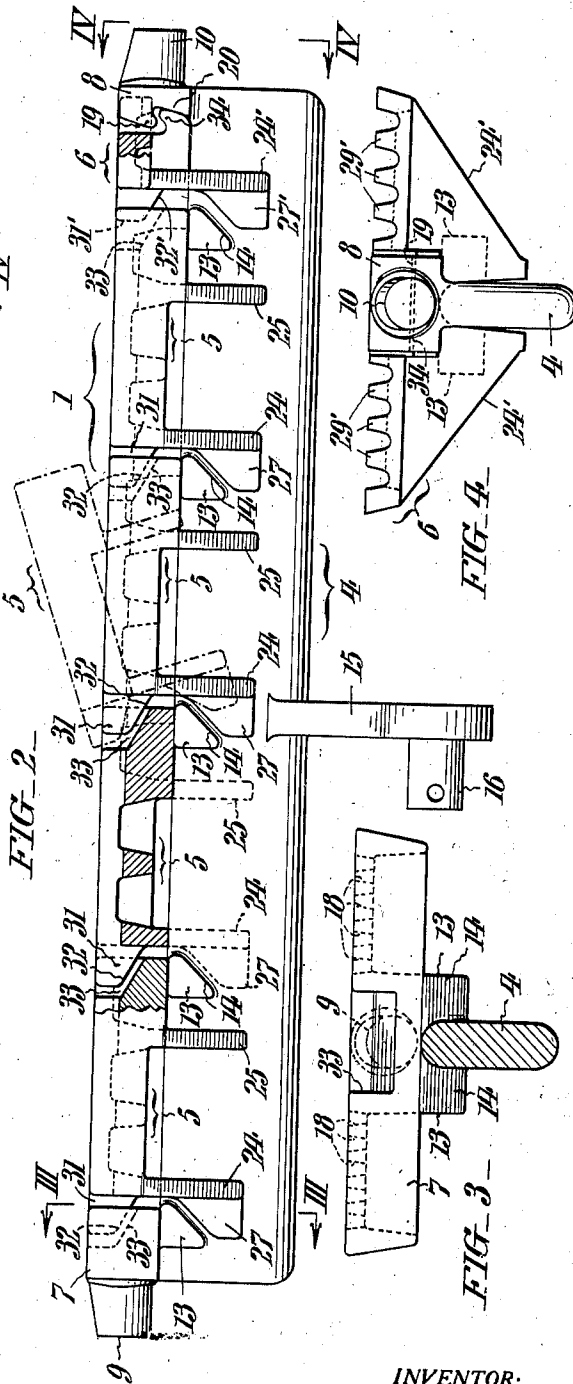
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2,258,280

GRATE

Filed Feb. 24, 1941

2 Sheets-Sheet 1



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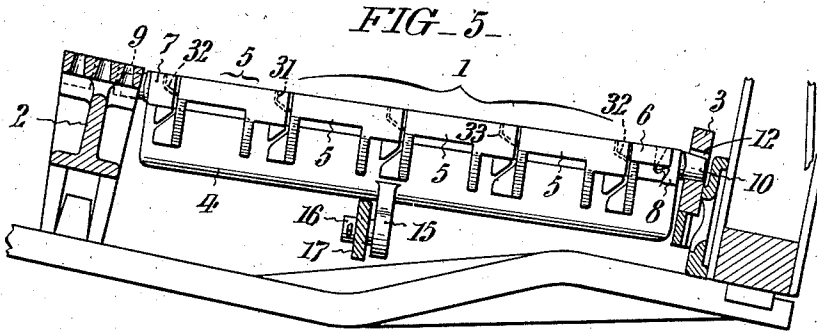
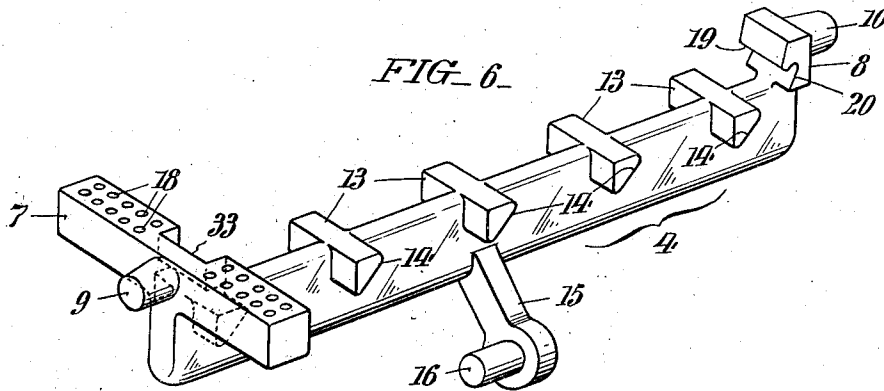
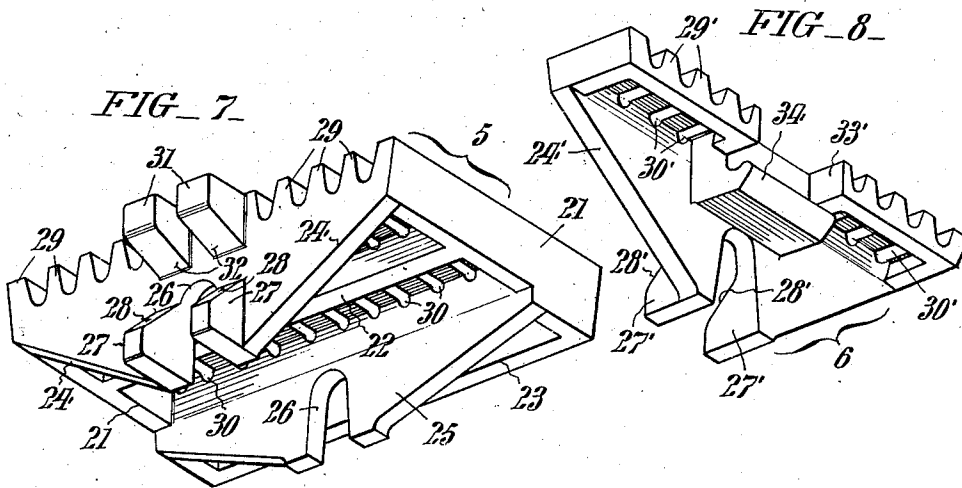
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,258,280

GRATE

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7 Claims. (Cl. 126—168)

This invention in its broader aspects has reference to grates and, more particularly, to the species commonly known as heavy-duty grates such as included in locomotive fire-boxes, boiler furnaces, and so forth.

A primary object of this invention is to provide an improved grate of the above indicated variety which comprises sections including serially-mounted main units, of substantially uniform size and proportions, and a substantially smaller locking unit.

Another object is to provide a grate of the species noted in the preceding paragraph including means whereby the serial main units and the locking unit are interengaged at their contiguous ends; and a common carrier bar embodying lateral projections with a filler piece at one end and a projection at the other end, for coaction with a complemental projection on the locking unit in retaining the several units in mutual connection.

A further object is to furnish grate main and locking units of the referred to species embodying means, for coaction with the carrier bar lateral projections, whereby all of said units are normally interlocked against separation by forces tending to disconnect them during shaking of the grate as a whole.

Subsidiary objects have reference to structural refinements whereby the improved grate, hereafter more fully disclosed, is adapted for quick assembly and expeditious removal of a damaged unit or units whenever desirable or expedient.

The above stated objects, with ancillary advantages, will be clearly apparent from the following detailed explanation of the selected embodiment thereof exemplified in the accompanying drawings, wherein like reference characters designate corresponding parts in all the views; while the concluding claims more particularly define the features of novelty over the prior art.

In the drawings:

Fig. 1 is a plan view of a grate section embodying the instant improvements with a fragmentary portion of the associated bearing means.

Fig. 2 is a longitudinal side elevation of the grate section and carrier bar removed from the bearing means, and having parts in section for a clearer understanding of structural details.

Fig. 3 is a lateral section viewed in the direction of the angled arrows III—III in Figs. 1 and 2.

Fig. 4 is an end elevation viewed in the direction of the angled arrows IV—IV in Figs. 1 and 2.

Fig. 5 is a relatively reduced scale, longitudinal section taken approximately on the plane V—V in Fig. 1.

Fig. 6 is a perspective view of the section carrier bar.

Fig. 7 is a perspective view of one of the grate section main units looking upwardly from below the same; and,

Fig. 8 is a similar view of the associated locking unit.

In describing the form of this invention exemplified in the two sheets of illustrative drawings herewith, specific terms will be employed for the sake of clarity, but it is to be understood the scope of said invention is not thereby limited; each such term being intended to embrace all reasonable equivalents which perform the same function for an analogous purpose.

Referring now with more particularity to the illustrated embodiment of this invention, a grate section is comprehensively designated by the reference character 1, it being readily understood that the grate as a whole comprises an assembly of such units in juxtaposition for lateral support intermediate the conventional frame center and side bearers 2, 3, respectively, and, inasmuch as the sections 1 correspond, the following description will be restricted to a full explanation of one in order to obviate unnecessary repetitive matter.

Each grate section 1 comprises a carrier bar 4, a plurality of rectangularly-contoured fuel-supporting main units 5 and a locking unit 6.

The carrier bar 4 is a longitudinal beam, see Fig. 6, embodying at one end a transversely related up-set filler piece 7 and at the other end a similarly up-set hook section 8, said filler piece and hook section respectively having axially aligned projections or trunnions 9, 10; the former 9 of which being adapted for pivotal engagement in spaced recesses 11 provided for the purpose along the center bearer 2, and the latter for insertion into similarly spaced holes 12 along the side bearers 3. In addition, the carrier bar 4 is provided along its upper part with flanking laterally directed lugs 13 at intervals of its length, preferably of the form best appreciated from Figs. 2 and 6; that is to say each said lug is of somewhat right-angled triangular cross-section having the two sides including the ninety degree angle respectively horizontal and vertical to the upper edge of the bar 4, with the hypotenuse or side 14 opposing such angle inclined in respect thereto for a purpose later set forth. The carrier bar 4 also embodies an angularly directed arm 15 with a laterally related pin projection 16 for attachment of a conventional shaker rod 17, Fig. 5, in accordance with known practice; while the filler piece 7 is provided with frusto-conical shaped apertures 18, whereas the hook section 8 has a rounded lip 19 and an adjacent inclined abutment face 20.

Each main unit 5 is of hollow rectangular formation to include paralleling stepped walls 21, 21 with intervening spaced walls 22, 23 and relatively deeper buttressing walls 24, 25 having

medially located cut-outs or notches 26 of a shape to seat on the carrier bar 4. It is to be particularly noted that the wall 24 is provided with outwardly directed lugs 27 flanking the notch 26 therein and including sloped faces 28 for coaction with the carrier bar projection inclined sides 14, as clearly understandable on an examination of Figs. 2 and 5; while the relatively remote wall 23 is of a depth to directly seat on top of the bar projection 13. The unit 5 is formed across the upper face with parallel bar portions 29 and intervening air passages 30, while the wall 24 embodies one or more lugs 31 co-planar with the bars 29, said lugs having the under faces 32 inclined to the horizontal for engagement in an aligned recess 33 in the opposing wall portion 23 of an adjoining unit 5, or the filler piece 7. It is to be noted that by extending the buttress walls 24, 25 downwards, as shown, they jointly serve to protect the unit outward lugs 27 from forces introduced when shaking the section 1 and tending to cause misalignment or displacement by straddling coaction of the cut-outs 26 with the carrier bar 4.

The smaller locking unit 6 is similar in general construction to the main units 5, accordingly corresponding reference characters are applied with a prime exponent for purposes of illustrative differentiation only; while the end recess 33' is provided with a subjacent hook 34 in inverted relation to the carrier bar hook section 8, and under which it is adapted for disposal to effect mutual interlocking of all the units 5 and 6 to the carrier bar 4.

The section units 5, 6 are assembled by commencing at the filler piece end of the carrier bar 4, with placement of the main units 5 consecutively in straddling engagement thereon and sliding them to the left-hand as viewed in Figs. 1, 2 and 5. In this position the lugs 27 of each unit 5 will be located below the carrier bar superjacent lateral projections 13; with the respective end lugs 31 in the recesses 33. When the last or outermost right-hand unit 5 has been applied to the carrier bar 4, the locking unit 6 is dropped vertically downward until it rests on said bar, whereupon it is moved to the right until the subjacent hook 34 thereon is located below the carrier bar hook section 8. Now it will be readily apparent that, the carrier bar lugs 13, unit lugs 27, and the locking faces 32, 33 being formed as described, they will gravitationally force the main units to the right and hold the locking unit hook 34 under the carrier bar hook section 8.

A damaged unit 5 may be readily replaced by first removing the locking unit 6, and shifting the main units to the right of said damaged one until the latter can be lifted from its position, in an obvious manner. In Fig. 2, the manner of applying or lifting out a unit 5 is conventionally indicated in dot-and-dash lines, while the manner of re-locking the units after replacing a damaged one is the same as previously set forth.

The main units 5 and locking units 6 can be made standard for all ordinary sized grates and the length of the carrier bar 4 made to conform by increasing or decreasing the cross dimension of the filler piece accordingly; whereas it will be self-evident the invention hereinbefore described may be used in any type of furnace other than locomotive fire-boxes.

Having thus described my invention, I claim:

1. A grate section for furnaces comprising a carrier bar with means for pivotally supporting

it at opposite ends, and projecting lugs at intervals of its length; and a plurality of removable fuel supporting units in the form of perforated plates serially mounted on the carrier bar, said plates embodying vertically-spaced projections and aligned recesses on the opposite ends so that, when a carrier bar is aligned therewith, the projections and corresponding recesses of adjacent plates will engage and interlock with the laterally projecting lugs of the carrier bar.

2. A grate section according to claim 1, wherein the lugs on the carrier bar are arranged in aligned pairs which project laterally from opposite sides of said bar; the fuel supporting units have bifurcated transverse webs which fit over the carrier bar; and wherein lugs on one of said webs flanking the bifurcation thereof respectively engage beneath an aligned pair of the carrier bar lateral lugs.

3. A grate section according to claim 1, wherein the carrier bar lugs have inclined faces for coaction with complementally inclined edges of projecting lugs on the respective fuel supporting units, such units each embodying other medially located lug means engageable in an aligned recess in the contiguous end of the adjoining unit, and said lug means have inclined underfaces coactive with complementally inclined faces in the associated recess, whereby all of the units are interlocked for gravitation longitudinally of the carrier bar.

4. A grate section according to claim 1, wherein the spaced lugs for mutually interlocking the grate surface plates have their underface inclined to the horizontal, and they seat in a common aligned recess at the contiguous end of the adjoining section.

5. In a grate section of the type described, a carrier bar in the form of a longitudinal member embodying a transversely related up-set filler piece at one end and an up-set hook section at the other end, aligned trunnions projecting from the filler piece and hook section for pivotal support of the carrier bar, laterally directed lugs flank the longitudinal member in spaced pairs, each said lug being of right-angled triangular section with one of the sides including the ninety-degree angle co-planar with the top edge of said longitudinal member, and an angularly directed shaker arm projects downwards from the carrier bar.

6. In a grate section of the type described, a fuel supporting main unit of hollow rectangular formation with spaced depending webs, a medial cut-out in each said web for straddling coaction with the carrier bar for the section, outwardly-directed lugs flank the cut-out in one of the webs, said lugs having the top faces inclined with respect to the horizontal, a medial lug co-planar with the upper surface of the unit at one end with an aligned complemental recess at the opposing end, and such lug and recess have similarly inclined lower faces.

7. In a grate section of the type described, a fuel supporting locking unit of rectangular formation with a depending web, said web having a medial cut-out for straddling engagement over the grate section carrier bar and outwardly directed lugs flank such cut-out at the open end thereof, a centrally located upper lug above the cut-out and an opposing recess at the other side of the unit, and a superjacent hook below the recess.

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