

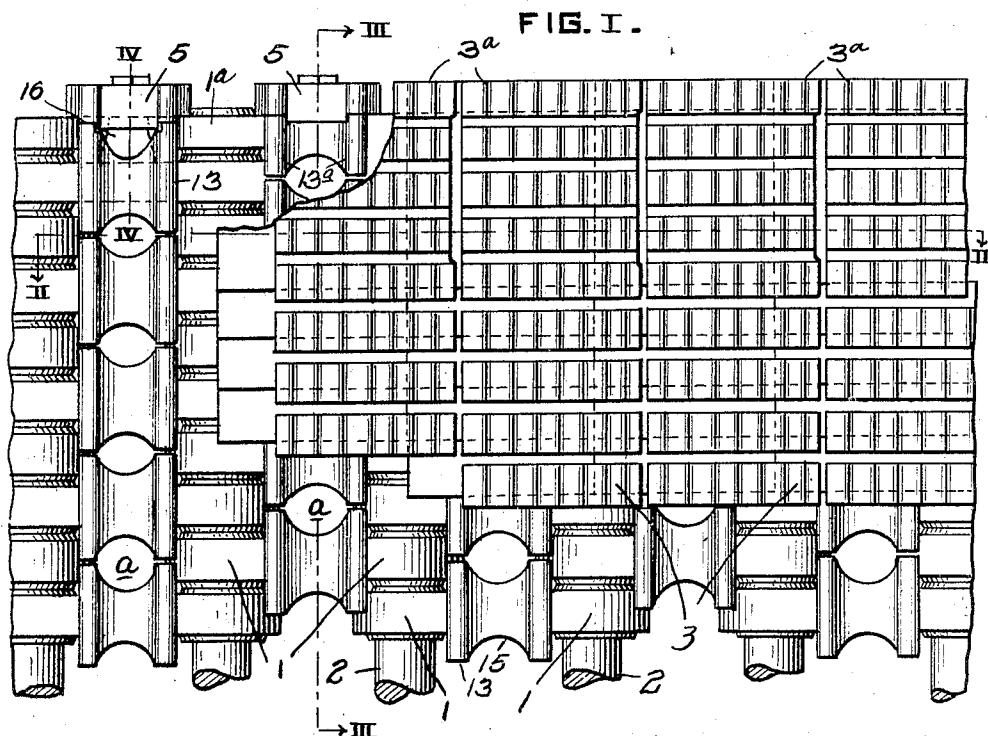
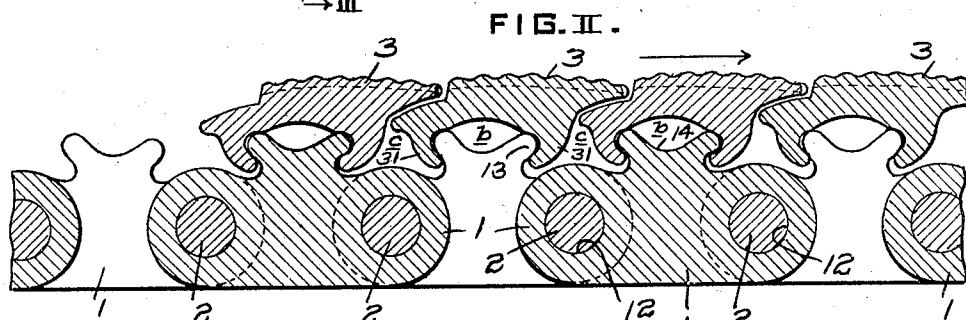
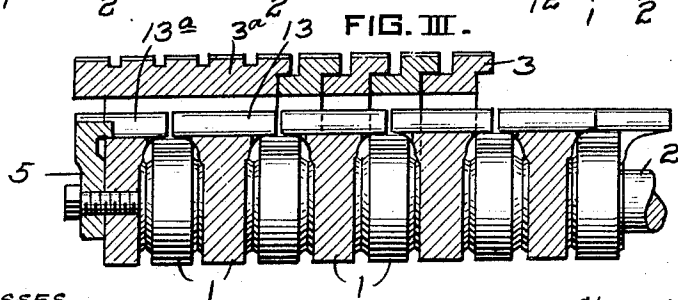
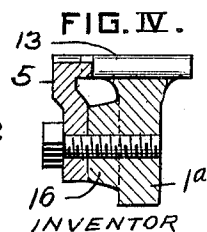
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H. B. HOLT

FURNACE GRATE

Filed July 14, 1922



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UNITED STATES PATENT OFFICE.

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FURNACE GRATE.

Application filed July 14, 1922. Serial No. 575,059.

To all whom it may concern:

Be it known that I, HARRIS B. HOLT, residing at Dormont, in the county of Allegheny and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Furnace Grates, of which improvements the following is a specification.

My invention relates to furnace grates, and particularly to travelling grates of the endless-chain type, which by their movement carry new supplies of fuel to the furnace and carry away the ashes remaining after combustion. The objects of invention are simplicity of structure, durability, facility in replacement, and efficiency.

In the accompanying drawings Fig. I is a fragmentary view of a grate as seen from above, in which my invention is embodied; Figs. II and III are views in longitudinal and transverse section, on the planes respectively indicated by the lines II—II and III—III, Fig. I; Fig. IV is a fragmentary section on the vertical plane indicated at IV—IV, Fig. I.

The grate is made up of a large number of pieces of two kinds: links and grate bars. The links are of two particular shapes, indicated at 1 and 1^a. They are elongate bodies, ordinarily iron castings, with provision for inter pivoting, and to that end have in this instance transverse pivot holes 12 at opposite ends. They are further provided with intermediate outstanding essentially T-shaped lugs 13. Practically, I make these links about seven and one quarter inches long and an inch and an eighth wide. The particular dimensions are unimportant beyond this: they indicate how relatively small is the link compared with the dimensions of the grate as a whole. Wide departure is of course permissible from the dimensions given above by way of example. The T-shaped lugs 13 are in links 1 about twice as wide as the body of the links—about two inches and a quarter wide, more or less. This greater width of the lugs 13 is clearly shown in Figs. I and III. The modification in the lugs formed upon links 1^a will presently be noted.

More minutely examined, these T-shaped lugs are transversely grooved or hollowed, as indicated at 14, and on either side verti-

cally grooved, as indicated at 15. To these minutiae of conformation attention will again be directed.

The multitude of links is assembled and articulated to constitute an endless chain belt, as by means of pivot pins 2. These extend substantially the full width of the assembled grate. The arrangement is a familiar one, and will be recognized on brief examination of the drawings. The articulated links are arranged in transverse rows, the links standing apart at intervals equal to the width of a link, the ends of the links of adjacent rows are interlocked, and the pivot pins unite the links row with row through the so interconnected ends. Thus the successive rows of links stand in echelon formation row upon row, while the whole articulated link assembly has openings or meshes between the links, allowing passage of air through the grate to the bed of fuel above.

It is usual with chain grates to make the chain structure endless and to mount it on opposite sprocket wheels, by the turning of which the desired grate movement is attained. Such mounting and driving will ordinarily be resorted to in the use of the grate of my invention, but, since these matters are of common knowledge, it suffices to make mention of them, without illustration in the drawings.

I have said that the T-shaped lugs extending from the links are twice as wide as the links themselves, and I have said that in assembly the transversely aligned links stand the breadth of a link apart. The links are assembled with these lugs standing out all from the same side of the grate structure, the burden-sustaining side, and accordingly, when assembly has been made, the lugs of each row of links constitute in effect a substantially continuous support, extending transversely from side to side, across the articulated chain structure.

The marginal links are alternately of the forms 1 and 1^a. Links 1 have already been described. Links 1^a differ in this respect only, that their T-shaped lugs are built out laterally from the link bodies on one side only, as indicated at 13^a, Figs. I and III. On the other side the lugs are flush with the lateral face of the link body.

To the marginal links are bolted, midway

of their length, blocks 5; these blocks form stops, to secure the grate bars when strung in line upon the T-shaped cross rails, in the manner presently to be described. The
 5 marginal links 1^a are built out with bosses 16 upon which block 5 may be bolted. This last mentioned detail, shown in Fig. I, is more clearly illustrated in Fig. IV.

The second component of the grate structure is the grate bar. There is a large number of them, and they, but for the exception presently to be noted, are identically alike. They are essentially fuel-supporting plates 3, formed preferably as iron castings, each
 15 provided underneath with two transversely extending convergent lugs 31, defining and forming a seat for the T-shaped lugs 13 formed upon the links 1.

The individual grate bars may be of any
 20 desired width; conveniently they are of equal width with the chain links, that is to say about an inch and an eighth wide, and in assembly they are strung, one after another upon the transverse rails formed by
 25 the T-shaped lugs of the links, after the links themselves have been assembled in the manner already described.

The blocks 5 bolted to place secure the lines of grate bars when applied. The grate
 30 bars, then, like the links, are assembled, in transverse rows, but ordinarily they stand in close succession, touching one another, or substantially in contact. It is not important that the grate bars of successive rows
 35 be aligned or be out of alignment; ordinarily they will stand in alignment, or nearly so.

The drawings show certain more minute features of structure of these grate bars, and these features I shall briefly note. These plate like grate bars are so formed
 40 that when assembled they overlap, in testudo formation, both transversely and longitudinally of the grate. The transverse overlapping is illustrated in Fig. III, the longitudinal, in Fig. II. This refinement of
 45 shape will be understood without further elaboration; the reason for it is, while permitting the passage of air, to prevent the sifting through of fuel and ashes, and also
 50 to screen the chain from the heat of the fire.

The noticeable convex arching of the upper surfaces of the grate bars is a feature
 55 which makes for the easy discharge of the ashes. And this last mentioned feature, together with the transverse corrugating of the burden-sustaining surfaces of the grate bars, facilitates the aeration of the bed of
 60 fuel, and aeration is of course essential to combustion. The features also aid in the feed of fuel and of ashes.

I have said of the grate bars that they

may be of any desired width. Fig. III shows marginal bars 3^a of greater width
 65 than the medial bars of the transverse row. The reason for providing such wider marginal bars is that a tendency to freer aeration of the bed of fuel along the margins is corrected and a more even burning achieved.
 70 Another reason is that with wider marginal bars the whole grate moves more evenly. This provision of wider marginal bars is not, however, a limiting feature, of my invention as here embodied.
 75

Air in sufficient quantities for combustion has free access, through the interstices in the chain, through the spaces *a* defined by and between the grooved T-shaped extensions 13
 80 formed on the links, and between the overlapped grate bars to the bed of fuel above. Aeration is facilitated by the hollow spaces *b*, formed by and between the grooved tops of the T-shaped lugs 13 and the oppositely
 85 recessed under surfaces of the grate bars and by the spaces *c* between the grate bars, and aeration is further facilitated by the arching of and the transverse corrugating of the coal-sustaining upper surfaces of the grate bars.
 90

The sifting through of dust and ashes which tends to foul such a mechanism is by the testudo formation of the assembled grate bars prevented. The structure has a minimum number of parts and is very simple.
 95 The chain support is by the overlapped grate bars completely screened and protected from the heat of the fire. When a grate bar requires to be replaced, it may readily be slipped off laterally and a new bar applied in place, without any greater disturbance of the organized structure.
 100

I claim as my invention:

1. In a chain grate structure a chain made up of rows of interpivoted links, the links
 105 being provided with lugs which in assembly combine and constitute grate bar supports extending transversely across the structure, and a plurality of grate bars borne by said supports in transverse rows, the bars of each
 110 row standing in closed rank side by side.

2. In a grate structure a chain made up of rows of interpivoted links, the links being provided with lugs which in the assembly combine and constitute grate bar supports extending transversely across the structure, and a plurality of grate bars borne by said supports and each grate bar mounted upon and borne by one only of said supports.
 115

In testimony whereof I have hereunto set my hand.
 120

HARRIS B. HOLT.

Witnesses:

FRIEDA E. WOLFF,
 PERCY A. ENGLISH.