

May 28, 1929.

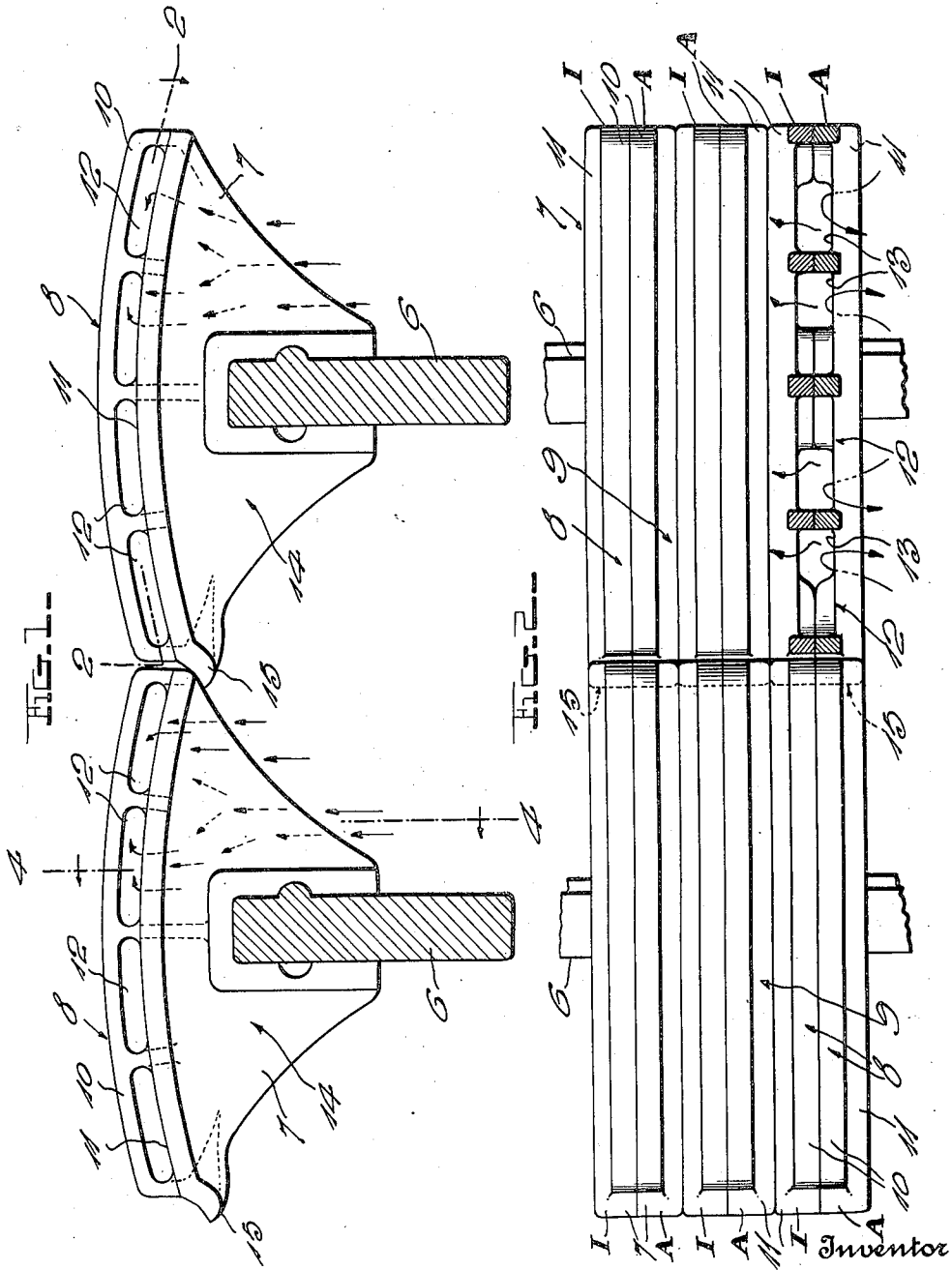
J. W. HULSON

1,715,294

GRATE STRUCTURE

Filed June 13, 1927

2 Sheets-Sheet 1



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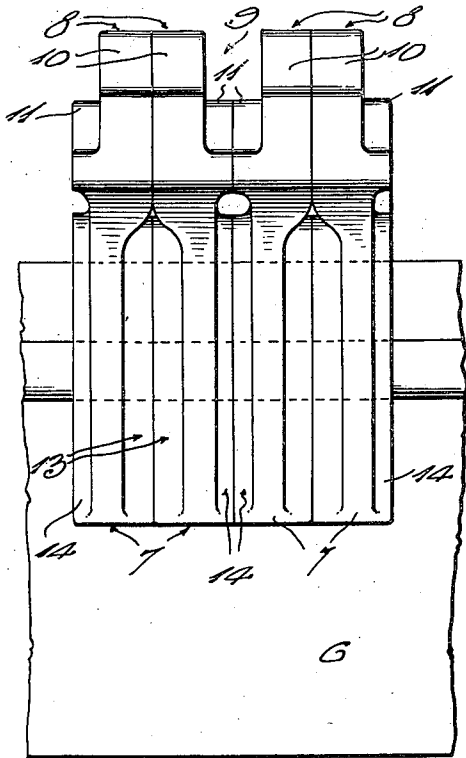


FIG. 3.

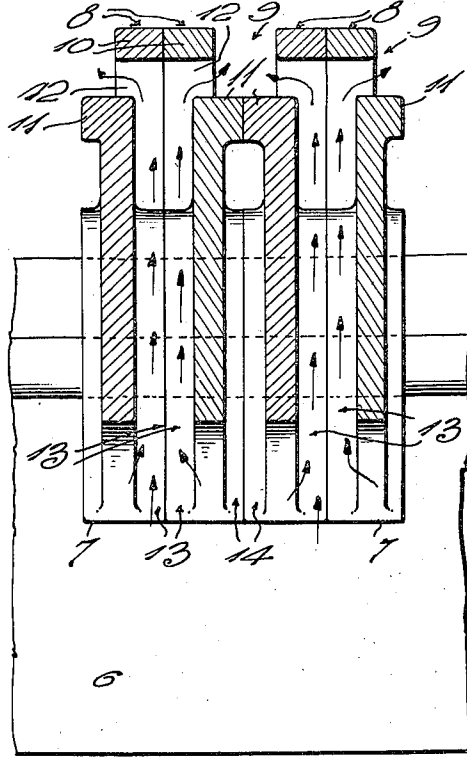


FIG. 4.

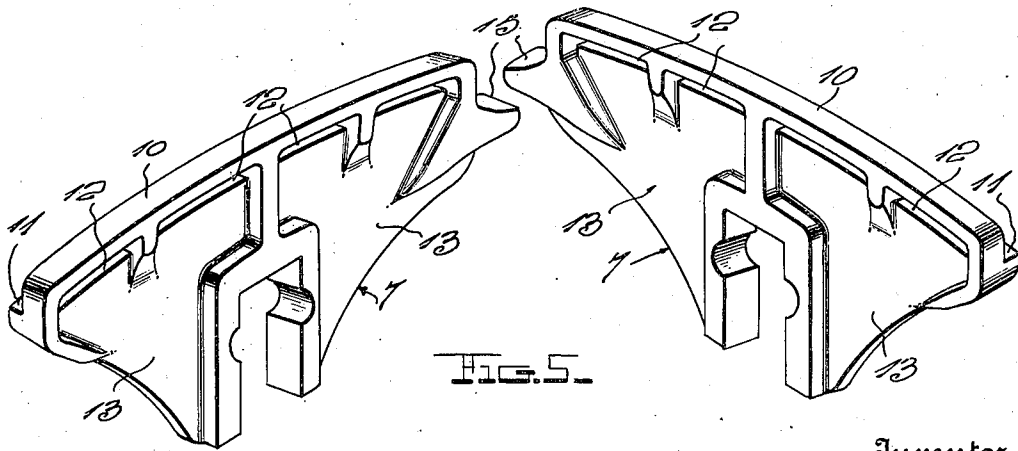


FIG. 5.

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UNITED STATES PATENT OFFICE.

JOHN W. HULSON, OF KEOKUK, IOWA, ASSIGNOR TO HULSON GRATE COMPANY, OF KEOKUK, IOWA, A CORPORATION.

GRATE STRUCTURE.

Application filed June 13, 1927. Serial No. 198,538.

The invention relates to improvements in grates designed primarily for burning lignite fuel, although not restricted to use with such fuel.

5 The principal object of the invention is to provide a grate structure through which the fuel cannot sift, yet of such construction as to admit a large quantity of air.

10 A further object is to provide a grate structure embodying finger bars and finger plates thereon of such novel construction as to provide the upper surface of the grate with alternate ridges and grooves, said plates being formed with passages which admit air
15 through the side walls of said ridges, so that no upwardly opening draught inlets are necessary in the grate structure and hence there is little liability of the fuel sifting there-through.

20 A still further object is to provide a novel arrangement and construction of finger plates, in which effective provision is made for cooling by air contact, greatly reducing the danger of warping.

25 A still further aim is to provide a construction which will be rather simple and inexpensive, may be easily manufactured, and will be highly efficient and desirable.

30 With the foregoing in view, the invention resides in the novel subject matter hereinafter described and claimed, the description being supplemented by the accompanying drawings.

35 Fig. 1 is a fragmentary longitudinal section through a portion of a grate constructed in accordance with my invention.

Fig. 2 is a fragmentary top plan view partly in horizontal section on line 2—2 of Fig. 1.

40 Fig. 3 is a fragmentary side elevation of one of the finger bars and an end elevation of a number of the finger plates mounted thereon.

Fig. 4 is a vertical sectional view on line 4—4 of Fig. 1.

45 Fig. 5 is a perspective view showing two of the finger plates separated from each other to more clearly disclose their construction.

In the drawings above briefly described, the numerals 6 designate the finger bars and 7 denotes the finger plates thereon. These plates are disposed in vertical planes transverse to the bars 6 and said plates are in substantial contact with each other. They may be mounted upon the bars 6 in any desired
55 manner, but preferably in accordance with

U. S. Patent 1,500,920, issued July 8, 1924, to myself and William F. Bradley.

The upper edges of the plates 7 are shaped to provide alternate ridges 8 and grooves 9 extending longitudinally of the grate structure, that is, transversely of the finger bars 6. In the present disclosure, to provide this alternate ridge and groove construction, I provide each plate 7 with a transversely stepped edge, providing a relatively high step 10 and a comparatively low step 11 for each plate, said steps both extending from end to end of the plate. As seen in a number of the views, the low steps 11 of alternate plates (A) are disposed adjacent the low steps 11 of the intervening plates (I), and the high steps 10 of said alternate plates are disposed adjacent the high steps 10 of said intervening plates, providing the alternate ridge and groove construction.

75 The high steps 10 have a plurality of draught inlet passages 12 formed there-through, and the sides of the plates 7 at which said high steps are located, are recessed as at 13, providing vertical air passages leading to the transverse passages 12 from the lower edges of the plates. The passages 12 and the recesses 13 of adjacent plates, register with each other as shown most clearly in Fig. 4.

85 The sides of the plates 7 at which the low steps 11 are located are provided with registering recesses 14 to receive air. Thus, this air and that passing through the passages 13—12, keep the grate structure comparatively cool and hence overcomes warping to a large extent.

By providing the novel construction shown and described or a substantial equivalent thereof, a grate is provided which will effectively burn lignite or other fuel, and the combined area of the draught inlets 12 may be as great as 50% of the total area of the grate surface. Even this proportion may be changed to obtain a greater amount of air if desired, by constructing the grate with the grooves 9 deeper and forming the inlets 12 of greater height. While an abundance of air is admitted through the grate, there is little liability of downward sifting of the fuel therethrough, due to the positioning of the air inlet passages in the ridges 8 and opening through vertical sides thereof into the grooves 9.

To prevent any sifting of fuel through the grate at the ends of the plates 7 of any finger 110

bar, I prefer to provide these plates at one end with lips 15 which are in contact with each other and constitute a continuous flange underlying the adjacent ends of the plates on adjacent finger bars. These contacting lips prevent the existence of vertical openings at the ends of the plates, through which the fuel could sift.

Obviously, the grate may be shaken or dumped in any desired manner, and it may be used in connection with locomotives, stationary boilers, and all types of furnaces consuming solid fuel. In any instance, the grate is efficient and in every way desirable.

Excellent results have been obtained from the exact details disclosed and they are therefore preferably followed. However, within the scope of the invention as claimed, variations may be made.

I claim:

1. In a grate, a finger bar, a plurality of finger plates transverse to and carried by said finger bar, said plates being disposed in contact with each other and having their upper edges shaped to provide alternate ridges and grooves which extend longitudinally of said plates, said plates being formed with draught passages which open through the longitudinal sides of said ridges, and a projecting lip on one end of each plate extending throughout the thickness of the latter, the lips of said plates being disposed in contact with each other and constituting a continuous flange to underlie ends of other finger plates on an adjacent finger bar, thereby preventing the existence of vertical openings between the finger plates of the two finger bars.

2. In a grate, a finger bar, and a plurality of finger plates transverse to and carried by said bar, the upper edge of each of said plates being transversely stepped to provide each with a relatively high step extending from end to end of the plate and a relatively low step also extending from end to end thereof, the low steps of alternate plates being adjacent the low steps of the intervening plates, and the high steps of said alternate plates being adjacent the high steps of said intervening plates, providing alternate ridges and

grooves, said plates having transverse draught passages through their high steps opening into said grooves, and, when assembled, providing vertical air passages whose upper ends communicate with said transverse passages.

3. In a grate, a finger bar, and a plurality of finger plates transverse to and carried by said bar, the upper edges of said plates being transversely stepped to provide each with a relatively high step extending from end to end of the plate and a relatively low step also extending from end to end thereof, the low steps of alternate plates being adjacent the low steps of the intervening plates, and the high steps of said alternate plates being adjacent the high steps of said intervening plates, providing alternate ridges and grooves, the contacting high steps of said plates having transverse registering draught passages opening into said grooves, contacting sides of said plates being formed with registering draught passages from the lower edges of the plates to said transverse passages.

4. In a grate, a finger bar, and a plurality of finger plates transverse to and carried by said bar, the upper edges of said plates being transversely stepped to provide each with a relatively high step extending from end to end of the plate and a relatively low step also extending from end to end thereof, the low steps of alternate plates being adjacent the low steps of the intervening plates, and the high steps of said alternate plates being adjacent the high steps of said intervening plates, providing alternate ridges and grooves, the contacting high steps of said plates having transverse registering draught passages opening into said grooves, half the number of contacting sides of said plates being formed with registering draught passages from the lower edges of the plates to said transverse passages, the other contacting sides of the plates having registering spaces to receive air for cooling purposes.

In testimony whereof I have hereunto affixed my signature.

JOHN WILLIAM HULSON.