Oct. 28, 1930. C. J. PARKER 1,779,852

COAL BURNING GRATE

Filed May 16, 1927 2 Sheets-Sheet 1

FIG. 2

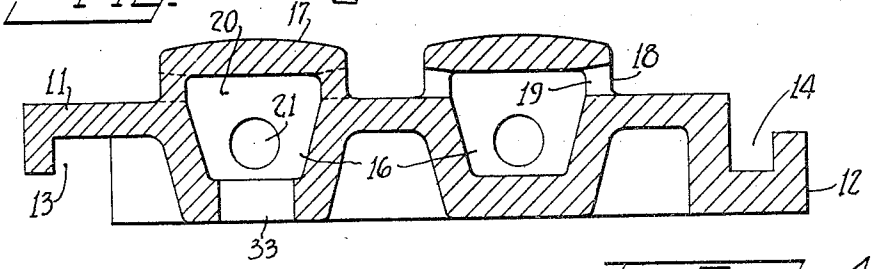


FIG. 4

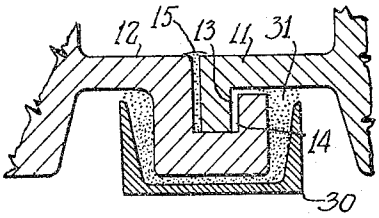


FIG. 3

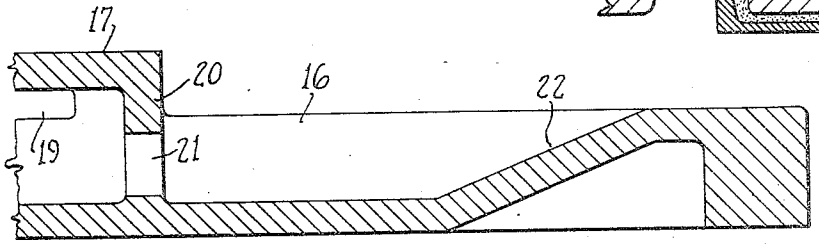
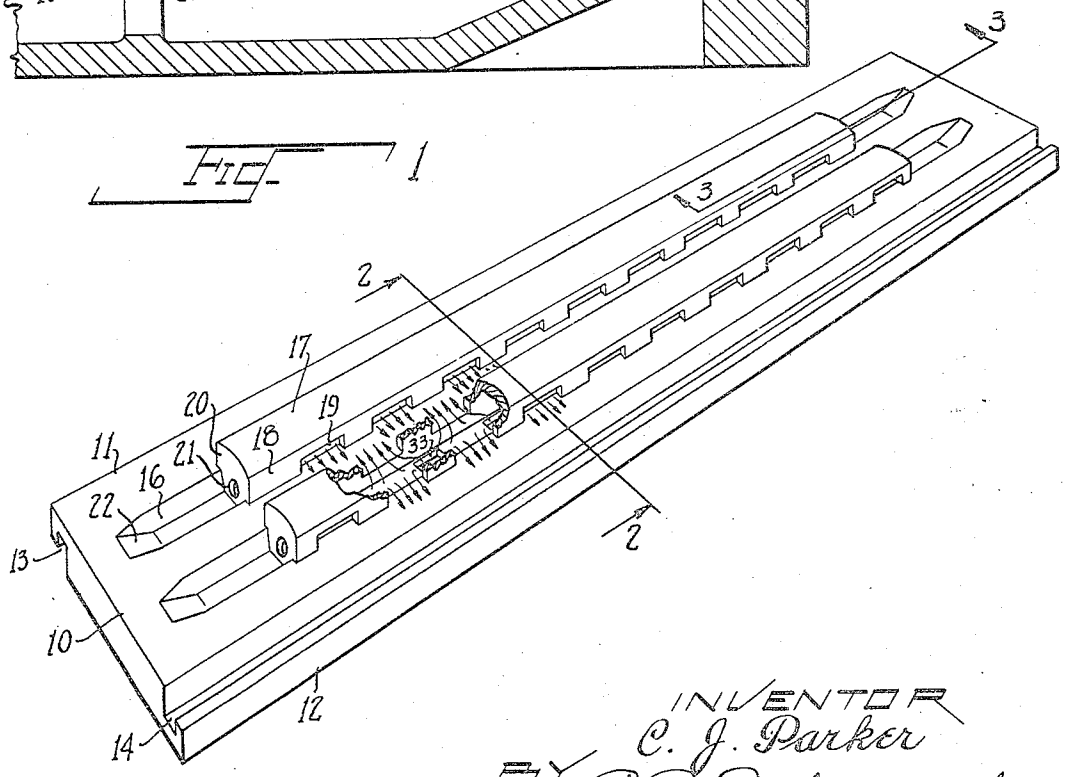


FIG. 1



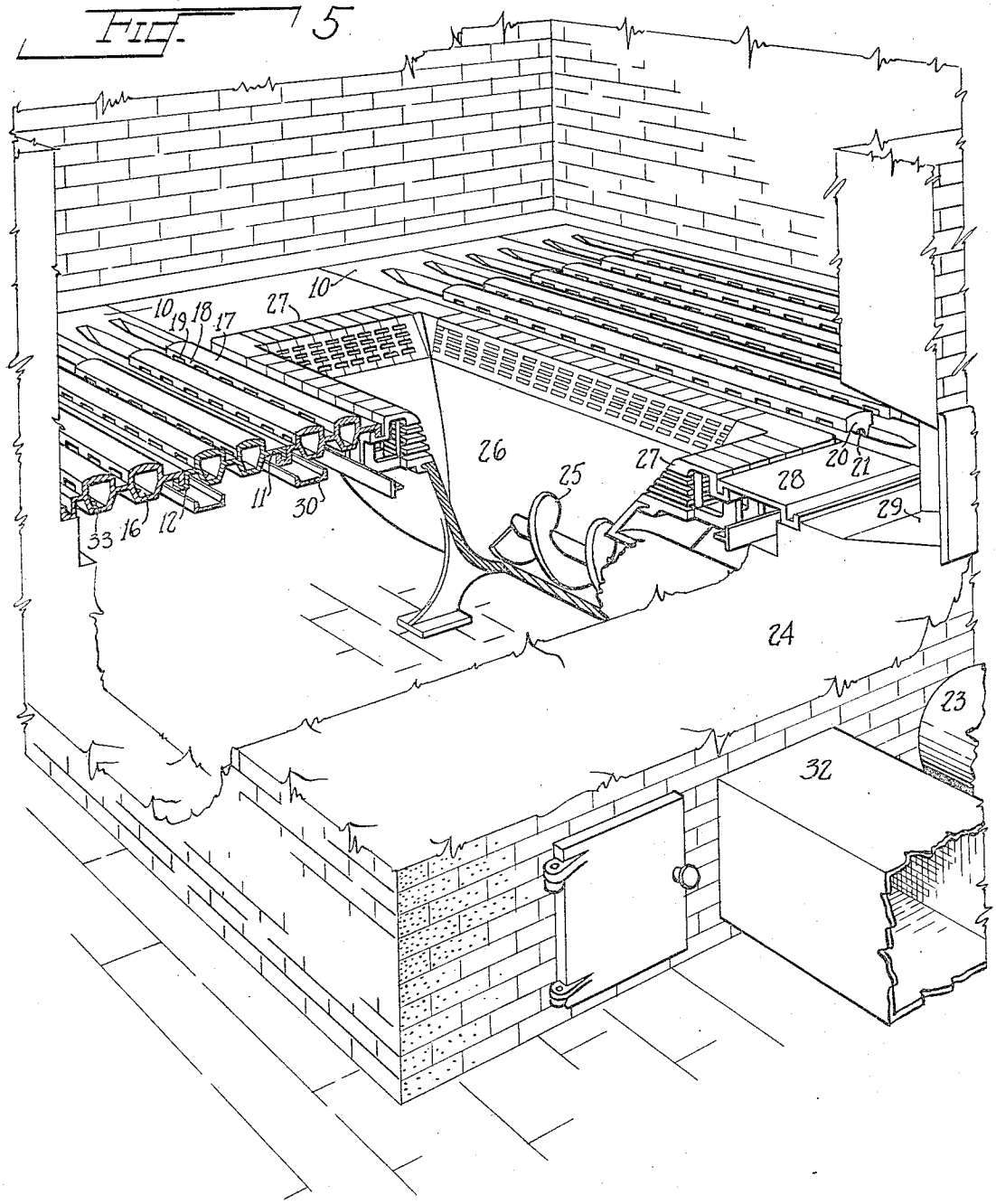
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FIG. 5



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UNITED STATES PATENT OFFICE

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COAL-BURNING GRATE

Application filed May 16, 1927. Serial No. 191,608.

This invention relates generally to coal burning devices, and particularly to a special form of coal burner adapted to burn lignite and similar coal.

The first object of this invention is to provide an exceedingly simple and efficient grate for burning lignite coal without undue loss caused by incoming air carrying off the partially burned fuel.

The second object is to so construct the grate that it can be readily installed in sections and that it can be easily cleaned without danger of injury to the individual sections.

The third object is to so construct the individual sections that their union with adjacent parts is in the nature of a tongue and groove which it is a relatively easy matter to keep air-tight for the purpose of preventing a direct upward draught of air from the source of supply under the grates.

The fourth object is to provide lateral outlets for the air which are so arranged that the entire grooves between the bars will be fire swept, and that all of the air will be completely diffused with the burning gases to an extremely uniform degree throughout the entire grate area with the sole object of eliminating losses caused by over-draughts at various points in ordinary burners.

The fifth object is to so construct the grate that all of the air that passes through same into the combustion area must first pass into a super-heating and pressure-reducing chamber, one of which exists under each section.

These, and other objects, will become more apparent from the specification following as illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of the grate bar with a portion broken away to show the flow of the air. Figure 2 is a section taken along the line 2—2 in Figure 1. Figure 3 is a section taken along the line 3—3 in Figure 1. Figure 4 is a section showing the transverse lap of the grates. Figure 5 is a perspective view showing the grates applied to one type of coal burner.

Similar numbers of reference refer to similar parts throughout the several views.

Referring in detail to the drawings, the grate itself consists of a longitudinal member 10 whose lateral edges 11 and 12 are provided with the downturned groove 13 and the upturned groove 14 adapted to make adjacent grates susceptible to close fitting, with the aid of cement 15, which will prevent any air from blowing upwardly between the grate members. Longitudinally in each grate 10 are formed the channels 16, over the middle portion of each of which is formed a cap 17 whose side walls 18 are provided with laterally-pointing outlets 19 so positioned as not to be opposite a similar opening in the adjacent grate. The purpose of this off-setting is to secure a complete fire sweeping of the space between the walls 18 and the complete mixing and diffusing of the air before it has a chance to spend its force in carrying away the unburned fuel. Each cap 17 is provided at each end with a closing wall 20 at whose lower end is formed an air outlet 21 which can also serve as a clean-out for the grate.

The ends 22 of the channel 16 are preferably sloping to facilitate the removal of ashes.

For the purpose of illustrating the advantages of this grate there is shown an ordinary furnace in which coal is fed through the pipe 23 through the front of the furnace 24 by means of the screws 25 into the fire pot 26, around whose upper inner edge are placed the tuyères 27. A dead-plate 28 occupies the space between the fire door opening 29 and the nearest tuyères 27. It is preferable to provide channels 30 under the grates 10 and to fill the channels with plastic cement 31 before placing the grate bars in position thereby securing air-tight joints between the grates. Air is supplied to the area under the grates 10 through the pipe 32 by a fan, or in any other convenient manner.

The operation of the furnace is as follows: When the grates above described are employed in connection with a furnace, as illustrated in Figure 5, the fuel is fed up into the fire box by means of the screw 25 and gradually accumulates while burning and

falls over the sides of the tuyères 27 onto the bars 10.

When lignite coal is burned it is imperative that no direct blast of air strikes the burning fuel which might otherwise be carried over with the smoke or into the ash pit.

With this construction the air which enters through the pipe 32 passes upwardly through the holes 33 in the bottom of the channel 16. The total of the area of the holes 33 and 21 in each grate is less than the total of the area of all of the holes 19 in the same grate, which causes somewhat of a reduction in pressure in the chamber formed between the cap 17 and the channel 16, as well as the superheating of the air contained therein with a naturally improved burning condition for the fuel.

I claim:

1. A grate bar consisting of a longitudinal bar member one of whose side edges is provided with a downturned groove and the other with an upturned groove, the upper side of said bar having a pair of longitudinal channels formed therein each channel having air inlet holes in the bottom thereof, each channel also having a cap provided with side and end outlet openings through which air may reach fuel on said grate, each side opening having a staggered position with relation to similar holes in the adjacent side of the nearest bar.

2. In a grate for coal burning furnaces consisting of a longitudinal bar having downturned ends and sides, one side thereof having an upturned flange formed thereon and the other side having a corresponding downturned flange formed thereon, the top of said bar forming a relatively smooth surface having a pair of longitudinal channels formed therein extending almost the entire length of said bar and whose ends incline upwardly to the top of said bar; a continuous cap for each of said channels having lateral air outlet openings formed therein, the adjacent sides of each pair of caps having a spaced relation, said sides having their air outlet openings alternating in position, and the bottom of said channels having air inlet openings therein of smaller area than are the outlet openings in their respective caps.

3. A grate bar consisting of a flat longitudinal member having a plurality of longitudinal parallel grooves formed on the top thereof which terminate short of the ends of the bar, each of said grooves having an elevated cap formed over same having sides extending downwardly to the top side of the grate bar and ends extending downwardly to the bottom of its respective groove, said caps extending longitudinally along said grooves and terminating short of the ends of said grooves, said cap ends and said cap side members having air outlet holes formed therein.

4. The combination of a plurality of longitudinal grate bars each of which has an upturned flange formed along one edge thereof and a downturned flange formed along the opposite edge thereof, the downturned flange of one bar engaging the upturned flange of the next adjacent bar in a manner to present a straight even top surface to the grate, the under side of the upturned flange of each bar forming a downwardly extending rib and a supporting channel forming a groove in which said rib rests, said groove containing a plastic filling which seals the union between the sides of the bars resting on same.

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