Sept. 19, 1933. T. H. BANFIELD 1,927,199

COMBUSTION PLATE FOR STOKERS

Filed Dec. 17, 1929

FIG. 1

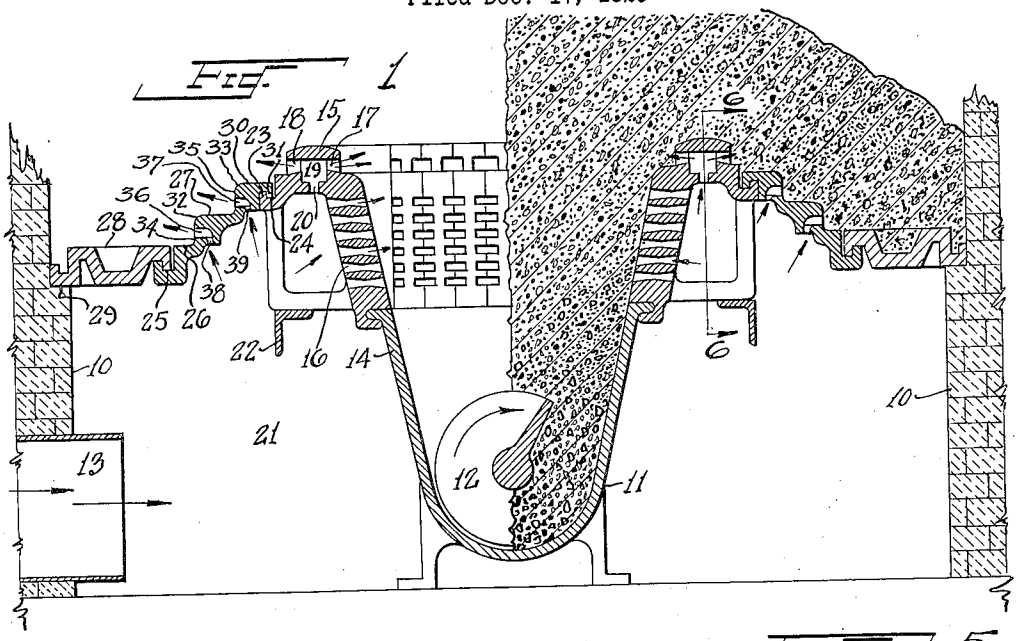


FIG. 2

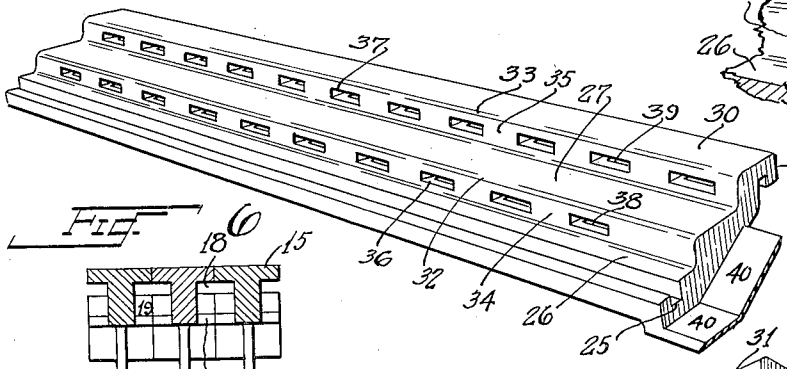


FIG. 5

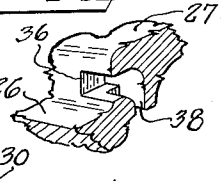


FIG. 4

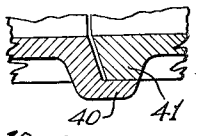


FIG. 6

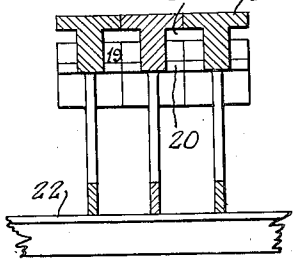
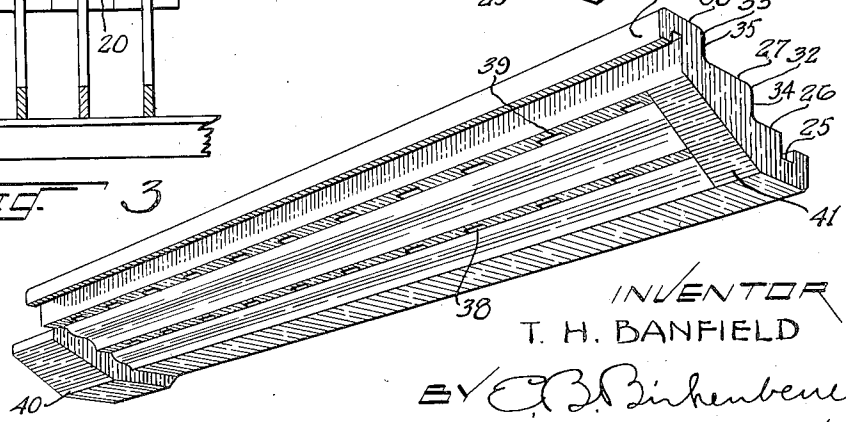


FIG. 3



INVENTOR
T. H. BANFIELD
BY E. B. Birkenbeuel.
ATTORNEY

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COMBUSTION PLATE FOR STOKERS

Thomas H. Banfield, Portland, Oreg., assignor to Iron Fireman Manufacturing Company, Portland, Oreg.

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Serial No. 414,631

5 Claims. (Cl. 110—47)

This invention relates generally to underfeed stokers, and particularly to a form of stepped combustion plate used in conjunction therewith.

The main object of this invention is to provide a form of coal burning combustion plate having a plurality of air outlet openings in which there exists a restriction to the flow of air for the purpose or reducing the force of the blast to the greatest degree around the outer portion of the fire bed where the burning coals are lightest.

The second object is to provide a form of combustion plate which will increase the burning area thereof without increasing the horizontal dimensions of the grate surface.

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

Figure 1 is a transverse section through a typical form of underfeed stoker on one side of which is indicated the approximate shape of the fuel bed.

Figure 2 is a perspective view of the stepped combustion plate element from its outer upper side.

Figure 3 is a perspective view of the stepped combustion plate element from its inner under side.

Figure 4 is a longitudinal section through an overlapping end joint.

Figure 5 is a perspective view through an air duct.

Figure 6 is a section taken along the line 6—6 in Figure 1.

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

Referring in detail to the drawing, in order to illustrate this invention there is shown the usual form of setting 10 within which is placed the fuel duct 11 of an underfeed stoker provided with a conveyor 12 operated by a suitable mechanism (not shown). Opening into the area around the fuel duct 11 is an air inlet pipe 13 through which air is delivered by means of a fan or blower (not shown). On the outwardly flanged sides 14 of the fuel duct 11 are mounted the tuyères 15 provided with the Venturi openings 16, the topmost inner openings 17 and the topmost outer openings 18 communicating with a channel 19 into which air can enter through the relatively small openings 20 from the air box 21. The tuyères 15 are supported by the angle bars 22, or in any other convenient manner. The outside edge of each tuyère 15 is provided with an upwardly turned flange 23 forming a groove 24 into which the side edges of the ordinary horizontal dead plate is normally positioned.

With my construction instead of employing a horizontal dead plate I prefer to use the form shown in Figures 2 and 3 in which the combustion plate consists of four terraces, the lowermost terrace 25 which is the bottom of the channel, the second terrace 26 corresponding with the top level of additional horizontal dead plates which may be associated therewith and the terrace 27 which forms the first terrace above the line of the dead plate 28 (which of course may vary in number) one side of which rests on the channeled terrace 25 and the other side of which rests on the shoulder 29 of the brickwork in the setting 10. The fourth terrace 30 is the uppermost one and terminates in a downwardly turned flange 31 which rests in the grooves 24 of the tuyères 15. The corners 32 and 33 between the upright faces 34 and 35 and their respective terraces 27 and 30 are rounded for the purposes of providing a smoother casting and one which will not be so apt to burn away, as well as to remove unnecessary metal therefrom. Obviously the number of terraces can be varied without departing from the spirit of the invention.

Through the faces 34 and 35 are formed the enlarged openings 36 and 37 which are not directly underneath each other but preferably bear a staggered relation, as shown in Figure 2. The openings 36 and 37 communicate by restricted downwardly extending passages 38 and 39 with the air box 21. The restriction offered by the reduced openings 38 and 39 is such as to allow a softer blast of air to enter the coal bed than is possible from the openings 16 for the reason that by the time fuel has traveled to the outermost portion of the grate surface its volatiles have been largely driven off leaving it very light and susceptible to being carried away by the burned gases if the air at this point is moving too rapidly.

By the construction above described it will be be seen that there is not only provided an increased grate area but also an improved burning action, due to the fact that air passes out of the horizontal openings 36 and 37 into the almost completely consumed fuels without any danger of these openings becoming obstructed by the passing materials. While the exact depth of fuel will vary under different operating conditions, it will preferably follow closely to the line indicated in the drawing.

It is aimed to have the flow of air decrease outwardly starting from the openings 16 and

gradually reducing past the openings 17 and 18 until the minimum flow is secured at the openings 36 and 37.

In Figure 4 is shown the form of joint employed where the length of one step combustion plate is insufficient for the purpose, in which case there is provided the angular flange 40 upon which the end 41 of an adjacent combustion plate can rest.

It can be seen that by the use of the angling and reduced openings, 36 and 37 whose intakes are considerably smaller than are their outlets and that the outlets of the holes 36 and 37 are horizontal, that not only is the static head of the air within the box 21 reduced but there is little chance for the holes 36 and 37 to become choked with coal or ashes. By angling the passageways, the restriction is still further increased without providing any greater difference in area between the holes 36 or 37 and their respective intake openings 38 or 39.

By increasing the burning area of the grate is meant to increase the area measured in a horizontal plane over which the coal is supplied with air passing through the combustion plates.

I claim:

1. A combustion plate for underfeed stokers having a stepped upper surface the risers of said steps having horizontal air outlet passages formed therein and having vertical inlet passages of less cross sectional area than the outlet passages discharging into said outlet passages.

2. A combustion plate for underfeed stokers comprising a longitudinal member having a stepped cross section, the individual steps thereof having risers normal to the treads thereof, the risers of said steps having horizontally discharging air outlet passages, each of said outlets having a downwardly extending inlet passage, said inlet passages having less cross sectional area than the outlet passages.

3. A stoker having in combination a retort having air delivering tuyères encricling same, combustion plates sloping downwardly and laterally from said tuyères, said combustion plates having horizontally and outwardly discharging openings therein, and vertical inlet openings of less area than the area of the discharge openings, said inlet openings communicating with said outlet openings.

4. A combustion plate for underfeed stokers having a stepped fuel-engaging surface, the risers in the steps thereof having air outlet passages therein connecting with openings of less cross sectional area which communicate with the under side of the combustion plate.

5. The substance of claim 4, and an extension flange along one end of said plate the upper side of which occupies the same plane as does the under edge of the opposite end of said plate.

THOMAS H. BANFIELD.