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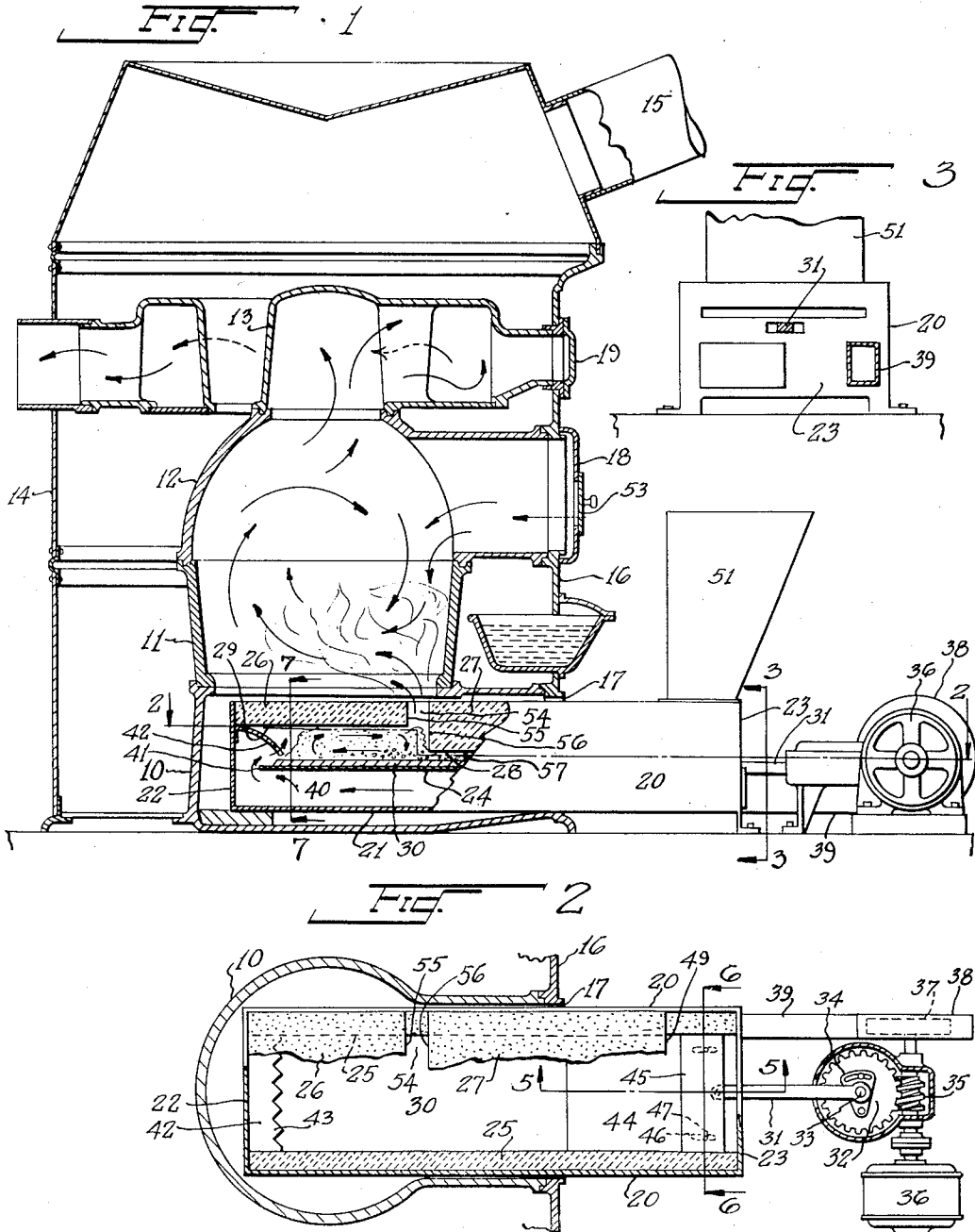
W. W. JONES

1,939,854

STOKER

Filed Jan. 14, 1931

2 Sheets-Sheet 1



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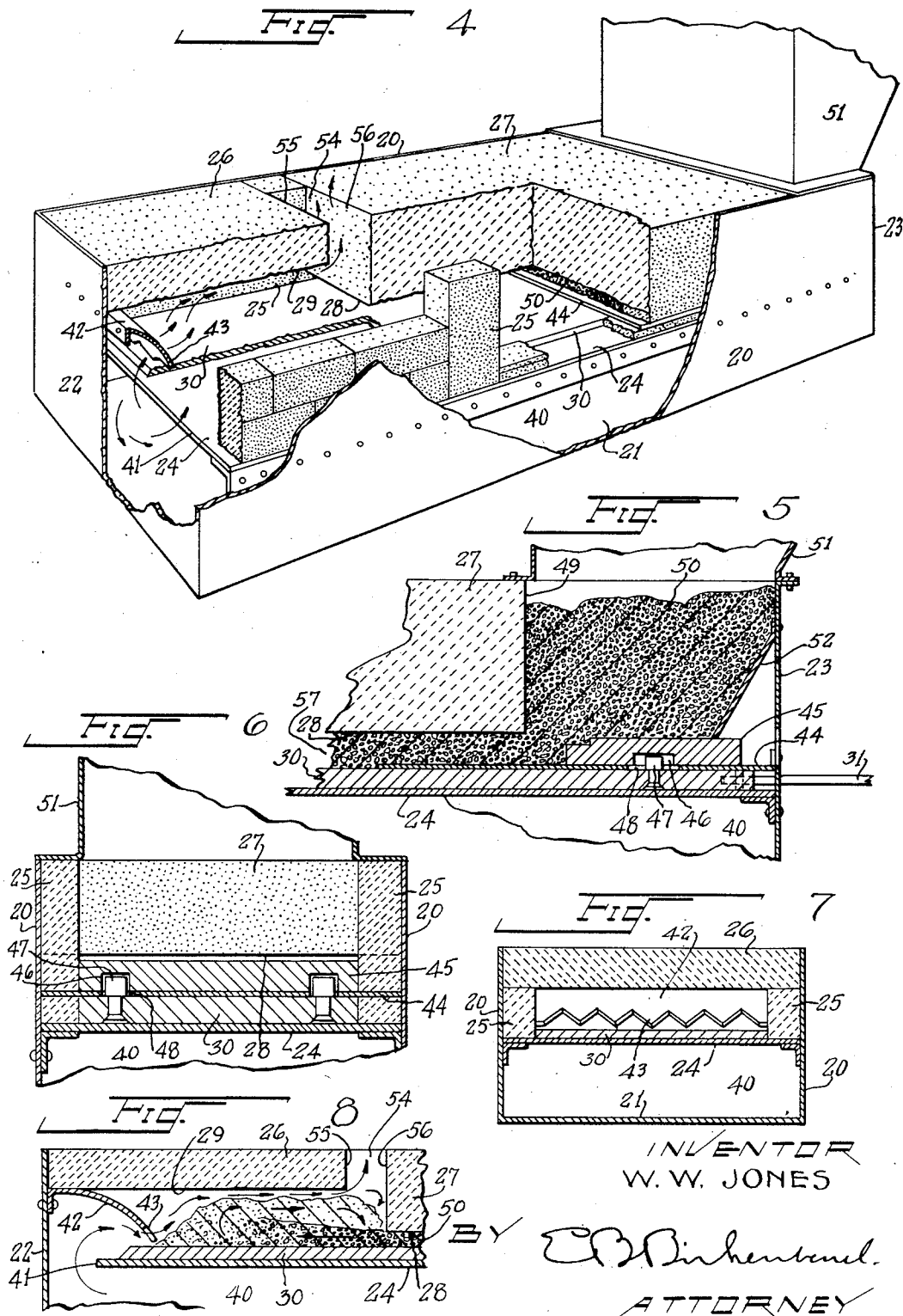
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UNITED STATES PATENT OFFICE

1,939,854

STOKER

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3 Claims. (Cl. 110—46)

This invention relates generally to coal burning devices, and particularly to a stoker.

The main object of this invention is to provide a stoker for industrial and domestic use especially adapted for the utilization of low grade fuel containing a fair per cent of volatiles.

The second object is to provide a stoker in which the fuel is very shallow and in which the combustion takes place at a relatively low temperature which is below the fusing point of the incom-
bustibles.

The third object is to provide a stoker which will totally consume all of the fuel with, of course, the exception of foreign substances such as tramp metal, sand, rock, etc.

The fourth object is to provide a circulating action for the coked materials which will repeatedly bring same into contact with the heat until all of its combustibles have been gasified.

The seventh object is to provide a coal stoker so simple in construction and operation and so adaptable to any existing form of furnace as to make the same available to a greatly enlarged class of users.

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

Fig. 1 is a vertical section through a furnace equipped with this stoker showing a portion of the stoker in side elevation.

Fig. 2 is a plan view of the stoker with portions of the upper surface broken away in order to more clearly show the details of the structure.

Fig. 3 is a vertical section along the line 3—3 in Fig. 1.

Fig. 4 is a perspective view of the stoker with a portion broken away in section.

Fig. 5 is a section taken along the line 5—5 in Fig. 2.

Fig. 6 is a section taken along the line 6—6 in Fig. 2.

Fig. 7 is a section taken along the line 7—7 in Fig. 1.

Fig. 8 is a fragmentary section showing the circulation of the coking fuel.

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

In order to illustrate this invention there is shown the ash box 10 upon which is mounted the fire pot 11 which supports a combustion dome 12 on top of which is placed the usual radiator 13. A casing 14 surrounds this structure and has branching therefrom a number of heat delivery pipes 15. The furnace front 16 is provided with

the usual ash pit door opening 17, fire door 18 and cleanout door 19.

Referring particularly to my device the same will be seen to consist of an elongated box whose sides 20 are held in spaced relation by a floor 21 as well as by the rear side wall 22 and the front end wall 23. About midway up on the sides 20 is mounted a shelf 24 which is stationary and supports the fire brick sides 25 across which is placed a fire brick slab 26 which extends to the rear end wall 22. Across the forward end of the stoker is placed a heavier slab of fire brick 27 whose lower edge 28 is considerably below the lower edge 29 of the slab 26.

On top of the shelf 24 is placed a ram 30 consisting of a plate which only partly occupies the space between the shelf 24 and the under side 28 of the slab 27. The ram 30 is movable and is joined by means of a connecting rod 31 to a crank 32 whose throw is made variable by virtue of the fact that its center 33 is mounted on a movable crank 34 which can be made concentric or eccentric with relation to the worm wheel 32. The worm wheel 32 meshes with a worm 35 driven from the motor 36, which also drives a fan 37 mounted within the casing 38 and which has its discharge 39 opening through the wall 23 into the compartment 40.

It will be observed that the rear end 41 of the shelf 24 is spaced from the end wall 22 for the upward passage of air. Also that there is provided a curved deflector 42 whose downturned edge 43 is serrated for the purpose of preventing stream lining of the air blast.

On top of the ram 30 is placed a stationary plate 44 upon which is slidably mounted a stepped feed plate 45 whose under side is provided with slots 46 into which extend the pins 47 which project upwardly from the ram 30 through the slots 48 in the plate 44. The movement of the feed plate 45 is less than that of the ram 30, due to the lost motion in the slots 46.

The foremost end 49 of the slab 27 is spaced from the end wall 23 and it is through this space that the fuel 50, which is preferably in crushed form, is fed into the stoker from the hopper 51 which is mounted on top of the sides 20. In order to prevent the coal 50 from getting in front of the feed plate 45 there is provided a deflecting chute 52 whose lower edge just clears the movable plate 45. Secondary air is admitted through the fire door 18 under the control of the draft 53.

The operation of the device is as follows: Fire is started by placing suitable kindling in the opening 54 between the front edge 55 and the rear

edge 56 of the fire brick slabs 26 and 27 respectively and the motor 36 is started by any convenient switching mechanism (not shown). Under the combined action of the feed plate 45 which pushes the coal 50 from the hopper 51 into the space 57 between the under side 28 of the slab 27 and the top side of the plate 44, the coal finally reaches the end of the plate 44 and is now carried by the oscillating ram 30. As it proceeds it becomes packed and heated so that by the time it reaches the edge 56 of the slab 27 it is puffed up to several times its original volume. This travel has carried the kindling fire backwardly toward the baffle plate 42 underneath which air is passing over the approaching fuel. This primary air is sufficient to keep alive the gas producing fire and to carry the gas generated toward the opening 54. It will be appreciated that the first gas formed will be CO₂, after which it will be broken down under the action of the heat to CO and it is not burned until it emerges from the opening 54, namely the top side of the slab 26.

As shown in Fig. 8 there is created a circulating movement within the coke being formed, the lighter particles being carried along with the air currents and deposited in the grooves formed near the face 56 at each oscillating movement of the ram 30. Therefore any particle of coke which has not been volatilized will return to the fire zone with the newly forming coke as many times as are required to completely gasify same. The result is that, owing to the low temperatures at which the fuel is volatilized, no clinker is formed and the only material which passes over the end 41 of the shelf 24 would be foreign substances such as metal, sand or other materials which are not combustible at the temperatures at which this stoker operates.

I am aware that gas producing stokers have long been constructed and I therefore do not intend to cover such devices broadly, but I do intend to cover all such forms and modifications thereof as fall fairly within the appended claims.

I claim:

1. A stoker comprising an elongated box-like structure having a bottom, side and end walls, a horizontal plate vertically spaced from the bottom and extending from one end wall to a point adjacent the opposite end wall, a fuel hopper positioned to deliver fuel on said plate adjacent the said one end, a refractory cover member spaced above said plate and extending from said hopper a substantial distance toward said opposite end and defining with said plate a restricted fuel passage, a second refractory cover member spaced above said plate and extending from said opposite end toward said first cover member, but spaced therefrom to provide a vertical passage therebetween, a baffle plate extending from said opposite end beneath said second cover member to a point slightly above the adjacent end of said plate, said second cover member, together with said plate, the baffle plate, the side walls, and the inner end of said first cover member defining a retort chamber, a reciprocating feeding plate mounted on and substantially covering said plate, means for reciprocating said feed plate, and means for supplying air to the space beneath said plate.

2. The substance of claim 1, and a stationary plate over the reciprocating feed plate forming a bottom for said hopper and extending into said restricted fuel passage, the fuel from said hopper passing over the end of said stationary plate onto said reciprocating plate within said restricted fuel passage.

3. The substance of claim 1, and a stationary plate over that portion of the reciprocating plate which is under said hopper, and a second reciprocating feed plate above said stationary plate including means for moving said second reciprocating plate a lesser distance than is said first mentioned reciprocating plate whereby fuel is moved from said hopper over the end of said stationary plate and within said restricted fuel passageway.

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