Nov. 11, 1941. F. D. YARICK 2,262,079

STOKER APPARATUS

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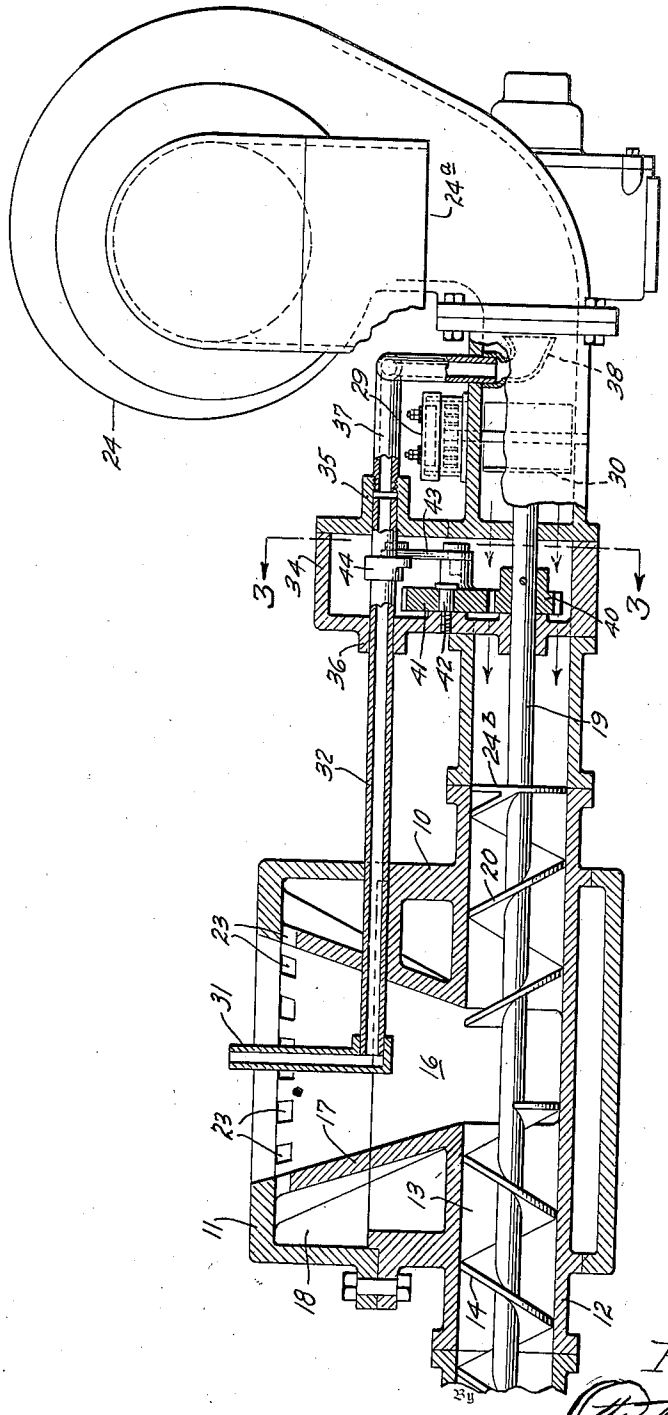


Fig. 1.

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Fig. 2.

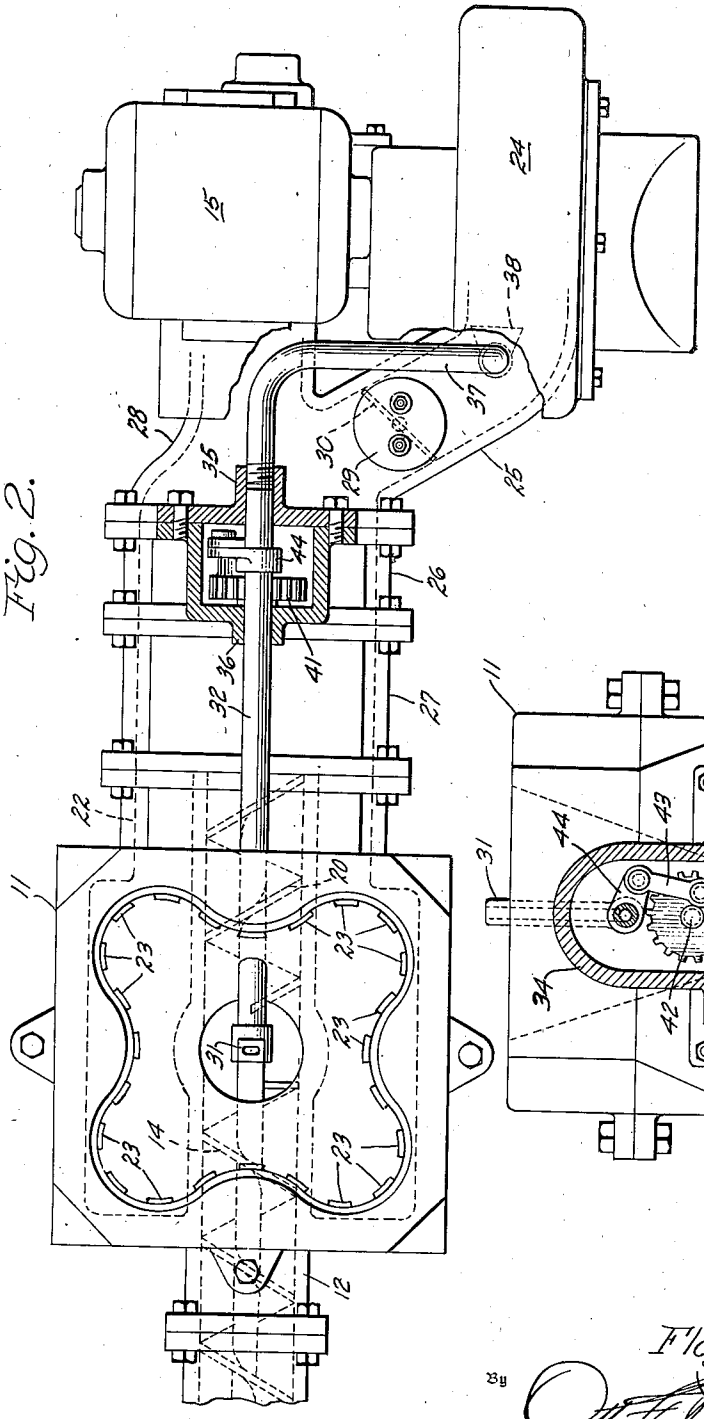


Fig. 3.

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Patented Nov. 11, 1941 2,262,079

UNITED STATES PATENT OFFICE

2,262,079

STOKER APPARATUS

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Application July 22, 1939, Serial No. 286,021

5 Claims. (Cl. 110—45)

This invention relates generally to heating apparatus and more particularly to fuel stoker apparatus.

One of the objects of the present invention is to provide a new and improved fuel stoker apparatus in which coking of the fuel is substantially eliminated.

Another object of the invention resides in the provision of a novel agitator means for preventing coking of the fuel.

Another object of the invention is to provide a fuel stoker apparatus in which fuel combustion is improved in a manner such that coking masses of fuel will be broken.

Other objects of the invention will become apparent from the following detailed description taken with the accompanying drawings in which

Figure 1 is a side view partly broken away and in section of my stoker apparatus;

Fig. 2 is a top plan view partly broken away and in section of the stoker apparatus, and

Fig. 3 is a view in cross section of the apparatus taken along the line and in the direction of the arrows 3—3 of Fig. 1.

Referring to the drawings by characters of reference, the fuel stoker apparatus includes a fuel retort which, in the present instance, is sectionally constructed having a base 10 and a removable top 11 which may be secured to the base by bolts or by any other suitable means. The base 10 is provided with a horizontally extending duct 12 providing an entrance passage 13 for fuel which, in the present stoker, is drawn or pulled into the retort by a screw-feed 14 driven by an electric motor 15. The fuel passage 13 opens into a vertical passage 16 formed by an upstanding continuous wall 17, cast integral with the base and on the upper open end of which the burner top 11 seats. The base 10, wall 17 and the top 11 cooperate to form an air chamber 18 which surrounds the passage 16. On the shaft 19 of the screw 14 and beyond the opening 16, are provided threads 20 which are reversed from and opposed to other threads of the screw whereby to force fuel up the retort passage 16.

On opposite sides of the feed screw are air inlets 22 which lead into the retort air chamber 18 whence air egresses through ports 23 to the fire, the ports 23 being provided as slots in the upper edge of the retort wall 12 and the screwthread 20 terminates in a disc 24b which serves to close passage 13 to the air. Air is supplied to the retort by a blower 24, driven by the electric motor 15, the inlet, as at 24a of the blower being at all times open and the outlet of the blower being connected by connected together ducts 25, 26 and 27 to the retort inlets 22. The duct 25 is a Y-shaped duct having one branch, as at 28, connected to the casing of the motor 15 and partly housing the screw-shaft 19 which extends therethrough to the motor. In the duct 25 there is a damper 30 which is actuated by a heat motor 29 which may be controlled by a thermostat (not shown), the heat motor 29 serving to effect a delayed and slow opening of the damper to give the feed screw time to build up the fire bed before the full capacity of the blower is utilized so as to avoid extinguishment of a low fire by the blower.

In order to prevent coking in the retort, I provide an agitator 31 for the fuel in the retort, the agitator also being arranged and adapted to direct a stream of air on the fuel slightly above the retort top to increase combustion in a vertical plane and at a level where there is a tendency of coking of the fuel. The agitator 31 is an upstanding tube secured at its lower end within the retort fuel passage 16 to one end of a hollow horizontal shaft 32 which is journaled in a bore in the retort. The shaft 32 extends externally of the retort to and through a casing 34 having aligned hollow bosses 35, 36 receiving the shaft, the hollow boss 35 also receiving the open end of a tube 37, the other end of which is secured in and to the wall of the duct 25 between the damper 30 and the blower outlet. Within the duct 25, a funnel 38 is secured to the tube 37 and the large end of the funnel faces the outlet of the blower for increasing flow through the hollow shaft 32 to the agitator tube 31.

The screw shaft 19 is rotatably mounted in aligned bores in the casing 34 and fixed to the shaft within the casing is a gear 40 which meshes with a gear 41 rotatably mounted on a stub shaft 42. A link 43 is pivotally connected at one end thereof to and offset from the center of the upper gear 41, the other end of the link 43 being pivotally connected to a crank 44 which is secured on the hollow shaft 32, within the casing 34.

In operation fuel is fed up through the retort passage 16 by the screw 14 and air is supplied to the retort by the blower 24 to maintain and increase combustion. Air also enters the funnel 38 and passing through the hollow shaft 32 is discharged from the upper end of the agitator tube 31 to the fuel. At the upper end or top of the retort there is a tendency of the fuel to coke but if this occurs in the present retort the agitator mechanically breaks up the mass and in ad-

dition the jet of air issuing from tube **31** increases combustion, causing the mass of fuel tending to coke to be cut into with the result that the fuel settles down in the retort. Driven from the screw shaft **19**, the link **43** and crank **44** rotate the hollow shaft **22** first in one direction and then in the other giving a back and forth or oscillating movement to the agitator. When energized, the heat motor **30** effects a delayed and slow opening of the damper **30**, but air flows to and from the agitator tube **31** either by forced draft when the blower is in operation or by natural draft when the blower is stopped by reason of the tube **37** being connected to the duct **25** rearwardly of the damper **30** or between the damper and the blower outlet.

While I have shown and described my invention in detail it is to be understood that the same is to be limited only by the appended claims for many changes may be made without departing from the spirit and scope of the invention.

What I claim is:

1. In a stoker apparatus, a retort having a substantially vertical passage for fuel and having adjacent the top thereof, a plurality of inwardly directed air outlets, a blower, duct means connecting said retort to the outlet of said blower, an automatically operable damper controlling flow through said duct, a casing between said retort and said blower, a hollow shaft rotatably mounted in said casing and having one end projecting into the retort passage, said hollow shaft having an upturned end portion in said passage provided with an air outlet, means within said casing operable to drive said shaft to oscillate said end portion, and a tube connecting said shaft to said duct means between said damper and the blower outlet.

2. In a stoker apparatus, a retort having a substantially vertical passage for fuel and having an air outlet, a blower, duct means connecting said retort to the outlet of said blower, supporting means between said blower and said retort, a hollow shaft rotatably mounted in said supporting means and having one end projecting into the retort passage, said hollow shaft having an upturned end portion in said passage provided with an air outlet, means operable to drive said shaft, damper means in and controlling flow through said duct means, and means communicatively connecting said hollow shaft to said blower outlet anteriorly to said damper means.

3. In a stoker apparatus, a retort having a substantially vertical passage for fuel and having adjacent the top thereof a plurality of air outlets, a blower, duct means connecting said retort to the outlet of said blower, a damper controlling flow through said duct means, a casing between said blower and said retort, a hollow shaft rotatably mounted in said casing and having one end projecting into the retort passage, said hollow shaft having an upturned end portion in said passage provided with an air outlet, means within said casing operable to drive said shaft and oscillate said upturned end portion, and means communicatively connecting said shaft to said duct means anteriorly to said damper.

4. In a fuel stoker apparatus, a fuel retort, means providing an air chamber associated with said retort for supply of air to the fire, a blower, duct means connecting said air chamber to the outlet of said blower, a damper controlling flow through said duct means, an upwardly directed fuel agitator member within said retort and having an air passage therethrough for discharge of air to the fire, means operable to oscillate said agitator member, and means communicatively connecting said agitator member to said duct means anteriorly to said damper.

5. In a fuel stoker apparatus, a fuel retort having a burner top and having a lower fuel inlet, a shaft projecting into said retort through the side thereof above said fuel inlet and at a substantial depth below said burner top and the top of the fuel bed, a feed screw for moving fuel through said inlet into said retort, means driven from said feed screw to oscillate said shaft about the longitudinal axis thereof, and an elongated agitator member secured adjacent its lower end transversely to said shaft within said retort and extending upwardly above said burner top.

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