March 6, 1934. F. J. WINDER ET AL 1,950,015

GAS BURNER FOR INDUSTRIAL FURNACES

Filed May 28, 1931

Fig. 1

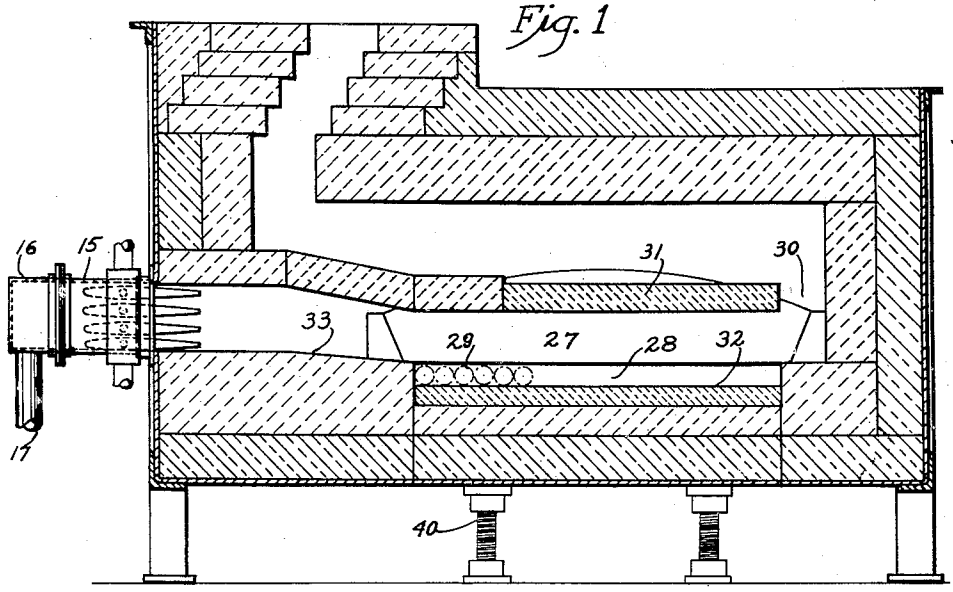


Fig. 2

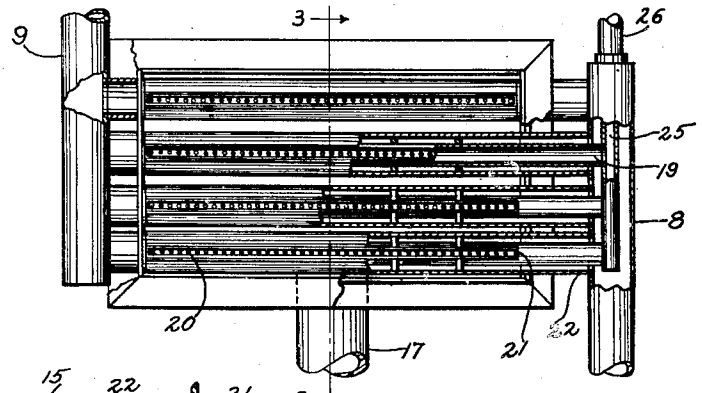
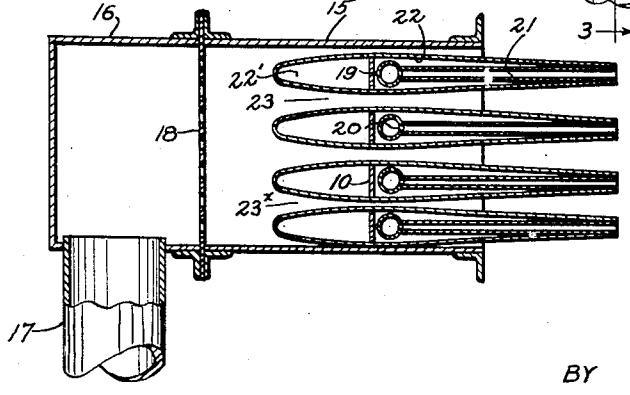


Fig. 3



INVENTORS:
FRANK J. WINDER
WILLIAM LEHRER

BY Charles A. Lind
ATTORNEY.

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GAS BURNER FOR INDUSTRIAL FURNACES

Frank J. Winder and William Lehrer, Toledo, Ohio, assignors to Surface Combustion Corporation, Toledo, Ohio, a corporation of New York

Application May 28, 1931, Serial No. 540,564

6 Claims. (Cl. 158—109)

This invention has for its object to provide a gas burner from which air and gas, respectively, may be discharged for parallel flow with minimum turbulence to the end that a relatively long and luminous flame may be produced within the furnace to be fired and withal to provide a burner which shall be relatively simple in construction and otherwise well adapted for its intended purpose.

Referring to the drawing wherein the preferred embodiment of the invention is shown,—

Fig. 1 shows the improved burner in side elevation and associated with a forge furnace, the latter being shown in vertical longitudinal section;

Fig. 2 is an end elevation of the burner, parts being in section, and

Fig. 3 is a section on line 3—3 of Fig. 2.

In the drawing, 15 indicates a rectangular housing or conduit to one end of which is coupled a header 16 whereinto air may be delivered by a supply pipe 17. Extending across the inner end of the conduit 15 and separating it from the header 16 is a screen or perforated plate 18 through which the air from the header 16 must pass to enter the conduit, the screen serving to eliminate eddy currents as the air flows into the conduit.

Extending crosswise of the conduit 15 in parallel spaced relation are a plurality of gas pipes 19. Each pipe along its outer side is longitudinally apertured, either by a slot or, as is preferred, by a series of orifices as indicated at 20. Secured to and forming in effect a forwardly projecting radial continuation of the respective pipes 19 are relatively long slot-type gas nozzles 21, it being noted that the gas nozzles extend beyond the adjacent end of the housing.

Each gas nozzle and its gas supply pipe is housed by an elongate and hollow body 22 which extends the full width of the conduit 15 and which is bellied intermediate its ends. As clearly shown in Fig. 3, the said bodies are arranged in spaced relation to form passages 23 for the flow of air from the said conduit, it being noted that the passages are relatively restricted intermediate their ends due to the bodies 22 being bellied as said, the passages as viewed in Fig. 2 being of stream line form. It is preferred to pass cooling water through the bodies 22 and to this end there is arranged at one side of the conduit a water supply pipe 9 and at the other side a waste pipe 8 each connected to the bodies by lateral conduits which may be extensions of the said bodies.

The gas pipes 19 are extended into the waste pipe 8 for connection to a gas supply pipe 25 which extends from the pipe 8 as a pipe 26. The bodies 22 are interiorly braced by a wall 10 and since the rear portion 22′ of the body does not require water cooling, said wall is preferably imperforate.

An application of the burner to a furnace is shown in Fig. 1. The heating chamber is indicated at 27 and a longitudinally extending slot 28 is provided in a side wall of the furnace to permit the insertion of work thereinto, the work being generally indicated at 29 by dotted circles. The spent heating gases leave the heating chamber through an end passage 30 and may be caused to flow in a reverse direction over a dividing wall 31 on their way out of the furnace. It will be noted that the hearth 32 is below the level of a throat 33 whereinto the burner discharges, this difference in level being preferably the same as the thickness of the work being heated in order that the streamline flow of the gases may be interfered with as little as possible while passing through the heating chamber. If desired the hearth may be made vertically adjustable in order to adjust the hearth level to different sizes of work. Any suitable means may be provided for adjusting the hearth level, numeral 40 indicating screw jacks for that purpose.

The gas supplied to the nozzles 21 will ordinarily be raw gas, that is, gas without admixture with air, but some air may be admixed with the gas prior to being supplied to the gas manifold 25. The amount of air flowing through the passages 23 will ordinarily be such as to supply all of the air required for complete combustion of the gas. In some cases it may be desirable to restrict the lower air passage as indicated at $23^{\times}$ in order that the gas from the lower nozzle may not be fully consumed but to serve instead as a protective gas blanket for the material being heated and thus prevent or reduce oxidation thereof.

The respective streams of air and gas will be discharged from the burner with velocities sufficiently low to cause them to flow without substantial turbulence with the result that mixing of the air and gas will occur primarily by interdiffusion and the flame will be relatively long and luminous. By making the air passages 23 of stream line form the air will flow through the passages with minimum turbulence as will be readily understood.

While the gas nozzles are shown as mounted across an air conduit formed by the housing 15, it will nevertheless be apparent that the gas nozzles and their associated bodies 22 may be mount-

ed across an air conduit formed in the furnace structure itself.

What we claim as new and desire to secure by Letters Patent is:

1. In a gas burner, the combination of a plurality of stream line bodies of substantial width and length and arranged in spaced relation to form streamline air passages between themselves, gas nozzles discharging from said bodies longitudinally thereof, and means projecting into said bodies for supplying gas to said nozzles.

2. In a gas burner, the combination of a conduit for air, a plurality of bodies extending across said conduit in spaced relation to form individual passages for the flow of air from the conduit, said bodies being of substantial length longitudinally of the conduit, gas nozzles projecting into the bodies from one end thereof, and means coupled to the inner end of the nozzles for supplying gas thereto.

3. In a gas burner, the combination of a conduit for air, a plurality of bodies extending across said conduit in spaced relation to form individual passages for the flow of air from the conduit, said bodies being of substantial length longitudinally of the conduit, gas nozzles projecting into the bodies from one end thereof, and means coupled to the inner end of the nozzles for supplying gas thereto, the said bodies being bellied intermediate their ends.

4. In a gas burner, the combination of a conduit for air, a plurality of bodies extending across said conduit in spaced relation to form individual passages for the flow of air from the conduit, said bodies being of substantial length longitudinally of the conduit, gas nozzles projecting into the bodies from one end thereof, and means coupled to the inner end of the nozzles for supplying gas thereto, the said bodies being hollow and the inlet end of the said nozzles being intermediate the ends of said bodies.

5. In a gas burner, the combination of a conduit for air, a plurality of bodies extending across said conduit in spaced relation to form individual passages for the flow of air from the conduit, said bodies being of substantial length longitudinally of the conduit, gas nozzles projecting into the bodies from one end thereof, and means coupled to the inner end of the nozzles for supplying gas thereto, the said nozzles projecting from the discharge end of the said conduit.

6. In a gas burner, the combination of a conduit for air, a plurality of bodies extending across said conduit in spaced relation to form individual passages for the flow of air from the conduit, said bodies being of substantial length longitudinally of the conduit, gas nozzles projecting into the bodies from one end thereof, and means coupled to the inner end of the nozzles for supplying gas thereto, the said nozzles being of less length longitudinally of the conduit than the said bodies.

FRANK J. WINDER.
WILLIAM LEHRER.