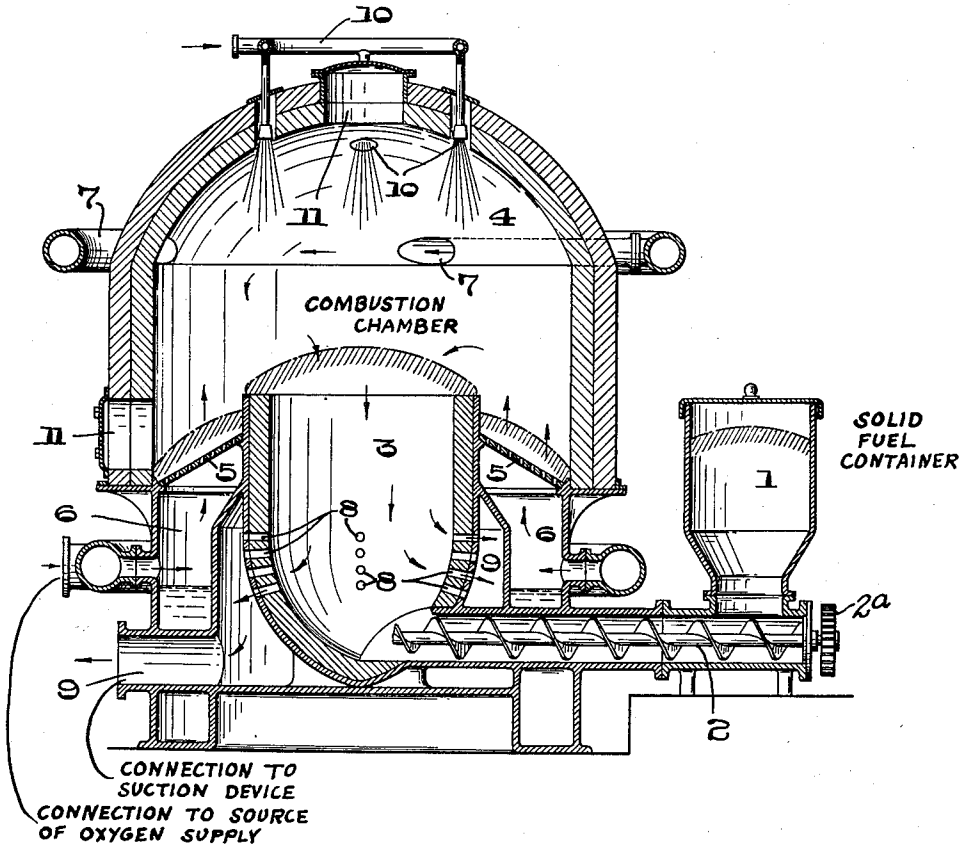
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CONTINUOUS FEED GAS PRODUCER

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CONTINUOUS FEED GAS PRODUCER

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This invention relates to the producing of fuel gas, and it is an object of the invention to provide improved apparatus for producing conveniently and easily fuel gas, such as producer gas or semi-water gas, in large quantity and of superior quality, in a comparatively small furnace by causing a layer of solid fuel to travel through a gasifying retort and regulating the combustion of fuel, gaseous, liquid or pulverized, continuously fed to the free combustion chamber of a furnace.

A further object of the invention comprises the providing in apparatus of this character of means to cause high temperature combustion gas or gases of quick burning fuel, such as gaseous, atomized, liquid or pulverized fuel, burnt in a free combustion chamber, to pass by suction through a layer of solid fuel traveling continuously through a gasifying retort connected with said free combustion chamber and at the same time producing combustion gas; that is, gasifying a fuel and simultaneously completely burning the reducing solid fuel.

In the drawing accompanying and forming a part of this application, there is illustrated in longitudinal section an embodiment of a fuel gas producer for carrying the invention into practice.

In carrying out the embodiment of the invention illustrated in the drawing, solid fuel, such as coal, for gasification is continuously fed from a source of supply, such as a bin 1, into a gasifying retort 3, comprising a vertically supported cylindrical body, by continuously operating feeding means, shown as a screw conveyor 2 having a gear 2a fixed on the shaft thereof for operative connection with and actuation from a source of power (not shown). The continuous feeding of the fuel to the retort effects continuous upward travel of the fuel through the retort, and the fuel in its passage through the retort is subjected to the action of high temperature combustion gases from a free combustion chamber in a dome-shaped furnace 4 to effect gasification of the fuel in the retort. After gasification the fuel is transferred from the retort onto a conical grate 5 in the lower portion of the furnace and up through which grate the retort is extended into and opening to the combustion chamber where the remaining combustibles in the fuel are completely burnt with an adequate supply of a substance to support and aid combustion of the fuel, such as oxygen air or a gas mixture rich in oxygen, fed in an excessive amount under pressure to the burning fuel from a chamber in the casing 6 below the grate and producing a high temperature combustion gas. The residue of the combustion of the fuel, such as ash, collects upon the lower portion of the grate and is removed from the furnace through an opening in the furnace wall having a removable closure, as at 11, by means usually used for such purpose in furnaces of gas producers.

To further increase or elevate the temperature of the combustion gases in the combustion chamber, combustion of a suitable amount of additional quick burning fuel is effected in the combustion chamber, such as pulverized, liquid or gaseous fuel mixed with air, steam or other oxygen containing gas as may be deemed desirable, fed to the combustion chamber in regulatable quantity, as by a regulatable feeding device, shown at 7 in the form of a conduit disposed about the wall of the combustion chamber and having branch pipes leading therefrom opening through the wall of and to the combustion chamber, thus providing a secondary supply of air, or a suitable gas and air mixture, to the burning fuel to aid and support combustion thereof and produce a high temperature and highly efficient combustion gas or gases for the gasification of the fuel in the retort 3.

The combustion gases are conducted from the combustion chamber through the fuel in the retort 3 by suction and delivered to a place of use or storage. For this purpose there is provided a chamber 9 about the lower portion of the retort, shown as formed by a wall extended from and spaced about the retort, said chamber being in communication with the retort intermediate the ends thereof through ports or channels 8 in the wall of the retort, and the gases of combustion drawn from the combustion chamber into the retort and through the fuel therein and from the retort through the ports 8 to the chamber 9 and delivered from said latter chamber to the place of use or storage, said chamber being provided with an outlet adapted for connection of a suction fan, not shown. The gasification of the fuel in the retort is effected by the reduction and dry distillation of the fuel therein by the gases of combustion in its passage through the fuel in the retort.

Furthermore, steam or water sprays 10 and an opening with a removable closure 11 may be provided in the wall of the furnace or combustion chamber, and heat resisting or refractory material may be applied to the inner surface of the wall of the furnace and combustion chamber.

According to the present invention, by the continuous feeding of fuel to the gasifying retort 3, and the regulating of the combustion of the bed

of fuel on the grate 3, and particularly by the regulating of the supply of quick burning fuel charged into the free combustion chamber to elevate the temperature of the combustion gases, the gasifying action is not only always rendered effective but is highly efficient, and with a gas plant of small size a larger amount of gas of excellent quality may be produced. This is especially so since the combustion is effected mainly in the free combustion chamber, with the result that overheating of the gasifying retort and the formation of clinker in the retort are entirely prevented. A gas producer thus constructed when the free combustion zone for pulverized, liquid or gaseous fuel and the gasifying zone are separated, facilitates the gasification of a fuel slack as a retort fuel, which is difficult to be disposed of with a reducing gas producer wherein there is commonly used a thicker bed of fuel for combustion and gasification.

We claim:

1. In apparatus for producing fuel gas, a furnace having a grate and an enclosed free combustion chamber, a retort extended through the grate into and opening to the combustion chamber, means to continuously feed solid fuel into and move said fuel through said retort and deliver the same from the opening of the retort onto the grate for combustion, means to supply through the grate an oxygen-containing gas to support and aid combustion of said fuel, and means in communication with the retort intermediate the opening to the combustion chamber and the connection of the fuel feeding means therewith to conduct the combustion gases from the combustion chamber through the fuel and from the retort.

2. In apparatus for producing fuel gas, a furnace having a grate and an enclosed free combustion chamber above the grate, a retort extended through the grate and opening to the combustion chamber, means to feed fuel to and continuously move the fuel through and deliver the same from the retort onto the grate for combustion, means to supply through the grate an oxygen-containing gas to support and aid combustion of said fuel on the grate, means for supplying a quick burning fuel in suspension in a fluid stream to the combustion chamber for combustion therein to elevate the temperature of the combustion gases in the combustion chamber, and a suction chamber surrounding a portion of the retort and in communication with the retort intermediate the ends thereof thereby to draw the combustion gases from the combustion chamber through the fuel and from the retort.

3. In apparatus for producing fuel gas, a furnace having a dome-shaped enclosed combustion chamber and a grate below the combustion chamber, a retort comprising a vertically supported cylindrical body with the upper end extended through the grate into and opening to the combustion chamber, means connected with the lower portion of the retort to feed material into and continuously move the material through the retort and deliver the same from the retort onto the grate for combustion, a casing disposed about the lower portion of the retort having an annular chamber therein immediately beneath the grate in communication with a source of oxygen-containing gas for supporting the combustion of the fuel on the said grate, and a suction chamber in said casing in communication with the retort intermediate the ends thereof thereby to induce a flow of the combustion gases from the combustion chamber through the fuel and from the retort.

4. In apparatus for producing fuel gas as claimed in claim 3, means opening to the combustion chamber for feeding a quick burning fuel in suspension in a fluid stream into the combustion chamber for combustion therein to elevate the temperature of the combustion gases.

5. In apparatus for producing fuel gas, a furnace having a grate and an enclosed combustion chamber above the grate, a vertical cylindrical body extended upward through the grate into and opening to the combustion chamber having ports through the wall intermediate the ends thereof, a continuously rotatable screw conveyor to feed fuel from a source of supply to the lower portion of the cylindrical body and move the fuel through said body onto the grate for combustion, an annular chamber disposed about the cylindrical body immediately beneath the grate for supplying air through the grate to aid combustion of the fuel, means to feed fuel in suspension in a fluid stream to the said combustion chamber to elevate the temperature of the combustion gases therein, and a suction chamber in communication with the ports in the wall of the cylindrical body thereby to induce the flow of the combustion gases from the combustion chamber through the fuel and outward through the ports in the cylindrical body.

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