July 27, 1937. R. FALCONER ET AL 2,088,368

GAS GENERATOR

Filed March 12, 1935

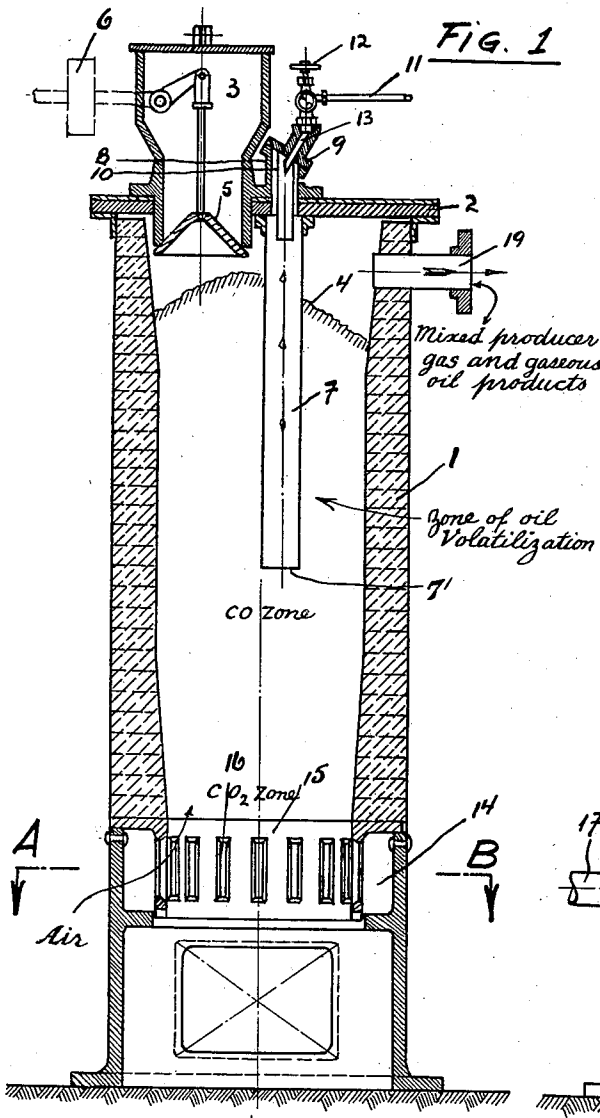


FIG. 1

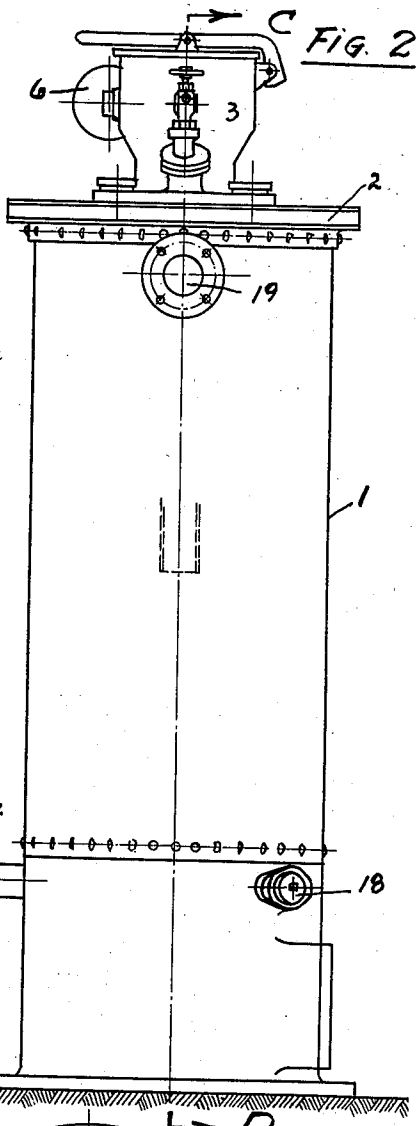


FIG. 2

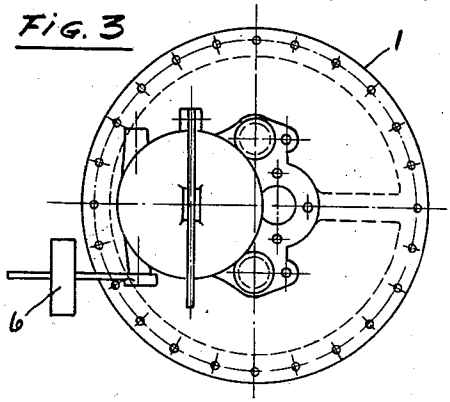


FIG. 3

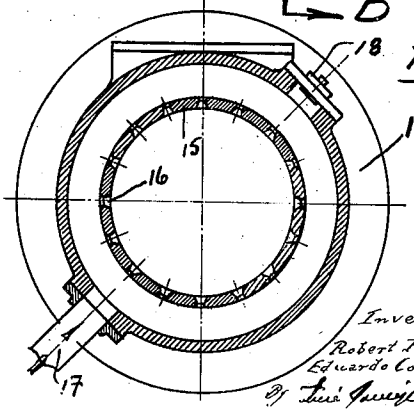


FIG. 4

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UNITED STATES PATENT OFFICE

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GAS GENERATOR

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Application March 12, 1935, Serial No. 10,703

3 Claims. (Cl. 48—72)

This invention refers to a process and an apparatus for generating a mixed gas from charcoal, coke, coal, wood or other solid fuel in combination with crude oil, fuel oil, gas oil or other liquid fuel with or without the use of steam.

The process of the present invention consists in introducing liquid fuel continuously into the hot solid fuel of a continuous updraft producer through a retort which is suspended from the inside of the head of the producer and which reaches down into the producer to a point near the upper part of the so-called CO zone, thus making use of the surplus heat from the incomplete combustion of the solid fuel for producing gas from the liquid fuel, and leading the liquid fuel into the retort through a small pipe suspended from the head of a chamber communicating with the said retort and reaching within the same, and, if desired, introducing steam into said chamber to prevent overheating of said retort and for producing carbon monoxide and liberating hydrogen.

The apparatus according to the present invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a vertical cross sectional view of the apparatus taken on the line C—D of Fig. 2.

Fig. 2 is a side view of the apparatus.

Fig. 3 is a top view of the apparatus.

Fig. 4 is a horizontal cross sectional view of the apparatus taken on line A—B of Fig. 1.

In all the figures of the drawing, the same reference numbers indicate the same parts.

With reference to said figures of the drawing, 1 is a vertical producer properly lined with heat resisting material and provided with a head 2. Said head is provided with a hopper 3 for the introduction of the solid fuel 4. The feeding of the solid fuel is controlled by a gate 5 operated by a counterweight 6.

From the inner side of the head 2 there is suspended a tubular retort 7 which reaches about half way down in the producer. This retort registers with a chamber 8 arranged on the outside of the head 2 and having a head 9 from which is suspended a pipe 10 which reaches inside the retort 7. Liquid fuel is fed through the pipe 11 and is regulated by valve 12 entering through the nozzle 13 into the pipe 10.

The bottom of the producer 1 is provided with an air chamber 14 and a vertical circular grate 15 having air holes 16. Air is admitted continuously to the bottom of the producer through the pipe 17, and the pipe 18, ordinarily closed, is for blowing out ashes from the bottom of the grate, 19 is the outlet for the combined gases.

The apparatus according to the present invention may be used as a fuel generator for internal combustion motors of any type or for ovens, boilers or other heat consuming apparatus, or for lighting systems.

The apparatus works in the following manner:

A small amount of solid fuel is first introduced through the hopper 3. Said fuel will gather in or on the grate 15 where it is ignited. Once the fuel is ignited, more fuel is charged and more air is blown through the pipe 17 until a producer gas is produced of sufficient quality to start the motor, by the creation of a combustion zone where CO_2 is formed and an overlying reduction zone where the CO_2 is reduced to CO.

After the motor is started on producer gas, it is allowed to run for a while until the producer heats up, when the liquid fuel valve 12 is opened and the liquid fuel is fed into the pipe 10 by way of the nozzle 13, falling by gravity from said nozzle through the retort 7 and down to the point 7' in the hot solid fuel at the open end of the retort where it first comes into contact with the fuel bed. This point 7' is located just above the reduction zone so that the latter is not cooled by the oil. The latter is preheated by its passage through the retort embedded in the upper part of the fuel bed, and after its admission to the latter at the point 7' it is entrained upwardly through the fuel bed by the air blast and is volatilized into gas by the surplus heat produced by the incomplete combustion of the said solid fuel. This oil gas mixes with the producer gas and is discharged admixed therewith through the outlet pipe 19.

Having thus described our invention, what we claim is:

1. A producer for producing oil enriched producer gas, comprising a producer adapted to contain a fuel bed, means for continuously supplying an air blast traversing said fuel bed upwardly and creating therein a lower combustion zone, an intermediate reduction zone and an upper zone of volatilization, a gas offtake above said

fuel bed, a tubular retort extending and opening downwardly from the top of and centrally of the producer into the fuel bed to a point above the reduction zone, means for admitting a continuous supply of oil comprising a nozzle having its outlet positioned substantially at the axis of said retort for dropping oil by gravity substantially axially through said retort but out of contact with the walls thereof into the fuel bed at said point.

2. A producer for producing oil enriched producer gas, comprising a producer adapted to contain a fuel bed, means for continuously supplying an air blast traversing said fuel bed upwardly and creating therein a lower combustion zone, an intermediate reduction zone and an upper zone of volatilization, a gas offtake above said fuel bed, a tubular retort extending and opening downwardly into the fuel bed to a point above the reduction zone, means for admitting a continuous supply of oil comprising a nozzle having its outlet positioned substantially at the axis of said retort for dropping oil by gravity substantially axially through said retort but out of contact with the walls thereof into the fuel bed at said point.

3. A producer for producing oil enriched producer gas, comprising a producer adapted to contain a fuel bed, means for continuously supplying an air blast traversing said fuel bed upwardly and creating therein a lower combustion zone, an intermediate reduction zone and an upper zone of volatilization, a gas offtake above said fuel bed, a tubular retort extending and opening downwardly into the fuel bed to a point above the reduction zone, means for admitting a continuous supply of oil comprising a nozzle having its outlet positioned substantially at the axis of said retort for introducing oil substantially axially through said retort but out of contact with the walls thereof into the fuel bed at said point.

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