

939,288.

Patented Nov. 9, 1909.
2 SHEETS—SHEET 2.

FIG 2

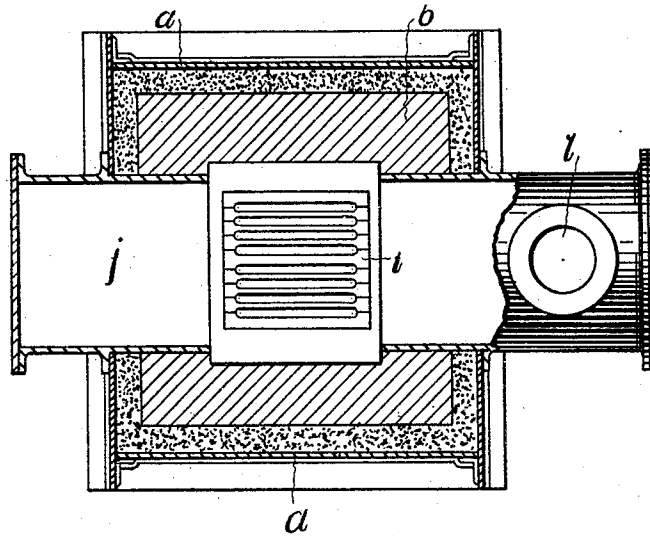
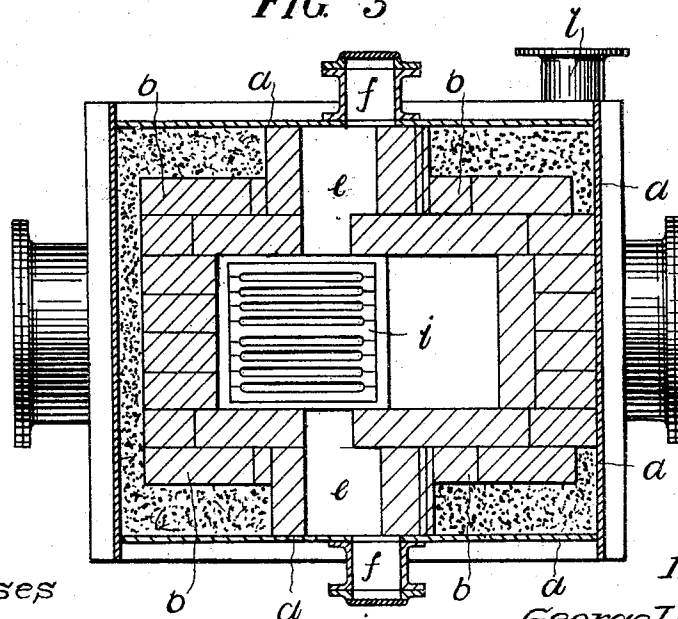


FIG 3



Witnesses
f. Stern
H. C. Hunstinger

Inventor
George Louis Morton
by *B. Singer*
Attorney

UNITED STATES PATENT OFFICE.

GEORGE LOUIS MORTON, OF FOUR OAKS, SUTTON COLDFIELD, ENGLAND.

GAS-PRODUCER.

939,288.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed February 1, 1909. Serial No. 475,541.

To all whom it may concern:

Be it known that I, GEORGE LOUIS MORTON, a citizen of Great Britain, and a resident of "The Spinney," Streetly Lane, Four Oaks, Sutton Coldfield, in the county of Warwick, England, have invented certain new and useful Improvements in Gas-Producers, of which the following is a specification.

This invention comprises improvements in and relating to gas producers and is designed to provide a producer for bituminous fuel in which practically complete conversion of the hydrocarbon gases into a fixed working gas is effected, thereby providing a product free from tarry matter.

The particular features are the provision of an equally distributed air supply throughout the body of the fuel and the employment of a radiating roof or wall, sloped to approximately the natural slope of the fuel which with the air supply properly proportioned to the fuel at every point, enables the necessary temperature for conversion to be maintained.

The principal air opening is near the top of the producer and it is here that combustion is originally commenced; sufficient air being supplied for effecting the distillation of fuel and then further air supplies are arranged below this in the neighborhood of the sloping roof for maintaining a temperature for conversion. The chamber or shaft of the producer is comparatively narrow and the sloping radiating portion is also narrow and projects out from the shaft increasing the dimensions of the same in the one direction only (if only one sloping part is used). It is in this part of the producer and preferably to one side of the vertical cylindrical portion of the shaft that the supplemental air inlets are arranged.

It will be seen that this construction offers no facilities for the formation of a central core of black or dead fuel, which is constantly occurring with ordinary vertical cylindrical shaft producers wherein the raw fuel rapidly falls down the center and on account of the capacity of the shaft, and the amount of air available being limited (in suction plants), this central body of fuel is largely missed by the air and gases which take the shortest course to the exit.

The step at the bottom of the hottest zone of this producer holds up the fuel in this zone and prevents it falling in a black state

into the lower part of the producer in which case the gases given off from it would not be in contact with the requisite heat for a sufficient length of time during their passage to the outlet, to be properly converted.

On the drawings: Figure 1. is a vertical section of a producer which is an example of the manner of carrying the invention into effect. Fig. 2. is a sectional plan of same on line 2—2 of Fig. 1. Fig. 3. is a sectional plan at line 3—3 of Fig. 1.

The producer is contained within a built up iron shell *a* and is adequately lined with refractory material *b*. The principal air opening *c* is arranged at about the level of the top of the primary fuel, that is the fuel for combustion for supplying the heat for distillation of the raw fuel which is charged through a plain opening *d* or through a feed hopper, into the approximately vertical space above the first air opening. The first opening may comprise a number of inlets all around the generator or practically so and any section may be opened or shut off as desired. At the primary air inlet level, or below same when the latter extends all around supplemental openings *e* with air shafts *f* are provided, the number, position and size of these supplemental openings varying according to the size of producer and the quality of the fuel to be used. They should be placed to provide at each point in the body of fuel a proper proportion of air to fuel to insure the maintenance of the desired temperature, and this is what is meant where the phrase "equable distribution of air" is used in this specification. These openings if desired need not be provided with castings at their entry into the generator, but may remain simple openings into which the fuel will fall and collect at the natural slope of the fuel.

From the primary air inlet point the wall *g* of the generator is sloped back as shown and at the bottom of the slope a supplementary air inlet *h* is provided. The slope is formed to correspond to the natural slope of the fuel or a little sharper, that is to cut the slope of the fuel; the fuel then packs well so that no space is left between it and the wall. This sloping wall *g* is constructed of firebrick slabs or like refractory material and forms a radiating surface providing an efficient heating for the fuel in the neighborhood, moreover in use the tendency for the gases distilled off from the fuel seems to be.

to follow this wall in their path down the producer. This in conjunction with the air inlet *h* is of very great value as the gases are subjected to an efficient heat during their
 5 passage through a considerable body of well packed fuel and the air is then introduced which consumes any free carbon present. The air inlets *e* are arranged in the neighborhood of the sloping roof or wall
 10 and between the primary inlet and the step at the bottom of the wall so as to form a zone of high temperature at this part through which the distilled gases have to pass. Below the air inlet *h* the generating
 15 space narrows down again and is finished with a supporting grid *i* at the bottom; here a compartment *j* is formed, closed against the entry of air by a suitable door; this serves for taking out the ashes etc. when required. Beneath this the usual ash space *k*
 20 is formed as shown. The gas outlet *l* is arranged at the bottom of the fuel column as clearly represented.

With this producer the combustion chamber would be charged with coke for commencing, the charge occupying the generator up to the first opening *c*, a fire is lighted on the top of this primary fuel and after heating up to incandescence the raw fuel is
 30 introduced at the inlet *d* filling the space above the primary air inlet to the top which is sealed by the cover or hopper. The gases are then distilled from the raw fuel and pass down the producer receiving additional
 35 air at *h*. The greater part of the products of the primary combustion pass down the slope *g* and at *h* meet a further air supply which completes the combustion and frees the gas to a large extent of any free carbon
 40 formed by the burning of part of the raw fuel or deposited by the break up of hydrocarbons distilled from the raw fuel. The sloping roof and the step at the bottom serve to hold together and pack the fuel, in the
 45 generator so that proper conversion is effected during the passage of gases through the fuel from the zone of distillation to the outlet. Steam may be led in at *m* or at suitable openings in the usual way, provision
 50 being made for its satisfactory introduction.

With such a producer experiment appears

to prove that variation in capacity can not be on the line of general increase in diameter of the shaft as beyond a certain limit in width
 an amount of dead fuel appears in the center 55 which is practically untouched by the incoming air and of course is greatly detrimental. The length of the column from the step at *h* to the grid *i* however admits of increase and the chamber above *h* roofed by
 60 the sloping wall *g* may be enlarged, but to get considerable variation I may add more of these chambers with sloping roofs say radiating from the common generating space and fuel column. This appears likely
 65 to prove the most satisfactory way of increasing the capacity of each producer but of course if desired more than one producer may be employed as in a battery.

What I claim then is:

1. In a gas producer a shell having a charging aperture, a lateral air inlet near said charging aperture, an outwardly projecting sloping portion below said air inlet, the angle of inclination of said sloping portion being the angle of the natural slope of
 75 the fuel and said portion being constructed to cover the fuel without leaving any intermediary space between the fuel and said portion, and supplementary air inlets at the
 80 height of said sloping portion.

2. In a gas producer a shell having a charging aperture, a lateral air inlet near said charging aperture, an outwardly projecting sloping portion below said air inlet, the angle of inclination of said sloping portion being the angle of the natural slope of
 85 the fuel and said portion being constructed to cover the fuel without leaving any intermediary space between the fuel and said
 90 portion and without closely packing the fuel, supplementary air inlets at the height of said sloping portion and an inwardly sloping portion below said first named sloping portion.
 95

Signed at Birmingham in the county of Warwick England this 19th day of January A. D. 1909.

GEORGE LOUIS MORTON.

Witnesses:

F. GILBERT BUTTELL,

E. DAWSON HARDCASTLE.