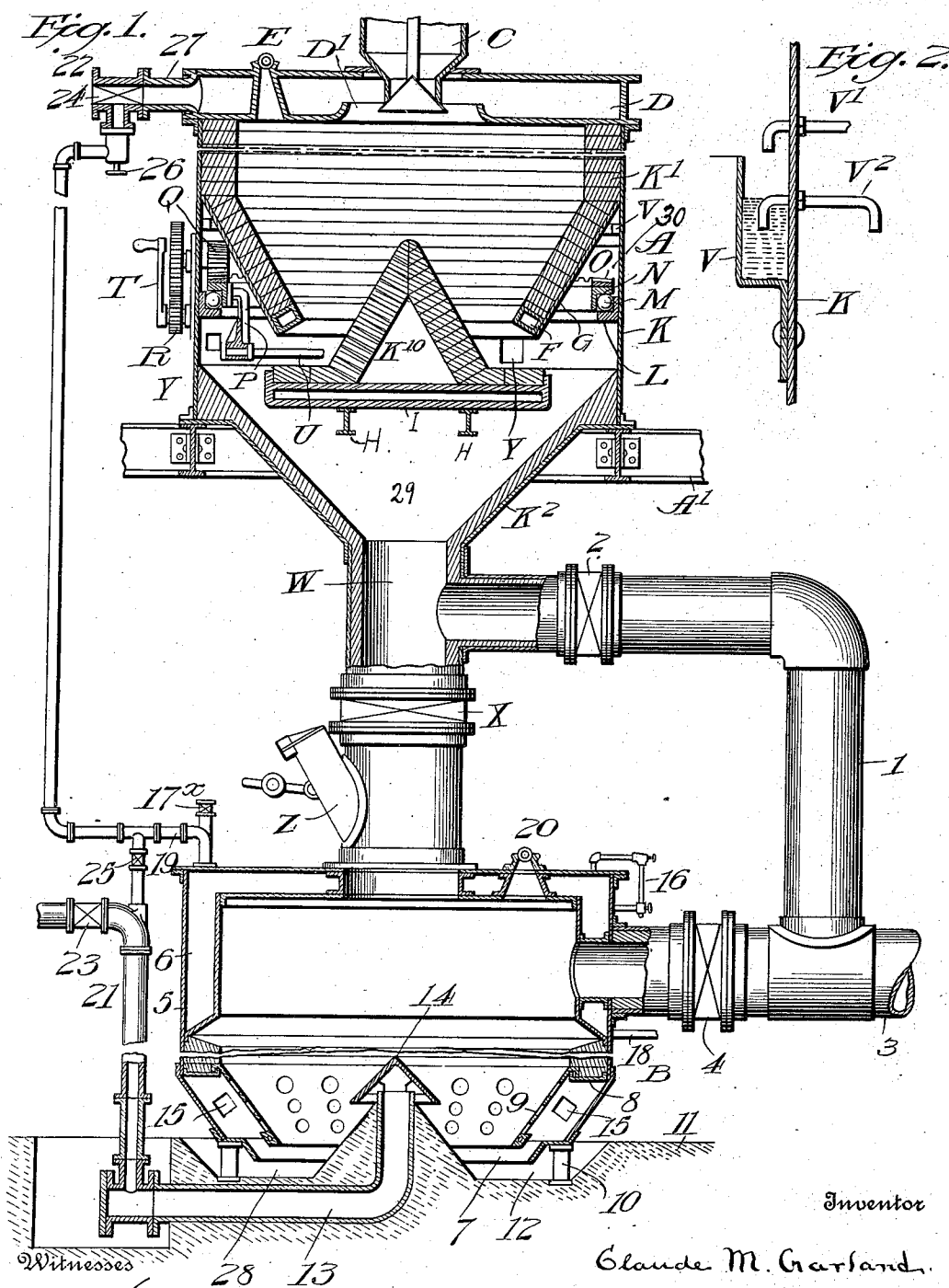


C. M. GARLAND.
GAS PRODUCER.
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1,014,385.

Patented Jan. 9, 1912.



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UNITED STATES PATENT OFFICE.

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GAS-PRODUCER.

1,014,385.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CLAUDE M. GARLAND, a citizen of the United States of America, and resident of Collingswood, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Gas-Producers, of which the following is a specification.

The objects of my invention are to construct a gas producer which will generate in a simple manner, from bituminous coal and other fuels rich in volatile matters, gas practically free from tar and other objectionable, condensable hydro-carbons; to be able to efficiently convert the tar into a permanent gas; to provide a compound gas producer, which is capable of continuous operation, and to gain efficiency of production and simplicity of operation.

Figure 1 is a general sectional elevation, some parts however being external views, and some parts broken away to permit the essential elements to be drawn to as large a scale as possible. Fig. 2 is a sectional view of a detail.

The organization comprises an upper generating chamber A, supported upon beams A¹. Below the chamber A, is a lower chamber B. K is the shell of the chamber A, which shell is lined on the inside with fire bricks K¹, and finished at the top by a steam jacket D, for the passage of the blast of air and steam on its way to the interior of the chamber A from the tuyers 27 and through the port D¹. The fuel charging hopper C terminates at the port D¹. One of the poke holes is at E, provided through the walls of the jacket D.

At the bottom of the chamber A, is an annular opening for the discharge of permanent gas, volatile products and partially gasified fuel. This opening is formed in the following manner: The lower end of the chamber A is inwardly conical downward, and, projecting into the lower open end of the chamber A is a structure K¹⁰ being conically pointed upward and small enough to leave the annular discharge open-

ing between itself and the lower edge of the chamber A. F is a water cooled mantle for supporting the fire brick lining K¹, and which is riveted to the conical shell G, which in turn is rigidly secured to the main shell K. The beams H support a cast iron plate I, spaced from the lower edge of the chamber A and supporting the fire brick structure K¹⁰ so as to form a combination of the annular opening above mentioned. The casing or shell K projects cylindrically downward, and opposite the conical portion G, thereby leaving a space between this projection and the conical portion G. In this space is a ball race L, provided with balls M. Rigidly mounted upon the upper cover N of the ball race L, is a rotary annular rack O. Engaging with the rack is a bodily stationary but rotating pinion Q, turned by means of gearing R and crank T. When the rack is rotated on its axis, by means of the crank T, the poker U revolves around and in the discharge opening, for the poker is carried on a bracket P, which is attached to a rotating cover N, and rack O.

V is an annular water jacket provided with an inlet pipe V¹, and overflow pipe V². This water jacket V is attached to the inner surface of the shell K in the space opposite the conical portion G.

Y represents cleaning doors located around the lower part of the shell K.

K² is a funnel forming a continuation of the chamber A and ending in a pipe W, which communicates with the top of the lower gas generating chamber B, which latter is provided with a charging hopper Z, conveniently extended through the wall of the pipe W. The gas off-take pipe for the chamber B is 3. Connecting this pipe and the pipe W is a third pipe 1 having a valve 2. The chamber B may be cut off from the generator A by a valve X in the pipe W, and by the valve 2 in the pipe 1.

4 is a valve in the pipe 3 for cutting off communication between the chamber B and the pipe 1. Supporting the fire brick lining is a mantle ring 8, riveted and bracketed to

the shell 5. Suspended from this mantle ring are the cast iron bosh plates 9. The producer is supported on the columns 10, which rest in the concrete foundation 11. This foundation contains the water basin 12, which with the seal ring 7 closes the bottom of the producer B and prevents the escape of the blast which is introduced through the pipe 13 and the conical hood 14. The casing 5 is provided with cleaning doors 15. The space 28, permits the easy removal of ash. The water space 6 is provided with gage glass 16, back pressure valve 17, water inlet pipe 18 and steam discharge 19. Extending through the water space is the poke hole casting 20. The steam pipe 19 leads to the air inlet pipes 21 and 22, which are provided with regulating valves 23 and 24. The steam pipe is provided with regulating valves 25 and 26.

The operation of the compound producer is as follows: Assume that the valves X and 4 are open and the valve 2 closed. Fuel is discharged into the chamber A through the hopper C. Air, forced from a blower or through induction, and steam, for the gasification of the fuel enter the twyers 27, circulate through the top plate D, cooling the same, and pass down through, and gasify a portion of the fuel. The gases formed, pass out through the space 29, and down through the pipe W into the chamber B, and out through the pipe 3. From time to time, the operator revolves the crank T, which rotates the annular rack O and cover N, to which is bracketed the poker U. The rotation of this poker pushes the partially gasified fuel from the plate I, and this falls into the chamber B, where the blast of air and steam from the hood 14, completes the gasification. The poker U may be rotated continuously by power instead of by hand. The sensible heat from the gases and from the fuel in the chamber B generates steam in the jacket 6, the steam being held under a constant pressure by the back pressure valve 17, and allowed to pass through the regulating valves 25 and 26, in quantity depending upon the requirements of the fuel and mixes with the air forming the blast for the producer. The air may be supplied to the producer at a pressure greater than atmospheric pressure, or it may be induced through the producer at a pressure lower than atmospheric pressure. The conical firebrick structure K¹⁰ is used to facilitate the even descent of the fuel in the chamber A. The water jacket at V supplies steam within the space 30 which steam keeps down the temperature of the working parts inclosed within the shell or casing K. The valves X, 2 and 4 are used in cases of emergency to isolate either generating chamber without effecting the op-

eration of the other. The valves X and 4 are open, and the valve 2 is closed during the normal operating condition. Should it be necessary to shut down the chamber A, for repairs, the valves X and 2 would be closed, and green fuel would be charged into the chamber B through the hopper Z. If the chamber B were to be shut down, the valves X and 4 would be closed and the valve 2 opened.

By means of this invention, I am able to convert the condensable hydrocarbons evolved during the process of gasification, into permanent combustible and useful gases, thereby avoiding any necessity of expensive scrubbing apparatus and loss of time and labor, while at the same time, increasing the efficiency of the process.

I claim as my invention:—

1. In a gas producer, the combination of coaxially superimposed gas generating chambers, a fuel charging device centrally located at the top of each chamber, twyers at the top of the upper chamber and at the bottom of the lower chamber respectively, a pipe for the passage of gas and partially gasified fuel communicating from the center of the bottom of the upper chamber to the center of the top of the lower chamber, and a gas off-take pipe communicating with the upper portion of the lower chamber.

2. In a gas producer, the combination of superimposed gas generating chambers, a pipe communicating from the bottom of the upper chamber to the top of the lower chamber for the passage of both gas and partially gasified fuel, a valve in said pipe, a gas off-take pipe leading from the gas space in the upper part of the lower chamber, a valve in the gas off-take pipe, a connecting pipe leading from the first named pipe at a point above said valve therein, to the gas off-take pipe and located on the other side of the valve therein from said lower chamber, and a valve in said connecting pipe.

3. In a gas producer the combination of superimposed gas generating chambers, means for feeding both gas and partially gasified fuel from the bottom of the upper chamber to the gas space at the top of the lower chamber, a gas off-take pipe located at the upper portion of the lower chamber and communicating with the gas space therein, means for cutting off communication between the two chambers, and a gas off-take pipe communicating with the space above said means and below said chamber.

4. In a gas producer, the combination of communicating superimposed gas generating chambers, a water boiler jacket for the generation of steam, and located at the top of the lower chamber, a steam jacket at the top of the upper chamber and communicat-

ing with the water boiler jacket and with
the interior of the upper chamber, a twyer
at the upper portion of the upper chamber
and communicating with the steam jacket
5 for admitting air thereto, for causing air
and steam to pass from the upper portion
of the upper chamber, through the same

and into the top of the lower chamber, and
a gas off-take pipe leading from the top of
the lower chamber.

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Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."