

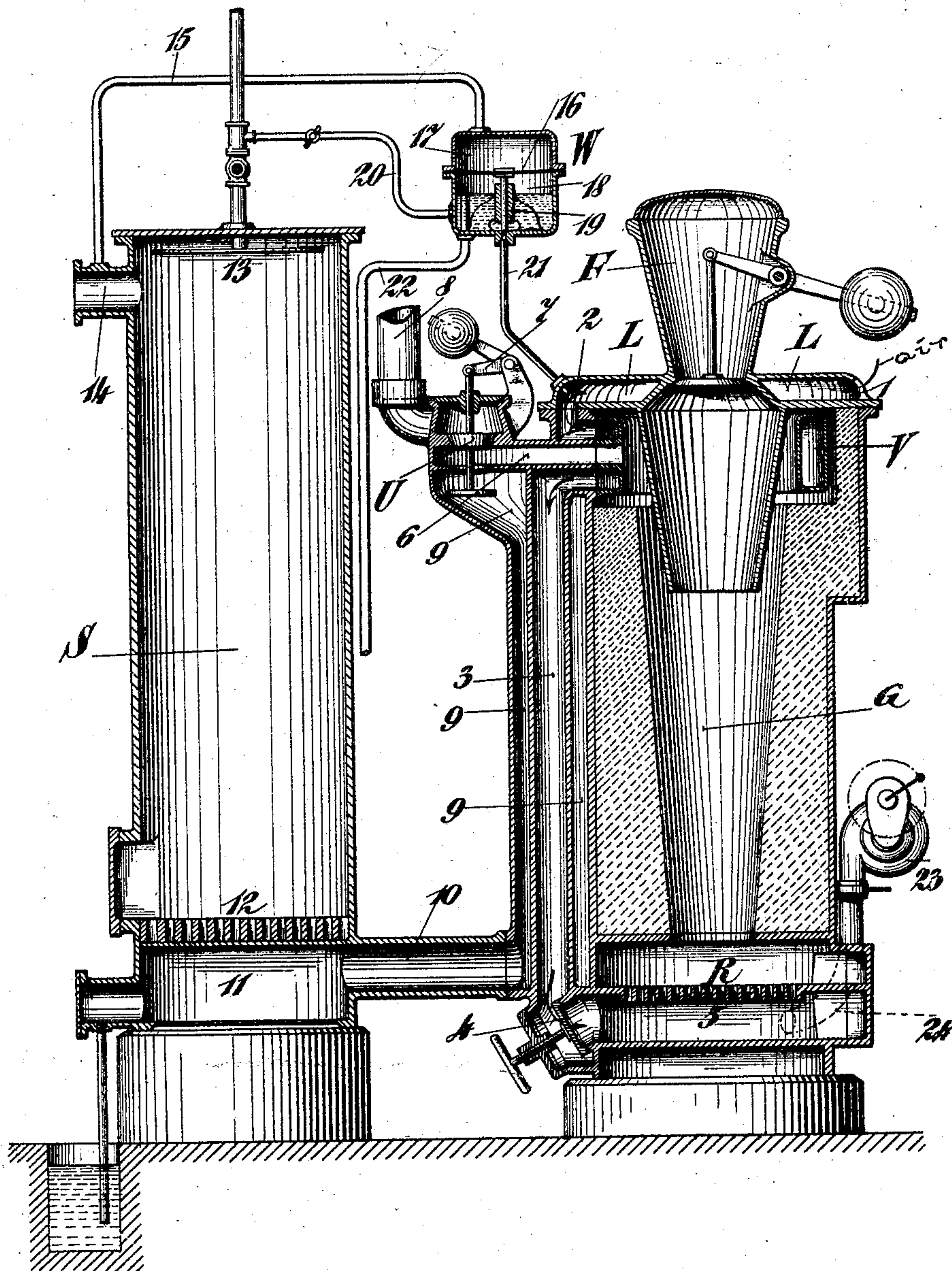
No. 775,641.

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H. WEIGLE.
GAS GENERATOR.

APPLICATION FILED APR. 11, 1903.

NO MODEL.



Witnesses:

Edber.

B. L. Summers

Inventor:

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UNITED STATES PATENT OFFICE.

HENRI WEIGLÉ, OF TÖSS, SWITZERLAND, ASSIGNOR TO THE FIRM OF SCHWEIZERISCHE LOCOMOTIV-UND MASCHINENFABRIK, OF WINTERTHAR, SWITZERLAND.

GAS-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 775,641, dated November 22, 1904.

Application filed April 11, 1903, Serial No. 152,230. (No model.)

To all whom it may concern:

Be it known that I, HENRI WEIGLÉ, engineer, a citizen of the Republic of Switzerland, residing at Töss, Switzerland, have invented
5 new and useful Improvements in Gas Generating or Producing Apparatus, of which the following is a specification.

The object of this invention is an apparatus for generating gas for use in motors or engines, in which apparatus the heat of the hot
10 gases generated is utilized for the preliminary warming of the air, for the vaporizing of the water, and for the superheating of the resultant mixture containing air and steam.

In most gas-producers hitherto known in the production of a gas rich in hydrogen an excess of steam was generated, while in the apparatus hereinafter described only so much
15 water is vaporized as is necessary for the production of a gas of constant constitution and possessing the highest possible caloric value. This object is attained by introducing the water in such small quantities into a steam-generator, which is under the heating action
20 of the outcoming hot gases, that the whole of the water introduced is at once completely vaporized. The water-supplying apparatus also is so connected with the gas-supply leading to the motor or engine that the quantity
30 of water introduced and vaporized is entirely dependent upon the quantity of gas which is used up, and thus it is impossible for an excess of steam to be generated.

In the accompanying drawing a section of
35 one form of construction of the apparatus is shown by way of example.

G is a furnace having walls of fire-resisting material and into which the fuel is charged through a hopper F with a double or trapped
40 opening device of any suitable kind. At the bottom of the furnace is a grate R, while at the top of the same is a steam-generator V, which consists of a hollow annular casing. This latter is arranged in a cylindrical pro-
45 longation of the furnace, which is in connection with the chamber of the furnace proper. The interior of the generator V is connected, on the one hand, through a conduit 2 with a

preliminary air-heater L, to which atmospheric air is admitted by an opening 1, and, 50 on the other hand, through a conduit 3 with a chamber 5 beneath the grate R. Between the conduit 3 and the chamber 5 is a valve 4, by which the communication between the furnace-chamber and the steam-generator V may 55 be cut off at the required times.

A conduit 6 leads out of the furnace-chamber G to an interchanging valve U, which may be operated by a counterweighted lever 7. According to the position of the lever 7 60 the conduit 6 is connected with the chimney 8 or with the conduit 9. The conduit 9 wholly or partially surrounds the conduit 3, which serves for conveying the steam and air to the under side of the grate, and thereby prevents 65 the latter from cooling down. The conduit 9 communicates by a pipe 10 with the bottom 11 of a scrubber S. This latter is filled with coke standing upon a grid 12, while at the top of the scrubber is arranged a water-
70 spreader 13. A pipe 14 leads out of the scrubber to the gas-engine or to a similar apparatus in which the outgoing gases are utilized.

From the scrubber or from any suitable 75 place in the gas-pipe 14 a tube 15 leads out to the water-supply apparatus W. This consists of a closed vessel which is divided into two parts either by a diaphragm or a piston, with which latter a valve 19 is connected. 80 This latter is adapted to cut off the water-supply from the chamber 18 of the apparatus W to the pipe 21 by closing the upper end of the opening leading into the said pipe. The chamber 18 serves as a small water-reservoir, in 85 which a constant water-level is maintained by a supply-pipe 20 and an overflow-pipe 22. The pipe 21 leads out from this reservoir to the preliminary heater for air, L, or directly into the steam-generator V. A ventilator 23 90 is also provided for introducing air through a pipe 24 to the chamber 5 beneath the grate R.

The action of this apparatus is as follows: The furnace is first operated after the manner of a slow-combustion heater while air 95 is introduced through the ventilator, the valve

4 being closed and the interchanging-valve U placed in such a position that the gas from the furnace-space G passes direct to the chimney 8, the conduit 6 being shut off from the conduit 9. The hot gases circulate around the generator V, whereby they are caused to give up a part of their heat to this latter and also to the preliminary air-heater L. As soon as the carbon in the furnace G is burning properly the valve U is operated so that a connection is established between the furnace G and the engine, or rather the cylinder thereof, through the conduit 6 and conduits 9 and 10, the scrubber, and pipe 14. The engine is started in the usual manner by turning the shaft, and during the first outward movement of the piston gas is sucked in from the furnace-chamber G through the conduit 6, conduits 9 and 10, and through the scrubber. The valve 4 is in the meantime again opened and air is thus allowed to enter the furnace through 1, L, 2, V, 3, 4, 5, R. The air is thus heated in its passage by means of heat emitted from the hot gases issuing from the furnace, while these latter are simultaneously partially cooled. The air heated and, as will be described hereinafter, mixed with steam now comes in contact with the red-hot fuel in the furnace, whereby Dowson or producer gas is formed, which passes out through the passage 6, conduits 9 10, space 11, grid 12, scrubber, and pipe 14 to the engine in which it is burned with the production of work. Each time that a charge is drawn into the engine-cylinder a momentarily-partial vacuum is formed in the pipe which leads to the chamber 17 of the water-supply apparatus W, whereby the diaphragm or piston 16 is moved, together with the valve 19, connected thereto, and as a consequence a small quantity of water is allowed to pass out of the reservoir 18 through the pipe 21 into the generator V. This very small quantity of water is mixed with the already partially-heated air and passes with the latter into the steam-generator V in the form of steam. In its passage through the annular generator and through the conduit 3, valve-opening 4, and chamber 5 to the under side of the grate the mixture of air and steam is further heated. After this the mixture comes in contact with the layer of red-hot fuel in which the gas production takes place and is in a large measure carbon monoxid. The hot gases now pass to the top of the furnace, circulate around the steam generator or heater V, and give up a part of their heat to the latter and to the lower wall of the preliminary air-heater L. On their further passage to the scrubber the hot gases further prevent the cooling of the mixture of heated air and steam which is passing through the neighboring conduit from the heater V to the under side of the grate R, as described above.

Having now particularly described and ascertained the nature of my said invention and

in what manner the same is to be performed, I declare that what I claim is—

1. In a gas-generator, the combination with the producer; of an air-heater and a surface vaporizer in the upper part of the producer, both located in the path of the producer-gases, said vaporizer and heater in communication with each other and with the producer below the grate thereof, and means to supply air and water to said heater and vaporizer, respectively, substantially as set forth.

2. In a gas-generator, the combination with the producer; of an air-heater and a surface vaporizer in the upper part of the producer, both located in the path of the producer-gases, said vaporizer and heater in communication with each other and with the producer below the grate thereof, and means to supply air and water to said heater and vaporizer, respectively, in proportion to the gas consumed, substantially as set forth.

3. In a gas-generator, the combination with the producer; of a surface vaporizer, an air-heater above the same, both located at the upper end of the producer in the path of the producer-gases, said heater and vaporizer in communication with each other and with the producer below the grate thereof, and means to supply air and water to the heater and vaporizer, respectively, in proportion to the gas consumed, substantially as set forth.

4. In a gas-generator, the combination with the producer; of an air-heater and a surface vaporizer located in the upper end of the producer in the path of the producer-gases, said heater and vaporizer in communication with each other and with the producer below the grate thereof, and means to supply air and water to the heater and vaporizer, respectively, substantially as set forth.

5. In a gas-generator, the combination with the producer, of an air-heater, a vaporizer in communication with said heater and a pipe connecting the heater and vaporizer to the producer below the fuel-grate thereof, said heater, vaporizer and connecting-pipe all exposed to the direct action of the producer-gases, substantially as set forth.

6. In a gas-generator, the combination with a furnace, of a vaporizer and an air-heater, a conduit for both air and steam terminating beneath the furnace, means to cut off the conduit from the furnace, a gas-pipe surrounding the conduit, means to simultaneously close the gas-pipe and open communication to a chimney and vice versa, and means to supply forced draft to the furnace during the starting of the furnace, substantially as described.

7. In a gas-generator, the combination with a furnace, a surface vaporizer and air-heater; of a scrubber, a gas-supply pipe leading therefrom, means to supply water to the vaporizer and air-heater having a pipe connection to the gas-supply pipe, whereby water is automatically applied to the air-heater and vaporizer

at every diminution of pressure in the gas-supply pipe due to the periodic formation therein of a partial vacuum, substantially as described.

5 8. In a gas-generator, the combination with a furnace, of a surface vaporizer and air-heater, means to conduct air and vapor from them to the furnace, a scrubber, a pipe connecting the furnace and scrubber, a gas-delivery pipe leading from the scrubber, a reservoir connected to the air-heater and vaporizer, a diaphragm-actuated valve in the reservoir and a pipe to connect the reservoir above the diaphragm to the gas-delivery pipe to admit
10 water to the vaporizer and air-heater at every formation of a partial vacuum in the gas-delivery pipe, substantially as described.

9. In a gas-generator, the combination with a furnace having a grate and a scrubber; of a
20 vaporizer in the upper part thereof, an air-heater above the vaporizer, a conduit to conduct air and vapor beneath the grate, a gas-pipe surrounding the conduit and connected to the scrubber, a gas-delivery pipe at the
25 upper end of the scrubber, means to direct furnace-gases direct to a chimney or to the

gas-pipe, a valve to close the conduit, a reservoir, means to maintain water at a level therein, a connection between the reservoir and air-heater and vaporizer, a diaphragm-actuated
30 valve to control the exit of water, and a pipe connecting the reservoir above the diaphragm with the gas-delivery pipe, substantially as described.

10. A gas-producer, a surface vaporizer 35 and an air-chamber therein, said air-chamber in communication with the vaporizer and both air-chamber and vaporizer located in the path of the producer-gases, means to automatically supply water to the vaporizer in proportion
40 to the consumption of gas, and a valve-controlled pipe to conduct the mixture of air and vapor beneath the fuel in the producer, substantially as described.

In testimony whereof I have signed my name 45 to this specification in the presence of two subscribing witnesses.

HENRI WEIGLÉ.

Witnesses:

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A. LEIBERKNECHT.