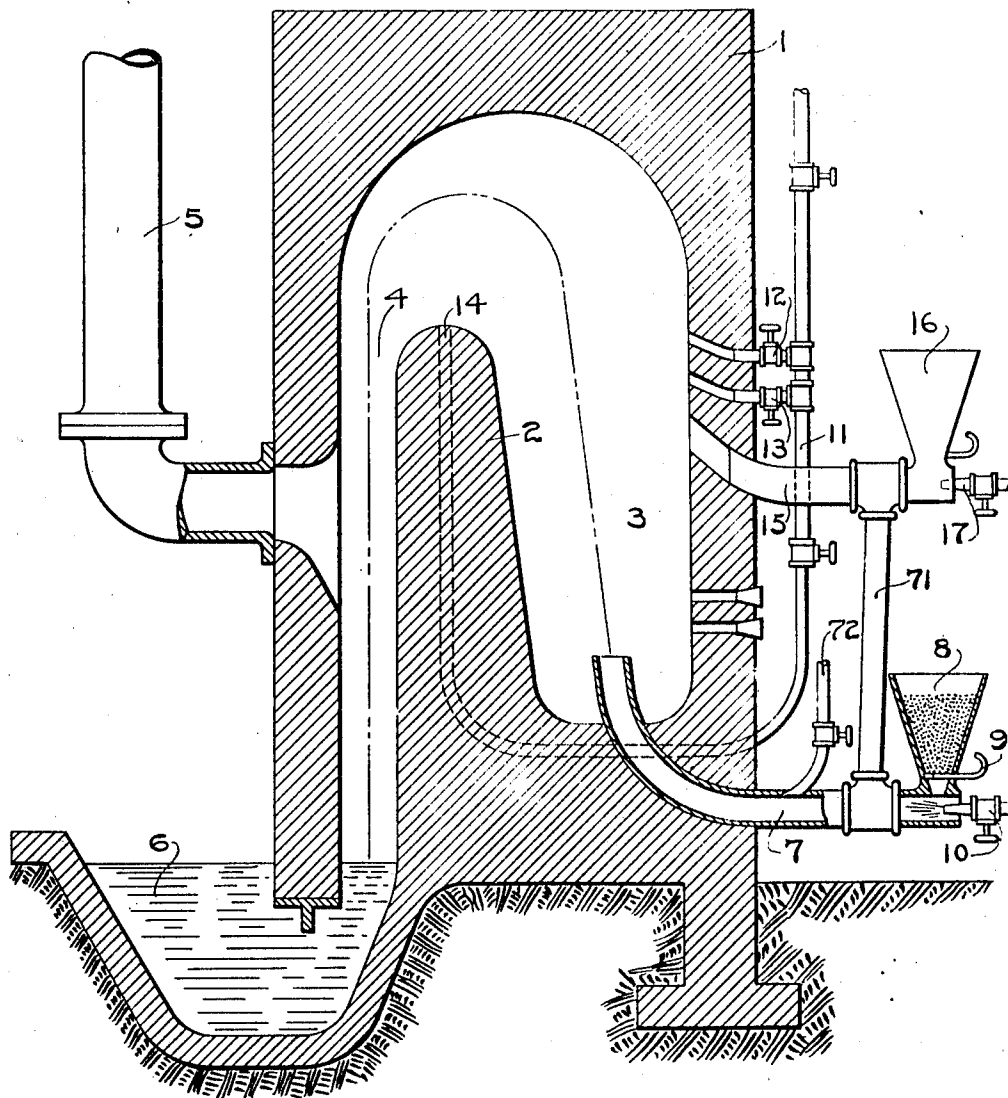


J. H. HIRT.
PROCESS OF PRODUCING GAS.
APPLICATION FILED FEB. 14, 1910.

1,039,398.

Patented Sept. 24, 1912.



WITNESSES =

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PROCESS OF PRODUCING GAS.

1,039,398.

Specification of Letters Patent.

Patented Sept. 24, 1912.

Application filed February 14, 1910. Serial No. 543,724.

To all whom it may concern:

Be it known that I, JULES H. HIRT, a citizen of the United States, residing at El Paso, in the county of El Paso and State of Texas, have invented a certain new and useful Improvement in Processes of Producing Gas, of which the following is a specification.

This invention relates to improvements in the process of making producer gas.

The object of the invention is to produce a gas that is rich in carbon monoxid, by a continuous process, where the gas-forming combustible material is admitted at one part of the gas generating chamber and producer gas is removed from another part of said chamber. The process also provides for reducing to carbon monoxid any carbon dioxide that may be formed. The process also provides for the proper reduction of the high temperature incident to the carrying out of the process.

The accompanying drawing illustrates one form of gas producer in which, or by means of which, the process may be carried out. The drawing will serve only to clearly ascertain the process and is not in any sense to be understood as limiting the process to said apparatus, which is claimed in application Serial No. 543,723 filed concurrently herewith.

The single figure of the drawing is a vertical section through the gas producer.

Referring to the drawing, the furnace 1 is of any suitable configuration and is shown as vertically disposed with its interior preferably dome shaped at the top. This interior of the furnace is divided by a vertical wall 2 into the gas generating chamber 3 and the narrow passage 4 leading at the bottom to the water seal 6. An inlet pipe 7 leads to the bottom of the gas generating chamber 3 and is upwardly directed. At its outer end a hopper 8 controlled by a gate 9 near its bottom is in communication therewith, and a blowing means 10, such as a blower or fan, is directed into the open end of the inlet pipe 7 adjacent the communication from the hopper 8.

A supplementary inlet pipe 15 communicates with the gas generating chamber 3 at a point slightly in advance of the point at which the inlet pipe 7 communicates therewith, and is upwardly directed therein. At its outer end this inlet pipe 15 is similarly

provided with a hopper 16 and with a blowing means 17. The inlet pipes 7 and 15 are connected by a pipe 71 at points adjacent the hoppers 8, 16 to permit of secondary supply through the primary inlet.

A steam pipe 11 is provided with valve controlled branch pipes 12, 13, 14, and two of these branch pipes 12, 13, communicate with the gas generating chamber 3 at adjacent points slightly in advance of the point of communication of inlet pipe 15 with said gas generating chamber 3. These branch pipes 12, 13, are also slightly upwardly directed to said gas generating chamber 3. Branch pipe 14 passes upwardly through wall 2 and at the highest point of the wall 2, communicates with the gas generating chamber 3. A supplementary valved gas starting inlet pipe 72 communicates with inlet pipe 7, said inlet pipe being forwardly directed at the point of communication. A gas off-take pipe 5 communicates with the passage 4 at a point intermediate the gas generating chamber 3 and the water seal 6. This off-take pipe 5 passes to any point where it is desired to use the gas generated in the gas producer.

Operation: A carbonaceous material having been introduced into the hoppers 8, 16, the blowing means 10 is caused to operate, directing a blast of air axially into the outer end of inlet pipe 7 and past the discharge end of the hopper 8, the gate 9 having been adjusted to a suitable opening. Under these conditions, the ignition of the charge entering the other inlet pipe 7 having been effected in any suitable manner, the gas-forming combustible material consisting of an admixture of finely divided carbonaceous material and air, will be carried upwardly through the gas generating chamber 3 and around the top of wall 2 down through passage 4 toward the off-take pipe 5. During its passage combustion will take place and the condition of completeness of such combustion will be determined by various conditions as to the extent of opening of the hopper gate 9 and the blowing means 10; also upon other extraneous conditions, such as the temperature of the gas producer. Combustion having proceeded for a time, the gas producer will become highly heated especially in the upper part of the gas generating chamber 3. In order to control the extent of the temperature rise, steam is

introduced through the various branch pipes 12, 13, 14, and these various points of introduction of the steam are designed to be at points of highest temperature. A chemical reaction takes place causing the disassociation of the elements of the steam or moisture into hydrogen and oxygen with a subsequent recombination of these gases wholly or in part with a gas-forming combustible material burning in the gas generating chamber 3. Free hydrogen, methane or marsh gas, carbon monoxid, and possibly carbon dioxid, will be some or all of the resulting gases.

15 In order to reduce any carbon dioxid that may be formed within the gas generating chamber 3, a supplemental introduction of gas-forming combustible material is made through the inlet pipe 15 by using the blowing means 17 in combination with the gas controlled hopper 16 having therein carbonaceous material. This carbonaceous material being introduced at a point of high temperature within the gas generating chamber 3, unites with the carbon dioxid gas, if any there be, reducing same to carbon monoxid. The air introduced through the blowing means 17 combines with other carbonaceous material introduced thereby, the adjustment being such that the carbonaceous material is in excess.

The gas-forming combustible material in-

troduced either through the main inlet pipe 7 or the supplemental inlet pipe 15, may consist of liquid hydrocarbon and air instead of carbonaceous material and air. The ash formed by the combustion, and any excess of solid material introduced into the producer, pass down through the passage 4 into the water seal 6 from whence they may be externally removed without stopping the main operation of the producer and without opening up communication from within the same to atmosphere.

It is claimed and desired to secure by Letters Patent,—

In the art of producing gas, introducing into the free space of a chamber an upwardly directed blast of gas forming combustible material, igniting said blast, introducing into the same free space of said chamber a second upwardly directed blast of gas forming combustible material, changing the direction of the flow of said combined blast, introducing moisture into said blast at the place of change and taking off from the changed flow the gas produced.

In testimony whereof, I affix my signature in the presence of two witnesses.

JULES H. HIRT.

Witnesses:

LEON E. HIRT,
C. CADENA.