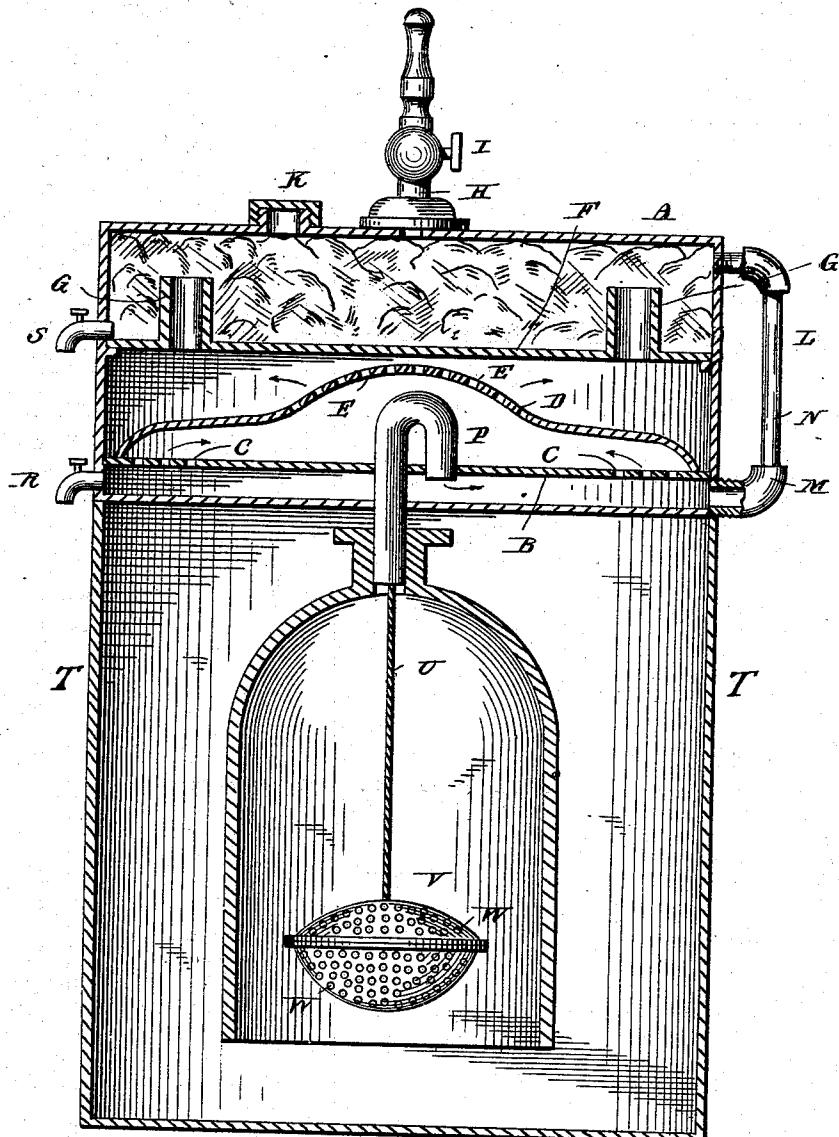


(No Model.)

S. B. BUSHFIELD.

APPARATUS FOR GENERATING AND CARBURETING HYDROGEN GAS.
No. 282,492.

Patented Aug. 7, 1883.



Witnesses.

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SAMUEL B. BUSHFIELD, OF DENVER, COLORADO.

APPARATUS FOR GENERATING AND CARBURETING HYDROGEN GAS.

SPECIFICATION forming part of Letters Patent No. 282,492, dated August 7, 1883.

Application filed June 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL B. BUSHFIELD, a citizen of the United States, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Apparatus for Generating and Carbureting Hydrogen Gas; and I do declare the following to be a full, clear, and exact description of the invention, such as will 10 enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the letters and figures of reference marked thereon, which forms a part of this specification.

This invention relates to certain improvements in apparatus for generating and carbureting gas for illuminating purposes; and it has for its objects to provide for thoroughly 20 carbureting the gas, so as to produce a steady, uniform, and brilliant light, and to produce an apparatus which will be simple and inexpensive in construction, easy to manipulate, and perfectly automatic in operation. These 25 objects I attain by the means illustrated in the accompanying drawing, in which is represented a vertical sectional view of my improved apparatus.

In the said drawing, the letter A indicates 30 the carbureting-chamber, which consists of a closed vessel of metal or other suitable material, preferably of cylindrical shape. Near the bottom of said vessel is located a horizontal diaphragm or partition, B, of metal or other 35 suitable material, which is provided with one or more series of annularly-arranged apertures, C, near its edge, for the purpose hereinafter explained. Above said diaphragm or partition is located a metallic dome, D, which sets 40 loosely upon said partition, and which is provided with a series of openings, E, as indicated, and above said dome, in the carbureting-chamber, is a diaphragm or partition, F, from which extends upward short pipes G into the 45 upper compartment of the carbureting-chamber, as shown. The said upper-chamber is packed with some absorbent material—such as sponge, excelsior, or the like—for the purpose hereinafter explained. The top of the chamber 50 is hermetically fastened to it, and is provided with a service-pipe, H, leading to one

or more burners, one being illustrated in the present instance, each burner being provided with a suitable stop-cock, I, by means of which the flow of gas may be regulated. The said top is also provided with a filling aperture or tube, K, which is closed by a suitable screw-cap or otherwise. From the upper part of the upper compartment extends a short elbow-pipe, L, and from the lower part of the lower compartment a similar pipe, M, between which is located a glass gage, N, by means of which the proper level of the carbureting-fluid in the lower part of the carburetor will be indicated in filling.

The letter P indicates a pipe passing upward through the bottom of the carbureting-chamber and the lower diaphragm, the said pipe being bent downward at its upper end, as shown, and its extremity passed below said diaphragm, as indicated, for the purpose hereinafter set forth.

The letter R indicates a cock for withdrawing the spent carbureting-fluid from the lower compartment of the carbureting-chamber, and S a similar cock for drawing off the spent fluid from the upper compartment.

The letter T indicates the generating-chamber, which consists of a vessel of copper, lead, glass, or other material capable of resisting 80 the action of sulphuric acid. The said vessel is of such size that the carbureting-chamber may be fitted upon its top, as shown. Within said vessel projects downwardly a bell of 85 non-corrosive material, which is connected to the lower end of the tube by a gas-tight joint, the tube communicating freely with its interior. From the said tube depends a wire, U, hooked at its lower end, to which may be attached a perforated copper basket, V, provided 90 with perforations W, for the purpose hereinafter set forth.

The operation of my invention is as follows: The gas-generating chamber is charged with 95 a solution of sulphuric acid in water to about two-thirds of its height, (more or less,) and the basket filled with scrap zinc or iron and secured to the hooked wire. The carbureting-chamber is then charged through the filling-aperture with hydrocarbon fluid of proper 100 specific gravity. The said fluid first collects in the upper compartment until it reaches the

level of the tubes extending up into the same. It then overflows into the lower compartment, passing under the edge of the loose dome, which may be serrated to allow of its more ready passage down into the space between the lower partition and bottom through the openings in said partition. It then gradually collects until it reaches the proper level, as indicated in the glass gage, when the filling is stopped and the filling-aperture closed. The carbureting-chamber is then placed upon the top of the generating-chamber, the bell extending down into the acid solution in said chamber. Upon opening one or more burners the pressure in the bell will be relieved, the acid solution will enter it and come in contact with the zinc or iron scraps. Hydrogen gas will be thereby generated, which will first force the air up through the carburetor and out of the same, after which the gas will commence to flow through, taking the direction indicated by the arrows. The reaction of the acid upon the zinc will develop a certain amount of heat, which will be carried up by the gas and imparted to the liquid in the lower compartment to assist in its volatilization. The dome compels the gas to pass to the center of the lower chamber, preventing the gas from carrying up any acid or watery vapor into the upper chamber, which might injure the packing, and distributing the gas into the upper part of the lower chamber in such manner that it will pass uniformly to all of the tubes leading to the up-

per chamber, so as to distribute it uniformly throughout the packing. The gas in a thoroughly and uniformly carbureted condition finally passes through the service-pipe to the burner or burners, where it is ignited. By wholly or partially turning off the gas the pressure in the bell is increased to a greater or less extent, exposing more or less zinc to the action of the acid, thus rendering the machine entirely automatic in its action. 35

Having thus described my invention, what I claim, and desire to secure by Letters Patent, 45 is—

The combination, in an apparatus for the manufacture of illuminating-gas, of the carburetor having a perforated diaphragm near its bottom, a loose perforated dome resting thereon and provided with perforations at its center, an upper diaphragm provided with upright tubes extending into a packing-chamber, with a central bent tube connecting with a generator and leading to the space below the lower diaphragm, a gage - pipe connecting the upper and lower chambers of the carburetor, and an eduction-pipe leading to one or more burners, substantially as specified. 50 55

In testimony whereof I affix my signature in presence of two witnesses. 60

SAMUEL B. BUSHFIELD.

Witnesses:

W. D. ALEXANDER,
J. JOE McCARTHY.