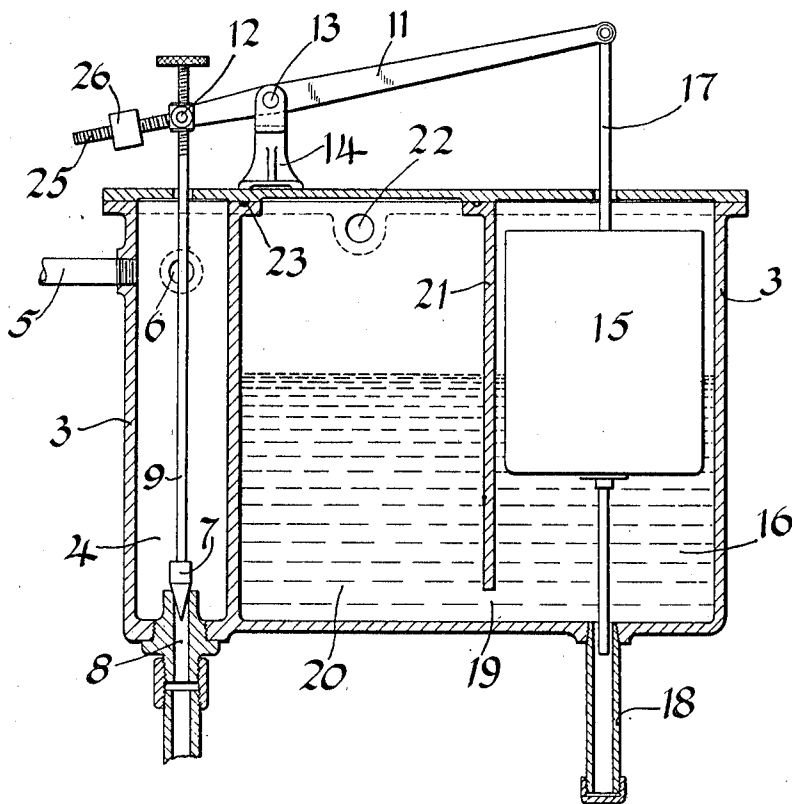


H. I. LEA.
GAS PRODUCER REGULATING VALVE.
APPLICATION FILED FEB. 14, 1907.

969,884.

Patented Sept. 13, 1910.



WITNESSES:

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UNITED STATES PATENT OFFICE.

HENRY I. LEA, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE MACHINE COMPANY, A CORPORATION OF PENNSYLVANIA.

GAS-PRODUCER REGULATING-VALVE.

969,884.

Specification of Letters Patent. **Patented Sept. 13, 1910.**

Application filed February 14, 1907. Serial No. 357,241.

To all whom it may concern:

Be it known that I, HENRY I. LEA, a citizen of the United States, and a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have made a new and useful Invention in Gas-Producer Regulating-Valves, of which the following is a specification:

This invention relates to automatic means for admitting to a gas producer such quantities of water as will best meet the requirements of the producer fuel bed under the various operating conditions encountered.

In the operation of gas producers it is found that the efficiency of the gas making apparatus is increased when a certain amount of water vapor is admitted with the air forming the blast entering the fuel bed. It is also found that instead of water vapor or steam, the products of combustion or CO_2 alone, may be admitted with the air and bring about a similar increase in efficiency. It is also found that a given fuel bed will make gas of variable quality if the ratio of the water vapor to the air, or of the products of combustion (or of CO_2 alone) to the air forming the blast, is varied. The fixed nature of the valve settings and the igniters on gas engines render it important that gas of uniform quality be produced and it is to this end that my invention is directed.

I wish it to be understood that I do not mean to restrict the application of this device to suction producers as such as this device, without any modification of principles, may be used in a wide range of gas making apparatus for the control of either liquids or gases in accord with the demands made upon the fuel bed or with changes in pressure existing in a gas main or reservoir to which proper connection may be made.

In the drawing accompanying this application and forming a part thereof, the figure is a sectional elevation of a valve embodying my invention.

This embodiment of my invention is adapted to be utilized in connection with steam or vapor generators operating in connection with a suction producer and consists of a valve which is adapted to de-

liver the water under a low head to the vapor generating chambers of the boiler. The valve is provided with a casing 3 which incloses a chamber 4, to which a supply of water is admitted through a pipe 5 and from which the overflow water is discharged through a port 6. The chamber 4 is provided with an automatically actuated valve 7 which controls the flow of water from the chamber through a port 8. The port 8 is located at the bottom of the chamber 4 and communicates through suitable piping with the water inlet of the boiler or vaporizer in conjunction with which the valve operates. The valve 7 is provided with a stem 9 which extends upwardly through the chamber and is connected to one end of a lever 11 by means of a screw connection 12, which renders the valve adjustable relative to the lever. The lever 11 is pivoted at 13 on a bracket 14, which is suitably mounted on the cover portion of the casing. The lever is automatically actuated by means of a float 15 which is adapted to be moved to different positions in accordance with the varying pressures encountered in the mains between the gas generator and the engine or other exhausting appliance. The float 15 is located in a chamber 16 and is connected by a stem 17 to one end of the lever 11. The stem 17 extends through the float and into a tubular guide 18 which is secured to the bottom of the chamber 16. The chamber 16 communicates through a port 19 with a chamber 20, which is located within the valve casing 3 and is separated from the chamber 16 by a partition 21. The chamber 20 is provided with a port 22 which communicates through suitable piping with the gas delivery mains located between the gas generator and the engine or other exhausting appliance and which transmits to the chamber 20 the gas pressure encountered within the mains. The chambers 16 and 20 are partially filled with water or other suitable liquid in which the float 15 rests. The chamber 20 above the liquid is air tight, a suitable packing 23 being employed between the cover portion of the casing and the walls of the chamber for the

purpose of rendering it so. The chamber 16 is exposed through any suitable opening, for instance, the opening around the stem 17, to atmospheric pressure and consequently variations in gas pressure within the chamber 20 will cause the water levels in each of the two chambers to fluctuate and to rise and fall amounts which correspond to the encountered gas pressure.

A threaded extension 25 is formed on one end of the lever 11 and is provided with a counterbalancing weight 26, which is adapted to be moved to different positions along the extension for the purpose of accurately balancing the operating parts of the automatically-actuated valve.

The operation of the valve is as follows: The valve 7 is adjusted by means of the stem 9 so that it will just close the port 8 when the float 15 occupies some predetermined position which corresponds to some definite gas pressure. Variations in gas pressure in the gas delivery mains will cause variations in the water level within the chamber 16 and consequently will cause the float to operate the valve through the medium of the lever 11 and the valve stem, to open and close the port 8 greater or less amounts. As the pressure in the mains decreases, the decreasing pressure within the chamber 20 above the liquid will cause the level of the liquid to rise in the chamber 20 and to fall in the chamber 16. The float 15, falling with the liquid in the chamber 16, will open the valve an amount corresponding to the decrease in pressure and will admit a corresponding amount of water to the steam generator or vaporizer. As the pressure in the gas mains again increases, due to the increased amount of gas generated by the producer, or the decreased amount of gas demanded by the engine or other exhausting appliance, the pressure in the chamber 20 will increase and will cause the water level in the chamber 20 to fall while it rises in the chamber 16. The float 15 rising with the water level will operate to close the valve an amount corresponding to the increased pressure and will, therefore, restrict or wholly shut off the flow of water through the port 8. Since the port 8 is always subjected to a constant pressure head, accurate regulation may be obtained by one adjustment of the valve relative to the lever 11.

While the construction here shown is particularly applicable to the control of water for the supply of a steam generator or vaporizer of a suction gas producer, it is evident that by merely altering the proportions of this device, the valve 7 may be made to control the quantity of CO_2 or the ordinary mixed products of combustion which

it might be desirable to admit instead of steam or water vapor with the air entering the fuel bed. It is not, however, intended to restrict this appliance to the suction producer practice alone, as it is obviously capable of controlling the flow of any gas or any liquid for any purpose whatever in accord with the changes in pressure transmitted to chamber 20 from any source whatever.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown is only illustrative and that the invention can be carried out by other means.

What I claim is:

1. A device for controlling the volume of a gas or liquid passing a given orifice in accordance with variations in existing fluid pressure, comprising a delivery orifice, a valve controlling the delivery therethrough, a pressure chamber, a float chamber communicating therewith, a float located within said float chamber and responsive to variations of pressure within said pressure chamber, a lever between said float and said chamber for actuating said valve and a counterbalancing weight, carried by said lever, for controlling the operation of said valve.

2. A device for controlling the volume of a gas or liquid passing a given orifice in accordance with variations in fluid pressure, comprising a delivery orifice, a valve controlling the delivery therethrough, a pressure chamber subjected to variations of fluid pressure, a float chamber communicating therewith, a float located within said chamber and responsive to variations of pressure in said pressure chamber, a lever between said float and said valve for actuating said valve and means, carried by said lever, for controlling the operation of said float and for varying the adjustment of said valve.

3. A device of the character described comprising a liquid chamber, an orifice provided in said chamber, a valve controlling the delivery through said orifice and means for maintaining a constant head of liquid over said orifice, in combination with a pressure chamber subjected to varying degrees of pressure, a float chamber communicating therewith, a float located within said float chamber and responsive to variations of pressure in said pressure chamber and a lever, connected to said float, for operating said valve.

4. In a device of the class described, a pressure chamber, a float chamber communicating therewith, a liquid chamber independent of the pressure and float chambers and hav-

ing inlet and outlet openings, a valve for
the outlet opening of the liquid chamber, a
float in the float chamber and connecting
means between the float and valve, said float
5 being responsive to variations in the pres-
sure chamber to seat or unseat said valve.

In testimony whereof, I have hereunto

subscribed my name this 30th day of Jan-
uary, 1907.

HENRY I. LEA.

Witnesses:

CHARLES W. MCGEE,
E. M. MCCALLISTER.