

(No Model.)

E. J. FROST & B. MIDDLEDITCH.
DEVICE FOR REGULATING QUALITY OF GAS.

No. 577,739.

Patented Feb. 23, 1897.

FIG. 1.

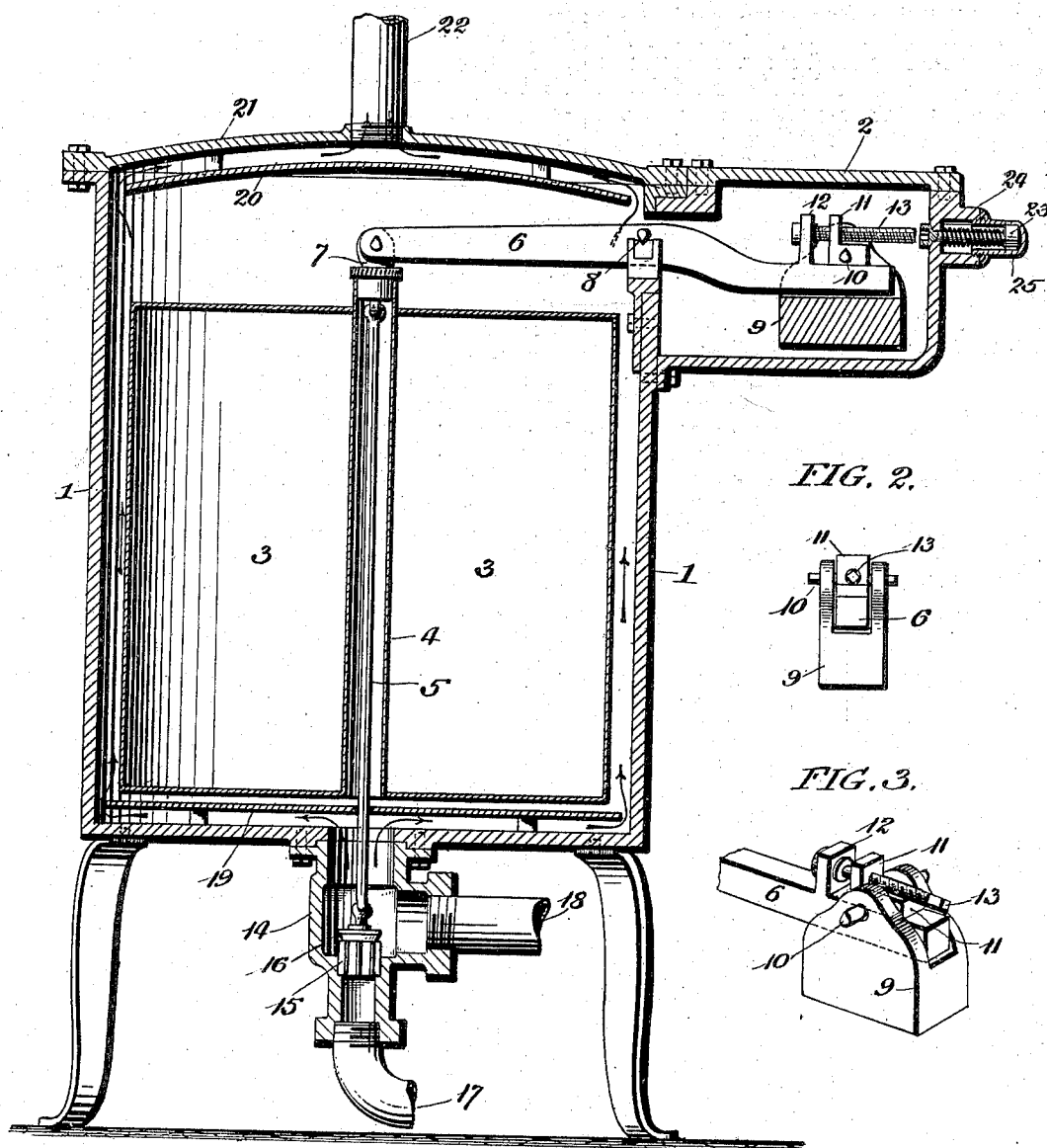


FIG. 2.

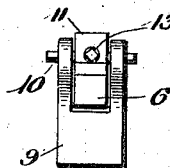
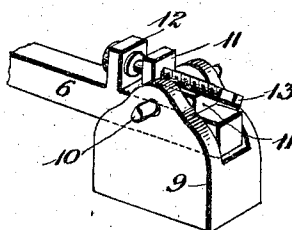


FIG. 3.



WITNESSES:

Sam. Williams
Chas. B. Collier

INVENTORS'

Edward J. Frost and
Benjamin Middleditch,

Chas. B. Collier,
Atty.

UNITED STATES PATENT OFFICE.

EDWARD J. FROST, OF PHILADELPHIA, PENNSYLVANIA, AND BENJAMIN MIDDLEDITCH, OF DETROIT, MICHIGAN, ASSIGNORS TO JOSEPH H. BERRY, OF DETROIT, MICHIGAN.

DEVICE FOR REGULATING QUALITY OF GAS.

SPECIFICATION forming part of Letters Patent No. 577,739, dated February 23, 1897.

Application filed June 13, 1895. Serial No. 552,643. (No model.)

To all whom it may concern:

Be it known that we, EDWARD J. FROST, of Philadelphia, in the State of Pennsylvania, and BENJAMIN MIDDLEDITCH, of Detroit, in the State of Michigan, have invented certain new and useful Improvements in Devices for Automatically Regulating the Quality of Gas, and especially that known as "air-gas" or "carbureted air," of which the following is a specification, reference being had to the accompanying drawings.

Figure 1 is a central vertical section of the apparatus. Fig. 2 is an end view of the lever and counterbalance, and Fig. 3 a view in perspective of the outer end of the lever and counterbalance.

It is well known that air-currents charged with hydrocarbon vapors of gasoline from carbureters and designed for illuminating purposes vary from time to time in the degree of saturation, thus causing corresponding variations in the illuminating power of the gas, and most of the time there is an oversaturation, thus causing smoke in the burning of the gas, with diminished candle-power and the giving out of unpleasant odors.

It is known that the gravity or weight of the gas varies with the degree of its saturation by the vapors of gasoline and that these vapors can be mixed in proper proportions with air and a uniform gas can be produced of unvarying candle-power.

Taking advantage of the above facts, the object of our invention is the production of a machine simple in construction and reliable in action whereby to automatically effect such regulation in the proportion of air and gas as to secure the best possible results from such mixture.

In the accompanying drawings, 1 represents a cylinder or mixing-chamber having the extension 2.

3 is a sealed float, preferably of cylindrical form, connected with one end of a lever 6, the mode shown in the drawings being a lug 7 on float 3, pivoted to the lever 6.

A central passage-way 4 may be formed through the float 3 to receive a valve-stem 5, one end of which is connected with the lever 6 through lug 7, the other end being connected

with a valve 16, hereinafter described. We have illustrated the device as made with a central passage-way through the float, but this passage-way may be omitted and the valve-stem connected with the float or with the lever in any other way.

The lever 6 is fulcrumed at 8 and is provided with a bifurcated counterbalance 9, which is supported by pivot 10, resting on bearings in traveling block 11, which in turn is supported on the outer end of the lever. 12 is an upward projection or lug on lever 6, forming a bearing for screw 13, for the adjustment of counterbalance 9. 14 is the casing containing the valve-seat 15, on which the valve 16 rests when closed. 17 is the air-inlet, through which air is supplied at a pressure equal to or greater than the pressure of the incoming gas, and 18 is the gas-inlet, and the arrows designate the passage of the gas around the deflecting-plate 19 and float 3. The rod 5 is connected at top by a swivel-joint to the lug 7 and at the bottom with the valve 16 with similar attachment. 20 is also a deflecting-plate and is attached to cover 21.

22 is the gas-outlet leading to the burners. 23 represents a rod having a bearing in the wall of extension 2 and adapted to have inward longitudinal and also axial movement, and has on its inner end a socket to engage with screw 13 to adjust the position of counterbalance 9. A spiral spring 24 on the stem of rod 23 retracts same when pressure is released from said rod.

The operation of our device is as follows: The float and the counterweight are so initially adjusted relative to each other as that the valve 16, controlling the air-inlet, is closed and remains closed when vapor of just the desired richness (or less) is passing from the carbureter into the gas-inlet 18 and through the cylinder 1 to the burners. As soon, however, as the vapor-current becomes too highly charged or saturated the increase of its density so resulting lifts the float 3 and with it the air-inlet valve, at same time correspondingly depressing the counterweight 9. This admits air to the mixing-chamber through inlet 17 and valve 16 to dilute the vapor in said chamber, and (when gas is be-

ing drawn from the mixing-chamber) the float varies the position of valve 16 in accordance with the amount of air required from time to time, thus keeping the vapor within the mixing-chamber at practically a constant density and insuring gas of even and regular quality. Sudden variations in the number of lights supplied from the mixing-chamber may cause the float to open the valve wide or to close the air-valve entirely; but ordinarily when the apparatus is in use the admission of air is continuous, but regulated, until the gasoline in the carbureter becomes nearly exhausted of its lighter constituents.

By the use of our invention the quality of gas supplied to the burners is practically uniform from the time the carbureter is charged with fresh gasoline down to the time when the gasoline is exhausted instead of being rich, heavy, and smoky at first and afterward poor, light, and deficient in illuminating power, as usual.

It will be observed that the counterweight on the outer end of the lever is movable longitudinally and can be readily and accurately adjusted by removing the cap 25, pushing inwardly the rod 23 until the socket on the inner end of same engages with threaded rod 13, and then turning rod 23 to the right or left, as required, to effect the desired adjustment.

Should it be desired to vary the standard or quality of the gas to be employed at the burners at any time, any desired adjustment as between the counterweight and the float can be effected in the manner described.

Our invention is equally applicable to the regulation of the supply of gasoline from a gasoline-tank to the carbureter, the valve in such case, as 16, being placed intermediate between the gasoline-tank and the carbureter, and its opening and closing being consequently effected by the varying density of the gas in the mixing-chamber and the corresponding rise and fall of the float.

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quently effected by the varying density of the gas in the mixing-chamber and the corresponding rise and fall of the float.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination with a mixing-chamber having a gas-inlet port and a gas-eduction port, of a lever pivoted in said chamber having on one arm a float and on the other arm a weight, an air-inlet port adapted to deliver air to said mixing-chamber (at a pressure equal to or greater than the gas-pressure at the gas-inlet port), and a valve controlling said air-inlet port and connected with said lever, whereby the admission of air to said mixing-chamber is regulated and varied in proportion to the richness of the gas entering said chamber, substantially as and for the purposes set forth.

2. In devices for regulating the quality of gas, the combination of a mixing-chamber provided with an inlet-port leading from a gas-producer, an air-inlet port leading from an air-blast, and an eduction-port leading to the burners, of air-inlet valve 16 and counterbalanced float 3 so connected to each other that the amount of opening of said valve is automatically regulated by the density of the gas admitted to said mixing-chamber, substantially as described.

3. The combination with mixing-chamber 1 provided with induction-ports for the admission of gas and air, respectively, and with an eduction or delivery port, and an extension 2, of float 3, passage-way 4, therethrough, valve-stem 5 balance-lever 6, counterbalance 9, valve 16, and an adjusting device connected with said lever whereby the adjustment of said counterbalance can be effected and the admission of air to said chamber be automatically regulated by the density of the gas admitted to said chamber, substantially as described.

4. The combination with mixing-chamber 1, provided with induction and eduction ports, of float 3, having passage-way 4, therethrough, lever 6, provided with lug, or projection 12, counterbalance 9, traveling block 11, threaded rod 13, valve-stem 5, connected at its upper end to lever 6, and at its lower end to valve 16, and means, as rod 23, for effecting the longitudinal movement of said counterbalance, substantially as described.

In witness whereof we have hereunto subscribed our names, in the presence of two witnesses, on this 1st day of June, A. D. 1895.

EDWARD J. FROST.

BENJAMIN MIDDLEDITCH.

Witnesses as to Edward J. Frost:

A. B. SHOEMAKER,

C. F. GUMMEY, Jr.

Witnesses as to Benjamin Middleditch:

A. H. WILKINSON,

R. B. WILKINSON.