

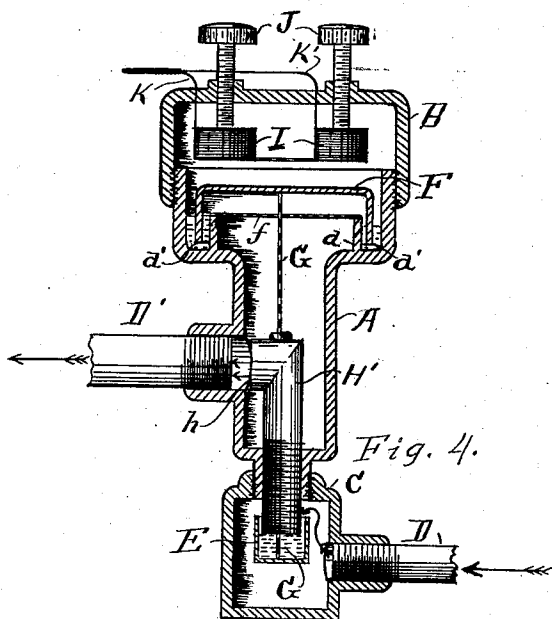
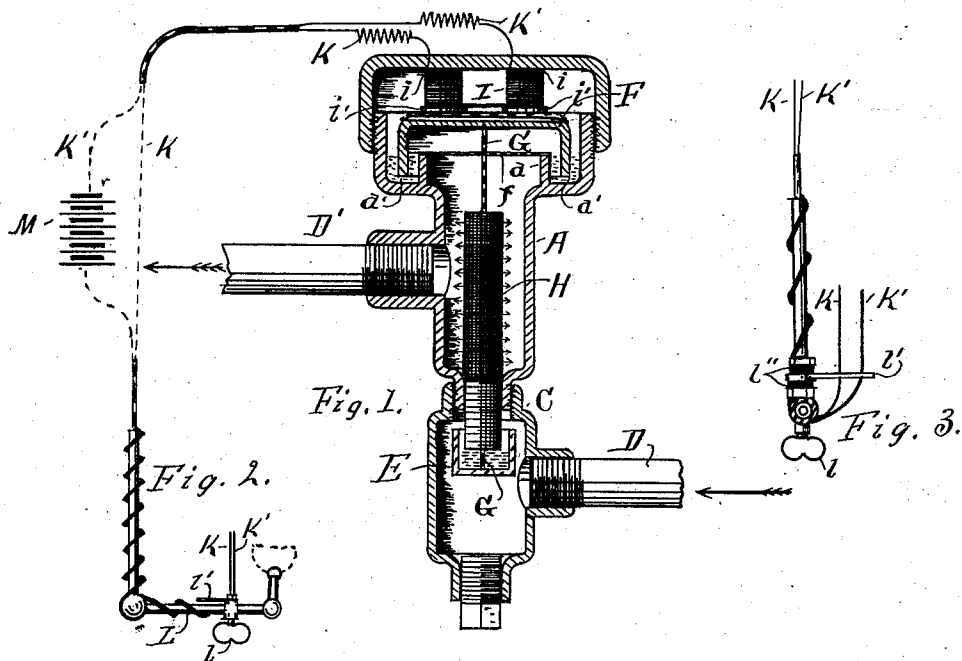
No. 763,054.

PATENTED JUNE 21, 1904.

G. T. GAMBLE.
GAS REGULATOR.

APPLICATION FILED MAY 5, 1903.

NO MODEL.



Witnesses

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GEORGE T. GAMBLE, OF GRAND RAPIDS, MICHIGAN.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 763,054, dated June 21, 1904.

Application filed May 5, 1903. Serial No. 155,769. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. GAMBLE, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Gas-Regulators, of which the following is a specification.

My invention relates to improvements in appliances for governing or regulating the flow of gas to lighted gas-jets; and its objects are, first, to so regulate the flow of gas to the jets, especially where pilot-lights are used, as to reduce the consumption of gas to the minimum; second, to so regulate the flow and pressure of the gas as to insure a steady and unvarying light, and, third, to provide for entirely cutting off the pressure or flow of gas to the jet as soon as all jets in a line have been cut off. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a sectional elevation of the regulator, showing its internal construction. Fig. 2 is a side elevation of a gas hanging and jet, showing the connection of the electric regulating device. Fig. 3 is an end elevation of the same, and Fig. 4 is a sectional elevation of the regulator, showing a modified form of pipe in the chamber between the inflow and the outflow pipes.

Similar letters refer to similar parts through the several views.

A represents the inclosing case or cylinder of the regulator, the upper portion of which is enlarged and provided with a partition *a*, which in conjunction with the outer wall forms a chamber *a'* for the reception and storage of mercury or other suitable liquid or semiliquid designed to receive the downwardly-projecting rim of the cap-shaped valve-head F to form an automatically-adjustable valve for governing the flow and pressure of the gas into and through the regulator. The lower end of the case A is constructed to form a small neck, into and through which the pipe H is screwed or otherwise properly secured, with the lower end projecting down into the chamber C, where the cup E is arranged to receive it. This cup is connected by the rod G with cup F in such a manner that it is made

to rise and lower with said cup and is partly filled with mercury or other suitable penetrable substance to form a closed valve against the flow of gas when the cup is raised up sufficiently to immerse the end of the pipe H or H'. In Fig. 1 the pipe H is represented as perforated and covered with a fine gauze for the purpose of allowing the gas to pass through freely, but not too forcibly, thus lessening the pressure in the chamber of the cap F and averting to a degree the danger of this cap reciprocating vertically and causing the light to be unsteady. This motion of the cap may be caused by too great pressure of gas accumulating in the chamber and raising the cup until the lower end of the pipe H is immersed in the mercury in the cup E, when the outflow of gas through the pipe D' will reduce the pressure sufficiently to allow the cups to drop and more gas to flow in through the pipe D, &c., thus keeping up a continual variation of pressure and a consequent unsteady flow of gas to the jets, causing a flickering or unsteady light. I further provide for averting this by placing a very fine screen *f* upon the partition *a* below the cup F, so that instead of the pressure of the gas in the chamber acting directly upon the cap its force is greatly lessened by reason of the resistance offered by the screen, and I find that a pipe formed with an elbow, as H', the opening of the pipe close to and directly toward the entrance to the outflow-pipe D', is even more effective than the form shown in Fig. 1, as the only pressure in the chamber A is by this means restricted to the backflow of gas from the outflow-pipe D', thus acting more uniformly upon the cup F. I also find it advantageous to place a fine screen *h* over the end of the pipe to lessen the outflow of gas.

The caps B are securely attached to the upper end of the chamber A for the purpose, first, of averting the danger of gas escaping from the chamber, and, second, to receive and support the magnets I, which act also as stops to prevent the cup from rising so high as to draw the rim out of the mercury in the cup and chamber *a'* and allow the gas to escape from the chamber A into the cap B.

The temporary magnets I are connected in

the circuit of the battery M by the wires K and K' and the lines *i*', as follows: The arm *l*' is connected with and operated by the valve-stem *l*. The insulating substance *l*'' (shown in Fig. 3) is inserted so that no electricity can escape through the gas-hangings L, and the bare wires K and K' pass this point in position so that when the valve or valves are closed, as in Fig. 3, the arm will come in contact with the wires and complete a circuit through the wires K K', the arm *l*, and the magnets I to the battery M, thus energizing the magnets sufficiently to raise the cups F and E sufficiently to shut off the flow of gas from the pipe D to the chamber A, thus wholly shutting the gas off from the jets when all lights are turned out.

i i represent insulating material between the magnets and the caps B, and *i' i'* represent non-magnetic caps between the magnets and the cup F for the purpose of insuring instant disconnection upon breaking the electric circuit. In Fig. 4 I have shown those magnets supported by regulating-screws J, designed to regulate the distance of the magnet from the cup. In this connection it must be borne in mind that the incoming gas enters a chamber C below the main chamber A and must pass through the cup E and the pipe H or H' before entering the chamber A, or, in other words, that there is no direct flow of gas into the main chamber independent of the cup and pipes last mentioned.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a gas-regulator, a main chamber, a receiving-chamber below the main chamber, an outflow-pipe opening at right angles with main chamber, a pipe extending from the receiving-chamber through the main chamber and opening into the outflow-pipe, a mercury-chamber above the main chamber, a cup projecting down into the mercury in said chamber, a rod connected therewith and passing down into the receiving-chamber, and a valve connected with the lower end thereof, substantially as and for the purpose set forth.

2. In a gas-regulator, a main chamber, a receiving-chamber below said main chamber, a pipe projecting up into the main chamber, an adjustable cup upon the main chamber the rim of which is embedded in mercury, an adjustable cup in the receiving-chamber having mercury therein and projecting up above the end of the pipe H, a rod passing through said pipe and connecting the two cups, a screen between

the main chamber and the cup that covers it, a cap screwed to the case that incloses the main chamber, magnetic stops within said cap, gas hangings and jets and an electric battery, a valve-stem, an insulated arm upon the valve-stem and an electric circuit from the battery through the magnets and to the gas-jets and completed by contact with said arm, substantially as and for the purpose set forth.

3. In a gas-regulator, a main chamber, a receiving-chamber below the main chamber, a pipe extending up into the main chamber and down into the receiving-chamber, a cap upon the main chamber, an adjustable inverted cup between the main chamber and the cap and having its rim immersed in a liquid, a cup in the receiving-chamber projecting up over the end of the pipe H, a liquid in said cup, a rod connecting this cup with the inverted cup above the main chamber, magnets in the caps connected in an electric circuit, said magnets insulated from the caps and having non-magnetic plates at the lower ends, substantially as and for the purpose set forth.

4. In a gas-regulator, a main chamber, a cap screwed to said chamber, a receiving-chamber below the main chamber, a pipe projecting up into the main chamber and down into the receiving-chamber, an inverted cup covering the main chamber with the edges immersed in mercury, a cup in the receiving-chamber containing mercury, a rod connecting said cups and holding the lower cup adjustable near the end of the pipe, magnets within the cap and connected in an electric circuit, and adjusting-screws supporting said magnets substantially as and for the purpose set forth.

5. In a gas-regulator, a main chamber having a cap, a receiving-chamber below said main chamber, an adjustable inverted cup over the main chamber having its edges immersed in mercury, a cup in the lower chamber containing mercury, a rod connecting said cups, an inflow-pipe entering the receiving-chamber, an outflow-pipe from the main chamber, a connecting-pipe leading from the cup in the inflow-chamber into the main chamber and having its upper end adjusted to open directly into the end of the outflow-pipe, substantially as and for the purpose set forth.

Signed at Grand Rapids, Michigan, May 2, 1903.

GEORGE T. GAMBLE.

In presence of—

C. V. CILLEY,
ITHIEL J. CILLEY.