(No Model.)

L. H. McCULLOUGH.

GAS REGULATOR.

No. 260,038. Patented June 27, 1882.

Fig. 1,

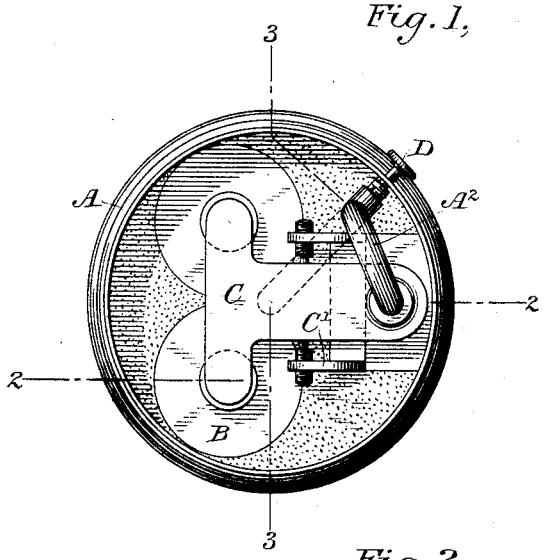


Fig. 2,

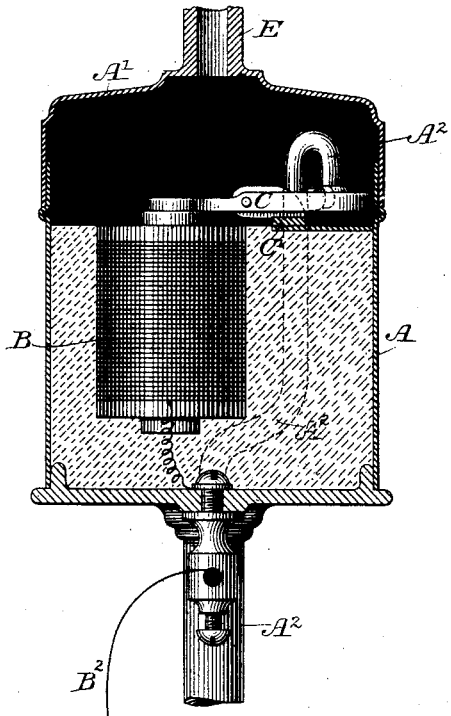
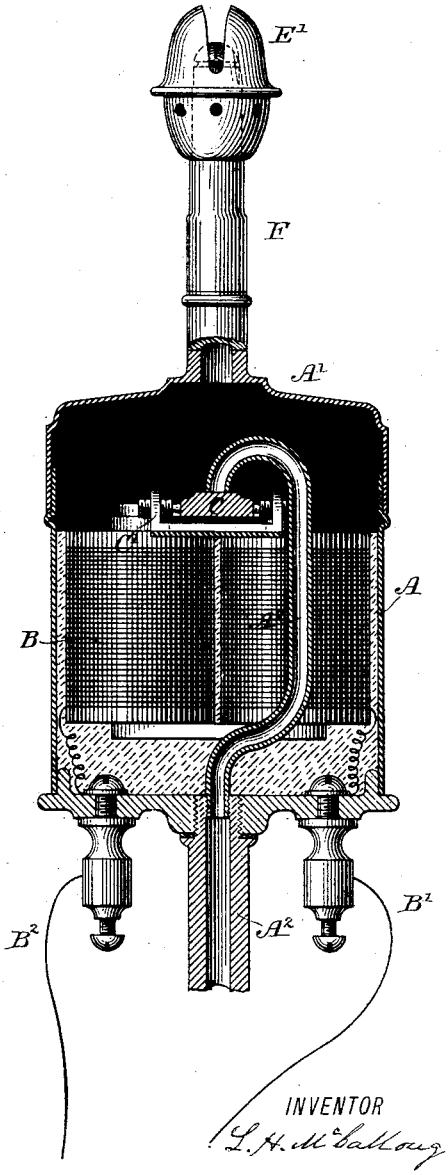


Fig. 3,



WITNESSES

Wm A. Skinkle.

Geo W. Breck

INVENTOR

L. H. McCullough

By his Attorneys

H. Holloway & Blanchard

UNITED STATES PATENT OFFICE.

LEWIS H. McCULLOUGH, OF RICHMOND, INDIANA.

GAS-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 260,038, dated June 27, 1882.

Application filed December 31, 1881. (No model.)

To all whom it may concern:

Be it known that I, LEWIS H. McCULLOUGH, a citizen of the United States, residing at Richmond, in the county of Wayne and State of Indiana, have invented certain new and useful Improvements in Gas-Regulators, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to electro-magnetic gas-regulators for gas-burners, in which the flow of gas to the burners is controlled by an electro-magnet suitably connected to a battery, in order that the flow of gas to a single burner, or to a series of burners at one point, or to the various burners in a certain district, may be regulated; and the objects of my improvements are, first, to provide a gas-burner with a gas-receiving chamber, from which it flows to the point where it is ignited or burned, the flow of gas to said chamber being controlled by an armature pivoted near its center, but at one side of its center of gravity, one end of which constitutes or carries a valve or other suitable device, as will be hereinafter more fully described; second, to provide an insulator for the electro-magnet with the case or chamber in which they are placed, so that the gas and all dampness may be excluded therefrom; third, to provide such combination and arrangement of devices as to admit of there being maintained at the tip of the burner a small taper during the day, but which, by the operation of the mechanism, may at any time be increased to a full-sized light; and, fourth, to provide such a construction and combination of parts as are necessary to make the device operative. I attain these objects by the devices and combinations thereof illustrated in the accompanying drawings, in which—

Figure 1 is a plan or top view of my apparatus, the burner and cap being removed for the purpose of showing the armature, the valve, the electro-magnet, the pipe for conducting the gas to the chamber above the insulating material, and the method of suspending the armature. Fig. 2 is a vertical section on line 2 2 of Fig. 1, showing the gas-induction pipe, one of the helices of the magnet, the armature resting against the end thereof, the connecting-wire, and its binder; and Fig. 3 is a sectional elevation on line 3 3 of Fig. 1, showing a portion of the gas-induction pipe, the electro-magnet, the armature, the gas-burner, a hood placed thereon, and the conducting-wires and their binder.

Similar letters refer to similar parts throughout the several views.

It has been customary heretofore to ignite the gas escaping from the burners of street-lamps by a current of electricity, it having been caused to emit sparks at the point where the gas leaves the burner, and also to heat to incandescence wires which were placed in such position as to ignite the gas as it passed them; but in such cases a large and expensive battery has been required, the expense of which has been so great as to nearly or quite exclude such methods from use.

My device and mode of operating differs from all others with which I am acquainted, in that I use the current of electricity and the armature itself, or a valve carried thereon, for the purpose of regulating the amount of gas that shall be allowed to pass to the burner, or cutting off such flow entirely, as occasion may require, which operation can be effectually performed by a very weak current, and consequently by the employment of a small battery.

I am also aware that an armature has been used to control the flow of steam and air through a pipe by means of a valve carried upon a lever pivoted at one of its ends, such a device being shown in a patent to Ballard, September 13, 1870, No. 107,326. My armature-lever is pivoted between its extremities, thereby economizing space, and the valve is seated directly upon an extension of the same.

In constructing gas-burners of my improved type, and in adapting them for use in lighting streets, halls, factories, and other structures, there is provided a case or vessel, A, of any suitable dimensions, its upper end being provided with a cap or cover, A′, which is removable for convenience in placing in said vessel the operative parts and the insulating material. To the lower end of the vessel A there is attached a pipe, A^2, through which the gas passes to the chamber in the upper portion of the vessel.

Upon referring to the drawings it will be seen that that portion of the induction-pipe

which is within the case or vessel is bent so as to allow it to pass upward without coming in contact with the magnet and armature, its upper end being bent as shown, in order that the lower end of said bent portion may rest upon a valve-seat formed upon the end of an armature or attached thereto.

Within the vessel or case A there is placed an electro-magnet, B, which, in the example shown, consists of two helices or spools wound with insulated wire, said magnet having the usual conducting-wires, B′ and B², for leading the current to and from the magnet. This magnet may be supported in the vessel or case in any desirable manner, it being firmly held in position by the melted beeswax, paraffine, rosin, or any other non-conductor of electricity, which material serves the double purpose of holding the magnet in position and of preventing the gas from coming in contact with the wire or other parts of the magnet, which is important to do, as, if the gas is allowed to come in contact with the wires, the sulphur contained therein has a very injurious effect upon them, the tendency being to convert the copper into a sulphuret, thus entirely destroying them.

In practice the amount of non-conducting material placed in the vessel or case is sufficient to fill it up to a point above the upper ends of the magnet, or on a level therewith. The upper ends of the helices or spools are provided with the usual projections, upon which one end of the armature rests when the valve is closed.

The armature above referred to is shown at C, it being fastened to a bracket, C′, which may rest upon a plate of metal placed upon the upper surface of the non-conducting material; or it may be secured in position in any other manner. Through the ears of this bracket set-screws are passed, as shown clearly in Fig. 1, the ends of which are provided with recesses, into which points formed on the sides of the armature pass, thus forming the pivotal points on which it moves. The form proposed for the armature is shown in the drawings, it being represented of a T form; but it may be of any other form that will cause its end which comes in contact with the gas-induction pipe to be so much heavier than its opposite end as to cause it by its own gravity to fall down, and thus allow a full supply of gas to enter the chamber in vessel A whenever the current of electricity ceases to flow through the magnet, such movement being aided by the pressure of the gas in the pipe A².

The construction and arrangement of the armature constitutes an important feature of my invention, as it provides for shutting off the gas, or all but a very small portion thereof, when the current of electricity is being passed through the magnet, the end of said armature which rests thereon being prevented from moving so far from the magnet as to carry it out of the influence of the current when its opposite end is lowered to admit the gas to flow into chamber A, its movement being arrested by a stop placed under the end thereof, which moves downward to permit the gas to pass out of the induction-pipe.

By the construction of the armature and the arrangement thereof shown, it is made to operate as an automatically-opening valve for the induction and regulation of the gas to the burner, and hence, if by accident, caused by a storm or otherwise, the wire leading from the battery to the burner or to any one of them should be broken, the valve or valves would instantly be opened and the gas could be used as if no accident had occurred.

One of the results of the apparatus is the maintenance of a small taper of burning gas at the tip of the burner at all times without wasting gas, and to accomplish this I may provide that end of the armature which rests against the end of the gas-induction pipe with a very small groove or other passage, the area of which shall be just sufficient to allow enough gas to leak or pass into the chamber, and so to the tip of the burner, to maintain at that point a small flame. I prefer, however, to provide for that purpose a set-screw, D, made to pass through the walls of the gas-chamber above the non-conducting material, and enter the gas-induction pipe A², which may be screwed outward, so as to allow the full amount of gas to supply the burner to pass it; or it may be screwed inward to such an extent as to admit only so much to pass as is required to support the small flame at the burner. The last-named device enables the person in attendance to at all times regulate the size of the flame or taper, and it also provides a means by which the pipe may be opened to such an extent as to cause the current of gas passing to carry out any obstruction that may occur in the pipe at that point.

The cap A′ is made to fit gas-tight upon the body of the case or vessel A, and is provided with any approved form of burner E, upon the upper end of which there is placed a hood, E′, for the purpose of preventing the wind from extinguishing the taper or small flame when the full-sized flame is not required.

Some of the advantages due to this form of burner may be enumerated as follows: First, it is simple in its construction, effective in its operation, enabling a person to light the burners throughout an entire city or district in the shortest possible period of time, and it only requires the use of a weak current, as compared with other methods of electric lighting; and, secondly, it results in a great saving of expense as compared with the system of hand-lighting, as the amount of gas burned through the day is in value but a small percentage of what it costs for lighting by hand; and, lastly, it provides a means by which any number of burners may be lighted simultaneously, or nearly so.

Having thus described my invention, what I

claim, and desire to secure by Letters Patent, is—

1. An armature pivoted at one side of its center of gravity, but remote from either end, its heaviest end carrying a valve for controlling the flow of gas to the burner, whereby the gravitating valve automatically opens the outlet of the gas-induction pipe when the current of electricity ceases to flow through the magnet, the parts being constructed substantially as described.

2. In a gas-burner, the combination of a case or vessel having in it a gas-receiving chamber for receiving gas from an induction-pipe, an electro-magnet, and an insulating material for preventing injurious effects upon the magnet, substantially as described.

3. The combination, in a gas-burner, of the armature C, pivoted at one side of its center of gravity, its heaviest end carrying a valve for controlling the flow of gas to the burner, and a gas-induction pipe, the outlet of which is controlled by the valve carried upon one end of the pivoted armature, substantially in the manner and for the purpose set forth.

4. In a gas-burner, the combination of the case or vessel A, having a gas-chamber in its upper end, the magnet B, the armature C, the gas-induction pipe A^2, and the insulating material, all substantially as described, and for the purpose set forth.

5. The combination of the case, magnet, armature and valve, and burner with a gas-supply tube provided with an opening to feed a taper flame when the valve is closed.

6. The combination of the case provided with a cover, a burner-tube, an armature and valve thereon, and a gas-supply tube extending into the upper part of the case and arranged to be closed by the valve, all substantially as set forth.

7. The combination of a case, an electro-magnet, a bracket to which is pivotally connected an armature bearing a valve, a gas-supply pipe extending above the bracket, and means for opening the valve when the current ceases.

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

LEWIS H. McCULLOUGH.

Witnesses:
D. P. HOLLOWAY,
A. RUPPERT.