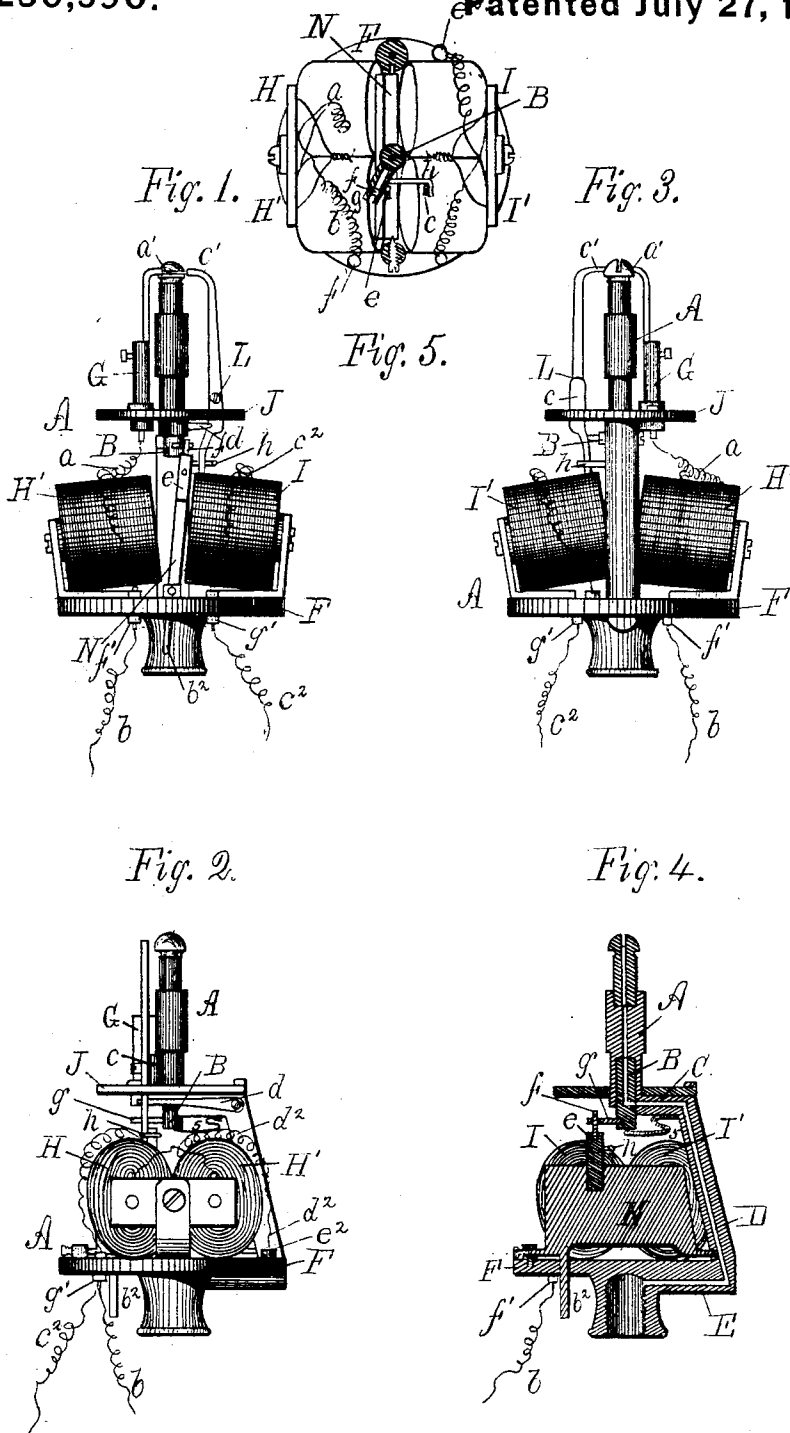


(No Model.)

J. P. TIRRELL.
Electric Gas-Lighting Apparatus.
No. 230,590. Patented July 27, 1880.



Witnesses.
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ELECTRIC GAS-LIGHTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 230,590, dated July 27, 1880.

Application filed May 22, 1880. (No model.)

To all whom it may concern:

Beit known that I, JACOB P. TIRRELL, a citizen of the United States, residing in Somerville, county of Middlesex, State of Massachusetts, have invented certain Improvements in Electric Gas-Lighting Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to apparatus for lighting gas by electricity in which the gas-cock is opened and closed by electric action upon a mechanical device connecting with such cock and a battery, and in which are employed, in combination with the burner, a stationary metallic arm terminating in a platinum or other metallic point in near proximity to the orifice in the burner, this arm or electrode being fixed to the burner and insulated from it and connected to one pole of a battery, and a movable arm or electrode, which is connected to the other pole of the battery, and pivoted or otherwise connected to the burner in such manner as when vibrated to make and break circuit with the latter and produce a spark to ignite the gas.

In this apparatus I employ two electro-magnets and a vertically-arranged vibrating armature connected with the gas-cock and arranged between the magnets, in combination with a movable and a fixed electrode, the latter being secured rigidly to and insulated from the body of the burner, and is connected with a button wired to an electric battery, while the burner itself is connected with the opposite magnet and a battery by a button, thereby making connection with the movable electrode, the whole being so arranged that the movement of the armature when attracted to one magnet, which is charged from the battery by a pressure upon its button, serves to open the gas-cock, and when attracted to the opposite magnet, by depolarizing the first and charging the second by pressure upon its button, the cock is closed, while as long as the first magnet remains charged by the pressure upon its knob the movable electrode vibrates with

rapid intermissions, and certain lighting of the gas is thereby insured.

My present improvements consist in the employment of a horizontal swinging arm attached to the lower end of the vertical gas-cock, this arm being forked and straddling an upright bar erected upon the top of a vibrating armature disposed between two pairs of electro-magnets and caused to vibrate by the closing and opening of an electro-circuit from a suitable battery, the vibration of the armature effecting reciprocation of the lever and cock.

My invention also consists in connecting the armature with the lower end of the movable electrode or arm in such manner that as the armature moves in one direction and opens the cock it causes the movable electrode to separate from the fixed and insulated electrode, thus breaking the electric circuit and producing a spark to light the gas, while a reverse movement of the armature closes the cock and allows the movable arm to return by the stress of a spring and make contact with the fixed arm.

My invention also consists in certain details of construction, as hereinafter more fully described and claimed.

The drawings accompanying this specification represent, in Figures 1, 2, and 3, front, side, and rear elevations of an apparatus embodying my improvements. Fig. 4 is a longitudinal vertical section through the vibrating armature.

In the said drawings, A represents the gas-burner, and B the cock or gate, which turns on a vertical axis, and is contained within the lower part of the burner, the duct for passage of gas taking a horizontal turn opposite the cock, as shown at C, for a short distance, and then descends vertically, as shown at D, to permit of introduction of the helices below the burner, and finally taking a second horizontal direction, as shown at E below the magnets, or below a shelf, F, which supports such magnets.

The two magnets are shown at H H' I I'. The fixed insulated electrode or arm, which

terminates in a platinum point, a' , is shown at G as an upright post erected upon a shelf, J, secured to the portion of the burner containing the cock, one of the wires a of one magnet—say H H—being connected with the lower end of such post, while the other wire, b , of this magnet H H' is connected with one pole, f' of the battery.

The wire of the opposite magnet, I I', which connects with one pole, g' , of the battery, is shown at C², while by its other wire, d^2 , it connects the other pole of the battery with some suitable part of the gas-burner—say at e^2 in Figs. 2 and 5.

The movable or vibrating arm or electrode is formed at its upper end with a horizontal bend, c' , and is shown at L as pivoted to the shelf J, and with its lower and shorter arm, e , extending downward through a slot in such shelf, a spring, d , being secured at one end to an adjacent part of the burner, and bearing at its free end against the arm e , to retract such arm when the attraction of the magnet for it ceases.

N is the armature of the magnets, and is a flat plate disposed vertically between the two pairs of magnets, and pivoted at its lower edge to the shelf F, the upper part of this armature terminating in a post, e , the upper extremity, f , of which is straddled by the forked end of a horizontal arm or lever, g , the base of which is secured to the lower end of the gas-cock. The post e further carries a horizontal bent or curved arm, h , which clasps about the extreme lower end of the arm e of the movable electrode, the length of this arm being such that as the armature stands at one extreme of its movement—that is, away from the magnets I I'—it draws the movable electrode away from contact with the fixed electrode, and breaks contact between the two, and produces the spark, at the same time actuating the forked lever and opening the cock; and when the armature returns to its opposite extreme the cock is closed, and the movable electrode returns to contact with the fixed by the stress of the spring.

It will be seen that the vibrations of the armature are of such extent and its relations to the gas-cock and movable electrode are such that the cock is opened before the spark is produced. The purpose of this is to cause a sufficient volume of gas to issue from the burner in advance of the spark to insure its ignition by the latter.

In order to sustain the cock B in such a manner that it will be extremely sensitive to the action of the armature, and also capable of adjustment as to tension in turning, I provide a spring, 5, having one end secured to the frame and the free end sustaining the valve B, as shown.

The operation of the apparatus is briefly as follows, supposing the gas-cock of the burner to be in such a position that the gas is shut off and it is desired to let on and ignite the

gas, and the two electrodes being in contact: On closing the circuit through the electromagnet H H' by means of a suitable knob in any part of the circuit, the armature will be attracted in such a direction—that is, toward said magnet—as to vibrate the forked lever and open the cock, and as the armature arrives at the extreme of its movement in this direction its hooked arm engages the lower end of the movable electrode and actuates the latter in such manner as to cause its upper end to recede from the fixed electrode and break contact with the latter, and by the inductive action of the magnet in the circuit a spark will be produced which ignites the gas issuing from the burner.

In the use of this device the pressure on the knob which charges the magnet H H' should be continued for a few seconds, as this produces rapid intermittent vibrations of the movable electrode and a corresponding number of sparks, the object of this being to insure the lighting of the gas should the first spark fail to do so. In order that these continued vibrations of the movable electrode and armature may be placed without effect upon the gas-cock, I form the notch in the forked end of the lever of sufficient width to permit of the vibrations of the armature without moving such lever.

When it becomes necessary to shut off and extinguish the gas, by a reverse movement of the cock the knob in the opposite circuit is pressed and the magnet I I' charged, the effect of which is to attract the armature in the opposite direction and close the cock, while at the same time the movable electrode is returned by its spring to contact with the fixed electrode.

To provide against objectionable results following the failure of the electric current to manipulate the armature and open or close the gas-cock, I add to the lower edge of such armature a horn or arm, b^2 , by means of which the armature may be made to open or close the gas-cock independently of the electric current.

I claim—

1. In an electric-lighting gas-burner, a magnet for turning the gas-cock by one electric impulse, combined with a fixed electrode, a' , and a movable electrode, c' , normally in contact, and mechanism connecting the armature with the movable electrode to break the contact between a' and c' the instant after the gas is turned on, and create a spark for ignition, substantially as described.

2. The magnet H H' and armature N, provided with pin f , and valve B, provided with the bifurcated arm g , in combination with the movable electrode c' and spring d and yoke or link h , arranged on opposite sides of the lower end of the movable electrode, as set forth.

3. The magnets H H' I I', armature N, mounted on a rock-shaft and provided with pin f and yoke h , in combination with the gas-burner A, provided with a vertical valve

having a bifurcated arm, *g*, and spring-support 5, fixed and insulated electrode G, movable electrode *c'*, pivoted at L, and spring *d*, all constructed, arranged, and operated as and for the purpose described.

4. The armature N, mounted on a rock-shaft and bearing the arm *e*, and pin *f*, engaging with a bifurcated arm, *g*, attached to the gas-

cock, in combination with pin *b*², rigidly attached to the armature and extending through 10 the casing, as set forth.

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Witnesses:

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