(No Model.)

T. W. LANE.

ELECTRIC GAS LIGHTER.

No. 444,706. Patented Jan. 13, 1891.

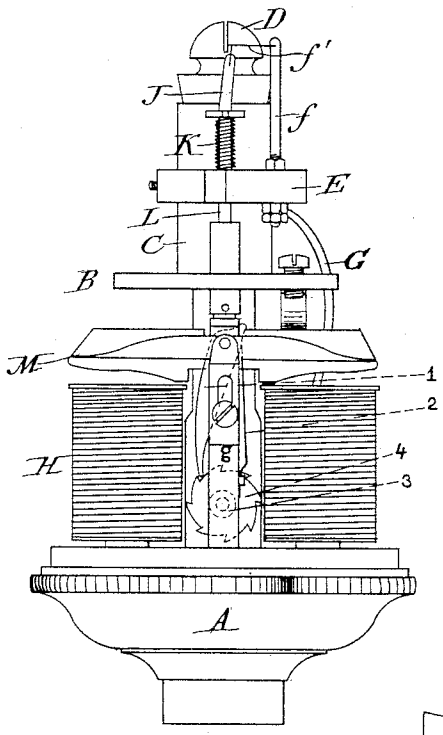


Fig: 1.

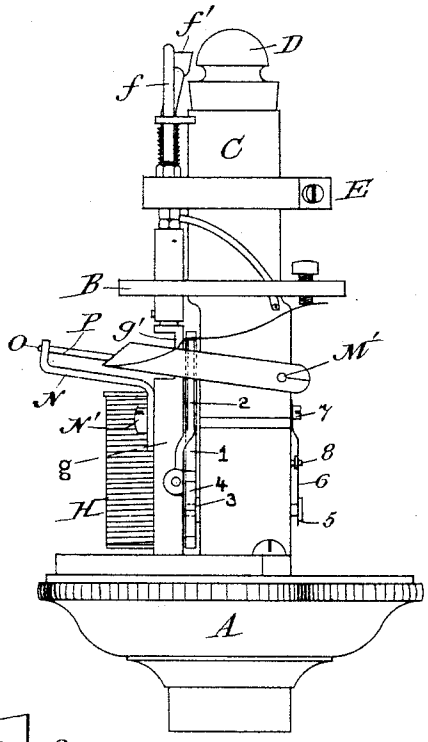


Fig: 2.

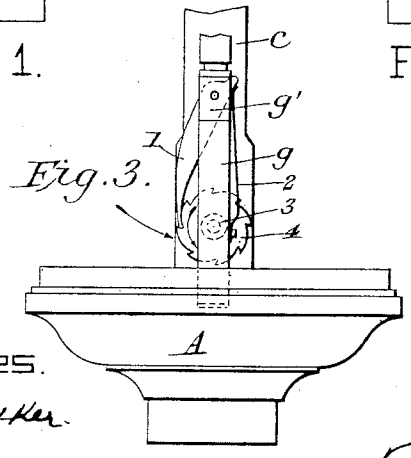


Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

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ELECTRIC GAS-LIGHTER.

SPECIFICATION forming part of Letters Patent No. 444,706, dated January 13, 1891.

Application filed June 13, 1889. Serial No. 314,097. (No model.)

To all whom it may concern:

Be it known that I, THOMAS W. LANE, a citizen of the United States, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Automatic Electric Gas-Burners, of which the following is a full and complete specification.

This invention relates to improvements in that class of single-circuit "automatics," so called, in which but one electric circuit is utilized for all the electrical functions of the apparatus, and is illustrated in Letters Patent to E. E. Bailey, of May 1, 1888, No. 382,249, and in a pending application by myself filed June 13, 1889, Serial No. 314,098, for improvements therein, and will be more clearly understood by reference to the drawings, (twice enlarged,) in which—

Figure 1 is a front elevation of such a burner as my invention relates to. Fig. 2 is a side elevation, one arm of the magnet being absent. Fig. 3 is a detail showing the base, and a part of the gas-pillar, pawl-carrying bar, and pawl, spring, and ratchet-wheel affixed to the gas-cock, all showing the relative position when the armature is down upon the magnet.

The object of my invention is to utilize in automatic electric gas-burners a ratchet-wheel and continuously-rotating gas plug or cock, in connection with a single electric circuit for both the operations of lighting and of extinguishing the gas.

In order to clearly explain the scope of my invention, I will first refer to earlier apparatus for automatic electric gas-burners, in which the force of electricity turns the gas-cock, vibrates the electrodes, and furnishes an electric spark.

In 1871 J. P. Tirrell patented (Nos. 121,301 and 121,302) apparatus, the latter form of which energized a magnet, whose armature at one movement opened the cock and caused the contact and separation of fixed electrodes; but these electrodes were not in circuit with that magnet, but were in another electric circuit, coming from another battery, whose current furnished the igniting-spark. The first-mentioned burner energized a magnet whose armature operated a pawl step by step against a ratchet-wheel connected with the gas-cock, thus gradually opening it, while the armature also operated the circuit-breaker, the lighting-current being supplied from another circuit. For both, it will thus be seen, two circuits were necessary to turn on and light the gas, and a third circuit to turn it off.

In 1872 Tirrell patented (No. 130,770) an apparatus in which by the action of the current through one magnet the gas-cock and circuit-breaker were both operated and the igniting-spark supplied. Later, Tirrell, in No. 230,590, applied this idea of a single circuit for the three operations of turning the cock, moving the circuit-breaker, and furnishing the spark to a burner in which one motion of the armature, as in No. 121,302, entirely opened the cock, using a second magnet and circuit to close the valve; and in No. 230,589 he modified the ratchet-wheel devices of No. 130,770.

In 1888, Bailey, No. 382,249, showed an apparatus utilizing only one circuit and one magnet, not only for these three lighting operations, but also for the extinguishing of the gas. His device for this consisted of mechanism by which he affixes to the gas-cock a block having two recesses. The rod or bar carrying the movable electrode has a pawl adapted, upon the electrode being carried downward by the stroke of the armature, to gear with the recesses. When the valve is shut and it is desired to light the gas, the current is admitted by the usual push-button to the magnet, which attracts the armature, which depresses the rod, whose upper end carries the movable electrode, which is thus separated from the fixed electrode supplying the spark. Upon this rod is a pawl, which is at the same time forced into the deeper recess of the block, moving it sidewise, thereby partially turning the gas-cock, so as to open it. The circuit being broken, the armature is withdrawn, carrying the electrode into contact with the fixed electrode, but not lifting the pawl entirely out of the recess, so that upon the magnet being re-energized by the

contact of the electrodes a repetition of the separation of the electrodes may be continued so long as the push-button is depressed. When that pressure is relieved the armature will recede so far as to lift the pawl out of the recess, and when it is desired to extinguish the gas a touch upon the button will energize the magnet, attract the armature, and so bring the pawl into the second recess, tilting the block back again and closing the cock. I have improved this construction in my aforesaid application, Serial No. 314,098, of even date with this.

With this explanation of the state of the art my present invention will by the aid of the drawings be easily understood.

A is the lower and B the upper platform; C, the pillar, having preferably the lava tip D. To the collar E is fixed in an insulated manner the electrode *f f'*, connected by wire G to the magnet H, which rests upon the platform A, and is connected by a wire (not shown) running to a push-button, by which connection is made with the battery (not shown) in the ordinary manner. The movable electrode J has a platinum point normally in contact with *f'* by force of the helical spring K, and is loosely socketed in the pawl-carrying bar *g* at L, so that not until near the end of its downward movement does it move the electrode J against the stress of the spring K out of contact with *f'*, as hereinafter explained. The bar *g* is controlled by the armature M, which is riveted to the pillar at M' by means of an angle-iron N, attached at N', into which, at O, plays loosely a pin P, affixed to or projecting from the armature. To allow of some play of the armature the bar *g* is recessed at *g'*.

4 is a ratchet-wheel rigidly affixed to the stem 3 of a gas-cock whose ways are in number in proportion to the teeth of the ratchet, so that the motion of the ratchet one tooth will alternately admit and shut off the gas. This ratchet and cock are operated by a pawl 1, pivoted to preferably the pawl-carrying bar *g* on its inner side, so as to gear with the teeth of the ratchet.

In constructing the apparatus the proportions must be such that at one complete downward sweep of the armature the ratchet will be rotated one tooth and the movable electrode separated from the fixed electrode, and so that before the armature is withdrawn far enough to lift the pawl free of the tooth the two electrodes will again come into contact.

To insure the pawl 1 returning to a perpendicular position, a flat spring 2 is fastened to the side of the bar *g* and extends upward and projects beyond *g*, so as to be pressed by the head or upper part of the pawl 1 when it is carried out of a perpendicular position by the ratchet-wheel, as shown in all the figures. I find it well to allow the opposite stem of the valve to project at 5, and be held in place by a forked spring 6 secured at 7, and passing over an adjustable fulcrum or screw at 8.

The operation of my invention will now be easily understood. Supposing the valve to be closed, the current will be admitted to the magnet H by the ordinary press-button and the armature attracted, thus forcing the pawl to turn the ratchet one tooth, opening the valve and also separating the electrodes. This ruptures the circuit and de-energizes the magnet, releasing the armature; but before the armature has receded far enough to lift the pawl 1 out of the tooth the electrodes have united and restored the circuit, causing the magnet to again attract the armature, and so again breaking the circuit. This make and break will continue so long as the press-button is depressed, and thus a shower of sparks sufficient to light the gas at the burner-tip will be caused. When the gas is lighted and the press-button released, the armature will recede so far as to lift the pawl 1 out of the tooth, and the spring 2 will bring the pawl to a position to engage with the following tooth of the ratchet. When it is desired to extinguish the gas, another depression of the button will energize the magnet, attract the armature, force the pawl into the succeeding tooth, rotate the ratchet one tooth, and close the valve. If the teeth are made of alternate depths, the depression at the turning-off movement need not be sufficient to separate the electrodes or make a spark.

Having now described my said invention, I do not claim the burner as an entirety, so far as covered in the Letters Patent and application already referred to; but

What I do claim is—

1. In an automatic electric gas-burner, a rotary gas-cock attached to a ratchet-wheel, and a pawl so connected with or operated by the armature as to admit the gas at its complete depression and thereafterward admit of a series of partial vibrations of the armature without withdrawing the pawl entirely from the tooth of the ratchet during pressure on the button, substantially as described.

2. In an automatic electric gas-burner, the combination of the bar *g*, pawl 1, flat spring 2, and ratchet-wheel 4, rigidly attached to the gas-cock 3, having teeth in proportion to its ways and adapted and arranged to permit a series of vibrations of the pawl without further revolution of the ratchet, substantially as described.

3. In a gas-lighting device, the combination of a rotating gas-cock whose spindle is attached to a ratchet-wheel having the number of its teeth in proportion to the number of gasways through the cock, so as to alternately turn on and off the gas, a pawl to rotate said cock, a spark-producing device, and an electro-magnet and its armature to operate

said devices, the circuit of the electro-magnet being controlled by the movement of the armature, and the teeth of said ratchet being of such depth in relation to the play of the pawl that the ordinary spark-producing vibrations will not permit said pawl to gear with the following tooth until the circuit is permanently opened.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

THOMAS W. LANE.

Witnesses:
NATHANIEL U. WALKER,
EDWARD P. PAYSON.