(No Model.)

J. P. TIRRELL.

AUTOMATIC ELECTRIC GAS LIGHTING APPARATUS.

No. 260,806. Patented July 11, 1882.

Fig. 1.

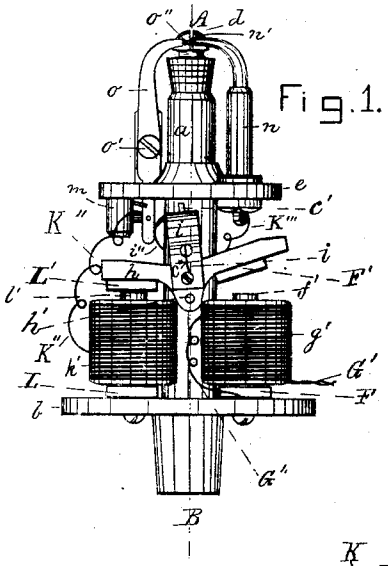


Fig. 2.

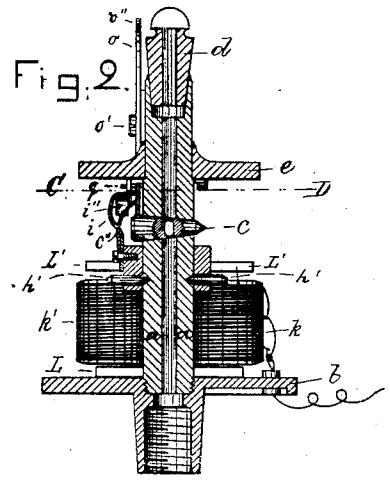


Fig. 3.

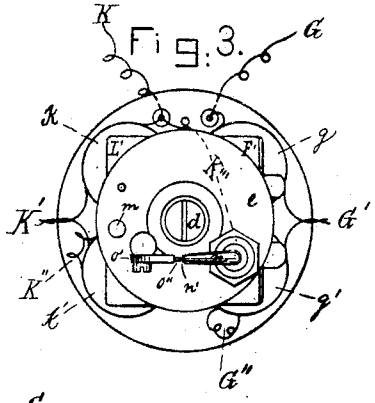


Fig. 4.

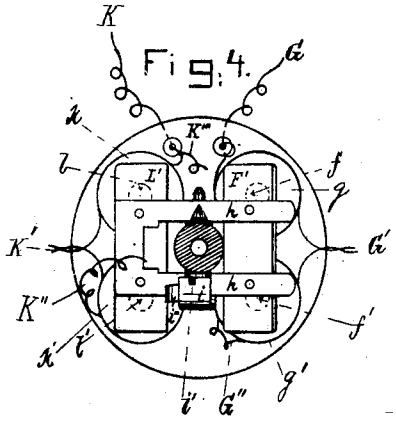
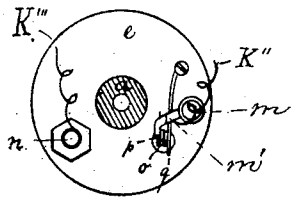


Fig. 5.



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JACOB P. TIRRELL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE ELECTRIC GAS LIGHTING COMPANY, OF PORTLAND, MAINE.

AUTOMATIC ELECTRIC GAS-LIGHTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 260,806, dated July 11, 1882.

Application filed December 27, 1881. (No model.)

To all whom it may concern:

Be it known that I, JACOB P. TIRRELL, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Automatic Electric Gas-Lighting Apparatus; and I do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawings.

This invention relates to improvements in automatic electric gas-lighting apparatus, and it is carried out as follows, reference being had to the accompanying drawings, on which—

Figure 1 represents a front elevation of the apparatus. Fig. 2 represents a central longitudinal section on the line A B, shown in Fig. 1. Fig. 3 represents a plan view. Fig. 4 represents a horizontal section on the line C D, shown in Fig. 2, as seen from above; and Fig. 5 represents a section on the said line C D, as seed from below.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a is the gas-pipe, having a suitable plate or frame, *b*, attached to it for securing thereto the electrical helices and electro-magnets, hereinafter to be more fully described.

c is the gas-cut-off cock, with its arm or lever *c'* as usual.

d is the tip at the top of the gas pipe or burner *a*, as shown.

Upon the pipe *a*, at a suitable place between the cock *c* and tip *d*, is secured a plate or frame or washer, *e*, which serves as a support for the electrodes, between which the electric spark passes in lighting the gas.

Upon the plate *b* is secured the soft-iron bar F, having upwardly-projecting soft-iron cores *f* and *f'*, surrounded respectively with the electrical coils or helices *g* and *g'* in the ordinary manner of making electro-magnets.

G is the battery-wire connected with the helices *g* and *g'*.

G' is the connecting-wire between said helices, and G'' is the ground-wire from the helix *g'*, which wire may be attached to the gas-pipe *a* or other metallic ground-connection.

At *h'* on the pipe *a* is hinged the rocking armature-lever *h*, to the under side of which are secured the armatures F' and L', one on each side of the fulcrum-pin *h'*, the latter being located below the top of the electro-magnets *f f'*, as shown, to enable me to obtain, in a very small compass, a long lever for the operation of the gas-cock, and also to shorten the distance between the plates *e* and *b*.

Midway on the armature-lever *h* is an arm or lever, *i*, provided in its upper end with a fork or slot, *i'*, embracing the lever *c'* on the gas-cock *c*, by which arrangement said cock *c* is made to close and open by the rocking of the armature-lever *h* on its fulcrum *h'*.

On the plate *b*, opposite the electrical helices *g g'*, are arranged a similar pair of coils or helices, *k* and *k'*, having soft-iron cores *l l'* and connecting bar L, as usual in electro-magnets.

K' is the connecting-wire between the coils *k* and *k'*.

K is the battery-wire to the coil *k*, and K'' is the ground-wire leading from coil *k'* to the bent arm *m'*, having platinum point in its end, and secured to the insulated post *m* on the under side of the plate *e*.

K''' is a branch wire, or its equivalent, leading from the wire K or independent battery to the insulated post *n*, secured to the plate *e*, and having platinum electrode *n'* in its upper end, as shown.

On one side of the forked lever *i* is a spring-projection, *i''*, which during the motion of the armature L' toward the electro-magnets *l l'* is brought in contact with the lower end of the rocking lever *o*, which is hinged at *o'*, and provided at top with platinum electrode *o''*, as shown. The lever *o* has a platinum point or projection, *p*, which is normally held against the insulated projection *m'* by the influence of a fine spring, *q*, as shown in Fig. 5.

The operation of this my improved gas-lighting apparatus is as follows: In its normal position, when the gas is shut off, the armature F' is resting on the top of cores *f f'*. To light the gas at the tip *d*, the current of electricity from the battery is switched onto the wire K, from which it passes to the coils *k k'*, around the cores *l l'*, causing the armature L' to be

attracted to the top of the cores *l l'* and the lever *h* to be turned on its fulcrum *h'* to the position shown in Fig. 1, at the same time causing the gas-cock *c* to be opened by the influence of the forked arm *i i'* on the gas-cock lever *c'*, the wire K'' being for the time the ground-wire from the coil *k*, by the medium of the bent arm *m'*, projection *p*, lever *o*, and gas-pipe *a*, until the projection *i''* comes in contact with the lower end of the lever *o*, causing its platinum breaker *p* to be disengaged from the arm *m'*, (the ground-connection,) and thus cutting out the magnetic cores *l l'* and coils *k k'* from the electrical circuit, which then passes through the branch wire K''' to the insulated post *n* and its electrode *n'*, where a spark is produced from a spark-coil, or its equivalent, in the circuit by the contact of the electrode *o''*, which has been moved up to it by the momentum of the armature-lever *h*, forked lever *i i'*, and spring-projection *i''*, the latter acting on the lower end of the lever *o*. As soon as the spark is produced at the electrodes *o'' n'*, the small spring *q* forces the projection *p* and bent arm *m'* in electrical connection and raises the armature L' away from the top of cores *l l'* by the contact of the lower end of the lever *o* with the side projection, *i''*, on the lever *i*, and thus allows the current from wire K to pass again to coils *k k'*, and causes the armature L' to be again attracted to tops of cores *l l'*, when the same operation is repeated—namely, contact of spring-projection *i''* with lower end of lever *o*, and forcing its projection *p* away from the bent arm *m'*, and thereby cutting out spools *k k'* from the electric circuit and sending the current again to post *n* and its electrode *n'*, and producing another spark between it and the electrode *o''*, and thus causing intermittent motions of the electrode *o''*, intermittent sparks at the tip for the ignition of the gas, and intermittently cutting out and connecting the spools or coils *k k'* with the electric current from the wire K until the gas is lighted, when the current is switched off by the operator from the wire K, when the various parts remain in their relative positions, as shown in Fig. 1. During the intermittent vibrations of the lever *i*, as above described, it does not vibrate the gas-cock *c*, on account of the forked opening *i'* in said lever *i* being made larger than the width of the cock-lever *c'*. The wire K''' may be made to lead directly and independently from a battery instead of being connected to the wire K, if so desired, to equal advantage. To extinguish the gas it is only necessary to switch the electric current to the wire G and its spools *g g'*, causing the armature F' to be attracted to tops of cores *f f'* and the armature-lever *h* to be turned accordingly, when the gas is automatically cut off by the influence of the forked lever *i i'* on the gas-cock lever *c'*.

c'' is a small spring secured to the forked lever *i i'*, and resting on the cock-lever *c'* for the purpose of keeping the gas-cock properly in its shell and to prevent it from getting loose and leaky.

What I wish to secure by Letters Patent and claim is—

1. In an automatic electric gas-lighting apparatus, the rocking lever *o*, combined with the lever *i*, actuated by electro-magnets and spring *q*, the circuit breaker *m' p*, and the top breaker, *n' o''*, at the burner-tip *d*, to make and break the circuit automatically through a branch or independent wire, as set forth.

2. In an automatic electric gas-lighting apparatus, the combination of lever *i* with rocking lever *o* and breaker parts *m' p* to make and break the circuit of the electro-magnets *k l k' l'*, and breaker parts *n' o''* at the burner-tip *d*, as described.

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

JACOB P. TIRRELL.

Witnesses:
ALBAN ANDRÉN,
LOUIS W. BURNHAM.