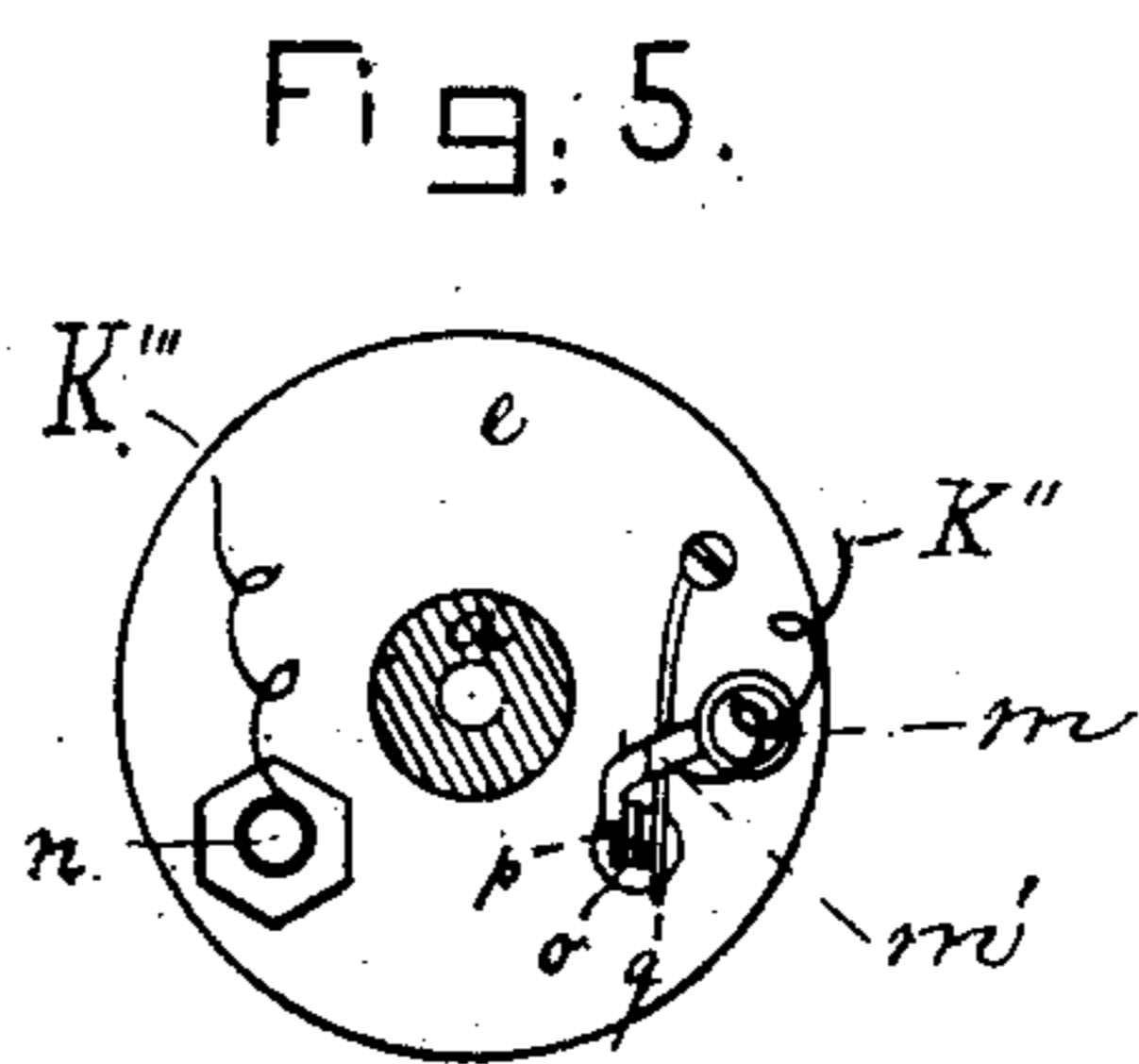
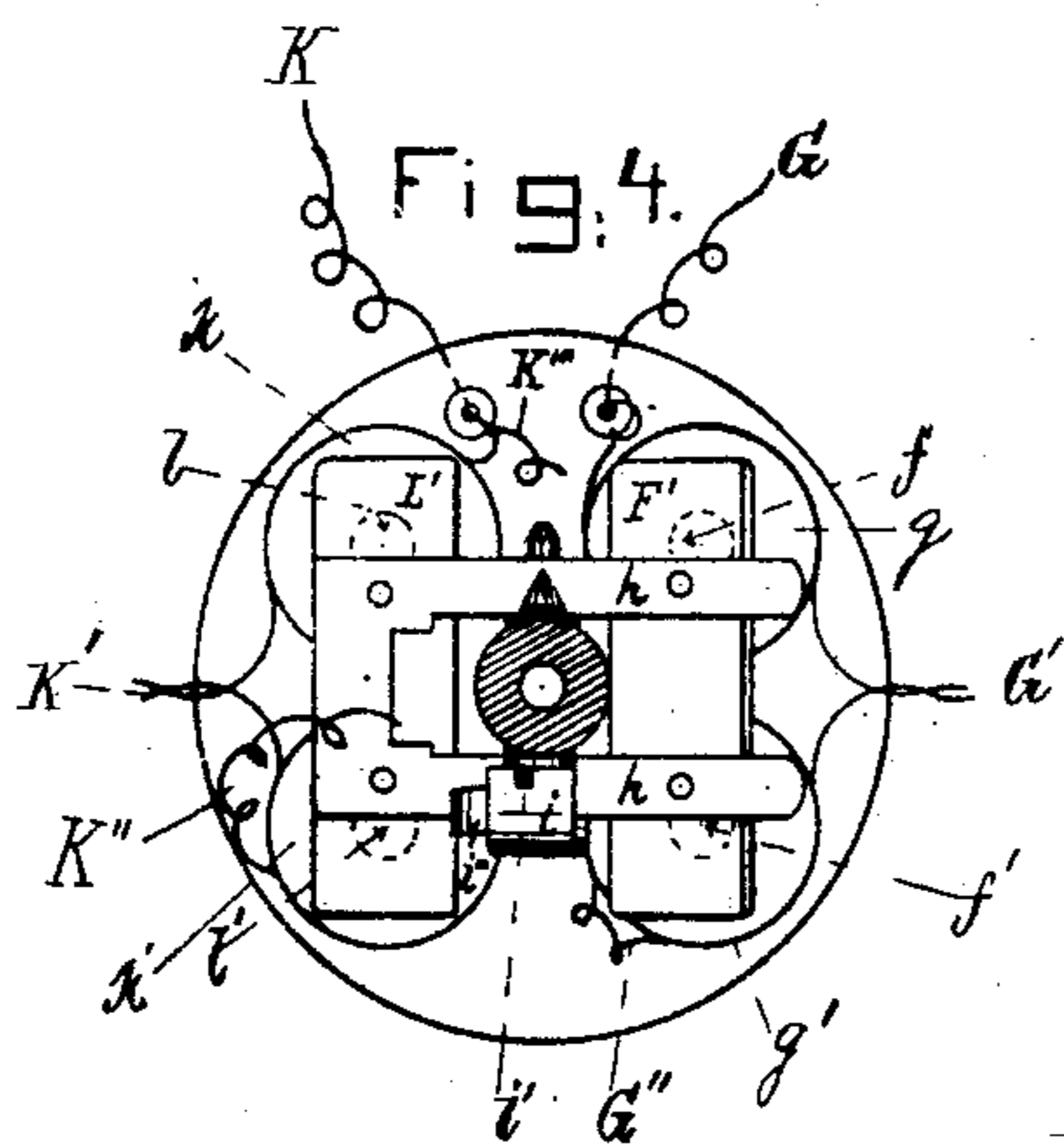
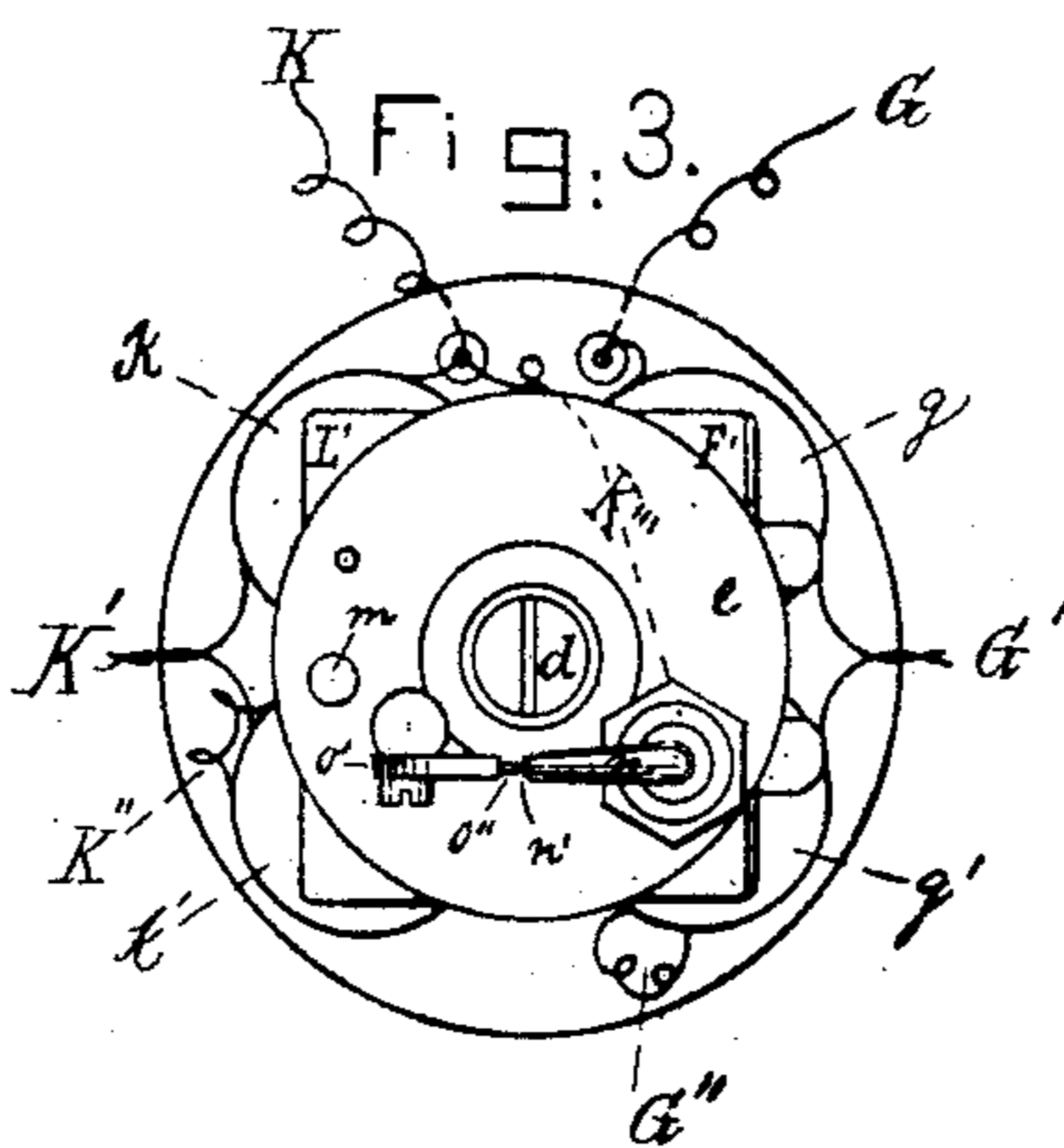
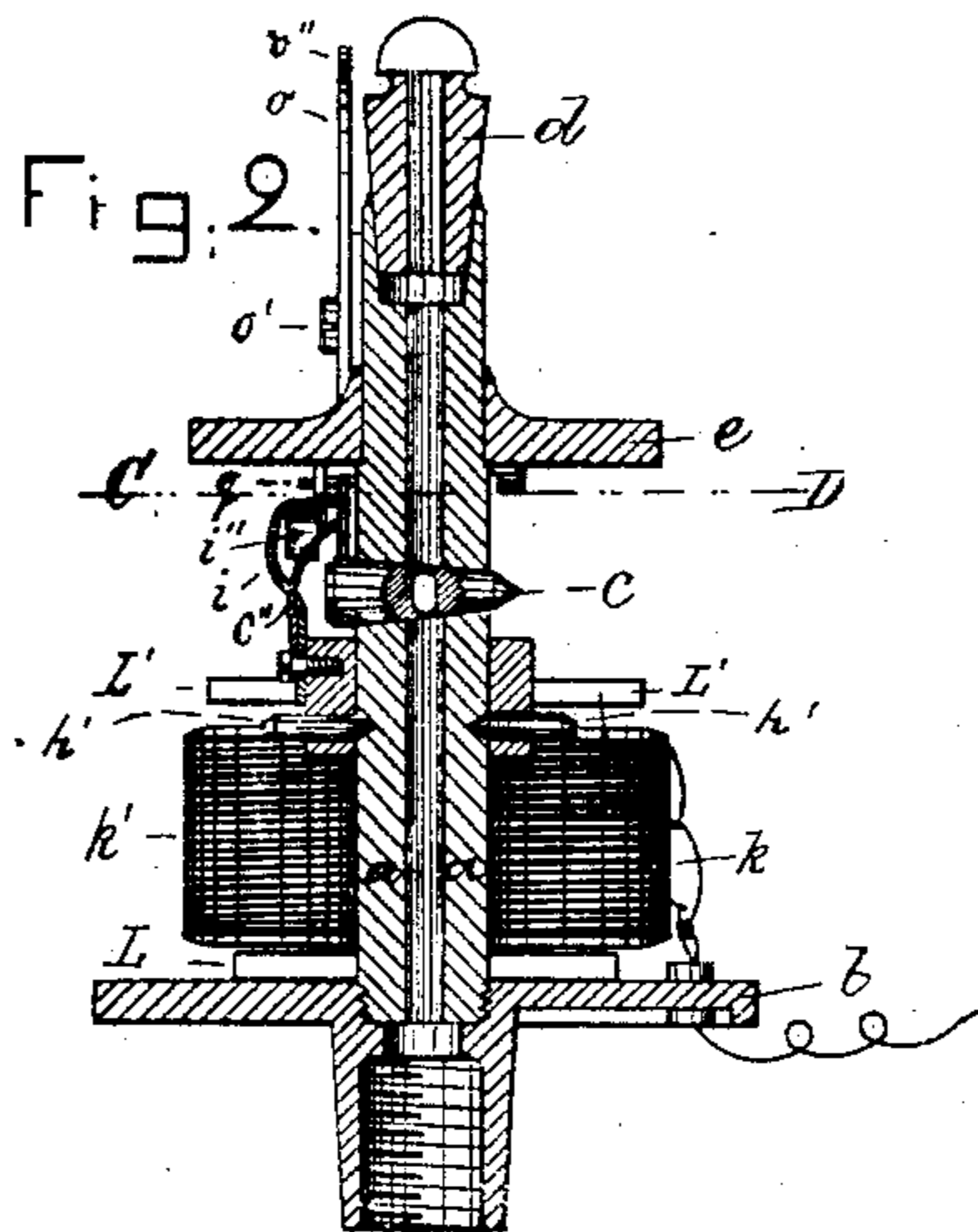
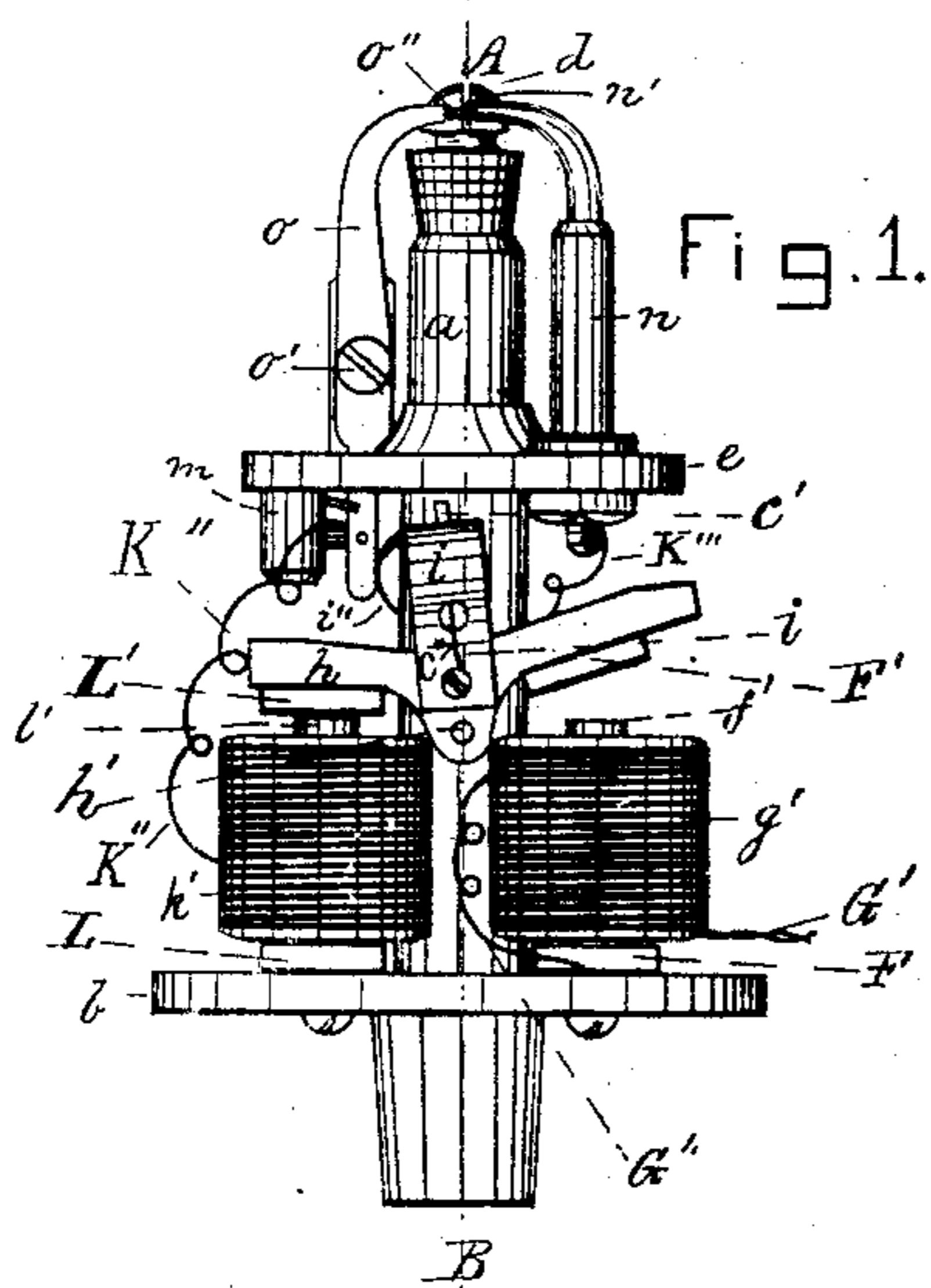


(No Model.)

J. P. TIRRELL.
AUTOMATIC ELECTRIC GAS LIGHTING APPARATUS.
No. 260,806. Patented July 11, 1882.



Witnesses.

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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 seen 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.