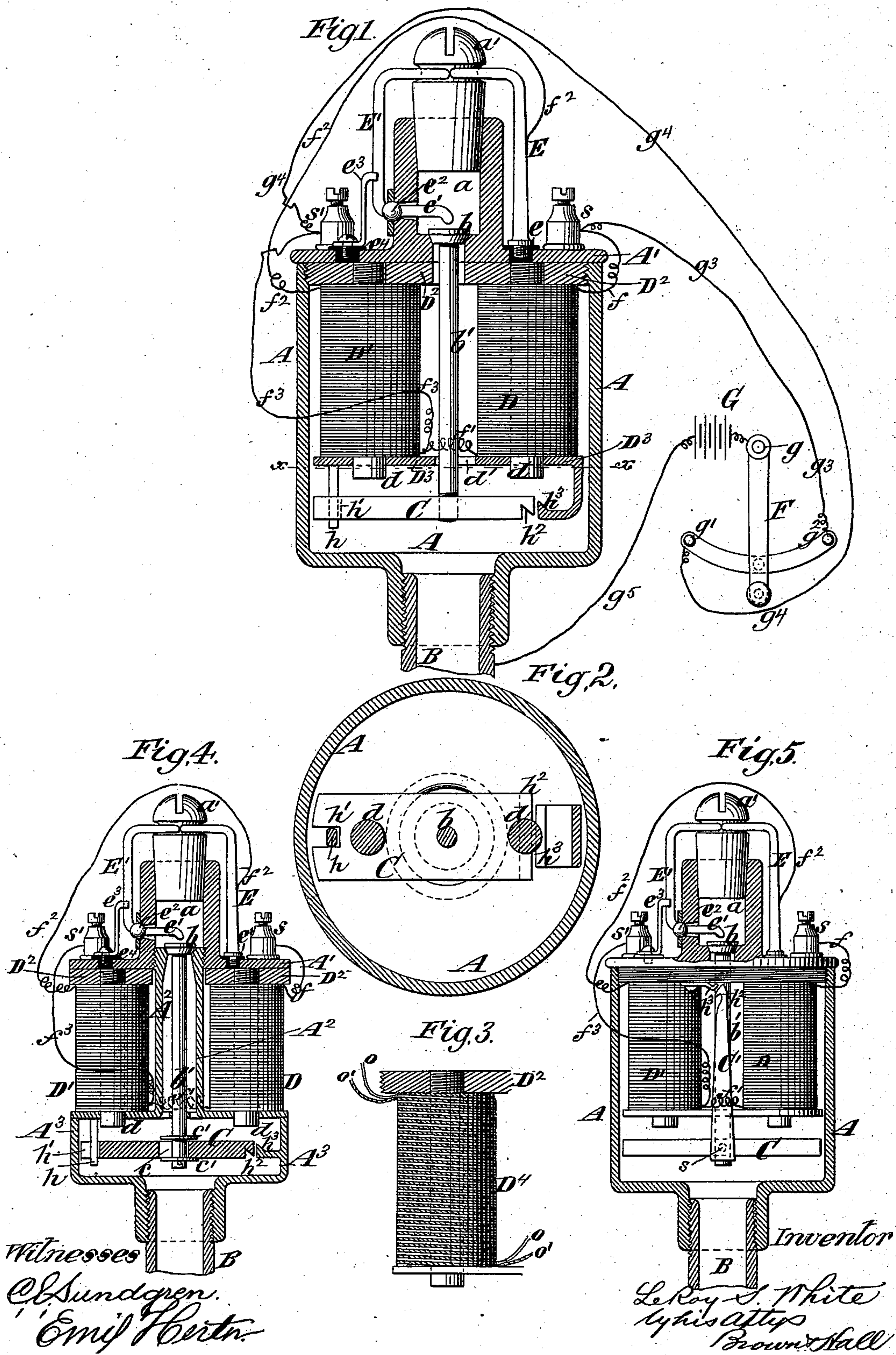


(No Model.)

LE ROY S. WHITE.  
ELECTRIC GAS LIGHTING BURNER.

No. 377,505.

Patented Feb. 7, 1888.





# UNITED STATES PATENT OFFICE.

LE ROY S. WHITE, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE ELECTRICAL APPLIANCE MANUFACTURING COMPANY, OF SAME PLACE.

## ELECTRIC GAS-LIGHTING BURNER.

SPECIFICATION forming part of Letters Patent No. 377,505, dated February 7, 1888.

Application filed September 20, 1887. Serial No. 250,176. (No model.)

*To all whom it may concern:*

Be it known that I, LE ROY S. WHITE, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Electric Gas-Lighting Burners, of which the following is a specification.

My invention relates to electric gas-lighting burners in which an electric current, acting through a suitable magnet or magnets, serves to lift an armature and the gas-valve connected therewith, and to move said armature into locking engagement with a catch or stop, whereby the valve is held open, and also to produce the igniting-spark, and in which another electric current serves to release the armature and gas-valve and permit the valve to close.

One feature of my present invention consists in the inclusion, in an electric gas-lighting burner, of electro-magnets, a gas-valve, and an armature connected with said valve, and having provision for both vertical and lateral movement, the said magnets and armature being combined to produce, by the energizing of the magnet or magnets, both a vertical and a lateral movement of translation of the armature, and a catch or stop for holding the armature raised and the gas-valve open.

The invention also consists in the combination, in an electric gas-lighting burner, with two magnet-coils and cores connected to form a horseshoe-magnet, of two electrodes or contact-pieces for producing a spark, an electric circuit, including both magnet-coils and the electrodes or contact-pieces, and having a branch connected with it between the coils, an armature and its connected gas-valve, and a catch or stop for holding the armature in an elevated position with the gas-valve open. With such combination, when an electric current is sent through the circuit, it energizes both magnet-coils, which, acting upon the armature, serve to effect the engagement of the armature with its catch or stop, and to hold the valve open, and when an electric current is transmitted through the branch to the circuit and only passes through one coil of the magnet it only energizes that coil to any material degree and serves to unlock the armature from its catch, and to permit the armature and its

attached gas-valve to fall and close the said valve.

In the accompanying drawings, Figure 1 is a vertical section of a burner embodying my invention, and in which a lateral movement of the armature is provided for by slotting the guide or opening through which the valve-stem connecting the valve with the armature works, and also including a diagram of the key or switch and battery-circuits employed to operate the burner. Fig. 2 is a horizontal section upon about the plane indicated by the dotted line *x x*, Fig. 1. Fig. 3 represents a magnet-coil wound so as to permit the operation of the burner to close the gas-valve without producing a spark. Fig. 4 is a vertical section of a burner embodying my invention, and in which a lateral movement of the armature upon the valve-stem is provided for by slotting the armature, and in which the magnet-coils are external to the gas-passage and case of the burner; and Fig. 5 is a vertical section of a burner, showing a lock of modified construction, whereby the armature is held in its raised position with the valve open.

Similar letters of reference designate corresponding parts in all the figures.

Referring first to Figs. 1 and 2, A designates the case of the burner, which is secured upon a gas-pipe, B, and which is closed at the upper end by a head, A', surmounted by a socket, *a*, in which fits a burner-tip, *a'*.

*b* designates a gas-valve, whereby the passage of gas from the case of the burner to the tip-socket *a* is controlled. The valve is at the upper end of a stem which is secured to an armature, C, hereinafter described.

D D' designate two magnet-coils, having their cores *d* secured at their upper ends in a piece, D<sup>2</sup>, of soft iron, thereby forming a horseshoe-magnet, the poles of which operate upon the armature C. As here represented, the two coils D D' are connected by a lower head, D<sup>3</sup>, having an opening, *d'*, in which the valve-stem *b'* works, and this opening is slotted or elongated, as shown in Fig. 1, so as to provide for the lateral movement of the stem *b'*, as well as for its vertical movement.

E E' designate the two electrodes or contact-pieces, which have their separating ends arranged adjacent to the burner-tip *a'*, and



which serve to produce an igniting-spark. The electrode or contact-piece E is secured in the case of the burner, it being insulated at *e*, and the electrode or contact-piece E' has an arm, *e'*, which projects into the tip-socket of the burner and directly over the valve *b*. A gas-tight joint, *e''*, is formed at the point where the arm *e'* passes through the tip-socket *a*, as is described and claimed in my application for Letters Patent No. 235,741, filed April 22, 1887. It will be observed that when the valve *b* is lifted it will strike against the arm *e'*, and by tilting the electrode E' will move its end out of contact with the adjacent end of the electrode E at the sparking-point.

Upon the case of the burner are two binding-posts, *s s'*. From the binding-post *s* a wire, *f*, leads to the magnet-coil D. Thence a wire, *f'*, leads to the coil D', and from the coil D' a wire, *f''*, leads to the electrode E, and this electrode being insulated from the case the current passes through the electrode E' to the case, and thence through the gas-pipe to the ground. The circuit described also has a branch, *f'''*, which leads directly from the post *s'* and joins the wire *f'* between the magnet-coils, so that a current passed through the branch *f'''* only passes through the wire of the coil D'.

I have included in Fig. 1 a switch, F, which serves the same purpose in this connection as would a double key, and which is pivoted at *g*, so that it may be swung upon either of two contacts, *g' g''*. From the contact *g''* a wire, *g'''*, leads to the binding-post *s*, and from the contact *g'* a wire, *g''''*, leads to the binding-post *s'*. From the gas-pipe a return-wire, *g''''''*, leads to the pivot *g* of the switch and includes a battery, G.

It will be observed that the electrode or contact-piece E' is by a spring, *e''''*, held in contact with the other electrode, E, and this spring is insulated from the case of the burner, as is shown at *e''''''*.

The armature C consists, as here shown, of a bar extending in the plane of the two poles *d*, and which is prevented from turning by a guide-pin, *h*, entering a slot, *h'*, in the end of the armature, as best shown in Fig. 2. This armature has a tooth or catch, *h''*, which, when the armature is lifted and moved toward the right of Fig. 1, is adapted to engage a catch or stop, *h'''*, for holding the armature raised with the valve *b* open.

It is necessary that the electro-magnets when energized should not only lift the armature, but shall produce a lateral movement of translation, or, in other words, move it toward the right hand of Fig. 1, so that when the current is broken the armature will fall with its tooth *h''* upon the catch or stop *h'''*. In the present example of my invention the valve-stem *b'*, which is central between the two magnet-coils D D', is fixed in the armature C at the right hand of the center of its length, or nearer its right-hand end, and consequently the center of the magnetic mass is not central between the two poles of the magnet-coils. Conse-

quently when both magnet-coils are energized the armature C is both raised and is drawn laterally toward the right hand of Fig. 1, so as to bring the center of its mass substantially coincident with a central position between the two poles *d*.

Suppose, for example, that it be desired to open the gas-valve and of course produce an igniting-spark. The switch F is turned upon the contact *g''* and the current passes through the wire *g'''*, binding-post *s*, wire *f*, coils D D', wire *f''*, and electrodes E E' to the burner-case and to the ground. Upon the energizing of the magnets the armature C will be raised, lifting the valve *b*, and the separation of the electrodes E E' will produce the igniting-spark. When the current is cut off, the armature falls slightly, but its tooth *h''* strikes upon and is retained by the catch or stop *h'''*. The slotted opening *d'* provides for the side movement of the valve-stem, which is necessary to permit the movement of the armature.

When it is desired to extinguish the gas, the switch F is moved upon the contact *g'*, and the current passes thence through the wire *g''''*, binding-post *s'*, branch *f'''*, magnet-coil D', wire *f''*, and electrodes E E' to the burner-case and to the ground. The coil D' only is energized, and acts, first, to lift the armature slightly and to withdraw it laterally from the catch or stop *h'''*, whereupon the valve *b* closes on the circuit being broken.

It is obvious that a spark is produced when the coil D' is energized to unlock the armature C, and this might be an annoyance to workmen fitting up the burners, because of their inability to tell whether a current sent has been one to light or extinguish the burner. To obviate this difficulty I may employ in lieu of the coil D' (shown in Fig. 1) a coil, D'', like that shown in Fig. 3, which is wound with two wires. One of these wires—the wire *o*, for example—would be in the main circuit or have the wire *f'* connected with it, and the wire *f''*, instead of being a branch of the main circuit, will be continued through the magnet by the wire *o'*, and this wire *o'* should be taken from the opposite end of the magnet-coil directly to the case of the burner without being connected with the electrode E. Consequently, when a current is sent through the wire *g''''* to the wire *o'*, the magnet-coil D'' will be energized, but no spark will be produced by the separation of the electrodes.

The example of my invention shown in Fig. 4 does not differ materially from that shown in Fig. 1, save that the head A' of the burner-case has connected with it a tube, A'', of small diameter, which constitutes a gas-passage and which is connected with a case portion, A''', surmounting the gas-pipe B, and in which the armature C is located. The magnet-coils D D', which are connected with the soft-iron cross-bar D'', are external to the gas-passage A'', and have their poles *d* presented through the case portion A''' in proper working relation to the armature, and hence the insulation ap-



plied to the magnet-wires is not subjected to the deteriorating effects of the hydrocarbon gas. In this instance, also, the lateral movement of the armature is provided for by slotting the armature at *c* to receive the valve-stem *b'*, and the armature can slide on the valve-stem between the two cheeks or shoulders *c'*, which are formed upon the stem.

The example of my invention shown in Fig. 5 does not differ materially from that shown in Fig. 1, save that the armature *C* is pivoted at *s* to the stem *b'* of the valve, and has an upwardly-projecting arm or finger, *C'*, which is adapted to engage a catch or stop, *h<sup>3</sup>*. When the armature is raised, the hook or tooth *h<sup>2</sup>* at its upper end engages a stop or catch, *h<sup>3</sup>*, and holds the armature and its attached gas-valve *b* in an elevated position with the valve open; but when the coil *D'* is alone energized its first action is to tilt the armature slightly and thereby move the hook *h<sup>2</sup>* out of engagement with the catch or stop *h<sup>3</sup>*, and when the current is broken the armature falls to the position shown in Fig. 5.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In an electric gas-lighting burner, electro-magnets, a gas-valve, and an armature connected with said valve and having provision for both vertical and lateral movement, the said magnets and armature being combined to produce by the energizing of one or all of the magnets both a vertical and lateral movement of translation of the armature, and a catch or stop for holding the armature raised and the gas-valve open, substantially as herein described.

2. In an electric gas-lighting burner, the combination, with two magnet-coils and cores connected to form a horseshoe-magnet, of two electrodes or contact-pieces for producing a spark, an electric circuit including both coils and the electrodes or contact-pieces, and having a branch connected with it between the coils, an armature and its connected gas-valve, and a catch or stop for holding the armature in an elevated position with the gas-valve open, substantially as herein described.

LE ROY S. WHITE.

Witnesses:

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CHAS. W. GILLETTE.