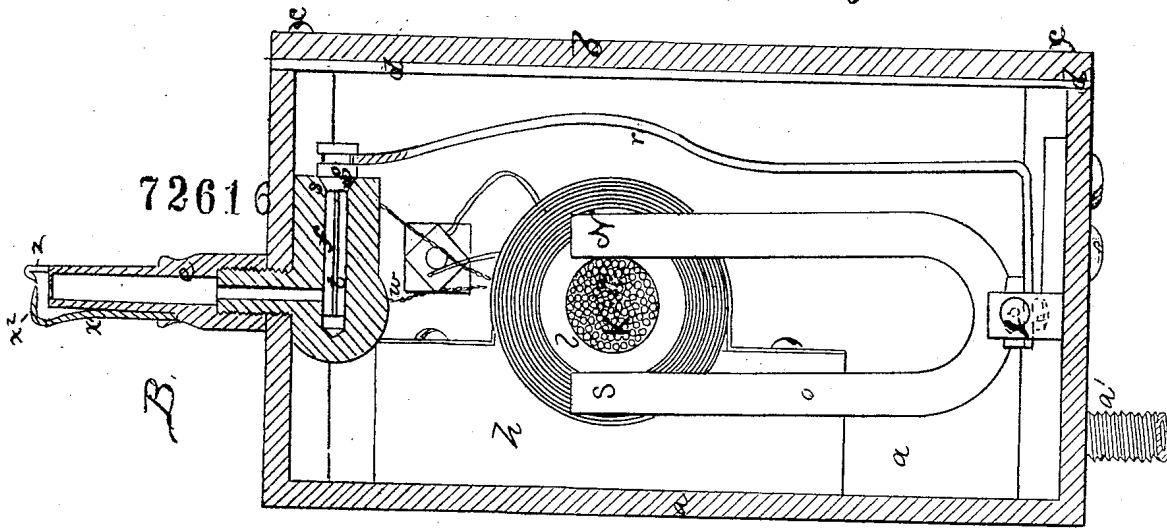
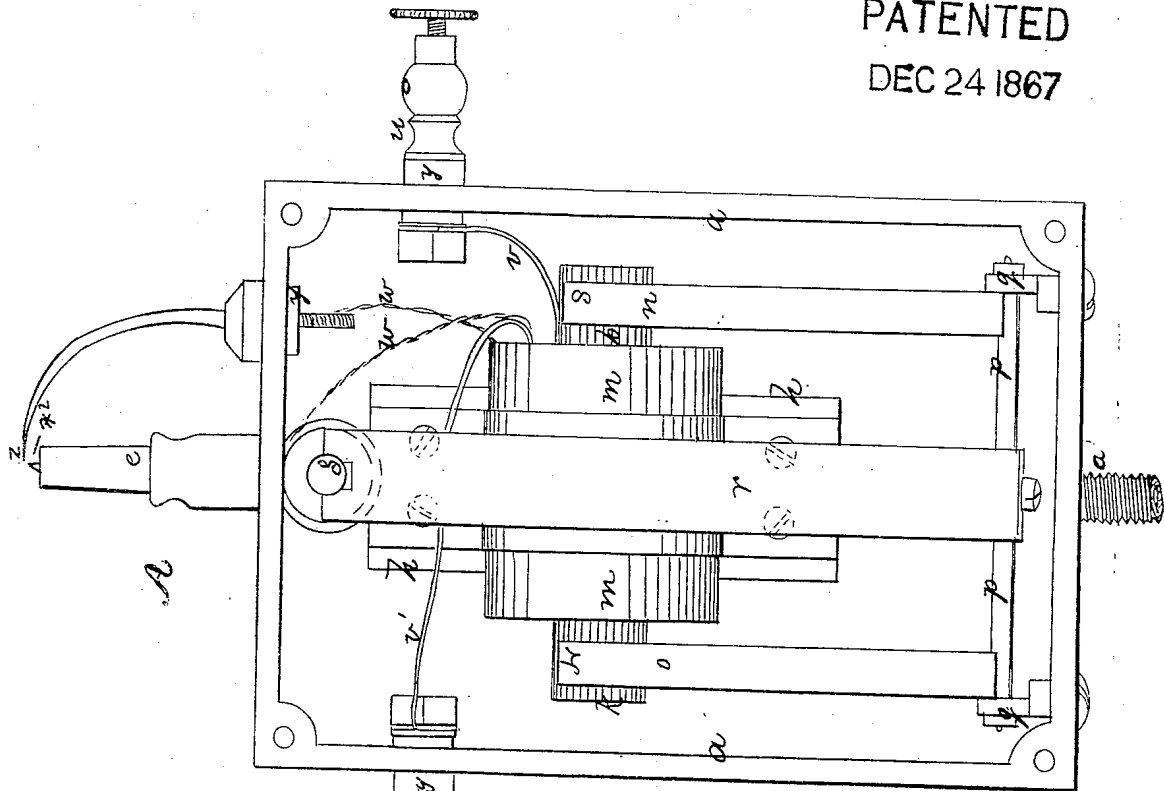


Moses G. Farmer's
 Imp't in Lighting and Extinguishing Gas.



PATENTED
 DEC 24 1867



M. G. Farmer, by
 Crosby Halsted & Fowler
 Attys.

Witnesses
 M. W. Frothingham
 L. H. Latimer.

United States Patent Office.

MOSES G. FARMER, OF SALEM, MASSACHUSETTS.

Letters Patent No. 72,616, dated December 24, 1867.

IMPROVEMENT IN LIGHTING AND EXTINGUISHING GAS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, MOSES G. FARMER, of Salem, in the county of Essex, and State of Massachusetts, have invented an Improved Gas-Lighting and Extinguishing Apparatus; and I do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of my invention sufficient to enable those skilled in the art to practise it.

The invention relates to a construction or arrangement of mechanism for lighting and extinguishing street gas-lamps by electricity.

Several plans have, of late years, been devised for effecting this object, but, so far as I know, they have all proved practically inefficient, for the reasons not necessary herein to specify, as, with the exception of employing a current of electricity, to effect the lighting and extinguishment of the lamps, my method is quite different from all others known to me.

To be practical, the electric spark, which ignites the gas, should be generated at or near the burner, and the apparatus for directly effecting such ignition should be protected from the injurious effect of the weather, and should be strong and durable, inexpensive, and of simple and easy construction, and these are characteristics of my invention.

By my arrangement, the lamps are to be lighted from a central office, but the lighting-spark is generated from an apparatus directly connected with each burner, so that the lighting of one lamp is in no way contingent upon the lighting of an adjacent one.

The drawings represent an apparatus embodying the invention, A showing the same in elevation, (the face-plate of the box being removed;) B, a vertical cross-section.

a denotes a strong metal box (preferably of cast iron) covered and made gas-tight by a face-plate, *b*, secured upon it by screws *c*, the joint being made close by a packing, *d*, the interior of the box constituting a gas-chamber. From the top of this box the burner *e*, (or a pipe leading to said burner,) projects, said burner or burner-pipe being suitably fixed to the box, and communicating with the gas-chamber through a valve-passage, *f*, controlled by a valve, *g*. Within, and fastened to one of the walls of the box, is a bed of wood, or equivalent insulating-substance, *h*, which supports a compound or double magnetic coil, secured to the bed by a strap, *i*, or in any other suitable manner. This compound coil is made like any ordinary induction-coil, having a central bundle of fine iron wires, *k*, an inner or primary helix of coarse wire, *l*, and an outer or secondary helix of fine wires, *m*. The wires of both helices are preferably made of copper, this metal being the best conductor in proportion to its cost. *n o* are two U-shaped permanent steel magnets, situated at the opposite ends of the central bundle of fine iron wires *k*, (which projects at each end beyond the helices *l m*, as seen at A,) and embracing the ends of the wires or extending up upon the opposite sides thereof, as seen at B. The magnets are mounted upon a rocker-shaft or bar, *p*, turning on bearings or pivots at *q*. An arm, *r*, is fixed upon and extends up from the rocker-shaft, and, at its upper end, this arm is forked and straddles the stem of the valve *g*, or enters a groove therein, so that outward movement of the arm opens the valve, and inward movement closes it, as will be readily understood. The valve *g* is made conical, and rests, when closed, in a correspondingly conical valve-seat, *s*, as seen at B, and the valve has a tongue or spindle, *t*, sliding in the gas-passage or tube *f*, and insuring the accurate contact of the valve with its seat when the valve is pushed in. The passage through the valve-seat leads directly to the burner, as seen at B. One end of the primary helix *l*, is connected to the inner end of an insulated screw-cup, *u*, by a wire, *v*, while the other end of said coil is connected to a similar cup, *w'*, by a wire, *v'*. One end of the secondary coil or helix *m* is in metallic connection with the burner or burner-pipe by a wire, *w*, while the other end of said coil is connected by a wire, *w'*, to an insulated conductor, *x*, this conductor and the screw-cups being insulated from the walls of the box by pieces of vulcanite or equivalent material, *y*. The insulation of the conductor *x* should be of such degree as to require a spark of nearly a quarter of an inch in length to leap from the wire *w'*, of the secondary helix, to the metal work of or within the box. The conductor *x* extends up to or over the orifice of the burner, and terminates in a platina point, *z*. Another conductor, *z'*, having a platina point, *z''*, is fixed to the burner, and, through the burner and valve-seat is brought into metallic connection with the wire *w* of the secondary coil.

The two platina points may preferably be placed about one-sixteenth of an inch apart, and about one-quarter of an inch over the orifice at which the gas issues from the burner.

At the bottom of the box is a pipe, *a'*, by which connection is made between the gas-chamber and the gas-pipe of the lamp to which the box is to be applied. The box, so arranged, is placed on a lamp-post, above the bracket, or is secured within the post, the burner *e* being at the point at which the gas is usually burned, and the pipe *a'* is connected to the service-pipe, which runs to or through the post, the gas-chamber of the box *a* being thereby constituted into an enlargement of the gas-pipe, from which the flow of gas is controlled by the valve *g*.

An ordinary gas-cock may be applied to the service-pipe, below or above the box, to shut off or regulate the flow of gas into the box. The circuit-wires from the central office are connected to the box through the cups *u u'*.

If a sufficiently strong current of electricity be sent in the proper direction through the primary helix *l*, its bundle of soft iron wires, *k*, becoming magnetic, will attract one pole of the permanent magnets and repel the other, thus rocking the shaft or bar *p*, moving the lever or arm *r*, and opening the valve *g*, permitting the gas to flow into and through the burner. If this primary current be now suddenly broken, an intense current will be generated in the secondary helix *m*, which current will pass around and across the platina points *z z'*, causing a spark at the points, which spark will ignite the issuing gas. The operations of closing and opening this primary circuit may be repeated many times in rapid succession, if the gas fails to be ignited the first time.

If the primary current be now sent through the coil *l*, in the opposite direction, the valve will be closed by the reverse attraction and repulsion of the bundles of wires *k*, upon the magnets *n o*. (The attraction of the permanent magnets for the bundle of soft iron wires should be sufficient to keep the valve either open or closed, according to the direction of the last current used.)

I do not confine myself to the use of a conical valve, as I may use a flap-valve, a balanced valve, like that used in the telegraph, or any other valve or cock that may be applicable. Many of these boxes may be inserted into a primary circuit, which has battery-power sufficient to operate them, by one Grove-cell for each box. There should be a condenser attached to the primary wires, just each side of the spot where the primary circuit is to be broken, in order to give sufficient length to the sparks.

The magnets may be stationary, and the bundle of wires *k* made movable and connected to and so as to work the valve, and the magnets may be outside of the box, and influence the bundle of wires *k k*, through a thin non-magnetic partition, or the primary and secondary coils, and their contained bundle of wires, may be outside, and influence the magnet, which, in such case, should be inside, and arranged to operate the valve.

I claim the combination of a straight, electro-magnetic bar, with its pole situated between the poles of two bent or U-shaped permanent magnets, which permanent magnets may be either simple or compound.

I claim, for use, in combination with the gas-burner of a street gas-lamp, a box or gas-chamber, containing an electric-spark-generating mechanism, and mechanism, as described, for opening with the current in one direction, and closing with the current in the opposite direction, a valve, said box containing gas, and being arranged to be located at or near to the burner, and in a circuit, substantially as set forth.

I claim giving motion to gas-valves, or other mechanism, by means of the above-described combination of electro and permanent magnets, whether the arrangement be such that the permanent magnets, or the electro-magnetic bar, be moved by the reversal of the current.

I claim, also, the arrangement of the burner, the igniting-points or wires, the gas-valve, the primary and secondary coils, and the electro and permanent magnets, substantially as shown and described.

MOSES G. FARMER.

Witnesses:

FRANCIS GOULD,
S. B. KIDDER.