

(No Model.)

J. J. MCGOWEN.  
ELECTRIC GAS LIGHTER.

No. 388,294.

Patented Aug. 21, 1888.

Fig. I.

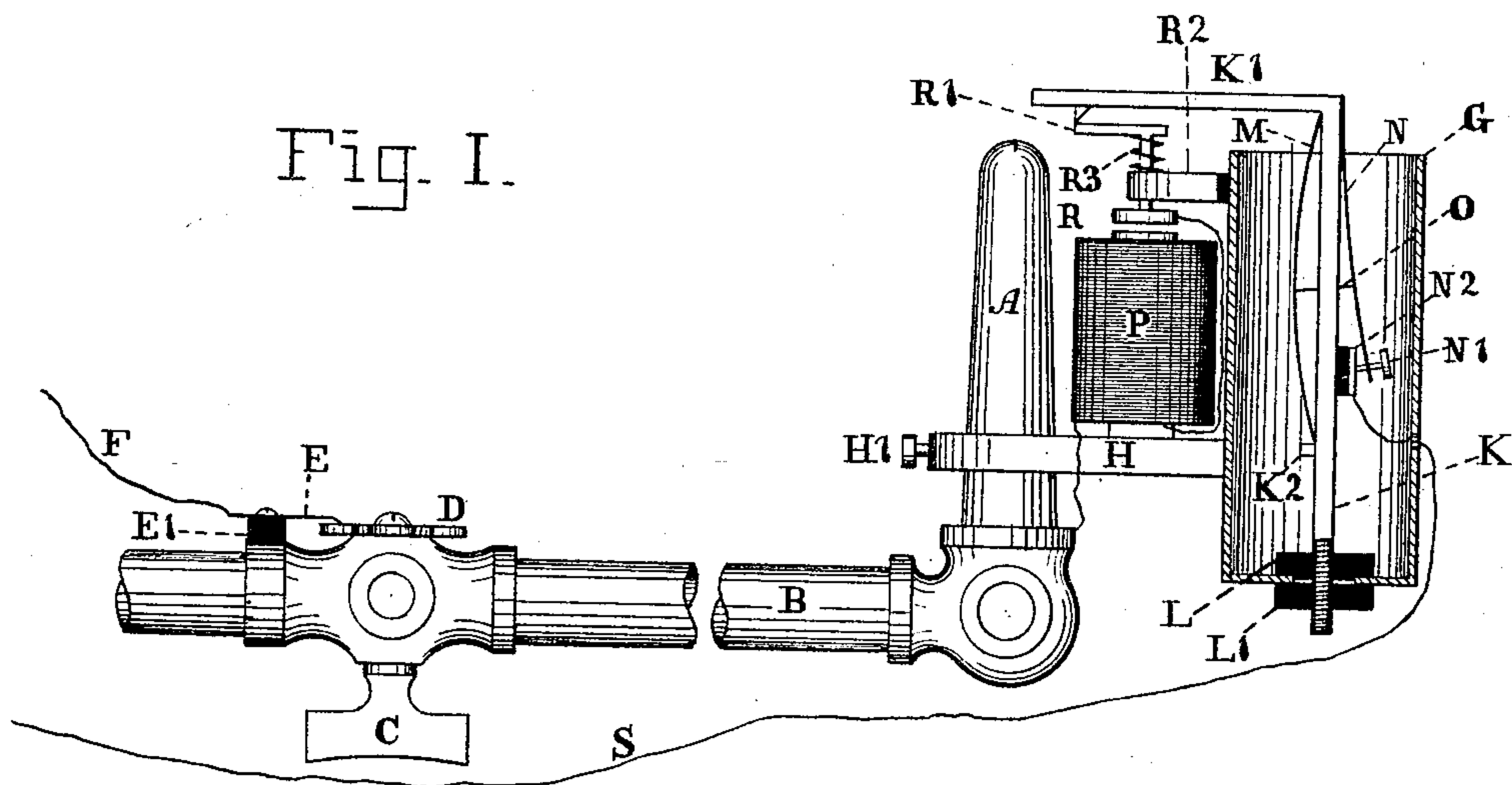
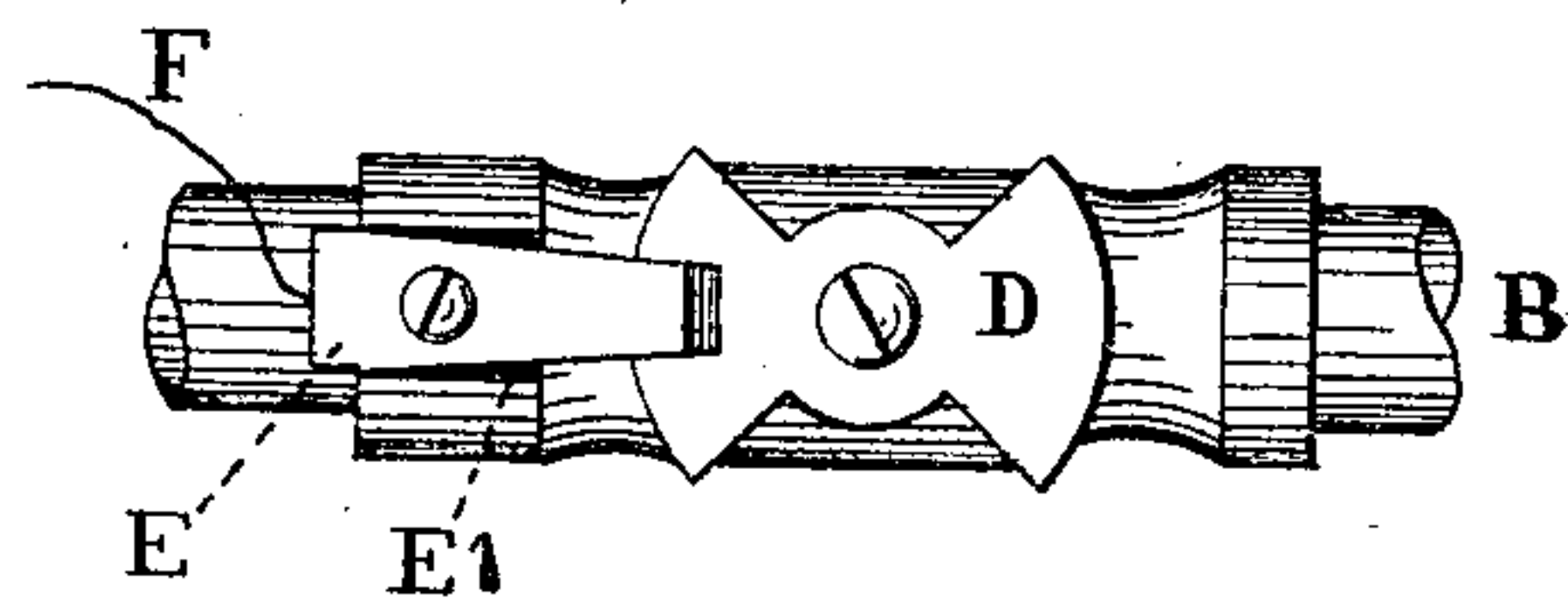


Fig. II.



WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## ELECTRIC GAS-LIGHTER.

SPECIFICATION forming part of Letters Patent No. 388,294, dated August 21, 1888

Application filed June 24, 1887. Serial No. 242,344. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN J. MCGOWEN, a citizen of the United States, residing at Ithaca, in the county of Tompkins and State of New York, have invented certain new and useful Improvements in Electric Gas-Lighters, of which the following is a full, clear, and exact description, which will enable others skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, which form a part of this specification:

This invention relates to that class of electric gas-lighters in which the gas is lighted by a spark generated by rapidly closing and breaking an electric circuit by means of a vibrating armature influenced by an electro-magnet placed in said circuit. Upon turning on the gas the circuit is closed, so that the vibrating spark-generator is made to operate, and said current is broken automatically soon after the gas is lighted, to prevent needless waste of the battery materials. The former end is attained by connecting the cock to a primary-circuit breaker, and the latter object is accomplished by the use of a secondary-circuit breaker caused to break the circuit through the expansion of some of its parts by the heat of the burning gas. When the gas is blown out or otherwise improperly extinguished, leaving unburned gas issuing from the burner, said gas is quickly relighted by the cooling and consequent return to their normal position of the expanded parts of the secondary-circuit breaker.

Referring to the drawings, Figure I is a side elevation of my improved gas-lighter, the case inclosing the secondary-circuit breaker being partly removed, the better to exhibit the devices therein contained. Fig. II is a plan view of the primary-circuit breaker.

The various parts of my improved device are attached to an ordinary gas-fixture, consisting of a burner, A, conducting-pipe B, and cock C. To the upper end of said cock is fastened a flat plate of metal, D, having the form of a mutilated disk, two opposite portions thereof being cut away, leaving two opposite projecting wings. The plate D being rigidly secured to the cock C, is therefore caused to revolve with said cock.

An elastic metallic spring, E, is fastened at one end to the gas-fixture at a convenient point near the cock, being electrically insulated from said fixture by means of an interposed non-conducting block, E'. The free end of said spring is arranged to press downwardly upon the projecting wings of the plate D when said plate is so turned by the revolution of the cock C as to bring said projecting wings into contact with the spring. A wire, F, connects the spring E with one of the poles of an electric battery.

The above-described devices, taken collectively—namely, the cock C, plate D, spring E, and insulating-block E'—I term the “primary-circuit breaker.”

The secondary-circuit breaker, which I will now describe, is inclosed within a cylindrical metallic case, G, to the middle portion of which is externally attached a metallic block, H, which I call the “clamp.” Said clamp is pierced with a vertical hole which encircles the gas-burner A, to which the clamp is secured by means of a set-screw, H'. A stiff bar, K, preferably made of brass, copper, or other metal capable of great expansion by heat, is vertically secured within the cylindrical case G, being substantially central to said case. The upper portion of said bar is flat and its lower portion is round, and is provided with screw-threads cut thereon. Said bar passes downwardly through a large central hole in the bottom of the case G, not touching the sides of said hole, in which position it is rigidly secured by means of insulating-nuts L L', screwed upon the bar respectively inside and outside of the case. By this construction the bar K is insulated from the case G.

The upper part of the bar K extends above the top of the case and is bent at a right angle extending across the top of the gas-burner. A flat normally-straight spring, M, is attached to the bar K in a substantially vertical position, being confined between the upper bent portion, K', of the bar and a pin, K'', laterally projecting from said bar at a point near the nut L. The space in which said spring M is thus confined is shorter than the spring, which is consequently forced out of a straight line, its central portion being bent away from



the bar K. The spring M is made of steel or other metal less expansible by heat than the bar K.

A thin elastic strip of metal, N, is rigidly 5 secured at its upper end to the upper vertical portion of the bar K and thence extends downwardly, its lower end being free. A screw, N', passes horizontally through said strip N, near its lower end, the point of said screw being 10 normally in contact with a small metallic plate, N<sup>2</sup>, attached to and electrically insulated from the bar K. The metallic strip N and screw N', taken together, I term the "key." Said strip N is connected to the spring M by means 15 of a wire, O, secured to said strip and spring at or near the middle portion of each, and curved to pass around the bar K.

An electro-magnet, P, is mounted in an upright position upon the clamp H, between the 20 case G and the burner. Above said electro-magnet an armature, R, is arranged, said armature being rigidly connected to a vertical rod, R', which passes loosely through a hole suitably formed in a guide-block, R<sup>2</sup>, attached 25 to and insulated from the case G. Said rod and armature are free to move vertically for a short distance, and are normally pressed upward by a spring, R<sup>3</sup>, coiled round the rod. In this position the armature is out of contact 30 with the electro-magnet, and the upper end of the rod R' is in contact with the upper horizontal portion of the bar K. The upper part of rod R' may, if desired, be bent horizontally toward the gas burner, to bring said point of 35 contact near the gas-jet.

I will now describe the electrical connections and the manner of operating the apparatus. When the gas is turned on and connection 40 made between the electric wire F and the gas-fixture by the primary-circuit breaker, as before described, the circuit is completed, as follows: The insulated wire encircling the electro-magnet P is connected at one end to the 45 gas-burner A, or other suitable part of the gas-fixture, and at the other end to the rod R', which in turn normally presses upon and connects with the bar K. The remainder of the circuit is through the strip N, screw N', and plate N<sup>2</sup>, to which plate a wire, S, is at- 50 tached, which passes out from the case G through a suitable hole formed therein, and is connected to the opposite pole of the battery.

The electric circuit being closed, as above described, the electro-magnet P immediately attracts the armature R and rod R', overcoming 55 the force of the spring R<sup>3</sup>. The circuit is broken by the withdrawal of the rod R' from the bar K, when the spring R<sup>3</sup> at once returns said rod and armature to their normal position, reclosing the circuit. Said rod and armature 60 are thus caused to vibrate rapidly in a manner very well known, and a succession of sparks results from the rapid breaking and closing of the circuit at the upper end of rod R'. The gas is lighted by said sparks, and the 65 flame rapidly heats the bar K by the contact of its upper bent portion, K', with said flame. Said bar K, being heated, expands longitudinally, thereby allowing the less-expansible 70 spring M to straighten. This movement of the spring results in forcing the key N N' away from the plate N<sup>2</sup>, thereby breaking the circuit, said key being influenced by said spring through the medium of the wire O. The armature R and rod R' now resume their 75 normal position. If the gas be blown out or otherwise improperly extinguished, leaving unburned gas issuing from the burner, the bar K, being no longer heated, contracts, thereby bending the spring M until contact is made by 80 the key N N' with the plate N<sup>2</sup>, when the circuit is again complete and the gas is relighted by the resulting action, as above described, of the electro-magnet and the armature R and rod R'. 85

Having fully described my invention, I claim and desire to secure by Letters Patent—

An electric gas-lighting apparatus organized with a cock and burner, a primary-circuit 90 breaker connected to that cock and arranged to close the electric circuit when the gas is turned on, a gas-lighter consisting of an electro-magnet placed in that circuit and arranged to attract an armature which in moving causes the circuit to be broken and the gas to be lighted 95 by the resulting spark, and a secondary circuit breaker arranged to break the circuit by the heating and consequent expansion by the gas-flame of some of the parts of that secondary-circuit breaker.

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Witnesses:

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H. M. HIBBARD.