

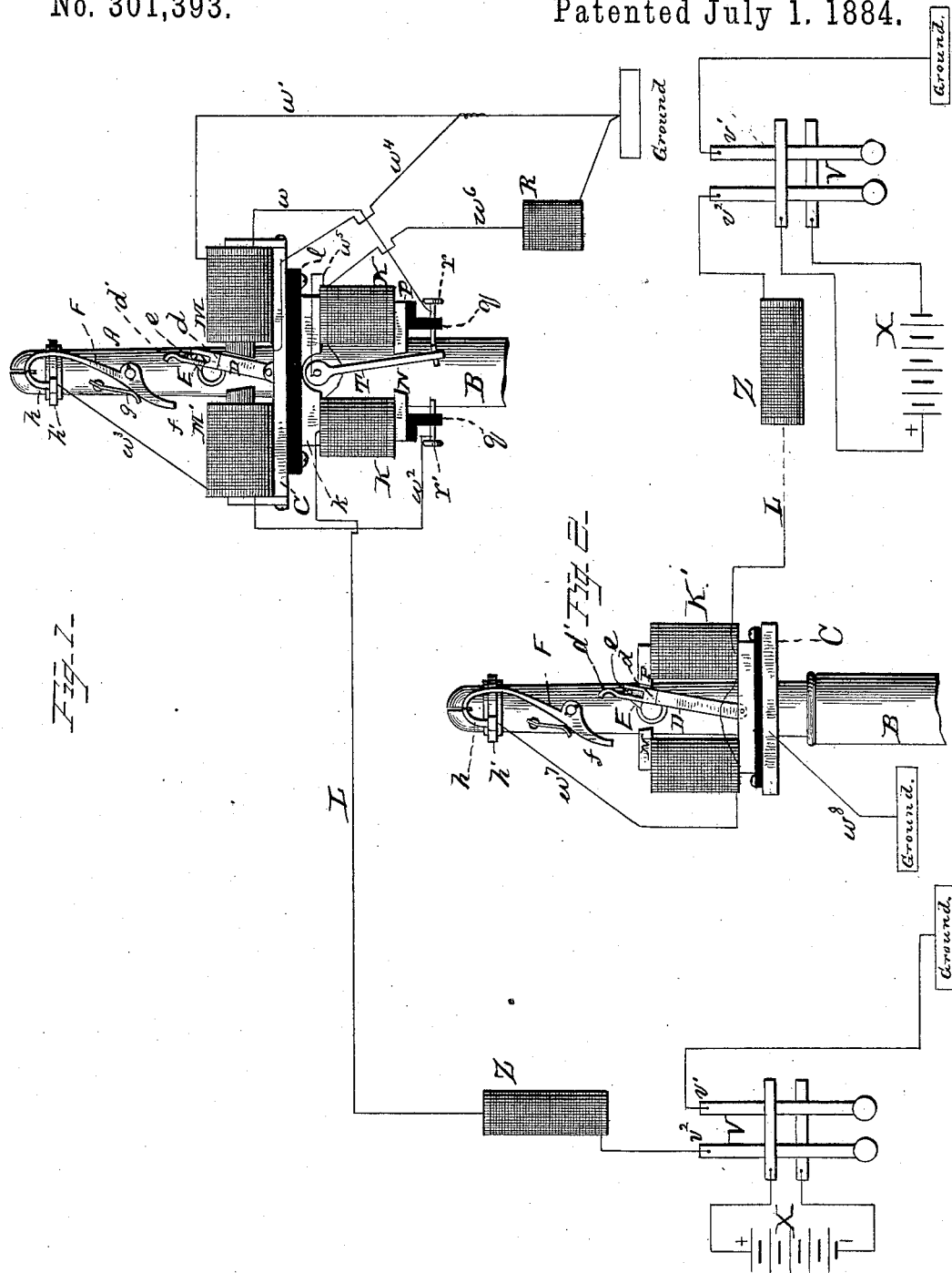
(No Model.)

W. H. SAWYER.

ELECTRIC GAS LIGHTING APPARATUS.

No. 301,393.

Patented July 1, 1884.



WITNESSES

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WILLIAM H. SAWYER, OF PROVIDENCE, RHODE ISLAND.

ELECTRIC GAS-LIGHTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 301,393, dated July 1, 1884.

Application filed January 22, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. SAWYER, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Electric Gas-Lighting Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

10 My invention relates to an improvement in that class of electrical gas-lighting apparatus in which devices at the burner are operated by electro-magnetism for turning on and off the gas and igniting the same.

15 The object of my invention is to enable apparatus of this class to be worked at a distance by means of a single main-line wire leading from the generator to ground through the distant devices to be operated; and in accomplishing this object the invention consists in certain novel constructions and combinations of co-operative elements, which will be fully understood from the following particular description, in connection with the accompanying drawings, in which—

25 Figure 1 is a view in elevation of a gas-lighting apparatus provided with my improvement. Fig. 2 is a similar view of a modified form of the apparatus.

30 Referring to Fig. 1, the letter A indicates a gas-burner secured to the end of a gas-pipe, B. Upon this burner is secured a horizontal metal shelf, C, upon which are mounted two electro-magnets, M and M', having their respective cores facing each other and separated by a space, within which is pivoted an armature, D, which will be swung toward the magnets alternately, as one or the other is energized by an electric current traversing its coil. 35 The armature has at its upper end a forked extension, d, into the fork of which extends a pin, e, projecting from an arm, E, mounted on one end of the gas-cock, which is arranged transversely through the burner in a well-known manner. When the armature D swings 40 toward magnet M, it turns the cock to turn off the gas, and it turns on the gas when it swings toward magnet M'. One of the forks or prongs, d', of the forked extension of the armature is 45 longer than the other, and has its upper end

arranged to strike the short arm f of a vibratory igniting-lever, F, just before the armature completes its movement toward magnet M'. This lever F is pivoted to and in electrical connection with the main part or 55 barrel of the burner, and is normally held by a light spring, g, in contact with a metallic pin, h, which is supported by a collar, h', insulated from the burner.

From the lower side of the shelf C is suspended a polarized magnet, K, having its yoke-piece k insulated from the shelf by an interposed strip, l, of hard rubber or other non-conducting substance. The pivoted tongue-armature T of this magnet is permanently 60 magnetic, as usual, and will be attracted toward either the pole P or N, according to the direction in which a current passes in the coils.

To the pole-pieces P and N are secured non-conducting brackets q q, in which are arranged 70 contact-screws r and r'. From the screw r a wire, w, connects with one terminal of the coil of turning-off magnet M, the other terminal of which is connected to ground by a wire, 75 w'. From the screw r' a wire, w², leads to one terminal of the coil of the turning-on magnet M', which has its other terminal connected with the igniting-pin h by a wire, w³. From this igniting-pin h the course of the circuit is 80 through arm F, the body of the burner, and a wire, w⁴, to ground; or it may go to ground direct through the gas-pipe.

The letter L designates the single main line, one terminal of which is connected to ground 85 through a battery, X, a pole-changer, V, and spark-coil Z, in a well-known manner, and the other terminal of which connects with the coils of the polarized magnet K by one terminal of said coils, which have their other terminal connected with the tongue T by a wire, w⁵, and 90 with the ground by a wire, w⁶, which connects to ground through a resistance-coil, R, the office of which will be presently explained.

The operation of the apparatus as now described is as follows: When the key v' of the 95 pole-changer is depressed, a current flows from the positive (+) pole of the battery X, through spark-coil Z, over the line L and coils of polarized magnet K, to ground over wire w⁶ 100

and resistance-coil R. A current in this direction causes the tongue T to be attracted by pole P and make contact with screw *r*. The moment this contact is made the main portion of the current flows over wire *w*⁶, tongue T, screw *r*, wire *w*, through the coil of magnet M, and to ground, and thus said magnet M is energized and attracts the armature D, so that the gas is turned off, as before explained. If the current on the line now ceases, the gas-cock will remain in the position to which it has been turned. If, now, it is desired to turn on and light the gas, the key *v*² of the pole-changer must be depressed, connecting the negative (—) pole of battery X to line, and the direction of the current through the coils of polarized magnet K will be the reverse of that when the other key was depressed. The pole N will now attract the tongue T and cause it to contact with screw *r*', and the moment this contact is made the main portion of the current will flow from tongue T over screw *r*', wire *w*⁷, coil of magnet M', wire *w*⁸, pin *h*, lever F, the body of the burner, and wire *w*⁴, to ground, while a small portion goes to ground over wire *w*⁶ and resistance-coil R. The magnet M' will be thus energized and attract armature D, so that it will turn on the gas, as already explained. Just before the armature completes its stroke, but after it has turned the cock sufficiently to allow the gas to flow to the slit of the burner, the prong *d*' strikes the short arm *f* of the lever F, and causes the upper end of said lever to break contact with pin *h*. At this moment a spark passes between the tips of the lever and the pin *h*, and across the path of the gas issuing from the slit of the burner. The circuit being broken and the force which separated the lever from the pin removed, the spring *g* forces the lever back to its contact with the pin, closing the circuit, and the same operation of breaking contact and producing sparks will be repeated as long as the key *v*² of the pole-changer remains depressed. It is usual and advisable to keep this key depressed from five to ten seconds, in order to produce a succession of sparks sufficient to insure the lighting of the gas.

It will be observed that by means of the ground-wire *w*⁶, I always have secured a complete circuit for operating the tongue T, and the resistance-coil R is so adjusted that the current will be diverted over the tongue when it makes its contacts. The tongue will remain inclined toward the pole by which it was last attracted, it is true, and will usually preserve a good contact with the screw toward which it is thus drawn; but jarring may shake it loose from the pole, or a slight warping break its contact with the screw, and I therefore prefer to use the ground-wire and resistance-coil in order to insure continuity of the circuit.

In the modification illustrated in Fig. 2 the separate turning-on and turning-off magnets

M and M' are dispensed with, and a polarized magnet, K', is arranged upon the shelf C, for operating the gas-cock and igniting devices direct. The tongue or armature D has a forked extension, *d*, which engages the pin *e* on arm E, which is fixed upon the gas-cock. An extended arm, *d*', of the tongue is arranged to strike the short arm *f* of lever F, for the same purpose that prong *d*' strikes said arm in Fig. 1. The main line L connects with one terminal of the magnet-coils, and the other terminal is connected with pin *h* by a wire, *w*⁷. A ground-wire, *w*⁸, leads from the burner, or it may be grounded through the pipe. A current over the line in one direction will cause the tongue D in Fig. 2 to swing toward pole P and turn off the gas, and a current in the opposite direction will cause it to swing toward pole N, turn on the gas, and operate the vibratory lever F, for igniting the gas, as will be readily understood from the explanation already given of Fig. 1.

I am aware that electro-magnets have been arranged to operate a polarized armature by reversed currents for turning on and off gas, and that separate electro-magnets have been operated by separate wires for the same purpose, one of such separate magnets also operating igniting devices. I lay no claim to such heretofore-used apparatus. In my improvement I use but a single line-wire for operating the devices for turning on and turning off the gas and effecting the ignition of the gas as it issues from the burner. In all gas-lighting apparatus heretofore constructed that I am aware of these three operations have required at least two line-wires, if the ignition is caused by the current direct and without extra means.

What I claim is—

1. The combination, with a gas-burner cock, a single main electric circuit, and a vibratory circuit-breaker arranged to produce sparks adjacent to the burner, of a polarized electro-magnet in said main circuit, and devices controlled by said polarized electro-magnet for operating the burner-cock either to turn on or off the gas, and to operate the circuit-breaker for igniting the gas, substantially as described.

2. The combination, with the burner, its cock, and the spark-producing circuit-breaker, of the neutral electro-magnet and armature arranged to operate the cock for turning off the gas, the neutral electro-magnet arranged to operate said armature for turning on the gas and actuating the spark-producing circuit-breaker, the single main electric circuit, a polarized electro-magnet in said main circuit, and suitable contacts and conductors for connecting the main circuit with the neutral electro-magnets alternately, and with the turning-on magnet through the circuit-breaker, by the operation of reversed currents on the main circuit, substantially as described.

3. The combination, with the neutral electro-magnets for directly operating the gas-cock, of the polarized electro-magnet, and the main circuit connected through the coils of
5 said magnet to its tongue, and also through said coils to ground, and a suitable resistance, and suitable contacts and conductors for connecting the main circuit to either of said neutral electro-magnets by the operation of the

polarized electro-magnet, substantially as described.

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

WILLIAM H. SAWYER.

Witnesses:

GILMAN E. JOPP,
JOHN O. DARLING.