No. 647,617. Patented Apr. 17, 1900.

G. SCHÜNEMANN & O. RIEDER.

ELECTRIC GAS LIGHTING DEVICE.

(No Model.) (Application filed Apr. 29, 1899.)

2 Sheets—Sheet 1.

Fig. 1.

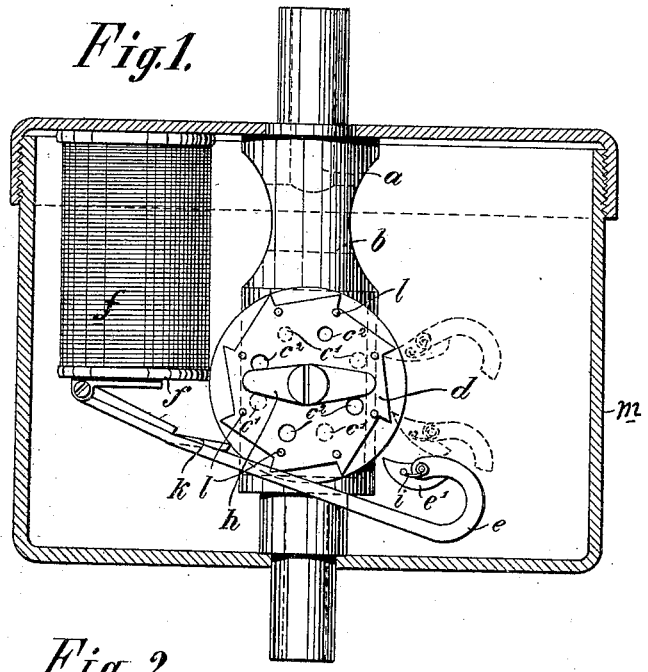
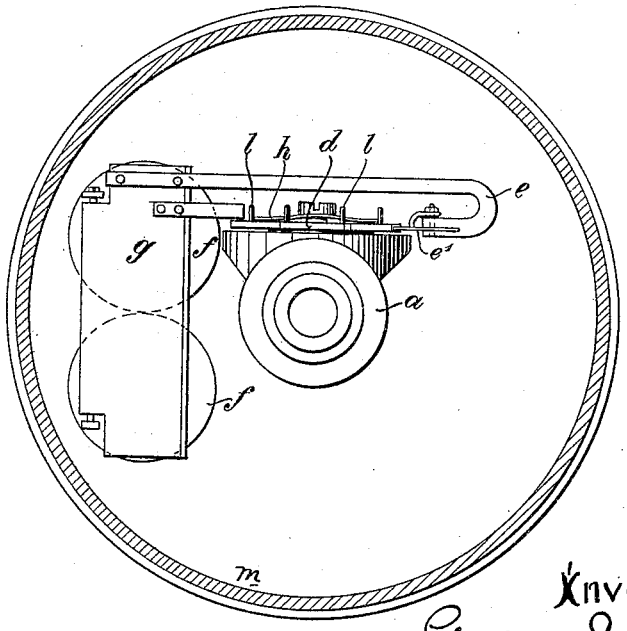


Fig. 2.



Attest
R. M. Kelly
H. J. Powell

Inventors
Gustav Schünemann
& Otto Rieder
By their atty
J. R. Johnson

No. 647,617. Patented Apr. 17, 1900.

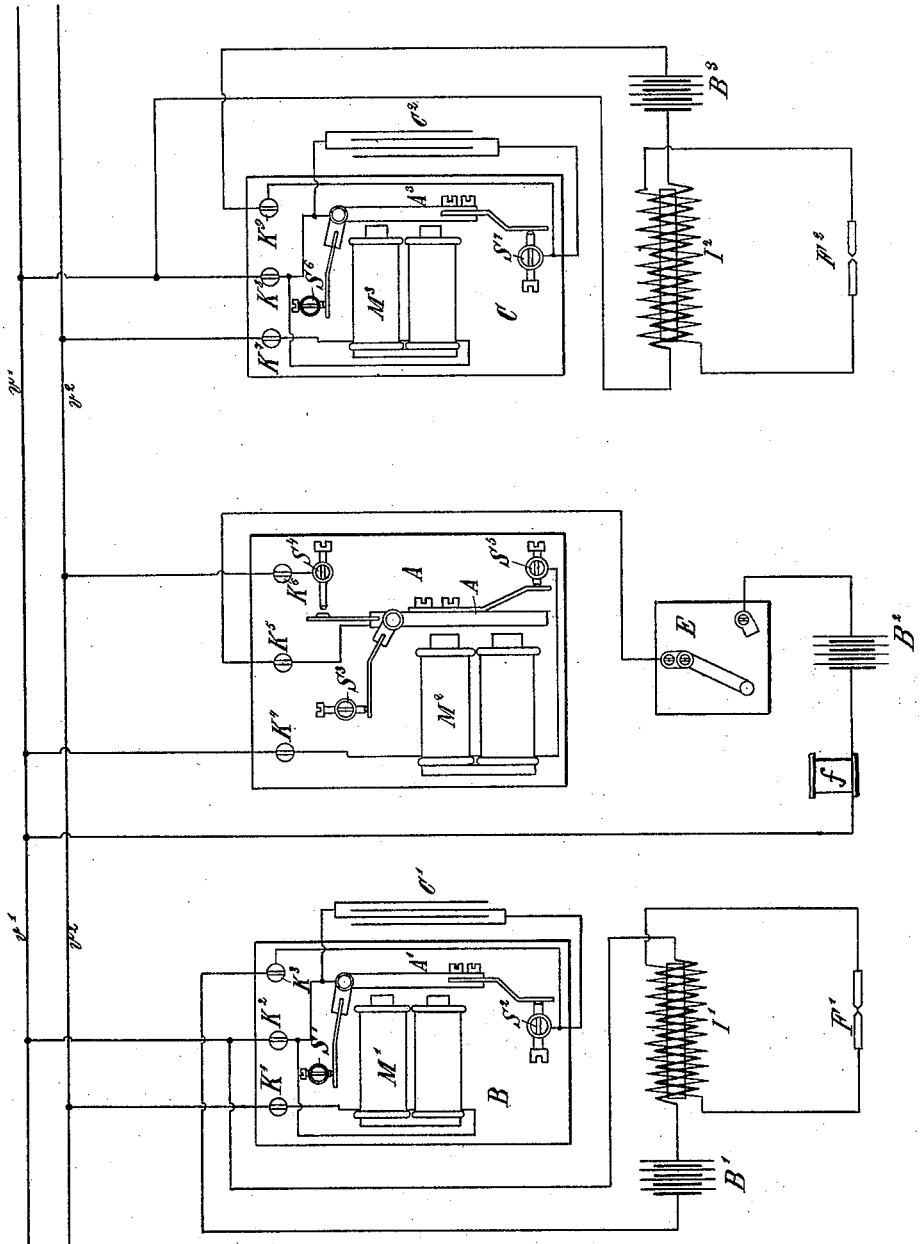
G. SCHÜNEMANN & O. RIEDER.

ELECTRIC GAS LIGHTING DEVICE.

(Application filed Apr. 29, 1899.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 3.



Attest
R. M. Kelly.
H. J. Powell.

Inventors
Gustav Schünemann
and Otto Rieder
By their atty
Thos. Hyde

UNITED STATES PATENT OFFICE.

GUSTAV SCHÜNEMANN AND OTTO RIEDER, OF BUDA-PESTH, AUSTRIA-HUNGARY.

ELECTRIC GAS-LIGHTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 647,617, dated April 17, 1900.

Application filed April 29, 1899. Serial No. 714,964. (No model.)

To all whom it may concern:

Be it known that we, GUSTAV SCHÜNEMANN and OTTO RIEDER, subjects of the Emperor of Austria-Hungary, residing at Buda-Pesth, in the Empire of Austria-Hungary, have invented certain new and useful Improvements in Electric Gas-Lighting Devices, (for which we have applied for patents in England, dated March 8, 1899, No. 5,111; in Germany, dated January 14, 1899, and February 25, 1899; in Hungary, dated January 31, 1899, No. 1,454; in France, dated January 21, 1899, No. 273,086, and March 4, 1899, No. 274,404; in Belgium, dated March 4, 1899, No. 110,782, and in Italy, dated March 7, 1899,) of which the following is a specification.

This invention relates to electric gas-lighting devices, and embraces means for operating the supply-cock electrically and electrical means for igniting the gas.

It is an object of this invention to enable the gas to be turned on and simultaneously ignited at a distance by electrical devices.

In the drawings, Figure 1 is a side elevation of electrical gas-cock-operating devices embodying our invention with the inclosing case in vertical section. Fig. 2 is a plan view of the same with the top of the case removed, and Fig. 3 is a diagrammatic plan view of the electrical igniting devices.

In Figs. 1 and 2 the gas-cock or supply-valve is illustrated as being actuated by an electric current acting on the electromagnet *f*, which current is thrown on or off by a switch or key. The armature *g* is drawn to the magnet and is provided at its free end with a lever *e*, the hinged head or pawl *e'* of which is capable of being tilted up. When the armature is drawn up, the hinged head *e'* engages with a tooth of the ratchet-wheel *d* and turns it the space of one tooth. The ratchet-wheel *d* is provided with holes c^2, arranged in a circle, there being half as many holes as there are teeth on the disk. The ratchet-wheel *d* is pressed up air-tight by means of the spring *h* against the surface of the gas-pipe, which is provided with corresponding escape-openings *c'*, and when the whole of the holes coincide the gas will pass through them into the air-tight casing *m*, which surrounds the whole of the mechanism, then through the cross-opening *b*, and through the pipe *a* to the burner, where it is ignited. The hinged head or pawl *e'* of the lever or pawl *e* is retained in its normal position by the action of the small spring *i*, and is thus enabled to pass the projecting tooth of the disk *d* without turning it back, and the armature *g* will be free to fall back into its original position. The teeth of the ratchet-wheel *d* and the stroke or traverse of the lever or pawl *e* are so arranged that the holes c^2 only coincide with the holes *c'* after every second lift of the lever and pawl *e e'*. If now the current is again shut off, the ratchet-wheel *d* will only have been moved so far that the escape-openings *c'* are covered, the cock closed, and the further supply of gas shut off. In order that the ratchet-wheel *d* after being lifted or moved by the lever and pawl *e e'* should not turn farther than necessary, an arm *k* is attached to the armature *g*, which when the lever and pawl *e e'* have reached their highest position comes in contact with the pins *l* and prevents the ratchet-wheel *d* from turning farther.

The middle apparatus A of Fig. 3 represents the central vibrator and consists of the electromagnet M^2 in connection with the source B^2 of electric current and the switch or key E, while the apparatus B and C shown to the left and right of A represent the local vibrators, and these also consist of electromagnets M' and M^3, furnished with batteries B' and B^3, each having an induction-coil I' and I^2 placed in the circuit of the battery-current. These local vibrators are placed at the point where the ignition takes place, and the requisite number of them are inserted in the lines or conducting-wires v' v^2 of the central vibrator. The magnet *f*, which controls the gas-cock or supply-valve, is in circuit with the battery B^3. The coils of the electromagnet M^2 are connected with the wires of the battery B^2, the circuit of which is closed when the switch E is closed, and at the same time the armature A^2 of the electromagnet is drawn back. The armature is shown in this position in the drawing. In this case the current takes the following course: from one pole of the battery B^2 through the switch E, clamping-screw K^5, armature A^2, and set-screw S^5 to the coils of the electromagnet M^2, and from

there through the clamping-screw K^4 and the conducting-wire v' to the other pole of the battery B^2. On closing the switch E by moving an ordinary knob or handle, for example, the current of the battery B^2 will circulate in the electromagnet M^2, causing the latter to immediately attract the armature A^2, and in so doing the circuit will be broken at the screw S^5. The electromagnet then liberates the armature A^2, and the circuit is again closed. This action is repeated continuously, and thereby the armature A^2 is caused to vibrate violently. The vibrating armature A^2 serves to close or complete and interrupt or break the circuit of the current circulating through the electromagnets M' M^3 of the vibrators B C by coming into contact as often as it is attracted by the electromagnet by means of a spring with the set-screw S^4, and thereby closing or completing the following circuits: first, from one pole of the battery B^2 through the switch E, clamping-screw K^5, armature A^2, set-screw S^4, clamping-screw K^6, conducting-wire v^2, and clamping-screw K' to the coils of the electromagnet M', and from there through the clamping-screw K^2 and conducting-wire v' back to the other pole of the battery B^2; second, from one pole of the battery B^2 through the switch E, clamping-screw K^5, armature A^2, set-screw S^4, clamping-screw K^5, and clamping-screw K^7 to the electromagnet M^3, and from there through the clamping-screw K^8 and conducting-wire v' back to the other pole of the battery B^2. In a similar manner any desired number of vibrators B C can be connected with the lines or conducting-wires v' v^2 of the central vibrator A.

The mode of action of the apparatus is as follows: By closing the switch E the circuit of the battery B^2 is closed with the central vibrator A. The electromagnet M^2 is thus caused to attract the armature A^2. At the moment this takes place the contact of the armature is withdrawn from the set-screw S^5, and simultaneously the armature through its upper contact is caused to touch the set-screw S^4, so that from this time the current leaving the coils of the electromagnet M^2 runs through the clamping-screw K^5 and armature A^2 to the set-screw S^4, from there through the clamping-screw K^6 and wire v^2 into the vibrators B C by the clamping-screws K' and K^7, and from there through the coils of the electromagnets M' and M^3, set-screws K^2 and K^8, and conducting-wire v' back to the battery B^2 of the central vibrator A. As, however, in this position, as before mentioned, the current does not run through the coils of the electromagnet M^2, the armature A^2 is not attracted. The current which the electromagnets M' and M^3 thus receive consists, therefore, of a momentary impulse. The action repeats itself automatically by closing or completing the circuit of the battery B^2, and the vibration of the armature A^2 in the central vibrator corresponds to the vibration of the armatures A' and A^3 in the vibrators B and C. When the electromagnets M' and M^3 set the armatures A' and A^3 in vibration, they effect the closing or completion and the interruption or breaking of the circuit of the batteries B' and B^3, by which means a current is induced in the secondary induction-coils I' and I^2 which possesses a force or intensity suitable for the production of an electric spark between the points at F' and F^2 for the purpose of lighting a gas-burner. When the vibration of the armatures A' and A^3 is caused by the armature A^2 of the central vibrator A, the lower contacts of the armatures A' and A^3 are made to touch the set-screws S^3 and S^7, whereby the current from B' and B^3 has a free course through the clamping-screws K^3 and K^9, as well as through the set-screws S^3 and S^7, armatures A' and A^3, clamping-screws K^2 and K^8, and through the induction-coils I' and I^2 and back to the batteries B' and B^3. The closing and interrupting of this circuit caused by the vibration of the armatures A' and A^3 produce, by means of the induction-coils I' and I^2, a violent formation of sparks at F' and F^3.

In order to make the formation of sparks still more active, condensers C' and C^2 may be introduced between the armature A' and the set-screw S^3 and between the armature A^3 and the set-screw S^7.

The screws S^3, S', and S^6 are used for setting the armatures A^2, A', and A^3 and for regulating the contacts.

By disconnecting the switch E the electric current may be shut off from the whole arrangement.

What we claim, and desire to secure by Letters Patent of the United States, is—

1. In electric gas-lighting devices, the combination of a gas-burner, a main source of electrical energy, a main vibrator in circuit therewith, a local interrupting-vibrator, spark-gap terminals adjacent to the burner, electrical circuits for energizing the local interrupting-vibrator controlled by the main vibrator, and means for producing high-tension currents electrically connected between the spark-gap terminals and the local interrupting-vibrator.

2. In electric gas-lighting devices, the combination of a gas-burner, a main source of electrical energy, a main vibrator in circuit therewith, a local interrupting-vibrator, spark-gap terminals adjacent to the burner, electrical circuits for energizing the local interrupting-vibrator controlled by the main vibrator, means for producing high-tension currents electrically connected between the spark-gap terminals and the local interrupting-vibrator, and an electrically-controlled supply-valve for supplying gas to the burner connected with the main source of electrical energy.

3. In electric gas-lighting devices, the combination of a gas-burner, a main source of electrical energy, a main vibrator in circuit therewith, a local interrupting-vibrator, spark-gap terminals adjacent to the burner, electrical circuits for energizing the local interrupting-

vibrator controlled by the main vibrator, an induction-coil in circuit with said local interrupting-vibrator, a local source of electrical energy in circuit with said induction-coil, and an electrical circuit between said induction-coil and the spark-gap terminals.

4. In electrical gas-lighting devices, the electrically-operated apparatus for controlling the gas-supply, consisting of a closed chamber having a gas-outlet, a gas-pipe entering said chamber, and provided with a series of supply-outlets c', the ratchet-disk d, provided with a series of openings c^2 adapted to register with the outlets c', the spring h, and the electrically-operated pawl for operating the ratchet-disk, combined and operating substantially as and for the purposes described.

In testimony whereof we have hereunto set our hands in the presence of two witnesses.

GUSTAV SCHÜNEMANN.
OTTO RIEDER.

Witnesses:
HECHT LIGROT,
CAMILLO RUPRECHT.