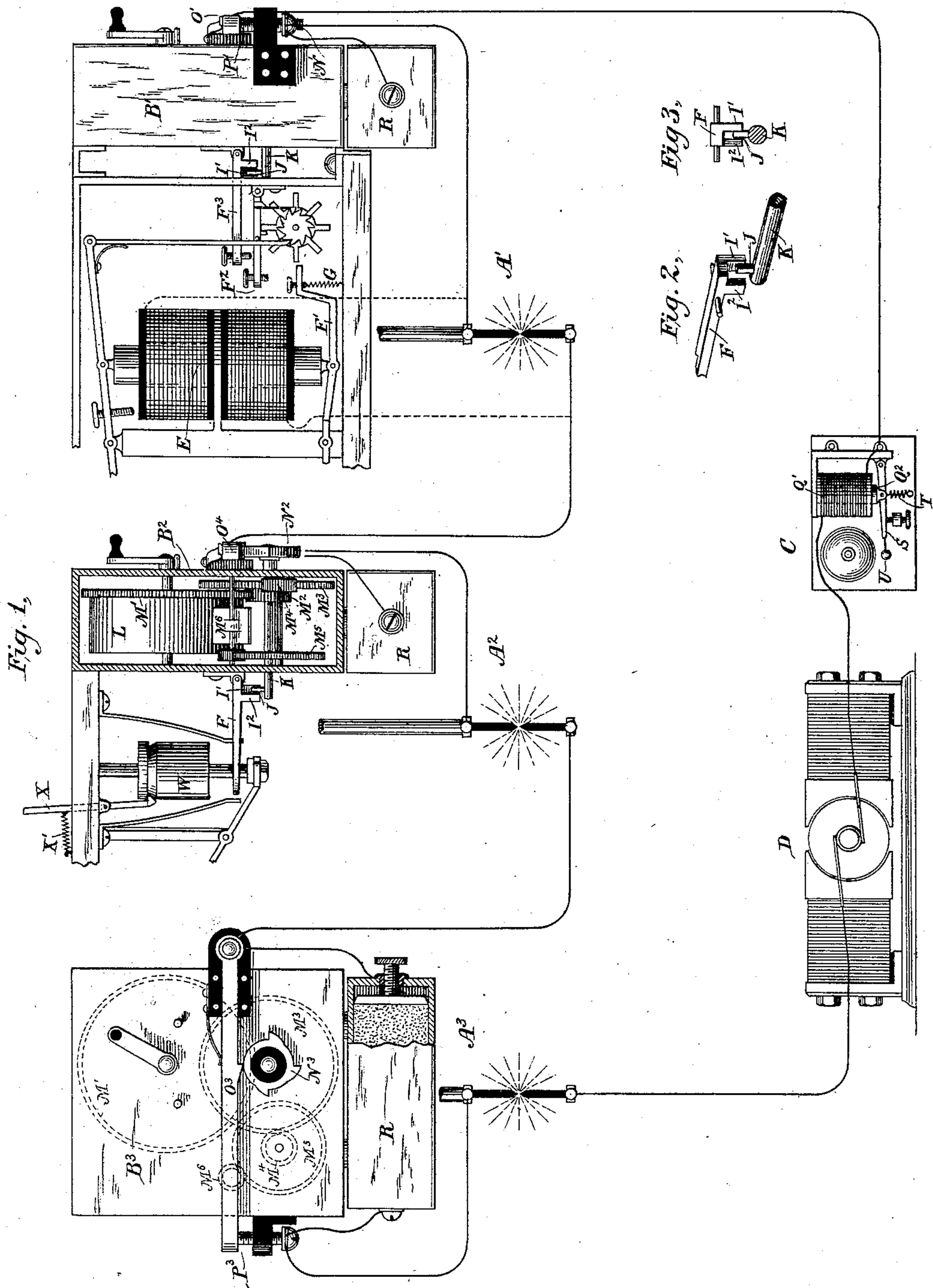


(No Model.)

R. J. SHEEHY.
ELECTRIC ARC LIGHTING SYSTEM.

No. 279,825.

Patented June 19, 1883.



WITNESSES

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UNITED STATES PATENT OFFICE.

ROBERT J. SHEEHY, OF NEW YORK, N. Y.

ELECTRIC-ARC LIGHTING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 279,825, dated June 19, 1883.

Application filed November 27, 1882. (No model.)

To all whom it may concern:

Be it known that I, ROBERT J. SHEEHY, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Electric Lighting Systems, of which the following is a specification.

My invention relates in general to the economical and practical management of electric lighting systems, and more particularly to appliances for automatically reporting at a central station the failure of any lamp in circuit, and for indicating the locality of the trouble by reporting the particular number or other distinguishing character by which the defective lamp is designated, in order that it may be at once visited by an inspector and the normal conditions of operation restored.

In general my invention may be described as follows: I make use of electro-magnetism, increasing correlatively with the resistance of the arc of any one of several electric lamps situated in the same circuit, to actuate mechanism (when said resistance exceeds a predetermined amount) whereby a special resistance is automatically and successively introduced into and withdrawn from the main line a proper number of times to transmit the distinguishing number or signal assigned to the light. This causes upon the main line a series of pulsations which are responded to by an appropriate reporting mechanism at the central station, so that the operator there may be apprised of the locality of the trouble. The particular subject-matter claimed will be hereinafter specifically designated.

My invention is illustrated in the accompanying drawings, in which Figure 1 is a theoretical diagram of an electric light system embodying my improvements, and Figs. 2 and 3 are detailed views of certain portions of the mechanism employed.

Referring to Fig. 1, I have therein shown my improvements as applied to a system in which three lights, $A^1 A^2 A^3$, are operated upon the circuit of an electric generator, D.

In conjunction with each lamp I have shown a mechanism, $B^1 B^2 B^3$, for instituting upon the main line certain electric pulsations when-

ever one of the lamps is out of order, to be interpreted by the signaling device C at the central station, so that the operator at that point can ascertain the designating number of the lamp in trouble. The devices B, connected with each lamp, are similar to each other in all respects. I have accordingly shown an end view at B^1 , a transverse section at B^2 , and a face view at B^3 , and applied similar reference-letters to corresponding parts appearing in each view. The devices B are shown as contained in separate cases, which are designed to be attached to the box containing the regulating mechanism of the electric lamp. The mode of operating the devices B will therefore be in a great measure dependent upon the character of the lamp to which it is attached. I have illustrated in connection with lamp A^1 the method of actuation which I prefer when the device is connected to the particular electric lamp for which I made application for Letters Patent on October 10, 1882. In connection with the lamp A^2 , I have shown means of operating such device in connection with another electric lamp of different construction, for which I applied for Letters Patent on October 16, 1882.

Considering the operation of the device as connected with lamp A^1 , the electro-magnet E is situated in a shunt-circuit spanning the electric arc, and its attractive force will accordingly be increased whenever the resistance of said arc becomes greater, and vice versa. Its armature F^1 , acting in opposition to the adjustable spring G, will, when the attraction exceeds a predetermined strength, engage with the lever F^2 , and then, acting through the latter, elevate the lever F^3 , which carries the stops I^1 and I^2 . In this manner the stop I^1 is automatically withdrawn from the path of a pin, J, carried by the shaft K, and the latter is disengaged and left free to revolve together with a time-train mechanism actuated by a spring contained in the drum L, and which comprises the wheels M^1 to M^5 and fan M^6 . The shaft K carries a cam-wheel, N^1 , provided in this instance with a single cam. A face view of a similar cam-wheel, N^3 , is shown in connection with the lamp A^3 , except that the

latter is provided with three cams. Detached views of the escapement mechanism which I prefer to use in this connection are shown in Figs. 2 and 3. The stop I', in moving from the path of the pin J, allows the latter to slide behind the stop I'. At a point near the end of a revolution the pin J will be arrested by the stop I'. When the lamp is restored to operation, the lever F³ is returned to its normal position, and the pin J assumes the position shown in the figures—i. e., in contact with the stop I'. The rotation of the cam-wheel N' causes the lever O' to be raised by the action of the cam carried thereby. Similarly a single revolution of the cam-wheel N³ will cause three successive elevations of the lever O'. With each elevation the main circuit which traverses said lever will be interrupted at the point P'; but the current will still traverse a shunt-circuit including an artificial resistance, R, which is capable of adjustment. There will therefore be transmitted through the circuit a single pulsation in the case of the lamp A'. With a single revolution of the cam-wheel used in conjunction with the lamp A² two such pulsations will be transmitted, and with a revolution of the cam-wheel co-operating with lamp A³ three pulsations. This arrangement may be indefinitely extended in its application, a device B being connected with each of a large number of lamps, the only difference being in the number or manner of grouping of the cams employed in conjunction with each.

At the central station I provide a mechanism, C, preferably consisting of an axial magnet or solenoid, Q', included in the main circuit, a core, Q², and lever S, properly adjusted by means of the antagonistic spring T to respond to the said pulsations. Thus, supposing the lamp A' to be cut out of circuit, the consequent decrease of resistance will cause a single stroke upon the bell, thus calling the attention of the attendant to the fact that one of the lamps is out of order. The cam-wheel N' will also be revolved in the manner described. The elevation of the lever O' will introduce the resistance R, which is preferably about equal to that of the arc under its normal conditions. This allows the bell-hammer U to drop. As soon as the resistance R is withdrawn, the hammer is again actuated and a single stroke given, thus notifying the operator that lamp No. 1 is out of order. This form of interpreting device I have devised to be used in connection with an automatic current-governor—such, for example, as that shown in my application for Letters Patent dated November 7, 1882. Such a governor will immediately restore the normal strength of current and prevent further action of the bell until called into operation by similar difficulties occurring in any of the remaining lamps.

The device B used in conjunction with the lamp A², while similar in all respects to that employed in conjunction with lamp A', is op-

erated in a somewhat different manner. A dog, X, may be used to sustain a weight, W. When said dog is withdrawn by any force acting in opposition to the spring X'—such, for example, as the force which operates the cut-out mechanism of the lamp—the weight will be released, which will descend upon and depress the lever F, and thereby actuate the shaft K in the manner described in connection with the lamp A'.

It is evident that the mechanism may be set in operation not only by the magnet E and weight W, but by equivalent mechanical and electrical devices.

I do not narrowly limit myself to the exact devices shown; but

What I claim as my invention is—

1. The combination, substantially as here-inbefore set forth, of an electric lamp, a device under control of the mechanism of said lamp for transmitting determinate pulsations to indicate the identity of said lamp, and a mechanism by which said pulsations are employed to produce a distinctive signal at another point in the circuit.

2. The combination, substantially as here-inbefore set forth, of an electric lamp, a device set in operation by increases in the resistance of the arc of said electric lamp for transmitting the determinate pulsations to indicate the identity of said lamp, and mechanism by which said pulsations are employed to produce a distinctive signal at another point in the circuit.

3. The combination, substantially as here-inbefore set forth, of an electric lamp, a cam-wheel set in revolution by an abnormal resistance created in said lamp, a loop-circuit of adjustable resistance automatically introduced into the main circuit as many times during a single revolution as there are cams upon said cam-wheel, and an interpreting mechanism actuated with each introduction of said loop-circuit.

4. The combination, substantially as here-inbefore set forth, of an electro-magnet actuated correlatively with increases in the resistance of the arc of an electric lamp, escapement mechanism actuated by said electro-magnet, a cam-wheel set in motion by said escapement mechanism, a series of cams of number selected to designate said lamp, and a resistance automatically introduced into the main circuit by the revolution of said cam-wheel.

5. The combination, substantially as here-inbefore set forth, of an electric light, a main circuit including a lever, a loop-circuit including a resistance, a cam-wheel for automatically elevating said lever, and thereby opening the main circuit a predetermined number of times, substantially as and for the purpose described.

6. The combination, substantially as here-inbefore set forth, of a circuit of electric lights, mechanism for establishing a definite

number of pulsations throughout said circuit immediately after the automatic withdrawal of any light from said circuit, and before the normal strength of current is restored by the
5 action of the current-governor, and a signaling device actuated first by the withdrawal of the lamp and afterward by said pulsations.

In testimony whereof I have hereunto sub-

scribed my name this 24th day of November, A. D. 1882.

ROBERT J. SHEEHY.

Witnesses:

DANIEL W. EDGECOMB,
CHARLES A. TERRY.