(No Model.)

P. DIEHL.

ELECTRIC LIGHTING SYSTEM.

No. 350,482. Patented Oct. 12, 1886.

Fig. 1.

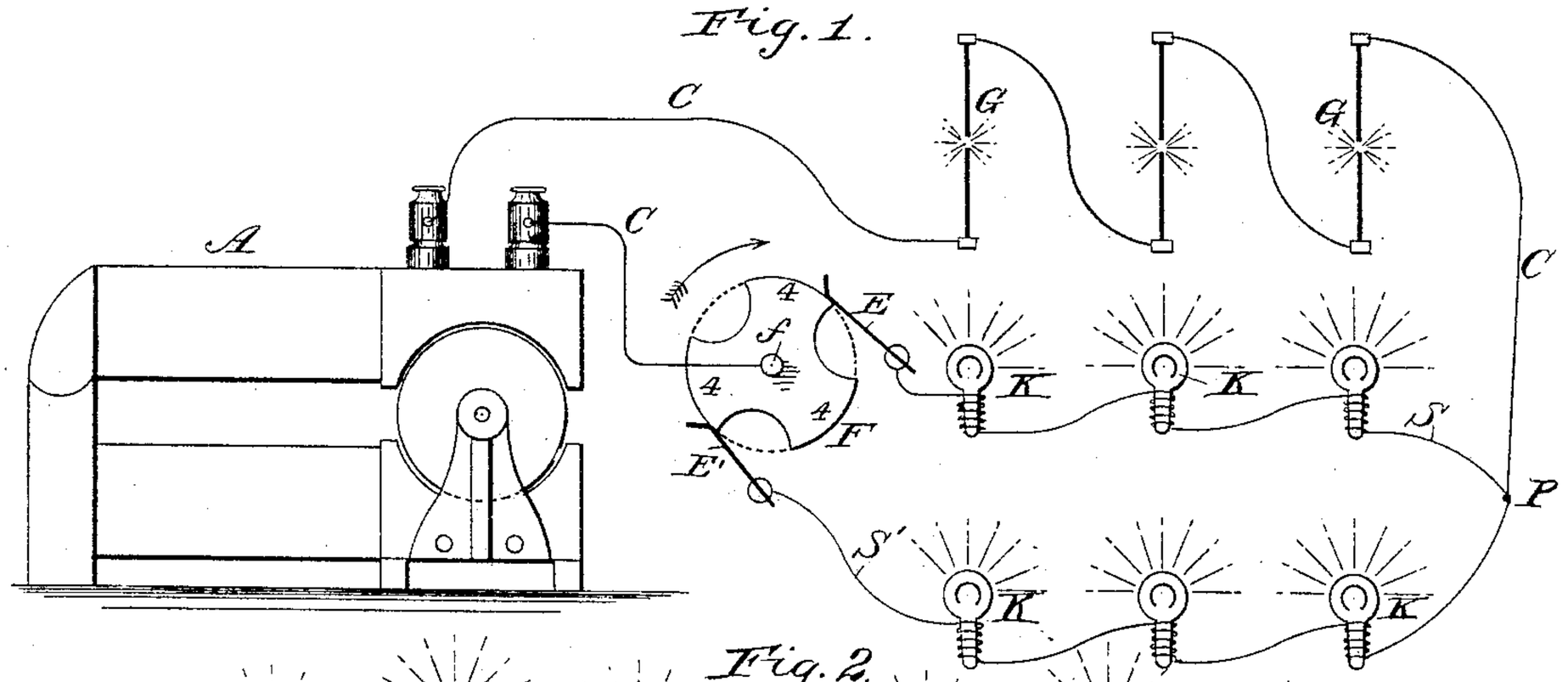


Fig. 2.

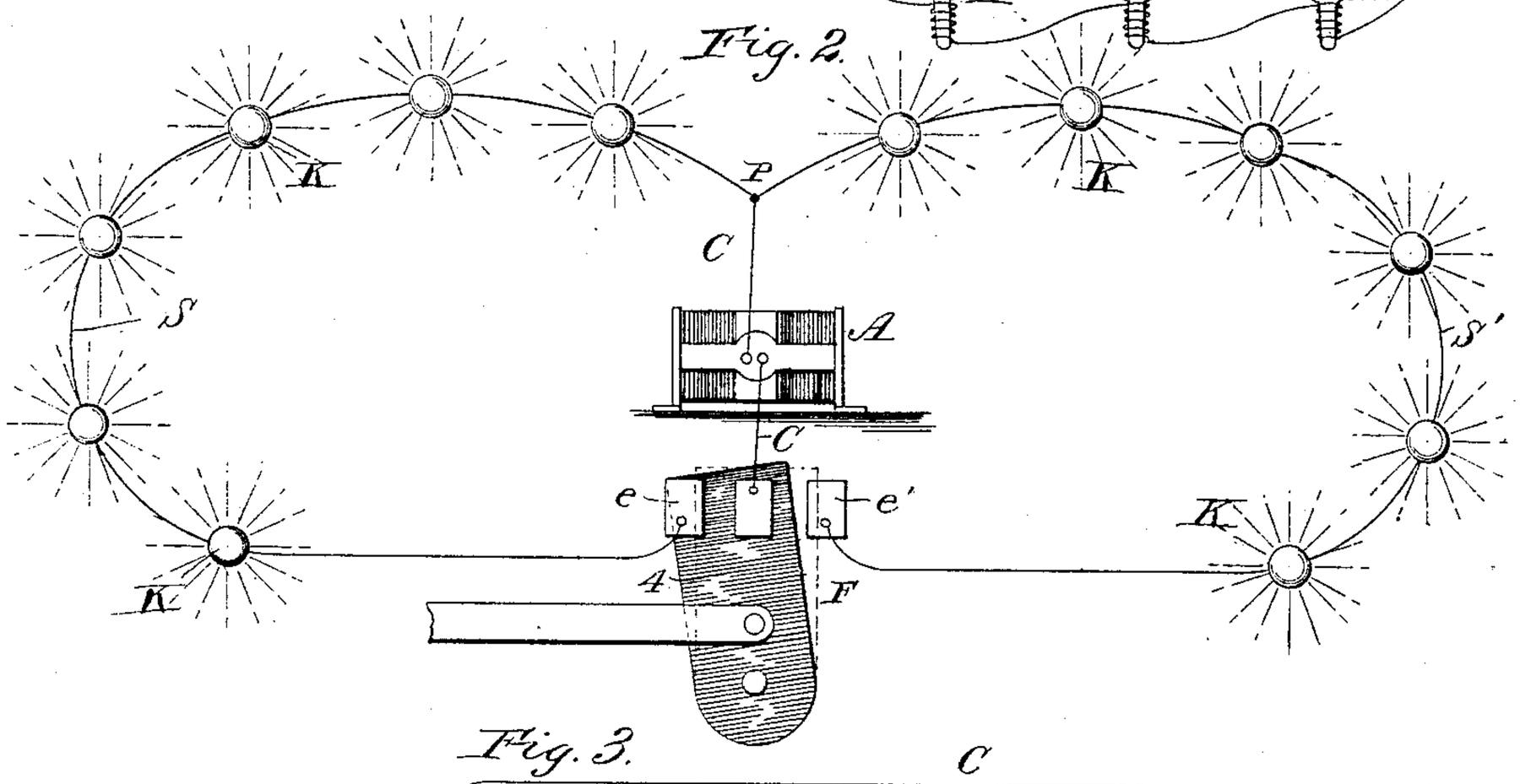
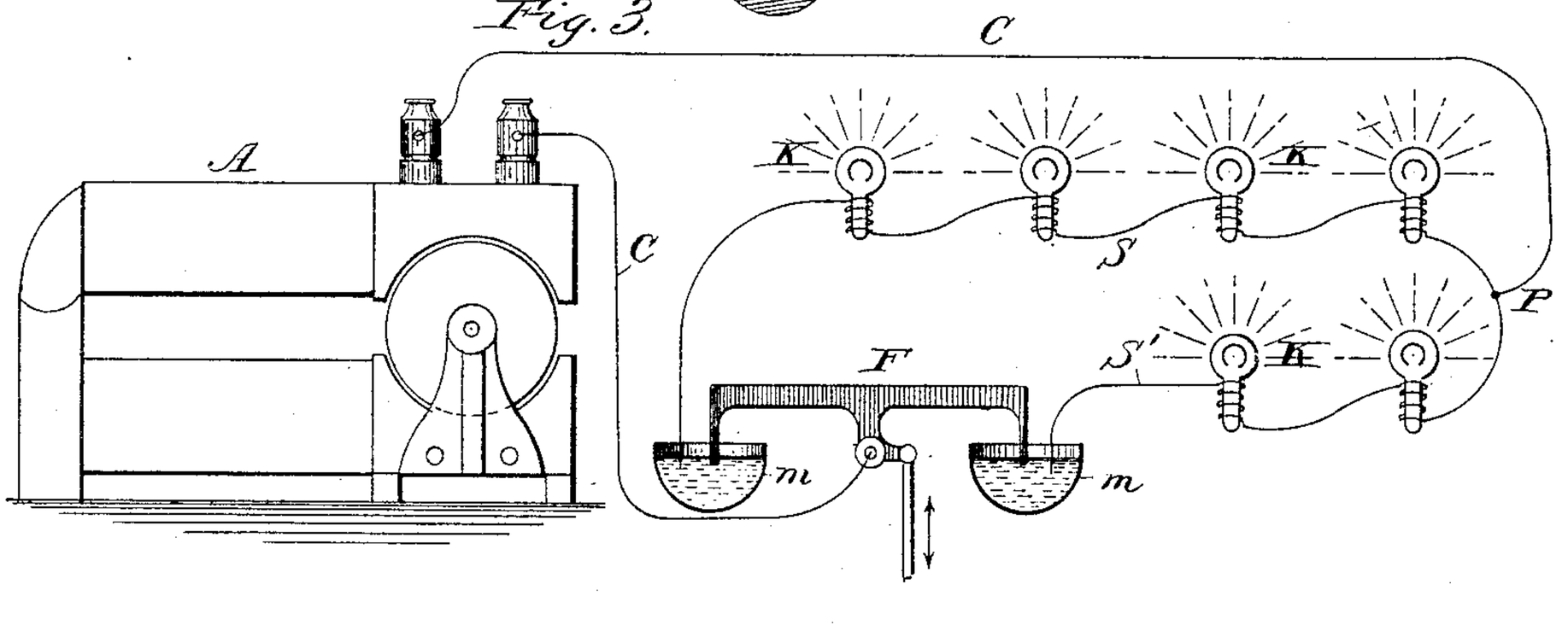


Fig. 3.



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UNITED STATES PATENT OFFICE.

PHILIP DIEHL, OF ELIZABETH, NEW JERSEY.

ELECTRIC-LIGHTING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 350,482, dated October 12, 1886.

Application filed March 26, 1886. Serial No. 196,681. (No model.)

To all whom it may concern:

Be it known that I, PHILIP DIEHL, a citizen of the United States, residing at Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Electric-Lighting Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention consists in a novel system of electrical distribution, more especially adapted for electric lighting, that permits of the simultaneous operation of translating devices which require a continuous current of one direction, and such that are adapted for use with alternating currents from one primary source of electricity. The latter may be any well-known or improved generator which furnishes a continuous current of one direction, such as a dynamo-electric machine, a primary or secondary battery. In the external main circuit of this generator I place translating devices which are adapted to be operated by a continuous current of one direction, such as arc lamps, electric motors, electrolytic vats, &c. Behind these translating devices the main circuit is divided into two or more branches, and in each of them are included the primaries of one or more inductoriums, the secondaries of which include each one or more translating devices adapted for operation by alternating currents—such as incandescent electric lamps, for example. It is not necessary that the inductoriums be separate from the translating devices operated by the same. They may constitute an integral part of the same, as in the case of the induction incandescent light patented to me March 28, 1882, No. 255,497. At the point where the main circuit is branched I interpose a circuit-changer, which operates to direct the current intermittently and in rapid succession through the different branches, the arrangement, however, being such that the current through the main stem is never broken, as will hereinafter more fully appear.

Behind the translating devices of the second order the branches of the primary circuit again unite, and may either return directly to the generator, or may have translating devices included and again branched, as before, by means of a circuit-controller, as will be readily understood by those skilled in the art.

My invention can best be understood by reference to the accompanying drawings, in which I have illustrated by diagrams a manner of carrying the invention into effect.

In said drawings, Figure 1 is a diagrammatic view of my preferred arrangement of circuits, lights, and electrical generating and controlling devices. Fig. 2 illustrates a modified form of current-controlling device or switch. Fig. 3 illustrates still another form of the latter device which may be used in my system.

Referring to the drawings, A indicates an electrical generator, and C the circuit of the current produced thereby. The circuit C is divided at any desired point, P, into two or more branches, S S′, which reunite through the medium of a current-controlling device, F. In one or both of the branch lines S S′ are arranged lights K, operating by induction—such, for instance, as the induction incandescent light patented to me March 28, 1882, No. 255,497. The lines S S′, it will be understood, are arranged in inductive relation to the secondary circuits of the lamps K. In the main line of the circuit C may be arranged arc lights G of the ordinary character. It will be understood that the lights K or G may be arranged in multiple arc or in series, as shown. The current produced by the generator A will be continuous through the circuit C as a whole, and will operate the arc lights G in the usual manner. It is, however, necessary that at the points where it is to act inductively, as upon the lamps K in the branches S S′, the current should be varied, as already described. The function of the controlling device F is to effect this variation of the primary current in the branches S S′ in such manner as not to necessarily disturb or affect the current in the main or undivided part of the circuit.

It is obvious that the device F may take many forms. In Fig. 1 it is of the commutator form, consisting of an axis, *f*, conducting portions 4, arranged at intervals around the axis and rotated thereby, and stationary brushes E E′, one for each branch of the circuit, adapted to bear against the conducting portions when the latter come opposite the brushes. The brushes E E′ and the conducting portions of the commutator are so arranged relatively to each other that before one of the brushes loses contact with a portion, 4, the

other brush will have been engaged bv one of said conducting portions. The axis *f* is electrically connected with the generator A by the continuation of the circuit C. It will thus be seen that when one of the brushes E E′ is engaged by a conducting portion, 4, of the device F all or a part of the primary current will pass through that branch to which the engaged brush belongs, and that when an interval between the portions 4 comes opposite said brush the current through that branch will be interrupted. Such variation of the primary current in any branch, when the makes and breaks occur with sufficient rapidity, affects the induction-circuit and produces the lighting of the lamps in that branch, while, by reason of the arrangement of brushes and commutator already referred to, the circuit as a whole will not be interrupted, thus avoiding sparking and permitting the operation of the arc lights G.

In Fig. 2 is shown a controlling device, F, in which a reciprocating or oscillating motion of a single conducting portion, 4, effects the making and breaking of the branch circuits. The width of this portion 4 being greater than the distance between the conducting-blocks *e e′*, the circuit C, as a whole, is not broken. It is not essential that a make and break should occur in the branches of the circuit. A partial interruption caused by a change in the resistance of the branches is sufficient to operate the induction-lamps therein. Thus a slender strip of conducting material may extend over the intervals between the conducting portions 4, as indicated by dotted lines in Fig. 1, with which strip the brushes will engage when not bearing on the portions 4 direct. Thus a total break will not occur, but a wavy current will be produced in the branches S S′. The current in the undivided part of the circuit will not, however, be affected. I prefer to use a rotary current-controlling device for the reason that by such means I can more easily close and break the circuit with the great rapidity desirable, the breaks occurring as rapidly as six thousand per minute with good results. If desired, the rotating current-controller may be mounted on and carried by the generator-shaft, it being insulated therefrom.

In Fig. 3 I have shown a form of current-controlling device in which the branches of the circuit terminate in cups of mercury, *m*, which are alternately placed in electrical communication with the continuation of the circuit by means of a vibratory conductor, F. The terminals of the conductor which dip in the mercury will be of such length that one will enter the mercury before the other leaves it, thus keeping the circuit as a whole unbroken.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. A system of electrical distribution consisting of a branched main circuit charged by a source of continuous current, and including translating devices in its undivided portion or portions, the primaries of inductoriums included in the branches, translating devices in the secondary circuits of the inductoriums, and circuit-controllers for diverting the main current through the branches in succession, substantially as described.

2. In a system of electrical distribution, a branched main circuit charged by a source of continuous current, translating devices fed directly by the undivided stem, and translating devices fed inductively by the branches, substantially as described.

3. An electric-lighting system comprising a primary circuit branched, as described, and charged by a generator of a continuous current, an electric lamp or lamps adapted to be operated by a continuous current of one direction in the undivided stem, a lamp or lamps adapted to be operated by alternating currents fed inductively by the branches, and a circuit-controller for diverting the main current through the branches in succession, substantially as set forth.

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

PHILIP DIEHL.

Witnesses:
WM. H. INSLEE,
JAMES G. GREENE.