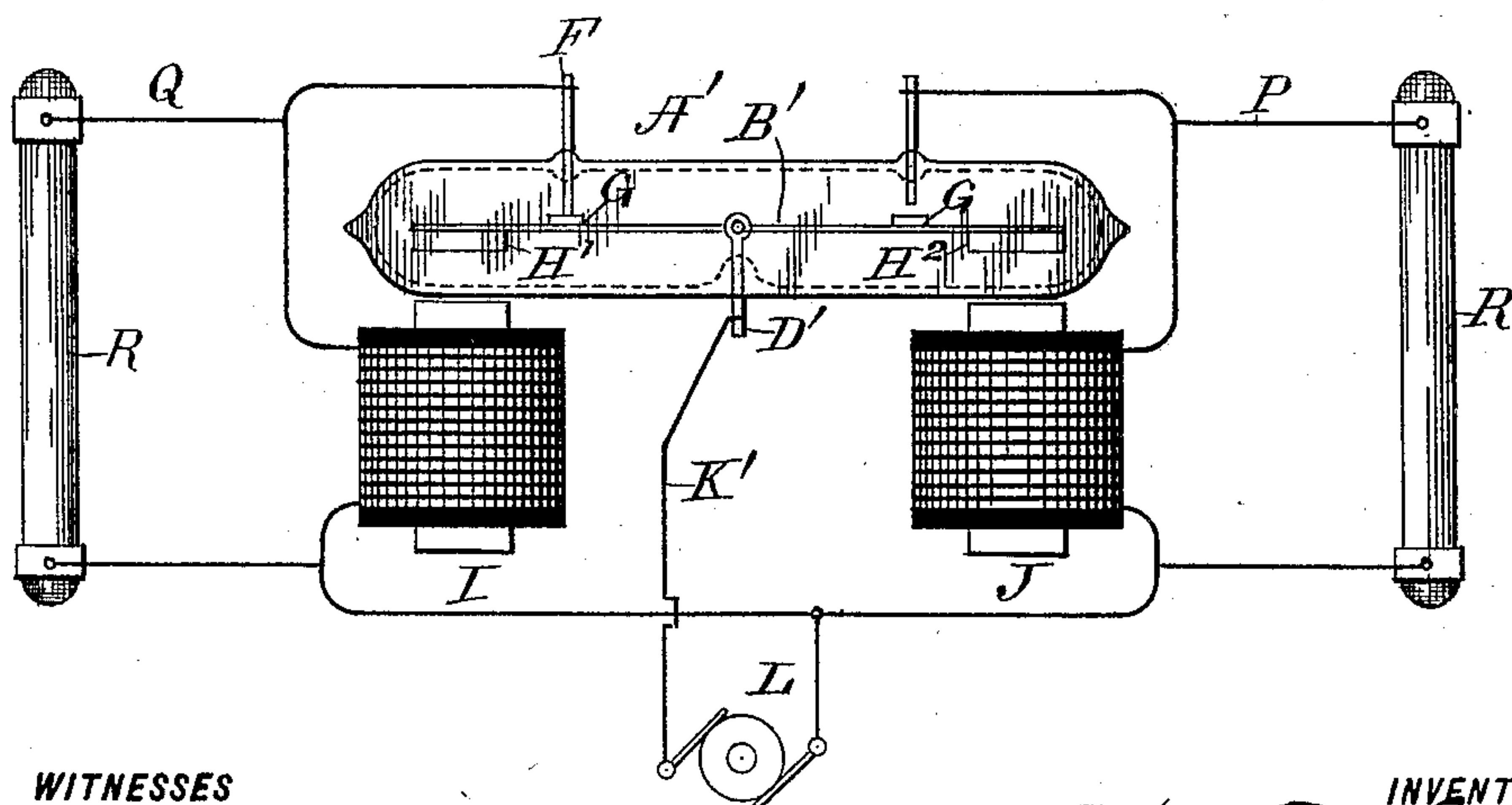
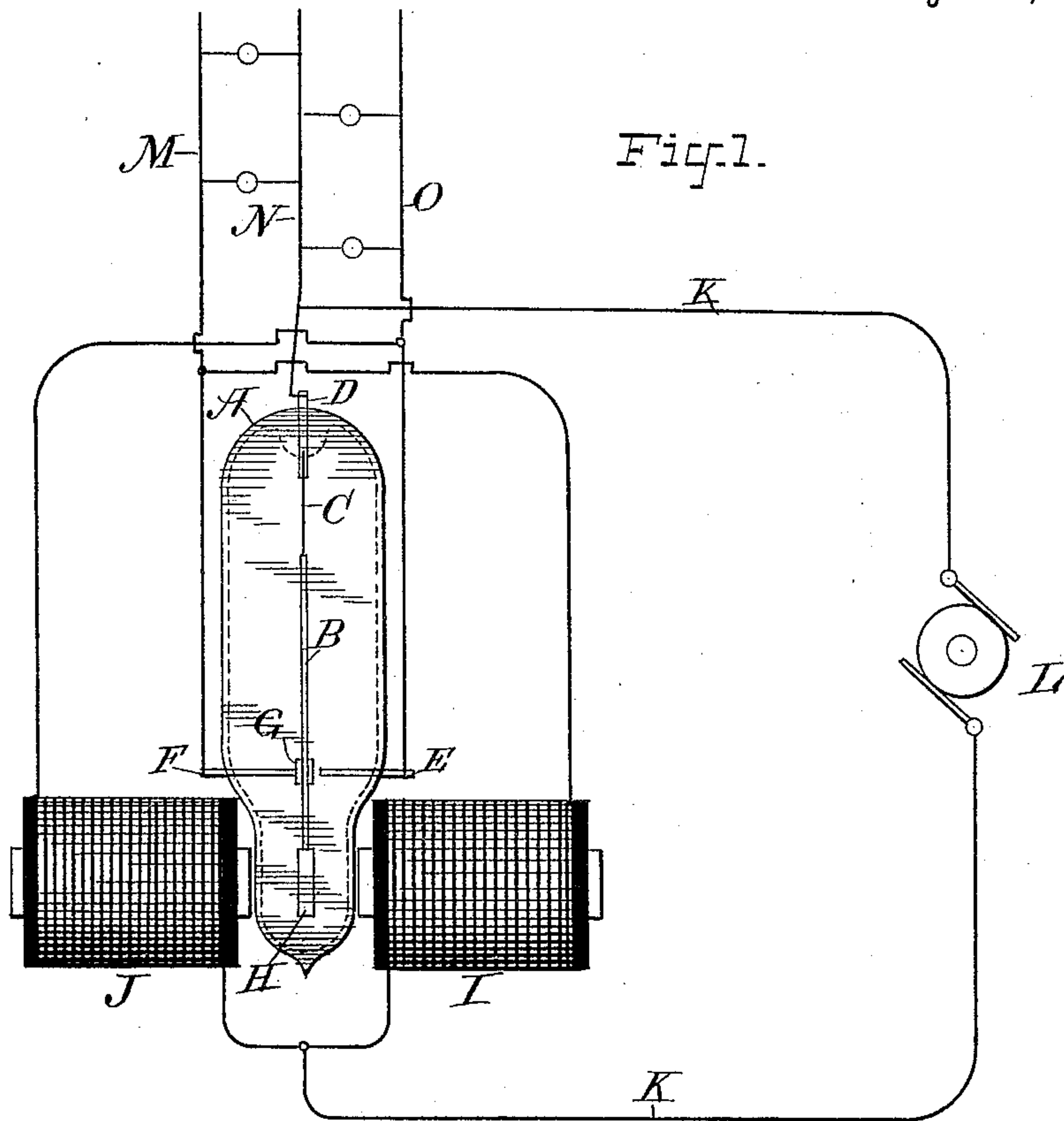


(No Model.)

D. McF. MOORE.
MAGNETIC CIRCUIT BREAKER.

No. 604,683.

Patented May 24, 1898.



WITNESSES

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DANIEL MCFARLAN MOORE, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE
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MAGNETIC CIRCUIT-BREAKER.

SPECIFICATION forming part of Letters Patent No. 604,683, dated May 24, 1898.

Application filed September 8, 1896. Serial No. 605,110. (No model.)

To all whom it may concern:

Be it known that I, DANIEL MCFARLAN MOORE, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented a certain new and useful Magnetic Circuit-Breaker, of which the following is a specification.

My invention relates to magnetically-actuated circuit breakers or interrupters in general, but particularly to those designed for use in electric-lighting systems heretofore patented by me, and especially as an improvement upon the construction forming the subject of application, Serial No. 570,872, filed December 3, 1895.

In this invention, as in one forming the subject of an application of even date herewith, Serial No. 605,109, provision is made for obviating the difficulties arising from the wearing away of the fixed contacts in those forms of interrupters using spring contact-tongues.

The main object of this invention is the utilization of each half-vibration of the contact-tongue to effect an interruption of a circuit and to accomplish this by means of the circuit-breaking magnets in the circuit of induction, thereby not only dispensing with the spring-tongue, but also with the extra magnet specified in the companion application, which is there employed to return the tongue to the fixed contact, and also with the extra circuit-breaking magnets in the first-named application.

With this object in view the invention consists in a circuit-interrupter having a contact-tongue engaging contacts at each half-vibration and actuated by the circuit-breaking magnets in the circuit of induction and a circuit or circuits to receive the discharges from the circuit of induction.

The invention also consists in the combination, with the lighting-circuits, of a circuit-interrupter having a single vibrating part controlling the flow of current to each circuit.

The invention further consists in the construction, combination, and arrangement of parts hereinafter fully described, and set forth in the claims.

In the accompanying drawings, which form a part of this specification, Figure 1 diagrammatically represents my improved form of

circuit-interrupter, and Fig. 2 similarly represents a modification thereof.

Though this invention is in the main broadly applicable to circuit-interrupters generally, it is here shown in the form best adapted to my system of electric lighting above referred to. Therefore, as seen in Fig. 1, the interrupter contacts are located in an exhausted receiver A, preferably formed from glass or similar material in which a high vacuum may be produced, though the receiver may be made of any other suitable material capable of sustaining a satisfactory degree of vacuum.

The vibrator contact-tongue B is shown suspended and is preferably mounted, as shown, to swing like a pendulum, a thin non-resilient strip C connecting it to the leading-in terminal D. This connection to the leading-in terminal may be made in any other satisfactory manner, the idea being to leave the tongue free to be moved simply by magnetic attraction.

In the sides of the receiver are inserted fixed contacts E and F in position to alternately engage suitable contact-plates carried by the tongue B, as at G. On the lower end of the tongue is mounted an armature H. At the sides of the receiver opposing one another are located the circuit-breaking magnets I J. These magnets are in the circuit of induction K, which is fed from any suitable source, as indicated at L, and extends by two distinct divisions through the tongue B and the contacts and has branching therefrom two lighting-circuits, (shown at M N O.)

In adjusting the circuit-interrupter the tongue B is placed in engagement with one or the other of the fixed contacts, being indicated in engagement with contact F. With the apparatus in this position circuit K is closed through magnet I, contact F, and tongue B. This energizes magnet I, draws the tongue toward it, interrupting the circuit with contact F, and making circuit with contact E, thereby directing circuit K over its other branch through magnet J, contact E, and tongue B, when magnet J will draw the tongue away from contact E into engagement with contact F. Thus the magnets I and J in the circuit of induction act also as the retractors for the tongue-contact and dispense with the necessity of using a spring-tongue.

In an interrupter thus operating the wearing away of contacts has no detrimental effect upon the operation of the circuit-interrupter other than that due to the slight increase in amplitude of vibration and consequent slight decrease in frequency of interruptions.

As in my lighting system forming the subject of previous patents, notably No. 548,127, of October 15, 1895, the interruptions in the circuit K cause the lamps in circuits M N O to give forth light.

In Fig. 2 the vibrating-tongue contact B' is shown mounted horizontally upon a pivotal support formed on the leading-in contact D' and carries at its ends armatures II' II², also contact plates or buttons G, for engagement with the fixed contacts E and F. The magnets I and J are in divisions of the circuit of induction K' and are located, respectively, under the armatures II' II². The current for the circuit K' is supplied from any suitable source, as L, and passes alternately through the magnets, their corresponding contacts, and the tongue B'. From each division of the circuit of induction extend lighting branches, as P Q, in which are shown vacuum-tube lamps R. The operation of this form of interrupter is as follows: The receiver A' having been set so that the tongue will be in engagement with contact F, the current flows over tongue B' through contact F and magnet I, thereby breaking circuit at F, bringing the other end of the tongue into engagement with E, and completing circuit through magnet J, which draws down the tongue B', breaking contact at E and making it at F. This action will continue as long as the current is on, and the lamps R will be lighted as described in the patent above referred to.

The use of one interrupter for several circuits is advantageous for several reasons. It enables an increased number of lamps to be used on the same current, thereby reducing the number of interrupters and their operating-coils, and by permitting the use of more lamps it avoids the necessity of increasing the current to make brighter a single set, as heretofore used with each interrupter. This likewise avoids rapid deterioration of the vacuum due to the passage of heavy currents through the interrupter and prolongs the life of the contacts.

The circuit-interrupters herein described are shown in the preferred positions, though obviously they may be mounted in other positions, since the retraction of the tongue is a positive one dependent upon the action of the magnets in the circuit of induction. So, also, in Fig. 2 the tongue may obviously be suspended by a bearing entering through the upper side of the receiver. The position and form of the fixed contacts may also be varied, and likewise the construction of the vibrating contacts, and instead of using both circuit-breaking magnets I and J one of them may be replaced by a weaker magnet constantly energized, which shall return the

tongue to the fixed contact after each break. This arrangement of magnets is an obvious one and is exemplified in connection with a pendulum-tongue in my application Serial No. 605,109, above referred to.

I do not herein claim, broadly, two or more self-inductive branches, each having means for rapidly interrupting its connection with the common return, combined with discharge-circuits connected between the branches and the common return, as this is claimed, broadly, in my application for patent filed April 15, 1898, Serial No. 677,706.

What I claim as my invention is—

1. The combination in a circuit of induction, of circuit-breaking magnets in said circuit, and a contact-tongue alternately actuated thereby to repeatedly make and break said circuit, and a circuit to receive the discharges of the circuit of induction.

2. A circuit-interrupter having a vibrating contact-tongue, in combination with a circuit of induction, circuit-breaking magnets in said circuit operating alternately upon said tongue, and a lighting-circuit controlled by each magnet and forming a branch of said circuit of induction.

3. The combination in a circuit of induction, of circuit-breaking magnets in said circuit, and a contact-tongue alternately actuated thereby to repeatedly make and break said circuit, a circuit to receive the discharges of the circuit of induction, and devices operated directly or indirectly by said discharges.

4. In a circuit-interrupter, the combination of a vibrating contact-tongue centrally pivoted, a contact engaged by each end thereof in alternation, magnets in circuit with said contacts and acting to vibrate said tongue automatically and continuously, a circuit of induction controlled by said interrupter, and a discharge circuit or circuits connected to the circuits of induction, substantially as and for the purpose set forth.

5. The combination with a source of current, of two self-induction coils, circuits or branches, a circuit-interrupter acting alternately on said coils or circuits, and a circuit or circuits forming branches around the contacts of the interrupter into which the coils discharge and containing devices operated by the discharges from said coils.

6. The combination in a circuit of self-induction, of a vibrating circuit-interrupter making contact at each half-vibration, of electromagnets in said circuit for actuating said interrupter, and a lighting-circuit at each contact for receiving the discharge from the circuit of induction.

Signed at New York, in the county of New York and State of New York, this 15th day of July, A. D. 1896.

DANIEL MCFARLAN MOORE.

Witnesses:

WM. H. CAPEL,
D. H. DECKER.