

No. 627,346.

Patented June 20, 1899.

D. McF. MOORE.

COOLING JACKET FOR VACUUM CIRCUIT INTERRUPTERS.

(Application filed Sept. 7, 1898.)

(No Model.)

Fig. 1.

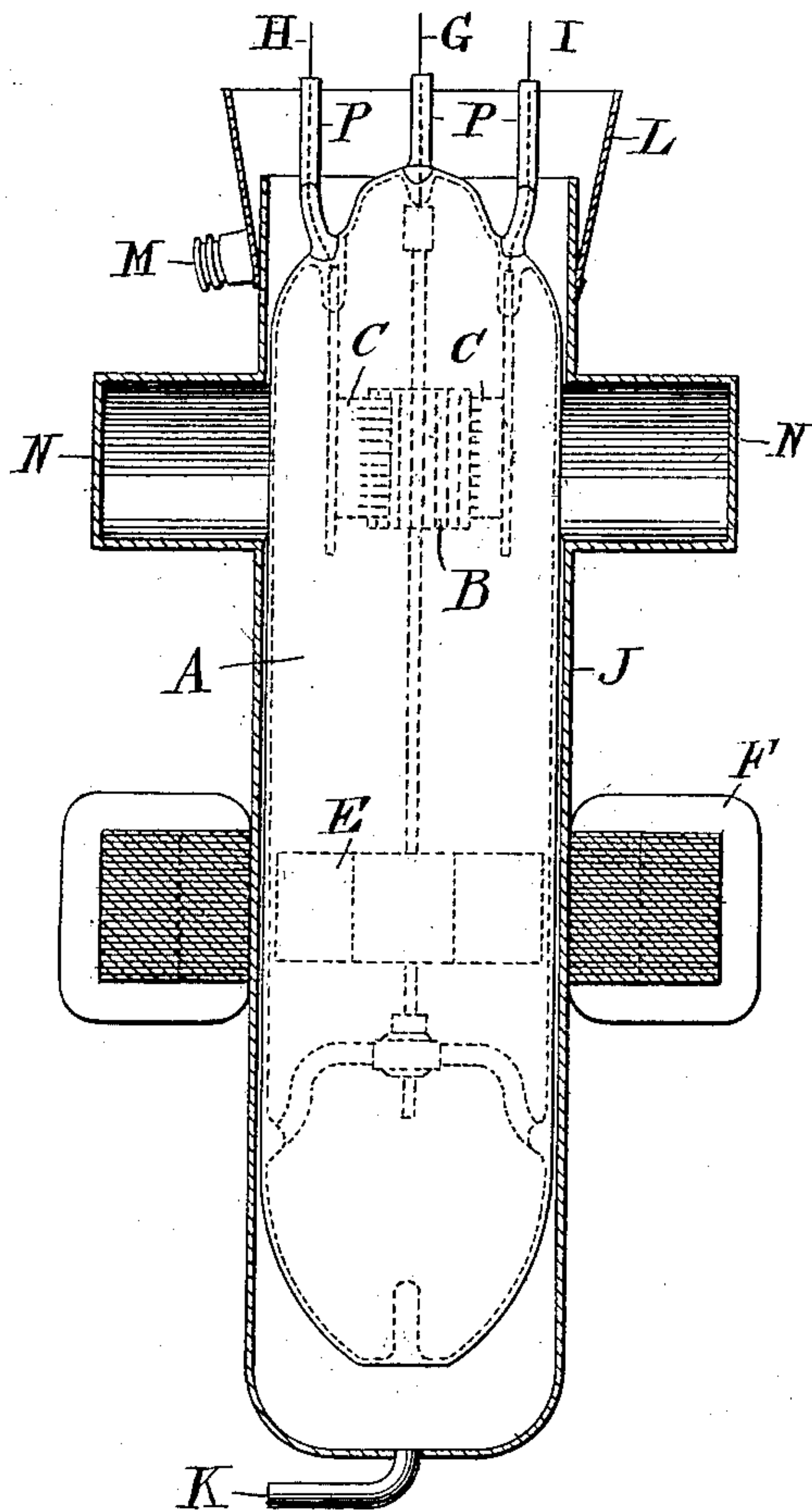


Fig. 2.

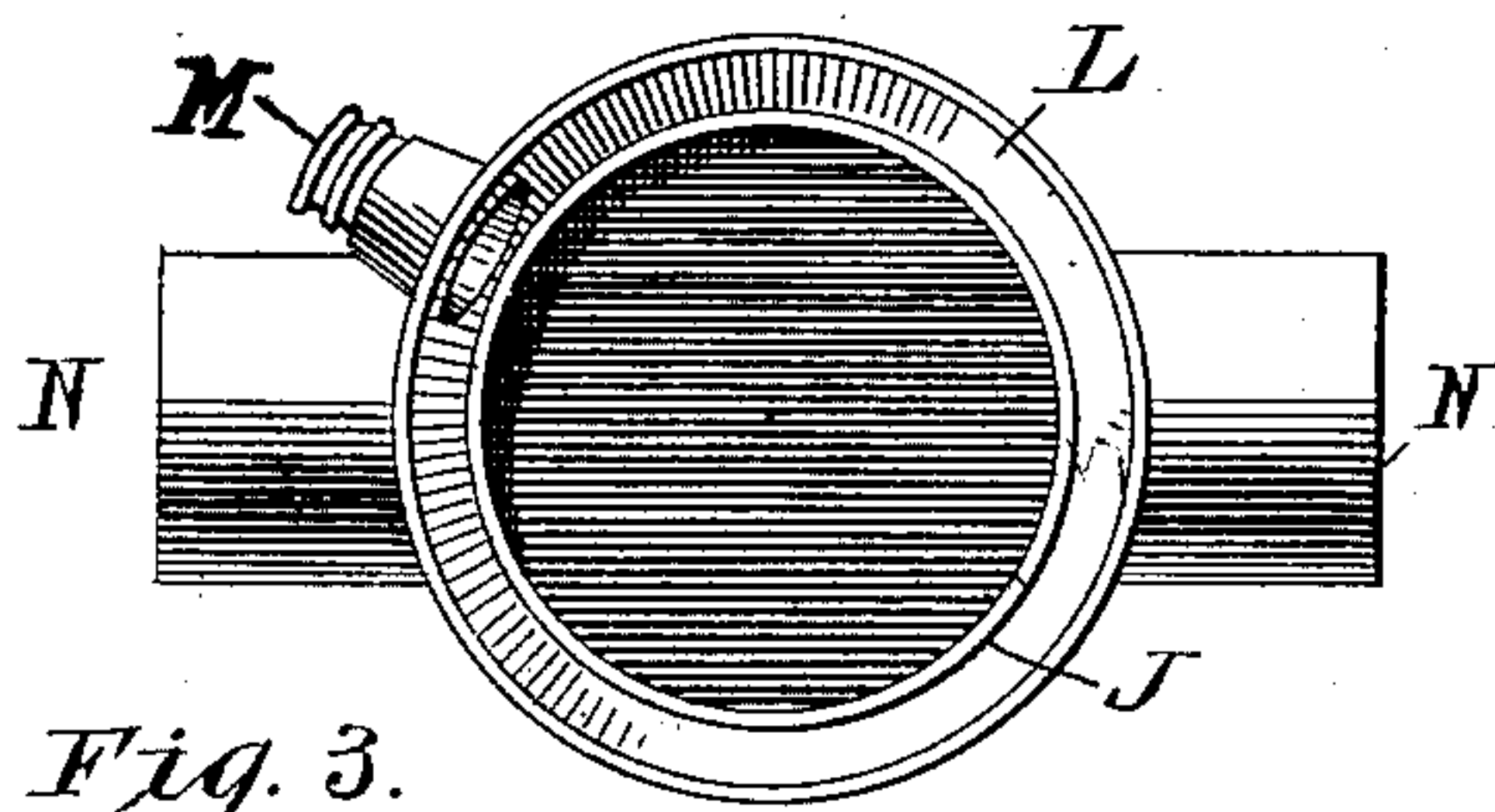
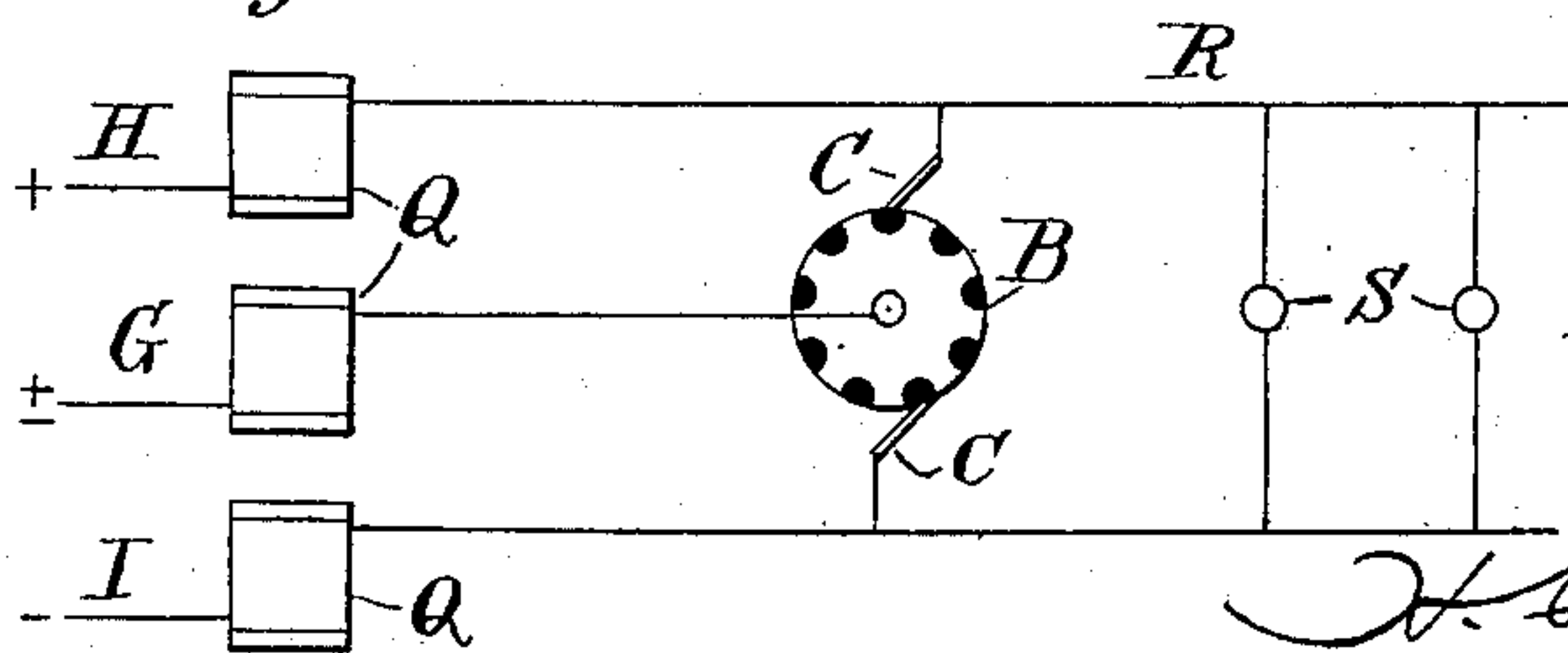


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## COOLING-JACKET FOR VACUUM CIRCUIT-INTERRUPTERS.

SPECIFICATION forming part of Letters Patent No. 627,346, dated June 20, 1899.

Application filed September 7, 1898. Serial No. 690,409. (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 certain new and useful Cooling-Jackets for Vacuum Circuit-Interrupters, of which the following is a specification.

This invention relates to cooling a vacuous chamber or receptacle containing a circuit-interrupter.

The object of the invention is to increase the luminous effects produced by interrupting a circuit of induction *in vacuo*; and to this end the invention consists in artificially cooling the vacuous chamber containing terminals or electrodes between which interruptions of said circuit take place.

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

In the accompanying drawings, which form a part of this specification, Figure 1 represents in vertical sectional elevation a circuit-interrupter in a vacuous chamber and the latter surrounded by a cooling-jacket. Fig. 2 represents the cooling-jacket in plan, and Fig. 3 represents in diagram a typical form of a circuit of induction for producing luminous effects by the use of a circuit-interrupter such as illustrated in Fig. 1.

The cooling of the vacuous receptacle may be effected in various ways. The most advantageous way of effecting it, however, is by flowing a cold liquid over the receptacle in a manner substantially as hereinafter fully described.

The invention is illustrated in connection with that form of rotary circuit-interrupter which has been found the most practical and which forms the subject of my application for patent, Serial No. 677,706, filed April 15, 1898.

In the accompanying drawings, A indicates the vacuous chamber, preferably made of glass; B, the break-wheel; C, the brushes bearing thereon; E, the armature, mounted on the same shaft with the break-wheel; F, the rotary field, preferably in the shape of a Gramme ring; G, the wire leading into the

break-wheel; H, the wire leading to one brush, and I the wire leading to the other brush.

Surrounding the receptacle A is a jacket J, preferably of metal, and of some non-magnetic metal, as brass or copper. This jacket may be of any suitable form, but is preferably made to fit within the field F. The jacket therefore comes very near the chamber A, thereby providing for only a thin layer of cooling fluid between it and the chamber. This insures a constant exchange of said fluid even when but a small amount of said fluid is flowing through the jacket. The cooling fluid—water, brine, or any other suitable fluid—is preferably admitted to the jacket at the bottom, as through pipe K. The jacket is preferably open at the top to allow the cooling fluid to flow over the edge thereof evenly at all sides, so as to insure equal upward currents at all points about the chamber A. This overflow is caught in a trough L, whence it discharges through an outlet, as M. This trough is located at a distance below the upper edge of the jacket, such as will insure the maintenance of the level of the fluid in the trough below the edge of the jacket, thereby providing an even discharge of the fluid from the jacket. Opposite to the break-wheel and brushes the jacket may be enlarged in order that the greatest cooling effect may be produced in the immediate vicinity of the circuit-interrupting part of the mechanism. Such enlargement may be produced as by annexing to the jacket the pockets or auxiliary chamber N, wherein the ascending fluid may tarry for a time on its way to the top of the jacket.

The bosses on the receptacle A, through which the leading-in wires pass, are prolonged by the addition thereto of the tubes P, whereby the contents of the jacket are prevented from forming a short circuit between the wires.

In the circuit of induction typified by the diagram Fig. 3 the current is supplied to the break-wheel B over the conductors G, H, and I, in which are located induction-coils Q, the discharges from which, on breaks occurring between brushes C and the wheel B, flow over the lighting-circuits R. Cooling the vacuous-chamber in which the wheel B operates,



as shown in Fig. 1, increases the degree of attenuation or vacuum, thereby rendering the interruptions of circuit more instantaneous and increasing the luminous effects in the lights S.

While a specific form of cooling device is illustrated, it is not intended to limit the invention to that particular form, since the vacuous receptacle might be cooled by driving a current of cold air against it or by dropping some volatile substance over it. Nor is it intended to limit the direction of flow of the cooling fluid over said receptacle, since in some locations it may be more convenient to flow the cooling fluid downwardly over the vacuous receptacle.

The fluid for cooling the receptacle may itself be cooled or refrigerated in any suitable manner on its way to the jacket.

Many changes may also be made in the shape and formation of the cooling-jacket, and it may be adapted to vacuous chambers of various shapes and forms without departing from the invention.

While I show a mechanical interrupter in the vacuous chamber, I do not limit myself thereto, as the invention is applicable to vacuous chambers containing any terminals or electrodes connected to any arrangement of circuits and between which interruptions of a circuit of induction are caused to take place in any way for the purpose of generating high-frequency waves or oscillations in a circuit directly or indirectly connected with said circuit of induction.

The invention claimed is—

1. The combination with a circuit of induction, of a circuit-interrupter therefor having its contacts inclosed in a vacuous chamber, and means for cooling said chamber.

2. The combination with a vacuous receptacle containing a circuit-interrupter, of a cooling-jacket surrounding said receptacle, substantially as and for the purpose set forth.

3. The combination with a vacuous recep-

tacle, of a rotary circuit-interrupter journaled therein and having a rotary armature on the shaft therewith, a rotary field surrounding the receptacle in the plane of the armature and a cooling-jacket surrounding the receptacle and located within the rotary field.

4. The combination with a vacuous receptacle containing a circuit-interrupter, of a cooling-jacket surrounding said receptacle, and extensions of the walls of the receptacle surrounding the leading-in wires and projecting above the cooling contents of the said jacket for the purpose set forth.

5. The combination with the vacuous receptacle, of the cooling-jacket surrounding it and extending above it and having an inlet at the bottom, the top of said jacket being constructed to allow an even overflow of the ascending liquid, and a discharge-trough secured to the jacket at a sufficient distance below the top thereof, to prevent the liquid in the trough rising to the top of the jacket.

6. The combination with the vacuous receptacle containing the break-wheel and brushes bearing thereon, of the cooling-jacket surrounding said receptacle and provided with enlargements opposite said brushes and break-wheel to insure the greatest cooling effect at that point.

7. The combination with a circuit-interrupter operating in an exhausted chamber, of means for artificially cooling the chamber.

8. The combination with an exhausted chamber containing terminals or electrodes between which interruptions of a circuit of induction are caused to take place in any way, of means for cooling said chamber.

Signed at New York, in the county of New York and State of New York, this 2d day of September, A. D. 1898.

DANIEL MCFARLAN MOORE.

Witnesses:

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