(No Model.)

D. McF. MOORE.

ELECTRIC REGULATOR.

No. 502,444. Patented Aug. 1, 1893.

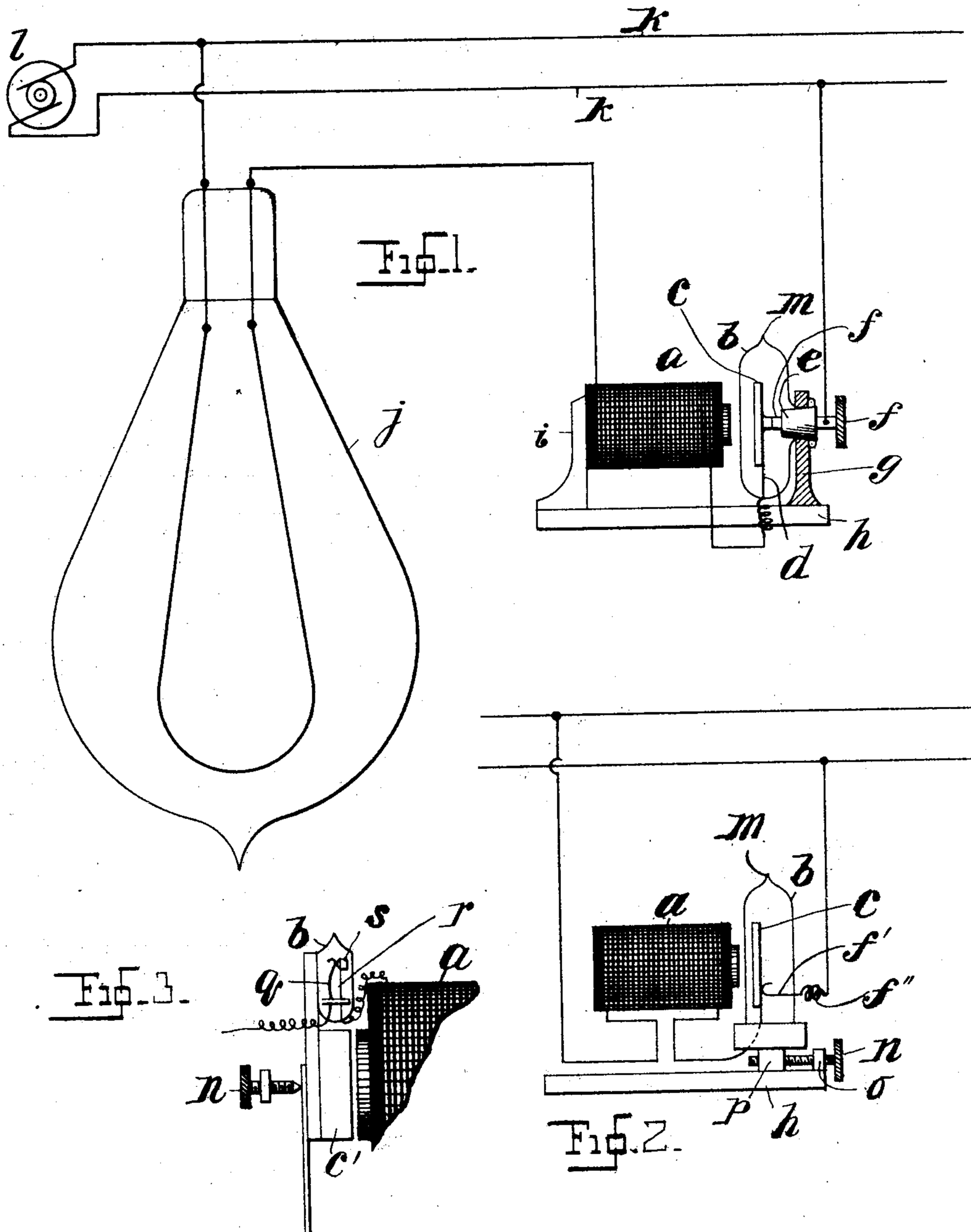

Fig. 1.

Fig. 3.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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ELECTRIC REGULATOR.

SPECIFICATION forming part of Letters Patent No. 502,444, dated August 1, 1893.

Application filed November 8, 1892. Serial No. 451,357. (No model.)

To all whom it may concern:

Be it known that I, DANIEL MCFARLAN MOORE, a citizen of the United States of America, and a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Electric Regulators, (Case No. 3,) of which the following is a specification.

My invention relates to means for regulating an electric current upon the principle of varying the degree or rate of interruptions of the circuit, and its object is the improvement of similar devices set forth in my earlier applications, Serial No. 420,943, filed February 10, 1892, and Serial No. 439,959, filed July 14, 1892.

The nature of the invention is illustrated by the accompanying drawings.

Figure 1 is a view of the device partially in elevation and partially in section, and is shown connected up with an electric generator and with that form of translating device known as an incandescent electric lamp. Fig. 2 is a similar view to Fig. 1 of a modification. The generator and translating device are omitted in this figure. Fig. 3 is a view of a modification of the device unnecessary parts being omitted or broken away.

The device embodying my invention consists of the combination of a magnet, *a*, an evacuated glass bulb *b*, containing an armature *c* mounted upon a spring support *d*, a stopper *e* closing the bulb *b* and provided with an adjustable electrical terminal *f* passing through the same, and normally pressing upon the said armature, a support *g* holding the bulb above the base plate *h*, and a yoke piece *i* holding the magnet *a* above the base *h*. The armature *c*, terminal *f*, magnet *a*, and translating device or lamp *j*, are all in the same circuit with the main lines *k* and generator *l*. The bulb *b* is exhausted of air in the manner of an incandescent electric lamp, or by means of an air pump or similar manner and sealed at *m*. Or, the bulb may be filled with an inert gas such as nitrogen. Or, the gas may be carbureted hydrogen.

The lower end of the spring *d* is terminated by a wire, preferably platinum, which passes through the glass, the glass being fused around the wire so as to make an air tight passage for the electric current.

The operation of the device is thus:—The lamp being in a closed circuit, and the terminal *f* having its maximum pressure upon the armature *c*, the current operates the lamp at its highest luminosity. The magnet *a* does not interrupt the current at the terminal *f*, the other terminal being the armature *c*. If it is desired to reduce the luminosity or to pass less current per unit of time through any translating device represented typically by the lamp *j*, the terminal *f* is moved to the right more or less, thereby reducing its pressure upon the other terminal or armature *c*, until the magnet *a* attracts the armature *c* sufficiently to interrupt the current at the terminal *f*. The circuit being interrupted, the magnet *a* becomes demagnetized and the spring *d* brings the two terminals *c*, *f* again in contact with one another. The magnet *a* becomes again magnetized and again separates the terminals, and these operations are repeated rapidly in succession. On account of the periods of interruption, although short but numerous, less current passes per minute through the translating device than when the circuit is permanently closed.

The position of the terminal *f*, which may be varied by hand, determines the degree and rate of interruptions and therefore regulates the amount of current passing per unit of time. Of course, if the unit of time during which an impluse of current passes between two interruptions is considered, the current cannot be said to be regulated; but such a unit of time is smaller than the smallest unit or second, because many interruptions occur in one second.

If the bulb contains gas having no chemical action upon the metallic terminals *c*, *f* during the sparking between the same, no injurious effects will be produced by the sparking. The same is true if the bulb *b* is exhausted simply and contains practically no gas or air whatever. It is true that if carbureted hydrogen is employed, the same will be decomposed into hydrogen and carbon, but these will have no injurious effect upon metal. When the device is employed with such a translating device as an incandescent electric lamp, it is in use so much that the terminal *f* is often adjusted for interruptions and therefore the sparking is very frequent.

In Fig. 2 the bulb *b* is entirely closed by fused glass, whereby greater permanency of vacuum or of power to retain an inert gas, is increased. The terminal *f* passing through a stopper *e* is replaced by a platinum wire terminal *f'* sealed through the glass bulb *b*, and bearing against the terminals and armature *c*. The regulation is effected by turning the screw *n* which passes through a fixed nut *o* and a movable nut *p* which carries the bulb *b*. When the bulb is at the maximum distance from the magnet *a*, the effect upon the armature *c* is so small that it does not vibrate. It is not visibly attracted. When the bulb is sufficiently near the magnet *a*, the armature *c* is attracted, the current is interrupted at *f'*, the magnet is demagnetized, and the circuit becomes again closed at the terminal *f* after which the operation is repeated and so on many times in a second. The degree and rate of interruptions of the circuit at the terminal *f'* may be varied by turning the screw *n*. A portion of the terminal *f'* outside of the bulb *b* is coiled as at *f''* in order to make the same flexible.

In Fig. 3 the description is such that the bulb *b* does not contain the armature and therefore can be made very small. Further, it contains no stopper. It merely has two platinum wires sealed through the same. The said bulb is carried upon the armature. Inside of the same are mounted two electric terminals, one of which *q* is stiff; being made of round platinum wire, and the other *r*, very flexible and elastic being hammered very thin, so that when the armature *c'* is attracted to the magnet *a* the terminal *r* by its momentum will leave the terminal *q* and thereby interrupt the circuit of the magnet, so that the armature will fly back again and the terminals *q*, *r* will again close the circuits. It is the momentum stored up in the spring *r* which causes it to spring forward and leave the terminal *q*. The amount of regulation is varied by changing the position of the screw *n*. *s* is a weight to insure the definite escape of the terminal *r* from the terminal *q*. It is attached to the terminal *r*.

I claim as my invention—

1. An electric regulator consisting of the combination of a magnet, a vibratory armature therefor, a bulb containing an inert fluid or vacuum, and attached to said armature, electric terminals in the bulb, and in contact with each other one of which is more flexible than the other, and means for regulating the distance of the armature from the magnet, the said terminals and magnet being in circuit with one another.

2. An electric regulator consisting of the combination of a magnet, a bulb evacuated or containing a fluid inert in reference to electrical conductors, an armature and electric terminals in said bulb and in circuit with said magnet, and means for varying the pressure between the terminals.

3. An electric regulator consisting of the combination of a magnet, a bulb evacuated or containing an inert fluid, a vibratory armature in said bulb, a fixed electric terminal passing into the bulb and pressing upon the armature and means for moving the bulb and its contents to and from the magnet.

4. An electric regulator, consisting of the combination of a magnet, a bulb evacuated or containing an inert fluid, a vibratory armature in said bulb, a fixed electric terminal passing into the bulb and pressing upon the armature, means for moving the bulb and its contents to and from the magnet, and means for regulating the distance of the armature from the magnet.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 1st day of November, 1892.

DANIEL McFARLAN MOORE.

Witnesses:

E. G. DUVALL, Jr.,

EDWARD P. THOMPSON.