

(No Model.)

A. L. ELLIS.

AUTOMATIC POTENTIAL REGULATOR FOR ELECTRIC CURRENTS.

No. 474,953.

Patented May 17, 1892.

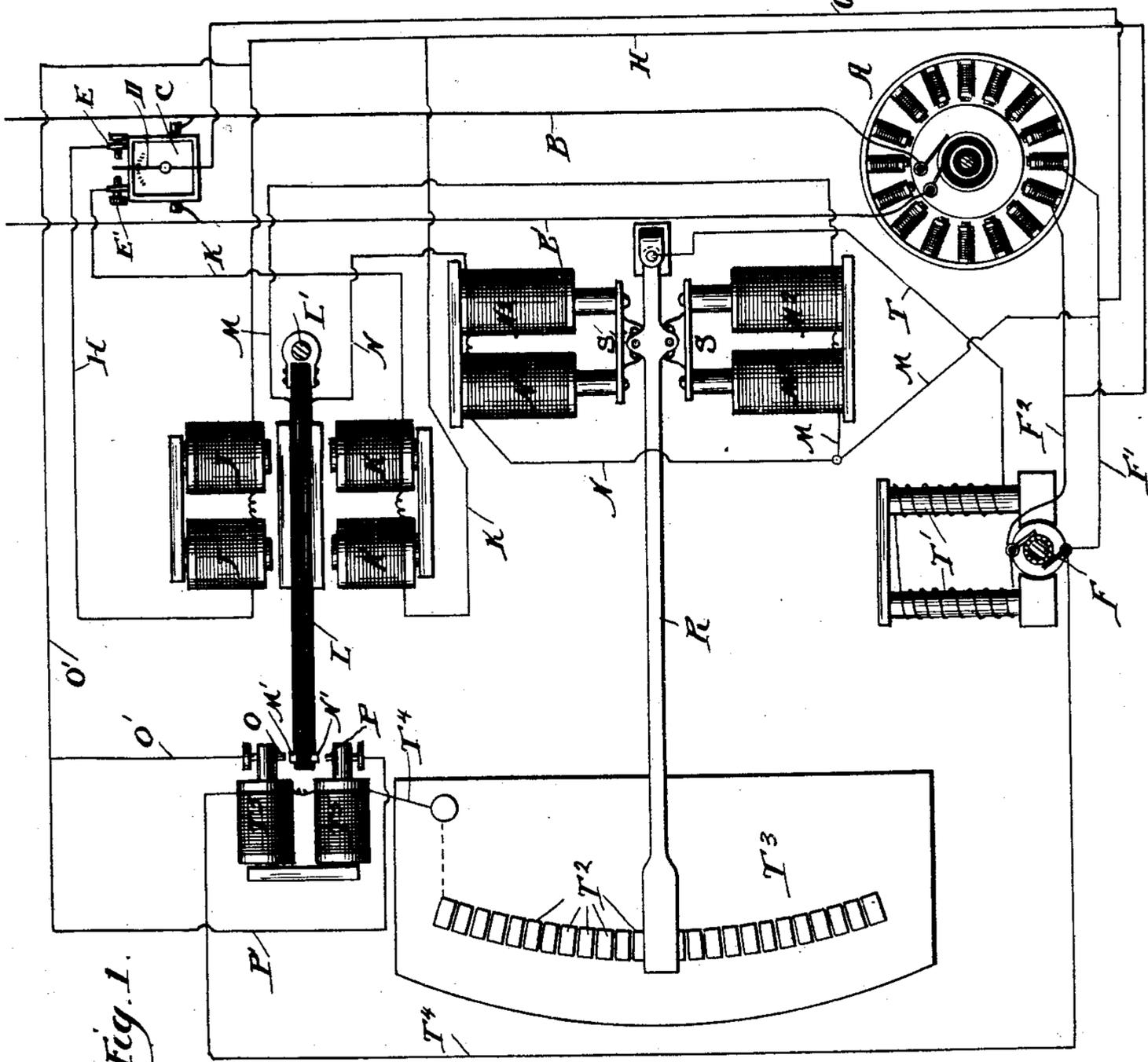


Fig. 1.

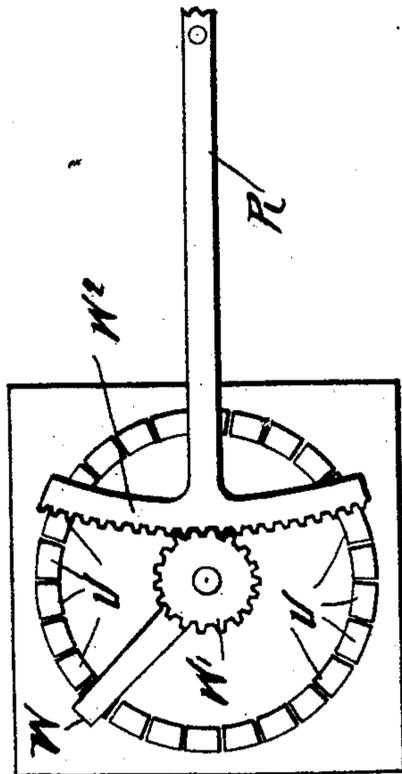


Fig. 2.

Witnesses:

Charles R. Chapman.

H. B. Hallock

Inventor:

Alvin S. Ellis.

by  
Francis W. Wake  
Attorney.

# UNITED STATES PATENT OFFICE.

ALVINIS 'LONZO ELLIS, OF CHICAGO, ILLINOIS.

## AUTOMATIC POTENTIAL-REGULATOR FOR ELECTRIC CURRENTS.

SPECIFICATION forming part of Letters Patent No. 474,953, dated May 17, 1892.

Application filed March 9, 1891. Serial No. 384,249. (No model.)

*To all whom it may concern:*

Be it known that I, ALVINIS 'LONZO ELLIS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Automatic Potential-Regulators for Electric Currents, of which the following is a full, clear, and exact specification.

My invention relates to automatic potential-regulators for electric currents, and has for its object to provide a convenient and simple device for keeping the regulation of such currents constant. It is illustrated in the accompanying drawings, wherein—

Figure 1 is a diagrammatic and part plan view. Fig. 2 is a detail of a modification.

Like letters are used to indicate like parts in both figures.

B and B' are conductors. Between these conductors and connected therewith is a voltmeter C, having the projecting needle D, adapted to vibrate between the contact-points E E'.

F is an exciting-dynamo, whose conductors F' F<sup>2</sup> lead to the field of the dynamo A.

G is a conductor, which leads from the conductor F' to the needle D. From the contact-point E leads a conductor H through the magnets J J to the conductor F<sup>2</sup>. From the contact post or point E' leads the conductor K through the magnets K' K' to conductor H, and thence to conductor F<sup>2</sup>.

L is an arm of insulating material pivoted at L' and provided with conductor-wires, one on each side, which are continuous, respectively, with the conductors M and N. The conductor M terminates at one end at the contact M' and at the other end leads to the magnet M<sup>2</sup>, and thence to the conductor F'. The conductor N terminates in the contact-point N' and passes through the magnets N<sup>2</sup> N<sup>2</sup>, and leads thence by one portion of the conductor M to the conductor F'. Opposed to the contact-points N' M' are the contact-points O and P. From O leads the conductor O' to the conductor H, and thence to the conductor F<sup>2</sup>, and from P leads the conductor P' to a connection with the conductor O', and thence to the conductor F<sup>2</sup>.

R is a pivoted arm, having loosely pivoted on opposite sides the cores S and S', the members of which pass, respectively, into the spools

M<sup>2</sup> N<sup>2</sup>. This arm R is in series with the field-magnets coils T' by means of the conductor T, and its outer extremity passes over the contacts T<sup>2</sup> of the resistance-box T<sup>3</sup>, thus varying the connection of the coils of such resistance-box. The other extremity of these coils is connected with the conductor T<sup>4</sup>, which passes through the magnets T<sup>5</sup>, and leads thence to the other brush of the dynamo F.

It will be obvious from examination of the case that many modifications could be made without materially departing from the spirit of this invention. One of these modifications is shown in Fig. 2, wherein the resistance-box is provided with a series of contact-plates V, and the connecting-arm W is centrally mounted on the spur-wheel W', which engages the arc-shaped rack W<sup>2</sup> on the end of the arm R, by which means a wider range of movement is given and a different arrangement of the contact-plates of the resistance-box can be had.

The use and operation of my invention are as follows: The voltmeter C, being placed between the main conducting-wires of the dynamo, is of course sensitive to changes in the potential of the machine and is provided with the needle D, which moves in one or the other direction from its normal position as the voltage abnormally increases or diminishes. If an increase of voltage should move the needle to the right, it will make contact with the point E, and thus close a circuit from the conductors F' F<sup>2</sup> through the magnet J. This will move the arm L, which is connected with the armature of the magnet J so as to bring the contact-points O and M' into engagement, whereupon a circuit is closed between the conductors F' F<sup>2</sup>, and which circuit includes the magnet or solenoid M<sup>2</sup>. This solenoid when energized will of course draw the arm R to one side, and thus throw a greater amount of resistance into the circuit which includes the field-magnet T' of the exciting-machine. The exciting-machine is thus weakened, and the field of the main dynamo is correspondingly weakened and the potential thereof reduced. The opposite operation takes place when the potential is diminished, in which event the needle D is moved toward the left, and the magnets K K' are energized and the solenoids M<sup>2</sup> M<sup>2</sup> are in turn energized and the

arm L' moved to one side to cut out resistances, and thus strengthen the field of the exciting-dynamo and also of the main dynamo. The operation of the device would be the same if the modification of Fig. 2 were substituted. When the voltage is normal, so that the needle is in equilibrium between the contact-points E and E', the device is idle; but this will not frequently occur and the device will be constantly active to cut in and out slight resistances. If the change in the main current is considerable, the device will obviously stay in operation in one direction long enough to move the arm R far enough to correct the inequality. This is done very rapidly, for any current whatsoever in either of the solenoids will have the effect to move the arms rapidly, since the opposed solenoid in such conditions is without energy.

I claim—

1. In an automatic potential-regulator for electric currents, the combination of a voltmeter in the main circuit with a needle projecting therefrom, opposed contacts on the opposite sides of such needle, circuits connected with each of said contacts, and motors, one in each of said circuits, and an exciter-dynamo,

said motors adapted one to set in operation mechanism to increase the other to diminish the strength of the field of the exciting-dynamo, and a resistance in series with the field-magnets of the exciter included in such mechanism.

2. In an automatic potential-regulator for electric currents, the combination of a voltmeter in the main circuit, a needle projecting therefrom, contacts on opposite sides thereof, circuits adapted to be made by the engagement of such needle with such contacts, electro-magnets, one in each of said circuits, two circuits controlled each by one of said magnets and containing each a solenoid, a resistance-box provided with an arm the movement of which varies the resistance in circuit, such movement controlled by said solenoids, a main dynamo supplying current to the main circuit, and an exciting-dynamo for the field-magnets of the main dynamo, said resistance-box in series with the field-magnet of the exciting-dynamo.

ALVINIS 'LONZO ELLIS.

Witnesses:

CELESTE P. CHAPMAN,  
HARRIET M. DAY.