

J. L. CREVELING.
ELECTRIC REGULATION.
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1,018,964.

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Fig. I.

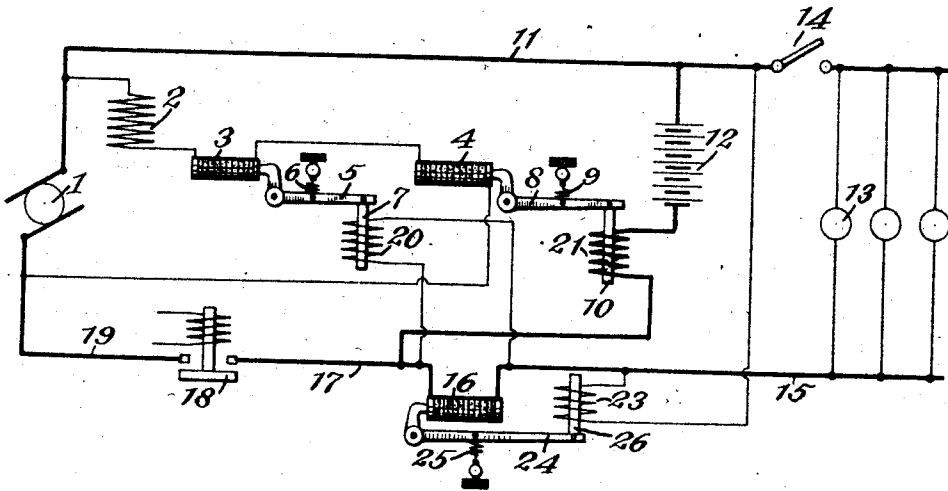
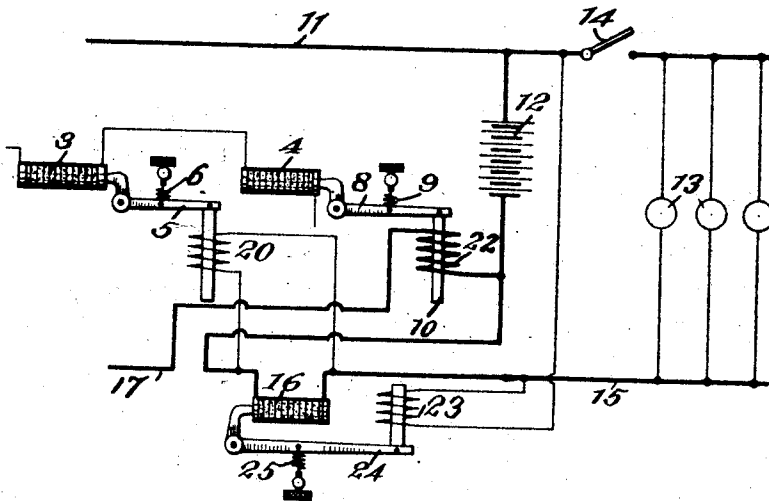


Fig. II.



WITNESSES

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ELECTRIC REGULATION.

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To all whom it may concern:

Be it known that I, JOHN L. CREVELING, a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Electric Regulation, as set forth in the annexed specification and drawing forming a part thereof.

My invention pertains to that class of electric regulation wherein it is desired to automatically regulate a dynamo or generator in a predetermined manner, and has for its particular object to provide means whereby the same may be governed in accordance with the duties thereof.

Figure I of the drawing is a diagrammatic representation of one type of system of electrical distribution comprehending my invention. Fig. II is a diagrammatic representation of a modified form of system comprehending my invention.

Referring to Fig. I of the drawing, 1 represents a dynamo or generator provided with the usual field coil 2 having in series therewith the variable resistances 3 and 4, in this instance indicated as of the carbon pile variety for sake of simplicity merely. The variable resistance 3 is controlled by the lever 5 normally drawn in an upward direction as by the adjustable spring 6 tending to increase the pressure upon the pile 3 and reduce the resistance thereof. The lever 5 is provided with the core 7 of iron or other magnetic material, and it will be obvious that motion imparted to the said core will control the resistance 3. The resistance 4 is controlled by the lever 8 normally drawn in an upward direction by adjustable spring 9 tending to compact the carbon pile 4 and reduce its resistance. The lever 8 carries at its extremity the magnetic core 10, and thus it will be obvious that motion imparted to said core will govern the resistance 4.

11 is a positive lead of the generator which is connected with the positive side of the storage battery 12 and with the positive side of the lamps or other translating devices 13 as through the switch 14. The negative terminals of the translating devices are connected with the main 15 carried to one side of the translation circuit regulating element 16 in this instance in-

dicated, as a carbon pile rheostat for sake of simplicity. The other side of the element 16 is connected as by the main 17 with the usual automatic switch 18 adapted to close when the voltage of the generator is substantially equal to that of the battery, and the opposite side of the switch 18 is connected as by the lead 19 to the negative brush of the generator 1.

The core 7 is surrounded by the coil 20 in such manner that excitation of the said coil tends to draw the core downwardly and to increase the resistance 3, and the said coil 20 is connected in shunt across the lamp regulating resistance 16. The coil 21 surrounds the core 10 in such manner that excitation of the said coil tends to draw the core downwardly and increase the resistance 4. The regulating element or resistance 16 is controlled as by lever 24 normally drawn in a downward direction as by the spring 25 tending to compact the carbon 16 and reduce the resistance thereof. The lever 24 is provided with the core 26 surrounded by the solenoid 23, excitation of which tends to raise the said core against the action of spring 25 and increase resistance 16.

In Fig. II there is illustrated only those parts of the system shown in Fig. I necessary to show the modification intended to be brought out in Fig. II, and like numerals have been used to indicate like parts, the only difference between the systems of Figs. I and II being that the coil 21 in series with the battery only in Fig. I is suppressed in Fig. II, and the coil 22 in series with the generator circuit employed in its stead.

The operation of my system is substantially as follows:—If the generator be running and its voltage such that it will charge the storage battery, the main switch 18 will be closed and current will flow from the generator through the shunt 2 and resistances 3 and 4, and the generator may be governed by proper manipulation of the said resistances. Current will also flow from the generator through the lead 11, storage battery 12, coil 21, lead 17, switch 18 and lead 19 to the generator, and I now so adjust the spring 9 that, when this current through the battery reaches a predetermined maximum, further increase in current will be prevented

by the coil 21 drawing the plunger 10 downwardly and increasing resistance 4 in a well known manner. Current will also flow through the solenoid 23 and, if the switch 14 be closed, through the lamps or other translating devices 13, and I now so adjust the spring 25 that the voltage across the translation circuit will be held constant, at a value which the battery can maintain across the translation circuit without assistance of the generator, by the coil 23 increasing the resistance 16 throughout increases in voltage across the generator. As there will always be some current flowing in the translation circuit either through the coil 23 or the translating devices or other means, there will be a drop across the resistance 16 which will increase upon increases of the said resistance. This drop will cause current to flow through the coil 20, and I so adjust the spring 6 that if the battery be charged to that point that its voltage has risen to the value above which it is desired the same shall not be forced then the current through 20 due to the drop across 16 brought about by the action of coil 23 will draw the core 7 downwardly against the action of spring 6 in such manner as to increase resistance 3 and prevent the generator from exceeding this voltage throughout speed changes.

The operation of the system shown in Fig. II may readily be understood from that above outlined with reference to Fig. I, the only difference being that coil 22 will limit the generator output instead of the current to the battery only as described with reference to Fig. I.

I do not wish in any way to limit myself to the exact details of construction nor to the exact mode of operation contained in this specification and given to illustrate merely one type of system embodying the essentials of my invention, for it will be obvious that wide departure therein may be made without departing from the spirit and scope of my invention which is as set forth in the following claims:—

1. The combination with a generator, a translation circuit and a regulator for the translation circuit, of means for regulating the generator responsive to current fluctuations and means for regulating the generator operated by the drop in potential across the translation circuit regulator.

2. The combination with a generator, a translation circuit and a regulator for the translation circuit, of means for regulating the generator current and means for regulating the generator voltage, said voltage regulating means being operated in response to an effect produced by the translation circuit regulating means.

3. The combination with a generator, a translation circuit and a regulator for the translation circuit, of current responsive

means for regulating the generator and means for regulating the generator voltage, said voltage regulating means being electrically operated by the translation circuit regulator.

4. The combination with a generator, and a translation circuit, of means for regulating the generator responsive to current fluctuations, a voltage operated regulator for regulating the translation circuit, a voltage regulator for the generator and means whereby the effect of the translation circuit regulator operates the generator voltage regulator.

5. The combination with a generator, and a translation circuit, of means for regulating the generator responsive to current fluctuations, regulating means for the generator, automatic regulating means for the translation circuit and electric means whereby the translation circuit regulating means operates the last named generator regulating means.

6. The combination with a generator, a translation circuit and a voltage operated regulator for the translation circuit, of means for regulating the generator throughout speed changes in response to current fluctuations, and means for regulating the generator throughout speed changes in response to voltage fluctuations comprehending electromagnetic means controlled by the operation of the translation circuit regulator.

7. The combination with a generator and a translation circuit, of means for regulating the generator responsive to current fluctuations, means for regulating the translation circuit, a voltage regulator for the generator and means whereby the translation circuit regulator operates said voltage regulator.

8. The combination with a generator and a translation circuit, of means for regulating the generator responsive to current fluctuations, means for regulating the translation circuit, a voltage regulator for the generator and means whereby operation of the translation circuit regulator operates the said voltage regulator.

9. The combination with a generator, a supply circuit and a translation circuit, of means for regulating the generator responsive to current fluctuations in the supply circuit, regulating means for the generator, regulating means for the translation circuit and means whereby the translation circuit regulating means operates the last named generator regulating means.

10. The combination with a generator, a storage battery and a translation circuit, of means for regulating the generator to charge the battery upon a current controlled circuit, means for regulating the translation circuit, means for regulating the gen-

erator and means whereby the said last named generator regulating means is operated by the translation circuit regulator.

11. The combination with a generator, a storage battery and a translation circuit, of means for regulating the generator to charge the battery upon a current controlled circuit, means for regulating the translation circuit, means for regulating the generator and electric means whereby the said last named generator regulating means is operated by the translation circuit regulator.

12. The combination with a generator, a supply circuit and a translation circuit, of a regulator for the generator, a coil for operating the same in the supply circuit, a translation circuit regulator, a regulator for the generator and means whereby the translation circuit regulator operates the last named generator regulator.

13. The combination with a generator, a supply circuit and a translation circuit, of a regulator for the generator, a coil for operating the same in the supply circuit, a translation circuit regulator, a regulator for the generator and means whereby the translation circuit regulator operates the last named generator regulator comprehending a coil affected by the operation of the translation circuit regulator.

14. The combination with a generator

having a field circuit, a supply circuit and a translation circuit, of a plurality of regulating means in the field circuit, means for operating one of said regulating means in response to current fluctuations in the supply circuit and means whereby the translation circuit regulator operates another of said regulating means.

15. The combination with a generator having a field circuit, a supply circuit and a translation circuit, of a plurality of resistances in the field circuit, means for operating one of said resistances comprising a coil in the supply circuit, a translation circuit regulator and means for operating another of said resistances comprising a coil responsive to the operation of said translation circuit regulator.

16. The combination with a generator having a field circuit, a supply circuit and a translation circuit, of a plurality of resistances in the field circuit, means for operating one of said resistances comprising a coil in the supply circuit, a translation circuit regulator and means for operating another of said resistances comprising a coil across said translation circuit regulator.

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