J. L. CREVELING.

ELECTRIC REGULATION.

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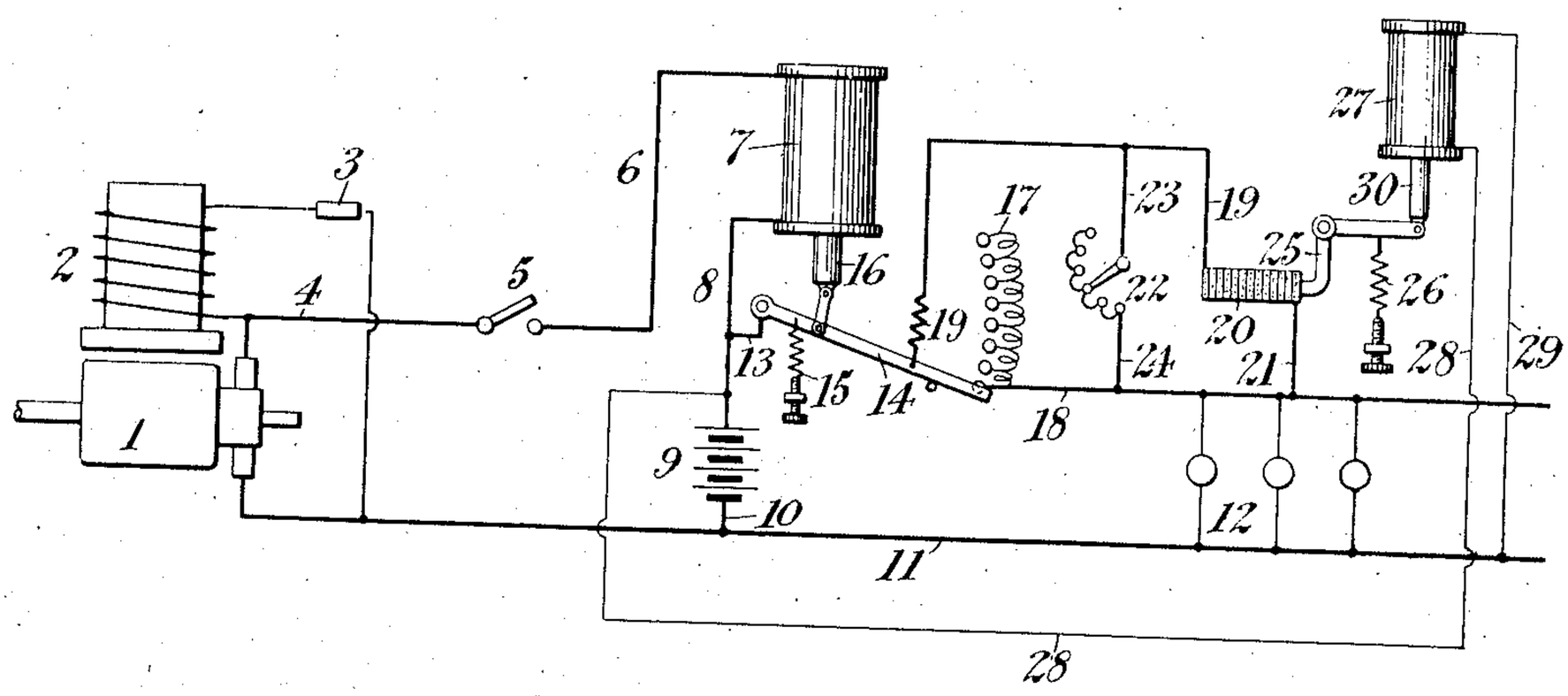
982,800.

Patented Jan. 31, 1911.



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ELECTRIC REGULATION.

982,800. Specification of Letters Patent. Patented Jan. 31, 1911.

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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 a certain new and useful Improvement 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 usually employed to automatically regulate the voltage upon a lamp or other translation circuit, and has for its particular object to provide means whereby the voltage upon the lamps or other translating devices in circuit with a generator and storage battery may be automatically governed to compensate for certain changes in voltage of the generator and the batteries, under various conditions as will hereinafter more plainly appear.

The drawing represents a diagrammatic view of one form of system of regulation embodying my invention.

In the drawing, (1) represents the armature and (2) the field of any suitable type of generator which, in this instance may be considered as one driven from the axle of a car and therefore subjected to wide variations in speed. The field may be regulated in any desired manner to compensate for changes in speed and, as devices for this purpose are well known in the art and form no part of my present invention, details of any particular type of regulator are omitted and such regulating means are simply indicated as at (3). The lead (4) is taken from one brush of the generator to the switch (5) which is preferably of the automatic variety, adapted to close the circuit when the voltage of the generator shall equal that of the battery. As switches of this type are well known in the art, further detail than the mere indication of the presence of such a switch is in this instance omitted.

From the switch (5) the lead (6) is carried to the solenoid (7), from which the lead (8) passes to one side of the storage battery (9), the other side of which is connected as by the main (10) to a lead (11), which is in communication with the other side of the generator and the lamps or other translating devices (12). The lead (8) is electrically connected as by the wire (13), with the lever (14), normally held in the position shown in the drawing, as by the spring (15), and adapted to be raised against the action of spring (15) by the solenoid (7) when the same shall attract its core (16) with sufficient force to overcome the tension of the spring (15). Movement of the lever (14) will cause a portion of the resistance (17) to be placed in series between the wire (13) and the wire (18) and thus in series with the lamps or translating devices (12), the amount of said resistance depending, of course, upon the position of the lever (14).

(19) represents a flexible connection with the lever (14) which communicates with one side of the resistance device (20), in this instance indicated as of the carbon disk variety for sake of simplicity. The other side of the resistance device (20) is connected with the main (18) as by wire (21) and thus the resistance device (20) is placed in shunt around the resistance device (17). If desired, an additional adjustable shunt (22) may be placed around the resistance device (20) as by wires (23) and (24) for the purpose of adjustment. The lever (25), through the action of the spring (26), normally tends to compact the carbons or otherwise reduce the resistance of the resistance device (20). Solenoid (27), placed across the battery circuit as by wires (28) and (29) will, by attracting its core (30), lessen the compression upon the disks of the device (20) in such manner as to increase the resistance thereof.

The practical operation of my improvement in electric regulation is substantially as follows: starting with the generator at rest and various instrumentalities in the positions indicated in the drawing. If the armature (1) be revolved, the generator will build up in the usual manner and, upon reaching a voltage approximately equal to that of the battery (9), the switch (5) will close and current will flow from the generator through the lead (4), switch (5), lead (6), solenoid (7), lead (8) to the battery (9) and lead (11) back to the generator; also through wire (13), lever (14), resistance device (17), wire (18), lamps or translating devices (12) and back to the generator through the lead (11). Some current will also flow through wire (19), resistance device (20), wire (21), to the lamps, and some also through wire (19), wire (23),

resistance device (22) and wire (24) to the lamps or translating devices. A small current will also flow through the wires (28) and (29) and solenoid (27).

By properly designing and adjusting the solenoid (7), spring (15) and resistance device (17), the said solenoid (7) may be caused to insert resistance in the lamp or translating circuit by movement of the lever (14) in such manner as to practically compensate for the rise in voltage which would ordinarily take place when the current delivered by the generator is raised from zero to its usual maximum amount and vice versa. In this manner the solenoid (7) may be made to hold the voltage upon the lamps or other translating devices practically constant throughout changes in speed of the generator or throughout changes in the output thereof varying from zero to its normal maximum current. However, if the batteries shall have become charged to that point that their voltage shall have risen beyond the normal, then the usual current variation through the solenoid (7) will be accompanied by wide alteration in the voltage necessary to cause such current, and the corresponding steps of the resistance inserted in the lamp or translation circuit by the movement of the lever (14) will require considerable change in order that such movement will cause the proper insertion of resistance to compensate for the variation in voltage. The solenoid (27), if properly designed and the spring (26) properly adjusted, may be so arranged that, upon this rise in voltage, the resistance (20) will be increased in such manner as to properly increase the amount of the lamp current which will have to be carried by the resistance (17) and in this way increase the drop therein in such manner as to cut down the voltage upon the lamp or translation circuit to compensate for the increase in voltage across the battery.

Adjustment of the relation between (17) and (20) may be accomplished by a proper shunt indicated at (22), if desired.

From the above it will be evident that I have shown a current operated regulator for varying the resistance in the lamp or translation circuit to compensate for rise in voltage due to varying currents supplied by the generator, and that I have also shown means whereby the values of the resistances inserted by said current operated means are determined by the voltage upon the storage battery or upon some portion of the work or translation circuit.

I claim—

1. The combination with a dynamo or generator, a storage battery, a lamp or translation circuit, and means for varying the voltage upon the lamp or translation circuit dependent upon the output of the generator, of means whereby said variation due to the output of the generator is dependent upon the voltage of the battery.

2. The combination with a generator, a storage battery and a translation circuit, of means whereby changes in output of the generator cause corresponding changes in the resistance of the lamp circuit, and means whereby the extent of such changes in the lamp circuit resistance depends upon the voltage across the battery.

3. The combination with a generator, a storage battery and a lamp or translation circuit, of means whereby variation in the output of the generator causes a compensating variation in the resistance in the lamp circuit, and means whereby the degrees of said compensation, effected by the output of the generator, vary in accordance with the voltage upon the storage battery.

4. The combination with a dynamo or generator, a storage battery, and a lamp or translation circuit, of means for inserting resistance in the translation circuit, depending upon the output of the generator, and means for determining the amount of resistance inserted, depending upon the voltage across the battery.

5. The combination with a generator, a storage battery and lamps or other translating devices, a magnet in series with the generator, voltage regulating means in series with the lamps or translating devices and means where by said magnet operates said voltage regulating means, of independent voltage regulating means whereby the voltage across the battery determines the amount of variation caused by the action of said magnet.

6. The combination with a dynamo, a storage battery and a translation circuit, of means for varying the voltage upon the translation circuit, dependent for its action upon the output of the generator, and means governing the effect of such action dependent upon the voltage of the battery.

7. The combination with a dynamo, a storage battery and a translation circuit, of means for varying the voltage upon the translation circuit, dependent for its action upon the output of the generator, means for governing the effect of such action dependent upon the voltage of the battery, and means for adjusting the amount of effect produced by said voltage actuated means.

8. The combination with a generator, a main circuit containing a magnet, a storage battery, a lamp or translation circuit, and means whereby said magnet inserts resistance in the lamp or translation circuit, of means for varying the effect produced by said resistance, thus inserted, operated by a magnet in shunt to the storage battery.

9. The combination with a generator and a main circuit containing a magnet, a storage

battery, a work circuit, and means whereby said magnet inserts resistance in the work circuit, of a shunt for varying the effect of said resistance, thus inserted, operated by a magnet affected by the battery voltage.

10. The combination with a generator, a storage battery, a lamp or translation circuit, and means for varying the voltage upon the lamp or translation circuit dependent upon the output of the generator, of means for altering the effect of such voltage varying means, depending for its action upon the voltage across the battery.

11. The combination with a generator and its main circuit, a magnet in said main circuit, a storage battery and lamps or translating devices, a variable resistance between the storage battery and the lamps or translating devices, operated by said magnet, of a variable resistance in shunt to said resistance in the lamp circuit, dependent in amount upon the voltage across the battery.

12. In a system of electrical distribution, translating devices and a voltage regulator for the translating devices comprehending a voltage governed rheostat having always an appreciable resistance and voltage varying means in shunt relation thereto having during its operation a point of negligible resistance.

13. Means for governing the voltage upon an electric circuit comprehending a voltage operated carbon rheostat in said circuit in shunt to an automatic rheostat adapted to short circuit said carbon rheostat.

14. A system of electrical distribution comprehending a generator, a storage battery, translating devices, a voltage operated rheostat for governing the voltage upon the translating devices and current operated means in shunt to said voltage operated rheostat adapted to short circuit the same.

15. Means for regulating an electric circuit comprehending a voltage controlled variable resistance therein having always an appreciable value and automatic means for reducing the resistance in said circuit below the minimum value of said variable resistance.

16. Means for regulating an electric circuit comprehending a carbon pile resistance in said circuit, voltage operated means for controlling said carbon pile and automatic means for reducing the resistance in said circuit below the minimum resistance of said carbon pile.

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