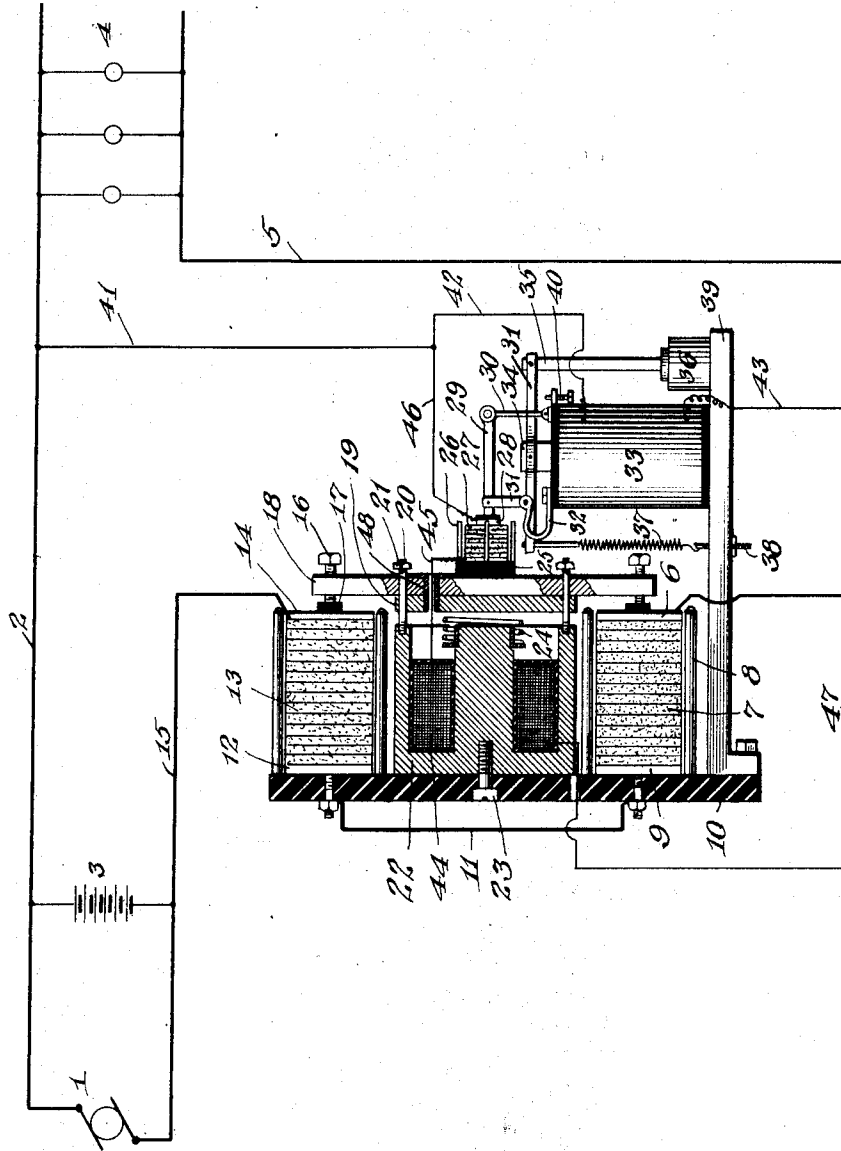


J. L. CREVELING.
ELECTRIC REGULATION.
APPLICATION FILED SEPT. 16, 1910.

1,042,770.

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WITNESSES

A. Crocker
W. Gillock

INVENTOR

John L. Creveling

UNITED STATES PATENT OFFICE.

JOHN L. CREVELING, OF NEW YORK, N. Y., ASSIGNOR TO SAFETY CAR HEATING AND LIGHTING COMPANY, A CORPORATION OF NEW JERSEY.

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 an electric circuit in response to changes tending to take place within a circuit.

My invention has for its particular object to provide means whereby the current in a circuit or the voltage across a circuit may be automatically governed in a predetermined manner.

As my invention is particularly applicable to systems of electric distribution wherein it is desired to hold a constant voltage upon a translation circuit throughout changes in voltage at the source from which the same is supplied, it will be described with reference to such a system.

The drawing is a diagrammatic representation of one type of system comprehending my invention.

In the drawing 1 represents a dynamo or generator, the positive brush of which is in communication with the lead 2 carried to one side of the storage battery 3 and lamps or translating devices 4. The other side of the translating devices 4 is carried to the main 5 which leads to the contact member 6 in electrical communication with one end of the carbon pile resistance 7 supported as by insulating rods 8 carried by the base 10. The other end of the carbon pile 7 is in electrical communication with the contact member 9 and is connected as by wire 11 with the contact member 12 in communication with one end of the carbon pile 13, the other end of which communicates with the contact member 14 from which the lead 15 is carried to the negative side of the battery 3 and the negative side of the generator 1. The contact members 6 and 14 are provided with insulating bushings 17 which engage the screws 16 carried by the movable arms 18 which are attached to the armature 19 of iron or other magnetic material. The armature 19 is free to move upon the rods 20 of brass or other non-magnetic material and its limit of travel in a right-handed direc-

tion is governed by the nuts 21. The rods 20 are carried by the magnet frame 22 secured to the base 10 as by the screw 23.

24 is a compression spring normally tending to move the armature 19 away from the magnet frame 22. Upon the member 18 is placed an insulating member 25 provided with insulating rods 26 for carrying a small carbon pile 27, one end of which is in electrical communication with the conducting member 28 insulated from and carried by the rod 29, one end of which is pivotally supported by the link 30 and the other end of which is engaged by the bell-crank lever 31 mounted upon the solenoid 33. The solenoid 33 is provided with the core 34 so arranged that excitement of the solenoid tends to draw the core downwardly and depress the lever 31 in such manner as to lessen the pressure upon the carbon pile 27.

35 is a rod pivotally connected with one end of the lever 31 and operatively connected with the dash-pot 36 to prevent too sudden movement of the core 34 if desired.

37 is a spring adjustable as by screw 38 tending to swing the lever 31 in such direction as to raise the core 34 against the attraction of solenoid 33. The solenoid 33 and dash-pot 36 may be mounted upon a bracket 39 carried by the base 10.

40 is a limiting screw for limiting the travel that can be given the lever 31 by the solenoid 33. One end of the winding of solenoid 33 is connected with the lead 2 as by means of wires 41 and 42 and the other end with the main 5 as by wire 43.

44 represents a winding upon the magnet frame 22 having one end connected, as by wire 45 passing through insulating bushing 48, with one end of the carbon pile 27. The contact member 28, in electrical communication with the other end of the carbon pile 27, is connected as by wire 46 with the wire 41. The remaining terminal of the coil 44 is connected with the main 5 as by wire 47.

The practical operation of my invention is substantially as follows: If the generator 1 be operating and supplying current to the storage battery 3 and translating devices, current will flow through the lead 2, translating devices 4 and main 5 to the contact piece 6, thence through carbon pile 7 to contacting member 9, thence through wire 11 to contacting member 12, carbon pile 13 and contacting

member 14 to lead 15 through which it will return to the generator 1. Current will also flow from the lead 2 through wire 41 and wire 46 to carbon pile 27, through said pile and thence through wire 45 to winding 44 5 and thence through wire 47 to the main 5. This current will tend to cause the magnet 22—44 to attract the armature 19 against the action of spring 24 in such manner as to 10 compress the carbon piles 7 and 13 and reduce the resistance thereof to a minimum, the degree of pressure brought upon the said piles depending, of course, upon the degree of excitation of the winding 44 which 15 in turn will depend upon the resistance of the carbon pile 27 in series therewith. Current will also flow from the lead 2 through wire 41, wire 42, winding of solenoid 33 and wire 43 to the main 5. This current will 20 tend to draw the solenoid core 34 downwardly and move the lever 31 against the action of spring 37 so as to increase the resistance 27 and decrease the current in the winding 44 and thus decrease the pressure upon the carbon piles 7 and 13 and increase 25 the resistance thereof, and I so adjust the spring 37 that when the normal voltage across the translating devices 4 is reached, any increase in voltage will cause the core 30 34 to be drawn downwardly and the resistance 27 to be increased and any fall in voltage across the translating devices 4 will allow the spring 37 to raise the core 34 and thus increase the pressure in the carbon pile 27 and decrease the resistance thereof 35 so as to increase the current flowing in the winding 44 and cause the magnet 22—44 to increase the pressure upon the piles 7 and 13 and decrease the resistance thereof. 40 Thus it will be obvious that any departure in voltage across the translating devices from the normal will cause the resistance of the piles 7 and 13 to be so varied as to compensate for the same. It will also be noted 45 that as the core 34 is depressed so as to lessen the pressure upon the pile 27 and thus weaken the winding 44 to decrease the pressure upon the piles 7 and 13, the armature 17 carrying the member 25 and the carbon pile 27 will also move in the same direction 50 as does the contact member 28 in such manner as to tend to cause the carbons 27 to again be compacted and their resistance lowered in such manner as to tend to increase the current in the coil 44 and thus 55 counteract the change made by the depression of core 34 in such manner as will obviously prevent hunting.

I do not wish in any way to limit myself 60 to the exact details of construction indicated in the accompanying drawing which is a mere diagrammatic representation of one form of apparatus embodying my invention.

It will be obvious that wide departure 65 may be made in the way of construction

without departing from the spirit of my invention which is as set forth in the following claims:

1. Means for regulating an electric circuit comprehending a regulating element, 70 electromagnetic means for controlling the same; electromagnetic means for governing said controlling means, comprehending means whereby increase in current in the last named electromagnetic means causes a 75 decrease in current in the first named electromagnetic means, said means being affected by the first named electromagnetic means.

2. Means for regulating an electric circuit comprehending a resistance varying 80 means, electro-magnetic means tending to decrease the resistance thereof, electro-magnetic means tending to reduce the effect of the first-named electro-magnetic means, and affected by the action of the first named 85 electro-magnetic means.

3. Means for regulating an electric circuit comprehending a resistance varying element in said circuit; electromagnetic means 90 tending to reduce the resistance thereof and electro-magnetic means for controlling the first-named electro-magnetic means and affected by the action thereof.

4. Means for regulating an electric circuit comprehending resistance varying 95 means, electro-magnetic means for reducing the resistance thereof, a carbon pile in series with said electro-magnetic means and affected by the action thereof and electro-magnetic means for varying the resistance 100 of said carbon pile.

5. Means for regulating an electric circuit comprehending a resistance varying element, electro-magnetic means tending to reduce the resistance thereof, means for varying 105 the current in said electro-magnetic means affected by the operation thereof and electro-magnetic means for varying the effect of the last-mentioned means.

6. Means for regulating an electric circuit comprehending a carbon pile, an electro-magnet and an armature separated by a narrow air gap, means whereby attraction 11 between said electro-magnet and its armature, compresses the carbon pile, means for governing the current in said electro-magnet, comprehending a resistance varying element, affected by the motion of said armature to vary the resistance thereof, and electro-magnetic means for controlling the resistance of said last-named resistance element. 15

7. Means for regulating an electric circuit comprehending current controlling means, an electro-magnet and an armature 1 separated by a narrow air gap, means whereby attraction between said electro-magnet and its armature lessens the effective resistance of the current controlling means, means 1 for governing the current in said electro-

magnet comprehending a resistance varying element affected by the motion of said armature to vary the resistance thereof, and electro-magnetic means for regulating the resistance of said last-named resistance element.

5 8. Means for regulating an electric circuit comprehending a circuit controlling element, electro-magnetic means for controlling the same comprising an electro-magnet
10 and an armature separated by a narrow air

gap, variable resistance for controlling the operation of said electro-magnetic means, means affected by the motion of said armature tending to vary said resistance and electro-magnetic means for governing said resistance.

JOHN L. CREVELING.

Witnesses:

CHAS. MCC. CHAPMAN,
M. HERSKOVITZ.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."