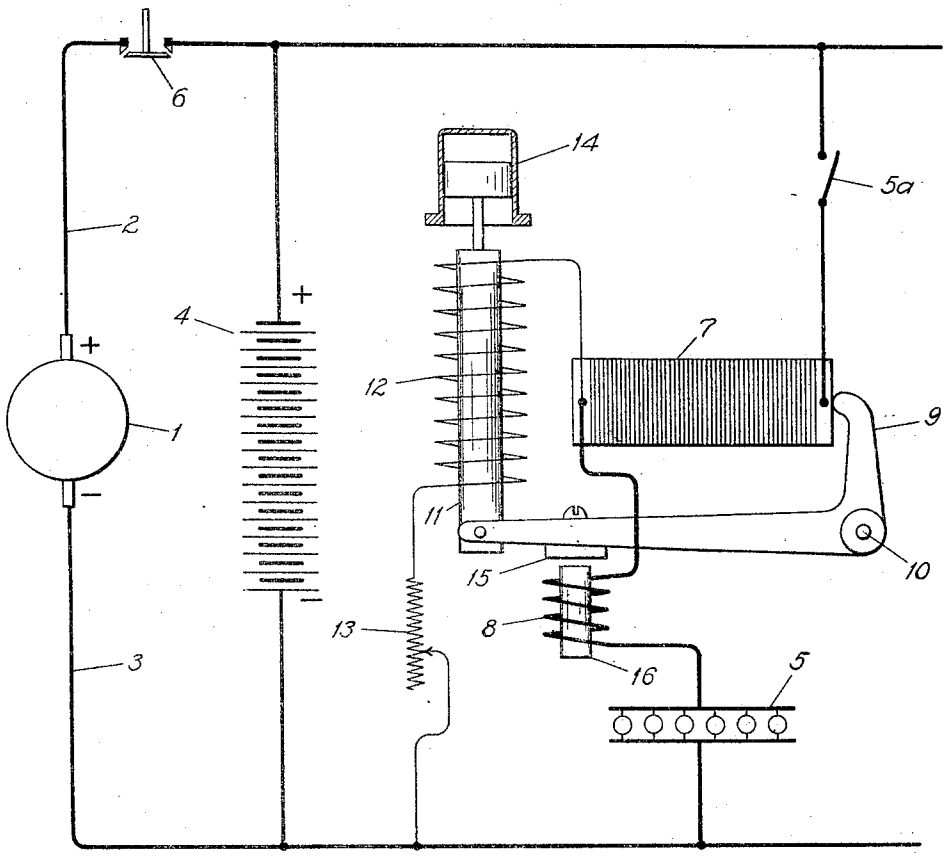
W. A. TURBAYNE.

LAMP VOLTAGE REGULATOR.

APPLICATION FILED JULY 23, 1917.

1,367,845. **Patented Feb. 8, 1921.**



WITNESS:

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LAMP VOLTAGE-REGULATOR.

1,367,845. Specification of Letters Patent. Patented Feb. 8, 1921.

Application filed July 23, 1917. Serial No. 182,307.

To all whom it may concern:

Be it known that I, WILLIAM A. TURBAYNE, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented new and useful Improvements in Lamp Voltage-Regulators, of which the following is a specification.

The present invention relates to lamp voltage regulators.

More particularly the invention relates to improved regulating means adapted to be inserted between the storage battery and translating devices in a system having a variable voltage source, as for instance, a car-lighting system. A great deal of difficulty has been experienced with lamp voltage regulators in use in car-lighting systems, for the reason that they are called upon to take care of wide variations in the supply voltage and wide variations in the lamp load. For instance, a heavy load may be used when the generator is inoperative. At this time the resistance of the lamp regulator should be very small. At other times a low lamp load is used when the voltage across the terminals of the storage battery is high. At such times it is necessary that the lamp voltage regulator have a considerable resistance.

An object of the present invention is to provide a lamp voltage regulator having a maximum range and involving only simple mechanism.

A further object is to provide a lamp voltage regulator which will provide close regulation over a wide range.

A further object is to provide a lamp voltage regulator of the compressible pile type in which the action of the compressible pile is controlled by the lamp load in a novel manner.

Further objects will be apparent as the description proceeds.

The one figure of the drawing represents diagrammatically one embodiment of the present invention.

The numeral 1 indicates a generator which may be driven from the car axle. Any preferred regulating means may be employed for procuring the desired characteristic of said generator. Said generator is adapted to supply mains 2 and 3. Across these mains 2 and 3 is connected a circuit containing a storage battery 4 and a second circuit containing lamps 5. An automatic switch 6 is interposed in the main 2 between the generator 1 and the storage battery 4. A lamp switch 5^a will be provided for throwing the lamps entirely out of circuit with the generator and storage battery when desired.

The lamps 5 have in series therewith a compressible pile rheostat 7 and a solenoid 8. The compressible pile 7 is operated upon by a bell crank lever 9 pivoted at the point 10. The bell crank lever 9 is operated by a plunger 11 which is adapted to move within a solenoid 12 which is connected across the circuit of the lamps 5 through an adjustable resistance 13. A dash-pot 14 may be provided to steady the action of the plunger 11.

The bell crank lever 9 carries an armature 15 adapted to coöperate with the core 16 which is located within the solenoid 8.

A mode of operation of the above described embodiment of the present invention is substantially as follows.

When only a low lamp load is being taken, the solenoid 8 will not be energized to a sufficient extent to exert an appreciable effect upon the bell crank lever 9. At this time, therefore, said bell crank lever 9 will be responsive to the solenoid 12 to so control the compressible pile rheostat 7 as to maintain substantially constant voltage across the lamps 5. As the plunger 11 approaches its lowermost position, as when the voltage impressed upon the mains 2 and 3 is reduced, the armature 15 will be brought closer to the core 16, whereby solenoid 8 will have a progressively increasing effect. Furthermore, as the lamp load is increased, said solenoid will have an increasing effect, whereby the bell crank lever 9 will be operated to compress the disks of the compressible rheostat 7 to thereby reduce the drop in said rheostat. At the time when maximum load is being taken by the lamps and minimum voltage is being impressed upon the mains 2 and 3, said bell crank lever 9 will be urged with maximum effort to compress the rheostat 7, whereby its resistance will be a minimum.

One embodiment of the present invention has been described in detail. Many modifications will occur to those skilled in the art. It is intended that this patent shall

cover all such modifications that come within the scope of the invention as defined by the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is—

1. In a car-lighting circuit, in combination, a variable speed generator, a storage battery charged thereby, a translation circuit in parallel with said battery, said translation circuit including translating devices and a series connected compressible rheostat, mechanical operating means for said rheostat, controlling means for said operating means responsive to voltage change across said translating devices, and controlling means for said operating means responsive to current changes in said translation circuit, said current responsive means being inoperative to control said operating means when the load on said translating devices is low.

2. In combination, a compressible rheostat, mechanical means for operating same including a pair of armatures, a voltage solenoid coöperating with one of said armatures for moving said means in one direction, and a current-responsive solenoid cooperating with the other armature for moving said means in the opposite direction, said current responsive solenoid being adapted to become effective to control said mechanical means only upon material decrease in effectiveness of said voltage solenoid.

3. In combination, a circuit to be regulated, a compressible rheostat in series with said circuit, means responsive to the voltage across said circuit for operating said rheostat, and means responsive to the current in said circuit for operating said rheostat, said current-responsive means being adapted to become effective to operate said rheostat only upon material decrease in effectiveness of said voltage responsive means.

4. In combination, a circuit to be regulated, a compressible rheostat in series with said circuit, means responsive to the voltage across said circuit for operating said rheostat to increase the resistance of said rheostat, and means responsive to the current in said circuit for decreasing the resistance of said rheostat, said current-responsive means being adapted to become effective to operate said rheostat only upon material decrease in effectiveness of said voltage responsive means.

5. In combination, a compressible rheostat, mechanical means for operating said rheostat, a voltage solenoid for operating said means in one direction, an armature carried by said means, and a current-responsive solenoid coöperating with said armature for operating said means in the opposite direction, said current-responsive solenoid being adapted to become effective to operate said mechanical means only upon material decrease in effectiveness of said voltage solenoid.

6. In combination, a compressible rheostat, mechanical means for operating said rheostat, voltage controlled means for operating said rheostat to increase the resistance of same, and current-controlled means cooperating with said mechanical means for tightly compressing said rheostat, said current-responsive means being adapted to become effective only upon material decrease in effectiveness of said voltage-responsive means.

7. In combination, a circuit to be regulated, a compressible rheostat in series with said circuit, voltage controlled means for controlling said rheostat to maintain substantially constant the voltage maintained across said circuit, and means responsive to the current flow in said circuit for causing compression of said rheostat, said last mentioned means being operative to exert a substantial effort only when the effectiveness of said voltage controlled means is materially decreased.

In witness whereof, I have hereunto subscribed my name.

WILLIAM A. TURBAYNE.