J. BIJUR.

LIGHTING SYSTEM.

APPLICATION FILED DEC. 21, 1910.

1,304,934.

Patented May 27, 1919.

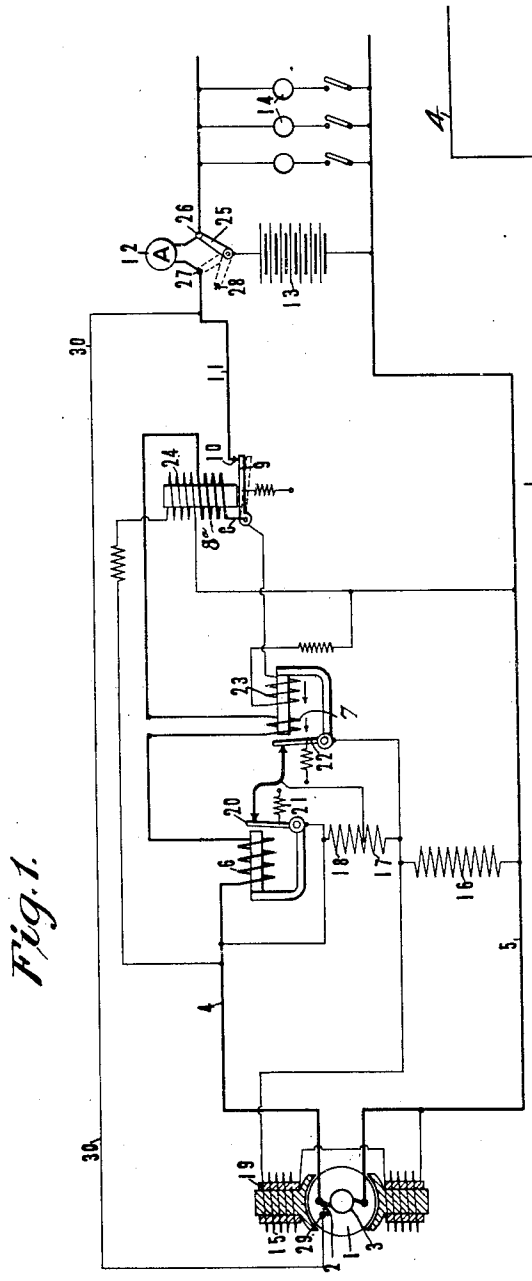


Fig. 1.

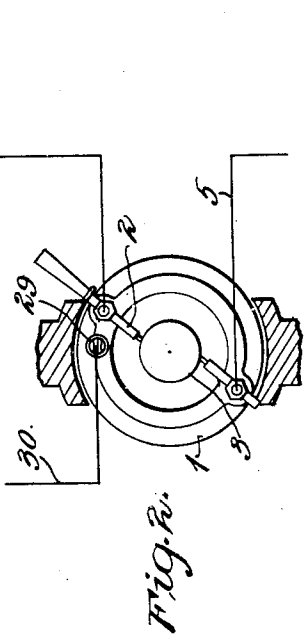


Fig. 2.

WITNESSES

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LIGHTING SYSTEM.

1,304,934. Specification of Letters Patent. Patented May 27, 1919.

Application filed December 21, 1910. Serial No. 598,532.

To all whom it may concern:

Be it known that I, JOSEPH BIJUR, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Lighting Systems, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to electrical systems of distribution and regulation and with regard to the more specific features thereof, to systems of the above type peculiarly adapted for use on automobiles. One of the objects thereof is to provide sensitive and efficient controlling and regulating apparatus for current lead to a storage battery or translating devices or both. Another object is to provide apparatus of the above type of a simple construction and reliable action. Other objects are to provide means enhancing the durability of parts in regulating apparatus under conditions of practical use and means for guarding against the building up of the generator field with a wrong polarity. Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawing is shown one of various possible embodiments of this invention.

Figure 1 is a diagrammatic plan. Fig. 2 is a diagrammatic detail of a circuit changing device.

Similar reference characters refer to similar parts throughout both figures of the drawings.

Referring now to this drawing in detail, there is indicated at 1 a shunt wound generator, the brushes 2 of which lead from the commutator 3 to the mains 4 and 5. The main 4 passes through a series coil 6 and a second series coil 7 to a main switch 8 from which the switch member 9 leads to a contact 10 and thence to a conductor 11 having serially disposed therein the ammeter 12. The conductor or main 5 leads directly to a battery 13 and lamps or other translating devices 14 bridged between the same and the conductor 11.

Connected in parallel with the shunt field winding 15 is a resistance element 16 and serially disposed in this field circuit as well as serially related one to another are resistance elements 17 and 18, the latter being of the greater value or higher ohmic resistance.

Fitted about the field magnets of the generator within the windings are copper sleeves 19, the purpose of which will hereinafter be described.

The resistance element 18 is provided with a shunting circuit comprising a vibratory member 20 normally urged against its circuit completing contact as by the spring 21. Operatively related to this member and tending to attract it into open circuit position is the coil 6.

In like manner shunting the resistance element 17 is a vibratory member 22 controlled by a voltage coil 23 bridged across the generator mains and having associated therewith the turns of current coil 7.

Likewise bridged across the generator mains is a voltage coil 24 coacting with the coil 8^a and tending to draw the switch member 9 into circuit closing position.

The connection of the battery branch to the main 11 comprises a switch 25 adapted to coact with contacts 26, 27 and 28. While resting against contact 26, as shown in full lines, the ammeter 12 measures the total generator output. If this switch be moved to contact 27 the ammeter measures the total lamp current from the generator and battery, whereas if it be moved to contact 28 the battery circuit is opened and the ammeter indicates the current passing from the generator to the lamps.

A contact 29 is formed adjacent one of the brushes 2 and this contact is connected as by conductor 30 with the main 11 adjacent the battery. These parts are so related that the brush 2 may be swung upwardly as indicated in dotted lines to break the armature circuit and complete a circuit from the battery through the generator field.

The operation of the above described embodiment of this invention is substantially as follows:—

Assuming the battery charge to be depleted, as the generator builds up the coil 24 of main switch 8 will at a certain stage develop sufficient field to close the switch 9

whereupon the main circuit is complete to the battery. The main switch acts in the ordinary manner in preventing back discharge from the battery should the generator slow down. The charging of the battery may now proceed with full current, this current being limited only by the capacity of the generator and by the danger of overload. The latter contingency is guarded against by the action of the coil 6 as this element is so proportioned that upon the limit of safe current being reached it will attract the member 20 breaking the shunt about the resistance element 18 and thus largely increasing the resistance of the field circuit and weakening the field. Such action tends to cut down the current permitting the member 20 to be retracted by its spring and a vibratory motion of this part will take place. In like manner an excessive voltage is guarded against by the coil 23 acting upon the vibratory member 22. The coil 23 acts cumulatively with the coil 7 in its effect upon the vibratory member 22. Coil 7 is of extremely few turns and, under ordinary conditions, its independent effect is almost negligible so that the total field acting upon member 22 is substantially proportional to the voltage across the mains. This coil 7 acts to reduce slightly the voltage maintained as the current rises, and in the event of an extreme overload, would be in itself sufficient to open-circuit the shunt about resistance 17 and thus protect the generator, even though coil 6 and the mechanism controlled thereby should for any reason fail to act. Moreover, the effect of coil 7 tends to bring the vibratory member 22 into slightly more frequent use than would otherwise be the case and thus tends to equalize the action of the two vibratory members. It may be noted that the resistance element 18 may be of greater value than that of resistance element 17, whereby a greater resistance would be thrown into the field circuit to guard against overload, as by short circuiting, than might be required in the case of excessive voltage. In this manner the potential drop in the resistance 17 would be less than would otherwise be necessary and the tendency to spark at the vibratory member 22 would be correspondingly reduced. Any tendency to spark at these vibrating members is furthermore reduced to negligible proportions by the provision of the copper sleeves 19 about the field magnets which are readily susceptible to eddy currents. These eddy currents react upon the inducing current of the field windings and materially neutralize their self inductive effect. The resistance element 16 in shunt to the fields permits the use of lower values in the resistance elements 17 and 18, for a given proportional change in the field current, and thus reduces the I R. drop due to field current in the latter elements with a still further reduction of any tendency to sparking at the vibratory members. It may be noted that the action of this shunt in reducing sparking is extremely effective.

If the apparatus is first used with a charged or partially charged battery the brush 2 is swung against the contact 29 before starting the generator and the battery discharges back through the shunt field in such direction as to polarize it properly for charging when the brush is again swung against the commutator and the generator started.

It will thus be seen that there is provided apparatus in which the objects of this invention are fully achieved and that in this apparatus the generator is utilized to its fullest safe capacity and yet constantly guarded against unsafe overload. The parts are simple and cheap in construction but are nevertheless durable and reliable in action and well suited for the most severe practical use.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In apparatus of the class described, in combination, a generator having a shunt field winding, a resistance in series with said field winding, a resistance element disposed in parallel with said field winding, means shunting said first resistance element, and electro-magnetic means adapted to change the current passing through said shunting means.

2. In apparatus of the class described, in combination, a generator having a shunt field winding, a resistance element disposed in parallel with said field winding, a resistance in series with said field winding, shunting means about said second resistance comprising a vibratory circuit-completing member, and electro-magnetic means adapted to vibrate said member.

3. In apparatus of the class described, in combination, a generator having a shunt field winding, a resistance element disposed in parallel with said field winding, a resistance element in series with said field winding, means comprising a vibratory member shunting said second resistance element, and means comprising a coil wound and connected to present a field substantially proportional to the voltage of said generator adapted to act upon said vibratory member

to change the current passing through said shunting means.

4. In apparatus of the class described, in combination, a generator having a shunt field winding, a pair of resistance elements in series with said field winding and with each other, shunting means about each of said resistance elements, each of said shunting means comprising a vibratory member, means comprising a coil wound and connected to present a field substantially proportional to the current output of said generator and adapted to control one of said vibratory members, and means comprising a coil wound and connected to present a field substantially proportion to the voltage of said generator and adapted to control the other of said vibratory members.

5. In apparatus of the class described, in combination, a direct current generator having a shunt field winding, a pair of resistance elements serially connected in said field winding, a pair of separate shunts respectively disposed about said resistance elements, and electro-magnetic means responsive to one function of the output of said generator to open one of said shunts and responsive to another function to open the other shunt, each of said shunts comprising a vibratory member under control of said electro-magnetic means.

6. In apparatus of the class described, in combination, a generator having a shunt field winding, a pair of resistance elements in series with the said field winding, shunting means about each of said resistance elements, each shunting means comprising a vibratory member, a coil wound and connected to present a field substantially proportional to the current output of said generator actuating one of said vibratory members, and a coil wound and connected to present a field substantially proportional to the voltage of said generator actuating the other of said vibratory members.

7. In apparatus of the class described, in combination, a generator having a shunt field winding, a pair of resistance elements in series with the said field winding, shunting means about each of said resistance elements, each shunting means comprising a vibratory member, a coil wound and connected to present a field substantially proportional to the current output of said generator controlling one of said vibratory members, and a coil wound and connected to present a field substantially proportional to the voltage of said generator controlling the other of said vibratory members, the resistance embraced by said current controlled shunt being greater than that embraced by said voltage controlled shunt.

8. In apparatus of the class described, in combination, a direct current generator having a shunt field winding, a pair of resistance elements serially connected in said field winding, a pair of separate shunts respectively disposed about said resistance elements, and electro-magnetic means responsive to one function of the output of said generator to open one of said shunts and responsive to another function to open the other shunt, each of said shunts comprising a vibratory member under control of said electro-magnetic means, and each of said resistance elements being of such value that the opening of the shunt about either of them tends to so reduce the magnetization by which the opening is occasioned that the shunt immediately closes whereby a vibratory regulating action of the shunt breaking member is brought about.

9. In apparatus of the class described, in combination, a generator having a shunt field winding, a resistance element disposed in parallel with said field winding and means independent of said resistance element and comprising a compound coil adapted to control the current flowing through said field and resistance in parallel, said coil comprising a voltage portion connected across said generator and a current portion connected in series with said generator.

10. In apparatus of the class described, in combination, a generator having a shunt field winding, a resistance element disposed in parallel with said field winding, a resistance element in series with said field winding, means comprising a vibratory member shunting said second resistance element, and means comprising a compound coil adapted to act upon said vibratory member to change the current passing through said shunting means, said coil comprising a voltage portion connected across said generator and a current portion connected in series with said generator.

In testimony whereof I affix my signature in the presence of two witnesses.

JOSEPH BIJUR.

Witnesses:
HELEN M. SEAMANS,
LEONARD A. WATSON.