

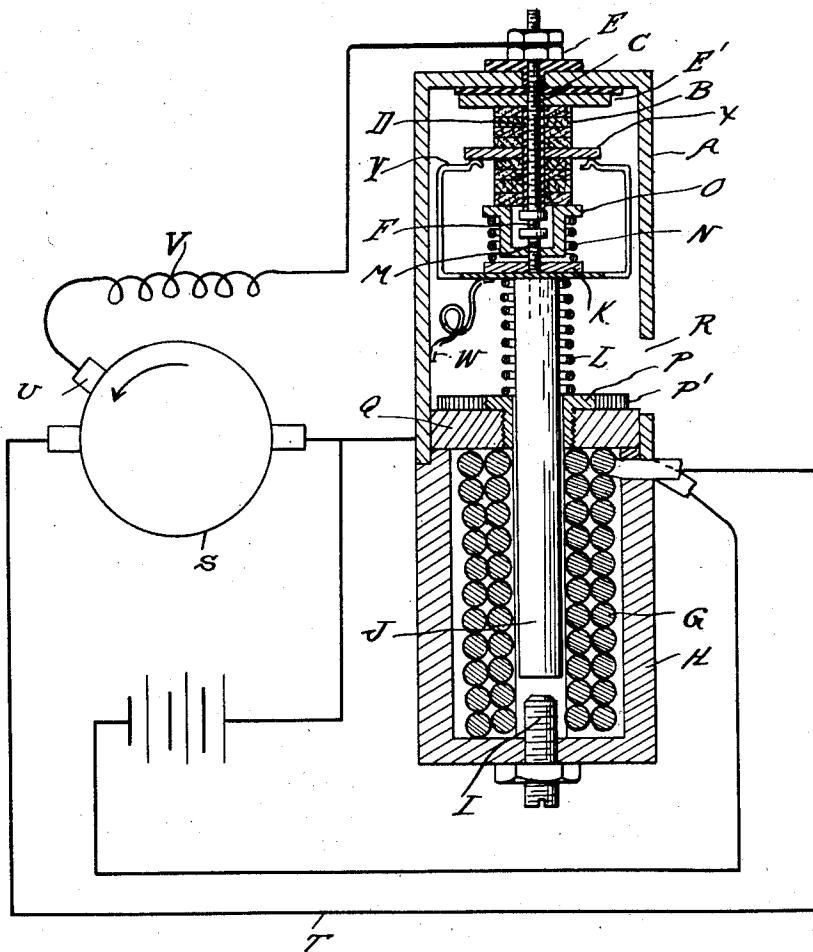
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ELECTRIC GENERATOR REGULATOR FOR MOTOR VEHICLE ELECTRIC SYSTEMS

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ELECTRIC GENERATOR REGULATOR FOR
MOTOR VEHICLE ELECTRIC SYSTEMS

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6 Claims. (Cl. 171-229)

The invention relates to regulators for electric generators and more particularly to constructions adapted for the regulation of generators used in motor vehicle electric systems.

5 It is the object of the invention to obtain a construction which when used with the usual third brush generator will secure greater efficiency while at the same time safeguarding against over generation. To this end the invention consists in the construction as hereinafter set forth.

10 The single figure of the drawing represents my improved regulator in longitudinal section with the electric circuits diagrammatically represented.

15 In the present state of the art it is usual to provide motor vehicle electric systems with a third brush generator which is adjusted to obtain a predetermined maximum charging rate at a predetermined speed of travel of the car. In so adjusting these generators it is usual to place the limit so as to be safe when the generator is first started in operation and is cold. However, after it has been running for some time the heat generated and the consequent increase in ohmic resistance will cut down on the rate of generation, a considerable amount below that to which it was originally set. Thus to safeguard the system the efficiency in ordinary operation is cut down below the desired limit.

20 Heretofore automatic regulators have been used in connection with third brush generators, said regulators comprising a carbon pile variable resistance and electro-magnetic means for varying the pressure thereon. These devices, however, which are designed to increase generation at higher engine speeds, do so at the expense of efficient generation at normal speeds. I have therefore devised a construction which overcomes this objection and by use of which the efficiency of the generator is increased both at abnormally low and abnormally high speeds without interference with its efficiency at normal speeds.

25 My improved regulator comprises a suitable casing A which encloses a carbon pile variable resistance B mounted upon a threaded rod C surrounded by an insulator sleeve D. The rod C is secured to the head of the casing A by nuts E and E' while at the inner end of the rod there is formed an electric contact member F. G is a solenoid preferably enclosed in the casing H of magnetic metal and which is arranged in axial alignment with the casing A. An adjustable stop or pole piece I is secured to the end of the casing H and a magnetic core J extends out from the solenoid into proximity to the carbon pile. The

end of this core has a flanged head K forming an abutment for a spring L which is sleeved upon the member J. There is also an electric contact member M secured to the head K and cooperating with the contact member F to close an electric circuit. Between the head K and the carbon pile B is a spring N for placing a predetermined pressure on the pile when the parts are in position with the contact members F and M closed. This spring N preferably engages a flanged cup shaped member O which encloses the contact members F and M but is spaced therefrom to be out of direct electrical contact therewith. The spring L abuts against an adjustable member P having a threaded engagement with a head Q of the solenoid casing H and this member P is provided with a disk P' having a serrated edge which is accessible through an opening R in the casing A.

The regulator unit being constructed as described, it is connected into the circuit of the third brush generator S as follows: The solenoid G is included in the output line T so that the magnetic effect of this solenoid is varied with changes in current in this circuit. The third brush U of the generator is connected with the field V as is usual and has in series therewith the switch formed by the cooperating contact members F and M, the latter being grounded at W. Thus while the contacts F and M remain closed, the third brush circuit has negligible resistance other than that of the field. However, in adjusting the third brush it may be set for a higher rate of generation than would be safe without the regulator.

During normal operation and up to a speed which will produce the desired maximum current, the contacts F and M remain closed. This is accomplished by the resilient pressure of the spring L which through the adjustable member P can be set to counteract the electro-magnetic pull of the solenoid. When, however, the speed of operation exceeds this limit, the electro-magnetic pull will be sufficient to draw the core J inward overcoming the resistance of the spring L and separating the contacts F and M. This will at once throw into the field circuit the resistance of the carbon pile B, but inasmuch as this pile is under compression due to the spring N its resistance will not be excessive. I may and preferably do further cut down the initial resistance of the pile by placing a contact plate X at an intermediate point in the pile B and provide one or more contact brushes Y for engaging the member X and forming a ground connection thereto.

Thus when the contacts F and M initially separate, the only resistance which is thrown into the field circuit is that of the upper portion of the carbon pile between the member X and the upper end of the pile.

After initial separation of the contact members F and M if the current generation is still excessive, the increased magnetic pull of the solenoid will draw the core J further inward, breaking the contact between the brushes Y and member X so as to include the resistance of the full length of pile in the field circuit. Further rise in the current output will draw the core member J into the solenoid and by movement of the abutment K will lessen the tension on the spring N. This reducing pressure on the carbon pile will increase the resistance thereof which increase is quite rapid and will be effected by comparatively slight increase in current production. Thus for increasing engine speeds above normal the increasing resistance in the field circuit will prevent an objectionable rise in current generation.

Stated in another way, with my improved regulator it is safe to adjust the third brush of the generator so that without the regulator the current generation at higher engine speeds would be dangerously high. With such an adjustment the generation at abnormally low speeds is greater than with the usual setting, while the operation of my regulator will prevent any objectionable over-generation at high speeds.

While my improved regulator is particularly adapted for use in connection with the third brush generator, it may also be used advantageously in connection with a shunt generator. Also the construction is one which can be conveniently arranged in a motor car at a point adjacent to the driver's seat.

What I claim as my invention is:

1. In a motor vehicle electric system including an engine driven generator of the shunt field type, a regulator comprising electro-magnetic means energized by and in proportion to the current output of the generator, a carbon pile variable resistance in series with said shunt field, a spring for placing a pressure on said pile, an abutment for said spring, a shunt around said pile, a circuit opener in said shunt including co-operating contacts, one of which is mounted on said abutment, a spring bearing on said abutment in opposition to said first mentioned spring and normally holding said contacts closed, and means operated by said electro-magnetic means in opposition to said last mentioned spring to first separate said contacts and to then progressively decrease the tension on said first mentioned spring to correspondingly increase the resistance of said carbon pile.

2. In a motor vehicle electric system including an engine driven generator of the shunt field type, a regulator comprising electro-magnetic means energized by and in proportion to the current output of the generator, a carbon pile variable resistance in series with said shunt field, a spring for placing a pressure on said pile, an abutment for said spring, a shunt around said pile, a circuit opener in said shunt including co-operating contacts, one of which is mounted on said abutment, a spring bearing on said abutment in opposition to said first mentioned spring and normally holding said contacts closed, manually adjustable means for varying the tension of said last mentioned spring and means operated by said electro-magnetic means in opposition to said last mentioned spring for moving

said abutment to first separate said contacts and open said shunt and to then progressively decrease tension of said first mentioned spring to correspondingly increase the resistance of said carbon pile.

3. In a motor vehicle electric system including an engine driven generator of the shunt field type, a regulator comprising electro-magnetic means energized by and in proportion to the current output of the generator, a carbon pile variable resistance in series with said shunt field, a spring for placing a pressure on said pile, an abutment for said spring, a shunt around said pile, a circuit opener in said shunt including co-operating contacts, one of which is mounted on said abutment, a spring bearing on said abutment in opposition to said first mentioned spring and normally holding said contacts closed, an abutment for the opposite end of said last mentioned spring manually adjustable to vary the tension on said spring, and means operated by said electro-magnetic means for moving said first mentioned abutment to first separate said contacts and open said shunt and to then progressively decrease the tension of said first mentioned spring to correspondingly increase the resistance of said carbon pile.

4. In a motor vehicle electric system including an engine driven generator of the shunt field type, a regulator comprising electro-magnetic means energized by and in proportion to the current output of the generator, a carbon pile variable resistance in series with said shunt field, a spring for placing a pressure on said pile, an abutment for said spring, a shunt around said pile, a circuit opener in said shunt including co-operating contacts, one of which is mounted on said abutment, a spring bearing on said abutment in opposition to said first mentioned spring and normally holding said contacts closed, an abutment for the opposite end of said last mentioned spring manually adjustable to vary the tension of said spring, a shunt around a portion of said pile, a yieldable contact mounted on said first mentioned abutment engaging a cooperating contact to close said last mentioned shunt and means operated by said electro-magnetic means for moving said first mentioned abutment in opposition to said last mentioned spring to first separate the contacts to open the shunt around the entire pile, to subsequently separate said yieldable contact from its cooperating contact to open the shunt about a portion of the pile and to progressively decrease the tension of said first mentioned spring to correspondingly increase the resistance of said pile.

5. In a motor vehicle electric system including an engine driven generator of the shunt field type, a regulator comprising a solenoid energized by and in proportion to the output of the generator, a movable core for said solenoid, a spring sleeved on said core, an abutment for said spring on said core, a carbon pile in alignment with said core, a spring bearing on one end of said pile and having its opposite end engaging said abutment, a shunt around said pile including co-operating contacts, one of which is carried by said abutment being held against the other contact by the tension of said first mentioned spring, an adjustable abutment for engaging the opposite end of said first mentioned spring and adapted to vary the tension thereof, a casing enclosing the parts apertured for access to said last mentioned abutment to permit of adjusting the same.

6. In a motor vehicle electric system including an engine driven generator of the shunt field type, a regulator comprising a solenoid energized by and in proportion to the output of the generator, a movable core for said solenoid, a spring sleeved on said core, an abutment for said spring on said core, a carbon pile in alignment with said core, a spring bearing on one end of said pile having its opposite end engaging said abutment, a shunt around said pile including cooperating contacts, one of which is carried by said abutment being held against the other contact by the tension of said first mentioned spring, a rotary threaded member forming an abutment engaging the opposite end of said first mentioned spring, a casing enclosing the parts and having a threaded bearing for engaging the threads of said rotary member, said casing being apertured for access to said rotary threaded member to adjust the same to vary the tension of the spring.

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