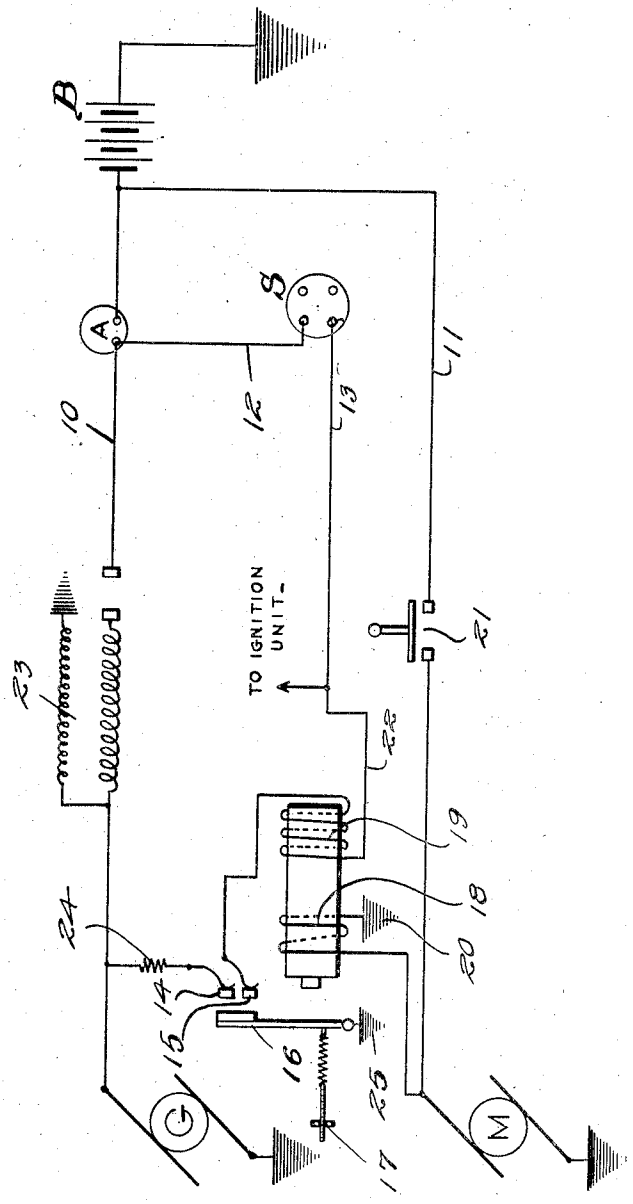
April 26, 1927. 1,626,488

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STORAGE BATTERY SYSTEM

Filed Sept. 14, 1926



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Patented Apr. 26, 1927. 1,626,488

UNITED STATES PATENT OFFICE.

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STORAGE-BATTERY SYSTEM.

Application filed September 14, 1926. Serial No. 135,473.

This invention relates to the storage battery systems of self-propelled vehicles and more particularly to a means for controlling charging of the battery to prevent constant overcharging thereof, which often occurs particularly where the vehicle is employed under conditions where it is operated for long periods with but infrequent stops.

A further and more specific object of the invention is to provide a regulator operating by the current fed to the starting motor during starting of the vehicle for determining whether the entire charge of the generator of the vehicle is fed to the battery or whether a portion of this charge is shunted, so that the charging rate is materially reduced.

A further and still more specific object of the invention is to provide a device of this character which operates at each operation of the starter, so that a change of conditions in the battery will provide the necessary change of the control mechanism to insure a proper charging rate.

A further object of the invention is to provide a device of this character which may be readily and cheaply produced, which is readily connected with the vehicle system without in any manner altering the same and which will be durable and efficient in service.

These and other objects I attain by the construction shown in the accompanying drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

The figure is a diagrammatic illustration of the electric circuit of an automobile, including a regulator constructed in accordance with my invention.

Referring now more particularly to the drawings, wherein I have generally indicated certain portions of the wiring system of a self-propelled vehicle, M designates the starting motor, G the generator, B the battery and S the ignition switch thereof. The system illustrated is the grounded system, one terminal each of the generator G, motor M and battery B being grounded. The remaining terminals of the battery B and the generator G are connected by a wire 10 and the motor M and battery B by a wire 11 and battery B and switch S by a wire 12. The output switch S is led by a wire 13 to the ignition circuit of the vehicle, which is designated by a legend. It will be seen that charging generator ignition and starting motor circuits are provided, each including a common battery B. These circuits may be of any usual construction and need not necessarily be limited to the particular arrangement herein illustrated.

In accordance with my invention, I provide a regulator comprising an electromagnetic switch having stationary contacts 14 and 15 and a movable armature contact 16. This armature contact is spring-biased to retain it in the open position and the spring tension is adjustable, as at 17, so that the force required to close the armature contact upon the contacts 14 and 15 may be regulated. The coil of the electro-magnetic switch is formed in two sections 18 and 19, of which the coil 18 will be hereinafter designated as the closing coil and the coil 19 as the holding coil. The closing coil has one terminal thereof grounded at 20 and the opposite terminal thereof connected in the motor circuit beyond the starting switch 21 thereof. The holding coil 19 has one terminal thereof connected at 22 to the ignition circuit beyond the ignition switch S from the battery B and the opposite terminal thereof connected with the contact 15. The contact 14 is connected between the usual cut-out 23 and the ungrounded brush of the generator through a resistance 24. The armature contact 16 is grounded at 25.

It will be seen that when the starter switch is energized, the closing coil 18 is placed in parallel with the starting motor M. If the current fed from the battery at this time is sufficient, the closing coil 18 will cause the armature contact 16 to close upon the contacts 14 and 15. If, however, the battery is weak, the armature contact 16 will not close and the circuits of the generator, motor and ignition system will remain usual. When the contact is closed, the holding coil 19 is energized from the battery B, so that when the starting switch is open, the contact 16 is held closed. Accordingly, a portion of the current from the generator G, instead of flowing to the battery B to charge the same, will pass through the resistance 24, contacts 14 and 16 and to the ground at 25. When the ignition circuit is open, the bias of the armature will open the circuit at the contacts 14, 15 and 16, so that no current will flow until the starter switch is again operated.

It will be obvious that by use of a regulator of this character, the ordinary opera-

tion of starting the car automatically reduces the portion of the generator output supplied to the battery in event the battery is already fully charged. A device of this character is particularly adapted for use in such systems due to the fact that the current drawn by the motor M during the starting operation is very heavy and accordingly any slight weakness of one or more of the battery cells will result in an insufficient current supply to enable the regulator to close the armature contact 16 upon the contacts 14 and 15. Thus, the battery will always receive a charge when this charge is necessary, even though it may show a full voltage charge under ordinary conditions without being fully charged. A further advantage of the device is that it provides for an occasional overcharge of the battery, an operation which is well known to be beneficial. For example, a battery nearly but not sufficiently charged to cause an operation of the armature contact 16 at the beginning of a long run will receive an overcharge before the run is completed. When, however, the ignition circuit is cut off and the car is again started, the battery will be prevented from receiving all the current generated. Furthermore, a device of this character provides for the proper regulation of charging during cold weather. It is well known that at this time, the discharge voltage of the battery is lower than in warm weather, with the result that current supplied to the regulator is reduced and insufficient to cause an operation thereof. As a greater demand is placed upon the battery in cold weather, charges, which during warm weather, would have an injurious effect upon the battery, merely serve, during cold weather, in keeping the battery in proper condition.

It will be obvious that the device, as herein illustrated, is capable of a considerable range of change and modification without in any manner departing from the spirit of the invention and I accordingly do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. The combination with the electrical systems of vehicles which include generator and starting motor circuits having a common storage battery, the starting motor circuit being normally open, of means rendered operative only by the closing of the starting motor circuit when the storage battery is substantially fully charged for shunting the storage battery in the generator circuit and means for retaining the operativeness of the first named means when the starting motor circuit is again opened.

2. The combination with the electrical systems of vehicles which include generator and starting motor circuits having a common battery, the starting motor circuit being normally open, of a normally opened shunt for the storage battery in the generator circuit, means rendered operative only by closing of the starting motor circuit when the storage battery is substantially fully charged for closing said shunt and means for retaining the shunt closed when the starting motor circuit is again opened.

3. The combination with the electrical systems of vehicles which include generator, starting motor and ignition circuits having a common storage battery, the starting motors and ignition circuits being normally opened, of means rendered operative by the closing of the starting motor circuit when the storage battery has a predetermined charge for shunting the storage battery in the generator circuit and means operative when the ignition circuit is closed while said means is operative for retaining said means in operative position.

4. The combination with the electrical systems which include generator, starting motor and ignition circuits having a common storage battery, the starting motor circuit being normally open, of means rendered operative by the closing of the starting motor circuit when the storage battery has a predetermined charge for shunting the storage battery in the generator circuit and means in the ignition circuit for retaining the first named means in operative position.

5. The combination with the electrical systems of vehicles which include generator, starting motor and ignition circuits having a common storage battery, the starting motor and ignition circuits being normally open, of a normally opened shunt for the storage battery in the generator circuit, an electro-magnetic switch for closing said shunt operated by closing of the starting motor circuit when the storage battery has a predetermined charge and means in the ignition circuit and operative when the ignition circuit is closed for retaining said switch in closed position.

6. The combination with the electrical systems of vehicles which include generator, starting motor and ignition circuits having a common storage battery, the starting motor and ignition circuits being normally open, of a normally opened shunt for the storage battery in the generator circuit, an electromagnetic switch including closing and holding coils, the closing coil shunting the starting motor in the starting motor circuit, the holding coil being open and connected with the ignition circuit beyond the opening thereof, the switch further including an armature contact which when closed completes the circuit of the storage battery shunt and of said holding coil.

In testimony whereof I hereunto affix my signature.

OSCAR CHARLES WIEDERHOLD.