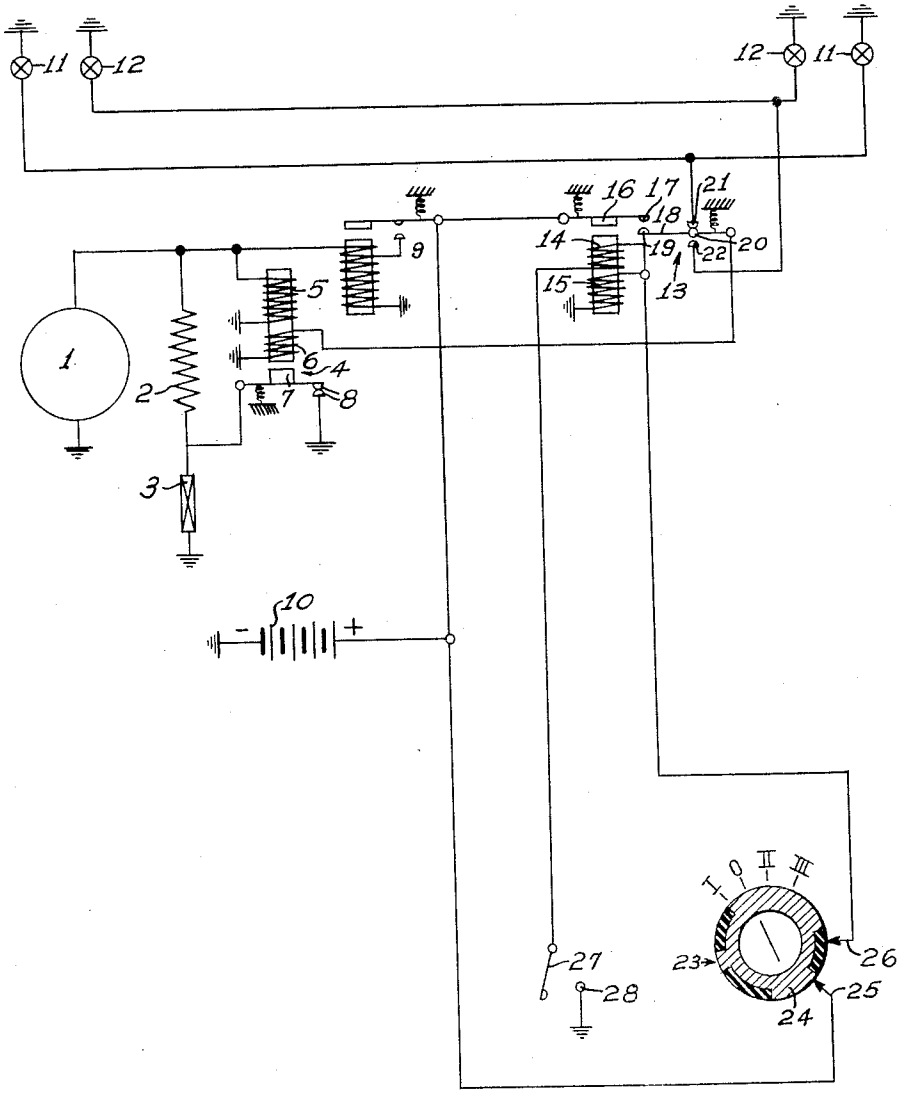
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ELECTRIC CIRCUIT FOR MOTOR VEHICLES

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ELECTRIC CIRCUIT FOR MOTOR VEHICLES

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1 Claim. (Cl. 171—313)

This invention relates to a lighting plant for motor vehicles driven by combustion engines, of the type comprising a light dynamo or electric generator regulated to maintain constant voltage and supplying the head lamps and the battery, and a light switch by which the intensity of the head lights can be varied to meet, for instance, day-time and night-time conditions, between zero and parking light, bright light, dim light etc.

It is an important object of the present invention to provide means, in a plant of the type referred to, by which the voltage available at the terminals of the head lights can be maintained constant under any conditions, independently from the charging conditions of the battery and the distance from the light switch to the head lights.

With this and further objects in view, as may become apparent from the within disclosures, the invention consists not only in the structures herein pointed out and illustrated by the drawing, but includes further structures coming within the scope of what hereinafter may be claimed.

The character of the invention, however, may be best understood by reference to one of its practical forms, as illustrated in the accompanying circuit diagram.

The invention, in a broad aspect, contemplates, in combination, the provision of means for adjusting the voltage regulator for the electric generator, by means of said light light switch, to produce a lower voltage in the "night" position of the light switch than in the "day" position thereof, and the provision of an electromagnetic switch or circuit breaker under control of the light switch, to permit the current to flow from the generator directly, through said electromagnetic switch, to the head lights, without taking the detour through the light switch on the switch board of the driver. In this manner, it is possible to supply to the head lights a substantially constant voltage which practically is not influenced by the charging conditions of the battery, with a minimum voltage drop.

Referring now to the drawing in greater detail, it will be noted that the plant comprises a light dynamo 1 including a field coil 2 and, in series therewith, a resistance 3 that can be short-circuited by an electromagnetic voltage regulator 4 which in turn includes a normal voltage coil 5, an additional voltage coil 6 having a magnetising effect assisting that of coil 5, an armature 7 and two regulator contacts 8, 8. Interpolated between the light dynamo 1 and a battery 10 is an electromagnnetic charging switch 9.

Provided on the front side of the motor vehicle are a pair of bright head lights 11, 11 for road illumination in the open country and a pair of dimmed or city head lights 12, 12. Advantageously, two-filament dimming lamps of the type known, for example, under the trade name of "Bilux" lamps are used for this purpose, one bulb of this type being installed in each main head lamp. For the sake of clarity the additional sources of light usually present on a motor vehicle, such as, parking light, tail light, additional search light, etc., have been omitted.

The circuit is controlled by an electromagnetic switch 13 comprising two voltage coils 14 and 15 magnetising their core in the same sense, as well as an armature 16 whose contact 17 cooperates with a contact 19 on a contact spring 18. Moreover, a double contact 20 on the spring 18 cooperates with two stationary contacts 21, 22.

Mounted in the reach of the driver, for example, on the switch board, is a light switch 23 including a contact cylinder 24 provided for four switch positions, viz—0, I, II and III which are 0 "all off," I "driving in daylight," II "Parking by night" and III "driving by night." The contact cylinder 24 has a plurality of contact segments mounted on its circumference and partly covered with insulating material, as shown, for cooperation with stationary contacts 25 and 26. The contacts provided on the light switch for other purposes besides the head light switching are not shown in the drawing. A dimming switch 27 to be operated from the driver and including a contact 28 serves for switching over from bright to dim light and vice versa. The open position as shown is for bright light and dimming is effected by closing the contact 28.

In the position as shown in the drawing, the light switch 23 is set for "day-time driving." In this case, the contact 26 engages an insulating segment, and the connection to the two coils 14 and 15 of switch 13 is cut off. As a result, the switch 13 takes up the position indicated in the drawing, interrupting supply to the head lamps 11, 11 and 12, 12 and interrupting the connection to the coil 6 of the voltage regulator 4. In this condition, the regulator 4 is influenced merely by the coil 5 and, by periodically switching on and off the resistance 3, regulates the voltage of the generator to a value of, say 7.5 v., thus ensuring full charging of a three-cell lead battery by day-time driving.

In the "night-time driving" position of the

light switch 23, the two contacts 25 and 26 are interconnected by the conductive portions on the contact cylinder 24, thus closing the circuit of coil 15 of switch 13. Supposing the dimming switch 27 is open, the coil 14 of switch 13 is switched off. The magnetic flux generated by the coil 15 causes attraction of the armature 16 to such an extent that the contacts 17, 19, are closed, while the contacts 20, 21, of the contact spring still remain closed. Consequently, the two head lamps 11, 11 are connected to the battery 10, or, with closed charging switch 9, to the generator 1. At the same time, coil 6 of regulator 4 is connected, through the cable leading to the contact spring 18, and the contacts 19, 17, with the battery 10. Hence, the regulator 4 is now influenced by the two coils 5 and 6 and regulates the voltage of generator 1 to assume a lower value than with day-time driving, namely, the nominal tension of the incandescent lamps of the head lights, say, 6.75 v. This voltage is reached very soon by the generator 1, even if the battery 10 should have been discharged down to a very low value.

In order to dim the head lights, the contact 28 of switch 27 is closed, whereby the coil 14 of switch 13 is connected to the body of the vehicle. Owing to the additional magnetisation effected by the coil 14 the armature 16 is now attracted with greater force, removing contact spring 18 from contact 21 and pressing it against contact 22, while the pair of contacts 17, 19 remain closed. The bright lights 11, 11 are now switched off and the dim lights 12, 12 are connected to the battery 10, or to the generator 1, respectively, the circuit of the regulator coil 6 remaining unchanged for regulation of the generator to a voltage of 6.75 volts.

By opening the dimming switch 27 the head lamps may then be switched back to bright light.

It will thus be understood that the generator is regulated to produce a lower voltage in the "night-time driving" position of the switch than in the "day-time driving" position thereof, and the head lamps are supplied with the nominal voltage for which they are provided. As soon as the generator starts charging the battery, the head lamps will receive a constant voltage corresponding to their nominal voltage, independently from the charging condition of the battery, so that variations in the light intensity of the lamps are prevented. Owing to the low voltage of the generator the charging current supplied to the battery cannot grow to excessive figures, and, as a result, overloading of the generator is avoided in spite of the additional load produced by the head lamps.

Sufficient charging of the battery is ensured by the fact that the generator is regulated to produce a considerably higher voltage at day-time driving.

It will be seen from the drawing that the electromagnetic switch 13 which is controlled by the light switch 23 permits a direct connection on the shortest possible path between the head lamps and the generator, thus avoiding the supply cable to be passed over the light switch 23. Hence, any voltage drop that would be caused by the length of cable required for this connection, by the light switch, etc., is avoided.

The apparatus of the present invention has been described in detail with reference to specific embodiments. It is to be understood, however, that the invention is not limited by such specific reference but is broader in scope and capable of other embodiments than those specifically described and illustrated in the drawing.

I claim:

In an electric lighting system incorporating a variable speed generator, a storage battery, an electromagnetic voltage regulator having a main voltage winding connected in shunt to said generator and an auxiliary voltage winding for modifying the regulation, two translating devices of different current capacity, circuit connections between said generator, battery and translating devices, said connections including an electromagnetic control switch having two windings and two armature operated contacts adapted together to occupy three positions in one of which said translating devices and auxiliary regulator coil are disconnected from that said generator, in another of which one of the translating devices and auxiliary regulating coil are connected with said battery and in the third of which the other translating device and said regulating winding are connected with said battery and a manually controlled circuit for energizing one of said control switch windings for contact movement to the second position and for energizing both said control switch windings for contact movement to the third position.

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