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ELECTRIC LIGHTING SYSTEM FOR SELF PROPELLED VEHICLES.

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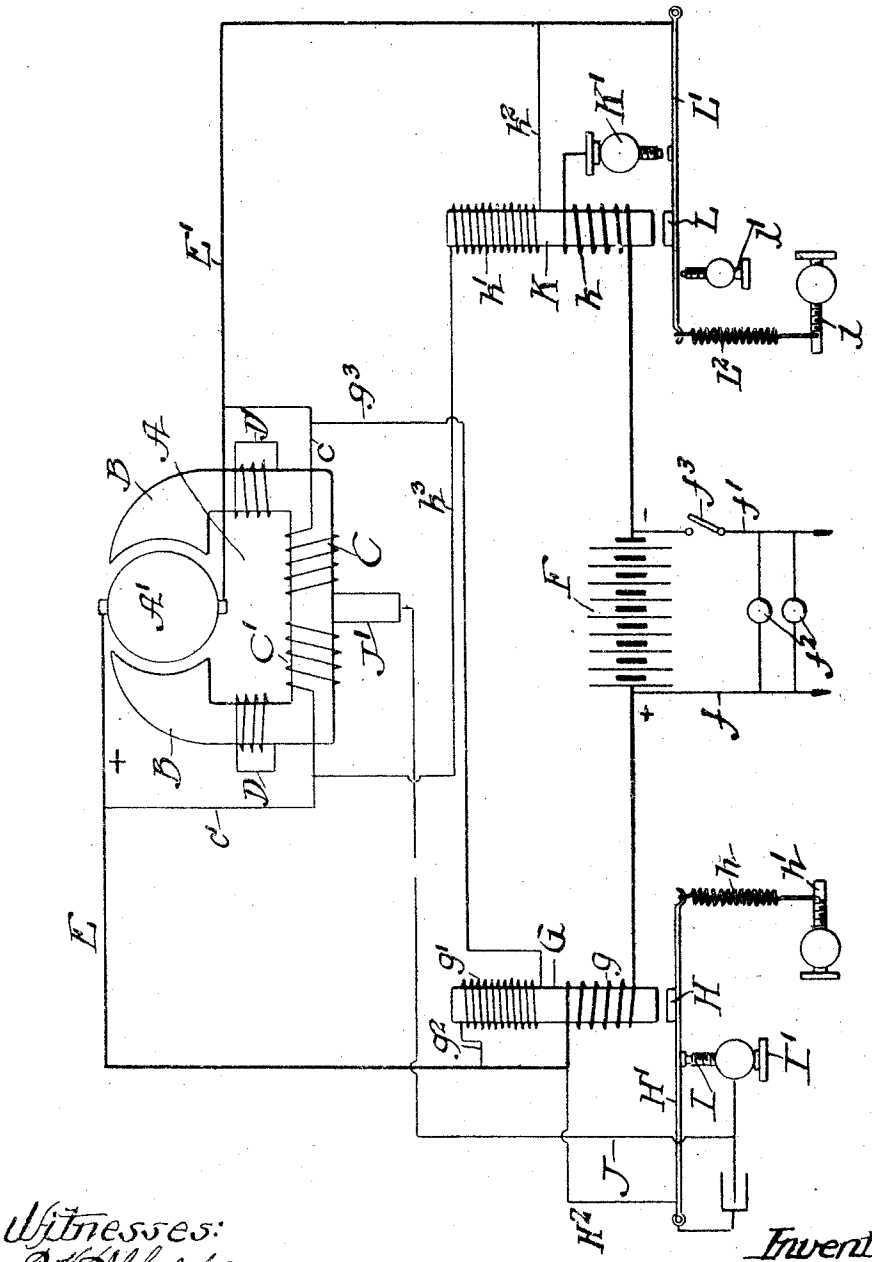
1,027,700. **Patented May 28, 1912**



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ELECTRIC-LIGHTING SYSTEM FOR SELF-PROPELLED VEHICLES.

1,027,700. Specification of Letters Patent. Patented May 28, 1912.

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To all whom it may concern:

Be it known that I, JAMES K. DELANO, Jr., a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric-Lighting Systems for Self-Propelled Vehicles; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in electric lighting systems for self propelled vehicles and consists of the matters hereinafter described and more particularly pointed out in the appended claims.

In the use of an electric dynamo for lighting a self propelled vehicle, where said dynamo is driven by the engine which drives the vehicle as, for example, in the case of an automobile, where the dynamo is driven by the gasolene engine, difficulty is encountered on account of the variable speed of the engine. If said dynamo is geared to the engine so as to produce its normal output at one speed, the dynamo would be ruined when the engine attained a higher speed.

The object of the present invention is to obviate this difficulty and to provide a system including a dynamo driven by the engine in which means is provided for compensating for the speed of the engine so as to prevent any deleterious effect on the dynamo.

The advantages of the system will appear as I proceed with my specification.

The drawing represents a diagrammatic view of my improved system.

A indicates a dynamo which is directly driven by the engine, (not shown in the drawing,) which propels the vehicle.

A^1 is the rotating armature of the dynamo, and B, B the field poles.

C is a shunt field coil which excites the armature in the usual way and C^1 is a differential field winding opposed to the winding C. Said field windings are connected together by a loop J^1 and the winding C is connected by a wire c to the main E^1, and the winding C^1 by a wire c^1 to the main E.

D, D^1 are short circuited dampening field coils, the purpose of which will appear later.

E, E^1 are the dynamo mains which lead to a storage battery F.

Interposed between the dynamo and the storage battery is an iron core G provided with a winding g in series with the dynamo and the storage battery, and with a winding g^1 of higher resistance which is connected by means of wires g^2, g^3 across the mains E, E^1. An armature H, mounted on a pivoted spring-controlled arm H^1, is arranged in position to be acted upon by said core G when the same is energized. Said arm H^1 is connected by a wire H^2 with the main E. A spring h is connected to the free end of said arm and normally holds the armature H away from said core G, said spring being connected to a screw h^1 about which it is adapted to be wound to adjust its tension. The arm H^1 is normally held by the spring h in engagement with a contact I, the position of which may be adjusted by means of an adjusting screw I^1. A wire J connects the contact I with the loop J^1 connecting the two field windings C, C^1.

K is an iron core interposed in the path of the return main E^1 between the storage battery F and the dynamo. Said core is provided with a winding k which is arranged in series with the battery F and a contact K^1, and with a winding k^1 which is connected across the mains E, E^1 by means of wires k^2, k^3. An armature L is arranged in position to be attracted by the core K when the same is energized, said armature being mounted on a pivoted arm L^1 which is connected by a spring L^2 to a fixed adjusting screw l. Said arm is electrically connected to the return main E^1. The position of the arm L^1 with reference to the core K is determined by an adjusting screw stop l^1 against which it normally rests, being held in this position by means of a spring L^2. When the core K is magnetized to attract the armature L, it causes the arm L^1 to engage against the contact K^1, and thus connect the winding k to the main E^1. From the battery F are led the lamp mains f, f^1 connected in the usual manner to lamps f^2. A switch f^3 serves to throw the lamps in or out.

The operation of the device is as follows: When the dynamo is started by the engine the current flows through the mains E, E^1 and from them through the shunt field C which is connected at one end to the main E^1 and at the other end through the loop J^1, wire J, the contact I, arm H^1 and wire H^2 to the main E. The core K, energized by the coil

k^1 (which is connected as above described across the mains E, E^1) attracts the armature L and causes the arm L^1 to engage the contact K^1, thus establishing connection of the battery with the dynamo through the return main E^1. When the dynamo is working at normal speed, the current passes into the storage battery F, through the coil g on the core G. As soon as the armature speeds up so as to produce a greater amount of current than required, the coil g, through which said current is passing, energizes the magnet G sufficiently to draw the armature H toward it notwithstanding the opposite pull of the spring h. By adjusting the spring h it is apparent that the point at which this will take place may be exactly determined. When this occurs the arm H^1 swings away from the contact I thereby breaking the direct connection of the field winding C with the mains and throwing in the differential field coil C^1, which is then connected to the main E through the wire c^1 and to the return main E^1, through the loop J^1, the winding C and the wire c. This winding being opposite to that of the field winding, cuts down the field and thus reduces the current until it has fallen to or below the required amount whereupon the armature H will, under the action of the spring, swing away from the magnet G, and thus return the connections to their initial position. The armature H will vibrate forward and backward, maintaining the current at the required amount.

In the operation of the armature H there is an abrupt change in the character of the field by reason of the change of the current from the field coil C to the opposing field coil C^1, and to retard this change I use the short circuited dampening coils D, D^1, which produce a lag in the magnetic fields B, B and this in turn effects the current through the coil g on the core G, giving it a more uniform flow which results in a slow vibration of the arm H^1. When the storage battery is fully charged its voltage is of course increased and the potential of the dynamo is correspondingly raised. The highest potential of the dynamo effects the high resistance coil g^1 which is connected across the mains so as to increase the magnetic pull of the core G on the armature H, said coil having the same effect as a weakening of the spring h. This cuts down the current flowing to the battery just as in the case where the dynamo exceeds the speed for its normal output. When the engine is stopped or slowed down the armature being below speed, the voltage of the battery exceeds that of the dynamo and the current flows from the storage battery toward the dynamo. This reverses the direction of the current through the coil k about the magnetic core K, which then acts differentially with respect to the coil k^1, so as to reduce the magnetic pull on the armature L. The arm L^1 is then swung by the spring L^2 away from the core K and from its engagement with the contact J. This breaks the connection between the mains and cuts the storage battery out of circuit with the dynamo, thereby preventing the battery from discharging into the dynamo.

I claim as my invention:

1. In a system of electric lighting for self propelled vehicles, a shunt field dynamo, said shunt field including a differential winding, a circuit normally bridging said differential field winding, and an electromagnetic switch in said bridging circuit controlled by the current in the dynamo circuit and adapted to be opened when the current in said dynamo circuit exceeds a predetermined value.

2. In a system of electric lighting for self propelled vehicles, a shunt field dynamo, said shunt field including a differential winding, a circuit normally bridging said differential field winding, an electromagnetic switch in said bridging circuit controlled by the current in the dynamo circuit and adapted to be opened when the current in said dynamo circuit exceeds a predetermined value, and adjusting means connected with said switch for fixing said predetermined current value.

3. In a system of electric lighting for self propelled vehicles, a direct driven dynamo, main wires, including supply and return mains, a field winding directly connected to the return main, a second differential field winding connected to but opposing said first field winding, said differential winding being connected to the other main, a magnetic core, a core winding thereon in series with said supply main, a branch wire connecting both of said field windings to the supply main, and an automatic cut-out located in said branch wire controlled by said magnetic core.

4. In a system of electric lighting for self propelled vehicles, a shunt field dynamo, said shunt field including a differential winding, a circuit normally bridging said differential winding, a normally closed switch in said bridging circuit, a magnetic core provided with a winding in series with said dynamo circuit, said magnetic core being adapted to open said switch when the current in said dynamo circuit has reached a predetermined value, and a second winding on said magnetic core in multiple with the armature circuit of the dynamo adapted to assist said series winding in opening said switch when the voltage of the dynamo reaches a predetermined value.

5. In a system of electric lighting for self propelled vehicles, a shunt field dynamo, said shunt field including a differential

winding, a short circuited dampening coil in said dynamo field, a circuit normally bridging said differential field winding, and an electromagnetic switch in said bridging circuit controlled by the current in the dynamo circuit and adapted to be opened when the current in said dynamo circuit exceeds a predetermined value.

In testimony that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 13th day of May A. D. 1910.

JAMES KENDALL DELANO, JR.

Witnesses:

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