F. F. DORSEY.

IGNITION SYSTEM.

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1,382,414. **Patented June 21, 1921.**

Fig. 1

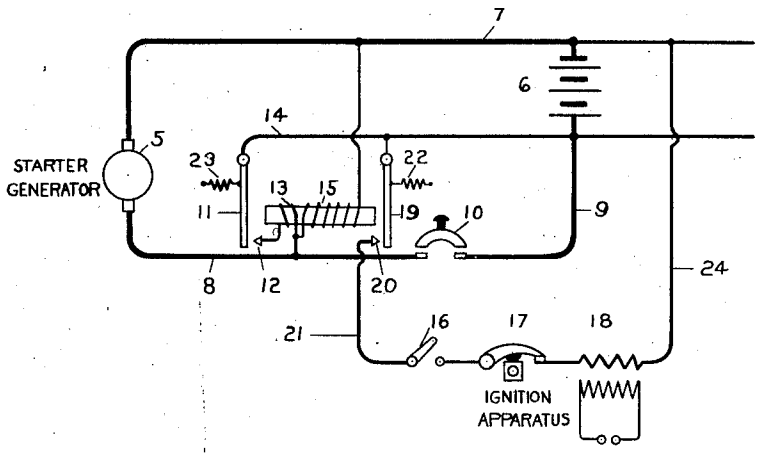
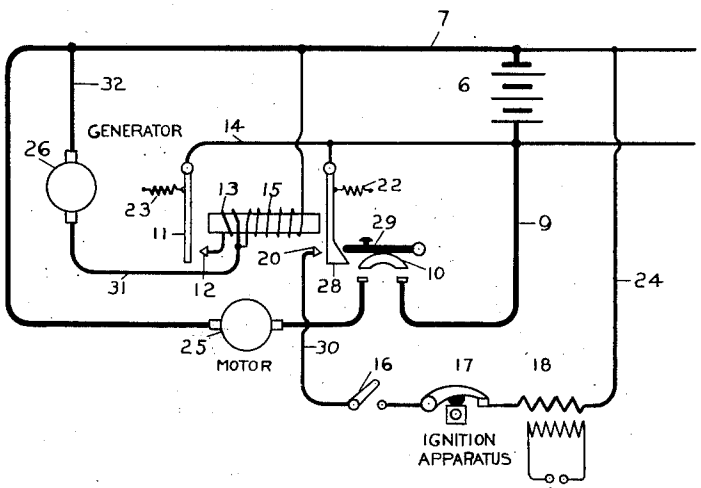


Fig. 2



Inventor:

Farnum F. Dorsey

UNITED STATES PATENT OFFICE.

FARNUM F. DORSEY, OF ROCHESTER, NEW YORK, ASSIGNOR TO NORTH EAST ELECTRIC COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

IGNITION SYSTEM.

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To all whom it may concern:

Be it known that I, FARNUM F. DORSEY, a citizen of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Ignition Systems; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to ignition systems of the type in which electric ignition-apparatus is energized by current from a storage-battery, and from a generator which also charges the battery, the generator being driven, at varying speed, by the engine in connection with which the ignition-apparatus is used.

In a system of the kind in question it is necessary or desirable, when the engine is stopped, to open the circuit connecting the ignition-apparatus with the battery, as otherwise the current may waste through the circuit owing to the fact that the apparatus has stopped with the engine-driven interrupter in closed-circuit position. A hand-operated switch is usually provided for the purpose, but since the user may fail to use this switch, it is also common to provide automatic means for either opening the circuit or introducing resistance into it whenever it remains closed for an abnormal length of time.

The object of the present invention is to provide simple and reliable means for automatically opening the ignition-circuit under the conditions just referred to. To this end it is proposed to use a relay of which the contact-members are connected in circuit with the battery and the ignition-apparatus, while the winding is connected across the terminals of the generator. So long as the engine is running the generator will furnish enough current to hold the relay-contacts closed, but whenever the engine stops the relay is deënergized and the ignition-circuit is automatically opened.

It is proposed to combine this relay with the relay or cut-out by which the generator is automatically disconnected from the battery, in the usual manner, whenever the E. M. F. of the generator falls below that necessary for charging the battery. This is accomplished by using a single magnet with two independent armatures, as hereinafter described.

In the accompanying drawings Figure 1 is a diagram of an ignition-system embodying the present invention as used in connection with an electric engine-starting system of the single-unit type, and Fig. 2 is a diagram showing the adaptation of the invention to a two-unit engine-starting system.

Referring to Fig. 1, a single-unit starter-generator 5 is shown as connected with a storage-battery 6 through main conductors 7, 8, 9 and a starting-switch 10. For the purpose of charging the battery the generator is connected with the battery through a reverse-current cut-out, comprising the usual armature 11 coöperating with a stationary contact-member 12. The armature 11 is actuated by a magnet having the usual series-winding 13, and when the armature engages the contact-member 12 the current flows, from the generator, through the wire 8, the winding 13, the armature 11, and a wire 14 to the battery 6, and returns through the wire 7.

In addition to the series-winding 13 the magnet has the usual shunt-winding 15, which is connected across the wires 7 and 8, and hence across the generator-terminals, so as to receive current whenever the generator is operating, even at the lowest speed.

The ignition-apparatus is shown as comprising the usual hand-operated switch 16, circuit breaker or timer 17, and induction-coil 18. In accordance with the present invention the flow of current through these parts is controlled by a second relay-armature 19 actuated by the magnet of the cut-out relay already described. This armature 19 is connected with the wire 14, and it coöperates with a fixed contact-member 20 which is connected, by a wire 21, with the switch 16. From the induction-coil the current returns, through a wire 24, to the battery.

The spring 22 which controls the armature 19 is adjusted so as to permit this armature to pick-up and to hold at the minimum voltage produced by the generator while the engine is running at its lowest speed, whereas the spring 23 which controls the armature 11 is adjusted according to the voltage necessary to prevent return-flow of current from the battery to the generator. Accordingly, the armature 19 will hold the ignition

