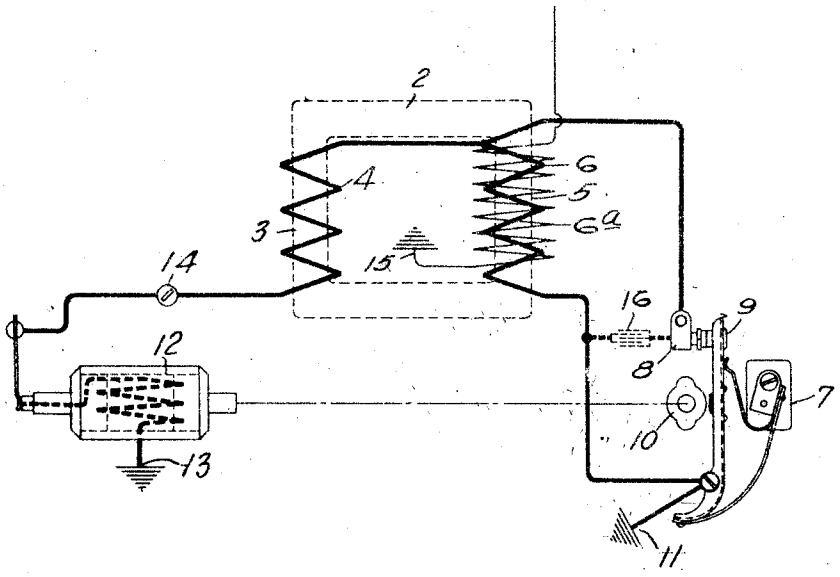
T. W. VARLEY.

ELECTRICAL SYSTEM.

APPLICATION FILED AUG. 9, 1916.

1,358,901. **Patented Nov. 16, 1920.**



INVENTOR

Thomas W. Varley

by M. Arthur Keeler

his Attorney

UNITED STATES PATENT OFFICE.

THOMAS W. VARLEY, OF NEW YORK, N. Y.

ELECTRICAL SYSTEM.

1,358,901. Specification of Letters Patent. Patented Nov. 16, 1920.

Application filed August 9, 1916. Serial No. 113,962.

To all whom it may concern:

Be it known that I, THOMAS W. VARLEY, a citizen of the United States of America, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Electrical Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, which forms part of this specification.

In Letters Patent 1,081,413, granted December 16th, 1913, to Richard Varley, there is disclosed an electrical system employing transformer means whereby a high tension and effectively sustained flow of current is afforded at a current using instrumentality, such as a spark plug forming part of the ignition equipment of internal combustion engines. The transformer specifically illustrated therein employs a choke coil or winding for controlling inductive relationship between an energizing winding and a secondary winding; suitable make and break mechanism being included in the circuit of the choke coil to effect intermittent discharges of energy at the instrument.

An improvement of that system, constituting my invention is an arrangement wherein the said choke coil may be employed as an active energizing winding after being brought out of short circuit, to assist the main energizing winding in building up a large body of flux in such manner as to effect sustained induction of a current in the secondary winding, as will more fully appear from the following description of my invention made in connection with the accompanying diagrammatic drawing, so that others skilled in the art to which it appertains may understand and construct the same.

The numeral 2 indicates a magnetizable member or core the leg 3 of which carries a winding 4. An opposite leg 5 of the core carries a winding 6 in the circuit of which is interrupter mechanism 7 comprising a fixed contact 8, a movable contact 9 and an actuating cam 10. The interrupter 7 normally short circuits the winding 6 through closure of the contacts 8 and 9. Closure of these contacts also connects the winding 4, through ground 11, in the active circuit of a source 12 of current comprising preferably an alternating current generator one end of the generative winding of which is grounded, as at 13. A hand switch 14 may be included in the circuit of the winding 4.

As clearly described in the above recited Letters Patent to Richard Varley, when the winding 4 is energized from the source of alternating current, a magnetic flux is set up in the transformer core 2. With the winding 6 normally short circuited, the lines of force are repressed from the leg 5, so that the flux tends to take a leakage path across the side of the transformer. The interrupter mechanism 7 is actuated in synchronism with the alternating current phases and is of such character that when the alternating current wave approaches or reaches the maximum peak or period of flow, the cam 10 will kick the contact 9 away from contact 8 and open the circuit of the coil or winding 5 through the contacts 8 and 9. As a result, the repressed flux is restored to normal in seeking the magnetic path provided by the leg 5. This inrush of flux at a high rate of change instantaneously builds up or induces a high potential current in a secondary winding 6^a also disposed on the leg 5 and one end of which is grounded as at 15; the opposite or live end leading to a suitable spark plug distributer apparatus or any suitable current using instrumentality, as will be well understood by those skilled in the art. However, upon opening of the short circuit of the winding 6, the winding 6 is also brought into circuit with the generator through the ground 11, so that this winding 6 now becomes an active winding, and a resultant flux is induced in the leg 5, which augments and follows the flux set up by the winding 4, discharged through the leg 5 upon opening of the short circuit of the winding 6. The flux action in the transformer core, and particularly through the leg 5 which carries the secondary winding 6^a, is thus sustained to such an extent that there is a prolonged energizing of the current using instrumentality or spark plug connected in the circuit of the secondary.

Inasmuch as the winding 6 is not connected in the generator circuit until the short circuit of that winding is opened and therefore the contacts 8 and 9 separated, I find that there is practically little or no tendency to sparking at the interrupter contacts. However, if desired, a condenser 16 may be connected across the contacts to ab-

sorb any sparking that may result under peculiar conditions.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A magnetizable member, a source of energy, a plurality of windings for inductively energizing the member, make and break mechanism arranged to normally short-circuit one of said windings upon itself, and to bring said winding and another of said windings into series with each other and with the source, and a coil inductively related to said member.

2. A magnetizable member, a source of energy, a plurality of windings for inductively energizing the member, make and break mechanism arranged to normally short-circuit one of said windings upon itself, and to bring said winding and another of said windings into series with each other and with the source, and a coil inductively related to said member, and having in circuit a current using instrumentality.

3. In an electrical system, a source of energy, a winding, a second winding, and a third winding connected in circuit with the first winding, and means for bringing the first and third windings into and out of series with each other and with the source of energy, including make and break mechanism for the circuit of said first and third windings.

4. In an electrical system, a primary winding, a secondary winding, a source of energy, and means for bringing the secondary winding into and out of inductive relationship with the primary winding, comprising a choke coil and means for connecting said choke coil in series with the primary winding and with the source of energy.

5. In an electrical system, a source of energy, a primary winding, a secondary winding, means for bringing the secondary winding into and out of inductive relationship with the primary winding, comprising a choke coil and means for connecting said choke coil in series with the primary winding and source of energy.

6. In an electrical system, a transformer core, and means for creating a flux therein and for causing said flux to be repressed, comprising a source of energy, a plurality of windings connected in series with said source and means for short circuiting one of said windings.

7. In an electrical system, a transformer core, means for creating a flux therein and for causing said flux to be repressed from the core, comprising a source of energy, a plurality of windings connected in series with said source and means for short circuiting one of said windings, and a coil inductively related to said core.

8. In an electrical system, a transformer core, means for creating a flux therein, for causing said flux first to be repressed from said core and then to traverse it, comprising a source of energy and a plurality of windings connected in series with said source and means for short circuiting one of said windings, and a coil inductively related to said core.

9. In an electrical system, a plurality of windings, and means for energizing one of said windings, for transferring said energy and supplying energy to a second one of said windings, comprising a source of current and a third one of said windings connected in series therewith and means for short circuiting said third winding.

10. A source of energy, a transformer core, two windings connected in series with said source for creating a flux in said core, means for intermittently short circuiting one of said windings, so as to alternately oppose and cause passage of flux through the core, and another winding inductively related to said first windings.

In testimony whereof, I have hereunto set my hand.

THOMAS W. VARLEY.