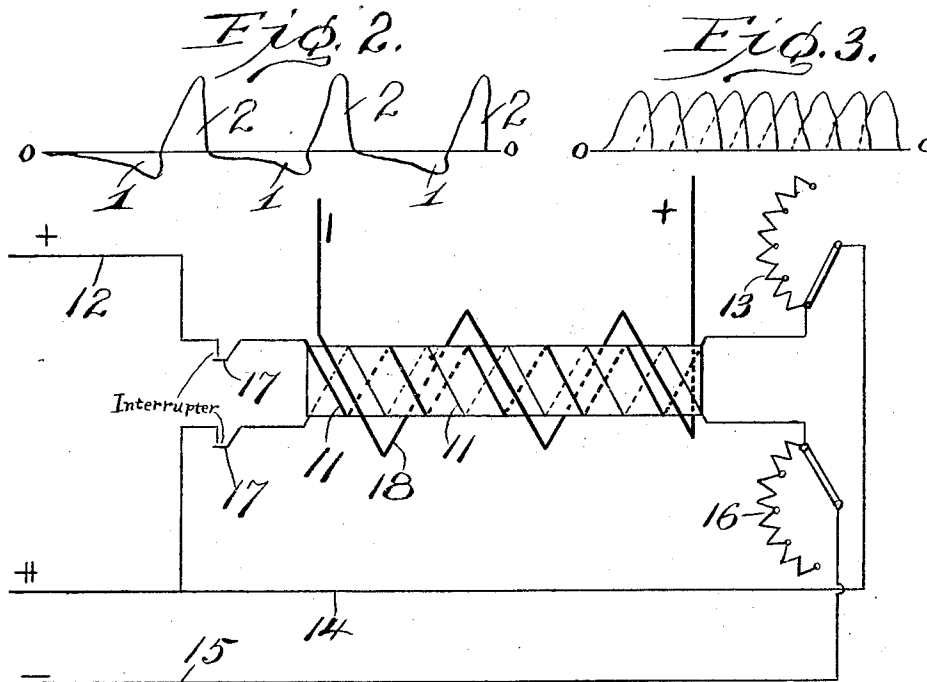
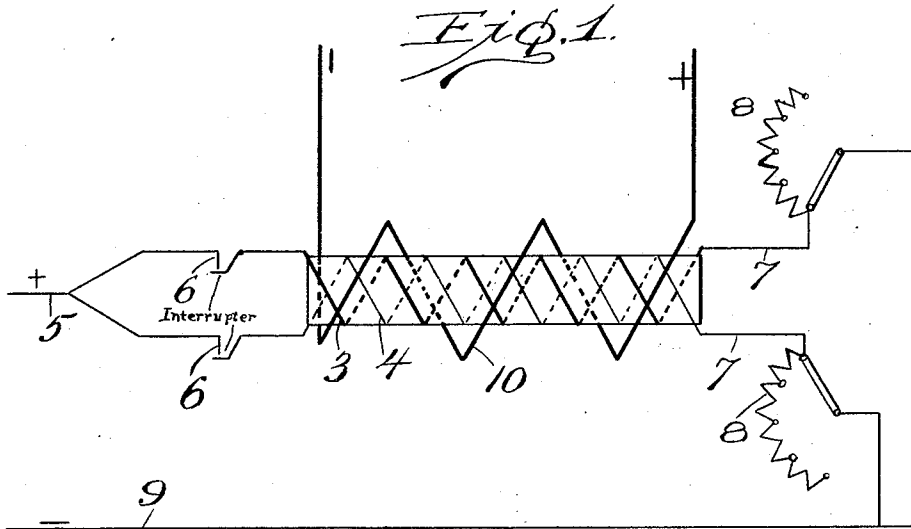


W. MEYER.
INDUCTION COIL.
APPLICATION FILED NOV. 27, 1908.

1,004,452.

Patented Sept. 26, 1911.

2 SHEETS—SHEET 1.



WITNESSES:

C. H. Jesler
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Fig. 4.

BY

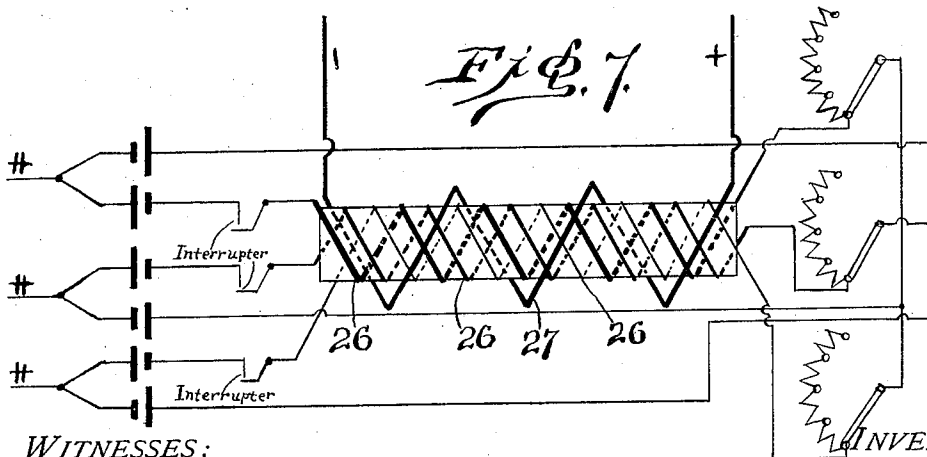
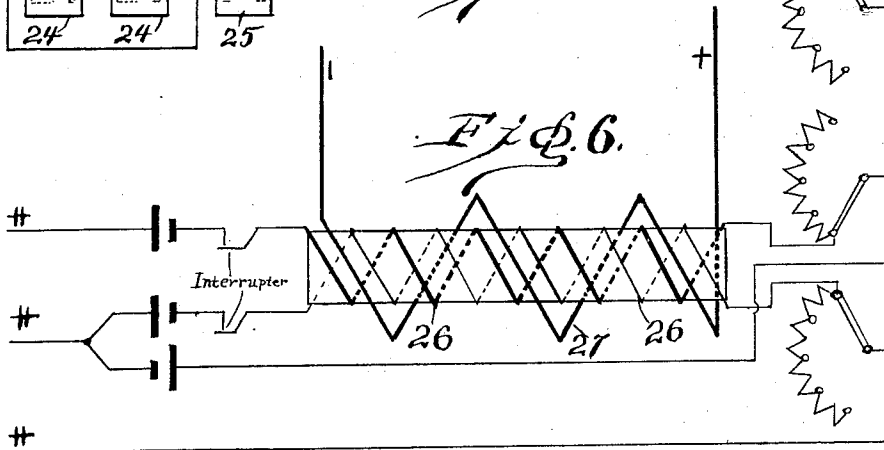
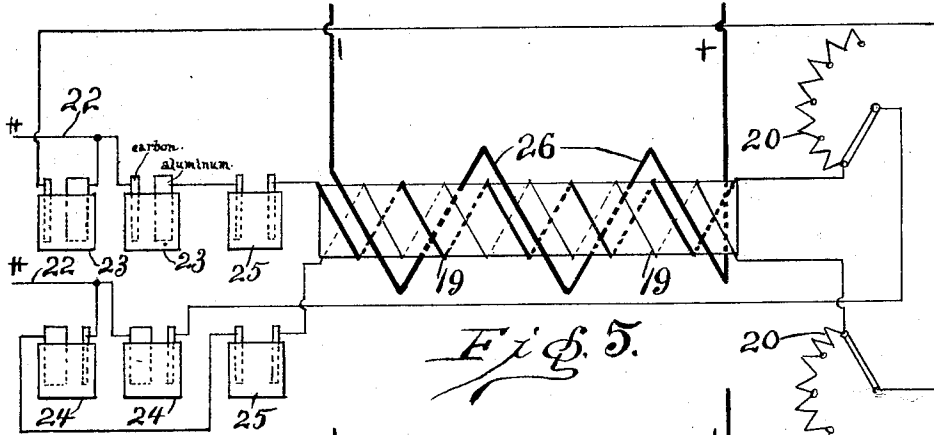
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

WILLIAM MEYER, OF CHICAGO, ILLINOIS.

INDUCTION-COIL.

1,004,452.

Specification of Letters Patent.

Patented Sept. 26, 1911.

Application filed November 27, 1908. Serial No. 464,685.

To all whom it may concern:

Be it known that I, WILLIAM MEYER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Induction-Coils; 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 improvements in induction coils, and the object in view is the obtaining of maximum efficiency and the production of a substantially continuous uni-directional current.

With this and further detail objects in view as will hereinafter become in part obvious and will in part be specified, the invention comprises certain novel constructions, combinations and arrangements of parts as hereinafter set forth and claimed.

In the accompanying drawings,—Figure 1 is a diagrammatic view of an induction coil embodying the features of the present invention. Fig. 2 is a diagram graphically indicating the curves of the current impulses, relative to the zero line, manifested in the secondary of an ordinary induction coil. Fig. 3 is a similar graphic showing of the current obtained by the present improved induction coil. Fig. 4 is a view similar to Fig. 1 showing the invention employed in connection with a three-wire direct current system. Fig. 5 is a similar view of the invention applied to a single phase alternating current system. Figs. 6 and 7 are similar views of the invention applied to three-phase alternating current systems.

In operating various devices, as for instance X-ray tubes, currents of extremely high potential are required, and with the single primary of an ordinary induction coil operated by a single interrupter there is nearly always a certain amount of inductive discharge from the secondary during the closing of the primary circuit which is in opposition to the discharge produced by the opening of the primary circuit. That is to say, when the primary circuit is closed an impulse such as is indicated at 1, in Fig. 2, results, and when the circuit is broken an opposing impulse 2 occurs, so that the current is not constant and partakes of the nature of an alternating current and even if the inverse discharge 1 were not present,

a certain amount of time would necessarily elapse between the discharges 2, 2, and thus a pulsating current would be given off. To eliminate both the inverse discharge indicated at 1, 1 and the pulsating effect of the discharges 2, 2, I propose to utilize multiple primaries wound in the same direction as indicated at 3 and 4, and I desire to clearly distinguish this from "differentially wound." The windings 3 and 4 are connected in multiple to the supply or positive lead 5 at one end, each primary being of substantially the same inductance and being provided with an interrupter 6 of any preferred type, either mechanical or electrolytic. The opposite end of each of the primaries 3 and 4 is connected by a conductor 7 with its respective rheostat 8, the rheostats 8 being in turn connected in multiple with the negative lead 9. The usual secondary 10 is provided in the ordinary manner. The structure thus described and seen in diagram in Fig. 1 is especially adapted for a direct current system. The interrupters 6 are preferably set to act alternately so that when the circuit is being closed in primary 3 it is broken in primary 4, and thus substantially the entire current from lead 5 is delivered through each of the primaries, the slight inverse discharge occasioned by the rise of current in one primary being neutralized by the discharge occasioned by the fall of the current in the other primary, only a comparatively small proportion of the induced current from the breaking of the circuit being sacrificed so that the resultant current in the secondary 10 may be correctly represented as indicated in Fig. 3 as a substantially continuous or practically constant uni-directional current, the impulses successively occasioned by the dropping of the current first in one primary and then in the other overlapping as indicated in Fig. 3. Thus I am enabled to secure a substantially constant uni-directional current of nearly the full or maximum current value obtainable by induction.

From the foregoing the adaptation of the invention to three-wire direct current systems and to single phase and polyphase alternating current systems will be apparent as indicated in the succeeding figures of the drawing.

In Fig. 4, which shows my invention in connection with a direct current three-wire system, 11, 11 indicate the primaries, one connected at one side to the positive lead

12, and at the other side through the rheostat 13 to the neutral lead 14, and the other primary connected at its correspondingly opposite sides respectively to the neutral lead 14 and the negative lead 15, a rheostat 16 being interposed between the last-mentioned primary and the lead 15, each primary being provided with an interrupter 17 suitably adjusted for controlling the alternate impulses. As will be obvious from the diagram, Fig. 4, positive current entering at one end of one primary 11 will affect the secondary 18 in the same manner as negative current entering the other primary at the respective opposite end, and the interrupters 17 will serve to break the circuits in a manner corresponding to the operation described with respect to the structure disclosed in Fig. 1. Thus the breaking of the positive current flowing in one direction in one primary will produce an inductive current in secondary 18 neutralizing the inverse inductive impulse in said secondary occasioned by the closing of the negative current flowing from the opposite end of the other primary and still leave the main body of the induced impulse in the secondary 18, and the breaking of the negative current will produce a similar effect with respect to the making of the positive current so that the resultant effect in secondary 18 is the same as that in the secondary 10 as above set forth.

In Fig. 5 I have indicated the invention as applied to a single phase alternating current, the primaries 19, 19 being arranged like primaries 11, 11 and provided with their respective rheostats 20, 20, and respectively connected to the opposite leads 21 and 22, suitable valves 23, 23 and 24, 24 being interposed between the leads and the respective primaries so that only positive impulses may pass into the primaries at one end or negative impulses at the other, the valves 23 being, if preferred, electrolytic, and each primary being provided with its own interrupter 25 which may also be electrolytic, if preferred, or mechanical as desired. The usual secondary 26 is provided and by reason of the use of the valves 23 and 24 and interrupters 25 the supply of alternating current to the primaries will give off the same form of current from the secondary as that obtained from the direct current in the structure seen in Fig. 1. A rheostat is preferably provided for each primary. This structure is also well adapted for two-phase currents.

In Figs. 6 and 7, I have indicated diagrammatically desirable arrangements of the present improved induction coil for

utilization in connection with polyphase alternating currents, and in each of these diagrams 26, 26 are the primaries and 27 the secondary, a third primary 26 being employed in the system indicated in Fig. 7, and the usual valves and interrupters being provided for controlling and distributing the current after the manner above set forth. The structure seen in Fig. 7 is, of course, wired for accommodating the additional primary, and in both Figs. 6 and 7 each primary is provided with its regulating rheostat, and both of these structures are especially well adapted for use in three-phase current systems.

What I claim is,—

1. In an induction coil, the combination with a magnetic core, of a plurality of independent primary coils wound on said core, an independent interrupter connected in a series circuit with each primary coil, such series circuits being all connected in multiple across a source of current, and a single secondary coil on said core in inductive relation with all of said independent primary coils.

2. In an induction coil, the combination with a magnetic core, of a plurality of independent primary coils wound on said core, an independent interrupter connected in a branch circuit in series with each primary coil, such branch circuits being all connected in multiple across a suitable source of current, means for adjusting the time constant of each branch circuit, and a single secondary coil on said core in inductive relation with all of said primary coils.

3. In an induction coil, a plurality of independent primary coils, an independent interrupter connected in series with each primary coil and with a source of current, a single secondary coil in inductive relation with all of said primary coils, and means for causing said interrupters to operate in succession.

4. The combination with a three-wire system of conductors, and a source of current connected therewith, of a magnetic core, a plurality of independent primary coils wound thereon, each being connected across a pair of said conductors, an independent interrupter in series with each coil, and a single secondary coil on said core in inductive relation with all of said primary coils.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM MEYER.

Witnesses:

L. R. MEYER,
ROBT. A. ARENS.