

No. 851,027.

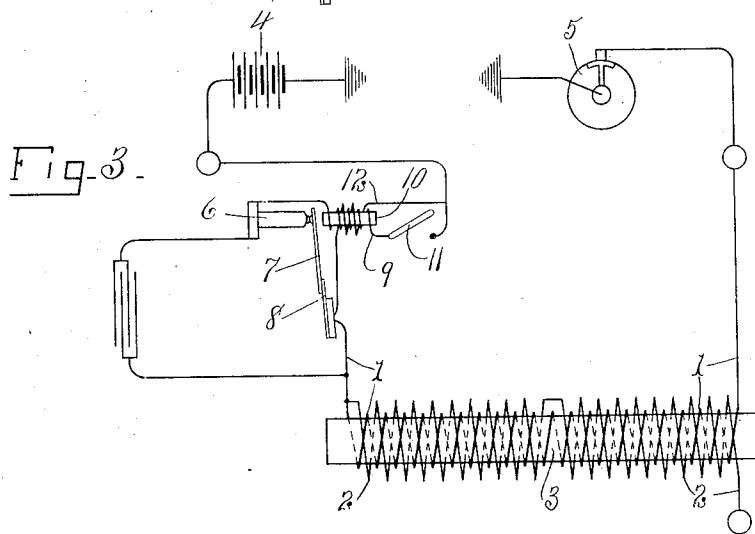
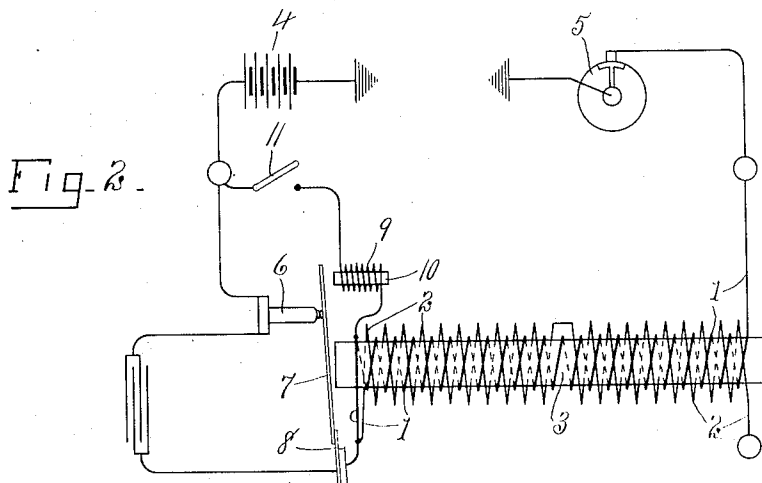
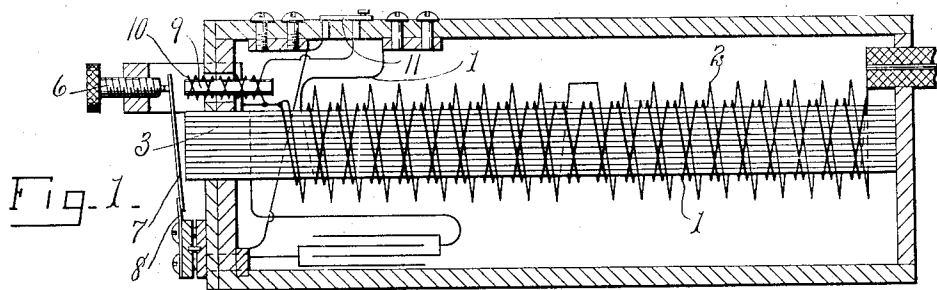
PATENTED APR. 23, 1907.

C. P. L. NOXON.

SPARK COIL.

APPLICATION FILED FEB. 5, 1906.

2 SHEETS—SHEET 1.



WITNESSES:

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Chas. H. Young.

INVENTOR

Charles P. L. Noxon

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2 SHEETS—SHEET 2.

Fig. 4.

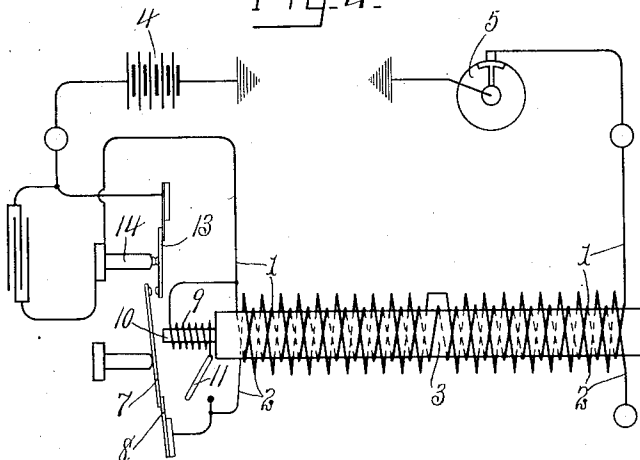
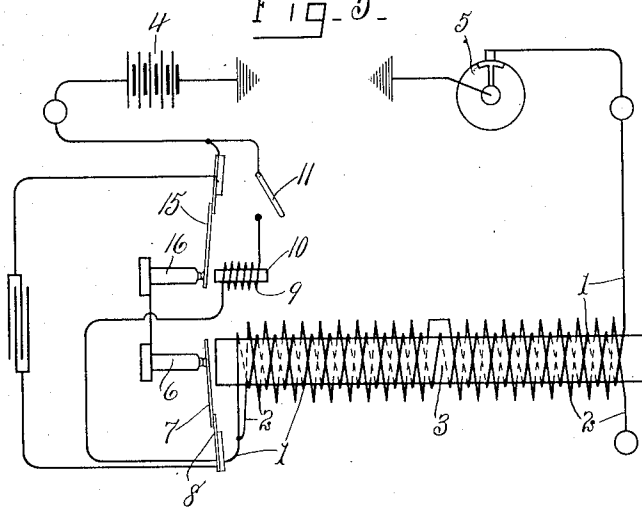


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES P. L. NOXON, OF SYRACUSE, NEW YORK.

SPARK-COIL.

No. 851,027.

Specification of Letters Patent.

Patented April 23, 1907.

Application filed February 5, 1906. Serial No. 299,441.

To all whom it may concern:

Be it known that I, CHARLES P. L. NOXON, of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Spark-Coil, of which the following is a specification.

My invention has for its object the production of a spark-coil which is particularly efficient in use; and it consists in the combinations and means hereinafter set forth and claimed.

In describing this invention reference is had to the accompanying drawings, in which like characters designate corresponding parts in all the views.

Figure 1 is a sectional view of a preferable form of my spark-coil and a case therefor. Fig. 2 is a diagrammatic view of said spark-coil. Figs. 3, 4, and 5 are diagrammatic views of modified forms of my spark-coil.

1 is a primary conductor, 2 a secondary conductor, and 3 a core, all of which parts may be of any desirable form, size, and construction suitable for use in induction-coils. The conductors 1 2 are respectively connected in the ordinary manner in a primary circuit and a secondary circuit, and a suitable source of electric energy 4, a mechanical means 5 for making and breaking a circuit, and a current-interrupting means are connected in the primary circuit, the means 5 being usually the ignition-controlling mechanism of the internal-combustion engine to which my induction-coil is connected, and the current-interrupting means, comprising a terminal 6 and an armature 7, which is normally in electrical contact with the terminal 6, is moved from the terminal for breaking the primary circuit and is engaged with said terminal for completing the circuit by any suitable means, as a spring 8.

9 is an electromagnetic means for attracting the armature 7 when the primary circuit is broken by the current-interrupting means and holding such armature from returning into engagement with the terminal 6 to complete the circuit while the mechanical means 5 is making the circuit. Said electromagnetic means is preferably arranged with its core 10 independent of and substantially parallel to the core 3 and with its coil or conductor connected in shunt in the primary circuit. It thus follows that the electromagnetic means 9 bridges the gap formed in the primary circuit when the armature 7 is separated from the terminal 6 and is of greater re-

sistance than the part of the primary circuit through which no current passes when the current is interrupted by the armature 7. The armature 7 is arranged in the magnetic field of both cores 3 and 10. It is apparent that the primary conductor or coil 1, core 3, and means 9, including the core 10, form a plurality of electromagnetic means in the primary circuit for breaking and for holding open the primary circuit. The conductor or coil of the electromagnetic means 9 is of high resistance, so that the current passing there-through is of only sufficient amperage to energize the core 10 to hold the armature 7 away from the terminal 6, but is insufficient to prevent demagnetization of the core 3.

A switch 11 is preferably provided for connecting and disconnecting the means 9 and the primary circuit, it being sometimes desirable to render the means 9 inoperative in order to produce a number of sparks to ignite a charge as when starting the engine. When a number of my coils are used in connection with a multicylinder internal-combustion engine, corresponding terminals of the shunt-circuits of high resistance may be connected together and one switch 11 provided for connecting and disconnecting all of said shunt-circuits and the primary circuits of the several coils. In the form shown in Fig. 3 the armature is arranged in the magnetic field of the core 10 only and said core is provided with an additional winding 12 of low resistance, so that the winding 12 energizes the core 10 to attract the armature 7 and to thereby interrupt the primary circuit. The shunt-circuit of high resistance of the means 9 (shown in Fig. 3) energizes the core to hold said armature from returning in contact with the terminal 6.

In Fig. 4 the core 10 is shown as arranged end to end with the core 3; but in this form the armature does not directly interrupt the current, as in the form shown in Fig. 2, but actuates a lever 13, which is normally in contact with a terminal 14 in the primary circuit. In the form shown in Fig. 5 the armature 7 is not in the field of the core 10, but is arranged in that of the core 3 only, and an additional armature 15 coacts with the core 10, both armatures 7 and 15 being held by springs, respectively, in contact with terminals 6 and 16 in the primary circuit. When the armature 7 is attracted by the core 3, the core 10 upon the breaking of said circuit by the armature 7 attracts its armature 15, and

thus holds open the primary circuit. When the armature 7 is attracted, the core 3 is demagnetized and said armature returns to its position in contact with the terminal 6.

5 To those skilled in the art it will be understood that by preventing the return of the armature of the current-interrupting means immediately after the circuit is broken the production of more than one spark is avoided
10 and the current passes through the mechanical means 5 uninterruptedly and with maximum power and with minimum wear of the separable contacting surfaces of the current-interrupting means, owing to the elimination
15 of unnecessary makes and breaks of the circuit. Moreover, when the mechanical means 5 operates to break the circuit a small current is passing over the same, and a minimum amount of sparking and wear of the
20 separable contacting surfaces of the primary circuit results. My invention is therefore particularly practical and efficient, especially when used with internal-combustion engines, in which great difficulty is experi-
25 enced by undue corroding and burning of the terminals for igniting the charges.

The construction and operation of my spark-coil will now be readily understood upon reference to the foregoing description
30 and the accompanying drawings.

What I claim is—

1. The combination of a primary circuit, a secondary circuit, mechanical means for making and breaking the primary circuit,
35 and means for interrupting the current in the primary circuit, the primary circuit including a plurality of electromagnetic means, each having a core, the cores thereof being independent of each other, said electromag-
40 netic means operating the second-mentioned means to interrupt the current in the primary circuit, and to hold said second-mentioned means in its position assumed when
45 interrupting the current while the first-mentioned means is making the circuit, substantially as and for the purpose specified.

2. The combination of a primary circuit, a secondary circuit, mechanical means for making and breaking the primary circuit,
50 and means for interrupting the current in the primary circuit comprising an armature, the primary circuit including a plurality of electromagnetic means, each having a core, the
55 cores thereof being independent of each other, said electromagnetic means operating to attract the armature to interrupt the current in the primary circuit and to hold said armature in its position assumed when inter-
60 rupting the current while the first-mentioned means is making the circuit, substantially as and for the purpose described.

3. The combination of a primary circuit, a secondary circuit, mechanical means for making and breaking the primary circuit,
65 and means for interrupting the current in the

primary circuit comprising a terminal in the primary circuit, and an armature movable relatively to the terminal for making and breaking the primary circuit, the primary circuit including a plurality of electromag-
70 netic means, each having a core, the cores thereof being arranged substantially parallel to each other, said electromagnetic means operating to attract the armature and move the same out of engagement with the terminal to
75 interrupt the current in the primary circuit, and to hold said armature in its position assumed when interrupting the current while the first-mentioned means is making the circuit, substantially as and for the purpose set
80 forth.

4. The combination of a primary circuit, a secondary circuit, mechanical means for making and breaking the primary circuit, and means for interrupting the current in the
85 primary circuit comprising a terminal in the primary circuit, and an armature movable relatively to the terminal for making and breaking the primary circuit, the primary circuit including a plurality of electromag-
90 netic means, each having a core, the cores thereof being arranged substantially parallel to each other, said electromagnetic means operating to attract the armature and move the same out of engagement with the terminal
95 to interrupt the current in the primary circuit, and to hold said armature in its position assumed when interrupting the current while the first-mentioned means is making the circuit, one of the electromagnetic means
100 being connected in the primary circuit to bridge the gap formed in the primary circuit at said terminal when the armature is attracted by the other electromagnetic means, substantially as and for the purpose specified.
105

5. The combination of a primary circuit, a secondary circuit, mechanical means for making and breaking the primary circuit, and means for interrupting the current in the
110 primary circuit comprising a terminal in the primary circuit, and an armature movable relatively to the terminal for making and breaking the primary circuit, the primary circuit including a plurality of electro-
115 magnetic means, each having a core, the cores thereof being arranged substantially parallel to each other, said electromagnetic means operating to attract the armature and move the same out of engagement with the
120 terminal to interrupt the current in the primary circuit, and to hold said armature in its position assumed when interrupting the current while the first-mentioned means is making the circuit, one of the electromag-
125 netic means being connected in the primary circuit to bridge the gap formed in the primary circuit at said terminal when the armature is attracted by the other electromag-
130 netic means, and being of greater resistance than the part of the primary circuit through

which no current passes when the current is interrupted by the armature, substantially as and for the purpose described.

6. The combination of a primary circuit, a secondary circuit, mechanical means for making and breaking the primary circuit, means for interrupting the current in the primary circuit, the primary circuit including a plurality of electromagnetic means, each having a core, said electromagnetic means operating the second-mentioned means to interrupt the current in the primary circuit, and to hold said second-mentioned means in its position assumed when interrupting the current while the first-mentioned means is making the circuit, and means for rendering inoperative the electromagnetic means for holding the second-mentioned means in its position assumed when interrupting the current, substantially as and for the purpose set forth.

7. The combination of a primary circuit, a secondary circuit, mechanical means for making and breaking the primary circuit, means for interrupting the current in the primary circuit comprising a terminal in the primary circuit, and an armature movable relatively to the terminal for making and breaking the primary circuit, the primary circuit

including a plurality of electromagnetic means, each having a core, the cores thereof being arranged substantially parallel to each other, said electromagnetic means operating to attract the armature and move the same out of engagement with the terminal to interrupt the current in the primary circuit, and to hold said armature in its position assumed when interrupting the current while the first-mentioned means is making the circuit, one of the electromagnetic means being connected in the primary circuit to bridge the gap formed in the primary circuit at said terminal when the armature is attracted by the other electromagnetic means, and a switch for connecting and disconnecting said one of the electromagnetic means from the primary circuit, substantially as and for the purpose specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 3d day of February, 1906.

CHARLES P. L. NOXON.

Witnesses:

S. DAVIS,
F. G. BODELL.