E. S. LINCOLN.

COMBINED IGNITION AND WORKING SYSTEM.

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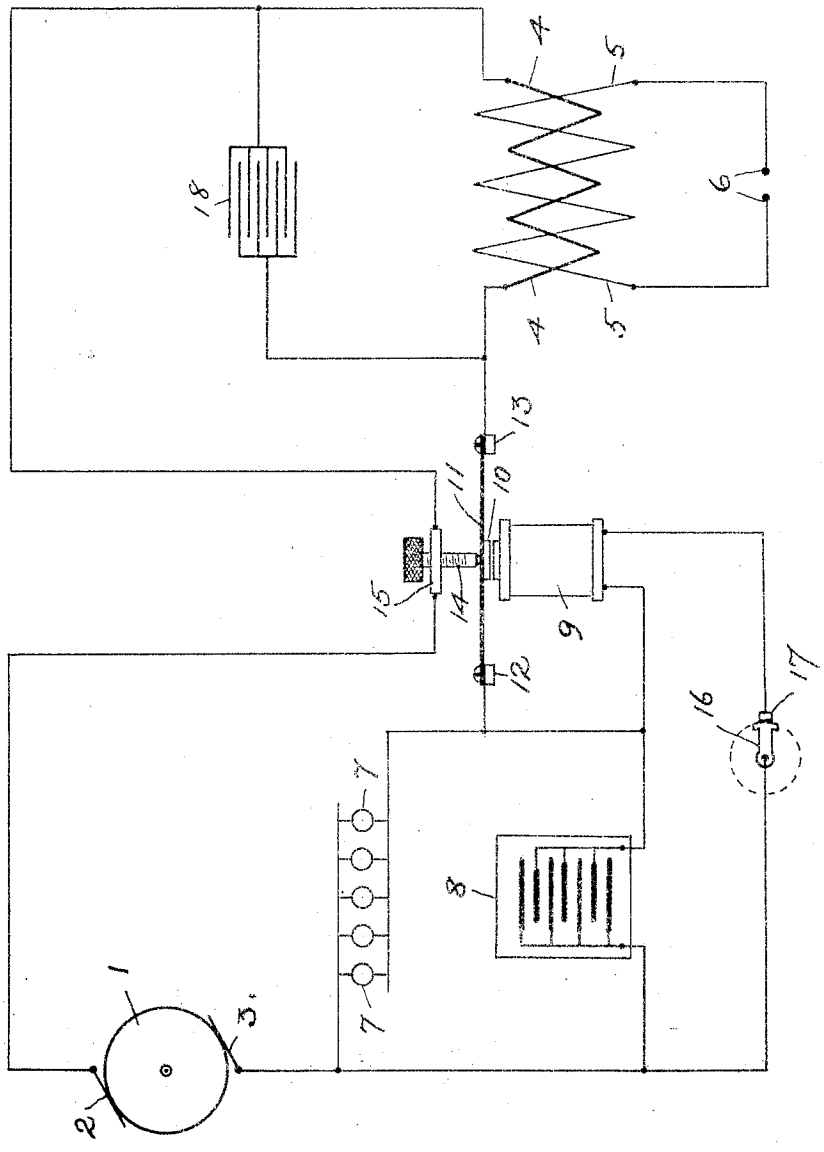

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UNITED STATES PATENT OFFICE.

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COMBINED IGNITION AND WORKING SYSTEM.

1,039,974. Specification of Letters Patent. Patented Oct. 1, 1912.

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To all whom it may concern:

Be it known that I, EDWIN S. LINCOLN, citizen of the United States, residing at Brookline, in the county of Norfolk and State of Massachusetts, have invented certain new and useful Improvements in Combined Ignition and Working Systems, of which the following is a specification.

My invention relates to electrical systems in which an electrical generator is adapted to supply electricity both for the purpose of energizing an inductive means and for supplying current to a working circuit.

More especially my invention relates to providing a combination of electrical apparatus so arranged and electrically so interconnected that a single electric generator may be employed for the purpose of supplying electric current for the ignition system of an internal combustion engine, and may be contemporaneously employed to supply current for lighting or other purposes.

My invention consists in the use of an electric generator, in combination with an inductive means, a working circuit, and other electrical apparatus, substantially as hereinafter described, all being combined and electrically interconnected substantially as hereinafter set forth.

The drawing presents diagrammatically one of the preferred embodiments of my invention.

In said drawing, 1 is an electric generator, preferably of the direct current type, and provided with the usual commutating brushes 2 and 3.

At 4 is indicated the primary winding of an inductive means, preferably an induction coil; the secondary winding, 5, of the same being electrically connected to the spark points 6, which may be located in any approved manner in the cylinder of an internal combustion engine, not shown in the drawings.

At 7 are indicated one or more electric lamps, representing a working circuit. A storage battery, which may be of any approved form, is indicated by the numeral 8.

At 9 is represented an electro-magnet which is adapted, when magnetized, to cause a movement of a movable armature 10 carried upon a resilient strip 11, which is of an electrically conductive material, and is secured preferably at either end, as shown, upon supports 12 and 13. Said strip 11 is normally in contact with the tip of a contact screw 14 adjustably mounted in a support 15.

At 16 is represented the movable member of a contact making device, as for example the rotating arm of a timer; said arm being adapted to contact, as it revolves, with the timer segment 17.

At 18 is a condenser of any approved type.

The electrical apparatus hereinabove mentioned are electrically connected by suitable conductors in the following manner. The commutating brush, 2, is connected at support 13, with the resilient strip 11; the circuit extending through the contact screw support 15, and the primary winding 4 of the inductive means. Leaving the resilient strip 11 at the support 12, the circuit divides into three branches, one branch leading through the working circuit containing the lamps 7, and a second branch leading through the storage battery 8, to the brush 3. A third branch traverses the winding of said electro-magnet 9 and is in electric connection with brush 3 at such times as the timer arm 16 and timer segment 17 are in electrical engagement. The condenser 18 is connected in usual manner in shunt around the separable contacts embodied in the resilient strip 11 and the contact screw 14.

My invention operates in the following manner. The timer arm 16 is assumed to be rotatably driven so as to come into engagement with the timer segment 17 at such instant as it is desired to produce a spark at the spark points 6. Except at the moments when as hereinafter described, the magnet 9 is in a magnetized condition, the resiliency of strip 11 is arranged to hold the same in contact with the tip of the contact screw 14, which is so adjusted in its support 15 as to be in electric engagement with the same. Assuming now that the generator 1 is rotatably driven so as to generate electric energy, and furthermore for the moment assuming that the timer arm 16 is out of engagement with the timer segment 17 it will be apparent that the current generated by generator 1 will pass by way of brush 2 into the contact screw 14 and thence into the resilient strip 11 whence it will return to brush 3 in part through the working circuit 7 and in part will operate to charge the storage battery 8 which is connected in parallel therewith; the resistance comprised in

the interengaging separable contacts embodied in the contact screw 14 and resilient strip 11 being relatively so low with respect to that comprised in the primary winding of the induction coil, that said winding is essentially short circuited and will remain in an unenergized condition and electrically inert. When however, the rotating arm 16 of the timer engages with the timer segment 17, the winding of the electro-magnet 9 will be connected in parallel with the working circuit 7 and with the storage battery 8, into the circuit included between the brushes 2 and 3, and a part of the current generated by the generator will traverse the magnet winding and will magnetize the same.

The magnetization of the electro-magnet 9 will operate to actuate the circuit breaker, the attraction of the magnet upon the armature 10 causing the separation of the separable contacts carried upon the resilient strip 11 and the contact screw 14. In consequence of the separation of the said separable contacts the current produced by the generator 1 will be suddenly compelled to traverse the primary winding 4 of the inductive means on its way to the lighting and storage circuits. In consequence, the sudden energization of the inductive means so produced, will operate in well known manner to induce a current in the secondary winding of the same which will cause a discharge at the spark points 6. When the continued rotation of the timer arm 16 has carried the same out of engagement with the timer segment 17, the magnet 9 will lose its power of attracting armature 10 and the resiliency of strip 11 will restore the same into its initial position in contact with contact screw 14. In consequence the primary winding 4 will be again short circuited and current will cease to traverse the same, whereupon said coil will again become inert and will remain so until the timer again becomes operative to again actuate the discharge producing instrumentalities, in the manner just indicated; said coil meanwhile discharging itself between its successive energizations into the condenser 18 in usual manner.

By adopting the method hereinabove described whereby the inductive means is thrown into the circuit so as to be connected in series with the generator and the working circuit momentarily when it is desired to energize the same it is possible to utilize the energy developed by the generator 1 for the double purpose as hereinabove described with comparatively slight disturbance to the operation of the working circuit or the charging circuit.

My invention hereinabove described may be readily adapted for use in connection with multi-cylindered engines either by employing a low tension distributer adapted to place a selected induction unit in operative relation to the system, or by using a high tension distributer for the purpose of placing the inductive means in operative relation with spark points located in a selected motor cylinder. The modifications necessary to effect either of the above constructions suggested may be easily effected by any competent workman experienced in ignition work, so I will not describe such modifications in detail. At the same time modifications, of a character easily effected by a competent workman, should be made in the timing apparatus so that the circuit through the electro-magnet 9 is completed, and the inductive means be thereby rendered operative to produce an electric discharge in each operative position of the distributer.

Having described my invention, I claim,

1. In an ignition system, in combination, a source of electric energy, a circuit breaker having normally engaged separable contacts, a vibratorless induction coil, a working circuit, a circuit connecting the source of energy in energizing relation with the working circuit through the separable contacts, a circuit interconnecting said separable contacts through the induction coil, and means for separating said contacts at the moment of ignition.

2. In an ignition system, in combination, an electric generator, a circuit breaker having normally engaged separable contacts, a vibratorless induction coil, a working circuit, a circuit connecting the generator in energizing relation with the working circuit through the separable contacts, a circuit interconnecting said separable contacts through the induction coil, and means for separating said contacts at the moment of ignition.

3. In an ignition system, in combination, an electric generator, a circuit breaker having normally engaged separable contacts and an electro-magnet for causing said contacts to disengage, a vibratorless induction coil, a working circuit, a circuit connecting the generator in energizing relation with the working circuit through the separable contacts, a circuit interconnecting said separable contacts through the induction coil, and means connecting the source of energy in energizing relation with the electro-magnet at the moment of ignition.

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

EDWIN S. LINCOLN.

Witnesses:
NATHAN B. DAY,
CHAS. F. RANDALL.