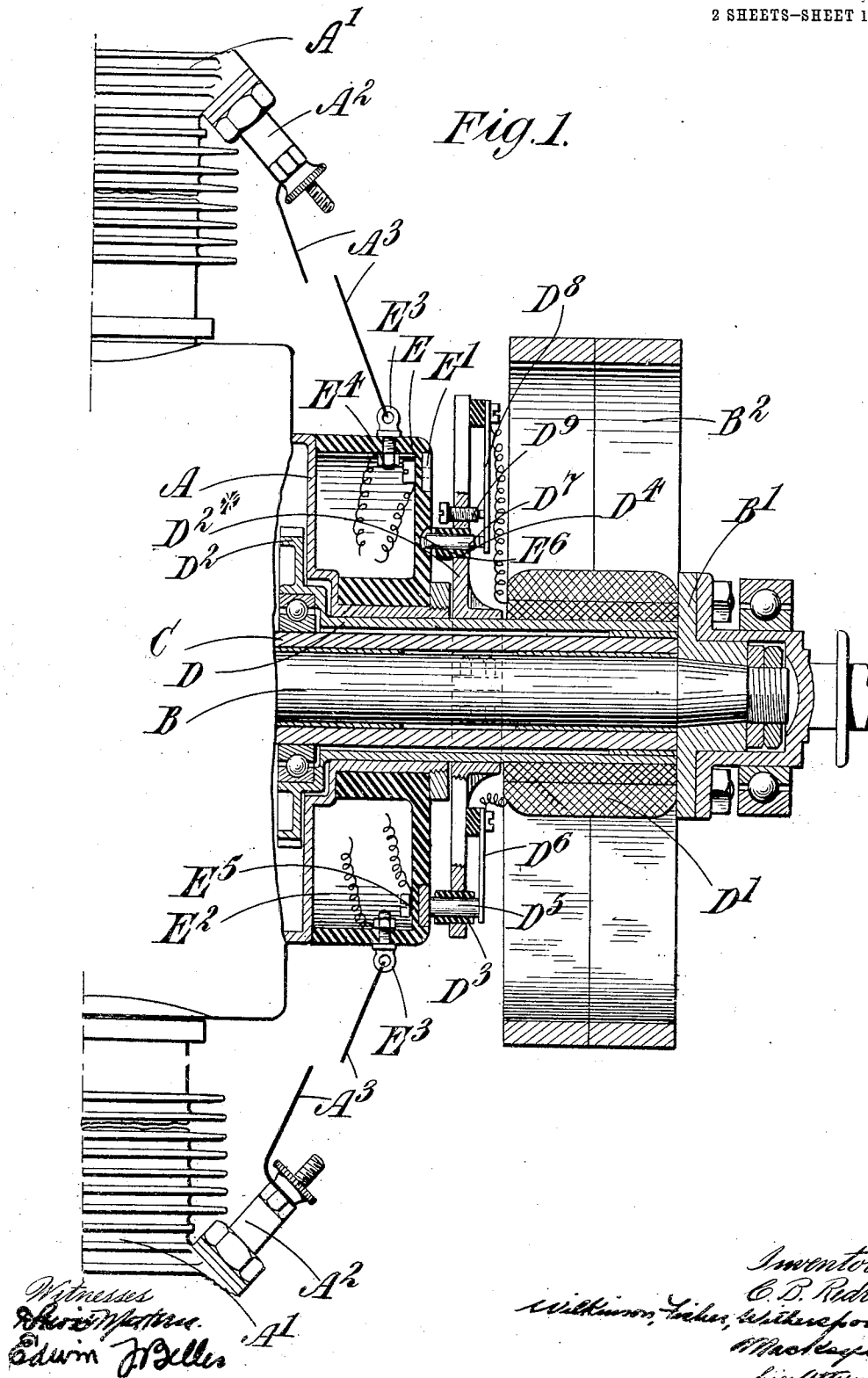


C. B. REDRUP.
MAGNETO IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JUNE 15, 1911.

1,030,127.

Patented June 18, 1912.

2 SHEETS—SHEET 1.



C. B. REDRUP.
MAGNETO IGNITION DEVICE FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JUNE 15, 1911.

1,030,127.

Patented June 18, 1912.

2 SHEETS-SHEET 2.

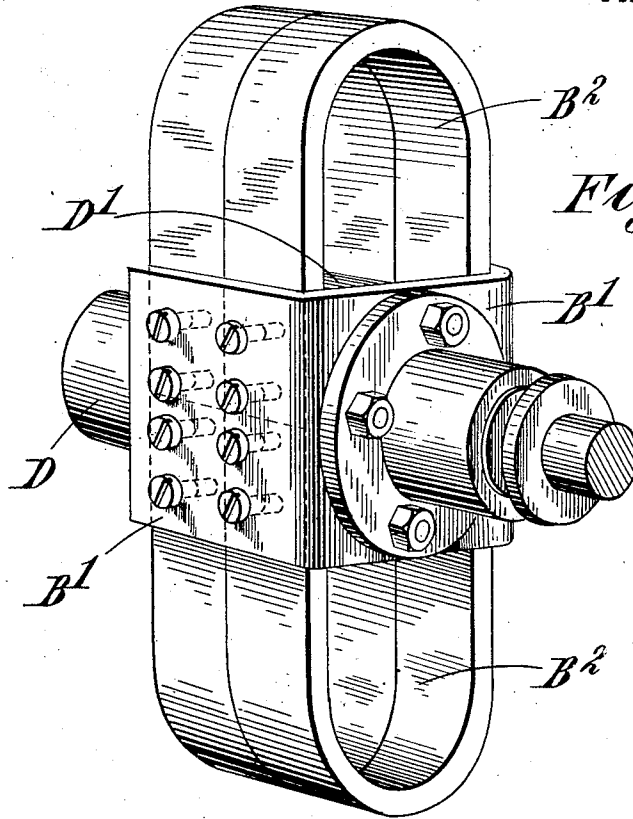


Fig. 2.

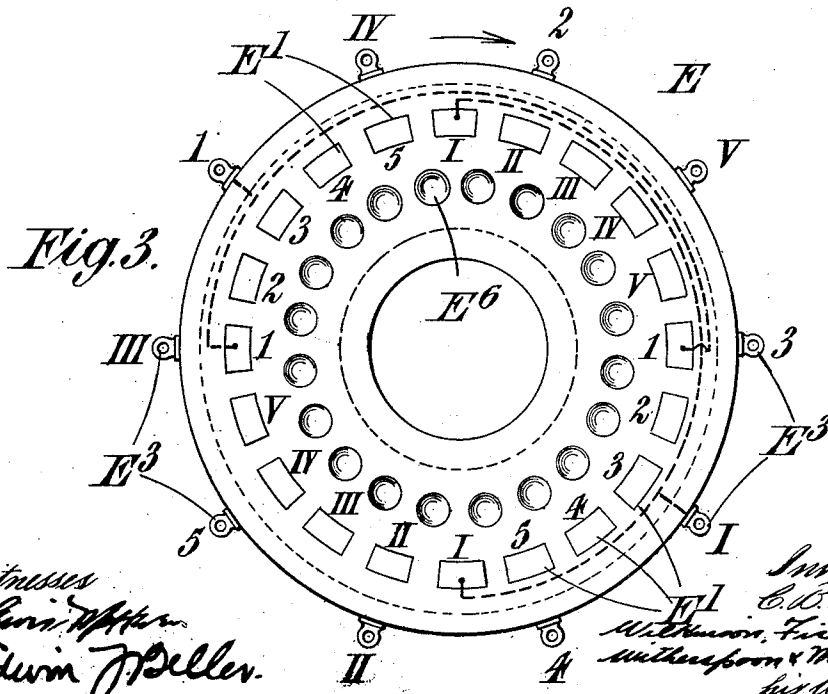


Fig. 3.

Witnesses
John H. Miller
Edwin J. Miller

Inventor
C. B. Redrup
William F. Fisher
W. H. Thompson & MacKaye
his Attorneys

UNITED STATES PATENT OFFICE.

CHARLES BENJAMIN REDRUP, OF CANTON, CARDIFF, ENGLAND.

MAGNETO IGNITION DEVICE FOR INTERNAL-COMBUSTION ENGINES.

1,030,127.

Specification of Letters Patent.

Patented June 18, 1912.

Application filed June 15, 1911. Serial No. 633,332.

To all whom it may concern:

Be it known that I, CHARLES BENJAMIN REDRUP, a subject of the King of England, residing at Canton, Cardiff, county of Glamorgan, Wales, England, have invented certain new and useful Improvements in Magneto Ignition Devices for Internal-Combustion Engines, of which the following is a specification.

This invention is for improvements in magneto-ignition devices for internal combustion engines and has for its object to provide a simple form of ignition apparatus and distributor for multi-cylinder engines of the type wherein the cylinders rotate.

According to one feature of this invention there is employed with a distributor plate that is rotatable with the cylinders and has on it a series of contacts arranged consecutively, a brush that travels around with the magneto armature in the same direction as but at a different speed from that of the cylinders. Preferably a make-and-break plunger cooperating with cam-surfaces on the distributor plate and carried around with the armature is employed for effecting the interruptions of the primary circuit of the armature, the first-mentioned brush being in such case connected with the high tension circuit.

The field magnets may be carried on the engine-shaft to operate as a fly-wheel and the back of the distributor plate may be made hollow to permit easy arrangement of the connections between the contacts and the series of external terminals, carried by the distributor plate.

In the accompanying drawings which illustrate one method of carrying out this invention:—Figure 1 is a central section through a magneto and distributor; Fig. 2 is a perspective view of the magneto mechanism magnets, and Fig. 3 is a face view of the distributor plate.

Like letters indicate like parts throughout the drawings.

A portion of the crank-case of the engine is shown at A and parts of two cylinders are shown at A¹. The cylinders A¹ are rigid with the crank-case and disposed radially thereto, the whole revolving together in the well-known manner, and as these parts are well-known they need no further description in the present specification.

The engine-shaft B rotates in a reverse sense to the cylinders and crank-case, and

secured to it by a bossed yoke B¹ are the magnets B² of the magneto apparatus. Surrounding the shaft B is a bush C and surrounding this is a sleeve D that carries the armature D¹ of the magneto apparatus. The sleeve D has on it a toothed wheel D² that lies within the crank-case A and meshes with other gear wheels therein. One of these other wheels is carried by the crank-shaft and the arrangement and ratios of the wheels are such that the sleeve D is driven in the same direction as, but at a different speed, from that of the crank-case A. Fast to the crank-case is a distributor plate E having on its face a series of contacts E¹. The plate E is in the form of a disk hollowed out at its back to form a chamber E² and the contacts E¹ are arranged in a circle (see Fig. 3) grouped as hereinafter described.

On the periphery of the distributor plate E is a series of terminals E³ there being as many terminals as there are cylinders of the engine. In Fig. 3 ten terminals are shown as the engine is supposed to have ten cylinders. Each cylinder carries an ignition plug A² conveniently situated on that side of it which is toward the magneto apparatus, and a wire A³ connects the ignition plug with the terminal allotted to it. Within the hollow back E² of the distributor plate each terminal is provided with a nut E⁴ and each contact has a set-screw E⁵; the plate E is of insulating material.

Fast on the sleeve D which, as already stated, carries the armature D¹ is a cross-arm D^{2*} and the portions of the arm that lie on opposite sides of the sleeve each carry a socket D³ D⁴ respectively. In the socket D³ a brush D⁵ is mounted and is free to slide endwise. One end of the brush bears against the distributor plate in line with the contacts E¹ and on the opposite end of the brush a spring D⁶ bears which is connected with one end of the high-tension winding of the armature D¹. The spring D⁶ is carried by the arm D^{2*} but is insulated therefrom as also is the socket D³.

In the socket D⁴ is a sliding plunger D⁷ one end of which bears against the distributor plate E in line with a series of recesses constituting cam faces E⁸. Against the opposite end of the plunger D⁷ a spring D⁹ bears which is connected to the primary winding of the armature D¹. The spring D⁹ is carried by but insulated from the arm

D^{2*} but in the arm and having metallic contact therewith is a set-screw D⁹ whose end lies opposite the vibrating end of the spring D⁸. The arm D^{2*} and thus the screw D⁹ is earthed and the screw is so set that when the plunger D⁷ is in the recess E⁶ as shown in Fig. 1, the spring D⁸ will be in contact with the set screw.

The grouping of the contacts E¹ is shown in Fig. 3 as arranged for an engine having a two-throw crank and ten cylinders, five of which are allotted to one crank and five to the other. The contacts E¹ and terminals E³ allotted to the cylinders for one crank are numbered with Arabic figures and the same parts allotted to the other set of cylinders are numbered with Roman figures. It will be seen that a group of five contacts with Arabic figures is arranged with its elements in consecutive order and then a group with Roman figures with its elements in consecutive order and following this is another group with Arabic figures, and yet another group with Roman figures, so that each group is duplicated. This is the arrangement adopted with the sleeve D that carries the armature and the brush D⁵ travels around one and a quarter turns relatively to the crank shaft while the crank-chamber which carries the distributor plate rotates only once relatively to the crank shaft. This extra quarter revolution of travel of the brush D⁵ has a two-fold object (1) the magneto magnets are provided with four poles which would only give four excitations to the armature per revolution whereas five are required, (2) it is necessary to move the brush relatively to the distributor plate and the quarter turn enables the brush thus to travel over five contacts corresponding to the five cylinders which are to be exploded during one revolution of the crank case relatively to the crank shaft.

The operation of this device is as follows:—As the armature D¹ rotates the current will be excited in the primary circuit by the magneto magnets in the well known manner. As the arm D^{2*} rotates with the plunger 7, the spring D⁸ maintains said plunger yieldingly in contact with the cam surfaces formed on the distributor plate E by the recesses E⁶, whereby said spring alternately engages and disengages the screw D⁹ to make and break the primary circuit. At the instant at which the spring D⁸ is thus disengaged from the screw D⁹, the brush D⁵ is on one of the contacts E¹ and thus current from the high-tension winding of the armature D¹ will pass from that contact to the ignition device that is connected therewith. Supposing the brush D⁵ is resting on the first contact of the left-hand group (Fig. 3) marked with Arabic figures the charge in cylinder 1 will be exploded and as the distributor plate is traveling in the direction of

the arrow slower than the brush, the brush will pass in consecutive order over the contacts 2, 3, 4 and 5 discharging the contacts of the corresponding cylinders 2, 3, 4 and 5. These cylinders, as is shown by the position of the terminals E³, Fig. 3, are arranged alternately with the cylinders of the other set so that during this relative movement of a quarter of a turn of the distributor plate and brush, the crank-case, and of course the distributor plate with it, has performed a complete revolution. The brush next will rest upon the contact I of the right-hand Roman group, Fig. 3, and will explode the cylinder marked with a Roman I and so on throughout the series Roman marked contacts and cylinders. After this the brush will next take the second set of contacts marked with Arabic numbers and then the second set marked with Roman numbers, by which time the crank-case will have performed four revolutions and each set of cylinders will have had their charges exploded twice.

As will be seen the hollow back of the distributor plate E enables the various parts to be readily connected to their terminals, the method of wiring being shown by dotted lines in Fig. 3 where the wiring for cylinders 1 and I only is shown to avoid confusion, and the terminals E³ are directly connected to the ignition plugs by wires A³ as already stated, and shown in Fig. 1.

Instead of having the armature D¹ mounted on the sleeve D and the magnets B² on the shaft B it will be easily understood that the magnets may be substituted by two or more complete magneto machines whose spindles would be geared with a wheel carried by the sleeve D. Whichever arrangement is employed, the magnets still serve as a fly-wheel for the crank-shaft B.

Obviously various modifications may be made in detail in this apparatus according to the kind of engine and number of cylinders to which it is to be applied, but the above description is given by way of example and not by way of limitation of the invention.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In an ignition device for multi-cylinder engines of a rotary reciprocating-piston type, the combination of a distributor plate provided with duplicate groups of contacts, a brush for engaging said contacts, means for rotating said plate and brush at different speeds in the direction of rotation of the engine cylinders, an electric generator having its armatures in electrical connection with said brush, means for rotating the armature of said generator with said brush, and connections to the engine shaft for rotating the field of said generator in a reverse direction.

2. In an ignition device for multi-cylinder engines of a rotary reciprocating-piston type, the combination of a distributor plate provided with duplicate groups of contacts and with a series of depressions, a brush for engaging said contacts, a plunger for engaging said depressions, means for rotating said plate in the direction of rotation of the engine cylinders, means for rotating said brush and plunger in the same direction at a different speed from that of said plate, a magneto generator having the secondary winding of its armature in electrical connection with said brush, means controlled by said plunger for opening and closing the primary winding of said armature, and means for rotating said armature with said brush and plunger.

3. In an ignition device for rotary reciprocating-piston engines having sets of

power cylinders, the combination of a distributor plate having duplicate groups of contacts for each set of cylinders, a brush for engaging said contacts, means for rotating said plate and brush at different speeds in the direction of rotation of the engine cylinders, an electric generator having its armatures in electrical connection with said brush, means for rotating the armature of said generator with said brush, and connections to the engine shaft for rotating the field of said generator in a reverse direction.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES BENJAMIN REDRUP.

Witnesses:

A. M. HAYWARD,
HARRY B. BRIDGE.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."