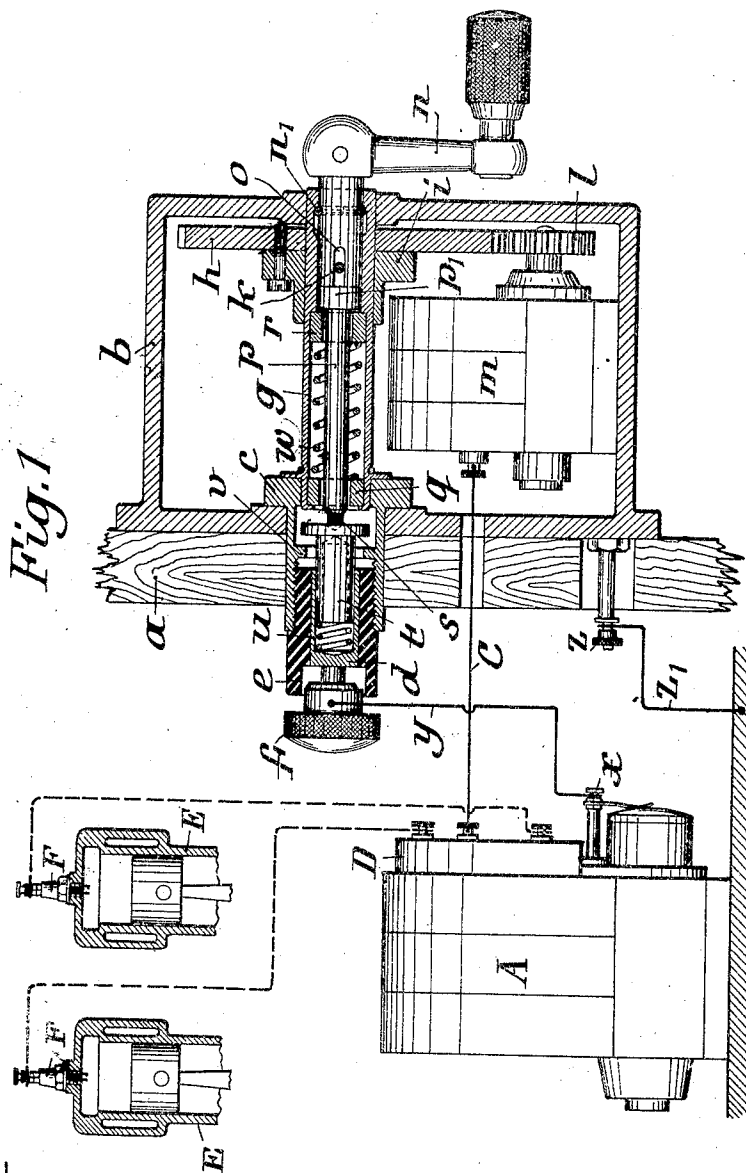


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ELECTRIC IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES.
APPLICATION FILED JAN. 15, 1913.

1,056,512

Patented Mar. 18, 1913.

2 SHEETS—SHEET 1.



WITNESSES

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ELECTRIC IGNITION SYSTEM FOR INTERNAL-COMBUSTION ENGINES.

1,056,512.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ANTON DIEMER, a subject of the Emperor of Germany, residing at and whose post-office address is Lerchenstrasse 77, Stuttgart, Germany, have invented certain new and useful Improvements in Electric Ignition Systems for Internal-Combustion Engines; 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.

The present invention relates to an electric ignition system for an internal combustion engine wherein there is employed a service magneto driven from the engine for ignition during normal running, and a starting magneto driven independently of the engine for ignition during starting; and more particularly to such a system embodying means operative at will through the intermediacy of the independent driving mechanism of the starting magneto for rendering the service magneto ineffective for producing ignition sparks, whereby the ignition system may be rendered inoperative in order to stop the engine or in order to prevent an unauthorized person from operating the engine.

In the preferred embodiment of my invention, the starting magneto is driven by hand by means of a removable handle which may be manipulated to short-circuit the service magneto for stopping the engine, and a normally incomplete short circuiting path for rendering the service magneto ineffective for producing ignition sparks is automatically completed upon removal of the handle, whereby the starting magneto can then not be driven to start the engine, while the service magneto can then not be used to normally run the engine. Furthermore the service magneto is automatically rendered effective again for producing ignition sparks during normal running merely by replacing the handle in position to manually drive the starting magneto to start the engine.

In the accompanying drawings illustrating my invention; Figure 1 represents a longitudinal section of the essential parts in application to an automobile, as an example, some of the parts being shown diagrammatically; Fig. 2 represents a corresponding view of a modification within my invention;

Fig. 3 is a section on line 3—3 of Fig. 2; and Fig. 4 is a section on line 4—4 of Fig. 2.

In the modification of Fig. 1, the starting magneto and the manually operated mechanism for driving it, are arranged on the dash-board *a* of the automobile within easy reach of the chauffeur, and in such a way as to be electrically insulated from the engine *E*. The housing *b* carries a metal bushing *c* into which is screwed a socket *e* of insulating material. The metal sleeve *d* is embedded in the socket *e* and is electrically connected with the binding post *f*. The rotatable hollow shaft *g* is journaled in the bushing *c* and in the wall of the housing *b*. The hub *i* of gear *h* is fastened to the shaft *g* by a pin *k* so that the gear engages with the gear *l* upon the armature shaft of the starting magneto *m*. Furthermore, when the operating handle *n* occupies its normal driving position, the pin *k* lies in the slot *o*. The rod *p* is guided in the disks *q* and *r*, and its end *p* rests against the hub of the handle *n*, while its other end *s* of insulating material normally lies against the sleeve *t*, which is pressed forward in the sleeve *d* by the spring *u*. An enlarged disk at one end of the sleeve *t* lies between the abutment flange *v* of the bushing *c* and the end of the hollow shaft *g* as shown. The handle *n* is held in its normal driving position by a spring loop *n*, resting in a groove in the handle *n* and sliding in an axially extended groove in shaft *g* as shown, so that the handle is held against unintentional longitudinal displacement or removal.

The longitudinally movable disk *r* is pressed by the spring *w* against an abutment within the hollow shaft *g*. The short-circuiting binding post *x* on the service magneto *A* is electrically connected to one terminal of the primary winding of the armature in the usual way, and also by conductor *y* to the binding post *f*. The housing *b* is electrically connected to the frame of the engine *E* by means of conductor *z*, extending from the binding post *z*.

The operation of the apparatus shown in Fig. 1 is as follows: When the handle *n* is turned, the armature of the starting magneto *m* is rotated rapidly, thereby producing a succession of ignition currents which are conducted by a conductor *C* to the distributor *D* of the service magneto *A*, and

through the distributor in the usual way to the proper one of the spark plugs F in the engine cylinders E, thereby igniting the combustible mixture therein and causing the engine to start and to run up to its normal operating speed. As soon as the engine is running normally, the operation of the starting magneto may be discontinued, and the service magneto will furnish the currents for ignition. The parts of the ignition system will then be in the position shown in the drawing. If, however, the engine is to be stopped by cutting off the ignition, the handle *n* is depressed, whereupon the spring *w* is compressed until the projection of the sleeve *t* is forced against the flange *v* through the intermediacy of the rod *p*, so that the binding post *x* is electrically connected to the frame of the engine E by way of the conductor *y*, binding post *f*, sleeves *d* and *t*, bushing *c*, housing *b*, binding post *z*, and conductor *z*₁. The primary winding of the service magneto A is consequently short circuited since its other terminal is grounded in the usual way, so that the service magneto is then ineffective to produce ignition sparks at the spark plugs F. If the handle *n* is removed from the driving mechanism of the starting magneto *m*, the rod *p* is moved longitudinally by the spring *u* until the projection of sleeve *t* comes into engagement with the end of the hollow shaft *g*. In this way also, the primary winding of the service magneto A is short circuited through substantially the same path as before.

Fig. 2 shows a modification of my invention differing from the construction of Fig. 1 principally in the fact that the driving mechanism for the starting magneto *m* comprises a screw-gearing consisting of a longitudinally movable rod 5 with a helical slot 8, into which projects a pin 7 carried by the rotatable hollow shaft 3, which is suitably journaled in the bushing 4 and the wall of the housing *b* in the space between the armature and the field magnets of the starting magneto *m*. The bushing 4 is provided with a square hole for guiding the squared extension of rod 5 in its longitudinal movements against the stress of spring 6, and consequently such longitudinal movement of the rod 5 rotates shaft 3 and the armature of the starting magneto *m* through the intermediacy of the gears *h* and *l*.

The handle 9 is provided for moving the rod 5 longitudinally, this handle being guided in a nipple 10 of housing *b*. One portion of the handle is covered with insulating material 11, while its opposite side is provided with depressions 12 and 13. A spring finger 14 is adapted to engage either of these depressions to hold the handle in position to which it is adjusted. The nip-

ple 10 carries the binding post 15, which is electrically connected with the binding post *x* of the starting magneto A by means of the electrical conductor *y*, and the housing *b* is connected to the engine frame by the conductor *z*₁.

A conducting sleeve 16 is guided within the binding post 15 and is pressed by the spring 17 against the insulating portion 11 of the handle 9 when the handle occupies its normal operating position. If the handle 9 is now pressed inwardly, the contact piece 16 slides upon the insulating portion 11, so that while the starting magneto is being rotated in this way the service magneto is effective for producing ignition sparks at the spark plugs F of the engine E when the engine reaches its normal running speed. When the handle 9 is released, the spring 6 forces it back into the position shown in the drawing and the spring 14 snaps into the depression 13 and holds the handle in that position.

The engine may be stopped during its normal operation by withdrawing the handle 9 to the position in which spring 13 rests in the depression 12. The conducting member 18, which is longitudinally movable on the outer end of the rod 5, is forced by the spring 19 to follow the handle until it touches the contact 16, whereupon the service magneto A is rendered ineffective to produce ignition sparks as a result of the short circuit path extending from the binding post *x* through the conductor *y*, the driving mechanism, and through the conductor *z*₁, from the housing *b* to the frame of the engine E. When it is desired to render the ignition system inoperative for starting, the handle 9 is completely removed from the driving mechanism of the starting magneto, whereupon the contact pieces 18 and 16 remain in engagement to permanently short circuit the service magneto until the handle 9 is again replaced in its normal operating position. By this means, no unauthorized person can start the engine from rest by means of the starting magneto or can cause the service magneto to furnish ignition currents. The handle 9 preferably has an unusual cross-section adapted to fit within an engaging guide in the nipple 10, so that it becomes impossible, as a practical matter, for anyone not provided with a key of this unusual kind to put the starting magneto into operation. In the construction shown, the cross section shown in Fig. 4 is used for this purpose.

Having thus described my invention, what I claim is:—

1. In an electric ignition system for an internal combustion engine, the combination with a service magneto arranged to be driven by the engine to produce ignition sparks during normal running, a starting

magneto for producing ignition sparks during starting, and driving mechanism independent of the engine for driving the starting magneto, of a normally incomplete short-circuiting path for rendering the service magneto ineffective to produce ignition sparks, and means for completing said short-circuiting path at will through the intermediacy of the independent driving mechanism of the starting magneto; substantially as described.

2. In an electric ignition system for an internal combustion engine, the combination with a service magneto arranged to be driven by the engine to produce ignition sparks during normal running, a starting magneto for producing ignition sparks during starting, and driving mechanism independent of the engine for driving the starting magneto and including a removable part, of a normally incomplete short-circuiting path for rendering the service magneto ineffective to produce ignition sparks, and means effective upon removal of said removable part for completing said short circuiting path; substantially as described.

3. In an electric ignition system for an internal combustion engine, the combination with a service magneto arranged to be driven by the engine to produce ignition sparks during normal running, a starting magneto for producing ignition sparks during starting, and driving mechanism independent of the engine for driving the starting magneto and including a removable manually-operated handle, of a normally incomplete short-circuiting path for rendering the service magnet ineffective to produce ignition sparks, and cooperating contacts electrically connected in said short-circuiting path and arranged to be separated to interrupt said short-circuiting path when the handle is in its normal operating position and to be in engagement to complete said short-circuiting path when the handle is removed; substantially as described.

4. In an electrical ignition system for an internal combustion engine, the combination with a service magneto arranged to be driven by the engine to produce ignition sparks during normal running, a starting magneto for producing ignition sparks during starting, and driving mechanism independent of the engine for driving the starting magneto and including a removable manually-operated handle, of a normally incomplete short-circuiting path arranged to render the service magneto ineffective to produce ignition sparks and including two contacts separated from each other and elec-

trically connected, and a spring pressed contact member, the arrangement being such that when the handle is in its normal driving position the contact member is out of engagement with both of said contacts, while when the handle is pressed beyond its normal driving position the contact member engages one of said contacts, and when the handle is removed the contact engages the other of said contacts; substantially as described.

5. In an electrical ignition system for an internal combustion engine, the combination with a service magneto arranged to be driven by the engine to produce ignition sparks during normal running, a starting magneto for producing ignition sparks during starting, and screw gearing independent of the engine for driving the starting magneto and including a depressible operating handle which is removable, of a normally incomplete short circuiting path for rendering the service magneto ineffective to produce ignition sparks, the arrangement being such that when the handle occupies its normal operating position for driving the starting magneto the short circuiting path is maintained incomplete, while the removal of the handle effects the completion of the short circuiting path; substantially as described.

6. In an electrical system for an internal combustion engine the combination with a service magneto arranged to be driven by the engine to produce ignition sparks during normal running, a starting magnet for producing ignition sparks during starting, and screw gearing independent of the engine for driving its starting magneto and including a depressible operating handle which is removable, of a normally incomplete short circuiting path arranged to render the service magneto ineffective to produce ignition sparks and including two cooperating contacts, the arrangement being such that when the handle occupies its normal operating position for driving the starting magneto the cooperating contacts are separated so as to maintain the short-circuiting path incomplete, while when the handle is partly withdrawn or is entirely removed the cooperating contacts engage each other and thereby complete the short-circuiting path; substantially as described.

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

ANTON DIEMER.

Witnesses:

PAUL WOLFART,
HERMANN SCHNEIDER.

It is hereby certified that in Letters Patent No. 1,056,512, granted March 18, 1913, upon the application of Anton Diemer, of Stuttgart, Germany, for an improvement in "Electric Ignition Systems for Internal-Combustion Engines," errors appear in the printed specification requiring correction as follows: Page 1, line 77, for the reference-letter "*p*" read *p*₁; page 3, lines 38 and 95, for the word "magnet" read *magneto*; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 6th day of May, A. D., 1913.

[SEAL]

C. C. BILLINGS,
Acting Commissioner of Patents.