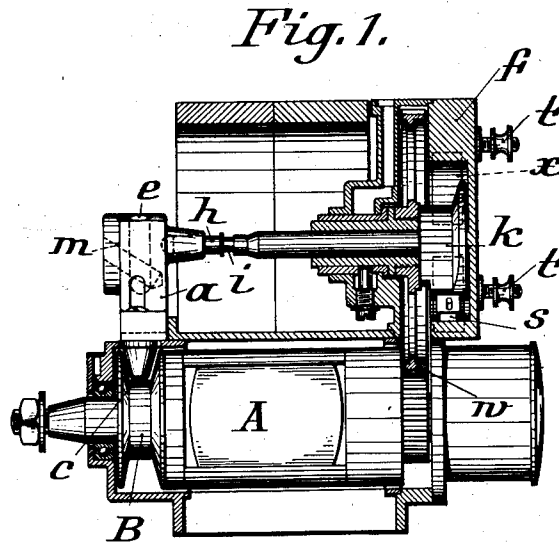
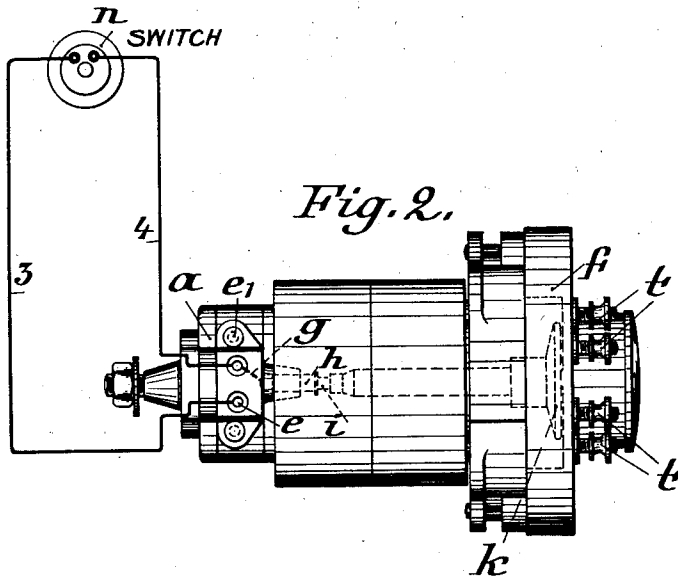


M. SCHÄFER & R. WAGNER.
 APPARATUS FOR ELECTRICAL IGNITION SYSTEMS.
 APPLICATION FILED APR. 9, 1912.

1,047,573.

Patented Dec. 17, 1912.
 2 SHEETS—SHEET 1.



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Fig. 7.

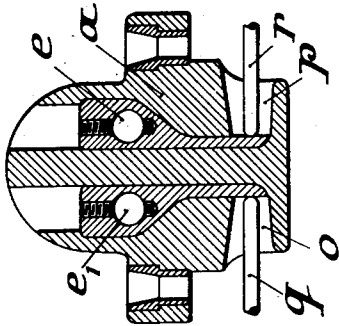


Fig. 6.

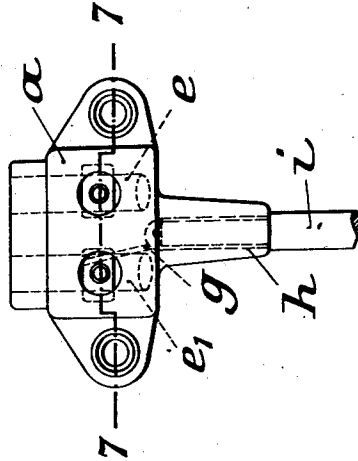


Fig. 5.

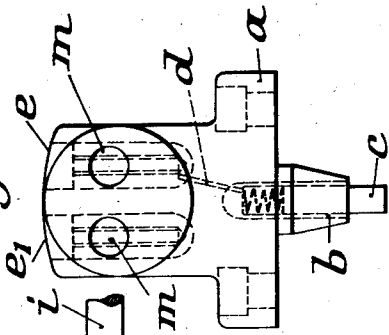


Fig. 4.

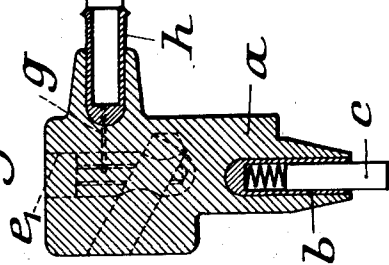
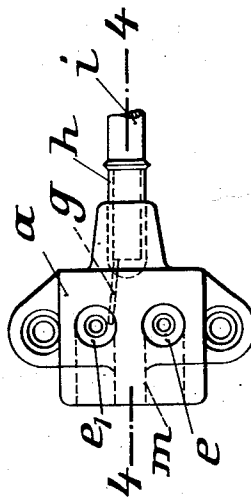


Fig. 3.



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APPARATUS FOR ELECTRICAL IGNITION SYSTEMS.

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To all whom it may concern:

Be it known that we, MAX SCHÄFER and ROBERT WAGNER, subjects of the Emperor of Germany, residing in Stuttgart, Germany, have invented certain new and useful Improvements in Apparatus for Electrical Ignition Systems; and we 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 apparatus for electrical ignition systems, and more specifically to a compact and effective arrangement of the ignition machine, distributor and mechanical interrupter wherein provision is made for electrically connecting a switch between the ignition machine and the distributor for the purpose of controlling the ignition currents from the machine, in such cases, for example, as with double ignition systems and a common set of spark plugs, and with single or double ignition systems with two sets of spark plugs.

It is usual to mount the mechanical interrupter at the front end of the rotatable shaft of an ignition machine, and to drive the distributor from the same end of the shaft. In that case the collector ring connected to the winding of the ignition machine is preferably located at the other end of the shaft. Where two separate ignition current sources are provided, as in double ignition arrangements having both a battery and an ignition machine, or in double spark ignition arrangements wherein two spark plugs are provided in each cylinder of the internal combustion engine, one set of which is to be short-circuited at certain times, a switch is connected between the collector ring and the distributor for disconnecting the ignition machine from the distributor in the first case, and for short-circuiting one set of spark plugs in the second case. One pole of this switch is electrically connected to the collector brush and the other pole is connected to the distributing contact of the distributor by a special conductor leading to the front end of the ignition machine.

An object of the invention herein dis-

closed is to simplify this organization by providing at the rear end of the ignition machine a carrier member provided with a brush holder in which the collector brush slides, a journal box for the rotatable shaft of the distributor, and two terminal connectors electrically connected respectively to the brush holder and to the distributor shaft which serves to conduct the ignition currents to the distributing contact of the distributor. The switch for disconnecting the ignition machine from the distributor, or for short-circuiting one set of spark plugs, is connected between these terminal connectors and may be located at any convenient place. In this way a compact and effective construction is provided for the purpose.

In the accompanying drawings, Figure 1 is a vertical section through an ignition machine embodying the preferred form of our invention; Fig. 2 is a top plan view of the machine; Fig. 3 is a top plan view of the carrier member on a larger scale; Fig. 4 is a vertical longitudinal section on the line 4—4 of Fig. 3; Fig. 5 is a rear elevation of the carrier member; Fig. 6 is a top plan view of a modified form of the carrier member adapted for use with double spark ignition; and Fig. 7 is a section on the line 7—7 of Fig. 6.

In Figs. 1 and 2, *f* is the distributor disk having the binding posts *t* adapted to be connected to the spark plugs in the cylinders of an internal combustion engine, and *i* is the distributor shaft. Upon the front end of the distributor shaft *i* is mounted a head *k* of hard rubber or the like carrying a carbon brush *s* electrically connected to the distributor shaft which is driven from the rotatable member of the ignition machine by the gearing *w*, whereby the brush *s* periodically connects the shaft *i* electrically with the distributor contacts *x* mounted in the usual manner along the inner periphery of the distributor disk *f* and connected to binding posts *t*. Upon the rear end of the rotatable member *A* of the ignition machine is mounted a collector ring *B* electrically connected to the secondary winding of the machine. The carrier member *a*, preferably

made of insulating material, such as hard rubber, is fastened to the frame of the ignition machine above the collector ring B. The carrier member *a* is provided with a metal sleeve *b* for holding a carbon brush *c*, which is spring-pressed against the collector ring B. The metallic journal box *h* in the carrier member serves as the rear bearing for the distributor shaft *i*. On the upper side of the block 2 are mounted the terminal connectors *e* *e*₁, of which *e*₁ is electrically connected to the journal box *h* of the distributor shaft *i* by a wire *g* embedded in carrier member *a*, while *e* is connected by an embedded wire *d* with the brush holder *b*. The slanting bores *m* lead from the rear wall of the carrier member *a* to intersect the bores of the terminal connectors *e* *e*₁.

Fig. 2 shows a switch *n*, mounted in any convenient place, and electrically connected by wires 3 4 to the terminal connectors *e* *e*₁ of the carrier member between the collector brush and the distributing contact *s*. These wires pass through the openings *m* and are held in position by the terminal connectors. By opening the switch *n* to disconnect the terminal connectors *e* *e*₁, the ignition machine is cut off from the distributor.

Figs. 6 and 7 show a modification within our invention in which the carrier member is adapted for two-spark ignition installations, wherein at full service speed of the engine, sparks are simultaneously produced at both spark plugs in each cylinder, while at starting or at slow speed only one set of spark plugs is used and the other set short-circuited. In installations of this kind, the collector ring for delivering the ignition currents produced in the secondary winding is usually divided into two segments and two diametrically opposite brushes are employed for collecting the currents. The two ends of the secondary winding are connected to the two segments, while the two spark plugs in each cylinder are in series with each other through the engine frame and the winding of the ignition machine. By means of a switch connecting the engine frame to one collector brush, one of the sets of spark plugs can be short-circuited in the well known manner. It will be apparent that such an installation can also be provided for double ignition systems.

In Figs. 6 and 7, the hard rubber carrier member *a* is provided with the journal box *h* for the distributor shaft and with two terminal connectors *e* *e*₁ for the attachment of the wires to a switch. However, instead of the brush sleeve *b* of the previously described construction, the bodies of the two terminal connectors are prolonged downwardly and their lower ends form the bottom of two lateral bores *o* and *p*. Within

these bores project two pins *q* and *r* which are pressed by springs (not shown) against the prolongations of the terminal connectors *e* and *e*₁. The pins *q* and *r* are connected to two diametrically opposite collector brushes (not shown) and therefore they connect the brushes to the binding posts *e* and *e*₁. The binding post *e*₁ is connected by a wire *g* to the journal box *h*. In order to now short-circuit one set of spark-plugs, it is only necessary to close a switch between the terminal connector *e* and the cylinder frame.

Having thus described our invention, what we claim is:

1. In combination with an ignition machine provided with a collector brush for collecting the ignition currents produced therein, and a rotatable distributor for distributing the ignition currents, of a carrier member provided with an electrical connection to said brush, a journal box for the rotatable shaft of said distributor, a terminal connector electrically connected to the brush connection, and another terminal connector electrically connected to said shaft.

2. In combination with an ignition machine provided with a collector brush for collecting the ignition currents produced therein, and a rotatable distributor for distributing the ignition currents, of a carrier member provided with a brush holder for said brush, a journal box for the rotatable shaft of said distributor, a terminal connector electrically connected to said brush, and another terminal connector electrically connected to said shaft.

3. In combination with an ignition machine provided with a collector brush for collecting the ignition currents produced therein, and a rotatable distributor for distributing the ignition currents, of an insulating carrier member provided with a metallic sleeve for holding said brush, another metallic sleeve in which the rotatable shaft of the distributor is journaled, two terminal connectors, and embedded wires electrically connecting said sleeves to said connectors.

4. In combination with an ignition machine provided with a mechanical interrupter mounted at one end thereof and driven thereby, and provided with a distributor mounted at the same end thereof, and also driven thereby, of an insulating carrier member arranged at the other end of the ignition mechanism, said member being provided with a brush holder for the collector brush of the ignition machine, a journal box for rotatable shaft of the distributor, and two terminal connectors electrically connected to said brush holder and said journal box.

5. In combination with an ignition machine provided with two part collector ring and a collector brush for each part for col-

lecting the ignition currents produced in the ignition machine, and a rotatable distributor for distributing the ignition currents, of a carrier member provided with a
5 journal box for the rotatable shaft of said distributor, a terminal connector connected to one of said brushes, and a terminal connector electrically connected to other of said brushes and also to said shaft.

In testimony whereof we affix our signatures, in presence of two witnesses.

MAX SCHÄFER.
ROBERT WAGNER.

Witnesses:

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PAUL WOLFART.