T. HUBERT.

MAGNETO.

APPLICATION FILED OCT. 12, 1907.

1,045,406.

Patented Nov. 26, 1912.

3 SHEETS—SHEET 1.

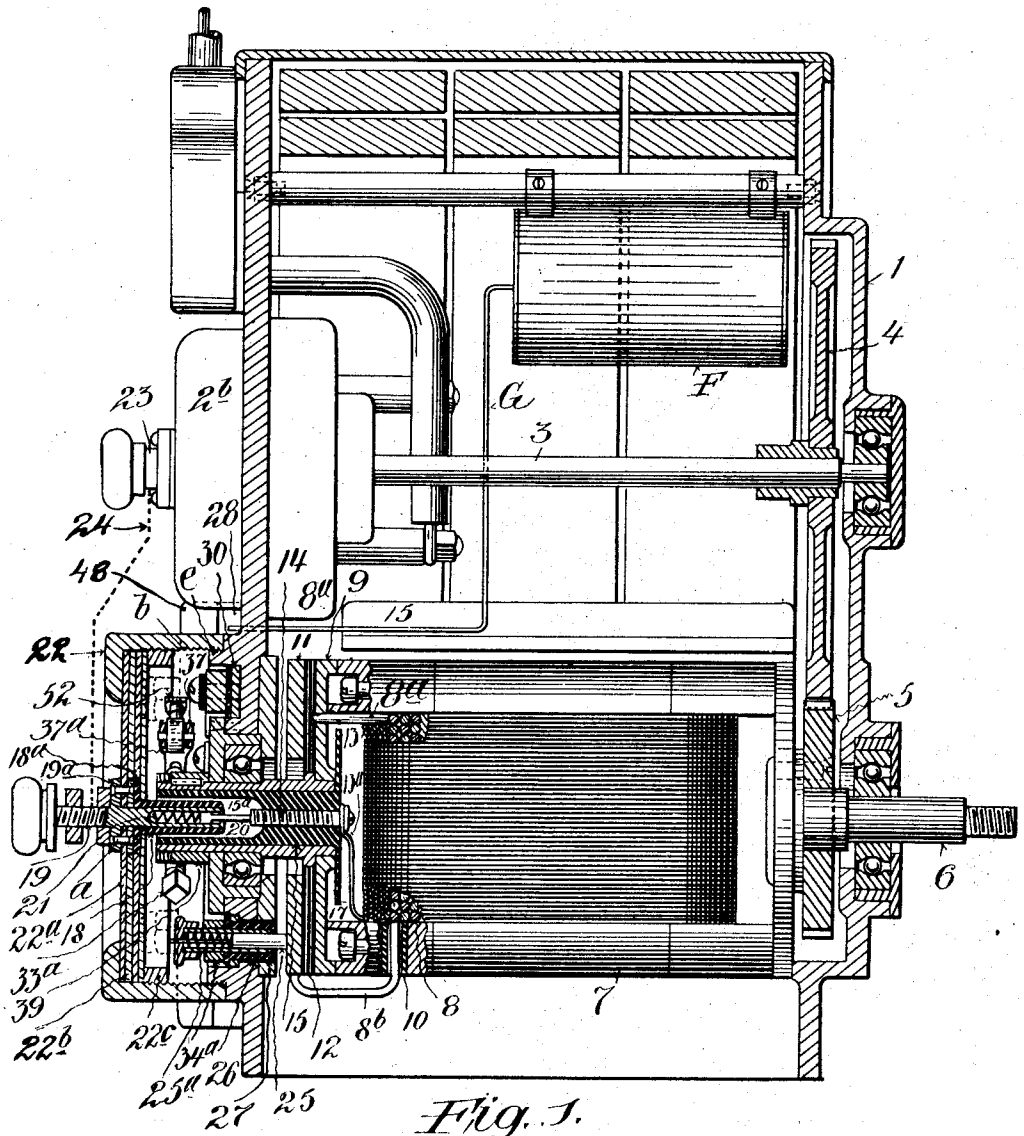

Fig. 1.

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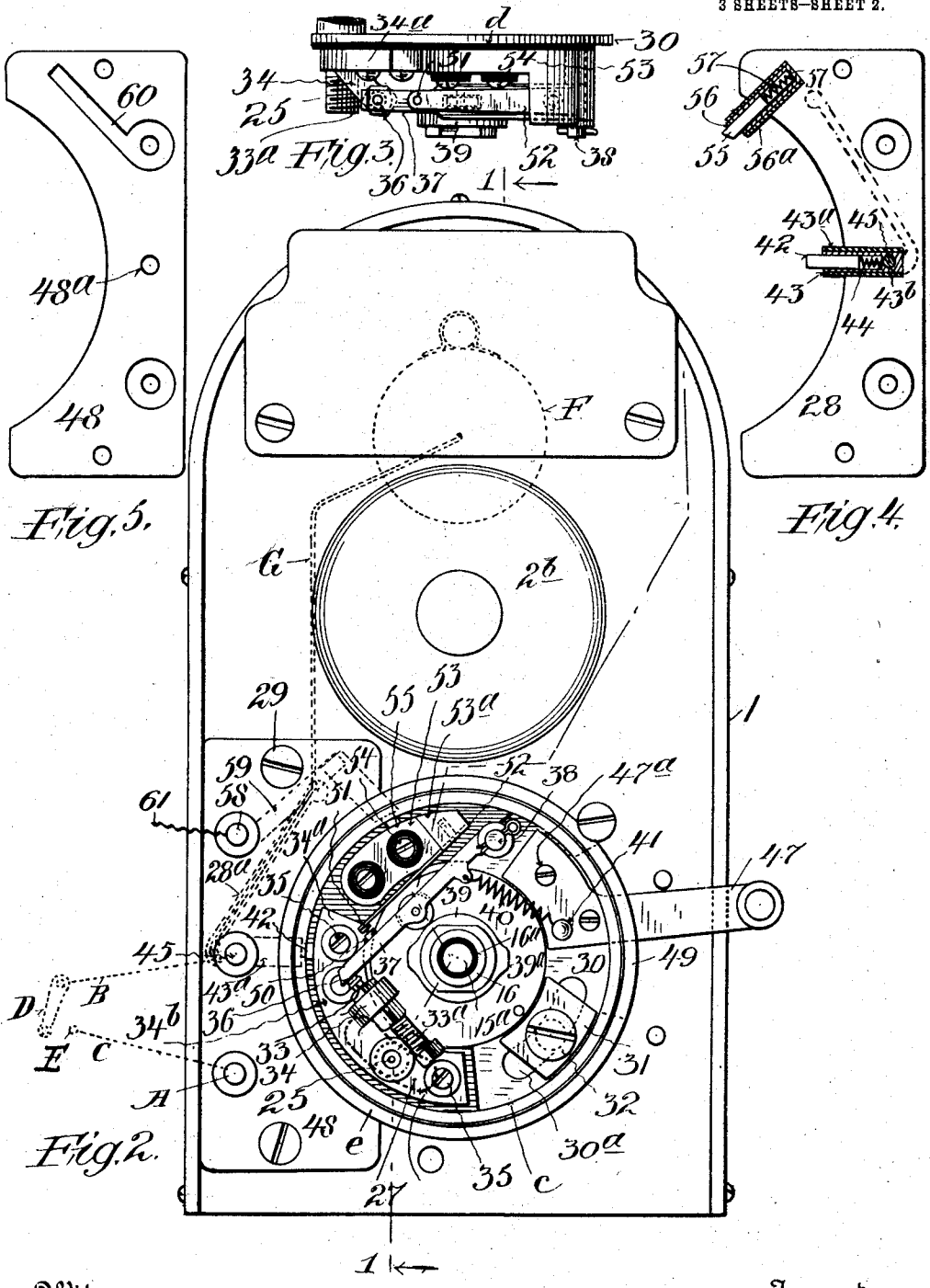

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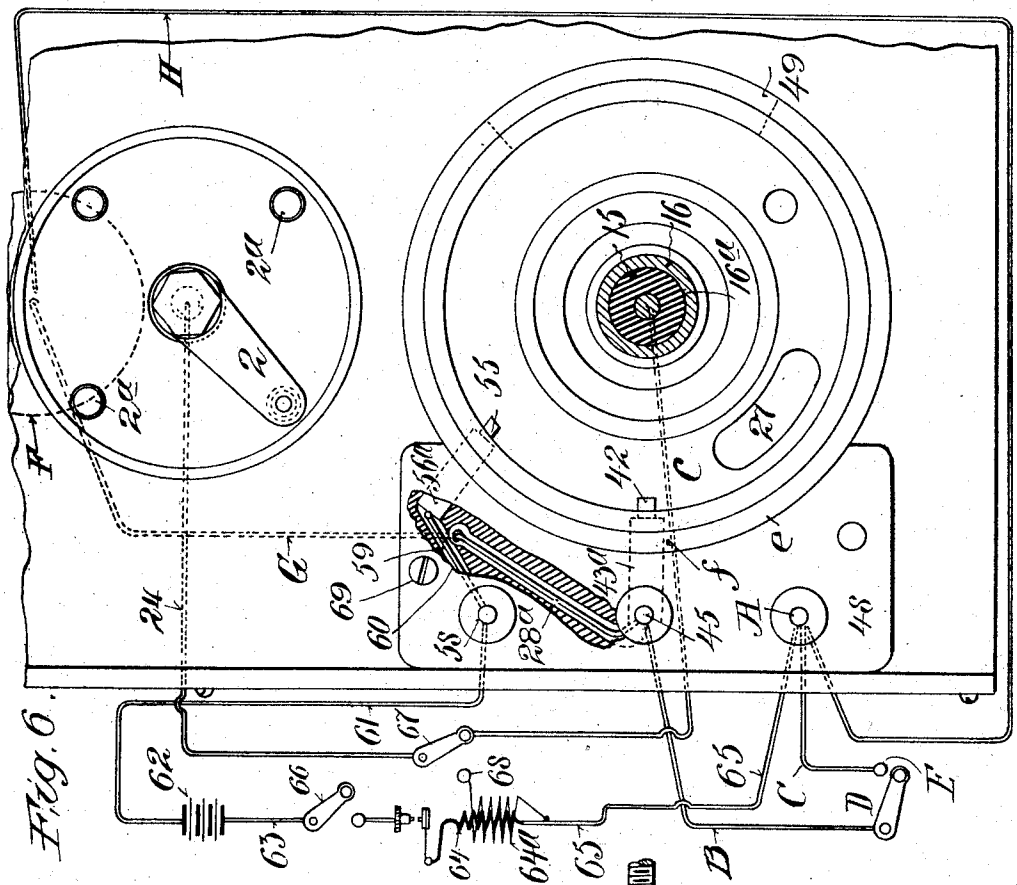

Fig. 6.

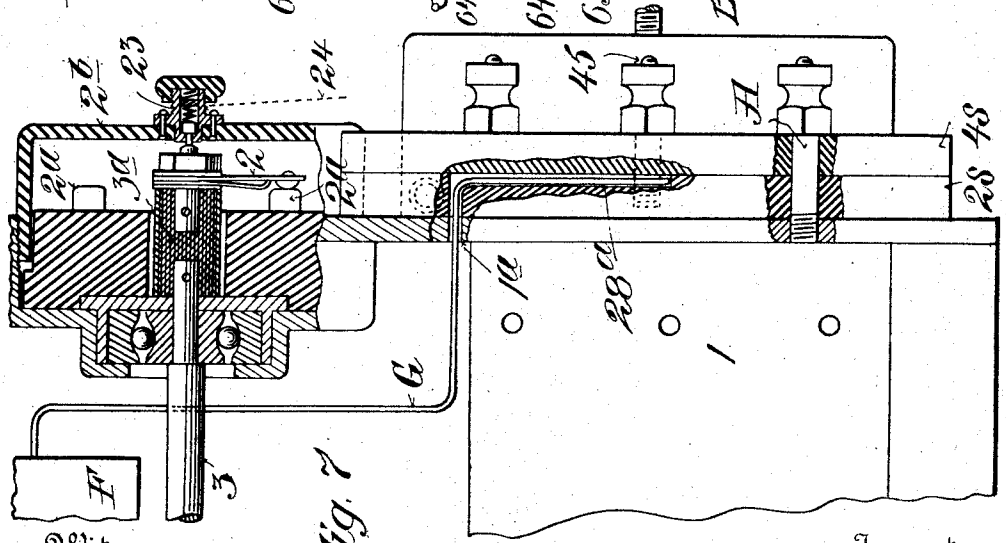

Fig. 7.

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UNITED STATES PATENT OFFICE.

THEODORE HUBERT, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO SPLITDORF ELECTRICAL CO., OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

MAGNETO.

1,045,406. Specification of Letters Patent. Patented Nov. 26, 1912.

Application filed October 12, 1907. Serial No. 397,097.

To all whom it may concern:

Be it known that I, THEODORE HUBERT, a citizen of the United States, and resident of New York city, borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in Magnetos, of which the following is a specification.

My invention relates to improvements in devices for producing ignition in internal combustion engines and particularly in connection with the jump spark used for igniting purposes in gas engines.

The object of my invention is to provide improved means for insulating various parts of the magneto to prevent the leakage of high tension currents, and also to permit the spark, or the time of make and break in the primary circuit, to be advanced or retarded at will, and to this and other ends my invention comprises the novel details of improvement and combinations of parts that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings forming part hereof, wherein,

Figure 1 is a sectional view of a magneto embodying my invention, the section being taken partly upon the irregular line 1, 1, in Fig. 2, the armature being shown partly broken away; Fig. 2 is an end elevation, looking from the left in Fig. 1, one of the caps being removed; Fig. 3 is a detail edge view of the primary circuit controlling devices; Fig. 4 is a detail view, partly in section, of brushes and their support; Fig. 5 is a detail view of a cap for the brushes; Fig. 6 is a partly broken face view, looking from the left in Fig. 1, parts being removed, illustrating diagrammatically certain circuits, and Fig. 7 is a partly sectional side view of the magneto looking from the left in Fig. 2.

Similar numerals of reference indicate corresponding parts in the several views.

The magneto, indicated generally at 1, may mainly be of any well known construction, and provided with a distributer for distributing the secondary current to spark plugs or igniting devices, which distributer is shown provided with a rotary contact 2 carried by a shaft 3 from which said contact is insulated by suitable insulation 3^a, contact 2 being adapted to engage contacts 2^a insulated from the magneto frame and connected with igniting devices or spark plugs in well known manner, said contacts being shown inclosed within insulating cap 2^b screwed upon the frame. Said shaft is shown having a gear 4 meshing with a gear 5 secured to shaft 6 of armature 7 for operating the distributer at half time respecting the rotation of the armature. Shaft 6 may be connected with a gas engine shaft in suitable manner. The armature may generally be of well known construction provided with a primary winding 8, one terminal 8^a of which is grounded through the armature, by being soldered to the brass head 9 thereof, to insure perfect continued contact, and the opposite terminal 8^b of said winding is shown passing through an insulating tube 10 fitted in the armature head and connected with a metal disk 11 secured on the armature and insulated therefrom, as by insulation 12. The secondary winding 13 is grounded through the armature, as by being attached to primary winding 8, and the outer terminal 13^a of the secondary winding is shown connected with a screw 14 secured in insulation 15 fitted within bore 16^a of shaft 16 of the armature, said screw being shown projecting within bore 15^a of insulation 15. At 17 is an insulating disk, which is shown integral with insulation 15, and is located between armature head 9 and the secondary winding to prevent the leakage of high tension current. At 18 is an insulating tube projecting well within bore 15^a of insulation 15, but out of contact therewith, and within said tube 18 is a contact or post 19 having a bore at its inner end, and within said bore is a contact 20 that projects from post 19 and bears against the end of screw 14, a spring 21 in bore 19^a serving to press contact 20 against screw 14. The head of contact 20 may first be placed in the bore of post 19 and then the inner end of said post may be bent over in front of said head to retain contact 20 within said post, as shown in Fig. 1. Insulation 18 and post 19 are shown secured by rivets *a* to a cap 22 secured on the magneto frame, as by screw threads *b*, and whereby the parts carried by said cap may be readily removed when said cap is taken off. Cap 22 is shown in the form of a suitable metal shell having a large central opening 22^a, and provided with a series of in-

sulating disks or plates 22b, such as mica, post 19 being shown provided with a flange 19a riveted to said mica disks, and an inner mica disk is shown over the flange 18a of insulation 18 whereby said post is thoroughly insulated from shell 22 and from the magneto frame. At 22c is a ring held in cap 22 as by screw threads and pressing the insulating or mica disks 22b against the front flange of cap 22, whereby said insulating disks are detachably secured to cap 22.

Post 19 may be connected with the post 23 of the distributer by a suitable conductor 24. Thus, as the armature rotates the secondary current will be collected by contact 20 from post 14, and as contact 20 is located well within bore 15a of insulation 15, and insulation 18 surrounding post 19 extends well within bore 15a, leakage of the secondary current to the adjacent parts is prevented.

At 25 is a brush in the primary circuit which is insulated from the magneto frame and bears against disk 11, which brush and its insulation 26 are adapted to move in a slot 27 in the magneto frame. Mounted to rotate upon the front face of frame 1, as within a recess *c* therein, is a plate, ring or disk 30, mounted concentric with the armature axis, and shown held in place by a plate spring 31 held upon the magneto frame by a screw 32 that passes through a slot 30a in plate 30, whereby the latter may be rocked or rotated back and forth while held firmly in place. Secured upon and insulated from plate or ring 30 is a contact 33 in the primary armature circuit, which is shown at the end of an adjustable screw 33a carried by a bracket 34 secured upon plate 30, as by screws 35, the base 34a of bracket 34 resting upon insulation *d* on plate 30. The tube 25a of brush 25 passes through a hole in base 34a, makes electrical contact therewith and with brush 25, and is adjusted thereby as plate 30 is rocked. At 36 is a contact to make and break the circuit with contact 33, and contact 36 is shown carried by an arm 37 that is pivotally supported upon plate 30, as by a post or stud 38 secured upon said plate and in circuit therewith. Arm 37 and thereby contact 36 is operated by a cam 39 secured on armature shaft 16, and at 40 is a coil spring secured to arm 37 and connected with plate 30, as by a stud 41, whereby as cam 39 rotates, the primary magneto circuit will be made and broken at 33, 36. Said cam 39 is shown provided with two extended parts or projections 39a, whereby such circuit will be made and broken twice during each revolution of the armature. The base portion 34a of bracket 34 is shown curved at 34b on an arc described around the axis of the armature (see Fig. 2) and a brush 42 engages said curved part 34b. Brush 42, which may be of any suitable construction, is shown in the form of a stud movably supported in a tube 43 inclosed in insulation 43a and normally pressed outwardly by a spring 44 within said tube, which tube and its insulation are shown seated within a suitable recess in insulation block 28 secured on the main frame adjacent wall *e*, which wall is provided with an opening at *f* for the passage of said brush. A post 45 is secured to the tube 43 at its hole 43b and projects through a hole 48a in the insulating cap 48 of insulation block 28. At A is a post supported by frame 1 which passes through holes in block 28 and cap 48, and a short circuit is established between posts 45 and A by means of conductors B, C, and switch D, whereby when said switch engages contact E current from the primary magneto winding may be short circuited around contacts 33 and 36 to stop an engine having its spark plugs in the secondary circuit. To cause sparks to be produced in the secondary circuit the short circuit is broken at D, E.

I have shown a condenser arranged in shunt with respect to the primary winding, which condenser is shown at F. One terminal of the condenser is grounded through the magneto frame, and another terminal is connected with post 45 to be included in the circuit through brush 42, base 34, brush 25 and the armature. For this purpose I have shown one terminal of condenser F connected with insulated conductor G, that passes through an opening 1a in the magneto frame, and enters a recess 28a in insulating block 28, for connecting conductor G with post 45. The diagrammatic illustration in Fig. 6 showing the wire H leading from the condenser to post A, and brush 25 also having connection with the other terminal of the condenser, illustrates how the condenser will be in shunt or parallel with the primary winding of the armature.

Plate 30 may be rocked back and forth by means of an arm 47 secured thereto, as by screws 47a, which arm projects through slot 49 in wall *e* surrounding plate 30. The insulating cap 48 is detachably fitted over block 28 whereby access to brush 42 and electrical connection may be had, screws 29 serving to hold said cap and block in position upon the frame. Fig. 4 shows the under side of block 28 that fits against the magneto frame, and Fig. 5 shows an inner face of cap 48, and which covers the channel 28a.

The arrangements are such that the primary circuit will lead from ground at the armature, as from the primary winding at disk 11, thence through brush 25, its tube 25a and base 34a, contacts 33, 36, arm 37, plate 30, the magneto frame, shaft 6, armature 7, head 9, and winding 8, back to disk 11, whereby as cam 39 is rotated and acts against roller 37a of arm 37 the primary

circuit will be made and broken to produce discharges in the secondary circuit. When ring 30 is rotated back and forth the position of roller 37ª with respect to the projections 39ª of the cam will be shifted, whereby the time of make and break of the primary circuit at 33, 36 will be advanced or retarded with respect to the relative position of the armature and the drive shaft of an engine that is connected with the armature, whereupon the time of the spark produced at spark plugs connected with the contacts 2ª of the secondary distributer will be advanced or retarded as desired, switch D at such time being open.

While my improvements above described my be used independently of a battery circuit, I have shown means whereby the primary of a battery circuit may be made and broken by the action of arm 37 and cam 39 independently of the primary magneto circuit and at the same time. For this purpose a contact 50 is shown secured to arm 37 on the side opposite contact 36, and contact 50 is adapted to make and break circuit with a contact 51 carried by a spring or contact 52 that is secured to a metal block 53 carried by and insulated from plate 30, as by insulation *d*, block 53 being shown secured to plate 30 by screws 54. The outer surface 53ª of block 53 is shown curved on an arc described around the axis of the armature (see Fig. 2) which curved surface 53ª is adapted to be engaged by a brush 55 shown carried by insulating block 28 and covered by cap 48. Said brush is shown slidably mounted in a tube 56 inclosed within an insulating tube 56ª and provided with a spring 57 for pushing the brush against block 53. Block 28 carries a post 58 connected with tube 56 by a wire 59, located in a recess 60 in cap 48, and facing block 28, post 58 being connected with a line wire 61 of a primary battery circuit. Line 61 connects with a terminal of battery 62 from which a wire 63 connects with one terminal of the primary 64 of an induction coil of any suitable or well known construction, the opposite terminal of which connects by a line 65 with ground at frame 1, as with post A, (see Fig. 6), a switch 66 controlling the battery primary circuit. The secondary 64ª of such coil is to be placed in circuit with the same spark plugs or igniting devices as the secondary of the magneto. This may be done by a switch 67 of the secondary circuit 24 of the magneto, which switch may also open and close the battery secondary circuit of coil 64 at contact 68, through the distributer 2 with the spark plugs when switch 67 opens the magneto secondary circuit. When switch 66 is open switch 67 will be moved to close circuit through 24 of the magneto secondary circuit, and when switch 67 is moved to contact 68 to break the magneto secondary circuit and close the battery secondary circuit, switch 66 of the battery primary circuit will be closed.

With the arrangements described the primary battery circuit will be made and broken by contacts 50, 51 as arm 37 is rocked by cam 39, and as contact 50 is on the side of arm 37 opposite contact 36 the magneto primary circuit will be broken by the movement of arm 37 that closes the primary battery circuit, and vice versa. Contacts 33, 36 and contacts 50, 51 will all be adjusted equally by plate 30 around the axis of the armature, so that similar adjustment of plate 30 may be made to advance or retard the time of sparking at the spark plugs or igniters when the latter are included in the circuit of the secondary winding of the magneto or of the battery circuit.

Having now described my invention what I claim is:

1. The combination of a magneto having an armature provided with a shaft, insulation located within a bore in said shaft, said insulation being provided with a bore, a contact secured to said insulation and connected with the armature secondary winding and communicating with the bore of said insulation, an insulating sleeve projecting within the bore of said insulation and out of contact therewith, a contact supported within said sleeve and in circuit with the first named contact, a post movably supporting the second named contact and located within said sleeve, and means to support said post and sleeve.

2. The combination of a magneto having an armature provided with a contact disk in circuit with the primary winding, a brush engaging said disk, an adjustable plate, coacting contacts carried by said plate one of which is movable and one insulated from the plate, means to electrically connect said brush with one of said contacts, means to operate said movable contact, a brush in circuit with the complemental stationary contact, insulation carrying said brush, a condenser, and a conductor connected with said condenser and brush and received in said insulation, said condenser having a terminal connected with the frame.

3. The combination of a magneto having an armature provided with a rotary contact in circuit with the primary winding, a brush engaging said contact, an adjustable plate, make and break contacts carried by said plate one of which is insulated therefrom, one of said contacts being movable, means to operate the movable contact by the rotation of the armature, said brush being in circuit with one of said contacts, another brush in circuit with one of said contacts, insulation carrying said brush, a condenser, and a conductor connected with said condenser and brush and received in said insulation, said

condenser having a terminal connected with the frame.

4. The combination of a magneto having an armature provided with an insulated contact in circuit with the primary winding, a brush to engage said contact and insulated from the frame, an adjustable plate carried by the frame, a contact carried by said plate and insulated therefrom and in circuit with said brush, a complemental contact carried by and in circuit with said plate, one of said contacts being movable, means actuated by said armature to operate said movable contact, a second brush engaging said insulated contact, insulation carrying said second brush, a condenser, and a conductor connected with said condenser and brush and received in said insulation, said condenser having a terminal connected with the frame.

5. The combination of a magneto, a brush insulated therefrom, means to maintain the brush in circuit with the primary winding of the magneto armature, the opposite terminal of said winding being grounded through the magneto frame, an adjustable plate in circuit with said frame, a contact carried by and insulated from said plate and in circuit with said brush, a complemental contact carried by and in circuit with said plate, one of said contacts being movable, means to operate the movable contact by the armature, a second brush in circuit with said insulated contact, insulation carrying said second brush, a condenser, and a conductor connected with said condenser and brush and received in said insulation, said condenser having a terminal connected with the frame.

6. The combination of a magneto, a brush insulated from the frame and maintained in circuit with the primary of the armature, an adjustable plate in circuit with the magneto frame and carrying said brush, means to permit said brush to move with said plate, a contact carried by and insulated from said plate and in circuit with said brush, a contact carried by and in circuit with said plate, one of said contacts being movable, means actuated by the armature to operate said movable contact, a second brush in circuit with one of said contacts, insulation carrying said second brush, a condenser, and a conductor connected with said condenser and brush and received in said insulation, said condenser having a terminal connected with the frame.

7. The combination of a magneto, a brush insulated therefrom and maintained in circuit with the primary winding of the armature, an adjustable plate carried by the frame and in circuit therewith, a contact having a base carried by and insulated from said plate, said base being in circuit with said brush, said base having a curved surface, a second brush engaging said surface, a movable contact carried by and in circuit with said plate to co-act with the first named contact, a cam operated by the armature to operate said movable contact, insulation carrying said second brush, a condenser, and a conductor connected with said condenser and brush and received in said insulation, said condenser having a terminal connected with the frame.

8. The combination of a magneto, an adjustable plate in circuit with the magneto frame, a pair of contacts carried by said plate, one of which is movable, one of said contacts being insulated from said plate and the other contact in circuit therewith, means to maintain said contacts in circuit with the primary armature winding, a cam connected with the armature shaft to operate the movable contact, a spring connecting the movable contact with said plate, a brush in circuit with said insulated contact, contacts for a separate circuit carried by said plate, one of which is movable, and a brush in circuit with the other of said contacts.

9. The combination of a magneto provided with an armature having primary and secondary windings, the primary winding being connected with the armature frame and with a disk carried by and insulated from the armature, an adjustable plate in circuit with the magneto frame, make and break contacts one of which is in circuit therewith, a movable member carrying one of said contacts, and means to operate said member by the armature, with a contact of a separate circuit carried by and insulated from said plate, a contact operated by said movable member to co-act with the contact of the separate circuit, and a brush carried by the magneto frame in circuit with the contact of said separate circuit.

10. The combination of a magneto, an adjustable plate supported by the magneto frame concentric with the magneto armature and in electrical connection therewith, a contact carried by and insulated from the plate, a brush in electrical connection with said contact, a complemental contact in circuit with said plate, one of said contacts being movable, contacts for a separate circuit carried by said plate, one of which is movable, a brush in circuit with one of said contacts, means to operate said movable contacts by the armature, and a condenser in electrical connection with said plate and with said first named brush.

11. The combination of a magneto, an adjustable plate supported by the magneto frame concentric with the magneto armature and in electrical connection with the armature, a contact carried by and insulated from said plate and in electrical connection with the primary winding of the armature, a brush in circuit with said contact, a contact in electrical connection with said plate, one of said contacts being movable, contacts for

a separate circuit carried by said plate, one of which is movable, a brush in circuit with one of said contacts, means actuated by the armature to operate the movable contacts, and a condenser having one terminal in circuit with said first named brush and the other terminal in circuit with said movable contacts.

12. The combination of a magneto having an armature provided with an insulated contact in circuit with the primary winding, a brush to engage said contact and insulated from the magneto frame, an adjustable plate in circuit with the magneto frame, and carried thereby, make and break contacts carried by said plate, one of said contacts being insulated from the plate, and means actuated by said armature to operate the movable contact of said make and break contacts, contacts for a separate circuit carried by said plate, one of which is movable, a brush in circuit with one of said contacts, with a condenser having one terminal in electrical connection with a terminal of the primary winding, the opposite terminal of the condenser being in circuit with said contacts of the adjustable plate.

Signed at New York city, in the county of New York and State of New York, this 8th day of October, A. D. 1907.

THEODORE HUBERT.

Witnesses:

T. F. BOURNE,

MARIE F. WAINRIGHT.