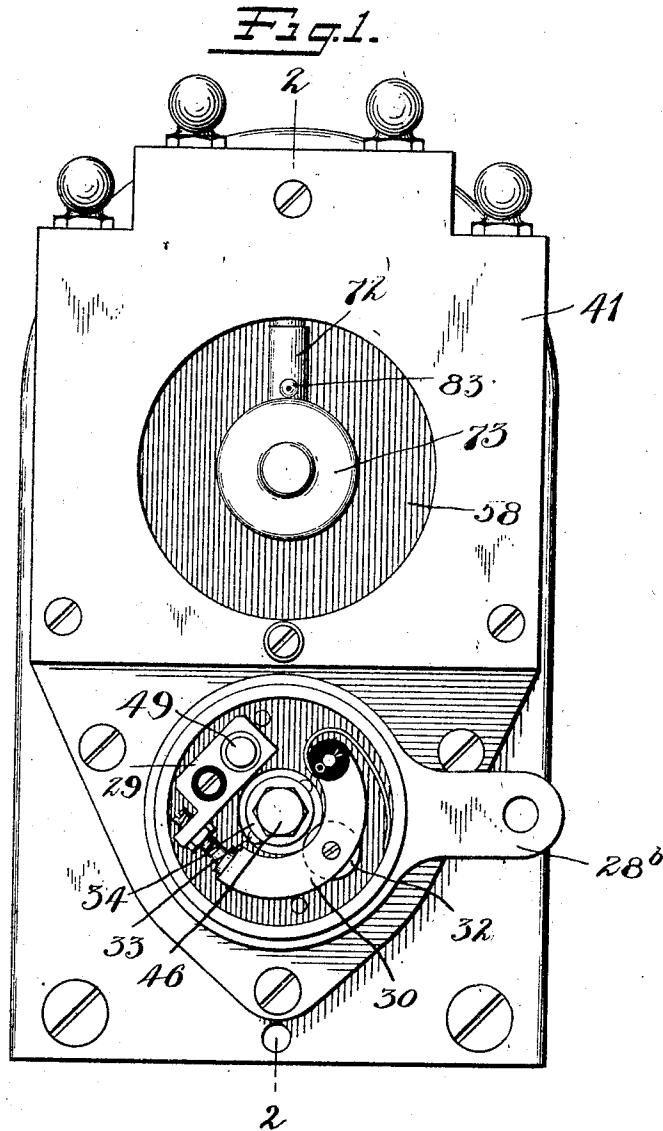


1,008,019.

C. CUNO.
MAGNETO.
APPLICATION FILED JAN. 20, 1910.

Patented Nov. 7, 1911.
4 SHEETS—SHEET 1.



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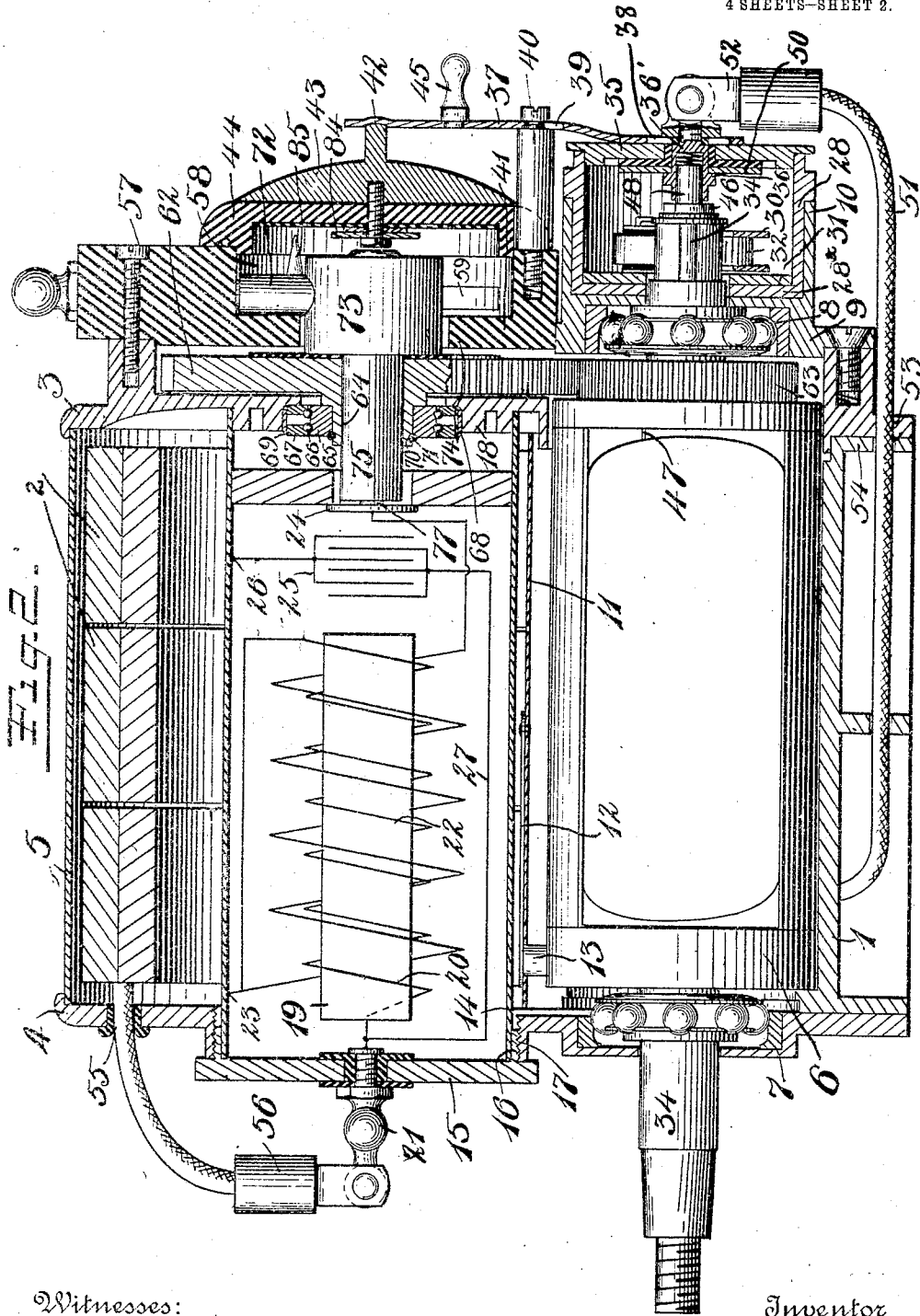
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4 SHEETS-SHEET 2.



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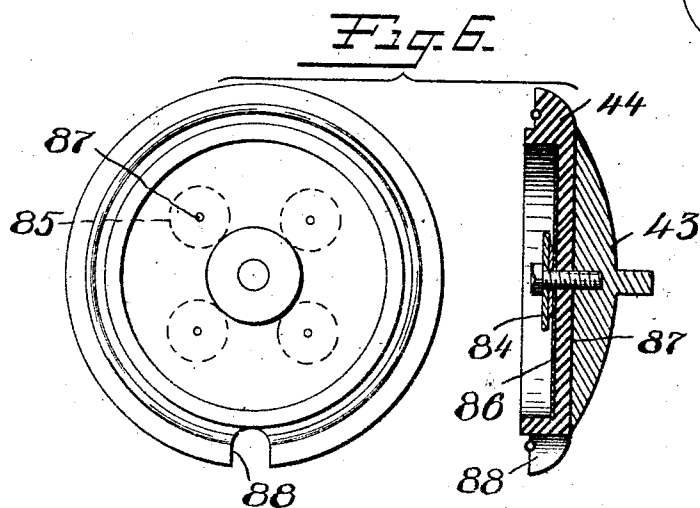
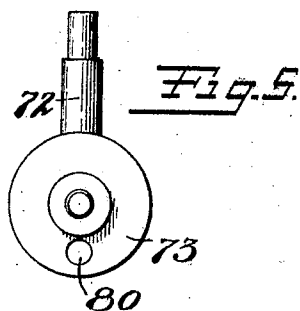
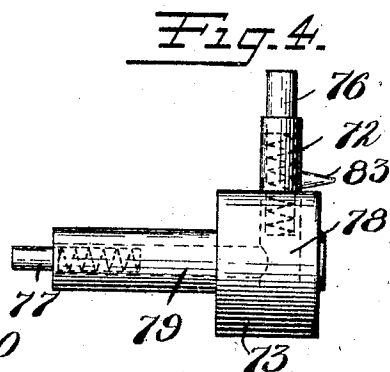
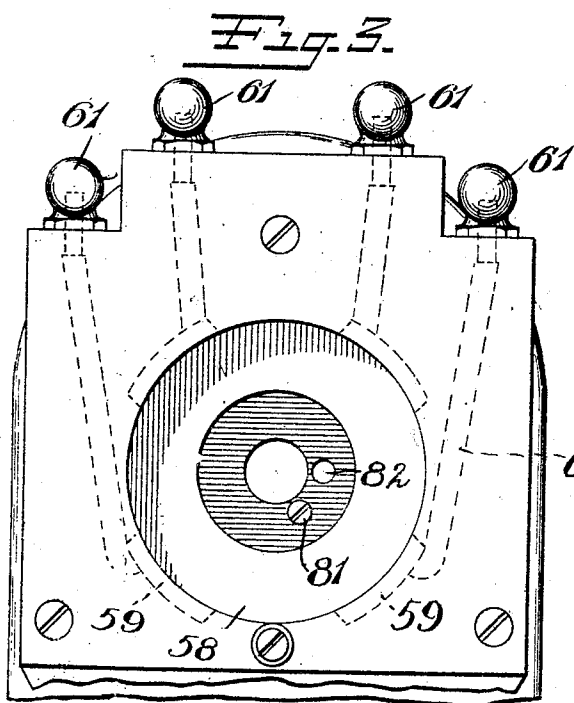
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4 SHEETS—SHEET 3.



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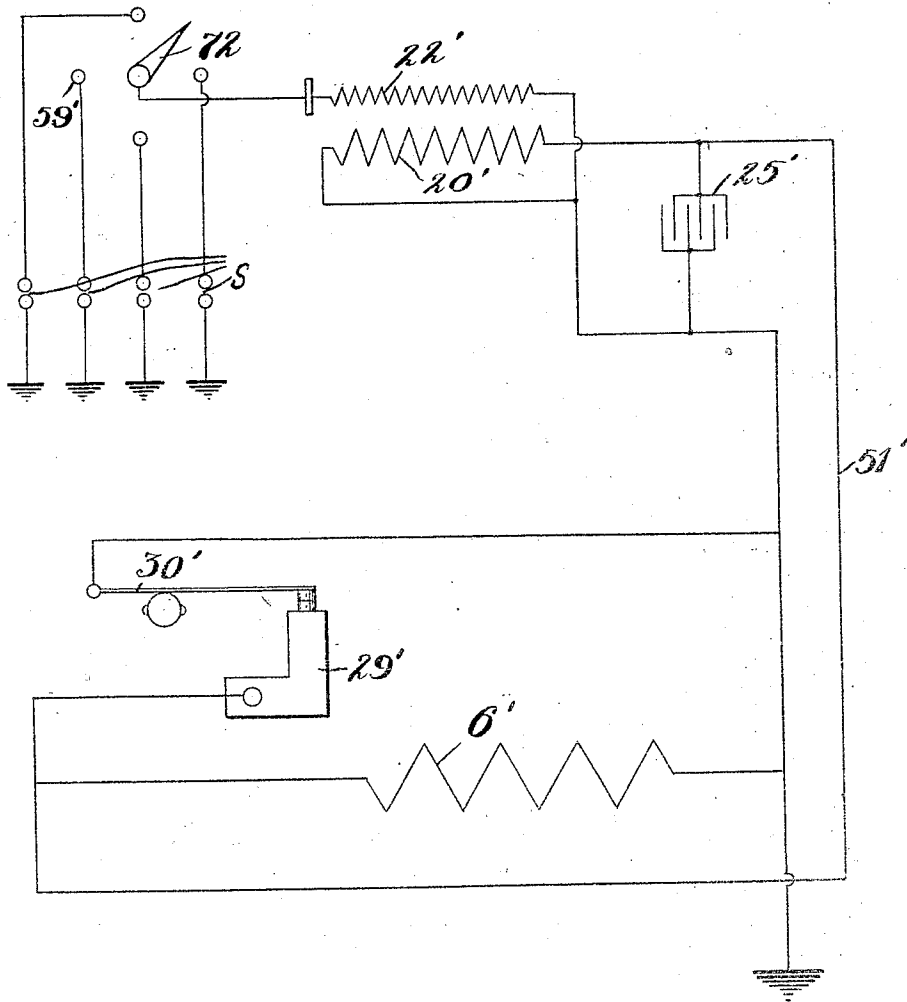
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4 SHEETS—SHEET 4.

1,008,019.

Fig. 7.



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UNITED STATES PATENT OFFICE.

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MAGNETO.

1,008,019

Specification of Letters Patent.

Patented Nov. 7, 1911.

Application filed January 20, 1910. Serial No. 539,059.

To all whom it may concern:

Be it known that I, CHARLES CUNO, a citizen of the United States, residing at Meriden, county of New Haven, State of Connecticut, have invented certain new and useful Improvements in Magnetos, of which the following is a full, clear, and exact description.

My invention relates to magneto electric machines, and particularly to such as are adapted for use in electric ignition systems for automobile engines and the like.

The object of the invention is to provide an improved construction of such apparatus, in which the parts are compactly assembled and in which said parts may be readily disassembled for inspection and repair.

In particular, the invention contemplates among other things, an improved construction of transformer comprising a casing having the transformer coils and condenser compactly mounted therein, which casing, together with the coils and condenser, may be bodily withdrawn from operative position without disturbing other parts of the mechanism.

A further object is to provide an improved arrangement of the electrical connections between the magneto armature and the interrupter, the transformer and the distributor.

A further object is to provide means in conjunction with the distributor whereby defective working of any one of the sparking devices may be readily detected and the particular defect accurately located without removing or otherwise disturbing any part of the apparatus.

With these and other objects in view, the invention consists in the construction and arrangement of parts, a preferred embodiment of which is illustrated in the accompanying drawings, in which,—

Figure 1 is an end view of the apparatus, parts being removed for clear illustration of certain interior mechanism; Fig. 2 is a vertical sectional view of the device on the line 2—2, Fig. 1; Fig. 3 is a view of a portion of the distributor mechanism detached; Fig. 4 comprises a side view of the distributor arm detached; Fig. 5 is a rear view of the distributor arm; Fig. 6 comprises a rear and transverse sectional view of a cap for pro-

tecting the distributor mechanism; Fig. 7 is a diagrammatic view of the electrical connections of the apparatus.

In the embodiment of my invention herein selected for illustration, 1 (Fig. 2) indicates a base plate, upon which the field magnets 2 are suitably mounted and secured, 3 and 4 indicate front and rear end plates respectively forming part of a casing for the interior mechanism of the magneto. For effective protection of this interior mechanism a sheathing 5 may be provided mounted upon the end plates 3 and 4. The magneto armature 6 is mounted in the usual manner between the poles of the field magnets 2 and is journaled at one end at 7 in the rear end plate 4 and at the opposite end at 8 in the plate support 9 secured to the front end plate 3, said plate having formed therewith or carrying the cupped bearing 10 for the interrupter carrier hereinafter to be described. Above the armature 6 extends a plate 11 which rests upon the machine frame and is provided with a spring contact arm 12, having a contact pin 13 engaging the periphery of one end of the armature, whereby the armature winding is effectively grounded through the machine frame and whereby grounding of the same through the bearings of the armature is avoided. Thus any possible sparking and consequent wear of the bearings is eliminated.

The transformer comprises, as indicated in Fig. 2, a cylindrical casing 14, having a head 15, provided with a threaded flange 16, adapted to screw within a threaded boss 17 of the rear end plate 4. The front end plate is likewise provided with a boss 18 adapted to be engaged by the inner hollow end of the transformer casing. By this construction the transformer may be readily inserted and secured within the magneto by screwing the flange 16 into the boss 17; while at the same time, the transformer will be accurately positioned within the magneto by the engagement of the inner end of the casing with the boss 18 on the front end plate 3. The transformer proper comprises the usual core 19 having a primary winding 20 connected to a leading-in terminal 21 insulatively mounted in the head 15; and the secondary winding 22, one terminal of

which, together with one terminal of the primary, is grounded on the transformer casing at 23. The opposite terminal of the secondary passes to a contact plate 24 secured to the inner end of the transformer casing by which a convenient connection may be made with the distributor arm hereinafter to be described. The condenser 25 is mounted in the inner end of the transformer casing adjacent the coil; one side of the condenser being grounded on the casing at 26, and the opposite end connected with the transformer primary by wire 27.

The interrupter or circuit breaker of the magneto comprises, as indicated in Figs. 1 and 2, an annular carrier 28 having the drawn-in flange 28^a, which may be readily slipped into and out of the bearing 10 on the supporting plate 9. The interrupter casing 28 also preferably carries an adjusting lever 28^b, by which the moment of sparking may be regulated by the operator of the machine. The particular construction of interrupter here illustrated, and covered specifically in my co-pending application, Serial No. 537,412, filed January 11th, 1910, comprises a fixed contact member 29 and a movable contact member 30, each of which is secured upon an adjustable base plate 31 mounted upon the base of the interrupter casing 28. The movable contact arm 30 is provided with a cam roll 32 arranged to be engaged by cam pins 33 carried by one end of the armature shaft 34 which projects into the interrupter casing, as indicated in Fig. 2. Said casing, furthermore, is provided with a removable cap or cover 35, carrying a contact stud or terminal 36, upon which is mounted a sliding latch member 37 for holding the cap or cover 35 in place said latch member 37 being secured to said stud 36 by the terminal head 36'. To lock the cover 35 upon the interrupter casing, said latch member is provided with a slot 38, sliding on but insulated from the stud 36, and with the key-hole slot 39 adapted to engage over the end of a headed stud 40 secured to the insulating casing 41 of the distributor mechanism. The upper end of the latch member 37 is provided with a recess 42 which engages the stud 43 of a cap or cover 44 of said distributor mechanism and said latch member is also provided with a handle 45 for convenient manipulation. In order to secure the cap 35 of the interrupter mechanism in place the larger portion of the key-hole slot 39 of the latch 37 is brought into register with the stud 40 and the latch member is then sprung inwardly and at the same time pushed down by the handle 45 until the smaller portion of the key-hole slot engages behind the head of the stud 40 and the recess 42 of the latch engages the stud 43 of the cover 44 for the distributor mechanism. By this arrange-

ment both the cap for the interrupter and that for the distributor are held in position by a single latching means.

Electrical connection between the winding of the armature and the interrupter is conveniently effected by means of a headed contact pin 46 extending through, but insulated from the forward end of the armature shaft 34 and connected with the armature winding by a wire indicated at 47, Fig. 2. Within the stud 36 on the cover of the interrupter is mounted a contact pin 48, which, when the cover is in place, contacts with the headed pin 46 of the armature shaft. The fixed contact member 29 of the interrupter is also provided with a contact pin 49 adapted to engage a plate 50, Fig. 2, secured to the interrupter cap, which plate is insulated from the cap but has electrical connection with the terminal stud 36. Thus, electrical connection between the armature winding and the interrupter will be automatically effected when the interrupter cap 35 is placed in position.

Connection between the armature winding and the transformer coil is effected by means of a connecting member 51 having a clip 52 for engagement with the terminal head 36' on the terminal stud 36. The connector 51 is conveniently arranged by extending the same through apertures 53 and 54 in the end plate 3 and the base 1, respectively, beneath the machine and out through the base plate into the space between the field magnets and the sheathing 5, then out through an opening 55 in the rear end plate 4 where it is connected by means of a clip 56 with the terminal stud 21 of the transformer coil. By this means when the ground circuit through the movable arm of the interrupter is broken the armature current will pass through connection 51 to the transformer.

The distributor mechanism, as illustrated in Figs. 1, 2 and 3, comprises a distributor casing 41 of insulating material, which is secured preferably to the front end plate 3 by means of screws 57 and having a distributor chamber 58 around which are arranged the several distributor segments 59, connected by means of wires 60 with terminal posts 61, to which the connections to the several sparking devices may be readily attached. At the rear of the distributor casing 41 a gear 62 is journaled within the end plate 3, which meshes with a gear 63 fixed to the armature shaft. To economize space and at the same time to afford a firm and easy bearing for the gear 62 the latter is provided with a short hub 64 frictionally mounted in a double ball bearing comprising an inner bearing member 65 having two ball races 66, and the outer bearing members 67 which in turn are inclosed by a sleeve or ring 68. The ball bearing as a whole is frictionally held in an aperture 69

in the end plate 3 and against a flange. The hub 64 has a groove 70 in its outer end to receive a split ring 71 whereby said hub is securely held within the inner bearing member 63 and rotates with the latter. The two sets of balls of the bearing hold the gear 62 firmly notwithstanding the short length of the gear hub 64 at the same time effecting a very compact construction. The proportion of the gears 62 and 63 one to the other may be of any desired quantity to adapt the same for use with the particular type of engine desired but in the construction here shown this proportion is one to two to adapt the same for use with a four cylinder engine. The gear 62 carries the distributor arm 72, having a hub 73 extending through an aperture 74 in the rear of the distributor casing 41 and from said hub a stem 75 extends through the hub of said pinion 62 and is frictionally held thereon.

Within the distributor arm 72 is mounted a contact pin 76 (Fig. 4) which is electrically connected with a contact pin 77 mounted in the stem 75 by means of intermediate connecting members 78 and 79, respectively. The rear of the distributor arm hub is provided with a recess 80 adapted to engage a pin 81 projecting from the face of the gear 62. This pin 81 may be mounted in either one of two sockets 82 in said gear, in order that the distributor arm may be adjusted to correspond with adjustments of the interrupter mechanism for right and left drive, as fully described in my co-pending application above referred to. As will be seen from an inspection of Fig. 2 the contact plate 24 of the secondary terminals of the transformer is alined with the stem 75 of the distributor arm when the latter is in operative position so that upon mounting the distributor arm upon the pinion 62, when the transformer is in place, the contact pin 77 will engage said contact plate 24 and thus make connection with the transformer secondary, while at the same time, upon rotation of the contact arm the contact pin 76 thereof will effect connection successively with the segments 59 leading to the several spark devices.

The arrangement of the circuits in the above described mechanism will be readily understood from an inspection of Fig. 7, in which 6' indicates the armature winding; 29' the stationary member of the interrupter; 30' the movable member thereof; 20' the primary winding of the transformer; 22' the secondary winding; 51' the connection between the armature and the transformer; 72' the distributor arm; 59' the distributor segments; 25' the transformer condenser, and S the spark plugs of the engine.

In operation of mechanism of this character it frequently happens that the spark-

ing devices of one or more cylinders become defective through corrosion or otherwise resulting in failure of the firing action. It is extremely important, therefore, not only to detect the fact of such defective action but also to locate exactly the point at which it occurs. To this end I provide upon the distributor arm a sparking point 83, which is at all times in electrical connection with the contact pin 77 through the members 78 and 79. Coöperating with this point I provide the cap or cover 44 of the distributor mechanism and a plate or disk 84 electrically connected with the stud 43 of the cover which in turn is electrically connected to the spring latch member 37 when the latter is in locking position. This latch member, as will be seen in Fig. 2, is grounded upon the cap or cover 35 when the latter is in position upon the interrupter mechanism. By this construction should defective action occur at the spark plugs of any cylinder of the engine or between the contact pin 76 of the distributor arm and any one of the segments 59 of the distributor mechanism, the high tension current of the transformer secondary will cause a spark to pass between the point 83 and the disk 84 upon the cover plate 44. In order that this spark or flash may be readily detected without removing any parts of the mechanism the cover 44 is provided with a plurality of openings or windows 85, Figs. 2 and 5, over which extends a disk 86 of mica or other translucent material. One of these openings or windows is located opposite or adjacent to each of the contact segments 59 of the distributor mechanism, so that in case of defective action at any one of these points, a flash will appear at the window located adjacent thereto, and the particular segment of the mechanism at which such defective action occurs will be indicated by the particular window at which the flash occurs.

To properly ventilate the chamber within which the distributor arm operates and to prevent the accumulation of ozone therein due to the occurrence of the spark, each one of the windows 85 is provided with a perforation 87, which is made large enough to admit sufficient air for ventilating purposes but small enough to effectually prevent access of dirt or moisture to the distributing mechanism. In order to insure the location of the several openings or windows 85 opposite or adjacent each of the contact terminals 59 of the distributor, the periphery of the cap 44 is provided with a notch 88, which fits over the latch pin 40 projecting from the distributor casing.

While I have herein shown and described a preferred embodiment of my invention, it is to be understood that the same may be modified in details and relative arrangement

of parts within the scope of the appended claims.

What I claim is:

1. In a high tension magneto ignition apparatus, the combination with a support having an armature and field magnets mounted thereon, of a transformer, distributor mechanism including a distributor arm, said transformer and arm being so constructed and arranged that they may be removably mounted on said support after the other parts of the magneto are assembled, and means for automatically effecting electrical connection between said transformer and said distributor arm by the mounting of said parts on said support.
2. In high tension magneto ignition apparatus, the combination with a support having an armature and field magnets mounted thereon, of a transformer having a casing constructed and arranged to be removably mounted upon said support after the other parts of the magneto have been assembled, distributor mechanism on said support including a distributor arm, said transformer having an exposed secondary contact and said distributor arm having a contact, said contacts being constructed and arranged to automatically effect electrical connection upon assembling said parts on said support.
3. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a main casing inclosing said parts, a transformer comprising a casing constructed and arranged to be removably mounted on said main casing after the other parts of the magneto and main casing have been assembled, distributor mechanism on said main casing including a distributor arm, and means for automatically effecting electrical connection between said transformer and distributor arm upon mounting the former on said casing.
4. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a main casing inclosing said parts, an opening in said casing adjacent the bow of said field magnets, a transformer including a casing therefor adapted to be inserted and held within said opening and to lie within the bow of said magnets, distributor mechanism on said main casing including a distributor arm, and means for automatically effecting electrical connection between said transformer and said distributor arm upon mounting said transformer in said casing.
5. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a casing inclosing said parts and comprising end plates, an opening in one of said end plates, and a boss on the opposite end plate, a transformer including a casing adapted to be inserted in said opening to lie within the bow of the

field magnets, said transformer when in operative position being supported at one end in said opening and at the opposite end on said boss, distributor mechanism on said main casing, and means to effect electrical connection between said distributor mechanism and said transformer upon mounting the latter on said casing.

6. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a casing inclosing said parts, a transformer having a primary terminal at one end and a secondary terminal at the opposite end, said transformer being constructed and arranged to be removably mounted on said main casing and within the bow of the field magnets after the casing and other parts of the magneto are assembled, distributor mechanism carried by said main casing, and means for automatically effecting electrical connection between said secondary terminal and said distributor mechanism upon mounting said transformer on said main casing.

7. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a casing inclosing said parts, a threaded opening in said casing adjacent the bow of said field magnets, a transformer having a cylindrical casing adapted to be screwed into said aperture and to be supported within the bow of said field magnets.

8. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a casing inclosing said parts, a threaded aperture in said casing, and a boss on said casing opposite said threaded aperture, and a transformer having a cylindrical casing adapted to be screwed into said aperture to lie within the bow of the field magnet and to be supported at one end in said aperture, the opposite end of said transformer casing being supported upon said boss.

9. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a casing inclosing said parts, a transformer constructed and arranged to be removably mounted on said casing and within the bow of the field magnets after the other parts of the magneto have been assembled, distributor mechanism mounted upon said casing including a distributor arm, a gear on said casing carrying said arm, a gear on the shaft of said armature meshing with said first mentioned gear, said distributor arm having a stem extending to said transformer when in operative position, and contacts on said transformer and said stem arranged to effect electrical connection automatically between said transformer and said distributor arm when said parts are assembled on said main casing.

10. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a main casing, distributor mechanism mounted on said main casing including a distributor arm, a boss on said main casing, a gear journaled in a ball bearing mounted in said boss operatively connected with the armature shaft, a distributor arm carried by said gear, an aperture in said main casing opposite said boss, a transformer having a casing adapted to be supported at one end within said aperture and at the opposite end on said boss, thereby inclosing and protecting said bearing, a contact for said arm, and a contact on said transformer adapted to effect electrical connection automatically upon assembling said arm and transformer on said main casing.

11. In high tension magneto ignition apparatus, the combination with a magneto of distributor mechanism and interrupter mechanism mounted thereon, a removable cap or cover for each of said mechanisms, and a single spring latch adapted to hold both of said caps or covers in place.

12. In high tension magneto ignition apparatus, the combination with a magneto of distributor mechanism and interrupter mechanism mounted thereon, a removable cap for each of said mechanisms, a sliding latch permanently connected to one of said caps and adapted to engage the other of said caps to hold said caps in position.

13. In high tension magneto ignition apparatus, the combination with a magneto of distributor mechanism and interrupter mechanism mounted thereon, a removable cap for each of said mechanisms, a fixed headed stud adjacent said mechanisms, and a spring latch slidably mounted on said stud and adapted to hold both of said caps in position.

14. In high tension magneto ignition apparatus, the combination with a magneto of distributor mechanism and interrupter mechanism mounted thereon, a removable cap for each of said mechanisms, a fixed headed stud adjacent said mechanisms, and a sliding spring latch permanently attached to one of said caps having locking means for engaging said stud and adapted to engage the other cap to hold both of said caps in position.

15. In high tension magneto ignition apparatus, the combination with a magneto of distributor mechanism and interrupter mechanism mounted thereon, a removable cap for each of said mechanisms, one of said caps having a headed stud, a spring latch slidably engaging said stud, and a fixed stud adjacent said mechanisms having locking means adapted to engage said latch, said latch being arranged to engage the other cap

and to hold both of said caps in position when locked by said locking means.

16. In high tension magneto ignition apparatus, the combination with a magneto of distributor mechanism mounted thereon and including a distributor brush, means for indicating defective action in said distributor, a removable cap for said distributor, interrupter mechanism mounted on said magneto, a removable cap therefor, and a single latch constructed and arranged to hold said caps in position, said latch forming a ground connection for said indicator means.

17. In high tension magneto ignition apparatus, the combination with a magneto of distributor mechanism mounted thereon having means for indicating defective action in said distributor mechanism, a removable cap for said mechanism, interrupter mechanism carried by said magneto, a removable cap for said interrupter mechanism, and a spring latch adapted to engage said caps respectively to hold the same in operative position, said latch being connected with said indicator means and being grounded through said interrupter cap when said caps are in position.

18. In high tension magneto ignition apparatus, the combination with an armature and field magnets therefor, of a frame supporting said parts, a transformer comprising a casing adapted to be removably mounted in said frame, primary and secondary windings and a condenser within said casing, a primary terminal at one end of said casing and a secondary terminal at the opposite end of said casing, said windings and condenser adapted to be automatically grounded through said casing when the latter is mounted in said frame, distributor mechanism carried by said frame including a distributor brush having a terminal adapted to project into said casing to make contact with the secondary of said transformer automatically when said casing is mounted in said frame.

19. A transformer for high tension magneto apparatus adapted to be removably mounted thereon and comprising a cylindrical casing having primary and secondary windings mounted therein, a condenser mounted in one end of said casing and connected with said primary, said primary, secondary and condenser being arranged to be grounded on said casing, distributor mechanism carried by said magneto apparatus, a primary terminal at one end of said casing, and a secondary terminal at the opposite end of said casing, said secondary terminal adapted to be connected automatically with said distributor mechanism when said transformer is mounted on said apparatus.

20. In high tension magneto ignition apparatus, the combination with a magneto

and distributor mechanism mounted thereon,
of a transformer constructed and arranged
to be removably mounted on said magneto
after the magneto and distributor mecha-
5 nism have been assembled, and comprising
a casing having primary and secondary ter-
minals thereon, said secondary terminal be-

ing arranged to make automatic connection
with said distributor mechanism when said
casing is mounted on said magneto.

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