

A. ZÄHRINGER.
MAGNETO ELECTRIC IGNITION APPARATUS.
APPLICATION FILED MAY 4, 1908.

Patented Oct. 6, 1914.
3 SHEETS—SHEET 1.

1,113,147.

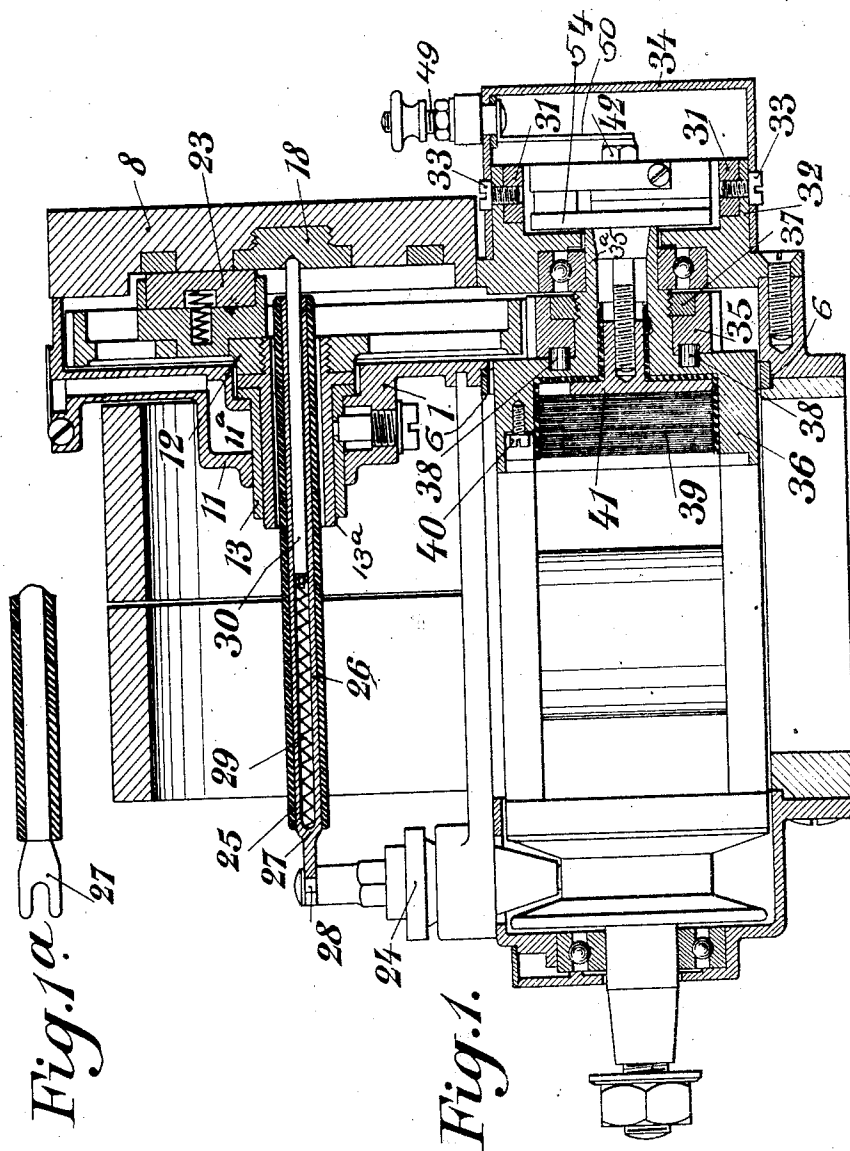


Fig. 1a.

Fig. 1.

WITNESSES

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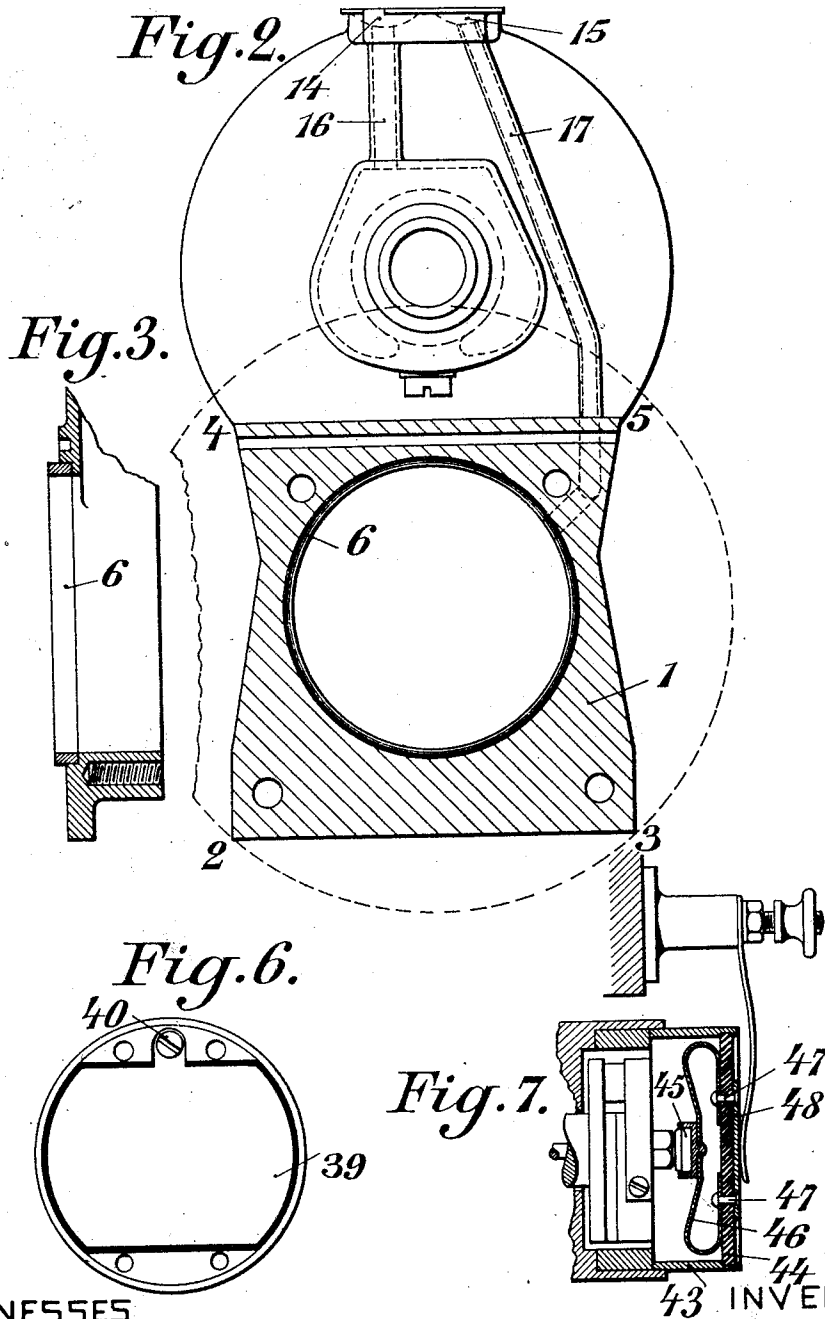
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3 SHEETS—SHEET 3.

Fig. 4.

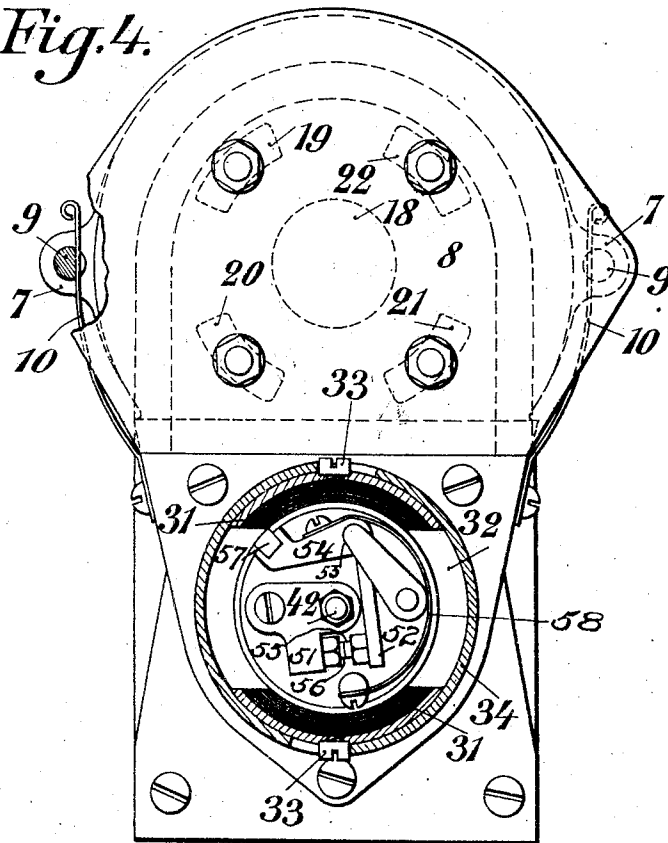
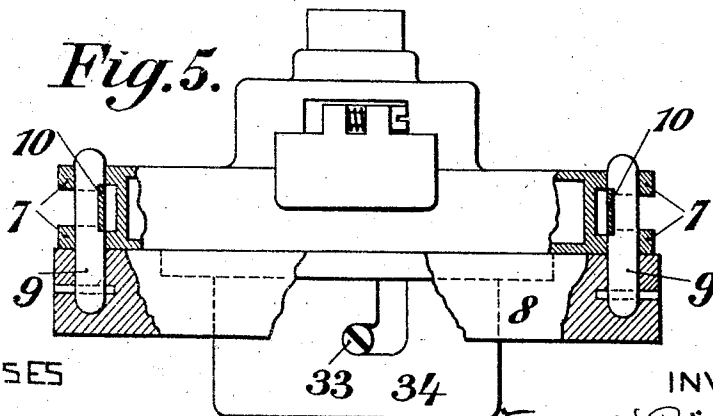


Fig. 5.



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UNITED STATES PATENT OFFICE.

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MAGNETO-ELECTRIC IGNITION APPARATUS.

1,113,147.

Specification of Letters Patent.

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To all whom it may concern:

Be it known the I, ARNOLD ZÄHRINGER, engineer, a subject of the German Emperor, residing at 13 Hoppenlaustasse, Stuttgart, Germany, have invented certain new and useful Improvements in Magneto-Electric Ignition Apparatus; 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.

This invention relates to apparatus for electrical ignition in internal combustion engines, and comprises certain improvements which will be described with reference to the accompanying drawings wherein—

Figure 1 shows an embodiment of the complete apparatus in longitudinal section, Fig. 1^a is a section through the distributor conductor, Fig. 2 is an elevation of the side plate, Fig. 3 a section through the lower part of this plate, Fig. 4 an elevation of the distributor, Fig. 5 a part sectional plan thereof, Fig. 6 is a view of the armature cover and condenser, and Fig. 7 is a sectional elevation of a modified construction of the closing cap.

In the ignition apparatus according to the present invention, the side plate 1 (Figs. 1 and 2) is so formed that in spite of the projecting parts thereon it can be milled over the whole bearing surface. In the construction shown the projecting part is the bearing flange 11 for the toothed wheel 12 of the distributor. In this case the fitting surface 2, 3, 4, 5, turned toward the shoe of the magnet poles cannot be worked on the lathe, since the circle passing through 2 and 3 cuts the said projecting flange, while on the other hand the centering ring 6 would prevent this surface from being milled or planed. To permit of this milling or planing the centering ring 6 is formed as a separate piece fitted into a recess in the side plate. This ring is set in place after the surface 2, 3, 4, 5, has been finished off.

The side plate 1 has forked lugs 7 for fixing the distributor disk (Figs. 4 and 5) which are bored to receive the bolts 9 on the distributor disk. Blade springs 10 are fixed to the side plate and bear against these bolts 9 within the forks of the lugs 7, the bolts having notches or grooves in which the springs engage to prevent the distributor disk from shifting backward.

In order that the bearing flange for the

shaft 12^a of the distributor wheel 12 may be cast in one piece with the side plate, it is made to extend laterally therefrom and then at its extremity turned inwardly to form a front wall 11 (Fig. 1) parallel and opposed to the front of the plate 1, the space bounded by this annular flange and its rear and front walls forming an oil chamber 11^a of which the inner open side is closed by a tightly fitting bush 13. If the bearing 13^a is to be insulated, this bush may be surrounded with insulating material.

In the upper part of the side plate 1 there are two ciling cups 14 and 15 (Fig. 2) close together, one connected with the distributor bearing by a vertical bore 16, while the other is connected with the bearing of the armature shaft by a duct 17 passing around the distributor bearing. By this arrangement the oiling of one of the bearings is not forgotten as may easily happen with arrangements hitherto usual wherein the oil-hole for the armature shaft on the distributor side is difficult of access and cannot be inspected.

The distributing apparatus comprises a stationary central circular metal piece 18 (Figs. 1 and 4). Around this piece 18 are arranged equi-distant from each other four metal segments 19, 20, 21 and 22 connected with the terminals of the leads, and to which the current is transmitted by means of a rotating carbon contact 23 insulated from the rest of the machine. The insulating disk 8 carrying the segments 18, 19, 20, 21 and 22, which is fixed to the side plate 1, can be so grooved between the piece 18 and the segments, or the contact 23 may be so grooved, or both may be so grooved, that the carbon is in contact only with the piece 18 and the segments, so that a flow of current is always insured.

From the brush holder 24 the current flows to the distributor through a metal tube 26 (Figs. 1 and 1^a) surrounded by an insulating sleeve 25 and terminating at one end as a fork 27 which can be pushed home into a groove 28 in the brush holder 24. Within the tube 26 is a metal pin 30 which is pushed by a spring 29 against the metal disk 18. An efficient contact is thus assured.

The segmental interrupter cams 31 (Figs. 1 and 4) are fixed by screws 33 to the projecting cylindrically turned piece 32 which may be regarded as a part of the side plate 1. The cams 31 fit snugly along their outer peripheries and their front faces against the

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surfaces of the part 32 of the side plate, so that they can be fixed each by a single screw 33. These screws also serve as the pins of a bayonet joint fixing the closing cap 34 shown in Figs. 1, 4 and 5, and which is placed over the projecting part 32 of the side plate.

The pinion 35 is mounted on the spindle 35^a of the armature cover 36 by means of a nut 37, pins 38 being provided to prevent rotation, which fit snugly in cavities in the armature cover and the pinion.

To prevent the condenser from working loose, the cavity in the armature cover has holding surfaces corresponding with the form of the condenser, that is the cavity is flat on two opposite sides as seen in Fig. 6, while between these two parts it is cylindrical. Into this cavity the condenser 39 surrounded with suitable insulating material is firmly pressed and is then screwed to the armature cover at 40, the insulated pole at 41 being connected with the interrupter through the hollow armature shaft by the screw 42.

The closing cap 34 (as shown in Fig. 7) can also be a metal tube 43, in which a disk 44 of insulating material is fixed. To this disk the spring 46 carrying the brush 45 is fixed by rivets 47, which are prevented from tearing through the disk 44 by a metal plate 48 placed under their heads, which plate can be used in the simplest manner for transmitting the current to the short circuit terminal by a blade spring fixed to the said terminal.

The interrupter block 31 is firmly secured to the pole 41 of the condenser by means of the screw 42 whose head serves as a contact for the blade spring 50 connected to the terminal 49. This block is thus caused to rotate with the condenser and armature. The screw 42 passes through but out of contact with the hollow shaft of the latter, which in this case is the spindle 35^a. The bell crank lever 52 is pivoted at 53 to a disk 54, which is secured to and in electrical connection with the armature shaft or spindle 35^a. One end of the lever is provided with a contact or terminal 55 which coöperates with a similar contact or terminal 56 carried by the block 51 to constitute a make and break device. The other end of the lever is provided with a shoe 57, pressed outwardly by the spring 58 which acting on said lever normally holds the contacts 55 and 56 together. Twice during each rotation of the armature, however, the contacts are separated by the cams 31 acting upon the shoe 57 of the lever, whereby the short circuit is broken intermittently in the well known way.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In a magneto electric machine, the combination, with a distributor shaft, an

armature, and a side plate having an inward projecting portion arranged to support said distributor shaft and also having an annular recess, of a ring removably fitted in said annular recess and projecting beyond the plane of the side plate, for engagement with a corresponding recess in the pole shoes, said ring being arranged to form a centering device for the armature.

2. In a magneto electric machine, the combination, with a distributor shaft, an armature, and a side plate having an inward-projecting portion arranged to support said distributor shaft and also having an inner surface arranged to come opposite the end of the armature and lying in one plane, said side plate having an annular ring receiving recess in the portion having the plane surface, of a removable centering ring fitted in said annular recess and projecting beyond the said plane of the inner surface of said side plate, said ring being arranged to form a centering device for the armature.

3. In a magneto electric apparatus, a side plate having a bearing flange cast integrally therewith and extending laterally therefrom, the outer extremity of the flange intumed to inclose a space on three sides, and a snugly fitting bush closing the fourth inner side of the space, said bush serving as a bearing.

4. In a magneto electric apparatus, a side plate having a bearing flange cast integrally therewith and extending laterally therefrom as an annulus, the outer extremity of the flange intumed to form an outer wall inclosing a space to form an oil chamber open on the inner side, and communicating with the bearing, and a snugly fitting bearing bush closing the inner side of the space, an oil cup above and communicating with the chamber.

5. In a magneto electric ignition apparatus, the combination with the collecting ring and a brush holder coacting therewith and provided with a grooved portion, of a distributing device, and a connection between the brush holder and distributor comprising a metal tube having a forked end embracing the groove in the holder, a rod within the tube in contact therewith and bearing with its outer end upon the distributor, and a spring pressing the rod against the distributor and reacting on the tube.

6. In a magneto electric ignition apparatus, the combination with the collecting ring and a brush holder coacting therewith and provided with a grooved neck, of a distributor, and a connection between the brush holder and distributor comprising a metal tube having a forked end taking over the grooved neck of the brush holder, a rod within and extending from the tube, a spring within the tube pressing the rod outward against the distributor, and reacting

on the tube; and an insulating covering about the tube.

7. A magneto electric ignition apparatus comprising a brush holder, a stationary distributor, a centrally arranged conductor on the said distributor, a metal casing, a groove in the said holder adapted to receive the said forked end, an insulating sheath over the said casing, a spring within the said casing and reacting against the said casing and a rod within the said casing adapted to be pressed by the said spring against the central conductor.

8. In a magneto electric apparatus, a side plate carrying a projecting cylindrical extension, segmental interrupter cams secured circumferentially within the extension in fixed relation thereto, and screws fixing said cams to the extension.

9. In a magneto electric ignition apparatus, a side plate carrying a projecting cylindrical portion, segmental interrupter cams secured circumferentially within the cylindrical portion, the said cams fitting along

one side and along their outer periphery against the inner side of the cylindrical portion, and a single screw arranged to hold each cam in fixed relation to the cylindrical portion.

10. In a magneto electric ignition apparatus, a side plate carrying a projecting cylindrical extension, segmental interrupter cams secured circumferentially within the extension, screws passing from the outside through the extension into the cams to hold them in place and having projecting heads, and a cap covering the open end of the cylindrical extension and provided with a circumferential portion having an angular slot adapted to engage one of the heads of the screws and form therewith a bayonet joint.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

ARNOLD ZÄHRINGER.

Witnesses:

G. ARNOLD,
REINHOLD ELWERT.