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Melidosian

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[54] **CIRCUIT INTERRUPTOR FOR IGNITION SYSTEM WITH IMPROVED ROTARY CONTACT**

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[52] **U.S. Cl.**..... **200/24,** 200/26, 200/DIG. 007, 200/19 R

[51] **Int. Cl.**..... **H01r 39/18**

[58] **Field of Search**..... 200/19 R, 21, 22, 200/23, 24, 25, 26, DIG. 007, 165, 164, 28

[56] **References Cited**

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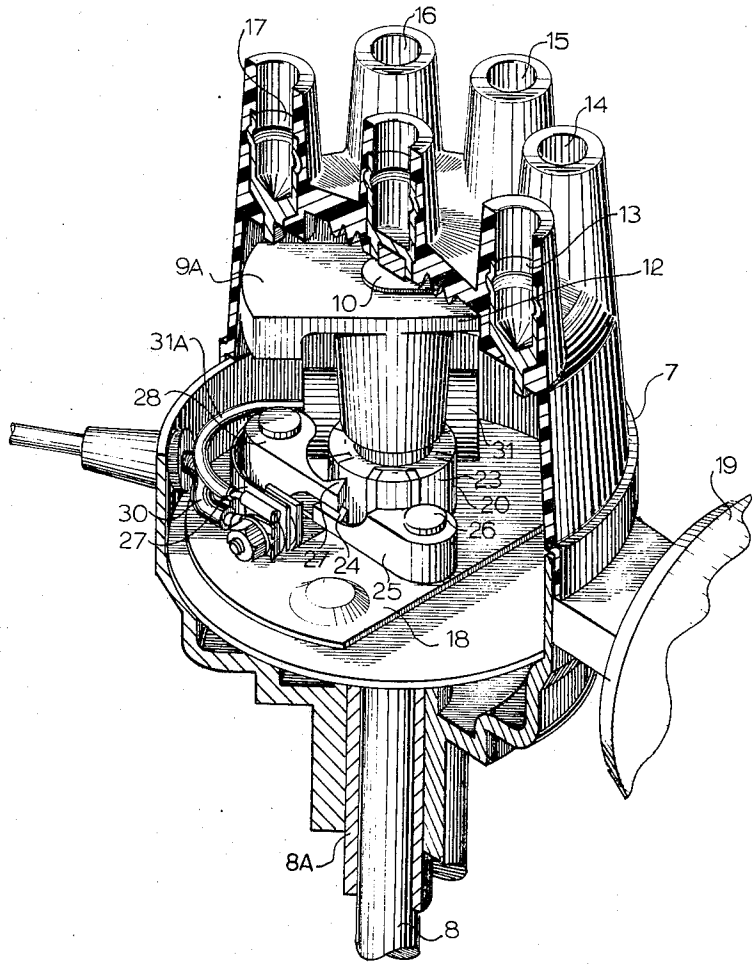
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Primary Examiner—J. R. Scott
Attorney—Edward M. Apple

[57] **ABSTRACT**

A segmented cylindrical conductive member, comprising an integrated, concentric, part of the distributor shaft, positioned intermediate the ends of the shaft and having wiping contact elements, one of which is connected to the primary power source and the other to ground.

7 Claims, 3 Drawing Figures



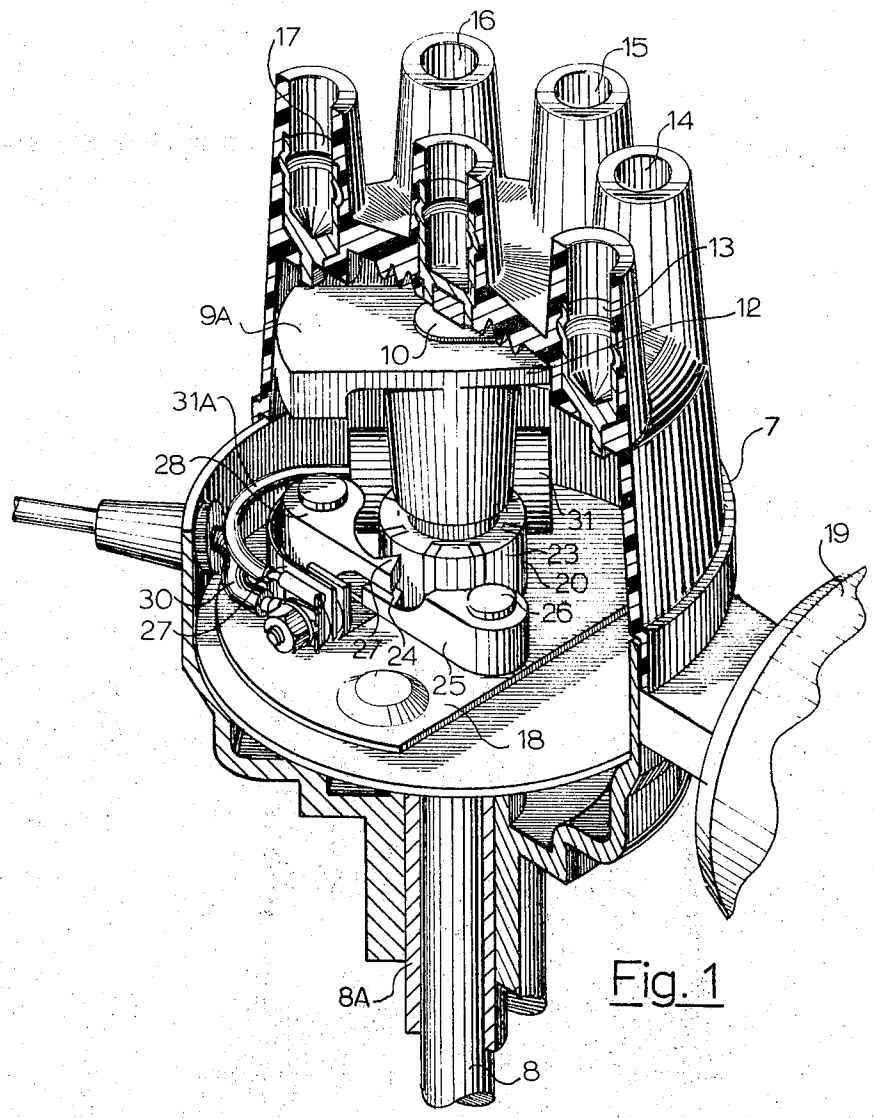


Fig. 1

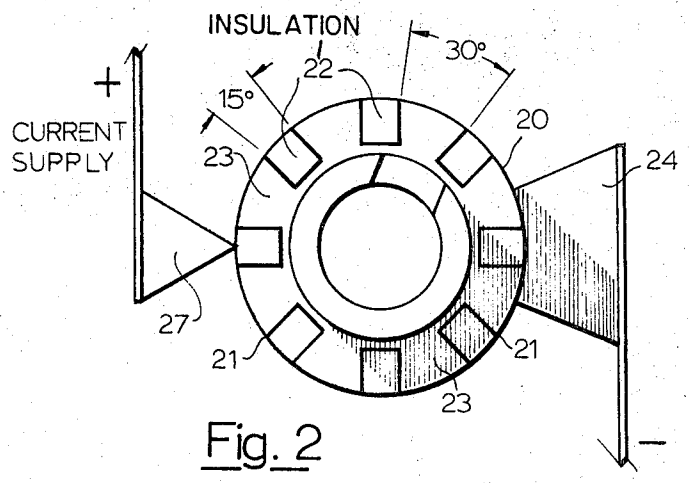


Fig. 2

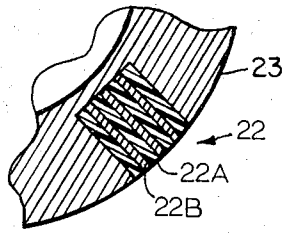


Fig. 3

CIRCUIT INTERRUPTOR FOR IGNITION SYSTEM WITH IMPROVED ROTARY CONTACT

This invention relates to battery, coil, ignition systems for internal combustion engines and has particular reference to the so called "distributor" for such systems.

Battery, coil, ignition systems now known to the public and extensively used throughout the automotive industry, employ a cam and a set of breaker points, set in the primary circuit, the circuit through said points being opened and closed by a spring biased oscillating arm which rides on the cam. This basic concept has been used for many years, but from a practical point of view has many short comings, particularly when incorporated with modern high speed, high compression, multi-cylinder engines.

It is therefore an object of this invention to obviate the necessity of using such breaker points, cam and oscillating arm and to provide a primary circuit make and break system, which utilizes a purely rotary motion, with a wiping action to effect the interruption of the primary curcuit. This improved system can be incorporated with conventional ignition distributors, without modification of the presently used means for advancing and retarding the spark, timing, and the like.

Another object of the invention is to provide a device of the character indicated in which the dwell angle is fixed for the life of the make and break rotor.

Another object of the invention is the provision of a device of the character indicated, in which the making and breaking of the circuit is done with a continuous line contact with the rotor, which effects a wiping action, which maintains a clean contact surface.

Another object of the invention is to provide a device of the character indicated, in which the dwell angle is fixed for the life of the rotor.

Another object of the invention is to provide a device, in which the dwell angle is not affected by the advancing and retarding of the breaker plate.

Another object of the invention is to provide a device of the character indicated, in which there is no point bounce, because of the elimination of the cam and breaker points.

Another object of the invention is to provide a distributor assembly which obviates the necessity of much complex machining, and the holding to close tolerances.

Another object of the invention is to provide a distributor assembly, in which comparitively inexpensive materials may be used with equal efficiency.

Another object of the invention is to provide a device of the character indicated, in which the dwell angle will not be affected by the probability of misalignment.

Another object of the invention is to provide a distributor assembly which may be serviced with a minimum expense.

A further object of the invention is to provide a device of the character indicated, in which a current supply brush and a ground brush are employed, thereby obviating the problem of etching the distributor shaft bearings.

Another object of the invention is to provide an ignition distributor with increased efficiency over presently known systems, whereby hydrocarbon emmission is effectively reduced.

Another object of the invention is to provide a device of the character indicated, in which multiple induction

can be produced in the ignition coil, by the use of laminated interruptor segments in the rotor.

Another object of the invention is to provide a distributor system, in which the full **12** volts of the battery supply may be utilized without the problem of oxidizing the breaker points.

The foregoing and other objects and advantages of the invention will become more apparent as the description proceeds, reference being made from time to time to the accompanying drawing, forming part of the within disclosure, in which drawing:

FIG. **1** is a vertical section, with parts broken away, taken through a distributor equipped with a device embodying the invention.

FIG. **2** is a plan view of the segmented rotor, with the wiping contact elements positioned one hundred and eighty degrees apart, for illustrative purposes.

FIG. **3** is a fragmentary detail, in sectional view, illustrating a modified form of the device.

Referring now more particularly to the drawing, it will be understood that in the embodiment herein disclosed, the reference character **7** indicates, in general, the distributor for an internal combustion engine.

The distributor has a drive shaft **8,** which is driven by the camshaft (not shown) of the engine, as in conventional practice. The distributor drive shaft **8** rotates in suitable bearings **8A,** and is lubricated as in conventional practice. At the upper end of the shaft **8,** is the conventional rotor **9A,** which has a spring biased element **10,** which is always in contact with the high tension terminal member **11.** The rotor **9A** is also provided with the spark plug wire terminals **13, 14, 15, 16,** and **17,** as in conventional practice.

The distributor **7** has a conventional breaker plate **18,** which is normally used to support the conventional breaker points, and the condenser, and is adjustable to provide means to advance and retard the spark. The plate **18,** in conventional practice, is rotatable by means of linkage **18A,** which is actuated by a vacuum mechanism **19,** or it may be adjusted manually as in conventional practice.

The foregoing elements constitute no part of the invention, except as they are combined with the elements which are hereinafter described.

Instead of the conventional cam, oscillating arm, and breaker points, here-to-fore used to make and break the circuit in the primary winding of the ignition coil (not shown), I use a cylindrical conductive member **20,** which is preferably an integrated element, carried on the distributor drive shaft **8.** The member **20** may also be a separate cylinder with a central opening, which may be press fitted on to the shaft **8.** In any event, the cylinder **20** has its periphery slotted, as at **21,** in which slots are received nonconductive elements **22,** which serve as circuit interruptors. The nonconductive interruptors **22** are spaced approximately thirty degrees from one another. The 30° conductive segments **23** between the interruptor **22** occupies approximately **15** degrees of the periphery of the rotor **20.**

In the embodiment herein disclosed, the rotor **20** is divided into eight conductive segments **23,** one for each cylinder of the internal combustion engine. The segments **23** may be grounded through the driveshaft **8,** it's bearings and metal housing, but I prefer to provide a ground brush **24,** which is carried on a conductive spring biased arm, **25,** which is grounded through the pin **26** and the plate **18.**

As shown in FIG. 2, the ground brush 24 may extend across one of the nonconductive interruptors 22, and contact two of the conductive segments 23. The more surface which the ground brush contacts, the better the wiping action on the periphery of the rotor 20.

The input current supply to the rotor 20 is provided by means of a wedge shaped contact brush 27, which provides a line contact between the brush 27 and the periphery of the rotor 20.

In FIG. 1, I show the current supply brush 27 and the ground brush 24, as being positioned one above the other. This is advantageous in that the primary input current does not have as far to travel to the ground as when the ground brush 24 is positioned one hundred and eighty degrees away from the input brush 27. (FIG. 2) The input brush 27 is carried at the end of a spring biased arm 28, which is pivoted on the breaker plate 18. The arm 28 is connected as at 29 and 30 to the current supply from the battery.

With my device, it is possible to use the full voltage of a 12-volt battery, instead of interposing resistance in the primary input line to cut the voltage down to approximately nine volts, as in conventional practice. In as much as there are no conventional breaker points used in this system, the making and breaking of the circuit through the periphery of the rotor 20 obviates any tendency for the make and break contacts to burn or oxidize. The input brush 27 is connected to the condenser 31 as at 31A, and hence to the primary winding of the ignition coil (not shown) as in conventional practice.

In FIG. 3, I show a modified form of interruptor. In this modification, the interruptor is laminated, with alternate layers of nonconductive 22A and conductive material 22B. With such a structure, multiple induction may be produced in the secondary winding of the ignition coil.

It is believed that the operation of the device is obvious from the foregoing description.

Having described my invention and what I claim and desire to secure by Letters Patent is:

1. The combination with an internal combustion engine ignition system, including a coil and a distributor, having a drive shaft, cap, rotor, and condensor, of a segmented, conductive member concentrically carried on said shaft, said conductive member having a plurality of slots in its periphery, with a nonconductive element in each slot, means to ground said conductive member, including a spring loaded comparatively wide wiping brush which is always in contact with said conductive member, and a spring loaded, comparatively thin, contact brush electrically connected to the primary power circuit of said system, said condensor, and said coil, and arranged to interrupt said primary circuit each time it contacts one of said nonconductive elements.

2. The structure of claim 1, in which said conductive member is an integrated portion of said drive shaft.

3. The structure of claim 1, in which said first named brush is arranged to simultaneously contact at all times at least two of the segments of said conductive member, and said second named brush is arranged to intermittently contact the said segments.

4. The structure of claim 1, in which each segment of said conductive member contains the number of degrees of a circle, which represents the dwell angle of the system.

5. The structure of claim 1, in which said second named brush makes a line contact with the said nonconductive elements and the said segments of said conductive member.

6. The structure of claim 1, in which the segments of said conductive member are spaced by members comprising alternate elements separated by laminated layers of conductive and nonconductive materials.

7. The structure of claim 1, in which said integrated rotor is grounded directly through said shaft.

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