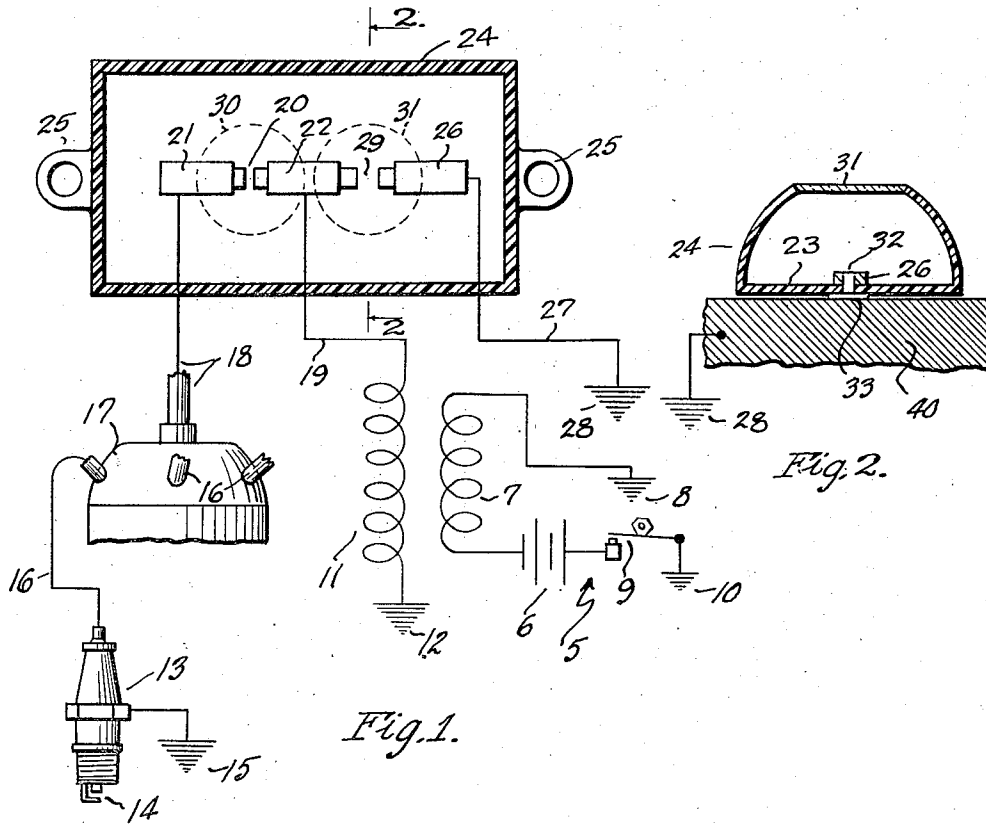
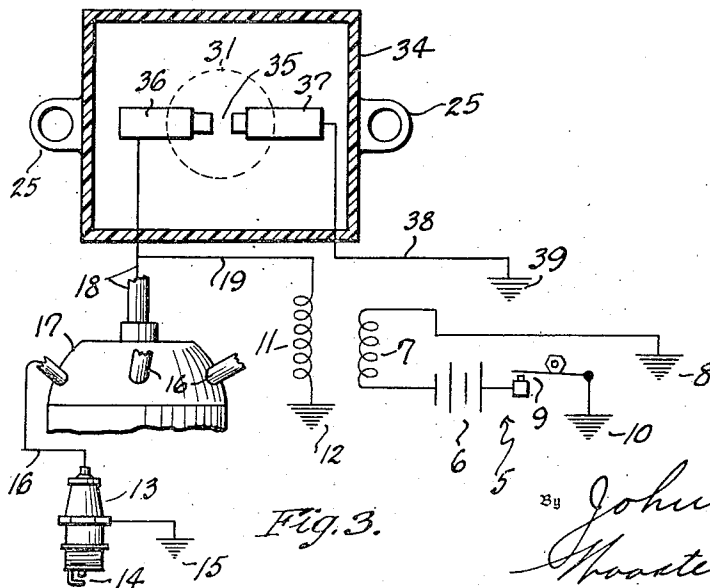


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 DEVICE TO INDICATE OPERATION OF IGNITION COIL AND
 DEFECTIVE SPARK PLUGS AND WIRING OF
 AN AUTOMOBILE ENGINE
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DEVICE TO INDICATE OPERATION OF IGNITION COIL AND DEFECTIVE SPARK PLUGS AND WIRING OF AN AUTOMOBILE ENGINE

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This invention relates to the ignition system of gasoline motors and the like, such, for example, as automobile engines, and has for an object to provide a simple and effective device which will indicate whether the ignition coil, spark plugs, wiring, and so forth, of the motor are working properly.

Another object is to provide such a device which will indicate whether elements of the ignition system, such, for example, as a spark plug, becomes defective, or a resistance in the wiring or a plug becomes too high so as to, if not corrected, cause a breakdown of the spark coil, and to indicate this condition before the voltage has become high enough to cause such a breakdown as might ruin the coil, or other breakdown in the system to cause stalling of the motor, so that the defect may be cured or the condition corrected before such breakdown in the coil or system occurs.

With the foregoing and other objects in view, I have devised the construction illustrated in the accompanying drawing forming a part of this specification. It is, however, to be understood the invention is not limited to the specific details of construction and arrangement shown, but may embody various changes and modifications within the scope of the invention.

In this drawing:

Fig. 1 is a somewhat diagrammatical view illustrating the arrangement of the device with a portion shown in section;

Fig. 2 is a transverse section substantially on line 2—2 of Fig. 1, and

Fig. 3 is a view similar to Fig. 1 showing a modified arrangement.

Referring first to Fig. 1, a conventional primary circuit is indicated at 5, including a battery or magneto 6, the primary coil of a transformer 7 grounded at 8, and the make-and-break points 9 of the distributor grounded at 10. The secondary or ignition circuit includes the spark coil, or secondary coil of the transformer, indicated at 11 grounded at 12 and connected in the ignition system comprising a series of spark plugs 13 of a motor, one only of which is shown, and the usual ignition spark plug gap 14 and grounded at 15. It is connected in the usual manner by a lead 16 to the distributor 17 and the center lead 18 of this distributor is connected by wire 19 to the other end of the spark coil 11 through a spark gap 20. This spark gap may be formed in any suitable manner, but is preferably formed between two metal blocks or conductors 21 and 22 connected in the distributor circuit, which includes the secondary coil 11, the distributor and the

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spark plugs. This gap may be mounted in any suitable manner, but is preferably mounted on an insulating base 23 and enclosed in an insulating casing 24 which may be mounted in any suitable position, preferably on the dashboard in front of the driver of a motor car, by any suitable means, such as screws or bolts through ears 25. The gap 20 is a relatively short gap so as not to interfere with the proper or normal flow of the high voltage current through the ignition circuit.

Connected in parallel with this ignition circuit is another circuit including the secondary coil 11, conductor 19, block contact 22, another metal contact block 26 and ground connection 27 to the ground 28. Between the elements 22 and 26 is another spark gap 29 which is somewhat greater than the combined gaps 14 and 20, so that in normal operation with the system working properly there will be a discharge across the gap 20 but no discharge across the gap 29. The elements 21, 22 and 26, may, if desired, be mounted on means (not shown) for shifting them to adjust the gap 20 and 29, or they may be permanently mounted for the proper gaps for properly functioning with different ignition systems and set according to the compression ratios of the type of engine used for different cars. The top wall 24 may be provided with windows over the gaps 20 and 29, such, for example, as a window with a green glass or lens 30 over the gap 20, and a red lens 31 over the gap 29.

In operation, if the ignition coil, spark plugs and other wiring is in proper condition and functioning properly, there will be a steady discharge across the gap 20 and the driver can observe this through the window 30. Under these conditions there will be no discharge across the wider gap 29, which is, as indicated, set to prevent this under normal operation, and lack of discharge here will indicate to the operator that the system is working properly. Should, however, a spark plug become defective or for some reason the resistance in the wiring or in one or more spark plugs become too high, then the voltage will increase and there will be a discharge across the grounded gap 29, which will warn the driver that there is something wrong in the system and he can have it corrected before the condition gets so bad as to cause a breakdown in the system, particularly in the ignition coil, and will thus save this coil to prevent ruining of the coil, or further, before there is other breakdown in the system to stall the motor.

Different means may be employed for grounding the element 26, but in Fig. 2 is shown a means

whereby it may be mounted in the lower wall 23 by means of a rivet 32 provided with a head 33 projecting through the bottom wall so that the mere mounting of the device on the dashboard or other grounded metal element 40 of a car will automatically ground this element.

A somewhat modified arrangement is shown in Fig. 3. In this arrangement, instead of having two spark gaps in the insulating casing 34, corresponding to the casing 20, there is a single gap 35 between the two metal blocks 36 and 37. The ignition circuit includes the secondary transformer or spark coil 11 and the lead 19 from the ungrounded end thereof is connected directly to the central lead 18 of the distributor 17. The circuit including the spark gap 35 includes this spark coil 11, lead 19 to the element 36, and the other element 37 is grounded in any suitable manner, that in the drawing comprising a conductor 38 grounded at 39. Therefore, in this arrangement the gap 20 is omitted, but the gap 35 corresponding to the gap 29 in the first form is in a circuit connected in parallel with the ignition circuit including the spark coil 11 the same as in the first form, in which the circuit including the gap 29 includes the spark coil and is connected in parallel with the ignition circuit, the difference being that in the first circuit there is a gap 20 in the ignition circuit. The gap 35 in this modified arrangement is enough wider than the spark plug gap 14 so that during normal operation there would be no discharge across this gap 35, and this fact will indicate to the operator that the system is working properly, but should a spark plug become defective or the resistance in the wiring or spark plug become too high, then there will be a discharge across the gap 35 which will indicate this defect to the operator before it has become great enough to cause a breakdown in the ignition coil 11, and the condition may be corrected before this coil has been damaged or before there is other breakdown in the system to cause a stall in the motor.

It will be clear from the above that the device is a very simple one and may be applied to any automobile system or the like without changing the system and requiring very little addition thereto, but will effectively indicate to the driver any trouble or defect in the ignition system before it has become serious enough to cause a breakdown or other damage to the ignition coil or the ignition system, so that he may have the condition corrected before such breakdown occurs.

Having thus set forth the nature of my invention, I claim:

1. In a motor ignition system comprising an electric circuit including a series of spark plugs, a distributor for supplying current in succession to said plugs, an induction coil and a supply lead

from said coil to said distributor, spaced conductor elements connected in said supply lead between the coil and the distributor providing a spark gap across which there is a discharge during normal operation of the plugs, and a second circuit including said coil connected in parallel with the first circuit between the coil and the first gap and including spaced conductor elements forming a second spark gap somewhat wider than the combined gaps of a spark plug and the other gap in the first circuit and narrow enough to permit a discharge to relieve this circuit should the voltage rise beyond a given limit, and means mounting said gaps so they are visible at all times.

2. In an ignition system for internal combustion motors comprising an electric circuit including a series of spark plugs, a distributor for supplying current in succession to said plugs, a grounded secondary induction coil and a supply lead from said coil to the distributor, a second circuit including said coil and ground connected in parallel with the first circuit, a casing including means whereby it may be mounted on a grounded metal member of a motor vehicle, spaced conductors mounted in said casing connected in the first circuit between the coil and the distributor providing a spark gap in series with the distributor, and spaced conductors connected in the second circuit, said latter conductors being spaced to form a spark gap greater than a spark plug gap plus the other gap in the first circuit so that during normal operation of the system there is a discharge across the first gap but no discharge across the second gap, the spacing of the conductors of the second gap being such as to permit a discharge to relieve the first circuit should its voltage rise beyond a given limit, said casing being provided with a transparent window over said spark gaps, and means mounting the conductor on the opposite side of the gap in the second circuit in the casing comprising a conductor extending to the outside of the base of the casing to contact the grounded member on which the casing is mounted and ground this conductor thereon.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,406,858	Henricks	Feb. 14, 1922
1,502,682	Reed	July 29, 1924
1,581,976	Moore	Apr. 20, 1926
1,632,166	Bourcier	June 14, 1927
1,720,983	Wike	July 16, 1929