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Maria et al.

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[54] **BATTERYLESS POCKET SPARK PLUG TESTER**

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[51] **Int. Cl.** .. **G01m 19/02,** G01r 31/00, H01v 7/00

[58] **Field of Search** ..... 324/15, 17; 123/148 BA; 315/55; 310/8.1, 8.7

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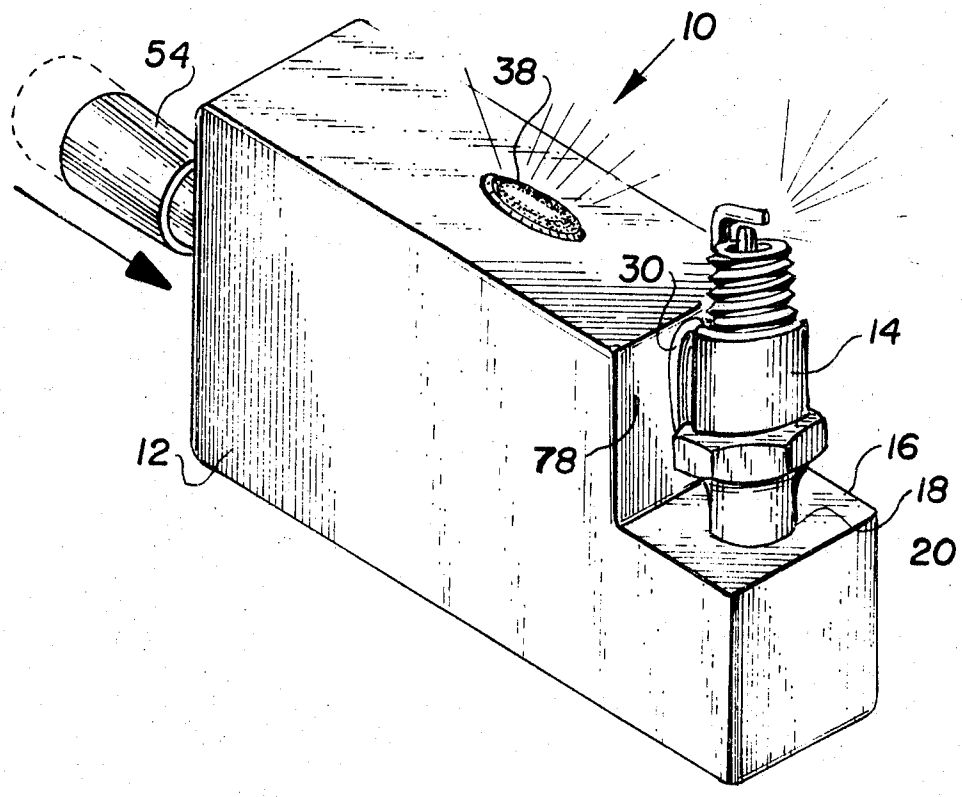
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Assistant Examiner—Rolf Hille

[57] **ABSTRACT**

A batteryless pocket spark plug detector operative with a piezo-electric crystal wherein the application of a compressive force to a piezo-electric crystal causes a high voltage signal to be applied across a spark plug so as to test whether there is an arc across the gap, and if not across the gap, across breaks in the insulation of the spark plug. If the latter occurs, the spark plug is defective. A neon bulb is provided for sensing the operation of the coil and, further, to indicate the operativeness of the device.

4 Claims, 4 Drawing Figures



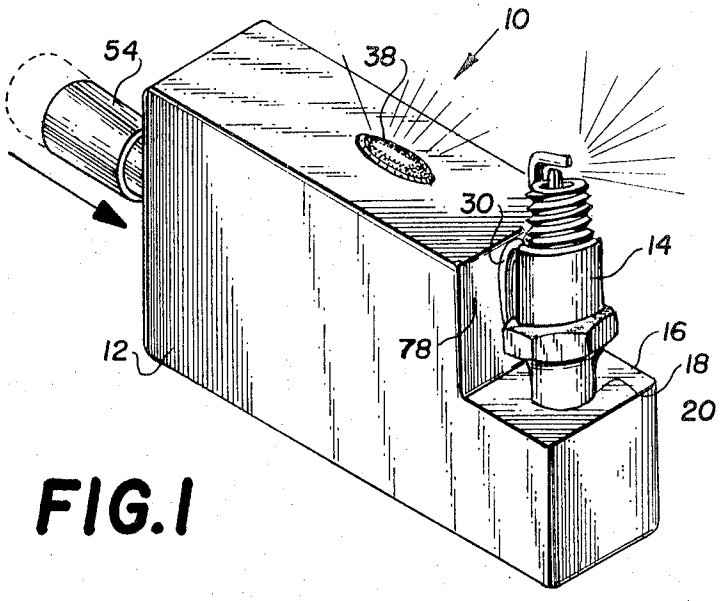
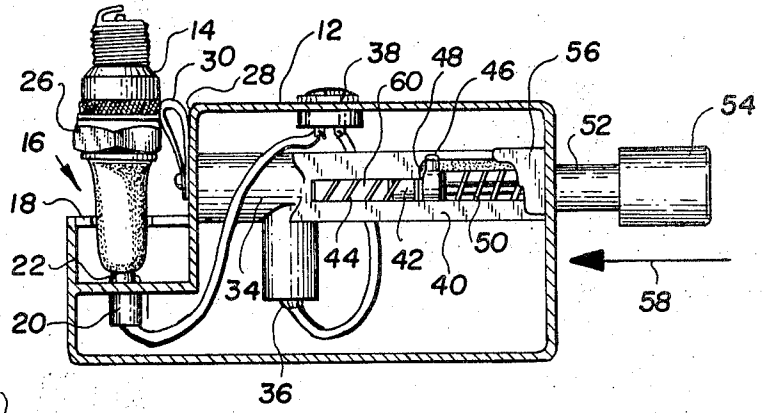


FIG. 1

FIG. 2



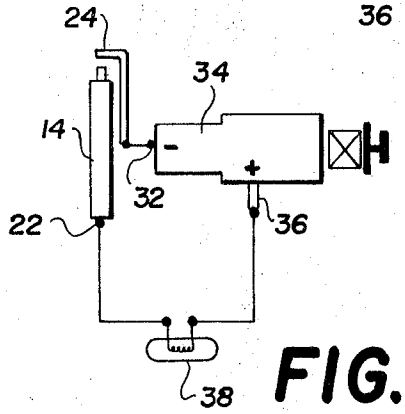


FIG. 4

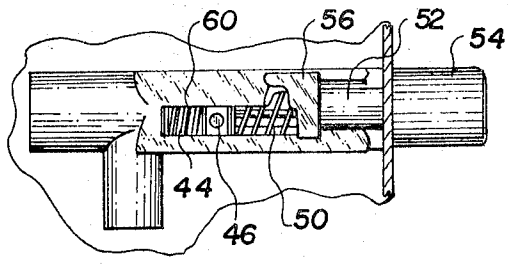


FIG. 3

BATTERYLESS POCKET SPARK PLUG TESTER

BACKGROUND OF THE INVENTION

In the past, piezo-electric devices have been utilized as a substitute for a source in internal combustion engines to energize spark plugs. Further, these sources have been utilized in hand held devices such as electric lighters to light a butane fuel. However, when it came to providing a simple spark plug tester, all such testers were rather large cumbersome devices which required that the spark plug be taken to the testing unit to be checked out. However, the average service man needed a simple unit which would allow him, while on the job, to check out each of the spark plugs to make sure that the insulation had not cracked and that the gap was in fact arcing with the application of voltage thereto. This type of device must be simple and easy to handle, extremely rugged in construction and should not require a separate power source such as battery as such power source is inevitably run down. Further, there should be a simple means for checking operation of the spark plug tester so as to avoid false readings.

It would additionally be useful to have a system for checking for wiring and operation of the electrical system which was also hand held and could be easily transported.

SUMMARY OF THE INVENTION

The invention comprises a small hand held unit about the size of a pack of cigarettes with a socket thereon for receiving the base of the spark plug. The base of the spark plug is then connected to one terminal of a piezo electric device in series with a neon bulb. The other terminal of the piezo electric device is connected through a spring contact member to the side wall of the spark plug so that a circuit is completed through the spark plug in a conventional manner. A suitable spring mechanism is operative to drive a compression device against the piezo electric crystal to cause compression thereof. The compression of the piezo electric crystal causes the high voltage signal to be applied through the neon bulb to the spark plug. The lighting of the neon bulb indicates that the tester is operative.

Further, one can easily view whether there is an arc across the gap of the spark plug showing that the spark plug is operative. If there is no arc across the gap of the spark plug, then there is usually some type of arcing within the insulation of the spark plug indicating that the spark plug is defective. This gives a quick simple check as to the effectiveness of the spark plug and a new spark plug can be inserted therein. It should further be noted that the neon bulb, in itself, when placed near any of the wires of the ignitition system, while the car is operating will sense the passage of current through the wires by lighting up and, thus, the spark plug tester provides a dual purpose.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the spark plug tester of the present invention with a spark plug in place.

FIG. 2 is a cross sectional view of the spark plug tester of FIG. 1.

FIG. 3 is a partial cross sectional view of the operating mechanism for the piezo electric crystal after compression.

FIG. 4 is a schematic showing of the electric circuit of the present invention.

In FIG. 1, there is shown the spark plug tester of the present invention generally designated by the numeral **10**. The spark plug tester **10** comprises a generally rectangular case **12** made out of a hard plastic material. The case **12** has one corner thereof recessed to form an area for receiving a spark plug **14**. In the recessed area **16**, there is provided a suitable flat surface **18** with a socket **20** therein receiving the lowermost contact **22** of the spark plug **14**. The spark plug **14**, has a suitable gap **24** which is in electrical conductive relation with a metal conductive ring **26** thereabout. On the side wall **28** of the recess **16** there is positioned a conductive spring member **30**. The conductive spring member **30** is connected to one terminal **32** of a piezo electric device **34**. The other terminal **36** of the piezo electric device **34** is connected through a neon indicator light **38** to the socket **20**. The piezo electric device **34** is a device which, upon compression, causes a high voltage signal to be transmitted across its output terminals.

The piezo electric device **34** is within a tubular case **40**. A striker element **42** is positioned within the tubular case **40** and is spring biased by way of a light spring **44** away from the electric device **34**. The spring **42** forces the striker **42** backward so that a suitable latching member **46** rests on a ledge **48**. On the side of the striker **42** opposite spring **44** there is a strong spring member **50** about a suitable plunger mechanism **52** connected to actuator **54**. Also connected to the plunger **52** is a camming device **56** which stops outward movement of the plunger **52**. When the actuator **54** is compressed as per the arrow **58** spring **50** is compressed until such time as the camming member **56** hits latch **46**, forcing it off the ledge **48** and into a groove **60**. When this occurs, the force of spring **50** is released driving striker **42** against the piezo electric device **34** causing immediate compression thereof and a high voltage electric signal to be transmitted through neon bulb **38** to the spark plug **14**. When the actuator **54** is released, spring **44** returns the striker **42** to its original position and twists arc member **46** back onto ledge **48**. Similarly, camming member **56** is returned to its original position by spring **50** and the tester is ready for another usage thereof.

As can be seen, with each movement of the actuator **54**, a high voltage pulse signal is supplied to the spark plug **14** to check whether an arc is transmitted across its gap **24**. Further, with each operation, the neon bulb **38** will be operated indicating that the tester itself is operating. If no arc appears across the gap **24**, then the spark plug **14** is not operative.

Further, normally, when no arc appears across the gap **24**, an arc or arcs will appear across breaks in insulation on the spark plug **14** further indication that the spark plug **14** is inoperative. It can be seen, easily, that it is simple to install the spark plugs **14** into position and, further, by reason of the arrangement of the spring **30** in the manner whereby it is in wiping relation with the ring **26** on a spark plug, and resiliently pivotal about contact **32**, the tester **10** can accept spark plugs of varying sizes without any change. It further should be noted that the neon bulb **38** acts not only as a checker for operation of the spark plug tester, but as an independent tester for indicating signals in the wiring of the motor as the motor is running. That is, it will pick up high frequency signals from the choke and other parts of the electrical system indicating that they are operative.

Although this invention has been described with respect to its preferred embodiments, it should be understood that many variations and modifications will now be obvious to those skilled in the art, and it is preferred, therefore, that the scope of the invention be limited, not by the specific disclosure herein, only by the appended claims.

We claim:

1. A spark plug tester comprising:

a piezo electric crystal;

compression means for applying a compressive force to said piezo electric crystal;

a casing adapted for holding in the hand of the user;

said piezo electric crystal being mounted within said casing;

said compression means comprising a spring biased snap-action striker, said striker being mounted for quick snap-action movement to strike against said piezo electric device to effect a momentary compression of said piezo electric device;

said striker being latch-mounted, spring means mounted behind said latch-mounted striker, and means for compressing said spring means and unlatching said striker to cause movement of said striker against said piezo electric device, return spring means oppositely mounted with respect to said first mentioned spring means for allowing only momentary striking of said piezo electric device and being further operative to re-latch said striker for a subsequent operation;

a socket for receiving a spark plug mounted on said casing; and

spring biasing contact means adjacent said socket on said casing for making contact with a conductive ring of a spark plug, said spring biasing contact mean being connected to one terminal of said piezo electric device and said socket being connected to the other terminal of said piezo electric device.

2. The spark plug tester of claim 1 including indicating means connected in circuit relation with said piezo electric device.

3. The spark plug tester of claim 2 wherein said indicating means is a neon bulb in series with said piezo electric device.

4. The spark plug tester of claim 1 wherein said spring contact means is a spring pivotally mounted to one terminal of said piezo electric device.

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