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2,353,322

RESISTOR FOR SPARK PLUGS

Original Filed Dec. 12, 1941

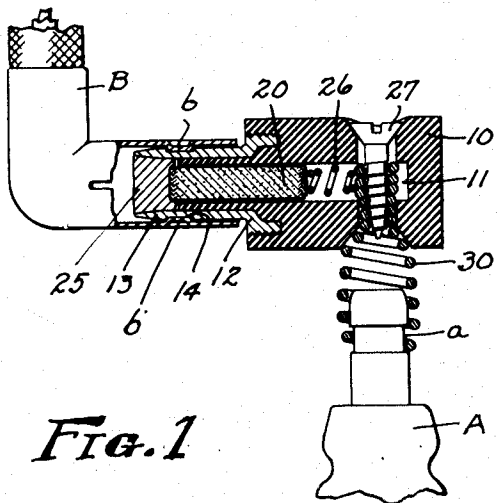


Fig. 1

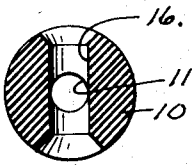


Fig. 3

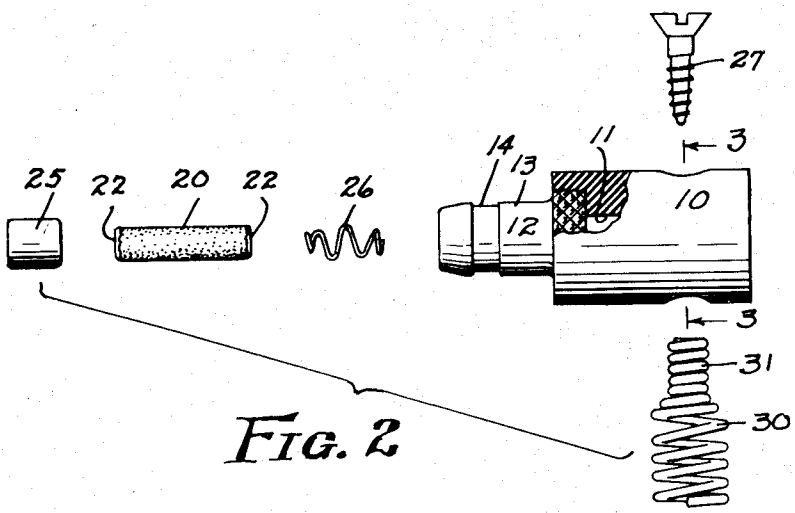


Fig. 2

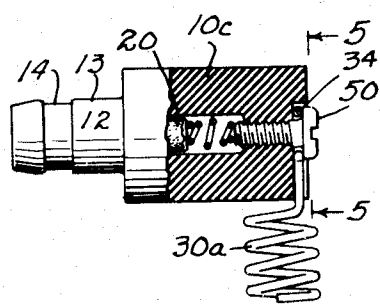


Fig. 4

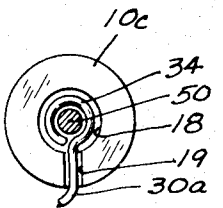


Fig. 5

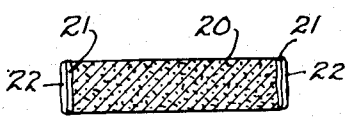


Fig. 6

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RESISTOR FOR SPARK PLUGS

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Original application December 12, 1941, Serial No.
422,752. Divided and this application July 13,
1942, Serial No. 450,672

5 Claims. (Cl. 201—63)

This invention relates to a resisting device adapted to be inserted between an electric conductor and a spark plug for continuing the connecting and introducing a resistor adapted to suppress a spark at the connection to the plug. Such devices are in use for the purpose of preventing interference with radio reception on an automobile due to the leakage or other irregular actions of the ignition circuit. The present application is a division of our copending application, Serial No. 422,752, filed December 12, 1941.

Our invention is concerned with the means for carrying a resisting element and effectively connecting it to the spark plug. Several embodiments of the invention are shown in the drawing hereof and are hereinafter more fully described, while the essential novel characteristics are summarized in the claims.

In the drawing, Fig. 1 is a sectional side elevation of one side of our resistor in place between a spark plug and the conductor therefor; Fig. 2 is an exploded view of the parts of the resistor shown in Fig. 1; Fig. 3 is a cross section through the body of the resistor as indicated by the line 3—3 in Fig. 2; Fig. 4 is a side elevation partly broken away and partly in section of a modified form of our resistor; Fig. 5 is a vertical cross section on the line 5—5 on Fig. 4; and Fig. 6 is a longitudinal axial section of the resisting element.

In Fig. 1, A indicates a spark plug having a conducting stem with an annular groove *a* therein. B indicates the head of a conductor which terminates in a split sleeve having inward projections *b* adapted to engage in the groove *a* of the plug when no resisting device is present. Our resisting device in any of the forms illustrated is adapted to be mounted on the spark plug and electrically and mechanically connect with the conducting groove *a* thereof and also with the two spring projections *b* of the supply line.

Referring first to the resisting device shown in Figs. 1, 2, and 3, 10 indicates a cylindrical body of insulating material having a central bore 11 leading from one end. This body carries a metallic sleeve 12 which is embedded in the end portion of the body and extends beyond it and around a reduced portion 13 of the body, and is provided with an annular groove 14 to receive the projections *b* of the conducting cable B.

Inserted in the bore 11 is a resisting element 20 which may be a round stick of carbon. 25 indicates a metallic plug, which may be of lead, seated in the end portion of the metallic sleeve 12, which preferably flares in this region. This

plug is thus in electric contact with the metallic sleeve 12 and also with the resisting element 20.

In the bore 11 of the body, at the other end of the resisting element and in electric connection therewith, is a compression spring 26 bearing against the other end of the element 20. This spring is compressed between the resisting element and an abutment (to be described) carried by the body. The spring 26 engages one end of the resisting element 20 and forces the other end against the plug 25.

The resisting element preferably carries suitable conducting metal at each end. To make a good connection between the metallic end and the carbon body of the resistor, we first spray the end of the resistor with molten copper to produce a layer 21 adhering to the resisting element, and then we apply a layer of solder 22 to the outside of this copper layer, as indicated in Fig. 6.

The means to connect our device to the spark plug comprises an external coiled spring 30 adapted to overlap the stem of the plug and seat in the groove *a* as shown in Fig. 1. In that view, and in Fig. 2, the end portion 31 of the spring 30 is coiled more tightly than the main body thereof, and this portion 31 enters a transverse opening 16 in the insulating body 10. A wood screw 27 enters the spring extension 31 within the lateral passageway of the insulating body 10 and holds its position, when it forms the abutment for the internal spring 26. That is to say, this wood screw is turned in from a position diametrically opposite the spring extension 31 and screws into such extension, thus expanding it and locking it to the body 10 as shown in Fig. 1, and at the same time establishing a good electric connection to the spring 26 which leads to the metallic end of the resisting element 20.

It will be seen that when the parts shown in Fig. 2 are assembled they produce the construction of Fig. 1 and provide a simple device readily attachable to the spark plug and to the conductor normally connecting directly to the plug, and thus introduce in the circuit a resisting element. The resistance of this resisting element exceeds the resistance between any other meeting parts of the connection from the conductor to the spark plug and thus operates to suppress any spark which might otherwise form at such junction and thereby reduces the interference with any radio equipment.

In the embodiment of Fig. 4, the metallic sleeve 12 connected to the conductor and the open coiled portion of the spring adapted to be mounted on the spark plug stem are the same as heretofore.

The insulating body, while of the same general character, differs in the embodiment, as also does its connection to the spring as will now be explained.

In Fig. 4, the body 10c is slightly differently formed. It carries the resisting element 20 backed up by the compression spring 26, but the inner end of the spring is engaged by a screw 50 which engages an axially threaded extension of the bore in the body. The clamping screw passes through a loop 34 on the spring 30a so that the head of the screw not only clamps the spring to the body 10c, but is in good electrical connection therewith. The inner end of the screw bears against the internal spring 26, which at its other end bears against the resisting element 20. The extreme end of the body 10c is circularly recessed at 18 to receive the loop of the spring 30a, and the body also has a radial recess 19 to receive the extension of the loop leading to the open coil 30a as is illustrated in Fig. 5.

In each of the embodiments shown, the resisting element is housed within an insulating body and is in good electrical connection to the open spring coil 30 which engages the spark plug. This open spring provides a yielding mechanical support for the conductor and resistor so that they are not likely to jar loose in the travel of the car. In each embodiment, the external spring is in good electrical connection to the internal spring which bears against the metallic end of the resisting element and operates to press said element so that its other end is maintained in good metallic connection with the plug connected to the terminal which the spring sleeve of the conductor engages.

It is to be understood that in each of the views, the parts are shown on a considerably larger scale than is normally employed in practice. The simple little device illustrated is readily mounted whenever desired by simply pulling the normal conductor free from its plug and attaching the resistor to the plug and the conductor to the resistor. The conductor is thus maintained approximately in its normal position and serves to conduct the sparking current to the plug without danger of extraneous sparks to interfere with radio operation.

Reference is made to our divisional application No. 501,964, filed September 11, 1943, for claims on the electric connector herein illustrated independent of the resistor.

We claim:

1. A resistor for spark plugs comprising a body, means carried thereby for attachment of a conductor, a resisting element in the body, a coiled spring carried by the body and adapted to coact with the stem of the spark plug, a screw insertable into the body for clamping the spring thereto and a conductor in the body electrically connected at one end with the coiled spring and at the other end with the resisting element.

2. In a resistor for spark plugs, the combina-

tion of an insulating body having a recess, a metallic sleeve projecting from the body and adapted to be externally engaged by a sleeve on the end of a conductor, a coiled spring secured to the body and adapted to embrace the stem of a spark plug, a resisting element within the recess, means for connecting it at its outer end to the sleeve carried by the body, a spring within the body normally pressing against the inner end of the resisting element and having the other end thereof in electric connection with the external spring, and a screw having the head thereof accessible from the exterior part of the body for clamping the external spring thereto.

3. A resistor for spark plugs comprising an insulating body having a bore, a metallic conducting sleeve carried by the body and projecting beyond one end thereof and suitable for engagement by the electric conductor which normally engages the spark plug stem, an external metallic coiled spring secured to the body and having a portion thereof projecting at right angles thereto and adapted to embrace a spark plug stem, a resisting element within the body having metallic ends attached thereto, a plug for connecting the outer end of the resisting element electrically to the external sleeve carried by the body, a compression spring within the body bearing against the other metallic end of the resisting element, the external spring having an extension thereon, and a screw engaging the extension for attaching the external spring to the body whereby an electric connection is established and maintained between the extension and the external spring.

4. A resistor for spark plugs comprising an insulating body having a bore, a conducting extension carried by the body, a resisting element within the bore, means for connecting one end of the resisting element electrically to the conducting extension, an external coiled spring having an extension at one end of the body, a screw threaded into the body and having a head engaging and binding the extension, and an internal spring bearing at one end against the resisting element and bearing at the other end against the screw.

5. In a resistor for spark plugs, the combination of an insulating body, a conductor carried thereby and projecting therefrom, a resisting element within the body, an electric connection at one end with the projecting conductor, an external spring having a portion adapted to engage the stem of the spark plug and having an extension projecting into a lateral opening in the body, a screw inserted into the body from a position opposite the extension, said screw entering such extension and binding it to the body, and a compression spring within the body bearing at one end against the resisting element and at the other end against the inward extension of the external spring.

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