Jan. 9, 1945. L. L. STOFFEL 2,366,757

RESISTOR FOR SPARK PLUGS

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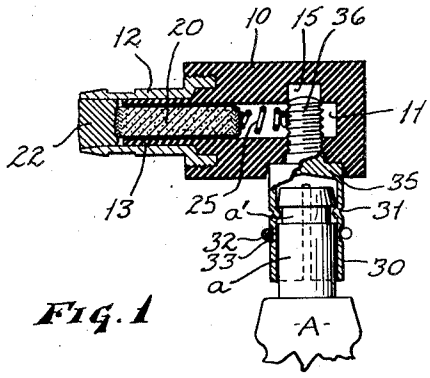


FIG. 1

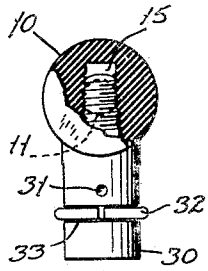


FIG. 2

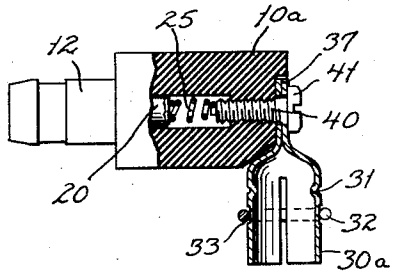


FIG. 3

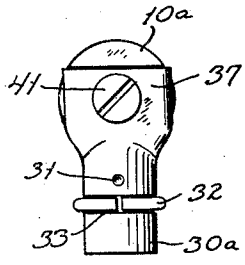


FIG. 4

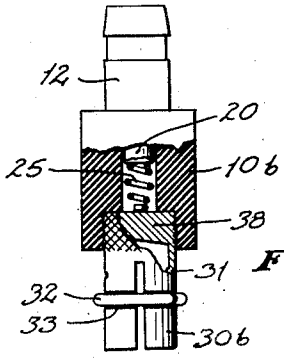


FIG. 5

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RESISTOR FOR SPARK PLUGS

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Application January 16, 1942, Serial No. 427,023

4 Claims. (Cl. 201—63)

This invention relates to a resisting device adapted to be inserted between an electric conductor and a spark plug to continue the connection and introduce a resistance 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 action of the ignition circuit. My invention is concerned particularly with means for mechanically and electrically connecting the resistor to the spark plug, the object being to provide such means in a simple form which may be readily applied in use and will maintain the resistor in place and in good electric connection with the spark plug notwithstanding the jarring due to the travel of the automobile.

Several embodiments of my invention are shown in the drawing hereof and are hereinafter more fully described. In the drawing, Fig. 1 is a sectional side elevation of one form of my resistor in place on a spark plug; Fig. 2 is a sectional end elevation of the embodiment of Fig. 1; Fig. 3 is a sectional side elevation of a second embodiment of the invention; Fig. 4 is an end view of the construction shown in Fig. 3; Fig. 5 is a sectional elevation of a third embodiment of the invention.

In Fig. 1, A indicates a spark plug having a conducting stem *a* with an annular groove *a'*. My resistor, in any of the forms illustrated, is adapted to be mounted on the spark plug stem and carries a conducting extension having an external contour similar to the spark plug, so that the electric cable usually attached directly to the spark plug stem may now be attached to the resistor.

Referring first to the embodiment shown in Figs. 1 and 2, **10** indicates a cylindrical body of insulating material having a central bore **11** leading from one end thereof. This body carries a metallic sleeve **12** embedded therein at the end where the bore is open, such sleeve extending around and projecting beyond a reduced extension **13** of the body.

Inserted in the bore **11** is a resisting element **20** which may be a round stick of carbon having layers of metal secured across its ends. **22** indicates a metallic plug, which may be of lead, seated in the end portion of the metallic sleeve **12** and in electric connection therewith and forming a conductive abutment for the end of 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 **25** bearing against the end of the element **20**. This spring is compressed between the resisting element and a suitable abutment which is in electric connection with the part to be attached to the plug. This spring **25** therefore is itself in good electric connection with the resistor and causes the resistor to be in good connection to the plug **22**, thus providing for a continuous conduction from the supply cable embracing the sleeve **12** to the spark plug.

The means to connect my resisting device to the spark plug comprises a split sleeve **30** in Fig. 1 adapted to embrace the stem *a* of the spark plug and having inward projections **31** to extend into the groove of such stem and having also a comparatively stiff external wire ring **32** embracing the split sleeve and seated in a groove **33** thereof.

As shown in Fig. 1, the split sleeve **30** leads from a solid head **35** on the other side of which is an axial screw-threaded extension **36** of smaller diameter. This extension passes into an internally threaded lateral recess **15** in the insulating body and attaches the split sleeve thereto, and also forms the abutment for the spring **25**.

Heretofore there has been considerable difficulty in maintaining sleeves of resistors in good electric connection with the stem of the spark plug. It is highly important that such good connection be maintained, not only to enable a proper spark to be supplied to the engine, but also to prevent any external sparking beyond the range of the resistor to suppress. I have found that while a simple split sleeve on the resistor is likely to become loose on the spark plug stem, due to the jarring and the eccentric action of the cable, the looseness is entirely overcome by my invention by the retaining ring **32** on the sleeve.

The embodiment of Figs. 3 and 4 employs the same principle of a split sleeve with an external ring but the connection therefrom to the resistor is different. In this embodiment the body **10***a* has the external conducting sleeve **12** and internally carries the resistor the same as in Fig. 1. The internal spring **25**, however, which at one end engages the resistor, at the other end here engages the inner end of an axially mounted screw **40**, the external head **41** of which holds the split sleeve in position on the body. In this case the split sleeve **30***a* has an extension **37** formed by flattening the sleeve to produce two engaging plies. An opening extends through these plies which is occupied by the shank of the

screw 40, the head 41 of the screw overlapping this flattened extension of the sleeve.

The screw 40 mechanically holds the sleeve on the body in a position projecting at right angles thereto, and at the same time forms the outer abutment for the spring 25 and thus causes a good electric connection from the sleeve 12 and its plug, through the resistor and internal spring and screw, to the external sleeve and thence to the spark plug. The engaging portion of the external sleeve has an external groove 33 occupied by a split wire ring 32, the same as in Fig. 1.

In the embodiment of Fig. 5 the external sleeve 30b is mounted axially on the body 10b. This body carries the metallic connecting sleeve 12 and the resistor 20 as in the other embodiments. The plug-engaging sleeve 30b, however, is differently connected, being formed with a solid head 38, which is embedded in a large axial recess communicating with the bore 11. This head forms the abutment for the internal spring 25, the other end of which engages the resistor. This sleeve 30b, like the others, has an external annular groove occupied by a split ring.

In any of the three embodiments shown, the split sleeve is effectively attached mechanically to the insulating body of the resistor and is in good electric connection with the resistor through the spring which maintains the resistor in snug contact with the metallic plug of the sleeve to which the ignition cable is attached. In each embodiment, either a part of the plug-engaging sleeve itself, or the attaching device for the sleeve, forms the abutment for the internal spring acting on the resistor, and in each embodiment the split sleeve which embraces the plug stem is prevented from spreading or other distortion in use by the restraining effect of the embracing stiff wire ring.

Reference is made to my divisional application No. 534,748, filed May 9, 1944, for claims relating to the subject matter illustrated in Fig. 5.

I claim:

1. A resistor device for spark plugs comprising an insulating body having a comparatively thin walled open ended cylindrical portion, the opening thereof extending into said body, a metallic sleeve embedded in said body and embracing said cylindrical portion thereof, a resistor mounted in the opening of said cylindrical portion and substantially embraced by said metallic sleeve, a metallic electrical contacting plug closing the opening in said sleeve and having an outer surface exposed to the exterior of the device and an inner surface in direct electrical contact with one end of said resistor, a spark plug connecting member having an integral threaded portion screwed into said body transversely of the resistor retaining opening therein, and a metallic coil spring interposed between said threaded portion of said connecting member and said resistor forming an electrical conductor therebetween.

2. A resistor device for spark plugs comprising a body of insulating material, said body having a thin walled cylindrical portion of an external diameter smaller than the remaining portion of the body, an open ended metallic sleeve embracing said cylindrical portion and having its inner end embedded in said body, a resistor within said cylindrical portion of said body and substantially embraced by said sleeve but insulated therefrom by said body, a metallic electrical conducting plug in the open end of said sleeve having a direct electrical contact with one end of said resistor and with said sleeve, a split sleeve adapted to embrace a spark plug stem, a spring retaining ring embracing said sleeve to resiliently contract it, threaded means screwed into the larger portion of said body to connect said split sleeve with said body and form an electrical connection between said split sleeve and the interior of said body, and a metallic coil spring interposed between said threaded means and said resistor to position the resistor against said plug and provide an electrical conductor between said resistor and said threaded means.

3. A resistor for spark plugs comprising an insulating body, a conductive member carried thereby and extending beyond the body, a resisting element within the body in electric connection with the conductive extension, an external sleeve adapted to embrace the spark plug, said sleeve having a flattened portion located at the opposite end of the body from the conductive extension, a member passing through an opening in the flattened portion of the sleeve and entering the body and secured thereto, said member having an external head engaging the outer face of the flattened portion of the sleeve, and a conductor within the body electrically connecting the inner end of the resisting element with the member holding the sleeve.

4. A resistor for spark plugs comprising an insulating body, a conductive sleeve carried thereby and adapted to be embraced by the terminal of an ignition circuit, a resisting element within the body in electric connection with the conductive sleeve, an external split sleeve adapted to embrace the spark plug, said split sleeve having a flattened portion located at one end of the body, a screw passing through an opening in the flattened portion of the sleeve and entering the body and secured thereto, and holding the external sleeve in place, a compression spring within the body bearing at one end against the inner end of the resisting element and at the other end against said screw, and a restraining ring embracing the split sleeve.

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