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IGNITION HARNESS ASSEMBLY

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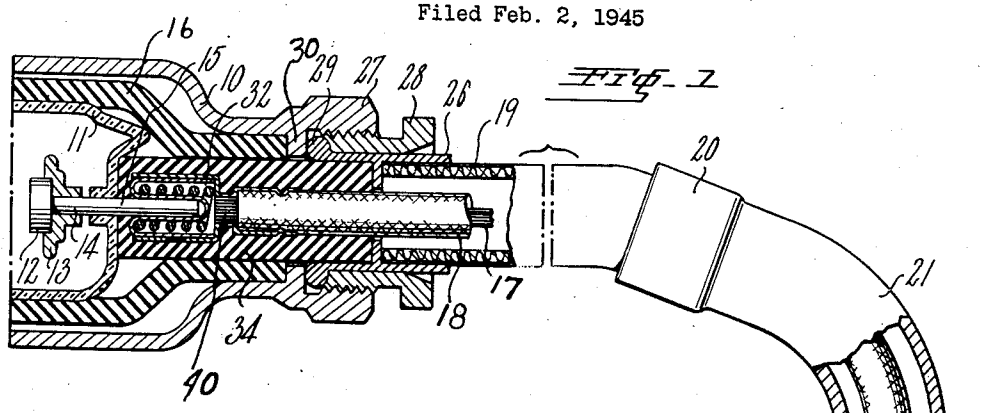


Fig. 1

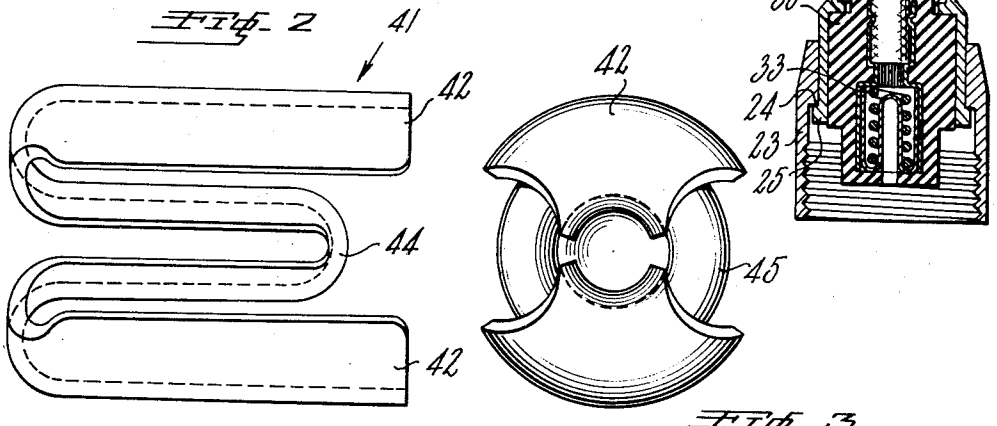


Fig. 2

Fig. 3

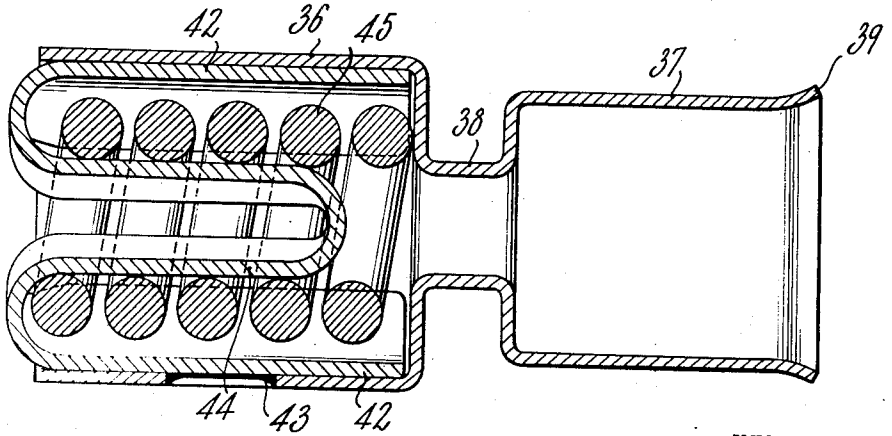


Fig. 4

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IGNITION HARNESS ASSEMBLY

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This invention relates to a new and improved lead assembly for electrically connecting electrical components and more particularly to a disconnectible and replaceable radio-shielded lead assembly having a minimum number of contact conducting surfaces, which is adapted to conduct heavy surges of high frequency current of short duration and which is also capable of withstanding wide temperature variations and considerable vibration, such as encountered by ignition leads employed in aircraft engines.

The primary object of this invention is to provide a new and improved disconnectible and replaceable radio-shielded lead assembly unit which is capable of conducting heavy surges of high frequency current of short duration without impeding the flow of the current; which has a minimum number of conducting contact surfaces; and which is also capable of withstanding wide temperature variations and considerable amounts of vibration such as are encountered by a lead connecting a capacity discharge gap and a spark plug in the ignition system of an aircraft engine.

Another object of the invention is to provide a disconnectible lead assembly of the type set forth, which may be easily and quickly connected to electrical components for forming electrical connection therebetween, and which may be easily and quickly installed or removed and replaced by another similar lead.

Another object is to provide new and improved terminals for a disconnectible lead of the type specified above, which terminals are integral with the lead and are adapted to make good electrical contact with the members to which they are connected.

Another object is to provide new and improved radio-shielded electrical leads of the type set forth.

Another object is to provide a new and improved radio-shielded lead having integral disconnectible terminals on both ends thereof.

Other objects and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawings. It will be understood that many changes may be made in the details of construction and arrangement of parts without departing from the spirit of the invention as expressed in the accompanying claims. We, therefore, do not wish to be limited to exact details shown and described, as the preferred form has been shown by way of illustration only.

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Referring to the drawing:

Fig. 1 is a side view, partly in section, of a lead connector formed according to the invention; Fig. 2 is a side view of the contact member of the terminal; Fig. 3 is an end view of the contact member shown in Fig. 2; and Fig. 4 is a sectional view through the terminal.

Referring more particularly to the drawings wherein similar reference characters designate corresponding parts throughout the several views, the invention is shown, for the purpose of illustration, applied to a lead connector for connecting a capacity discharge gap and a spark plug of an aircraft engine. In the drawings, 10 designates the housing for the capacity discharge gap only part of which is shown, and which includes a glass envelope or container 11 containing an electrode 12 and the shield 13 which are mounted on the stem 14 which has a portion 15 extending through the container to form an electrical connection for the discharge gap.

Between the container 11 and the housing 10 is positioned the insulator 16 of rubber or Neoprene which acts both as a shock and high tension insulator for the discharge gap.

The lead comprises a wire having a core 17 over which is the covering 18. The wire runs through the braided flexible radio shielding conduit 19, which conduit has an end secured by soldering within the flared end 20 of the conventional spark plug metallic elbow 21, through which said wire also extends.

The elbow 21 has the steel fitting 22 secured to the end thereof by first press-fitting the parts in telescoping relation and then silver-soldering the parts together by induction. The nut 23 has a portion in telescoping relation with the fitting 22 and has the flange 24 adapted to engage the flange 25 on the fitting 22 when the threaded portion of the nut is tightened in threaded engagement with the object to which the lead is to be connected such as a spark plug connection.

At its opposite end the conduit 19 is secured by solder or the like to the brass ferrule 26 which is held in position in the end 27 of the housing 10 by the harness nut 28 which is in telescoping engagement therewith with its end engaging the flange 29 on the ferrule 26. Flange 29 engages a flange 30 on the housing 10 and the harness nut 28 has an external threaded portion adapted to engage a threaded portion on the housing 10 to retain the members in assembled relation.

Within the conduit 19 and elbow 21 is positioned the lead which consists of the core 17 having the insulating covering 18. To each end of

the lead are secured the terminals 32 and 33, and the ends of the lead and the terminals are each enclosed in the insulators 34 and 35 respectively, which insulators are preferably of rubber, rubber-like or other suitable insulating material and are molded to such form as to enclose all of the terminal but the opening necessary for making connection.

The terminals 32 and 33 each comprise an outer shell consisting of the integral cylindrical portion 36 and cap portion 37 connected by the integral reduced open throat 38. The cap portion 37 has its outer end 39 flared to receive the end of the lead and, as shown in Fig. 1, the cap portion 37 is crimped on the lead with the forward end 40 of the core of the lead extending into the open throat 38 and secured therein by soldering or the like. The crimping of the cap member 37 on the lead covering 31 serves to relieve the solder connection of any strain and prevents breaking off of the lead at the soldered connection. Within the cap portion 37 is positioned the spring terminal member 41 which may be made of beryllium copper and which may be formed by blanking from a strip and then bending to proper shape and comprises the portions 42 adapted to be placed in telescoping relation with the cylindrical portion 36 and to be secured thereto by soldering through the opening 43 in the portion 36.

The integral spring contact member 44 is formed integral with and internally of the portions 42, and is adapted to receive the contact pin or rod such as the rod 15 on the spark gap, for positive electrical connection therewith. Before the spring terminal member 41 is positioned within the cylindrical portion 36, the coil spring 45 is placed therein surrounding the spring contact member 44 to compress the inner spring member into engagement with the contact pin or rod as hereinabove described.

The lead with the integral connections at its opposite ends forms a complete lead assembly which may be easily and quickly installed in the ignition system or disconnected therefrom.

From the foregoing it will be seen that we have provided relatively simple, efficient and economical means for obtaining all of the objects and advantages of the invention.

Having described our invention, we claim:

1. A terminal adapted to be connected to an electrical conductor for detachably connecting said conductor to an electrical component, said terminal comprising a tubular member having a contact portion and a connecting portion, said portions being connected by an integral reduced throat portion, said connecting portion being adapted to receive the end of the electrical conductor and be connected thereto and a contact member in said contact portion, said contact member having a hollow contact portion having slotted sides and adapted to receive a contact of an electrical component therebetween and a coil spring surrounding said hollow contact portion and normally compressing said sides toward said contact for retaining the same in resilient contact with said contact on the electrical component.

2. A terminal adapted to be connected to an electrical conductor for detachably connecting said conductor to an electrical component, said terminal comprising a tubular member having a contact portion and a connecting portion, said portions being connected by an integral reduced throat portion, said connecting portion being adapted to receive the end of the electrical conductor and be connected thereto and a contact member in said contact portion, said contact member having a hollow contact portion comprising a plurality of spaced walled portions adapted to receive a contact of an electrical component therebetween and a coil spring surrounding said spaced walled portions of said hollow contact portion for normally compressing said sections toward said contact for retaining the same in resilient contact with the contact on the electrical component and means for securing said contact member within said contact portion of said tubular member.

3. A terminal adapted to be connected to an electrical conductor for detachably connecting said conductor to an electrical component, said terminal comprising a tubular member having a contact portion and a connecting portion, said portions being connected by an integral hollow reduced throat portion adapted to receive the end of the core of the electrical conductor, said connecting portion being adapted to receive the end of the insulated portion of the electrical conductor and be connected thereto and a contact member in said contact portion, said contact member having a hollow contact portion adapted to receive a contact of an electrical component and a coil spring surrounding said hollow contact portion for retaining the same in resilient contact with the contact on the electrical component and an opening through said contact portion and solder in said opening for securing said contact member in position within said contact portion of said tubular member.

4. A terminal adapted to be connected to an electrical conductor for detachably connecting said conductor to an electrical component, said terminal comprising a tubular member having a contact portion and a connecting portion, said portions being connected by an integral hollow reduced throat portion adapted to receive the end of the core of the electrical conductor, said connecting portion being adapted to receive the end of the insulated portion of said electrical conductor and be connected thereto and a contact member in said contact portion, said contact member having a hollow contact portion adapted to receive a contact of an electrical component and a coil spring surrounding said hollow contact portion for retaining the same in resilient contact with the contact on the elecrical component, said contact member comprising a strip member formed with a hollow integral intermediate contact portion.

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