Jan. 21, 1969 C. A. CEA 3,423,718

TERMINAL WITH NAIL LANCE AND SUPPORT MEMBER THEREFOR

Filed Jan. 13, 1967 Sheet 1 of 2

FIG. 1

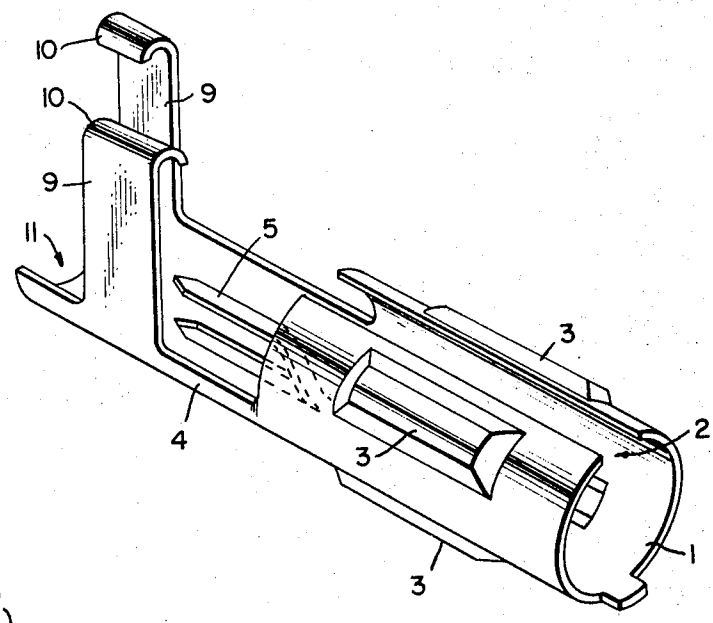


FIG. 2

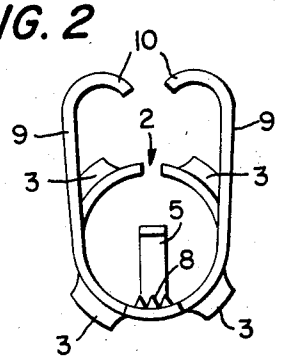
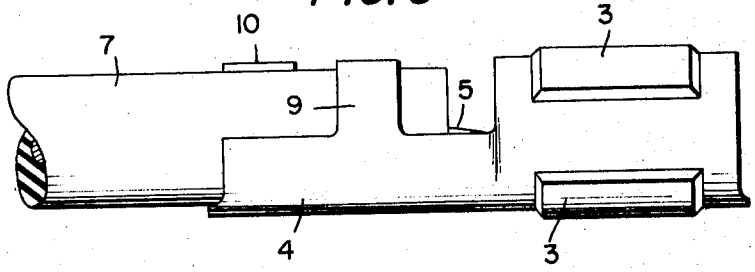


FIG. 3



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FIG. 4

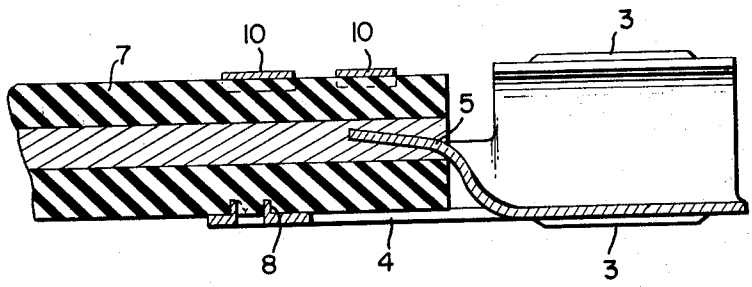


FIG. 5

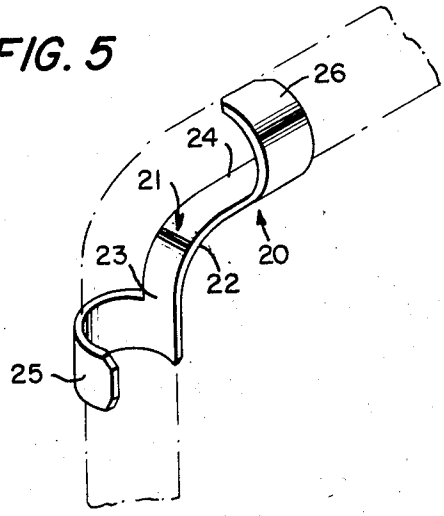
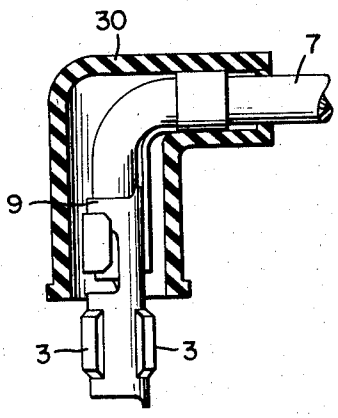


FIG. 6



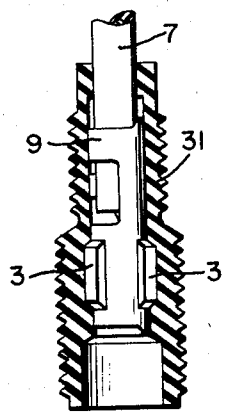


FIG. 7

United States Patent Office 3,423,718 Patented Jan. 21, 1969

3,423,718

TERMINAL WITH NAIL LANCE AND SUPPORT MEMBER THEREFOR

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Filed Jan. 13, 1967, Ser. No. 609,046
2 Claims
U.S. Cl. 339—100
Int. Cl. H01r 11/20, 15/12

ABSTRACT OF THE DISCLOSURE

The disclosure relates to a terminal having a generally cylindrical hollow contact end portion with an open seam which constitutes a spring means. A series of equidistantly spaced lugs are formed about the contact end for making intimate contact with an associated contact element. A contact or nail lance projects upwardly at a slight angle from the floor of the terminal to pierce the center conductor of a cable secured to the connector. The other end of the terminal has upstanding side walls with the ends thereof curled inwardly to form tabs for gripping cable insulation. These side walls are utilized with a crimping device for crimping to the cable insulation. An insulation gripping means is formed in the wire barrel directly adjacent one of the upstanding side walls, the nail lance constituting a gripping member which pierces and subsequently grips cable insulation during the crimping operation. A support member for the terminal provides a predetermined amount of bend in a wire connected to the terminal.

This invention relates to a terminal with a contact or nail lance for use with spark plugs, distributors and the like and for a support member for attachment thereto and for providing bends of predetermined amounts in wires emanating from the terminal. More specifically, the invention relates to a terminal for use with spark plugs, distributors, coils and the like which is capable of making connection by fitting over a contact member to which it is connected as well as fitting within a contact member to which it is connected. The invention also provides for the easy application of a permanent bend of predetermined angle to wires passing from the terminal, preferably of about ninety degrees, by the use of a simple clip-on support member on the terminal.

Terminal members for connection over the contact members of spark plugs and within the contact member of a distributor have individually been well known in the art. However, such terminal members have not been interchangeable in that terminals which were used for spark plugs could not be used for distributors and vice-versa. This requires that a retailer stock two different types of terminals with the inherent additional cost due to increased inventory.

The prior art has also disclosed devices for providing bends of ninety degrees or of other angles to wires directly above their point of connection to a terminal. Such wire bending devices or support members have normally been formed as an integral part of the terminal member or have required complex operations for proper attachment to the wire or terminal member.

In accordance with the present invention, the above mentioned infirmities of the prior art are overcome and a single terminal member is provided which is capable of connection to contact members by acting as either the male or the female member of a connection, as may be required. In addition, there is provided a simple and easily installed support member for the wires emanating from the terminal for providing a bend thereto of approximately ninety degrees.

Briefly, the terminal in accordance with the present invention has a generally cylindrical hollow contact end portion with an open seam which constitutes a spring means. The hollow contact end interior forms a female connection member. A series of equidistantly spaced lugs are formed about the contact end for making intimate contact with an associated contact element of a distributor cap, spark plug, etc., as the male member of the connection. A contact or nail lance projects upwardly at a slight angle from the floor of the terminal and is adapted to pierce the center conductor of an ignition cable or other insulated wire which is secured to the connector. The other end of the terminal, which is the wire barrel end thereof, has upstanding side walls with the ends thereof curled inwardly to form tabs for gripping cable insulation. These side walls are utilized with a crimping device for crimping to the cable insulation. An insulation gripping means is formed in the wire barrel directly adjacent one of the upstanding side walls, the gripping means constituting a gripping member which pierces and subsequently grips cable insulation during the crimping operation.

The support member for the terminal provides a predetermined amount of bend in a wire connected to the terminal. The support is made from sheet metal and is stamped out from a rectangular section of metal having finger portions extending from the ends of the rectangular section in opposite directions. The rectangular section is provided with a bend of arcuate shape at the center thereof of about ninety degrees and the finger portions extending normal to the rectangular portion are curved to form a portion of a cylinder. The support is utilized for providing ninety degree or other angular bends to wires extending from the terminal by supporting the wires along the rectangular section with the finger portions.

It is therefore an object of this invention to provide a terminal which is economical and which is capable of being used as either the male or the female member in a connection.

It is a further object of this invention to provide a terminal having a contact or nail lance projecting upwardly at a slight angle relative to the axis of a conductor to be secured thereto to provide good contact to the conductor.

It is a further object of this invention to provide a connector terminal having upstanding side walls which curl inwardly at their upper end to provide better and stronger gripping between terminal and cable during crimping operations.

It is a still further object of this invention to provide a support member for attachment to the terminal and the insulation of a wire emanating therefrom for providing an angular bend in the conductor of predetermined amount.

It is a yet further object of this invention to provide a support member for terminals which is inexpensive to manufacture, easily mounted and easily removed.

The above objects and still further objects of this invention will become apparent to those skilled in the art when considered in view of the following specification and drawings of preferred embodiments of the invention which are provided by way of example and not by way of limitation, wherein:

FIGURE 1 is an elevational view of a terminal in accordance with the present invention;

FIGURE 2 is an end view of the terminal in accordance with the present invention;

FIGURE 3 is a side view of the terminal in accordance with the present invention with a wire secured therein;

FIGURE 4 is a cross-section of the view of FIGURE 3;

FIGURE 5 is an elevational view of a support member in accordance with the present invention;

FIGURE 6 is an elevational view of the terminal member and the support member in accordance with the present invention utilized for connection to a distributor; and

FIGURE 7 is an elevational view of the terminal member in accordance with the present invention utilized for connection to a spark plug.

Referring now to FIGURES 1 to 4, there is shown a preferred embodiment of the terminal in accordance with the present invention which may be used as a spark plug contact, a distributor contact, a coil contact, etc. The terminal is generally a barrel or cylindrical in shape and includes a generally cylindrical contact end **1** with an open seam **2** extending therethrough to provide a spring action to the cylindrical portion **1** for contact with a mating connector member. The cylindrical contact end **1** includes a plurality of equidistantly spaced lugs **3** which extend coaxially with the axis of the cylindrical portion and are provided for making intimate contact with an associated female contact member such as a distributor cap or coil. The remaining portion of the terminal **4**, which is forward of the generally cylindrical contact end **1**, is also of cylindrical shape, but is in the form of a half cylinder and includes a contact or nail lance **5** which is cut from the bottom portion of the terminal and extends upwardly from the floor thereof at an angle of approximately seven degrees. An insulation gripping means such as barbs **8** (shown in FIGURE 2) also projects upwardly from the floor of the terminal and is provided for gripping the insulation of conductors positioned therein after the crimping operation (to be explained hereinbelow). The terminal also includes a pair of upwardly extending and offset tabs **9** with an inwardly curving upper portion **10** for gripping cable insulation.

In an alternative embodiment (not shown), the contact or nail lance **5** will have a gradual taper toward the point thereof rather than forming an abrupt point as shown in FIGURE 1. In addition, the diameter of the cylindrical member will be greater at the region **4** than at the region **1**.

The terminal is utilized by entering a conductor with insulation into the terminal as shown by the arrow **11** in FIGURE 1 so that the contact or nail lance **5** pierces the insulation and makes contact with the conductor as shown in FIGURE 4. The slight angle of the contact or nail lance makes it easier for the lance to enter a cable. The taper of the contact lance toward the tip thereof helps to make a better contact by spreading the center conductor. After the wire **6** with insulation **7** has been forced into the terminal and the contact lance **5** has made proper contact to the wire **6**, a crimping operation, which is well known in the art, is performed. The tabs **9** are thereby forced inwardly around the wire insulation **7** to force the insulation downward in the terminal member and against the insulation gripping means **8** as shown in FIGURES 3 and 4. The combination of the gripping means **8** and the crimped tabs **9** secure the wire and insulation in place in the terminal.

Referring now to FIGURE 5, there is shown a support member in accordance with the present invention. The support member **20** is formed from sheet metal and includes a rectangular or substantially rectangular portion **21** having an arcuate bend at its center portion **22** of approximately ninety degrees so that the end portions **23** and **24** of the rectangular portion **21** extend in a direction normal to each other. The end portion **23** has integral therewith a normally extending semicylindrical member **25** and the end portion **24** of the rectangular section includes an outwardly extending semicylindrical member **26** positioned normal thereto but in a direction opposite to the semicylindrical member **25**.

The support member of FIGURE 4 can be used separately or preferably in conjunction with terminal of FIGURES 1 to 4 wherein the semicylindrical portion **25** is positioned over the tabs **9** of the terminal as shown in FIGURE 6 by simple manual pressure. The wire and insulation **27** are then bent at an angle of approximately ninety degrees to follow along the rectangular section **21** and are positioned within the semicylindrical portion **26** and held in place at an angle normal to the wire and insulation extending to the terminal **12**.

FIGURE 6, as stated hereinabove, shows the combined use of the terminal in accordance with the present invention, when used in conjunction with the support member in accordance with the present invention. FIGURE 6 shows the terminal being used with a distributor where it would be used as the male portion of the connection. The terminal includes an outer insulating sleeve **30**.

FIGURE 7 shows the terminal of the present invention used as a female connection member for connection to a spark plug. The terminal includes an outer insulating sleeve **31**.

Though the invention has been described with respect to specific preferred embodiments thereof, many variations and modifications will immediately become apparent to those skilled in the art. It is therefore the intention that the appended claims be interpreted as broadly as possible to include all such variations and modifications.

What is claimed is:

1. A terminal comprising a split tubular barrel, a semitubular extension extending from one end of the barrel, projections extending from the outer surface of the barrel for engagement with a female connector, a tab integral with and extending from each edge of the semitubular extension and being spaced unequal distances from the barrel, the distance of one tab from the barrel being greater than the distance of the other tab from the barrel by an amount greater than the width of said other tab, a lance struck from said semitubular extension and having a penetrating portion extending along the axis of said extension for penetration into a conductor, and penetrating barbs struck from said semitubular extension for penetration into the insulation of a conductor, said lance extending to the tab nearest the barrel and the barbs lying within the longitudinal extent of the tab remote from the barrel.

2. A device as defined in claim **1** wherein the free ends of the tabs are curved to provide portions for penetrating into the insulation of a conductor.

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U.S. Cl. X.R.

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