Dec. 22, 1925. 1,566,465

A. CHAMPION

TERMINAL CONNECTER FOR SPARK PLUGS

Filed May 18, 1921

Fig. 2.

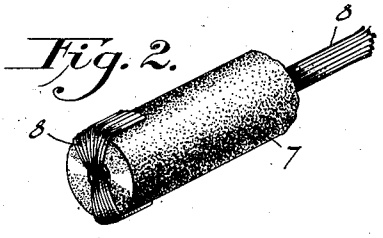


Fig. 1.

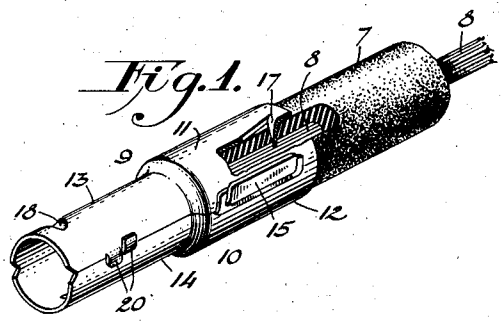
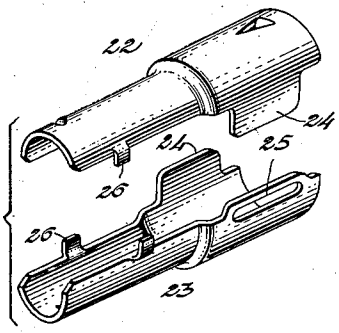


Fig. 5.



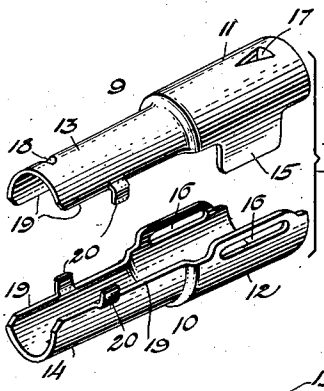


Fig. 3.

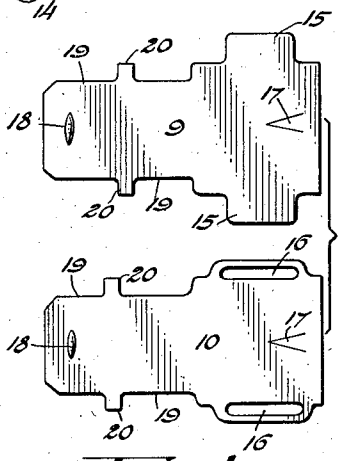


Fig. 4.

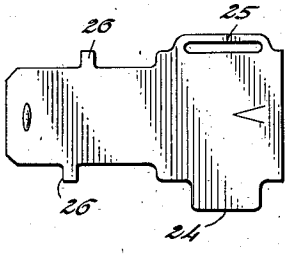


Fig. 6.

Inventor
Albert Champion
By His Attorneys
Blackmore, Spencer & Flint

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UNITED STATES PATENT OFFICE.

ALBERT CHAMPION, OF FLINT, MICHIGAN, ASSIGNOR TO A C SPARK PLUG COMPANY, OF FLINT, MICHIGAN, A CORPORATION OF MICHIGAN.

TERMINAL CONNECTER FOR SPARK PLUGS.

Application filed May 18, 1921. Serial No. 470,575.

To all whom it may concern:

Be it known that I, ALBERT CHAMPION, a citizen of the French Republic, and a resident of Flint, county of Genesee, and State of Michigan, have invented certain new and useful Improvements in Terminal Connecters for Spark Plugs, of which the following is a full, clear, concise, and exact description, such as will enable others skilled in the art to which the invention relates to make and use the same, reference being made therein to the accompanying drawings, which form a part of this specification.

My invention relates to terminal connecters employed in ignition systems for internal combustion engines for attaching the ends of the electrical conductors or cables to the spark plugs of the system; and the principal object of my invention is to provide an improved form of terminal connecter made up of two co-operating parts or members similar in form with one another, and in which the insulating covering of the conductor is clasped between adjacent ends of said members and held in place relative to said ends.

A further object of my invention is to provide an improved terminal connecter for use in the ignition systems of internal combustion engines in which the resiliency of the insulating covering of the leading-in conductor acts to impart resiliency to the connecter as a whole and to force the parts thereof toward one another; the resiliency of the covering which is commonly made of rubber acting to yieldably prevent the separation of the parts of the connecter, and hold the same in place relative to the spark plug when the connecter is in use.

A further object of my invention is to provide an improved terminal connecter made up of two sheet metal members semi-circular in cross-section and similar in form with one another and which members may be formed from suitably shaped blanks cut out from sheets of metal by the use of suitable punches and dies, and the members then bent into proper form to permit their being assembled with and secured to an end of a leading-in conductor.

With the above and other objects of invention in view, my invention consists in the improved terminal connecter illustrated in the accompanying drawing and hereinafter described and claimed; it being appreciated, however, that the same may be variously modified and that my invention includes all such modifications of the particular form thereof illustrated in the accompanying drawing as come within the scope of the concluding claims.

Referring to the drawing wherein the preferred embodiment of my invention is illustrated;

Figure 1 is a view showing a leading-in conductor equipped with a terminal connecter made in accordance with my invention, the view being in perspective.

Figure 2 is a similar view showing the conductor by itself and the manner in which the stranded conducting core thereof is spread out and bent back over the insulating covering prior to the assembling of the connecter and the electrical conductor.

Figure 3 is a view showing the two members which together form my improved connecter separate from one another.

Figure 4 is a view showing the two blanks from which the connecter members shown in Figure 3 are formed.

Figure 5 is a view showing a connecter made in accordance with my invention and in which both the members thereof are made from blanks of one form.

Figure 6 is a view showing one of the blanks from which the connecting members shown in Figure 5 are formed.

Referring now to the drawing, the reference numeral 7 designates one end of a leading-in conductor such as is used in internal combustion engine ignition systems for conducting the high tension current from the distributor of the system to the spark plugs of the several cylinders of the engine thereof, the same having an outer insulating covering made of rubber or equivalent material and which is of considerable thickness to secure the requisite insulation for the high tension current employed, and the conducting core of which commonly comprises a plurality of comparatively fine wires as shown at 8 in Figure 2 to thereby secure flexibility while at the same time securing sufficient current carrying capacity.

My improved connecter is made up of two elongated members 9, 10 semi-circular in cross-section, and the inner ends 11, 12 of which clasp the insulating covering of the leading-in conductor, said clasping ends being preferably made larger than the free

outer ends 13, 14 of said members; so that the inner sleeve portion formed by the assembled members is of greater diameter than the outer portion which fits over the free outer end of the inner or insulated electrode of the plug. The terminal member 9 is shown as provided with oppositely disposed tongues 15 which pass through loops 16 of the member 10 after the blanks shown in Figure 4 have been bent into semi-cylindrical form and the tongues and loops so shaped as to engage one another; after which the free ends of the tongues are bent about the outer bars of the loops, as best shown in Figure 1, to thereby secure the terminal members together.

The terminal members shown in Figure 3 are assembled with one another by the use of a suitable press, or otherwise; and the diameter of the cylindrical portion formed by the inner ends of said members is such that the end of the conductor 7, which is placed between the members before they are secured together, is clasped firmly between said members when they are forced together, and is held in place between said inner ends under compression; from which it follows that the resiliency of the insulating covering of the conductor acts to hold said free ends in engagement, as shown in Figure 1, when the parts are assembled. When the cylindrical portion of the terminal made up of the semi-circular portions 13, 14 is slipped over the outer end of a spark plug electrode said inner ends will separate slightly from one another; such movement being permitted by the resiliency of the insulating covering of the conductor 7 which is clasped and held in a state of compression between the clasping portions 11, 12 and the connecting members.

It therefore follows that the resiliency of the connecter as a whole is imparted thereto by the insulating covering of the leading-in conductors, thus providing a yieldable terminal connecter in which no spring is provided to secure the resiliency of the parts, and in which the parts which go to form the connecter need not be resilient to any considerable degree.

The semi-cylindrical portions 11, 12 of the elements which together form the connecter are preferably provided with spurs at 17 which are cut free from the sheet metal blank and forced inwardly into the body of the insulating covering during the assembling of the parts to thereby more firmly hold the connecter in place upon the end of the conductor; and the tubular portion formed by the semi-cylindrical portions 13, 14 is preferably provided with inwardly extending projections or humps 18 which commonly engage a knob or ridge at the outer end of the spark plug electrode, to thereby more certainly prevent the pulling off of the connecter from the electrode and the interruption of the supply of current to the engine.

The abutting free edges 19 of the free end of the connecter members are preferably provided with projecting lugs 20 offset slightly from the exterior surface of the said members so that when the members are assembled each lug of one member will overlie the adjacent side edge of the other member, as best shown in Figure 1, to thereby prevent sidewise movement of the free ends of the connecter. This, however, is a feature not always necessary as the resiliency of the insulating covering of the leading-in conductor will, if the parts are properly and carefully assembled, hold the free inner ends of the connecter members in proper position opposite one another. Inasmuch, however, as the assembling of the parts might result in the free ends of the members standing off-set relative to one another, I prefer to provide the lugs in question; in order that said free ends will be held in registry with one another, and a cylinder opening secured and maintained for the reception of the spark plug terminal and a better appearing connecter thus provided.

Before the parts 9, 10 are assembled to provide a complete connecter the conducting wire or wires of the conductor 7 are spread apart and bent back over the exterior surface of the insulation thereof so that when the connecter members are put in place and pressed together and secured in their final position an electrical contact will be established between the conducting wire core and the terminal members.

The two parts or members which form my improved connecter are preferably made from sheet metal blanks cut out, as by the use of suitable punches and dies, in substantially the form illustrated in Figure 4, after which the blanks are bent into the semi-cylindrical form illustrated in Figure 3 by the use of suitable bending dies. These bending dies may simultaneously provide the enlarged portions 11, 12; altho as hereinbefore stated the enlarged portions are not an essential feature of my invention, and the terminal connecter may if desired be of uniform diameter throughout.

In the form of my improved connecter shown in Figures 1 and 2 the parts thereof are similar in form, but not absolutely identical, the making of the connecter requiring two pairs of dies and punches to produce blanks of the form shown in Figure 4 which differ one from another in that two tongues are provided upon one blank and two loops upon the other.

In the form of my invention shown in Figure 5 the tubular connecter is made up of two elements or parts 22, 23 which are identical in form one with the other and

each of which has a tongue 24, which extends through a loop 25 in the other member; so that two blanks of the form shown in Figure 6 and which are identical one with the other may be used in the manufacture of the connecter. In this form of connecter the lugs 26 are present at the free meeting edges of the members 22, 23; each lug being off-set somewhat so that when the parts are assembled it will overlie the abutting edge of the other member, to thereby hold the free ends of the connecter members in registry with one another and provide a circular opening to fit over a spark plug electrode when the connecter is in use.

Having thus described and explained my invention, I claim and desire to secure by Letters Patent:

1. A terminal connecter comprising two similar elongated members semi-circular in cross-section so as to together form a tube; fastening elements disposed adjacent one end of each member at the free edge thereof, and which elements are adapted to engage one another to thereby secure said members together; and a lug extending from a side edge of each of said members and located adjacent the other end thereof, and which lug is adapted to engage the adjacent side edge of the other member to thereby prevent sidewise movement of said members.

2. A terminal connecter comprising two similar elongated members semi-circular in cross-section so as to together form a tube; co-operating pairs of fastening elements located upon abutting edges of said members and adjacent one end of the connecter formed when said members are assembled, and which fastening elements engage with one another to thereby secure said members together; and means located adjacent the ends of said elongated members remote from the ends at which said pairs of fastening members are located for preventing sidewise movement of said members.

3. A terminal connecter tubular in form and made up of two elongated members semi-circular in cross-section; means located adjacent one end of said members and whereby said members may be secured together; an electrical conductor having a resilient insulating covering clasped by the ends aforesaid of said members, and the conducting wire of which conductor contacts with said connecter; and means located adjacent the free end of said connector for preventing sidewise movement of the members thereof relative to one another.

4. A terminal connecter tubular in form and made up of two elongated members of like form and semi-circular in cross-section; means located adjacent one end of said members and whereby said members may be secured together; an electrical conductor having a resilient insulating covering extending into the tubular connecter at the end at which the members thereof are secured together, and the conducting wire of which conductor contacts with said connecter; spurs extending from the members of said connecter inward and into the insulating covering thereof; and lugs located adjacent the free end of said connecter and extending from each side edge of each member thereof over the abutting side edge of the other member to thereby prevent sidewise movement of said members relative to one another.

In testimony whereof I affix my signature.

ALBERT CHAMPION.