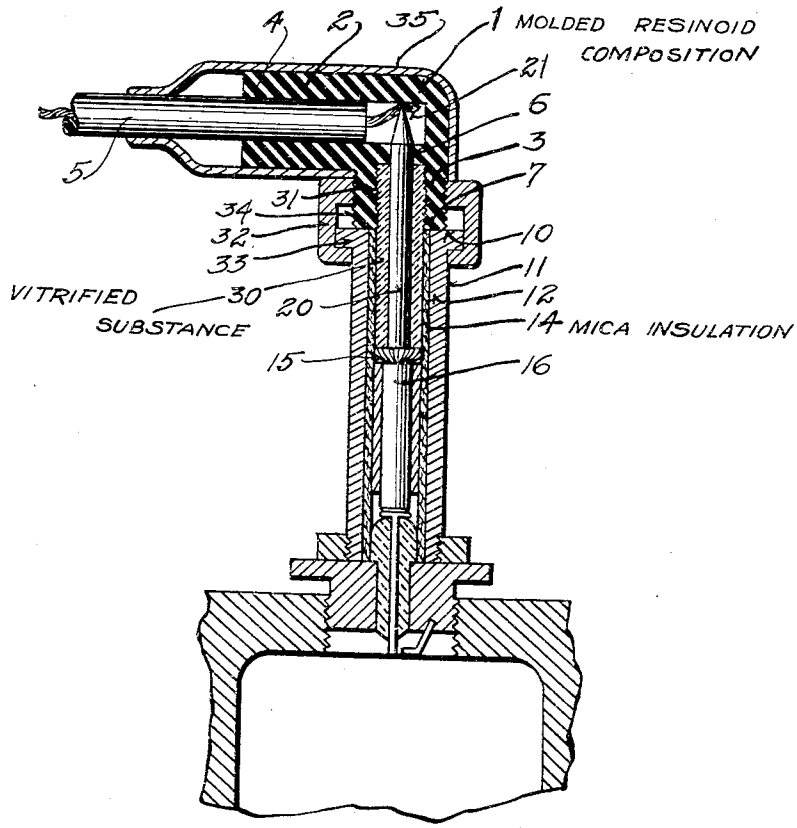
July 16, 1935. C. W. BLOUNT 2,008,573

ELECTRICAL CONNECTER

Filed June 8, 1929



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UNITED STATES PATENT OFFICE

2,008,573

ELECTRICAL CONNECTER

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Application June 8, 1929, Serial No. 369,305

2 Claims. (Cl. 173—269)

This invention relates to connecters establishing contacts between conductors or cable ends and electrical apparatus for the transmission of electrical currents. The invention is hereinafter set forth in its application to high tension leads to the spark plugs of an internal combustion, particularly an airplane motor, but it is to be understood that it is of general application commensurate with the scope of the appended claims.

A number of problems arise in connection with supplying of current to the spark plugs of an engine. For instance a mechanically strong connection is required that will not loosen or break on account of the vibrations. Again as the current is supplied under voltages of over 20,000, it is highly desirable that the contact be insulated in such a manner as to prevent dissipation through leakage paths; such insulation is more particularly required when the spark plugs are shielded to overcome interference with the reception and sending of radio. Another factor that must generally be taken into consideration is the limited space available for making the connection. There is furthermore the relatively high temperature caused by the release of heat during the engine operation, which may be as high as 350° to 375° F. at the outer end of the spark plug.

A construction that has been proposed for a spark plug connecter comprises an insulating elbow, one arm of the elbow contacting a spark plug and enclosing a conductor from the spark plug and the other arm enclosing a cable lead. As the spark plug is provided with a metal shell which is grounded, a short air-gap from the conductor to the shell is present if the elbow rests upon the upper surface of the plug. Such an air gap is obviated by extending the insulating elbow into the spark plug since a material of high insulating value, such as mica, lines the interior of the spark plug shell. The elbow is preferably molded from a synthetic phenolic resinoid composition, that is, a composition including as a binder a product obtained in the reaction of a phenol and formaldehyde or equivalent methylene-containing agent and characterized by a transformation from an initial fusible and reactive state to a final infusible one upon heating. These phenolic resinoid compositions in their final reacted condition have a good mechanical strength and are highly desirable as electrical insulation; but, while they are infusible and do not soften under high temperatures, their loss in strength and electrical properties at the high temperatures that are apt to be present is found objectionable.

According to the present invention this disadvantage of the prior construction is overcome by substituting a vitrified inorganic substance, as porcelain, for the extension of the connecter while the phenolic resinoid composition is retained for the remainder of the elbow structure, thus combining the mechanical strength and other properties of the resinoid for the exterior exposed portion of the connecter and the insulating property at high temperatures for the inclosed protected portion.

In the accompanying drawing the figure is a vertical cross section through a connecter and the outer end of a shielded spark plug.

The connecter as illustrated comprises a hollow member 1 with arms 2 and 3 and molded preferably from a composition consisting of a phenolic resinoid and a finely sub-divided filler which may be wood flour, asbestos, mica or other suitable material. The arm 2 is provided with a passage 4 large enough to receive the end of an insulated cable 5, and the other arm 3 likewise has a passage 6 opening into the passage 4.

The end surface 7 of the arm 3 is intended to contact the exposed end 10 of a spark plug 11. The spark plug is made with a metal shield or shell 12 which is grounded but also acts to prevent high tension radiation affecting the reception and transmission of radio waves; this shell encloses an annular mica insulation 14, forming a cylindrical depression 15 in the upper or exposed end of the spark plug.

A central contact 16 is provided at the bottom of the depression of the spark plug for a conductive element 20, or the conductive element can be made integral with the contact. This conductive element projects from the depression and is long enough to extend through the passage 6 of the connecter and to firmly grip the exposed conductor end 21 of the lead-in cable 5 against the wall of the passage in the arm 2 when the connecter or elbow is seated on the surface 13 of the plug.

As shown, the insulation forming the extension is a porcelain tube 30 about the conductive element 20 fitting into the cylindrical depression 15 of the spark plug and into the elbow. The contact 31 with the elbow is corrugated, made helical or otherwise formed to give an enlarged surface contact. By this arrangement a double function is provided: an adequate grip on the porcelain is afforded the resinoid insulation of the elbow, and the surface is greatly extended thus providing a greatly increased leakage path from the element 20 to the shell 12. The so-

increased leakage path permits a material reduction in the length of the porcelain tube and adapts it for limited spaces.

The elbow can be secured to the spark plug by any suitable clamping means. That illustrated is the ordinary pipe union consisting of the swivel nut **32** held in place by a flange **33** on the spark plug and engaging screw threads **34** on the elbow. The elbow is preferably covered with a shielding **35** made of woven wire or other suitable material.

I claim:

1. A connecter for establishing contact between an electrical conductor and electrical apparatus having a depression in its contact surface and a conductive element extending through and projecting from the depression comprising in combination a shielded insulating member molded from a resinoid composition and enclosing the conductor at one end, insulation formed from a vitrified substance projecting from the other end of said member and conformed to fit the depression in the apparatus, and clamping means external of said members for securing intimate contact between said conductive element and the conductor end.

2. A connecter for establishing contact between an electrical conductor and electrical apparatus having a depression in its contact surface and a conductive element extending through and projecting from the depression comprising in combination an insulating member molded from a phenolic resinoid composition enclosing the conductor at one end, a hollow porcelain insulation extending from the other end of said member into the depression and about the conductive element, the contacting surfaces of said member and said insulation having a sinuous conformation, and clamping means external of said member for securing intimate contact between said conductive element and the conductor end.

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