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2,767,384

QUICK CONNECTOR

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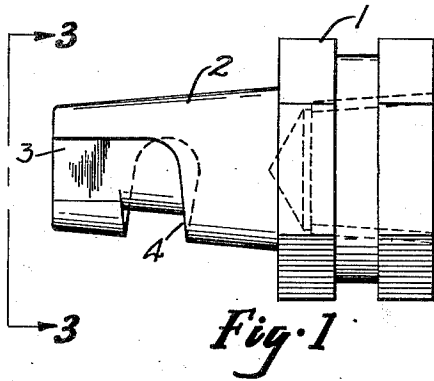


Fig. 1

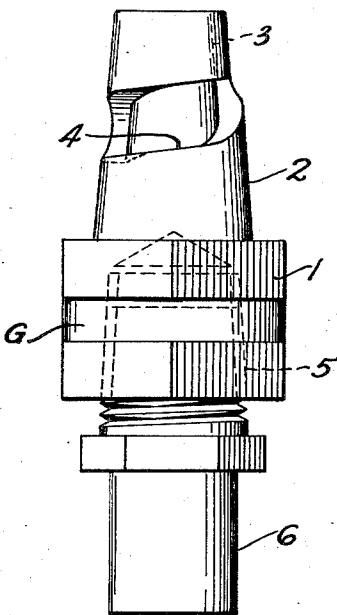


Fig. 2

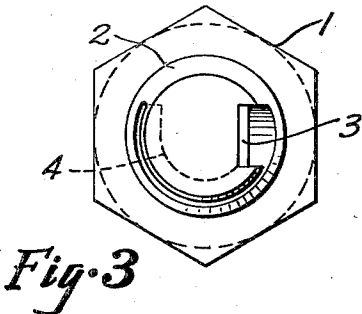


Fig. 3

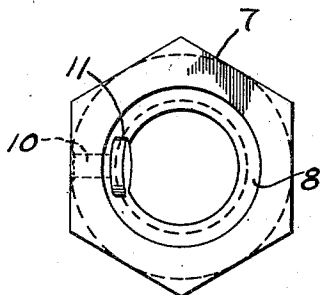


Fig. 5

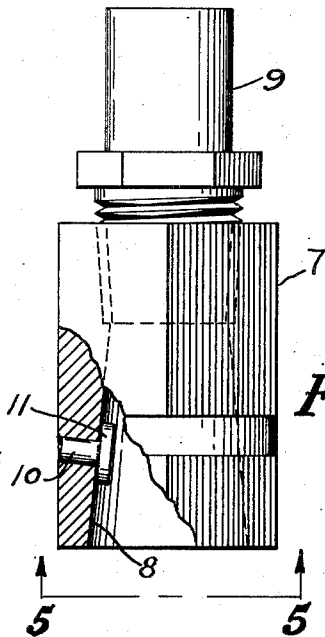


Fig. 4

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2,767,384

QUICK CONNECTOR

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2 Claims. (Cl. 339—270)

This invention relates as indicated to a novel quick connector, and more particularly to a connector for electrical cable such as welding cable.

Such electrical connections require frequently to be connected and disconnected so that a simple foolproof device is desirable for such purpose. Furthermore, since very large currents may be transmitted, it is important that good electrical conductivity be ensured at the connection and that such connection should not tend to loosen under tension or when subjected to abuse as when a welder drags the cable around behind him.

It is accordingly a principal object of my invention to provide a quick connector for electric cable which has a positive locking action affording excellent electrical contact.

A further object is to provide such connector which will not "freeze" in use but can always readily be taken apart when desired.

Still another object is to provide such connector which will stand a great deal of abuse and has no parts which are readily deformable or subject to excessive wear.

Other objects of my invention will appear as the description proceeds.

To the accomplishment of the foregoing and related ends, said invention then comprises the features herein-after fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

Fig. 1 is a side view of one element of my new connector;

Fig. 2 is a side view similar to Fig. 1 but rotated 90° about the axis of the connector;

Fig. 3 is an end view of such connector element;

Fig. 4 is a side view of the cooperating connector element adapted to interengage with said first element; and

Fig. 5 is an end view of such Fig. 4 element.

Referring now more particularly to said drawing, the male connector element may comprise a length of brass hex bar stock 1 having an axial tapered extension 2 extending therefrom. A circumferential groove G may be milled in the hex portion to facilitate manipulation, and if round bar stock is used this portion may be knurled. Milled in the outer peripheral surface of the conical extension 2 is a groove or slot extending generally axially in its outer end portion 3 and then turning into a slightly sloping cam portion 4. The other end of this element is drilled at 5 to afford means for permanently attaching a cable end thereto. Preferably such means may comprise a threaded stud 6 firmly screwed into the socket 5 and adapted to have the cable end cast welded thereto by means of molten copper produced by exothermic reaction in the general manner taught in Cadwell Patent 2,229,045. Other known methods for attaching the cable to the connector may, however, be employed.

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As shown in Figs. 4 and 5, the female element of the connector comprises a cylindrical or hex brass member 7 having a tapered inner opening 8 corresponding to conical extension 2 of member 1 but of slightly greater depth.

Such opening extends in cylindrical threaded form through to the other end of element 7 wherein a plug or stud member 9 similar to stud 6 may be inserted. A steel pin 10 is riveted in the side of member 7 with a circular head 11 protruding into conical inner opening 8 and adapted to fit reasonably snugly in cam slot 3, 4 of extension 2.

It will be seen from the foregoing that the two connector elements may be assembled and locked together by first inserting conical extension 2 into opening 8 with the head 11 of pin 10 entering cam slot portion 3 for relative axial movement of the elements. When such relative movement has progressed to a point where there is a loose fit of the parts, the pin head 11 enters the transversely sloping portion 4 of the cam track so that relative rotation of the elements now serves to draw conical extension 2 into firm engagement with the correspondingly tapered inner surface of opening 8. The degree of slope or taper of such extension and opening will preferably be about 5° relative to the axis, whereas the slope of cam track portion 4 will amount to approximately .104 inch with a 180° turn.

Due to the slope of such latter cam track and the fact that the cam 11 is circular or, more precisely, cylindrical in shape, when the parts are relatively rotated in the opposite direction there is very little tendency to stick, cam 11 making substantially a line contact with the side of cam track portion 4. It is accordingly very easy to separate the two interengaged elements of the connector when desired despite the fact that the 5° angle or taper of extension 2 and opening 8 is sufficiently small to constitute a "sticking" angle. The connector accordingly remains strongly assembled with excellent electrical contact despite rough handling but may nevertheless be separated through the application of relatively slight rotative force. The employment of the steel pin 10 (or other relatively hard metal) avoids appreciable wear or distortion of this important cam element, and the cylindrical surface of cam portion 11 prevents gouging of the cam track engaged thereby while at the same time facilitating relative rotation of the two connector elements into the tightest possible engagement.

It will be seen, accordingly, that I have provided a novel quick connector for electrical cable capable of affording excellent electrical contact and which will both withstand abuse in use and permit quick disconnection with the application of but little force and without danger of damage to the interengaged parts.

It is desirable that the helical pitch of the inner portion of the cam track be small to obtain the maximum mechanical advantage in connecting and disconnecting the elements as well as making accidental loosening of the parts in use unlikely. The size, shape, and composition of cam 11 prevent too firm a wedging action which might otherwise make separation of the parts very difficult. When the connector parts eventually become worn, they may be unscrewed from the studs bonded to the cable ends and replaced. With the male element 2 approximately one inch in length (a preferred size for practical purposes) the 5° taper will cause its surface to stick in engagement with the opposed female surface without, however, "freezing" in a manner to prevent separation through action of cam 11. Cam slot portion 4 will have a slope of from about 5° to about 9°, with 7° preferred, relative to a transverse plane normal to the longitudinal axis of the device to render cam 11 effective in thus drawing the surfaces into sticking engagement and thereafter separating the same.

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Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A quick connector for electrical cable comprising a male conductor made of brass and having a solid axial truncated conical extension tapering at an angle of approximately five degrees to the axis thereof, a cam groove in the outer surface of said extension which extends generally axially from its outer end and then helically inwardly at a small pitch, a female conductor likewise made of brass, an axial inwardly tapering opening in said female conductor which is slightly longer than the length of said extension of the male conductor, and a steel rivet in the side of said female conductor with a cylindrical head protruding into said opening of the same and adapted to fit said cam groove in the male conductor, said male and female conductors being first relatively reciprocated to bring the head of said rivet along said cam groove to the helical portion of the latter and then relatively rotated, whereupon the tapered surfaces of the conductors are drawn into close electrical and firm wedging engagement.

2. A quick connector for electrical cable comprising a male conductor having a solid axial truncated conical

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extension, a cam groove in the outer surface of said extension extending axially from its outer end and then helically inwardly at a small pitch, a female conductor, an axial inwardly tapering opening in said female conductor which is slightly longer than the length of said extension, the taper of said opening corresponding to that of said extension, and a cylindrical cam member protruding laterally into said opening from the side wall thereof and adapted to fit in said cam groove, said male and female conductors being first relatively reciprocated to bring said cam member along said cam groove to the helical portion of the latter and then relatively reciprocated, whereupon the tapered surfaces of the conductors are drawn into close electrical and firm wedging engagement, the angle of taper of said surfaces being selected to provide a sticking wedging action.

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