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RELEASABLE ELECTRICAL TERMINAL

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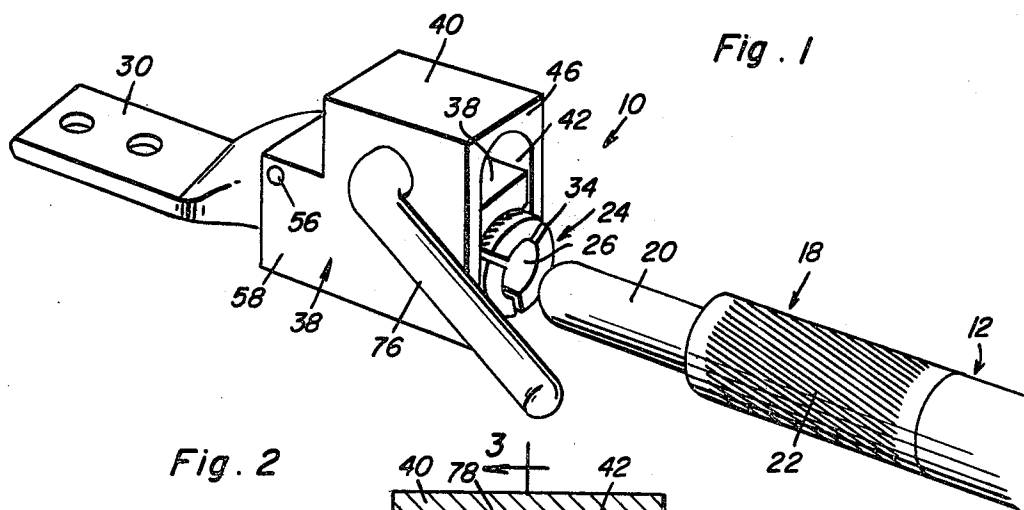


Fig. 2

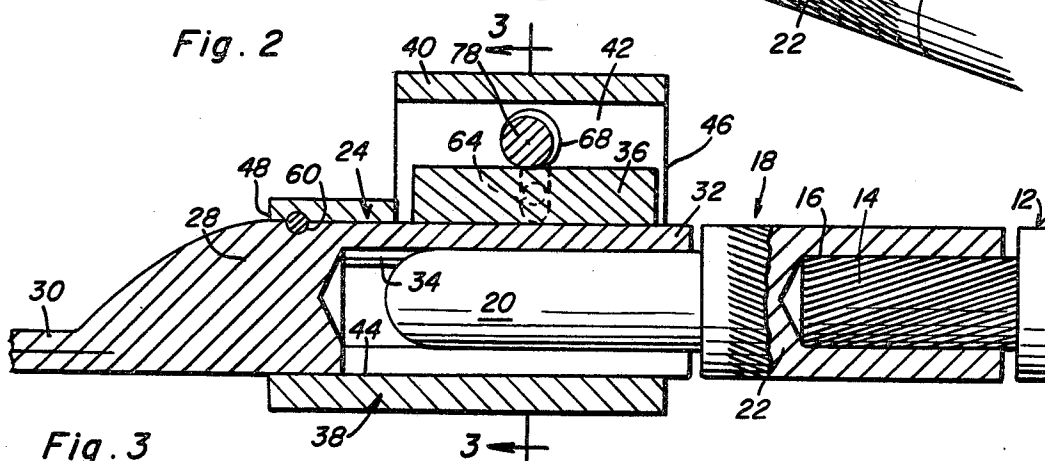


Fig. 3

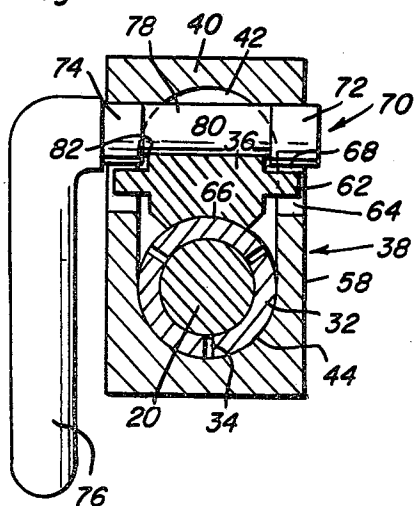
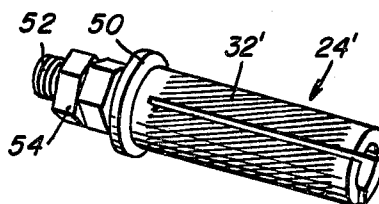


Fig. 4



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RELEASABLE ELECTRICAL TERMINAL

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8 Claims

ABSTRACT OF THE DISCLOSURE

An electrical connection of a jumper cable to a bus bar terminal wherein the cable lead is secured to a male plug inserted into a split sleeve socket held removably assembled in a housing by a key pin. A pressure plate slidably mounted in the housing engages the socket to contract it about the plug upon rotation of a cam actuating handle having a cam shaft held assembled in the housing by the socket and pressure plate.

This invention relates to cam actuated terminal locks for electrically and physically connecting an electrical cable to the terminal on a bus bar or circuit board.

In most cam actuated locks for releasable terminal connectors, component parts are fastened or held assembled by means of welds, rivets or screws that make manufacture of the device expensive as well as subject to breakage and/or rapid wear.

An important object of the present invention therefore is to provide a cam operated releasable terminal connector, the component parts of which are held assembled without the use of any rivets, screws or by welding.

In accordance with the foregoing, the terminal connector of the present invention includes a housing body within which a split sleeve socket, a pressure plate and the cam shaft are held assembled by means of a key pin.

As a result of the foregoing arrangement associated with the cam operated terminal connector, an electrical and physical connection may be rapidly established and released, the connection established being both structurally strong and electrically effective over a substantial contact surface.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view illustrating one form of a terminal connector assembly in accordance with the present invention, with the male plug thereof disconnected.

FIGURE 2 is a longitudinal sectional view through the terminal connector assembly with the male plug inserted.

FIGURE 3 is a transverse sectional view taken substantially through a plane indicated by section line 3—3 in FIGURE 2.

FIGURE 4 is a perspective view showing a modified form of one of the components associated with the terminal connector assembly.

Referring now to the drawings in detail, FIGURES 1, 2 and 3 illustrate a terminal connector assembly generally referred to by reference numeral 10 by means of which an electrical cable 12 is physically and electrically connected to a circuit board or bus bar. The conductor strands 14 associated with the lead portion of the cable 12 are accordingly crimped or otherwise suitably secured within the socket 16 of a male connector plug 18 having a cylindrical prong 20 made of suitable con-

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ductive material projecting forwardly from the body 22 of the plug. It should of course be appreciated, that the prong 20 may be of a shape other than cylindrical in which case, corresponding modification must be made to its cooperating socket member 24 within which the prong is received as shown in FIGURE 2.

The socket member 24 includes an open end 26 into which the prong 20 is inserted opposite a closed end 28 formed integrally with an anchor lug 30 having fastener receiving holes therein. The socket member includes a tubular sleeve portion 32 axially spaced from the end 28 provided with a plurality of longitudinal slots 34 so that the socket member may be elastically contracted about the prong 20 when it is clamped between a pressure clamping plate 36 and the bottom of a housing body 38 within which both the socket member and the pressure plate are held assembled.

It will be observed, that the housing body includes a vertically enlarged portion 40 within which a vertically elongated chamber 42 is formed having a semi-cylindrical bottom portion 44 on which the socket member 24 rests. The socket member axially projects by a slight amount from one end 46 of the vertically enlarged portion of the housing body and from the opposite end portion 48 of the housing body enclosing a cylindrical extension of the chamber 42 so that the socket member may receive the plug prong 20 and be secured to the terminal lug 30 outside of the housing body.

A modified form of socket member 24' is shown in FIGURE 4 similar to the socket member 24 except that the end of the socket member axially spaced from its tubular, split sleeve portion 32' is provided with a flange 50 adapted to abut the end 48 of the housing body. Also formed integrally with the socket member 24' and projecting axially from the flange 50, is an externally threaded screw portion 52 on which lock nuts 54 are threadedly mounted so as to clamp the assembly to the circuit board or bus bar with which it is associated.

The socket member and the pressure plate 36 are held assembled within the housing body by means of a key pin 56 received through openings in the side walls 58 of the housing body, said openings adapted to be aligned with a groove 60 formed in the socket member adjacent the end 28 as shown in FIGURE 2. The socket member is thereby held axially fixed within the cylindrical extension of the chamber 42. The pressure plate 36 on the other hand is held assembled within the vertically enlarged portion of the housing body by means of a pair of guide pins 62 extending laterally into vertical guide slots 64 formed in the side walls 58 of the housing body. The guide slots 64 extend substantially perpendicular to the socket member so that the pressure plate 36 will be vertically displaceable into engagement therewith. The bottom engaging surface 66 of the pressure plate accordingly conforms to the external surface of the socket member as shown in FIGURE 3.

The guide slots 64 terminate at their upper ends in larger, aligned circular openings 68 by means of which a cam shaft 70 is rotatably mounted within the housing body vertically spaced above the socket member. The cam shaft 70 is accordingly provided with axially spaced, cross-sectionally circular bearing portions 72 and 74, respectively, journaled within the aligned openings 68 through which the cam shaft is inserted into the housing from one side. Integrally formed at one end of the cam shaft outside of the housing and extending perpendicular thereto, is an actuating handle 76. The cam shaft is thereby angularly displaced about a rotational axis established through the housing body by means of the bearing portions 72 and 74 of the cam shaft. Interconnecting the bearing portions 72 and 74 within the chamber 42

of the housing body, is an eccentric shaft section 78 engaged with the top surface 80 of the pressure plate. It will be apparent therefore, that upon rotation of the actuating handle and the cam shaft 70 about the rotational axis thereof, the eccentric shaft section 78 will exert a downward thrust on the socket member through the pressure plate 36 clamping the tubular portion 32 of the socket member against the semi-cylindrical bottom 44 of the housing body to contract it about the plug prong 20.

From the foregoing description, the construction of the various parts which form the terminal connector assembly will be apparent. Initially, the cam shaft 70 is inserted into the housing body through one of the openings 68. The pressure plate 36 is then inserted sideways into the chamber 42 below the cam shaft until the guide pins 62 are aligned with the slots 64. The pressure plate may then be operatively positioned as shown with the pins 62 in the slots 64 just below the bearing portions 72 and 74. The cam shaft will then be held assembled within the housing by the pressure plate disposed between the axial shoulder abutments 82 formed between the bearing portions and the eccentric shaft section. The pressure plate will be held in its operative position when the socket member is inserted therebelow into the chamber 42. The socket member is then axially fixed in its assembled position by means of the key pin 56 as aforementioned by virtue of which all of the parts associated with the device are held assembled. The use of any fasteners such as screws, rivets, or welds is thereby avoided. The housing body may be made of a non-ferrous metal such as cast aluminum while the socket member is made of a suitable conductive material such as tellurium copper or brass. The pressure plate 36 is also cast from a suitable non-ferrous metal while the plug 18 is made of a conductive metal such as brass or copper. The one-piece cam shaft and actuating handle may also be made of a suitable metal such as brass.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as new is as follows:

1. A connector for a male plug comprising, a housing body, an elongated socket member adapted to extend through said housing body, a pressure plate slidably mounted within the housing body in engagement with the socket member, and cam means rotatably mounted by the housing body in engagement with the pressure plate for clamping the socket member to the housing body locking the plug therein, said cam means including a cam section engageable with the pressure plate and bearing means axially abutting the pressure plate for preventing disassembly of the cam means from the housing body when the socket member is disposed therein.

2. The combination of claim 1 wherein said pressure plate is provided with laterally extending pins slidably received in guide slots formed in the housing body substantially perpendicular to the socket member, said guide slots opening into bearing holes rotatably mounting the cam means.

3. The combination of claim 1 wherein said bearing means comprises a pair of axially spaced bearing portions diametrically larger than the cam section between which the pressure plate projects into engagement with the cam section.

4. The combination of claim 1 wherein said pressure plate is provided with laterally extending pins slidably

received in guide slots formed in the housing body substantially perpendicular to the socket member, said guide slots opening into bearing holes rotatably mounting the bearing portions.

5. The combination of claim 1 wherein said socket member includes a tubular portion having a plurality of axially elongated slots therein and key means extending through the housing body and received in a groove formed in the socket member adjacent said one end thereof for holding the socket member assembled within the housing body.

6. The combination of claim 5 wherein said pressure plate is provided with laterally extending pins slidably received in guide slots formed in the housing body substantially perpendicular to the socket member, said guide slots opening into bearing holes rotatably mounting the cam means.

7. A terminal connector for an electrical cable having a male plug secured thereto comprising, a housing body, an elongated socket member extending through said housing body having opposite ends projecting from the housing body, anchoring means on one of said ends of the socket member opposite the other end receiving said male plug, a pressure plate slidably mounted within the housing body in engagement with the socket member, and cam means rotatably mounted by the housing body in engagement with the pressure plate for clamping the socket member to the housing body locking the plug therein, said pressure plate being provided with laterally extending pins slidably received in guide slots formed in the housing body substantially perpendicular to the socket member, said guide slots opening into bearing holes rotatably mounting the cam means, said cam means including a cam shaft rotatably received in said bearing holes of the housing body having an eccentric shaft section in engagement with the pressure plate and an actuating handle connected to said cam shaft outside of the housing body, said cam shaft including a pair of bearing portions within the bearing holes forming axial abutments engageable with the pressure plate adjacent to the pins holding the cam shaft assembled within the housing body.

8. The combination of claim 7 wherein said socket member includes a tubular portion axially spaced from said one of the ends thereof having a plurality of axially elongated slots therein extending to said other end and key means extending through the housing body and received in a groove formed in the socket member adjacent said one end thereof for holding the socket member assembled within the housing body.

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U.S. Cl. X.R.

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