

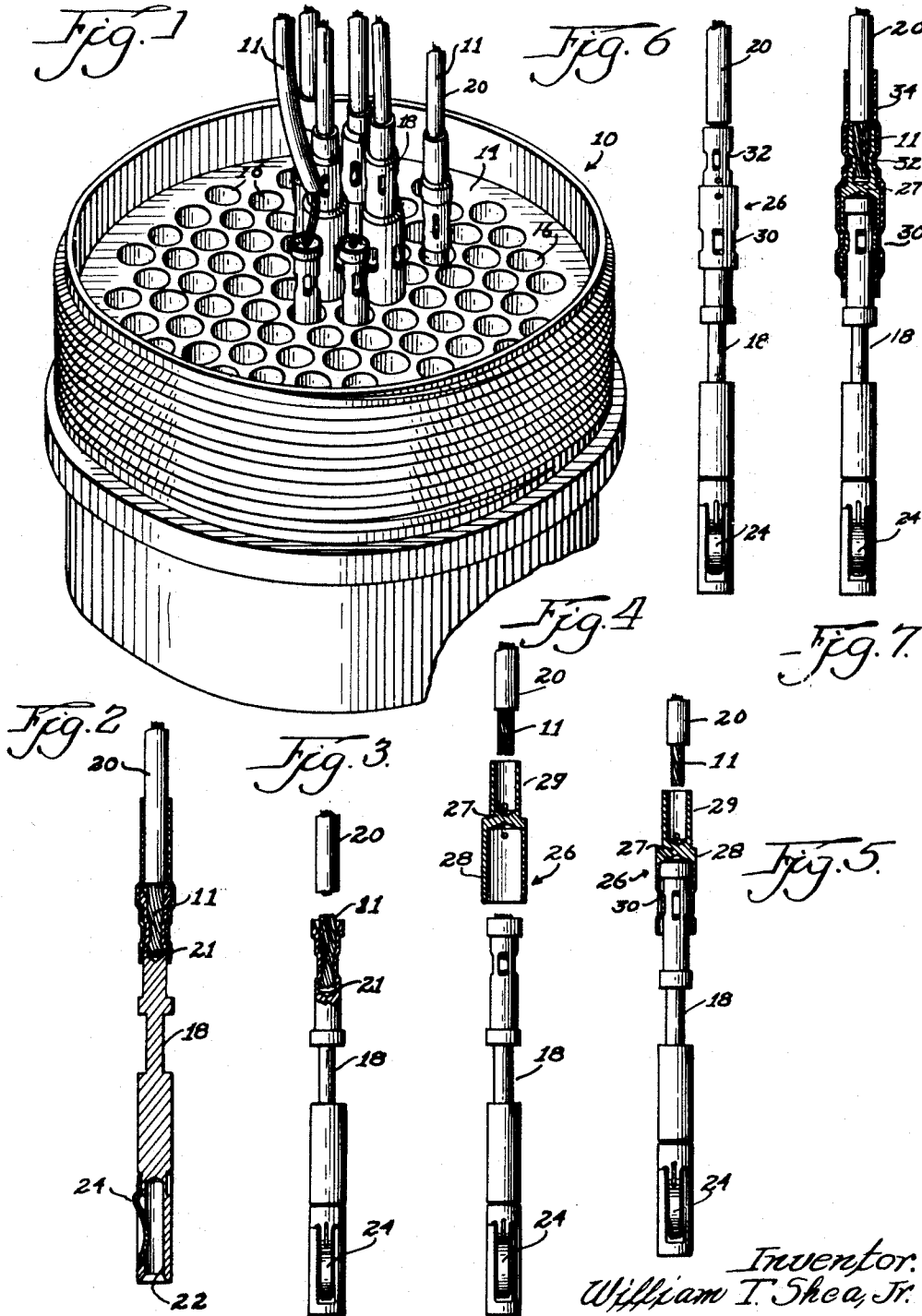
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CONNECTOR-CONTACT ADAPTER

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CONNECTOR-CONTACT ADAPTER

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1 Claim. (Cl. 339-176)

This invention relates to a connector-contacting adapter. In a detailed aspect, the invention is directed to a connector-contact adapter which will permit re-use of a multiple terminal socket or connector body whereby electrical connections can readily be re-established after an electrical conductor is severed or for some reason removed from its connection to the body of the socket or connector.

Particularly in communication circuitry where multiple conductors are utilized, a multiplicity of conductors is usually passed through one large, hollow cable which terminates at the socket or connector in which the individual conductors terminate. The individual conductors customarily are then secured to individual pins of a multiple connector for a male type of connection or to individual sockets in the case of a female type of connection. As is well known, the larger cable through which the multiple conductors are passed is usually of a heavy, wear-resistant character and is waterproofed. It provides a connection of such form that remotely located components may be interconnected without the necessity of numerous strung wires or conductors between the separate units. Because of the desire frequently to make and break connections by connecting into different sockets, the flexible housing tubing to enclose many conductors is much to be preferred to the more rigid conduit type of conductor housing.

Multiple connections or sockets of the type with which this invention is particularly usable frequently provide for connection of a substantial number of conductors to terminal boards or apparatus mounted in racks. The type of connection makes it a relatively simple operation to remove and replace complete rack sections, as desired. Unless suitable provisions can be made for effecting splices where any individual conductors become severed or separated from the individual socket pin or socket connection (as, for instance, to change a connection), it can readily be appreciated that the complete cable assembly would have to be replaced to make a connection change, if required. Often times with multiple conductors leading out from one tubular housing member in which as many as fifty or more conductors are often encased, a change in the connection pattern of particular conductors once secured either to different sockets or different socket pins is not difficult. However, since the multiplicity of conductors has been stretched tightly within the tubular housing member through which they all emerge, the overall fit is too tight to replace one conductor and there is insufficient conductor length beyond the end of the covering housing to permit any excess length for re-establishing a connection. Unless provisions are made in the way of an adapter which, in part, supplies additional length to the conductor and, in part, provides a convenient way for making a permanent securement of any individual conductor to a selected socket connector pin or to a socket or, in the event that a conductor has broken at the point of connection, provides a convenient way to reconnect the conductor without dismantling the complete assembly, much time is lost to re-establish the connection, to say nothing of the cost of so doing.

In the case of multiple connector or socket fittings where conductors of the number of fifty or more are involved, it is extremely expensive to make any change

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or to replace a broken conductor because of the need to rewire a complete assembly. By use of the invention here described it is possible to effect changes of conductor locations or outlets or to repair severed conductors for an expenditure which is as little as about one percent of that which would be involved to achieve the result by other methods.

This invention has therefore as one of its objects that of providing a rapid, convenient and efficient component assembly for installation of a connector contact adapter for establishing selected electrical connections for conductors into a socket, and to establish a secure joint or coupling between the members coupled.

Other objects and advantages of the invention will best be understood by referring to the following detailed specification of preferred embodiments thereof, and to the accompanying drawings in which:

FIGURE 1 is a perspective view showing a portion of a cable assembly in a connector;

FIGURE 2 is an elevational sectional view showing a conductor and socket arrangement as employed in a connector;

FIGURE 3 is an elevational view, partly in section, showing the conductor severed from its connection and the socket;

FIGURE 4 is an elevational view, partly in section, showing the manner positioning the connector contact adapter relative to the conductor and the socket immediately prior to securement and installation;

FIGURE 5 is an elevational view, partly in section, showing the connector contact adapter joined to the socket and the conductor to be secured;

FIGURE 6 is an elevational view showing the connection completed and immediately prior to final wrapping; and,

FIGURE 7 is an elevational view, partly in section, showing the completed connection.

Referring to the drawings wherein like reference numerals designate similar parts throughout, there is shown a suitable connector, indicated generally by the numeral 10, for connecting a plurality of insulated conductors or cable strands 11, as might be commonly employed in a communication circuit or in a circuit for controlling various electrical apparatus. As illustrated in FIGURE 1, the connector may be provided with external screw threads 12 for coupling with a suitable collar (not shown) which is secured to the housing member. The collar is internally threaded thereby providing a dirt-tight protective housing or shell for the cable connection and also to preclude any likelihood of disturbing pre-established connections. The connector is provided with a disk insert 14 formed of any suitable non-conductive material such as hard rubber, synthetic rubber, plastics, or the like. The disk is provided with a plurality of holes 16 adaptable to receive elongated metal sockets 18. In a typical connector arrangement, the number of holes may range from about 48 to 60 for most types of connectors with multiple conductors.

Metal socket 18, which may be formed of any suitable conducting metal such as copper, silver, aluminum, and the like, and alloys thereof, are slidably inserted into holes 16 of insert 14. Cable 11, which has been stripped of its insulating sheath 20 for a sufficient distance to provide for an exposed end of the internal conductors, is inserted into the hollow or well 21 of socket 18. The coupling or connection between the socket and conductor is secured by crimping, or the like. The opposite end of the socket is also provided with a suitable well 22 adaptable to receive a pin (not shown) extending from a wire leading from the opposite direction to the connector to

be electrically coupled with cable 11. The pin is secured in the well by means of detent 24.

In the event the wire becomes severed from its socket by reason of normal use and handling, the electrical connection may be re-established in a rapid and convenient manner by employing the connector contact adapter of this invention, and illustrated in FIGURES 4-7. According to the invention, the connector contact adapter comprises a cylindrical sleeve, indicated generally at 26, having a transverse partition or wall 27, thereby dividing the sleeve 26 into a first section 28 and second section 29. The first section 28 has an internal diameter substantially equal or slightly greater than, the external diameter of the end of socket 18 and is adaptable for receiving the end of the socket. The second section 29 is preferably of reduced diametrical dimensions in relation to the first section and is coaxially arranged therewith, and the longitudinal dimension of the second member is substantially equal to, or less than, the longitudinal dimension of the first section. It is frequently desirable because the reduced portion accommodates an element of substantially smaller diameter than the other section of the sleeve, and consequently there results a substantial saving of material and further facilities making the connection, as will be more apparent hereinbelow.

In order to establish the desired electrical connection, the first section 28 of sleeve 26 is slipped over the end of socket 18 until the end of the socket abuts the transverse, internal wall 27. An adequate connection for the sleeve is desirably constructed so that the inner periphery of the sleeve is in sliding engagement with the outer periphery of socket 18. The sleeve is made of a suitable metallic, conductor, material capable of being deformed under pressure, and may include, for example, copper, aluminum, brass, as well as alloys thereof. By reason of this feature, sleeve 26 enveloping socket 18 may be crimped at 30 by any suitable tool, such as a Daniels crimp tool, thereby frictionally gripping the socket.

As clearly shown by FIGS. 5, 6 and 7, the crimping at the region 30 is applied to the cylindrical sleeve 26 to secure it to the existing socket 18. The crimping effect secures the sleeve into the hollow or well 21 into which cable strands 11 have previously been crimped.

The insulating sheath 20 is stripped from the free end of wire 11 in order to expose an appreciable length of wire, as shown in FIGURE 4. The wire is then inserted into the reduced portion 29 of sleeve 26. Here again, the connection may be secured by crimping, as shown at 32.

The connection is properly insulated by means of a suitable sheath 34. For example, the sheath may be formed of a shrinkable plastic tubing, but hard rubber, synthetic rubber, or the like, may be employed.

It thus will be observed that the invention provides a rapid and convenient manner for connecting a severed wire from its socket. Further, because this type of repair is commonplace, the invention results in a substantial economy. Equally important, the connector contact adapter may be employed immediately adjacent to and/or surrounded by the numerous other sockets in the bundle without interference.

Although the foregoing invention has been described with reference to certain illustrative embodiments, it is evident that modifications and variations can be made by those skilled in the art to which the instant invention pertains.

What is claimed is:

In combination with apparatus for establishing electrical connections for a multiplicity of conductors terminating within a multiple-connector component wherein a multiplicity of contacts extend therethrough in substantially parallel relationship and in which each contact terminates in a recessed conductor-receiving end, the end of each conductor-receiving contact having an insulation-stripped end of an electrical conductor positioned therein and terminating therein and permanently secured thereto by tightly crimping the socket about the stripped end of the conductor, a splice combination for permitting conductor replacements or repair at any conductor-receiving end of any contact which comprises a substantially tubular-shaped elongated connector sleeve element having an intermediate transverse wall to divide the tubular element into two recessed sections, one recessed section being of a depth substantially corresponding to the length of the crimped section of the original conductor-receiving end and the depth of the other recess being sufficient to anchor a conductor therein, the inner and outer diameters of each of the recessed sections of the connector sleeve element at each end being different, the larger of the two recessed sections having an internal diameter substantially corresponding to the outer diameter of the conductor-receiving end of the contact and the outer diameter of the other recessed section substantially corresponding to the recess of the conductor-receiving end of the contact, the tubular connector sleeve element being telescopically positioned over the outer end of the conductor-receiving contact end with the conductor previously crimped therein severed from the contact at substantially the outer end thereof so that the portion of said connector sleeve element having the larger internal diameter surrounds the socket for a distance corresponding substantially to the inward spacing of the transverse wall from the outer end of the connector sleeve element, thereby locating the larger recessed end of the connector sleeve element over the recessed conductor-receiving end of the contact, the said recessed element being crimped to the conductor-receiving end at substantially the same region that the conductor-receiving end was initially crimped to secure the severed electrical conductor, the open end of the smaller of the two recesses in the connector sleeve element being adapted to receive and enclose a stripped end of the electrical conductor, and means to secure the insulation-stripped end of the electrical conductor received within the open end of the smaller section of said sleeve element thereby to establish through the connector sleeve element an electrical connection to one of the multiplicity of contacts.

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