

[72] Inventor **Harold Louis Bruetsch**
 New Cumberland, Pa.
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 [73] Assignee **AMP Incorporated**
 Harrisburg, Pa.

Primary Examiner—Marvin A. Champion
Assistant Examiner—Joseph H. McGlynn
Attorneys—Curtis, Morris and Safford, Marshall M.
 Holcombe, William Hintze, William J. Keating, Frederick
 W. Raring, John R. Hopkins, Adrian J. La Rue and Jay L.
 Seitchik

[54] **ELECTRICAL CONNECTOR**
 3 Claims, 7 Drawing Figs.

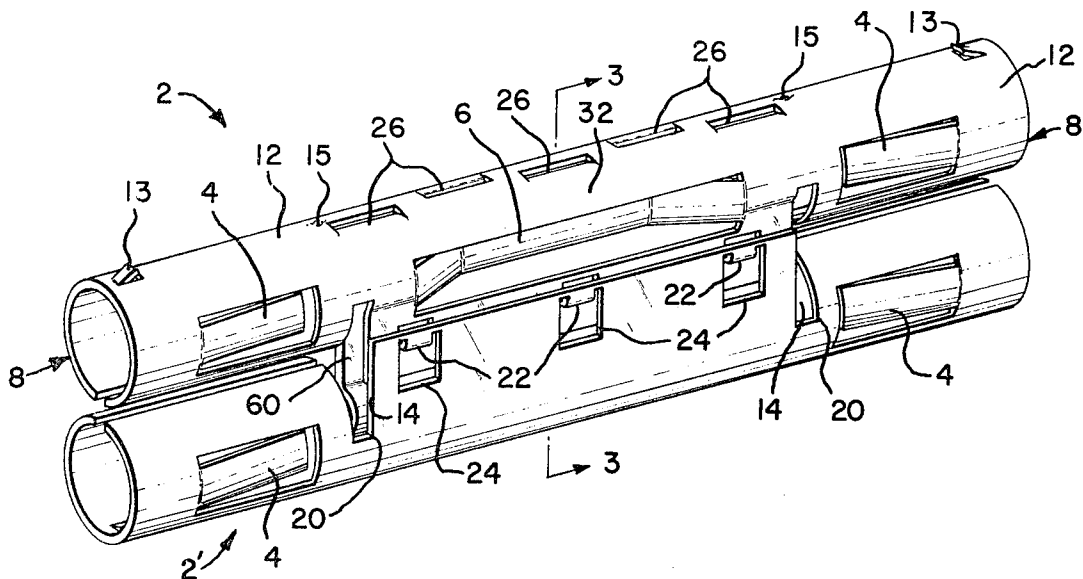
[52] U.S. Cl. 339/248,
 339/262
 [51] Int. Cl. H01r 13/12
 [50] Field of Search 339/204,
 205, 248, 249, 253, 256, 262

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ABSTRACT: This invention relates to a cylindrical wire splice having an internal metallic connector portion formed by rolling multiple precut metal strip, and an insulating cover rolled about the connector portion to insulate the electrical contact of the connector portion from points external of the device. The ends of the wires to be spliced have a radially enlarged collar which is engaged by oppositely directed tines of the connector portion to position the ends of the wire within the device. Cantilever surfaces at the center of the connector portion rigidly grip the ends of the wire to form a proper electrical contact therebetween. The ends of the insulating cover have resilient plug members which are inserted therein to seal the wires both before and after insertion into the device. The plug members have an opening to allow the insertion of the wires therein, and a portion of the plug member extends across the opening to seal the interior of the connector portion prior to the insertion of wires in the device.



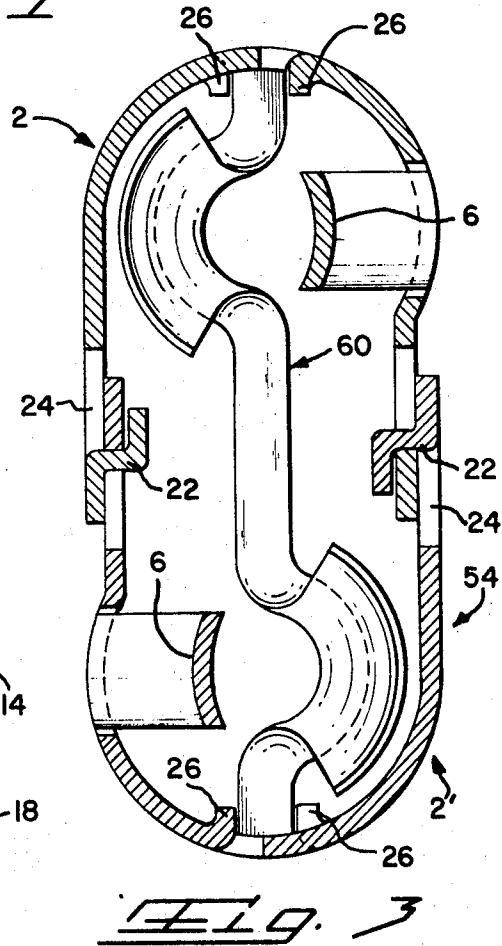
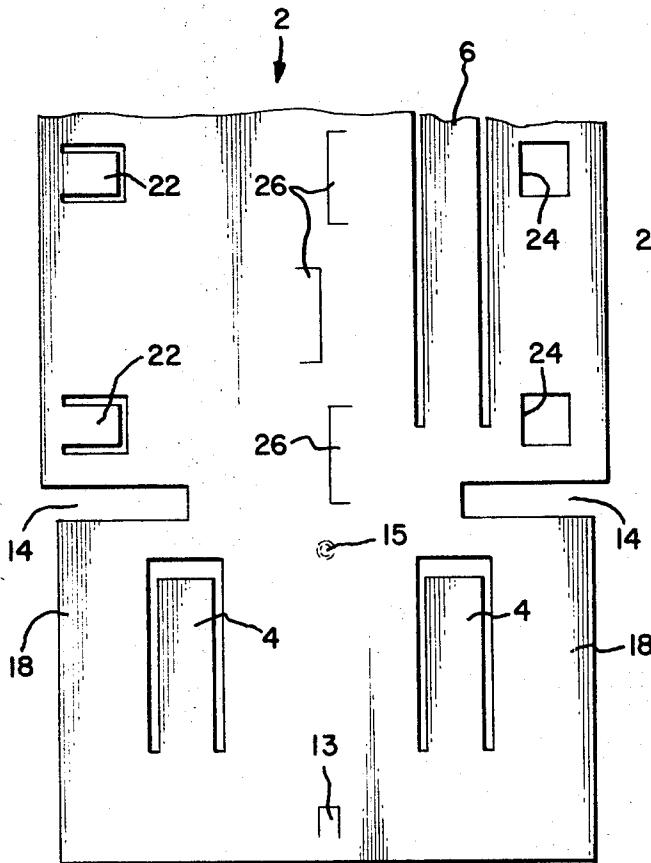
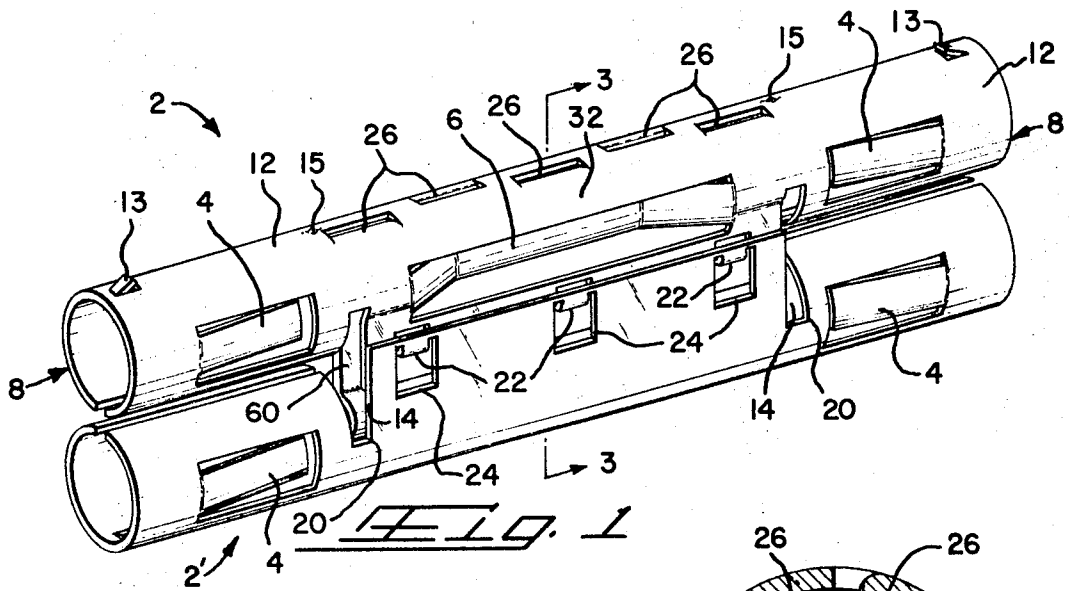


Fig. 2

INVENTOR.
Harold Louis Bruetsch
BY *William J. Keating*

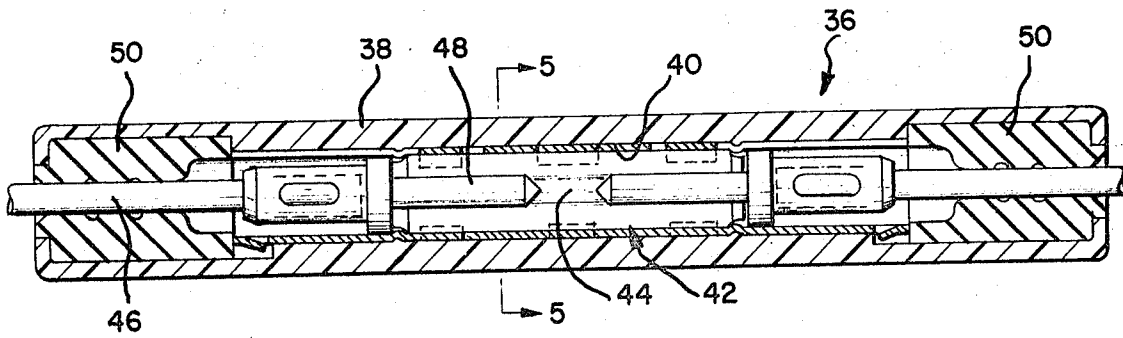


FIG. 4

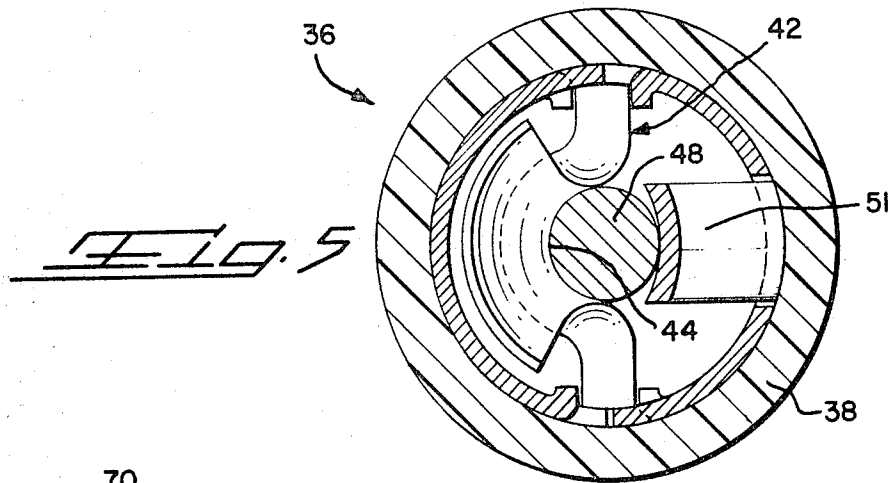


FIG. 5

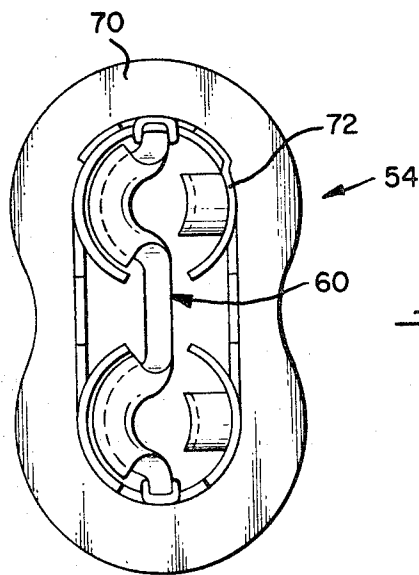
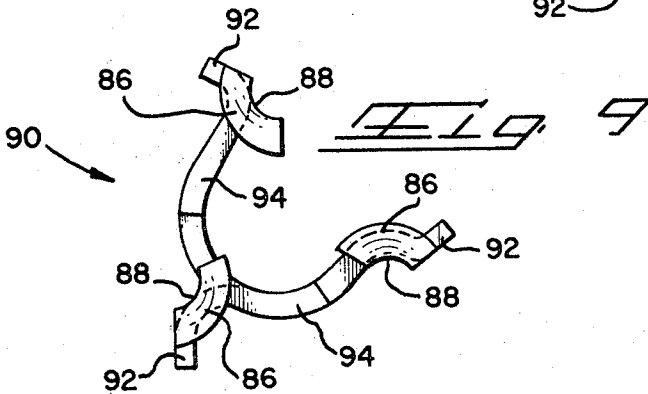
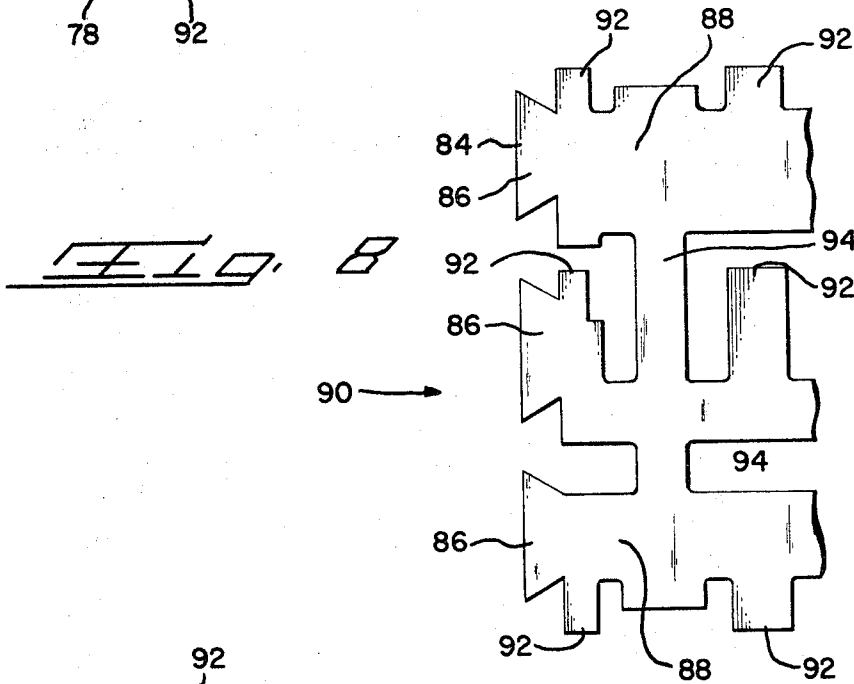
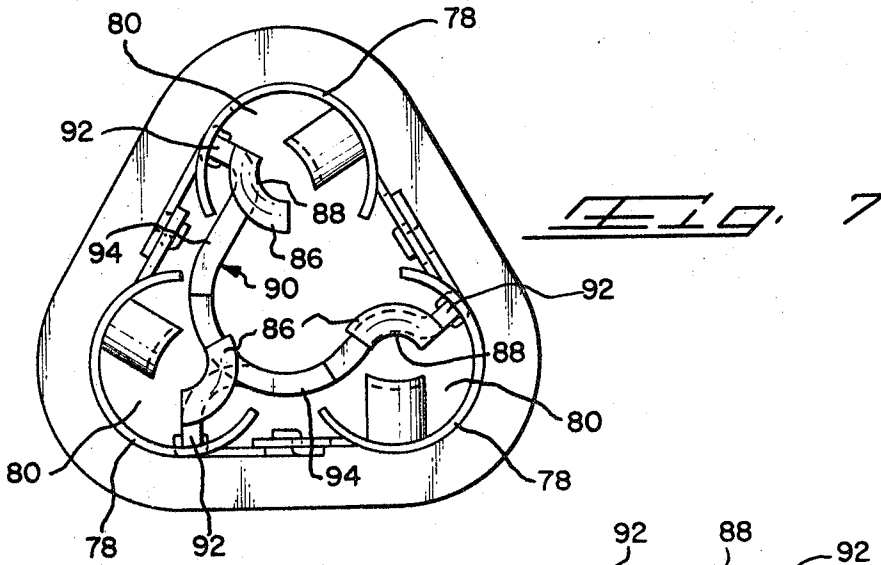


FIG. 6

INVENTOR.
Harold Louis Bruetsch

BY *William J. Keating*



INVENTOR.
Harold Louis Bruetsch
BY *William J. Keating*

ELECTRICAL CONNECTOR

This invention relates in general to quick operating wire splicing devices and in particular to a splicing device wherein wire ends are provided with male contacts and are electrically connected together in either a common interconnected splice or in separate individual splices. In addition, the wires are connected and retained in position by a formed metal strip which acts not only as an electrical socket but as a mechanical retention coupling.

This invention also relates to a method of making a splice device to form a common splice between a plurality of wires or separate individual connections between the wires.

In applications wherein there is a requirement to form a detachable connection between two wires or between a group of wires, such connections between single pairs of wires or between respective wire groups can be formed by providing a standard type of connector having male and female components. With an end of one wire group fastened to the male connector portion and an end of the other wire group fastened to the female connector portion, the respective wire groups can be connected by engaging the male portion with the female portion in a manner well known in the art.

However, the present invention is particularly useful where it is desired to form a common splice between a multiplicity of wires without resorting to relatively expensive connectors and cumbersome interconnections, and where the splice device can quickly connect and disconnect the wires.

The formation of a common electrical connection between a number of wires connected by the standard type of male-female connectors is a laborious procedure. Usually this is accomplished by using jump wires soldered between the contacts of the desired wires to be spliced in common. This procedure is not only time consuming and inefficient, but it results in a cumbersome and bulky connection.

It is therefore an object of the present invention to provide a quick connect and disconnect wire splicing device.

Another object of this invention is to provide a wire splicing device which is readily adapted for connecting a plurality of wires in a common splice or in individual and separate splices.

Other objects and advantages will be apparent to those versed in the art upon making reference to the description which follows and the accompanying sheets of drawings in which a structural embodiment of the invention is shown by way of example and from which the methods of the present invention may be understood.

AS SHOWN IN THE DRAWINGS

FIG. 1 is a perspective sketch illustrating the splice device;
FIG. 2 is a view of a development of a metal strip prior to forming and used in making the splice device according to the principles of the present invention;

FIG. 3 is a cross section view along the lines 3-3 of FIG. 1;

FIG. 4 is a section view of a single wire splice device;

FIG. 5 is a cross-sectional view taken along the lines 5-5 of FIG. 4;

FIG. 6 is a view of another embodiment of a wire splice device constructed from one piece of metal to form a connection between a double pair of wires;

FIG. 7 is a sectional view of another embodiment of a splicing device which can be utilized to form a common splice between three pairs of wires;

FIG. 8 is a development of metal strip prior to forming and used in making the bus bar arrangement shown in FIGS. 7 and 9; and

FIG. 9 is a view of the metal strip of FIG. 8 after it has been formed.

The present invention contemplates a splicing device wherein the principles of construction may be utilized to provide a single splice between a single pair of wires or a common splice between a multiplicity of wires.

According to one aspect of this invention an electrical connection between the wires is provided by a formed electrically conductive metal strip which also acts to retain the wires in

position. When a plurality of such strips is provided they can be joined together to form a common splice between a number of wires, or the strips can be utilized as separate individual pieces to form multiple single wire splices.

Referring now to FIG. 2, there is shown a flat metal strip 2 which forms the basic connecting and retaining portion of the wire splicing devices to be described herein. The metal strip 2 is formed with a series of tines 4 at the strip ends 8 and a beam member 6 located in the center of the strip. The beam member 6 is utilized to resiliently grip the wire ends to be spliced so as to maintain the wires in position within the splicing device. The tines 4 prevent the wires from accidentally being extracted from the splicing device.

Between the ends 8 of the metal strip 2 there is formed a connector or socket portion 12 which is defined by four slots 14 which extend from the side 18 toward the center of the strip. At each of the strip ends 8, there are two, generally rectangular tines 4 which are shaped so as to engage a shoulder on a contact. The projecting rib 22 is shaped so as to mate with a similarly dimensioned groove 24 at the opposite side of the identical second metal strip 2' (see FIG. 1). Toward the center of the metal strip (FIG. 2) is located a generally-rectangular beam member 6. Tabs 26 are stamped into the strip and are spaced in staggered relationship on both sides of the centerline of the metal strip 2.

In FIG. 1, the flat metal strip 2 is shown after it has been rolled to form the ends 8 into generally cylindrical shape with the tines 4 projecting into the center thereof. The beam members 6 project toward the center of the connector. The projecting ribs 22 mate within the grooves 24 to retain the splice in assembled position. The locating ribs 26 locate the bus bar within the device. These ribs 26 are located in the upper and lower surfaces and extend inwardly from these surfaces of the splice device to engage shoulders on the bus bar. The ears 13 engage shoulders within the cover. It may be noted that in the rolled position of the strip 2, shown in FIG. 6, the strip is overlapped to maintain the rolled strip in alignment.

Referring to FIG. 3, there is shown a wire splicing device 54 which is used to interconnect in a common splice a double pair of wires. The splicing device 54 (FIG. 3) is formed with an insulating cover. Two rolled metal strips 2, 2' are located within the insulating cover. The rolled metal strips 2, 2' are formed similar to the strips previously described. These rolled metal strips are interlocked, by virtue of fingers 22, to form a common splice between a double pair of wires, respectively inserted into the splicing device 54 through the ends so as to be resiliently held between the bus bar 60 and the beam member previously described. The wires and corresponding connector contacts are maintained within the splicing device 54 by the tines 4 which firmly grip the shoulder on the contact. Further, this interlocking of the rolled metal strips is accomplished, as previously mentioned, by virtue of the fingers 22 entering the windows 24 and resting against the ledge on the upperside of window 24.

The combination then of the bus bar 60 expanding the rolled metal strips in opposite directions and the fingers 22 engaging the windows 24 prevents the two rolled metal strips from being disassembled.

The species shown in FIG. 4 is a wire splicing device 36 capable of quickly interconnecting two wires. A tubular outer insulating cover 38 has a generally hollow center 40 within which there is held a rolled metal strip 42 formed similar to the rolled strip shown in FIG. 1. The metal strip 42 includes a connector portion 44 which forms a splice between a pair of wires 46 each having a connector contact on the wire ends to be spliced. The connector contact 48 is a standard type of male connector which is crimped onto the ends of wires 46. At each end of the wire splice 36 there is provided a molded rubber end seal 50 which is bonded to or retained by the outer insulating cover 38.

The splice is formed by inserting the wire 46 and contact 48 through the end seal 50 until the contact 48 is properly positioned in the splice. In this position the resilient beam member

51 (FIG. 5) similar to the beam in FIG. 2, firmly grips the connector contacts 48 since the contacts 48 have a diameter slightly larger than the diameter between the sections forming the gripping beam members. This insures a firm electrical contact between the wires 46 which are thereby spliced.

The splicing device 36 is constructed by forming a flat metal strip (similar to the strip in FIG. 2) with the connector portion 44 dimensioned to suit the desired connector contact 48. The flat strip is then rolled to form a rolled metal strip 42 as shown in FIGS. 4 and 5. The dimension of the connector portion 44 is chosen so that the radius of the beam member (similar to that shown in FIG. 1) is slightly less than the connector contact 48. An insulating cover 38 is then wrapped around the rolled metal strip 42 to complete the construction.

Referring to FIG. 6, the splicing device 54 is formed with an insulating cover 70, a single rolled metal strip 72 is utilized to interconnect in a common splice a double pair of wires. This single rolled metal strip 72 is formed similar to the strips previously described.

Referring to FIG. 7, there is shown a multiple splicing device, which can be utilized to form a common splice between three pairs of wires. In this configuration, an insulating cover 76 is formed around three rolled metal strips 78 which are formed in three separate, generally-cylindrical chambers 80. The rolled strips 78 have appropriate areas to form a reliable connection with the desired contacts and associated wires. Each of the rolled strips 78 is interconnected with a bus bar arrangement 90 to form a common splice between three pairs of wires inserted, respectively, into each of the rolled strips 78.

Between the ends 84 of the metal strip 90 (FIG. 8), there are formed entry sections 86 which are defined by triangular shapes which extend from contacting surfaces 88. Extending from the sides of the contacting surfaces 88 are legs 92 which press against the rolled metal strips when assembled. The contacting surfaces 88 are joined via connecting strip 94.

In FIG. 9, the flat metal strip 90 is shown after it has been formed into a generally-triangular shape. The entry section 86 is partly circular and extends beyond the connecting strip 94. This entry section 86 guides the contact into the splice device so that proper contact may be had between the metal strip 90 and a beam member of the type previously described (not shown). Further, the legs 92 engage the inner sides of the splice device so that each of the rolled metal strips comprising the splice device is interconnected to form a common splice between three pairs of wires respectively inserted therein.

The contacting surface 88 engages the connector contact so

that, in this position, the combination of the connector contact engaging the contacting surface 88 and the resilient beam member, a firm electrical contact is insured between the wires which are thereby spliced.

5 Although various modifications might be shown by those versed in the art, it should be understood that we wish to embody within the scope of the patent warranted herein, all such modifications as reasonably and properly come within the scope of our contribution to the art.

10 I claim:

1. A connector for splicing multiple wires having contacts thereon, said connector constructed from an electrically conductive metal and including an outer shell having ferrules on each end thereof for receiving said contacts, each ferrule having tines struck inwardly to lock the contacts in the ferrule, the connector having a beam member in the center thereof for mechanically and electrically engaging the inward end of each contact inserted into said connector, a current carrying member for transferring electric current from said contacts at one end of said connector to contacts at the opposite end of said connector, and wherein the current carrying member has lugs which project into apertures in the shell to provide a locating and holding means for positioning the current carrying member within said splice device.

2. A connector for splicing multiple wires having contacts thereon, said connector constructed from an electrically conductive metal having ferrules on each end thereof for receiving said contacts, each ferrule having tines struck inwardly to lock the contacts in the ferrule, the connector having a beam member in the center thereof for mechanically and electrically engaging the inward end of each contact inserted into said connector, a current carrying member for transferring electric current from said contacts at one end of said connector to contacts at the opposite end of said connector, and wherein the connector is comprised of a stamping which is formed into an assembly and includes ribs in said stamping for retaining the current carrying member in assembled form, shoulders on said current carrying member for engaging said ribs to hold the assembly in its formed position, including dimples in said stampings to prevent the current carrying member from moving axially.

3. The device of claim 2 including a shell surrounding said current carrying member, finger members on said shell, slots in said shell, said finger members extending into said slots to lock the shell in assembled position around the current carrying member.

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