United States Patent

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[54] **ELECTRICAL CONNECTORS ON A CARRIER STRIP**
5 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **339/276,** 29/630, 113/119
[51] **Int. Cl.** **H01r 11/08**
[50] **Field of Search** 339/276–278; 29/630; 113/119

[56] **References Cited**

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ABSTRACT: Plural different electrical connectors are provided on a common carrier strip so that each conductor of a multiconductor wire may have a specific connector secured or terminated thereto. The resulting terminated conductors are particularly useful in e.g., automobile wiring harnesses. The strip is adapted to be fed into automatic crimping presses wherein one set of crimping dies is used to crimp all of the connectors on the strip. Connectors are severed from the carrier strip when they are crimped onto the conductors of the multiconductor wires.

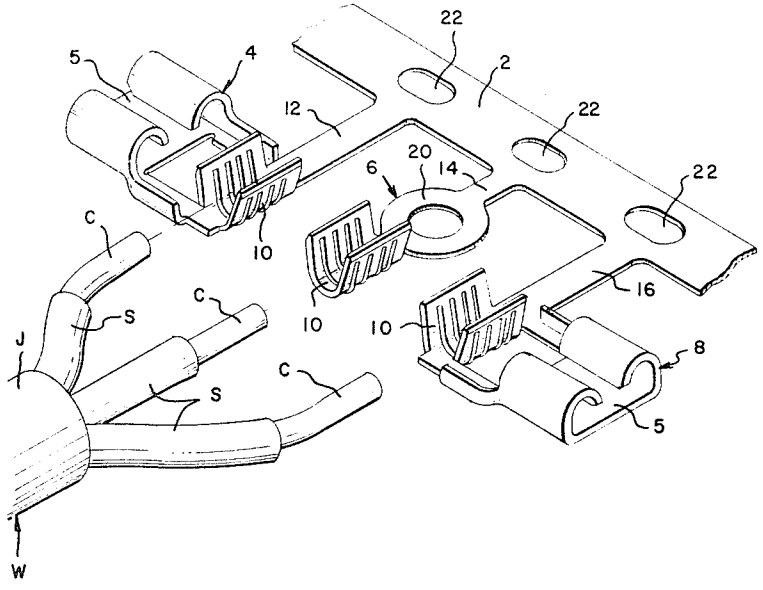


FIG. 1

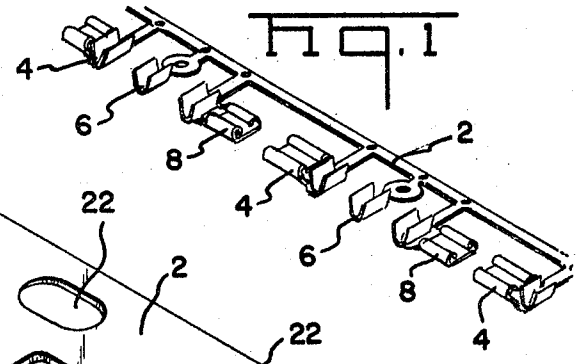


FIG. 2

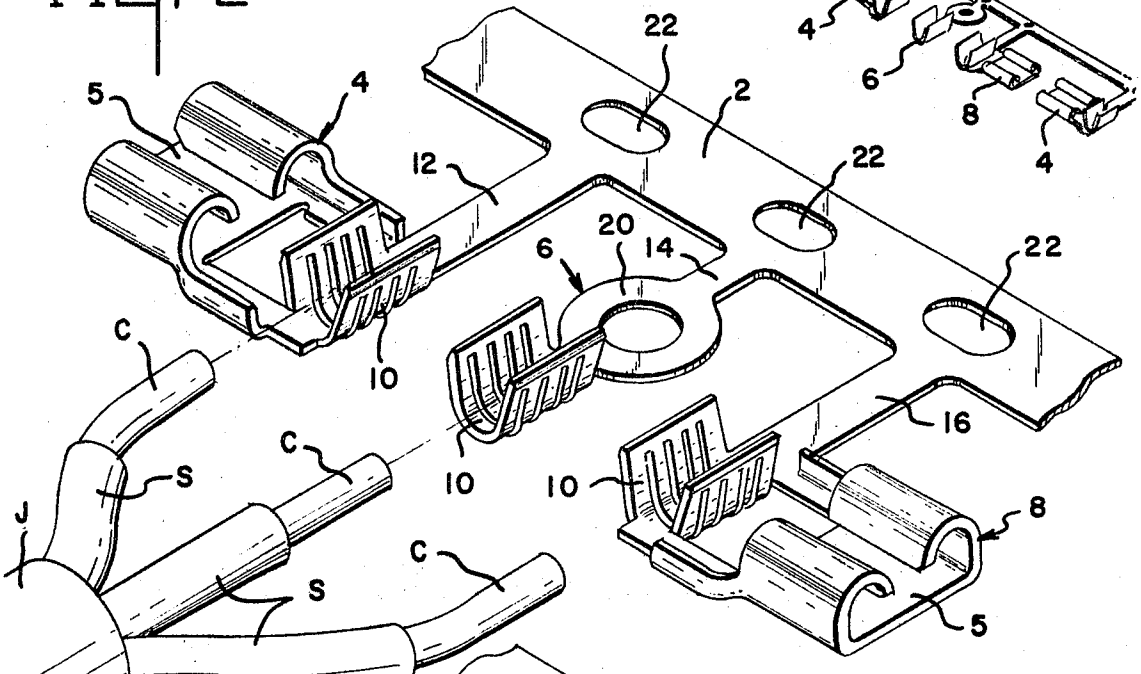
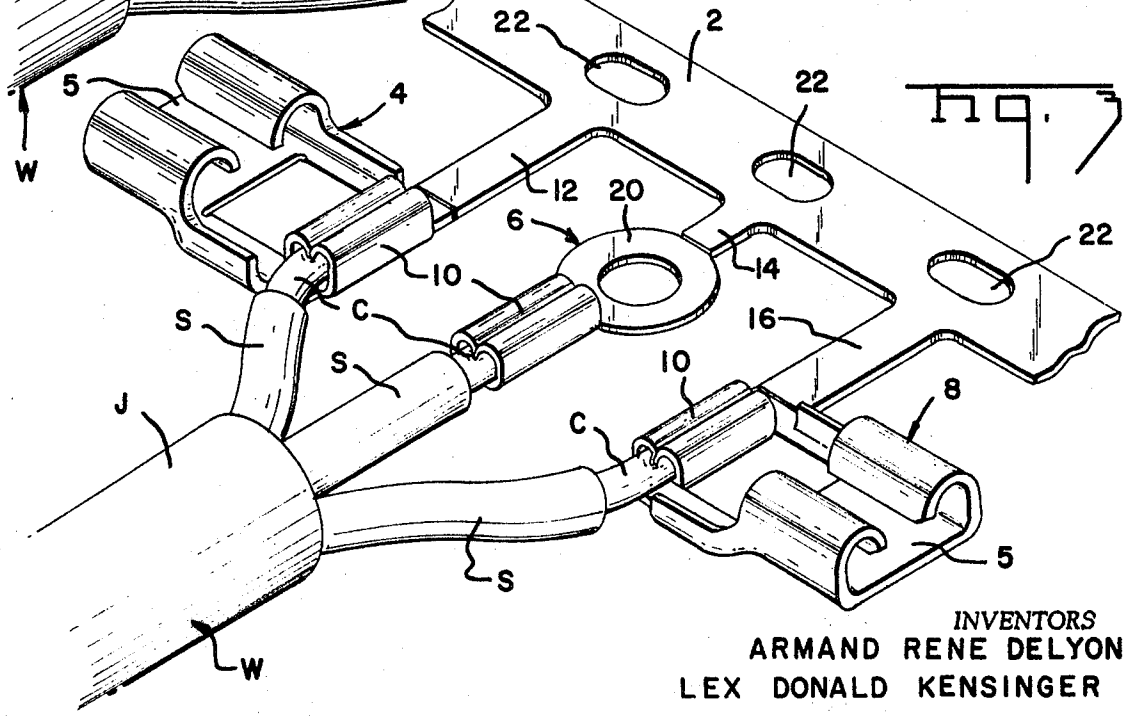


FIG. 3



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ELECTRICAL CONNECTORS ON A CARRIER STRIP

This invention relates to electrical terminals and connectors of the type adapted to be crimped onto wires, and particularly to terminals and connectors in strip form.

It is desirable in high-speed automatic lead wire making to have different types of electrical connectors programmed on a common carrier strip so that a multiconductor wire may have different connectors on its conductors. This type of wire is used in automobile wiring harnesses wherein, e.g., one conductor of the wire connects to ground, another conductor connects to one component and still another conductor connects to another component. Prior programmed connector strips include a carrier strip made of plastic or the like having loose piece connectors secured thereto. This arrangement entails expensive and time consuming assembly operations, and individual connectors often become inadvertently dislodged and subsequently released from the strip during storage and handling.

It is therefore an object of this invention to provide a unitary connector carrier strip having different shaped connectors formed thereon.

Another object is to provide a strip of plural different connectors which may be fed into automatic connector-crimping presses.

A further object is to provide a carrier strip with a group of different connectors thereon which may be mechanically and electrically secured to different conductors of multiconductor wire by automatic means.

Other objects and attainments of the present invention will become apparent to those skilled in the art upon a reading of the following detailed description when taken in conjunction with the drawings in which there is shown and described an illustrative embodiment of the invention; it is to be understood, however, that this embodiment is not intended to be exhaustive nor limiting of the invention but is given for purposes of illustration in order that others skilled in the art may fully understand the invention and the principles thereof and the manner of applying it in practical use so that they may modify it in various forms, each as may be best suited to the conditions of a particular use.

The accompanying drawings illustrate a three conductor wire which is terminated to three different connectors. U.S. Pat. No. 2,774,951, which is assigned to the present assignee, shows the general features of the two end connectors which are adapted to receive rectangular tabs. Each of the connectors comprise in general a floor or web having its edge portions upwardly turned and downwardly directed towards the floor so that the tab can be inserted between the floor and the edges of the sidewalls. U.S. Pat. No. 2,945,207, which is also assigned to the present assignee, shows the particular features of the two end connectors wherein the tab receptacles are formed at right angles to the axis of the wire barrels. This constitutes a flag type connector. U.S. Pat. No. 3,379,567, which too is assigned to the present assignee, shows the general features of the center connector which is of the apertured tongue type. Although this arrangement of connectors is suitable for a particular wiring application, it should be understood that any number of other different connectors may be formed in a carrier strip in the manner disclosed herein without departing from the spirit and scope of the invention.

In the drawings:

FIG. 1 is a perspective view of a section of a strip of connectors showing two series of connectors;

FIG. 2 is a perspective view of a portion of a strip showing connectors prior to being secured to conductors; and

FIG. 3 is a perspective view similar to FIG. 1 but showing the connectors secured to conductors.

Referring to FIG. 1, a preferred embodiment of the invention comprises an electrically-conductive sheet metal strip 2, such as copper or the like, which has different connectors 4, 6, and 8 thereon, these connectors having been stamped and formed from the strip and defining first, second and third series of electrical connectors. Each connector has a wire barrel

or ferrule 10 thereon which is adapted to be crimped onto a conductor C of a multiconductor wire W in the same manner as shown in the references. Wire barrels 10 are conventional in that they are generally U-shaped with inwardly-deformable sidewalls, however, they can be of closed-barrel configuration. Insulation-engaging ferrules can also be provided as part of the wire barrels.

The tab receptacle or connector portion 5 of connector 4 is directed toward the left and the tab receptacle or connector portion 5 of connector 8 is directed toward the right, otherwise they are of the same configuration. The center connector 6 is of the apertured tongue type, as described above, with the tongue or connector portion 20 being parallel with the axes of wire barrels 10. The first and third series of connectors 4 and 8 are integrally connected to strip 2 by bridging straps 12 and 16 which extend from one end of the respective connector wire barrels 10 to the strip 2, straps 12 and 16 and ferrules 10 of connectors 4 and 8 being continuous. The second series of connector 6 is integrally connected to strip 2 by a bridging strap 14, which extends from tongue 20 to the strip 2. Each of the wire barrels 10 are in spaced alignment relative to each other and relative to strip 2 so that each wire barrel 10 may be properly located in a crimping die area of a crimping press. Strip 2 has locating holes 22 therein by which the strip is moved through the various stages of its forming dies and by which it is later moved through the crimping dies of a press by a feeding mechanism on the press. Connectors are formed from flat strip stock in conventional metal forming presses which utilize conventional progressive dies.

A continuous strip of connectors may be rolled onto a storage reel or spool directly from the forming dies of a press for convenience of storage and handling. The spool may later be attached to an automatic crimping press so that the strip may be fed into the crimping dies of the press.

In use, FIG. 2, a multiconductor wire W is prepared by stripping away a portion of the outer jacket J of the wire and subsequently stripping away short lengths of insulation S covering conductors C. The exposed conductors C are then separately crimped to wire barrels 10 in successive fashion beginning with e.g., connector 4 and ending with e.g., connector 8. As each connector barrel 10 moves into position between the crimping dies, the operator inserts a conductor C into the barrel 10 and trips a switch to activate the crimping press. When the crimping dies bottom, the respective bridging straps 12, 14, or 16 of the connectors are simultaneously cut thus severing the connectors as illustrated in FIG. 3, from strip 2. Of course, the crimping dies may be such that all three connectors 4, 6, and 8 are crimped simultaneously onto conductors C and severing the connectors from straps 12, 14 and 16.

It will, therefore, be appreciated that the aforementioned and other desirable objects have been achieved; however, it should be emphasized that the particular embodiment of the invention, which is shown and described herein is intended as merely illustrative and not as restrictive of the invention.

I claim:

1. A strip of electrical connectors comprising a carrier strip; bridging straps extending outwardly from said carrier strip at spaced intervals therealong; a first, second and third series of electrical connectors connected to said bridging straps and having ferrule members disposed for receiving conductors of multiconductor wires; connector members of said first and third series of electrical connectors extending in a direction substantially normal with respect to said ferrule members thereof; and connector members of said second series of electrical connectors extending in the same direction as that of the ferrule members thereof.

2. A strip of electrical connectors according to claim 1 wherein said carrier strip is provided with holes at spaced intervals therealong for engagement by feeding means of a crimping machine to feed the strip of electrical connectors into a crimping area of the crimping machine.

3. A strip of electrical connectors according to claim 1 wherein said bridging straps for said first and third series of

electrical connectors are connected to said ferrule members thereof and said bridging straps for said second series of electrical connectors are connected to said connector members thereof.

4. A strip of electrical connectors according to claim 1 wherein said first and third series of electrical connectors have the same configuration.

5. A strip of electrical connectors comprising a carrier strip; bridging straps extending outwardly from said carrier strip at spaced intervals along said carrier strip; feed-engaging means provided by said carrier strip at spaced locations therealong; first, second and third series of electrical connectors connected to said bridging straps; said first and third series of electrical connectors having a same configuration; ferrule members provided by said series of electrical connectors and disposed in a manner for receiving electrical conductors of multiconductor wires; and connector members provided by said series of electrical connectors, said connected members of said first and third series of electrical connectors extend outwardly in a substantially normal direction from said ferrule members thereof and said connector members of said second series of electrical connectors extend in the same direction as said ferrule members thereof.