

Description

The present invention relates to a connector for a shield cable as mentioned in the introductory part of claim 1 and may be used of electronic controls in an automobile for example.

Fig. 12 shows a conventional connector of this type which is made by removing a length of outer sheath g of a shield cable a; separating a shield wires b from a signal line c, bundling and connecting the shield wire b and the signal line c to the contact terminal e and the insulation displacement terminal f of a connector body d, respectively.

However, the removal of the outer shield g, the separation of the shield wires b from the signal line c, and the direction of the signal line b and the signal line c to the contact terminals e and f have been made by hands. The shield wires b and the signal line c have been connected separately to the contact terminals e and f by bundling the shield wires b while using the insulation displacing technique for the signal line c. Consequently, it has been difficult to streamline and automate the connection operations. In addition, the signal line c from which the shield wires b were removed has been susceptible to electromagnetic interferences.

The prior art GB-A-2 020 919 discloses an electrical connector according to the introductory part of claim 1 which does not permits the simultaneous connection the signal line, the intermediate insulator, the shield wires and the outer sheath of the shield cable with a crimping tool using opposing tool means.

Accordingly, it is an object of the invention of the above-mentioned case to provide a connector which permits simultaneous connection by crimping of the signal line, intermediate insulator, shield wires, and outer sheath of a shield cable, thereby making possible continuous and automatic connection of a large number of connectors, whereby also shielding effect is enhanced.

According to the invention said object of the invention is obtained with the features of the characterizing part of claim 1. Preferred embodiments of the invention are mentioned in the subclaims.

The invention allows that the stripped front end of a shield cable is placed on the electrical contact such that the signal line, intermediate insulator, shield wires, and outer sheath are positioned on the respective crimping tabs and simultaneously pressed with a crimping tool onto the crimping tabs for effecting connection, making possible continuous and automatic connection of a large number of connectors. The shield sleeve fully covers the signal line and the signal line contact, thus providing an excellent shielding effect.

The above and other objects, features, and advantages of the invention will be more apparent from the following description when taken in conjunction

with the accompanying drawings.

Brief Description of the Drawings

Fig. 1 is a perspective view of a connector according to an embodiment of the invention before coupling;
 Fig. 2 is a perspective view of an electrical contact terminal of the connector;
 Fig. 3 is a perspective view of a signal line contact of the connector;
 Fig. 4 is a side elevation of the electrical contact terminal;
 Fig. 5 is a top plan view thereof;
 Fig. 6 is a bottom plan view thereof;
 Fig. 7 is a front elevation thereof viewed from the arrow VII-VII of Fig. 4;
 Fig. 8 is a rear elevation thereof viewed from the arrow VIII-VIII of Fig. 4;
 Fig. 9 is a sectional view taken along the line IX-IX of Fig. 4;
 Fig. 10 illustrates how to crimp a shield cable to the electrical contact terminal;
 Fig. 11 illustrates the electrical contact terminal to which the shield cable has been crimped; and
 Fig. 12 is a perspective view of a conventional connector.

Description of the Preferred Embodiment

Fig. 1 shows a connector according to an embodiment of the invention before coupling. A connector A consists of a female connector B and a male connector C. The female connector B includes a housing D and an electrical contact terminal 1 therein.

As Figs. 2-9 show, the electrical contact terminal 1 has a shield sleeve 3, an insulation body 4, and a signal contact 5. The shield sleeve 3 is divided into three portions; a tubular holder portion 6, a shield crimping portion 7, and a sheath retention portion 8. Behind the insulation body 4 in the contact holder portion 6 there are jig entrances 10 and 11. The jig entrance 10 extends forwardly from the rear edge 6a of the contact holder portion 6. The shield crimping portion 7 has a pair of crimping tabs 12 forming a U-shaped cross section. The sheath retention portion 8 also has a pair of crimping tabs 13 forming a U-shaped cross section. The crimping tabs 13 are greater than the crimping tabs 12.

The signal line contact 5 is divided into three portions; a contact body 14, a signal line crimping portion 15, and an insulator crimping portion 16. The contact body 14 has the form of a pin while the signal line crimping portion 15 consists of a pair of crimping tabs 17. The insulator crimping portion 16 has a pair of crimping tabs 18 forming a U-shaped cross section. The signal line contact 5 is supported by the insulator 4 within the contact holder portion 6 of the contact ter-

terminal 1 such that the signal line crimping portion 15 and the insulator crimping portion 16 are placed in the jig entrance 10 and 11, respectively.

In order to connect the shield cable 2 to the contact terminal 1, as Fig. 2 shows, a length of outer sheath 23 of the shield cable 2 is removed to expose the signal line (central conductor) 20, the intermediate insulator 21, and the shield wires (outer conductor) 22. The shield cable 2 is placed on the contact terminal 1 such that the signal line 20, the intermediate insulator 21, the shield wires 22, and the outer sheath 23 are positioned at the signal line crimping tabs 17, the crimping tabs 18 of the insulator crimping portion 16, the crimping tabs 12 of the shield crimping portion, and the crimping tabs 13 of the sheath holder portion 3, respectively.

As Fig. 10 shows, the signal line 20, the intermediate insulator 21, the shield wires 22, and the outer sheath 23 are simultaneously connected to the signal line crimping tabs 17 and the other crimping tabs 18, 12, and 13 by crimping techniques, respectively, by means of anvils 24a, 24b, 25a, 25b, 26a, and 26b, and crimpers 27a and 27b. More specifically, the signal line anvils 24a and 24b and the crimpers 25a and 25b are inserted through the jig entrances 10 and 11, respectively, to press the signal line crimping tabs 17 and the insulator crimping tabs 18 for simultaneous connection of the signal line 20 and the intermediate insulator 21. In addition, the crimping tabs 12 and 13 are crimped to the shield wires 22 and the outer sheath 23 with the crimping anvils 26a and 26b and the crimpers 27a and 27b, respectively, to connect the shield cable 2 to the electrical contact 1. The electrical contact 1 is then inserted and fixed in the housing D to form a female connector B, which is coupled to the male connector C for making electrical connection.

As has been described above, with the connector according to the invention, it is possible to simultaneously connect the signal line, the intermediate insulator, the shield wires, and the outer sheath to the respective crimping tabs with a crimping tool. This makes continuous connection of a large number of connectors possible and thus automation of the operation possible. The coverage by the shielding sleeve of the signal line and signal line contact increases and thus the shield effect.

Claims

1. An electrical connector for a shield cable (2) with a signal line central conductor (20), an intermediate insulator (21), a shield wires outer conductor (22) and an outer sheath (23), comprising
 - a shield sleeve portion (3) including a contact holding portion (6, 6a) extending forwardly from a rear edge (6a), first and second

and crimping portions (7, 8) to which said shield wires outer conductor (22) and said outer sheath (23) is connected by crimping, respectively;

- a signal line contact (5) having a contact body (14), third and fourth crimping portions (15, 16) to which said signal line control conductor (20) and said intermediate insulator (21) is to be connected by crimping; and
- an insulator body (4) placed within said contact holding portion,

characterized in that

- said contact holding portion (6, 6a) having a pair of opposing jig entrances (10, 11),
- said third and fourth crimping portions (15, 16) are positioned within said jig entrances (10, 11) for simultaneously crimping by a crimping tool having a pair of opposing tool means (24a, 24b; 25a, 25b) insertable through said jig entrances (10, 11).

2. The electrical connector according to claim 1, wherein said signal line contact (5) is supported by said insulator (4) within said contact holder portion (6, 6a) such that said signal line crimping portion (15) and said intermediate insulator crimping portion (16) are placed in the jig entrances (10, 11), respectively.
3. The electrical connector according to claim 1, wherein one of the opposing jig entrance (10) for inserting one of the opposing tool means (24a, 24b) extending forwardly from a rear edge (6a) of said contact holder portion.
4. The electrical connector according to claim 1, wherein said first and second crimping portions (7, 8) are rearwardly positioned from said opposite jig entrances (10, 11) for simultaneously crimping by said crimping tools having an additional pair of opposing tool means (26a, 26b; 27a, 27b).
5. The electrical connector according to claim 4, wherein said first to fourth crimping portions (7, 8, 15, 16) are positioned for simultaneously crimping by said first and second pairs of opposing tool means.

Patentansprüche

1. Elektrischer Verbinder für ein abgeschirmtes Kabel (2) mit einem in der Mitte verlaufenden Leiter mit Signalleitungen (20), einem zwischengeschalteten Isolierteil (21), einem äußeren Leiter (22) mit Abschirmdrähten, und einem Außenman-



minal 1 such that the signal line crimping portion 15 and the insulator crimping portion 16 are placed in the jig entrance 10 and 11, respectively.

In order to connect the shield cable 2 to the contact terminal 1, as Fig. 2 shows, a length of outer sheath 23 of the shield cable 2 is removed to expose the signal line (central conductor) 20, the intermediate insulator 21, and the shield wires (outer conductor) 22. The shield cable 2 is placed on the contact terminal 1 such that the signal line 20, the intermediate insulator 21, the shield wires 22, and the outer sheath 23 are positioned at the signal line crimping tabs 17, the crimping tabs 18 of the insulator crimping portion 16, the crimping tabs 12 of the shield crimping portion, and the crimping tabs 13 of the sheath holder portion 3, respectively.

As Fig. 10 shows, the signal line 20, the intermediate insulator 21, the shield wires 22, and the outer sheath 23 are simultaneously connected to the signal line crimping tabs 17 and the other crimping tabs 18, 12, and 13 by crimping techniques, respectively, by means of anvils 24a, 24b, 25a, 25b, 26a, and 26b, and crimpers 27a and 27b. More specifically, the signal line anvils 24a and 24b and the crimpers 25a and 25b are inserted through the jig entrances 10 and 11, respectively, to press the signal line crimping tabs 17 and the insulator crimping tabs 18 for simultaneous connection of the signal line 20 and the intermediate insulator 21. In addition, the crimping tabs 12 and 13 are crimped to the shield wires 22 and the outer sheath 23 with the crimping anvils 26a and 26b and the crimpers 27a and 27b, respectively, to connect the shield cable 2 to the electrical contact 1. The electrical contact 1 is then inserted and fixed in the housing D to form a female connector B, which is coupled to the male connector C for making electrical connection.

As has been described above, with the connector according to the invention, it is possible to simultaneously connect the signal line, the intermediate insulator, the shield wires, and the outer sheath to the respective crimping tabs with a crimping tool. This makes continuous connection of a large number of connectors possible and thus automation of the operation possible. The coverage by the shielding sleeve of the signal line and signal line contact increases and thus the shield effect.

Claims

1. An electrical connector for a shield cable (2) with a signal line central conductor (20), an intermediate insulator (21), a shield wires outer conductor (22) and an outer sheath (23), comprising
 - a shield sleeve portion (3) including a contact holding portion (6, 6a) extending forwardly from a rear edge (6a), first and sec-

ond crimping portions (7, 8) to which said shield wires outer conductor (22) and said outer sheath (23) is connected by crimping, respectively;

- a signal line contact (5) having a contact body (14), third and forth crimping portions (15, 16) to which said signal line control conductor (20) and said intermediate insulator (21) is to be connected by crimping; and

- an insulator body (4) placed within said contact holding portion,

characterized in that

- said contact holding portion (6, 6a) having a pair of opposing jig entrances (10, 11),
- said third and forth crimping portions (15, 16) are positioned within said jig entrances (10, 11) for simultaneously crimping by a crimping tool having a pair of opposing tool means (24a, 24b; 25a, 25b) insertable through said jig entrances (10, 11).

2. The electrical connector according to claim 1, wherein said signal line contact (5) is supported by said insulator (4) within said contact holder portion (6, 6a) such that said signal line crimping portion (15) and said intermediate insulator crimping portion (16) are placed in the jig entrances (10, 11), respectively.
3. The electrical connector according to claim 1, wherein one of the opposing jig entrance (10) for inserting one of the opposing tool means (24a, 24b) extending forwardly from a rear edge (6a) of said contact holder portion.
4. The electrical connector according to claim 1, wherein said first and second crimping portions (7, 8) are rearwardly positioned from said opposite jig entrances (10, 11) for simultaneously crimping by said crimping tools having an additional pair of opposing tool means (26a, 26b; 27a, 27b).
5. The electrical connector according to claim 4, wherein said first to forth crimping portions (7, 8, 15, 16) are positioned for simultaneously crimping by said first and second pairs of opposing tool means.

Patentansprüche

1. Elektrischer Verbinder für ein abgeschirmtes Kabel (2) mit einem in der Mitte verlaufenden Leiter mit Signalleitungen (20), einem zwischengeschalteten Isolierteil (21), einem äußeren Leiter (22) mit Abschirmdrähten, und einem Außenman-



tel (23), wobei der Verbinder folgendes aufweist:
 -- ein Abschirmmuffenteil (3) mit einem sich von einer rückwärtigen Kante (6a) aus nach vorn erstreckenden Kontakthalteabschnitt (6, 6a), einem ersten und einem zweiten Quetschverbindungs-
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- bereich (7, 8), mit welchem der äußere Leiter (22) mit Abschirmdrähten und der Außenmantel (23) jeweils unter Bildung einer Quetschverbindung verbunden sind;
 -- einen Signalleitungskontakt (5) mit einem Kontaktkörper (14), einem dritten und einem vierten Quetschverbindungs-
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bereich (15, 16), mit welchem der Leiter mit Signalleitungen (20) und das zwischengeschaltete Isolierteil (21) unter Bildung einer Quetschverbindung zu verbinden sind; und
 -- einen innerhalb des Kontakthalteabschnitts angeordneten Isolierkörper (4),
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- dadurch gekennzeichnet, daß
 -- das Kontakthalteabschnitt (6, 6a) ein Paar gegenüberliegender Vorrichtungseinsetzöffnungen (10, 11) aufweist,
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- zur gleichzeitigen Herstellung einer Quetschverbindung mittels eines Quetschwerkzeugs mit einem Paar sich gegenüberstehender und durch die Eingangsöffnungen (10, 11) einführbarer Werkzeugeinrichtungen (24a, 24b; 25a, 25b) der dritte und der vierte Quetschverbindungs-
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- bereich (15, 16) jeweils innerhalb der Vorrichtungseinsetzöffnungen (10, 11) positioniert sind.
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2. Elektrischer Verbinder nach Anspruch 1, bei welchem der Signalleitungskontakt (5) innerhalb des Kontakthalteabschnitts (6, 6a) vom Isolierteil in der Weise abgestützt ist, daß der Quetschverbindungs-
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- bereich (16) für das zwischengeschaltete Isolierteil jeweils in den Vorrichtungseinsetzöffnungen (10, 11) positioniert sind.
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Vorrichtungseinsetzöffnungen (10, 11) angeordnet sind.

5. Elektrischer Verbinder nach Anspruch 4, bei welchem der erste bis vierte Quetschverbindungs-
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Revendications

1. Connecteur électrique pour un câble blindé (2) comportant un conducteur central (20) de ligne de signaux, un isolant intermédiaire (21), un conducteur extérieur (22) à fils électriques de blindage et une gaine extérieure (23), comprenant
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- une partie (3) de manchon de blindage comprenant une partie (6, 6a) de support de contact s'étendant vers l'avant à partir d'un bord arrière (6a), des première et deuxième parties de sertissage (7, 8) auxquelles ledit conducteur extérieur (22) à fils électriques de blindage et ladite gaine extérieure (23) sont connectés par sertissage, respectivement ;
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- un contact (5) de ligne de signaux présentant un corps de contact (14), des troisième et quatrième parties de sertissage (15, 16) auxquelles ledit conducteur central (20) de ligne de signaux et ledit isolant intermédiaire (21) doivent être connectés par sertissage ; et
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- un corps d'isolation (4) placé à l'intérieur de ladite partie de support de contact, caractérisé en ce que
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- ladite partie (6, 6a) de support de contact présente une paire d'ouvertures de montage en regard (10, 11),
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2. Connecteur électrique selon la revendication 1, dans lequel ledit contact (5) de ligne de signaux est supporté par ledit isolant (4) à l'intérieur de ladite partie (6, 6a) de support de contact de sorte que ladite partie de sertissage (15) de ligne de signaux et ladite partie de sertissage (16) d'isolant intermédiaire sont placées dans les ouvertures de montage (10, 11), respectivement.
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3. Connecteur électrique selon la revendication 1, dans lequel une des ouvertures de montage en regard (10) pour insérer un des éléments d'outil en regard (24a, 24b) s'étend vers l'avant à partir d'un bord arrière (6a) de ladite partie de support de contact. 5

4. Connecteur électrique selon la revendication 1, dans lequel lesdites première et deuxième parties de sertissage (7, 8) sont positionnées à l'arrière desdites ouvertures de montage en regard (10, 11) pour un sertissage simultané par lesdits outils à sertir présentant une paire supplémentaire d'éléments d'outil en regard (26a, 26b ; 27a, 27b). 10 15

5. Connecteur électrique selon la revendication 4, dans lequel lesdites première à quatrième parties de sertissage (7, 8, 15, 16) sont positionnées pour un sertissage simultané par lesdites première et deuxième paires d'éléments d'outil en regard. 20

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