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(54) **CONNECTOR ASSEMBLY AND CONNECTION SYSTEM USING SAME**
VERBINDERANORDNUNG UND VERBINDUNGSSYSTEM DAMIT
ENSEMBLE RACCORD ET SYSTÈME RACCORD ASSOCIÉ

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Description

FIELD OF THE INVENTION

5 **[0001]** The present invention relates to connector assemblies.

BACKGROUND OF THE INVENTION

10 **[0002]** An electrical control device is usually connected to a wiring harness thanks to one or several electrical connectors. In order to enable this electrical connection, it is common to provide a connector assembly (also called socket) on the housing of said electrical control device.

15 **[0003]** Further, the signals and power supplies going through such connector may be subject to electromagnetic interference (also called 'EMI') or may themselves generate disturbances. It is thus beneficial to shield the signals and power supplies going through such connector in order to increase the immunity against incoming interferences and to decrease the levels of generated disturbances. Such provisions are also referred to as 'EMC' or Electromagnetic Compatibility.

20 **[0004]** EP 1164664 shows a Connector assembly according to the preamble of claim 1.

SUMMARY OF THE INVENTION

25 **[0005]** It is an object of the invention to improve the shielding of connector assemblies.

30 **[0006]** According to the invention, it is provided a connector assembly according to claim 1, adapted to be fastened to a mounting support, for instance an electrical control device, and adapted to receive a mating counterpart belonging to a wiring harness.

35 **[0007]** The connector assembly comprises a connector foot portion, adapted to be fastened to a housing of the electrical control device thanks to fastening devices.

40 **[0008]** The connector foot portion comprises a base metal shield plate.

45 **[0009]** According to the invention, the shield plate is made of any material which conducts electricity such as copper alloy, tin, or aluminium alloy which are classed among different categories (or series) according to the main alloying element.

50 **[0010]** Moreover, since such a connector assembly may be exposed to external environment, different kind of corrosion may appear (such as pitting corrosion or surface corrosion) and thus may affect the functions of the connector assembly. Therefore, it would be interesting to provide a connector assembly which is able also to resist in wet and corrosive environment while exhibiting good shielding properties.

55 **[0011]** That is why, according to an embodiment, the metal shield plate is made of an aluminium alloy of 1XXX series such as 1100, 1080, 1050, 1060, 1070 or 1010. In fact, said specific 1XXX series of aluminium alloy presents anti-corrosive and shielding properties which are adapted for such a use.

60 **[0012]** According to a preferred embodiment, the metal shield plate is made of aluminium alloy 1050.

65 **[0013]** Classification of aluminium alloys is established by The International Alloy Designation System (IADS) and is well known to the person skilled in the art.

70 **[0014]** According to the IADS, an aluminium alloy of 1XXX series contains at least 99% of aluminium. The second digit indicates modifications to alloy or impurity limit and the two last digits indicate the purity of the alloy. For example, an aluminium alloy 1070 means that it contains a minimum of 99.70% of aluminium, an aluminium alloy 1050 means that it contains a minimum of 99.50% of aluminium and an aluminium alloy 1100 means that it contains a minimum of 99.00% of aluminium.

75 **[0015]** The connector also comprises a body portion extending away from the connector foot portion outwardly relative to the mounting support.

80 **[0016]** In a preferred embodiment, the connector body portion has a body shield member which is in electrical contact with said metal shield plate. Further the metal shield plate is in electrical continuity with said fastening devices.

85 **[0017]** Thanks to these dispositions, the electrical continuity is ensured between the fastening devices and the body shield member whenever the connector assembly is fastened to the mounting support. Further the fastening devices are in electrical contact with the mounting support, thus establishing a complete electrical continuity between the body shield member of the connector assembly and the mounting support.

90 **[0018]** In some other embodiments, one might also use one or more of the features as defined in the dependent claims.

95 **[0019]** According to another aspect, the invention is also directed to connection systems comprising a connector assembly as described above, fastening devices, and a mounting support. Further the fastening devices are adapted to fasten the connector assembly on the mounting support, whereby the fastening devices are in electrical contact with the mounting support.

[0020] According to another aspect, the invention is also directed to an assembly method for fastening a connector assembly as described above to a mounting support, the method comprises the steps of:

- mounting the metal shield plate on the connector foot portion,
- inserting metallic inserts into holes,
- fastening the connector assembly thanks to fastening devices.

[0021] As a result, the shield member is in electrical contact with said metal shield plate and the metal shield plate is in electrical continuity with said fastening devices. Further, the fastening devices are in electrical continuity with the mounting support.

BRIEF DESCRIPTION OF THE DRAWINGS

[0022] Other features and advantages of the invention appear from the following detailed description of one of its embodiments, given by way of non-limiting example, and with reference to the accompanying drawings.

[0023] In the drawings:

- Figure 1a and 1b are general views of the connector assembly according to the invention,
- Figure 2 is a sectional view of the connector assembly of Figure 1,
- Figure 3 is a detailed enlarged view of a section of the foot portion.

MORE DETAILED DESCRIPTION OF THE INVENTION

[0024] In the figures, the same references denote identical or similar elements.

[0025] Figure 1a and Figure 1b show a connector assembly 10 according to the invention, comprising :

- a connector foot portion 1, having a substantially rectangular general shape, with a bottom surface 15 and a top surface 16, said connector foot portion 1 comprising a base metal shield plate 3, adapted to be placed adjacent to the bottom surface 15 as depicted in Fig. 1b,
- a connector body portion 2, extending from the top surface 16 of the connector foot portion, said connector body portion having a substantially cylindrical general shape.

[0026] The connector foot portion 1 and the connector body portion 2 may be formed as a plastic part, preferably made as an integral plastic molded part.

[0027] In the illustrated example, the connector body portion 2 has an oval shape with an external surface 25 and an internal surface 26 (see Fig. 2). A body shield member 22 is placed adjacent to the internal surface 26, said body shield member 22 being formed as a thin metallic sheet extending from a base portion 22a to a top portion 22b. The base portion 22a is adjacent to the bottom surface 15 of the connector foot portion 1.

[0028] Inwardly relative to the body shield member 22, a hollow portion 80 is provided, in which wires and terminals can take place. In the illustrated example, two power connexions 81,82 and two signals connexions 83,84 are installed in the hollow portion 80 (see also Fig. 1b). Of course other connexion configurations are also possible.

[0029] A mating connector belonging to a wiring harness can be connected to the connector assembly 10 along a mating axis X, from the left hand side on Fig. 1a and 1b.

[0030] Said body shield member 22 has elastic lugs 23 extending slantwise outwardly away from said base portion 22a. In the depicted example, elastic lugs 23 are disposed all around the base portion 22a. Said elastic lugs 23 bear on said base metal shield plate 3 for establishing an electrical contact between said body shield member 22 and said metal shield plate 3.

[0031] As visible on the Figure 2, the connector foot portion 1 is adapted to be fastened to a mounting support such as a housing 6 of an electrical control device thanks to fastening means. Said electrical control device has electrical interfaces with for example sensors and actuators, and with power supply through electrical connector assemblies like the considered depicted connector assembly 10. The connector foot portion can also be fastened directly onto a car frame portion or a an engine portion rather than onto an electrical control device.

[0032] Said housing 6 encloses a control unit and is adapted to mechanically and electromagnetically protect said

control unit. Said housing 6 comprises recesses 60 adapted to receive fastening devices 5. In the illustrated example, the fastening devices are screws 50, and the counterpart are said threaded holes 60, but other fastening devices are encompassed in the scope of the present invention like riveting, press fitting or other means.

[0033] At least around threaded holes 60, housing 6 is partially metallic, whereby the fastening devices 5, when fastened to the housing, are in permanent electrical contact with said housing 6.

[0034] On the connector foot portion 1, there is provided at least a hole 14 receiving said fastening devices 5. In the depicted example, there are provided four holes 14 distributed at the four corners of the foot portion 1.

[0035] Further, a metallic insert 4 is inserted in each hole 14. Each metallic insert 4 is in electrical contact with both the metal shield plate 3 and with the fastening devices 5 as it will be explained in details later on.

[0036] Turning to the base metal shield plate 3, the base metal shield plate 3 is made from a thin metallic sheet having a substantially rectangular shape similar to the rectangular shape of the foot portion 1, disposed parallel to a interface plane P which is perpendicular to the mating axis X.

[0037] The base metal shield plate 3 comprises a central opening 30 for the passage of electrical connections and holes 44 (at least one hole, four holes in the example) coaxially located relative to the holes 14 of the connector foot portion 1, the edge of each hole 44 comprising at least a slant elastic projection 33 extending toward the foot portion 1, and adapted to bear on the metallic insert 4. Further, the base metal shield plate 3 comprises four clips 32 (see Fig. 1a) engaging into corresponding recesses 18 provided in the connector foot portion. Clips 32 are extending substantially perpendicularly from the surface of the shield plate 3. Preferably, clips 32 have a pine tree shape in order to be retained once inserted into the recesses 18, whereby the metal shield plate 3 is firmly retained on the foot portion 1 prior to fastening with the fastening device 5, as illustrated in Fig 1b.

[0038] As a result of the above described assembly fastened on the housing 6, a permanent electrical contact is established between the housing 6 and the body shield member 22, via the metal shield plate 3 and the metallic insert 4. Therefore, advantageously according to the invention, there is provided a shielding continuity between the housing 6 and the connector body portion 2, hence ensuring an improved electromagnetic protection, both for the control unit itself and for the electromagnetic environment. This enables the outer surface of the housing 6 to be provided with any kind of suitable treatment such as painting, corrosion protection, or the like, which may be electrically insulating.

[0039] Turning now to Figure 3, the fastening device is exemplified by a screw 50 having a head 52, a bearing collar 51, a body 53 fitted with a male thread 54 received in the female thread 60 of the housing 6. The metallic insert 4 comprises a bottom section 41 bearing on the elastic projections 33 and a top section 42 bearing on the collar 51 of the screw.

[0040] The external surface of the metallic insert is adjacent to the internal surface of the hole 14. On the top area of the hole 14 is provided a border 17, protruding relative to the top edge 42b of the top section 42, along the mating axis X.

[0041] A local cutaway on the left side of the screw on Figure 3 shows the border 17 before screwing, whereas on the right side it is shown after screwing.

[0042] As a result, when the screw 50 is screwed, the border 17 is reached first by the collar 51, and is subsequently compressed down to a level which is defined by the top edge 42b of the top section 42 of the metallic insert 4.

[0043] Consequently, the compressed portion, being at least partially elastically deformed, acts as a brake for the screw 50 in order to avoid a loosening of the screw 50.

[0044] The invention is also directed to an assembly method for assembling a connector assembly 10 as described above to a housing 6, this method comprising the steps of:

- mounting the metal shield plate 3 on the connector foot portion 1, the metal shield plate 3 being retained in position by the clips 32 as above described,
- inserting metallic inserts 4 into holes 14,
- fastening the connector assembly thanks to fastening devices 5.

[0045] As a result, the body shield member 22 is in permanent electrical contact with the metal shield plate 3 and the metal shield plate 3 is in permanent electrical continuity with the fastening devices 5, and the fastening devices are in permanent electrical continuity with the housing 6 via the metallic inserts 4.

[0046] The electrical continuity and the shielding continuity are therefore ensured from the connector body 2 to the electrical control device housing 6.

[0047] Further, the screw 50 compresses the border 17 during the screwing, and the compressed border, being at least partially elastically deformed, is adapted to brake the screw after screwing in order to avoid loosening of the screw 50.

Examples

Example 1: Salt spray tests for connection systems

1-Experimental parameters

[0048] Salt spray tests have been performed on the following connection systems:

- Sample A: connector assembly which does not comprise a metal shield plate, this connector assembly being fastened to a housing of an electrical device thanks to fastening devices.
- Sample B: connector assembly which comprises a metal shield plate made of aluminum alloy 1050, this connector assembly being fastened to a housing of an electrical device thanks to fastening devices.

[0049] The interface shielding measurement is measured before the tests. For that, samples A and B are put on a braid and the interface shielding measurement is measured between the terminals of a multimeter. The result of the interface resistance shielding is thus representative of the whole connection system.

[0050] Then, samples A and B are put in a salt fog chamber and are subjected to different tests. The parameters of the tests are summarized in table 1.

Table 1: Test parameters

Nature of the test	Duration (h)	Temperature (°C)	Tolerance (°C)	Relative humidity (%)	Tolerance (%)
Salt spray	4	35	+/-2	No requirement	
Drying	2	60	+/-2	Less than 30% RH	-
Temperature and humidity	2	50	+/-2	95	+/-5RH

[0051] One cycle takes 8 hours.

[0052] After 78 cycles, the interface shielding measurement of samples A and B is measured.

2- Results

[0053] The results are summarized in table 2 below.

Table 2

Sample	Rc initial (mΩ)	Rc after 78 cycles (mΩ)
A	234	725
B	276	273

[0054] The results clearly show that the connector assembly comprising a metal shield plate made of aluminum alloy 1050 (samples B) presents a very low difference between the interface resistance shielding before the spray tests and after 78 cycles of the spray tests compared to the connector assembly which does not comprise a metal shield plate.

3- Conclusions

[0055] These results underline that the presence of a metal plate made of aluminum alloy 1050 allows the decrease of the corrosion inside the connector assembly, especially in the interface area with the device.

Example 2: Comparison of the corrosion between metal shield plates made of different aluminum alloys

[0056] The following connection systems have been subjected to the salt tests described in example 1.

[0057] Sample 1: Connector assembly comprising a metal plate made of 1010 aluminum alloy (1XXX series); said connector assembly being fastened to a housing of an electrical device thanks to fastening devices.

[0058] Sample 2: Connector assembly comprising a metal plate made of 2017 aluminum alloy (2XXX series); said connector assembly being fastened to a housing of an electrical device thanks to fastening devices.

[0059] Sample 3: Connector assembly comprising a metal plate made of 5754 aluminum alloy (5XXX series); said connector assembly being fastened to a housing of an electrical device thanks to fastening devices.

[0060] After 80 cycles, the connector assemblies of samples 1, 2 and 3 have been disassembled from the housing of the electrical device to observe the corrosion visible to naked eyes.

[0061] The metal plate made of 1XXX series aluminum alloy presents the lowest corrosion whereas the metal plate made of 2XXX presents the highest corrosion.

[0062] These observations underline that the metal plate made of 1XXX present the best anti-corrosive properties.

Claims

1. A connector assembly (10), adapted to be fastened to a mounting support, comprising :

- a connector foot portion (1), adapted to be fastened to the mounting support (6) thanks to fastening devices (5), said connector foot portion (1) comprising a base metal shield plate (3),
- a connector body portion (2), extending away from the connector foot portion outwardly relative to the mounting support, and having a body shield member (22),

whereby the body shield member (22) is in electrical contact with the shield plate (3) and whereby the shield plate (3) is in electrical continuity with the fastening devices establishing a complete electrical continuity between the body shield member (22) and the mounting support (6),

wherein the connector foot portion (1) has at least a hole (14) receiving said fastening devices (5),

characterized in that a metallic insert (4) is inserted in the hole (14), this metallic insert being in electrical contact with the shield plate (3) and with the fastening devices (5).

2. Connector assembly (10) according to claim 1, wherein the shield plate (3) has a hole (44) coaxially located relative to the hole (14) of the connector foot portion (1), the hole (44) of the shield plate having at least a slant elastic projection (33) adapted to bear on the metallic insert (4).

3. Connector assembly (10) according to any of the claims 1-2, wherein the shield plate (3) is made of an aluminum alloy of 1XXX series.

4. Connector assembly (10) according to any of the claims 1-3, wherein the shield plate (3) has clips (32) received in the foot portion (1) whereby the shield plate (3) is retained on the foot portion (1).

5. Connector assembly (10) according to any of the claims 1-4, wherein the body shield member (22) has elastic lugs (23) bearing on the shield plate (3) for establishing the electrical contact between the body shield member (22) and the shield plate (3).

6. Connector assembly (10) according to claim 5, wherein the shield plate (3) has a central opening (30) with an oval shape substantially corresponding to the shape of the body shield member (22), and the elastic lugs (23) are distributed around the oval shape.

7. Connector assembly (10) according to any of the claims 1-6, wherein the fastening devices (5) comprise at least a screw (50) adapted to be received in a thread (60) in the mounting support (6).

8. Connector assembly (10) according to claim 7, wherein at least one hole (14) of receiving fastening devices has a border (17), this border protruding with respect to the metallic insert (4), whereby the border is compressed by the screw (50) after the screwing, and whereby said border is adapted to brake the screw after screwing in order to avoid loosening of the screw (50).

9. A connector assembly (10) according to claim 1, wherein:

- the connector foot portion (1) comprises at least three holes (14) and the fastening device being screws,
- the connector body portion is a substantially cylindrical connector body portion (2), extending away from the connector foot portion outwardly relative to an electrical control device, wherein the body shield member (22) is cylindrical with respect to a mating axis (X),
- wherein the shield plate (3) extends substantially in a plane (P) perpendicular to the mating axis (X),

- at least three metallic inserts (4) are inserted respectively in the holes (14),

wherein the shield plate (3) is in electrical contact with the metallic inserts (4), whereby said metallic inserts (4) are in electrical contact with the screws (50).

10. Connector assembly (10) according to claim 9, wherein each of the hole (14) has a border (17), said border protruding with respect to the metallic insert (4) along the mating axis (X), whereby the border is compressed by the screw (50) after the screwing, and whereby said border is adapted to brake the screw after screwing in order to avoid loosening of the screw (50).

11. Connection system comprising :

- a connector assembly (10) according to any of the claims 1 to 10,
- fastening devices (5),
- a mounting support (6),

wherein the fastening devices are adapted to fasten the connector assembly (10) on the mounting support (6), whereby the fastening devices (5) are in electrical contact with the mounting support (6).

12. Connection system comprising :

- a connector assembly (10) according to any of the claims 8 or 10,
- screws (50),
- a mounting support (6),

wherein the screws (50) are adapted to fasten the connector assembly on the mounting support, whereby the fastening devices are in electrical contact with the mounting support and whereby the screws (50) compress the border (17) after the screwing, and whereby said border is adapted to brake the screw after screwing in order to avoid loosening of the screw (50).

13. Assembly method for fastening a connector assembly (10) according to any of the claims 1 to 10, to a mounting support (6), comprising the steps of:

- mounting the shield plate (3) on the connector foot portion (1),
- inserting metallic inserts (4) into holes (14),
- fastening the connector assembly thanks to fastening devices (5) whereby said body shield member (22) is in electrical contact with the shield plate (3) and the shield plate (3) is in electrical continuity with the fastening devices (5), and whereby the fastening devices are in electrical continuity with the mounting support (6).

14. Assembly method for fastening a connector assembly (10) according to claim 13, whereby the fastening of the connector assembly is done by :

- screwing screws (50) in threads (60) of the mounting support (6) whereby the body shield member (22) is in electrical contact with the shield plate (3) and whereby said shield plate (3) is in electrical continuity with said screws, and whereby said screws are in electrical continuity with the mounting support (6), and whereby the screws (50) compress a border (17) of the hole (14) after the screwing, and whereby the border is adapted to brake the screw after screwing in order to avoid loosening of the screw (50).

15. A connector assembly (10) according to any of the claims 1 to 10, adapted to be fastened to a mounting support, comprising a connector foot portion (1), adapted to be fastened to the mounting support (6), and comprising a base metal shield plate (3), wherein the shield plate (3) is made of an aluminum alloy of 1XXX series.

Patentansprüche

1. Eine Verbinderanordnung (10), die ausgebildet ist, an einem Befestigungsträger befestigt zu werden, die aufweist:

- einen Verbinderfußteil (1), der ausgebildet ist, an dem Befestigungsträger (6) durch Befestigungsvorrichtungen (5) befestigt zu werden, wobei der Verbinderfußteil (1) eine Basismetallabschirmungsplatte (3) aufweist,
- einen Verbinderkörperteil (2), der sich von dem Verbinderfußteil weg relativ zu dem Befestigungsträger nach außen erstreckt und ein Körperabschirmungselement (22) hat,

wobei das Körperabschirmungselement (22) mit der Abschirmungsplatte (3) in elektrischem Kontakt ist und wobei die Abschirmungsplatte (3) in elektrischer Kontinuität mit den Befestigungsvorrichtungen ist, wobei eine vollständige elektrische Kontinuität zwischen dem Körperabschirmungselement (22) und dem Befestigungsträger (6) hergestellt wird,

wobei der Verbinderfußteil (1) zumindest ein Loch (14) zum Aufnehmen der Befestigungsvorrichtungen (5) hat, **dadurch gekennzeichnet, dass** ein Metalleinsatz (4) in das Loch (14) eingeführt ist, wobei dieser Metalleinsatz in elektrischem Kontakt mit der Abschirmungsplatte (3) und mit den Befestigungsvorrichtungen (5) ist.

2. Verbinderanordnung (10) gemäß Anspruch 1, wobei die Abschirmungsplatte (3) ein Loch (44) hat, das coaxial relativ zu dem Loch (14) des Verbinderfußteils (1) angeordnet ist, wobei das Loch (44) der Abschirmungsplatte zumindest einen schrägen elastischen Vorsprung (33) hat, der ausgebildet ist, auf dem Metalleinsatz (4) zu liegen.

3. Verbinderanordnung (10) gemäß einem der Ansprüche 1-2, wobei die Abschirmungsplatte (3) aus einer Aluminiumlegierung der Serie 1XXX besteht.

4. Verbinderanordnung (10) gemäß einem der Ansprüche 1-3, wobei die Abschirmungsplatte (3) Klammern (32) hat, die in dem Fußteil (1) aufgenommen sind, wobei die Abschirmungsplatte (3) an dem Fußteil (1) gehalten wird.

5. Verbinderanordnung (10) gemäß einem der Ansprüche 1-4, wobei das Körperabschirmungselement (22) elastische Laschen (23) hat, die auf der Abschirmungsplatte (3) liegen, zum Herstellen des elektrischen Kontakts zwischen dem Körperabschirmungselement (22) und der Abschirmungsplatte (3).

6. Verbinderanordnung (10) gemäß Anspruch 5, wobei die Abschirmungsplatte (3) eine zentrale Öffnung (30) mit einer ovalen Form im Wesentlichen entsprechend der Form des Körperabschirmungselements (22) hat, und die elastischen Laschen (23) um die ovale Form herum verteilt sind.

7. Verbinderanordnung (10) gemäß einem der Ansprüche 1-6, wobei die Befestigungsvorrichtungen (5) zumindest eine Schraube (50) aufweisen, die ausgebildet ist, in einem Gewinde (60) in dem Befestigungsträger (6) aufgenommen zu werden.

8. Verbinderanordnung (10) gemäß Anspruch 7, wobei zumindest ein Loch (14) von aufnehmenden Befestigungsvorrichtungen einen Rand (17) hat, wobei dieser Rand in Bezug auf den Metalleinsatz (4) vorsteht, wobei der Rand durch die Schraube (50) nach dem Einschrauben komprimiert wird, und wobei der Rand ausgebildet ist zum Halten der Schraube nach dem Einschrauben, um ein Lösen der Schraube (50) zu verhindern.

9. Verbinderanordnung (10) gemäß Anspruch 1, wobei:

- der Verbinderfußteil (1) zumindest drei Löcher (14) aufweist und die Befestigungsvorrichtung aus Schrauben besteht,
- der Verbinderkörperteil ein im Wesentlichen zylinderförmiger Verbinderkörperteil (2) ist, der sich von dem Verbinderfußteil weg relativ zu einer elektrischen Steuervorrichtung nach außen erstreckt, wobei das Körperabschirmungselement (22) zylinderförmig in Bezug auf eine Verbindungsachse (X) ist,
- wobei sich die Abschirmungsplatte (3) im Wesentlichen in einer Ebene (P) senkrecht zu der Verbindungsachse (X) erstreckt,
- zumindest drei Metalleinsätze (4) jeweils in die Löcher (14) eingefügt sind,

wobei die Abschirmungsplatte (3) in elektrischem Kontakt mit den Metalleinsätzen (4) ist, wobei die Metalleinsätze (4) in elektrischem Kontakt mit den Schrauben (50) sind.

10. Verbinderanordnung (10) gemäß Anspruch 9, wobei jedes der Löcher (14) einen Rand (17) hat, wobei der Rand in Bezug auf den Metalleinsatz (4) entlang der Verbindungsachse (X) vorsteht, wobei der Rand durch die Schraube (50) nach dem Einschrauben komprimiert wird, und wobei der Rand ausgebildet ist zum Halten der Schraube nach dem Einschrauben, um ein Lösen der Schraube (50) zu verhindern.

11. Verbindungssystem, das aufweist:

- eine Verbinderanordnung (10) gemäß einem der Ansprüche 1 bis 10,
- Befestigungsvorrichtungen (5),
- einen Befestigungsträger (6),

wobei die Befestigungsvorrichtungen ausgebildet sind zum Befestigen der Verbinderanordnung (10) an dem Befestigungsträger (6), wobei die Befestigungsvorrichtungen (5) in elektrischem Kontakt mit dem Befestigungsträger (6) sind.

12. Verbindungssystem, das aufweist:

- eine Verbinderanordnung (10) gemäß einem der Ansprüche 8 oder 10,
- Schrauben (50),
- einen Befestigungsträger (6),

wobei die Schrauben (50) ausgebildet sind zum Befestigen der Verbinderanordnung an dem Befestigungsträger, wobei die Befestigungsvorrichtungen in elektrischem Kontakt mit dem Befestigungsträger sind, und wobei die Schrauben (50) den Rand (17) nach dem Einschrauben komprimieren, und wobei der Rand ausgebildet ist zum Halten der Schraube nach dem Einschrauben, um ein Lösen der Schraube (50) zu verhindern.

13. Montageverfahren zum Befestigen einer Verbinderanordnung (10) gemäß einem der Ansprüche 1 bis 10 an einem Befestigungsträger (6), das die Schritte aufweist:

- Anbringen der Abschirmungsplatte (3) an dem Verbinderfußteil (1),
- Einfügen von Metalleinsätzen (4) in Löcher (14),
- Befestigen der Verbinderanordnung durch Befestigungsvorrichtungen (5), wobei das Körperabschirmungselement (22) mit der Abschirmungsplatte (3) in elektrischem Kontakt ist und die Abschirmungsplatte (3) in elektrischer Kontinuität mit den Befestigungsvorrichtungen (5) ist, und wobei die Befestigungsvorrichtungen in elektrischer Kontinuität mit dem Befestigungsträger (6) sind.

14. Montageverfahren zum Befestigen einer Verbinderanordnung (10) gemäß Anspruch 13, wobei das Befestigen der Verbinderanordnung durchgeführt wird durch:

- Einschrauben von Schrauben (50) in Gewinde (60) des Befestigungsträgers (6), wobei das Körperabschirmungselement (22) mit der Abschirmungsplatte (3) in elektrischem Kontakt ist und wobei die Abschirmungsplatte (3) in elektrischer Kontinuität mit den Schrauben ist, und wobei die Schrauben in elektrischer Kontinuität mit dem Befestigungsträger (6) sind, und wobei die Schrauben (50) einen Rand (17) des Lochs (14) nach dem Einschrauben komprimieren, und wobei der Rand ausgebildet ist zum Halten der Schraube nach dem Einschrauben, um ein Lösen der Schraube (50) zu verhindern.

15. Eine Verbinderanordnung (10) gemäß einem der Ansprüche 1 bis 10, die ausgebildet ist, an einem Befestigungsträger befestigt zu werden, aufweisend einen Verbinderfußteil (1), der ausgebildet ist an dem Befestigungsträger (6) befestigt zu werden, und aufweisend eine Basismetallabschirmungsplatte (3), wobei die Abschirmungsplatte (3) aus einer Aluminiumlegierung der Serie 1XXX besteht.

Revendications

1. Assemblage de connecteur (10), adapté à être fixé sur un support de montage, comprenant :

- une portion de pied de connecteur (1) adaptée à être fixée sur le support de montage (6) grâce à des dispositifs de fixation (5), ladite portion de pied de connecteur (1) comprenant une plaque de base en métal formant écran (3),
- une portion de corps de connecteur (2) s'étendant en éloignement de la portion de pied de connecteur vers l'extérieur par rapport au support de montage, et ayant un élément de corps formant écran (22),

dans lequel l'élément de corps formant écran (22) est en contact électrique avec la plaque formant écran (3), et

dans lequel la plaque formant écran (3) est en continuité électrique avec les dispositifs de fixation en établissant une continuité électrique complète entre l'élément de corps formant écran (22) et le support de montage (6), dans lequel la portion de pied de connecteur (1) a au moins un trou (14) recevant lesdits dispositifs de fixation (5), **caractérisé en ce qu'un** insert métallique (4) est inséré dans le trou (14), cet insert métallique étant en contact électrique avec la plaque formant écran (3) et avec les dispositifs de fixation (5).

2. Assemblage de connecteur (10) selon la revendication 1, dans lequel la plaque formant écran (3) comporte un trou (44) situé coaxialement par rapport au trou (14) de la portion de pied de connecteur (1), le trou (44) de la plaque formant écran ayant au moins une projection élastique en biais (33) adaptée à porter sur l'insert métallique (4).

3. Assemblage de connecteur (10) selon l'une quelconque des revendications 1 et 2, dans lequel la plaque formant écran (3) est réalisée en un alliage d'aluminium de la série 1XXX.

4. Assemblage de connecteur (10) selon l'une quelconque des revendications 1 à 3, dans lequel la plaque formant écran (3) comprend des pinces (32) reçues dans la portion de pied (1) grâce à quoi la plaque formant écran (3) est retenue sur la portion de pied (1).

5. Assemblage de connecteur (10) selon l'une quelconque des revendications 1 à 4, dans lequel l'élément de corps formant écran (22) comporte des pattes élastiques (23) portant sur la plaque formant écran (3) pour établir le contact électrique entre l'élément de corps formant écran (22) et la plaque formant écran (3).

6. Assemblage de connecteur (10) selon la revendication 5, dans lequel la plaque formant écran (3) a une ouverture centrale (30) avec une forme ovale qui correspond sensiblement à la forme de l'élément de corps formant écran (22), et les pattes élastiques (23) sont distribuées autour de la forme ovale.

7. Assemblage de connecteur (10) selon l'une quelconque des revendications 1 à 6, dans lequel les dispositifs de fixation (5) comprennent au moins une vis (50) adaptée à être reçue dans un taraudage (60) dans le support de montage (6).

8. Assemblage de connecteur (10) selon la revendication 7, dans lequel au moins un trou (14) destiné à recevoir des dispositifs de fixation comporte une bordure (17), cette bordure étant en projection par rapport à l'insert métallique (4), grâce à quoi la bordure est comprimée par la vis (50) après le vissage, et grâce à quoi ladite bordure est adaptée à freiner la vis après le vissage afin d'éviter un desserrage de la vis (50).

9. Assemblage de connecteur (10) selon la revendication 1, dans lequel :

- la portion de pied de connecteur (1) comprend au moins trois trous (14) et le dispositif de fixation est formé par des vis,
- la portion de corps de connecteur est une portion de corps de connecteur sensiblement cylindrique (2) qui s'étend en éloignement de la portion de pied de connecteur vers l'extérieur par rapport à un dispositif de commande électrique, dans lequel l'élément de corps formant écran (22) est cylindrique par rapport à un axe d'accouplement (X),
- dans lequel la plaque formant écran (3) s'étend sensiblement dans un plan (P) perpendiculaire à l'axe d'accouplement (X),
- au moins trois inserts métalliques (4) sont insérés respectivement dans les trous (14),

dans lequel la plaque formant écran (3) est en contact électrique avec les inserts métalliques (4), grâce à quoi lesdits inserts métalliques (4) sont en contact électrique avec les vis (50).

10. Assemblage de connecteur (10) selon la revendication 9, dans lequel chacun des trous (14) a une bordure (17), ladite bordure se projetant par rapport à l'insert métallique (4) le long de l'axe d'accouplement (X), grâce à quoi la bordure est comprimée par la vis (50) après le vissage, et grâce à quoi ladite bordure est adaptée à freiner la vis après le vissage, afin d'éviter un desserrage de la vis (50).

11. Système de connexion comprenant :

- un assemblage de connecteur (10) en accord avec l'une quelconque des revendications 1 à 10,
- des dispositifs de fixation (5),

- un support de montage (6),

dans lequel les dispositifs de fixation sont adaptés à fixer l'assemblage de connecteur (10) sur le support de montage (6), grâce à quoi les dispositifs de fixation (5) sont en contact électrique avec le support de montage (6).

12. Système de connexion comprenant :

- un assemblage de connecteur (10) selon l'une quelconque des revendications 8 ou 10,
- des vis (50),
- un support de montage (6),

dans lequel les vis (50) sont adaptées à fixer l'assemblage de connecteur sur le support de montage, grâce à quoi les dispositifs de fixation sont en contact électrique avec le support de montage et grâce à quoi les vis (50) compriment la bordure (17) après le vissage, et grâce à quoi ladite bordure est adaptée à freiner les vis après le vissage afin d'éviter un desserrage de la vis (50).

13. Procédé d'assemblage pour fixer un assemblage de connecteur (10) selon l'une quelconque des revendications 1 à 10 sur un support de montage (6), comprenant les étapes consistant à :

- monter la plaque formant écran (3) sur la portion de pied de connecteur (1),
- insérer des inserts métalliques (4) dans les trous (14),
- fixer l'assemblage de connecteur grâce à des dispositifs de fixation (5), grâce à quoi ledit élément de corps formant écran (22) est en contact électrique avec la plaque formant écran (3), et la plaque formant écran (3) est en continuité électrique avec les dispositifs de fixation (5), et grâce à quoi les dispositifs de fixation sont en continuité électrique avec le support de montage (6).

14. Procédé d'assemblage pour fixer un assemblage de connecteur (10) selon la revendication 13, dans lequel la fixation de l'assemblage connecteur est effectuée

- en vissant des vis (50) dans des taraudages (60) du support de montage (6) grâce à quoi l'élément de corps formant écran (22) est en contact électrique avec la plaque formant écran (3) et grâce à quoi ladite plaque formant écran (3) est en continuité électrique avec lesdites vis, et grâce à quoi lesdites vis sont en continuité électrique avec le support de montage (6), et grâce à quoi les vis (50) compriment une bordure (17) du trou (14) après le vissage, et grâce à quoi la bordure est adaptée à freiner la vis après le vissage afin d'éviter un desserrage de la vis (50).

15. Assemblage de connecteur (10) selon l'une quelconque des revendications 1 à 10, adapté à être fixé sur un support de montage, comprenant une portion de pied de connecteur (1), adaptée à être fixée sur le support de montage (6), et comprenant une plaque métallique de base formant écran (3),

dans lequel la plaque formant écran (3) est réalisée en un alliage d'aluminium de la série 1XXX.

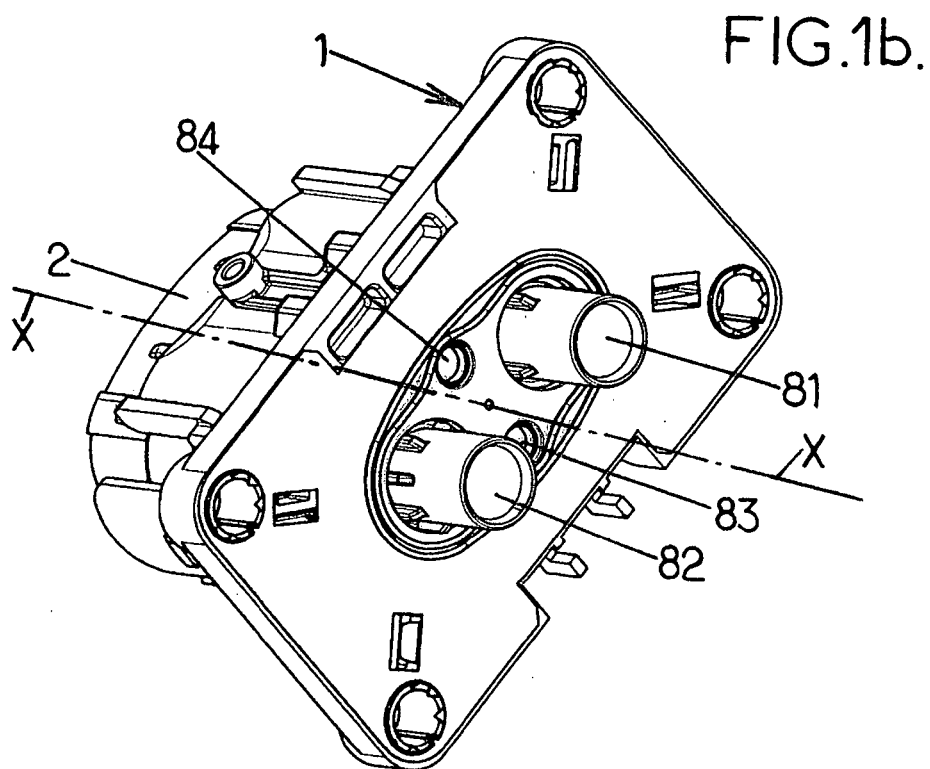
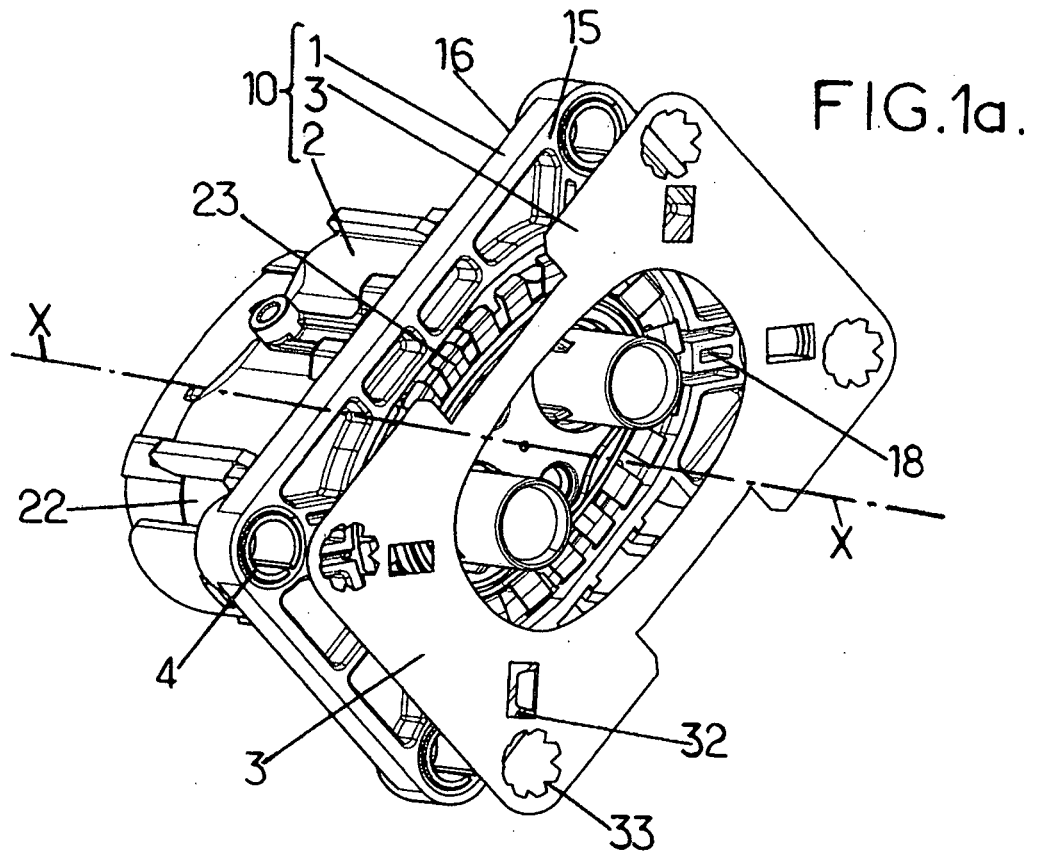


FIG.2.

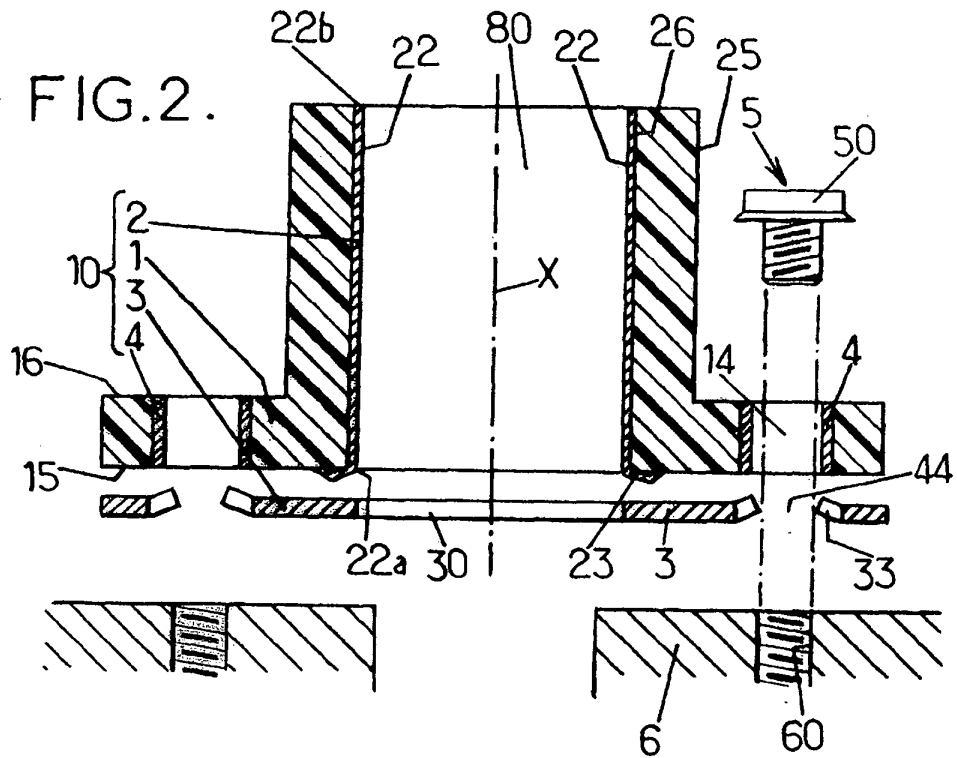
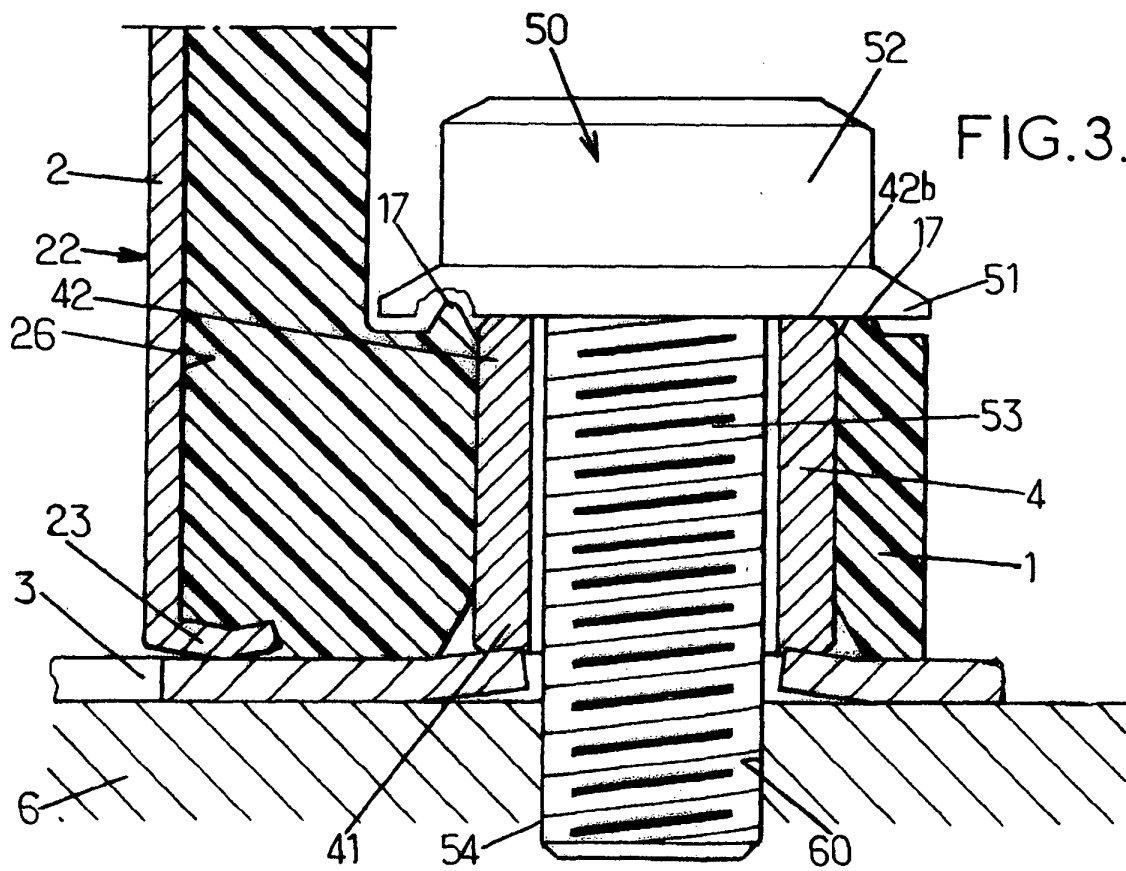


FIG.3.



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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