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(54) **ELECTRICAL CONNECTOR WITH TERMINAL PROTECTION AND CENTERING DEVICE**

ELEKTRISCHER VERBINDER MIT ANSCHLUSSSCHUTZ UND ZENTRIERUNGSEINRICHTUNG

CONNECTEUR ÉLECTRIQUE À DISPOSITIF DE PROTECTION DE BORNES ET DE CENTRAGE

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Description

[0001] The present invention relates to an electrical connector, such as a motorized vehicle connector, and also to a connector assembly comprising such an electrical connector.

[0002] Motorized vehicles comprise electrical circuits for powering motors, light bulbs, electronic devices, etc. These electrical circuits include electrical cables and connectors.

[0003] Such connectors may include a front plate or grid movable between a preassembly position, for protecting male terminals, and a closed position, allowing the coupling of the male terminals with corresponding female terminals provided on a complementary or counterpart connector.

[0004] Front plate of this type are used to protect the male terminals, which are formed as thin projecting pins, when the electrical connector is not coupled with a complementary electrical. By thin projecting pins, it is meant pins having for example a diameter smaller than 1,5 mm.

[0005] In the preassembly position, the front plate is located near the front end of the electric male terminals, protects them and prevents them from being deformed or damaged when they are not inserted in respective female terminals, or when the connector and its counterpart are being plugged in together.

[0006] When the connector is coupled with a complementary connector, the front plate is moved to a closed position against the front face of the housing of the connector so that the male terminals engage the respective female terminals of the complementary connector.

[0007] WO 2007/042534 discloses a connector according to the preamble of claim 1.

[0008] It is also known to center the male terminals relative to the female terminals by using female terminals having a funnel-shaped end and male terminals having a pointed end or by maintaining the terminals with a clearance inside their respective housings, so that the male and female terminals are allowed to move and adapt the tolerances without creating stress in their housings. Alternatively and more difficult to achieve, such connectors may be designed with more strict dimensioning tolerances in order to assure the correct positioning of the male terminals relative to the female terminals.

[0009] But in any case, if stress is applied on the cables attached to the male terminals transversally with regard the terminal longitudinal axis, the male terminals will tilt in their cavity and the alignment with the female terminals will be jeopardized.

[0010] It is an object of the present invention to provide an electrical connector incorporating, in a straightforward, reliable, low-cost manner, both the functions of protection of the terminals and centering of the male terminals relative to corresponding female terminals.

[0011] To this aim, the present invention relates to an electrical connector according to claim 1.

[0012] In this electrical connector, the protection and

the centering of the terminals are both carried out by a single element, i.e. the front plate, cooperating with the housing. The front plate is movable relative to the housing in a plane parallel to the front face of said housing, which enable to correctly position the male terminals relative to corresponding female terminals. The dimensioning tolerances of the connectors may therefore be enlarged and the terminals may be shaped as desired without worrying about the centering problem.

[0013] The present invention may also other optional features, considered either independently or in combination, of the electrical connector corresponding to claims 2 to 10 and the connector assembly corresponding to claims 11 to 13.

[0014] Other aspects and advantages of the invention will appear upon reading the following description, given by way of example and made with reference to the annexed drawings, wherein:

- Figure 1 is an exploded view of a connector assembly according to the invention,
- Figure 2 is a top view of an electrical connector according to the invention,
- Figure 3 is a section view taken along line III-III of Figure 2,
- Figure 4 is a section view taken along line IV-IV of Figure 3,
- Figure 5A and 5B are partial top views of an example of anchoring device for a connector assembly according to the invention.

[0015] In the description, the terms "front", "rear", "frontward", "rearward" are defined relative to an assembly direction A represented by an arrow in Figures 1, 3 and 4. The assembly direction A is the direction in which the electrical connector is coupled with a complementary connector, as it will be described later.

[0016] With reference to Figure 1, a connector assembly 1 is described. The connector assembly 1 comprises an electrical connector 2 for carrying male terminals 4 and a complementary electrical connector 6 for carrying female terminals (not shown). The electrical connector 2 comprises mainly a housing 8 for receiving and maintaining male terminals 4 and a front plate 34 or grid, the function of which is further explained below. The complementary connector 6 comprises a housing 48 and a casing 60.

[0017] The housing 8 comprises a plurality of longitudinal cavities 10 having respective axes parallel to the assembly direction A and for receiving respective male terminals 4, as shown on Figures 3 and 4. Each cavity 10 comprises a front opening 12 provided in the front face 14 of the housing 8 for the passage of the front end 16 of respective male terminals 4. The front end 16 of a male terminal is connected to an electrical cable 18 inserted in a cavity 10 through a rear opening of said cavity.

[0018] The male terminals 4 are maintained in the respective cavities 10 by primary retaining means cooperating with a retaining seat 20 provided on each terminal

4. As shown in Figure 4, the primary retaining means comprise, for each terminal 4, a first and a second elastic lances 22 and 24 projecting on opposite walls of a cavity 10 towards the center of said cavity and in direction A towards the front opening 12. The surface of each lance 22 and 24 has a tooth 26 which clicks inside the retaining seat 20 of the terminal 4. The tooth 26 has a profile designed for allowing the insertion of the terminal 4 past the lances 22 and 24 in the assembly direction A and for preventing the withdrawal of said terminal 4 in the opposite direction. To that end, each tooth 26 comprises a rear face 28 having a smooth slope and a front face 30 defining a stop preventing the withdrawal of the terminal 4.

[0019] A gap 32 is provided between each lance 22, 24 and the respective wall of the cavity 10 from which the lance 22, 24 projects. This gap 32 allows the lances 22, 24 to elastically deform towards the wall from which each lance projects during the insertion of the terminal 4. The lance shape is then restored toward a position in which it is less (or not) stressed and deformed. The terminal 4 is then retained inside the cavity 10. It is to be noted that when the terminal 4 is not fully or incorrectly inserted in the cavity 10, the lances 22, 24 remain deformed and project inside the gaps 32. The terminal 4 is then retained inside the cavity 10.

[0020] The front plate 34 is mounted on the front face 14 of the housing 8. The front plate 34 comprises a plurality of apertures 36 facing the front openings 12 of the cavities 10 and allowing the passage of the front ends 16 of the terminals 4.

[0021] The front plate 34 is arranged to protect the front ends 16 of the terminals 4 when the connector 2 is not coupled with a complementary connector 6 and during the plugging of the connector 2 and its counterpart or complementary connector 6. To this end, the front plate 34 is movable between a preassembly position, shown in Figures 3 and 4, for protecting the terminals 4, and a closed position (not shown), permitting the mating of the male terminals 4 with the corresponding female terminals carried by the complementary connector 6. In the preassembly position, the apertures 36 surround the front extremity of the front ends 16 of the terminals 4, and, in the closed position, the front plate 34 is placed against the front face 14 of the housing 8 and the front ends 16 of the terminals project frontward from said plate 34.

[0022] To assist the introduction of the front ends 16 of the terminals 4 in the apertures 36 and to guide said front ends toward the center of the apertures 36 during movement of the front plate 34, said front plate comprises guiding means provided on the rear face of the front plate 34. The guiding means are for example formed by two tabs 37 per aperture 36, said tabs 37 defining a substantially funnel-shape under and around each aperture 36, as shown in Figure 4. Therefore, when the front extremity of a terminal 4 meets a tab 37, the latter guides said front extremity towards the corresponding aperture 36.

[0023] A slight clearance is provided between the front

ends 16 of the terminals 4 and the apertures 36 of the front plate 34 in order to enable movement of said front plate 34 relative to the terminals 4 between the preassembly position and the closed position. This clearance is small enough for allowing the front plate 34 to drag the male terminal when it moves parallel to plane P, so that the guidance of the male terminals by the front plate is optimized.

[0024] In order to maintain the front plate 34 in the preassembly position when the connector 2 is not coupled with a complementary connector 6, the front plate 34 and the housing 8 comprise releasable mutual fixing means. These mutual fixing means comprise locking rods 38 extending frontward from the front face 14 of the housing 8. The housing 8 comprises for example four locking rods 38, each one of which being provided at a corner of the front face 14. As shown on Figure 1, each locking rod 38 comprises a fork made of two teeth 40. These teeth cooperate respectively with the front face and rear face of the front plate 34 around the opening 42 for interlocking with the front plate 34 and maintaining the front plate 34 in the preassembly position. Such mutual fixing means are for example described in FR-2 778 502.

[0025] As shown on Figure 2, the openings 42 are dimensioned so that a clearance 44 is provided between the locking rods 38 and the corresponding openings when the front plate 34 is maintained in the preassembly position. The clearance 44 is designed so that the front plate 34 is movable in a plane P parallel to the front face 14, i.e. a plane perpendicular to the assembly direction A. The front plate 34 is movable both in a direction according to the length of said plate and in a direction according to the width of said plate. Therefore, in the preassembly position, the front ends 16 of the terminals 4, which are located in the apertures 36, follow the movements of the front plate 34.

[0026] The front plate 34 further comprises means for maintaining the position of the front plate 34 relative to the complementary connector 6 in the plane P while plugging the connector 2 with a complementary connector 6. These means also enable the repositioning of the front plate 34 in its preassembly position when the connectors 2 and 6 are unplugged in. As shown in Figure 1, these means comprise at least an anchoring device 46 and at least an abutment projection provided on a wall of the housing 48 for receiving the anchoring device 46. The anchoring device 46 penetrates in the housing 48 during the coupling of the connector 2 with the complementary connector 6 and prevents the movement of the front plate 34 relative to the complementary connector 6.

[0027] The anchoring device 46 comprises an arm 50 extending frontward from the front plate 34. The arm is for example disposed on a side of the front plate 34 near a corner thereof. The arm 50 comprises an elastic branch 52 and a rigid branch 54 linked together as shown in Figure 3.

[0028] Figures 5A and 5B illustrate an example of arm 50 and the way the arm 50 engages the housing 48.

According to this example, the front plate 34 and the housing 8 are brought closer to the complementary connector 6, here a female connector, comprising the housing 48 and the casing 60.

[0029] First, the front plate 34 remains floating but maintained by the locking rods 38 on the housing 8 while the connector and its counterpart or complementary connector are brought closer. Parts of the connector and its counterpart connector may help to guide them during this first approach step.

[0030] Then, the connector and its counterpart connector are close enough so that at least one arm 50 can interact with at least one notch 58 provided on the housing 48. The chamfered end 59 of the arm 50 is guided into the notch 58 as shown on Figure 5A. During this second approach step, the four arms 50 help to self-center the front plate 34. At this stage, the male and female terminals are still not interacting with each other and the front plate 34 is still floating with regard to the housing 8, but the front plate begins to be referenced with regard to the housing 48 and consequently with regard to the female terminals.

[0031] Each elastic branch 52 further comprises at least one tooth 56 and each notch 58 comprises at one the abutment projections 49.

[0032] The housing 48 is provided with the casing 60 of the complementary connector 6. The housing is for example a locking plate 62 as shown in Figure 1. Such a locking plate 62 is known from the man of the art and is movable between a preassembly position and a closed position and is arranged to determine correct engagement of the female terminals in the complementary connector 6 and prevent release of said female terminals from the complementary connector 6 when the terminals are correctly engaged therein. Such a locking plate 62 further prevents the coupling of the complementary connector 6 with a connector 2 if the locking plate 62 is not in the closed position. Such a locking plate 62 being known, it will not be further described here.

[0033] During a third step, shown on Figure 5B, the arms 50 clicks into the notches 58 when the protrusions or tooth 56 of the anchoring devices 46 pass behind the abutment projections 49 of the housing 48. Indeed, each protrusion 56 is elastically pushed behind the projection 49 thanks to the elastic branch 52. The front plate 34 is then secured to the housing 48 and is no longer floating with regard neither to the housing 8 of the connector 2 or the housing 48 of the complementary connector 6. At this stage the front ends 16 are in alignment with the apertures 17 of the locking plate 62, in a waiting position, in which the front ends 16 does not mate the female terminals, but the connector 2 and the complementary connector 6 are locked together.

[0034] While the front plate 34 is referenced and centered relative to the complementary connector 6 (since it is allowed to move in the plane P thanks to the above mentioned clearance), the male terminals 4 follow the movement of the front plate 34. They are then precisely

centered relative to the corresponding female terminals because the front plate 34 is centered and maintained relative to the complementary connector 6. At this stage the front plate 34 and the locking plate 62 are located face to face, close to each other. The male terminals are therefore easily and correctly positioned relative to the corresponding female terminals.

[0035] During a fourth step, the locking rods are actuated by a locking device (not shown) so as to make the front plate 34 free to come closer to the housing 8. Then the connector 2 and the complementary connector 6 can be further plugged in. While the connector 2 and the complementary connector 6 are further brought together, the male and female terminals are guided by the front plate 34 in the apertures 17 and can mate without any risk of damages.

[0036] The elastic branch 52 pushes the rigid branch 54 in abutment against an edge of the notch 58 so that the front plate 34 is firmly maintained relative to the complementary connector 6 in order to prevent relative movement of the front plate 34 relative to the complementary connector 6 in the plane P.

[0037] The abutment projection 49 has a smooth slope, enabling the passage of the tooth 56 during the insertion of the arm 50 in the notch 58, and an abutment surface resisting to the passage of the tooth 56 during the withdrawal of the arm 50 from said housing 48. When unplugging the connectors 2 and 6, the abutment projection of the housing 48 pulls the tooth 56 in the direction A which causes the front plate 34 to move towards its preassembly position. Once the front plate 34 is in the preassembly position, the locking rods 38 interact with the front plate 34 with a greater force than the force needed to release the tooth 56 from the abutment projection. Therefore, the complementary connector 6 can be decoupled from the connector 2 while the front plate 34 remains in its preassembly position.

[0038] The above described connector 2 and connection device 1 are particularly simple to produce and to use, the protection of the terminals and the centering of said terminals being both carried out by a single element, i.e. the front plate 34.

[0039] The connector is less fragile and easy to handle.

[0040] Changes can be made without departing from the scope of the present invention.

Claims

1. Electrical connector (2) comprising:

- a housing (8) defining a number of cavities (10) for housing respective male terminals (4), each cavity (10) comprising a front opening (12) provided in the front face (14) of the housing (8) for the passage of a male terminal (4),
- a front plate (34) comprising apertures (36) for the passage of the male terminals (4), and being

- movable between a preassembly position, for protecting the terminals (4), and a closed position, designed to be hold when a complementary connector (6) is plugged in with said electrical connector (2) for mating the male terminals (4) with corresponding female terminals provided on the complementary connector (6); **characterized by** the front plate (34) and the housing (8) comprising releasable mutual fixing means (38) for maintaining the front plate (34) in the preassembly position, wherein said releasable mutual fixing means are arranged so that the front plate (34) is movable, in the preassembly position, in a plane (P) parallel to the front face (14) of the housing (8).
2. Electrical connector according to claim 1, wherein the fixing means (38, 34) comprise locking rods (38) extending frontward from the front face (14) of the housing (8), the locking rods (38) comprising at least a tooth (40) for interlocking with the front plate (34) and maintaining said front plate (34) in the preassembly position.
 3. Electrical connector according to claim 2, wherein the locking rods (38) cooperate with the front plate (34) with a clearance (44) in the preassembly position in order to enable movement of the front plate (34) in the plane (P) parallel to the front face (14) in said preassembly position.
 4. Electrical connector according to any of claims 1 to 3, wherein the rear face of the front plate (34) comprises guiding means to guide the male terminals (4) into respective apertures (36).
 5. Electrical connector according to claim 4, wherein the guiding means comprise tabs (37) extending from the rear face of the front plate (34) towards the housing (8) and defining a substantially funnel-shape.
 6. Electrical connector according to any of claims 1 to 5, comprising means (46, 48) to maintain the position of the front plate (34) relative to the complementary connector (6) in said plane (P) during the coupling of the connector (2) with a complementary connector (6).
 7. Electrical connector according to claim 6, wherein the means (46, 48) to maintain the position of the front plate (34) also comprises hooking means for holding back the front plate (34) and draw it along up to its preassembly position when the connector (2) and the complementary connector (6) are unplugged.
 8. Electrical connector according to claim 6 or 7, wherein the means (46, 48) to maintain the position of the front plate (34) relative to the complementary connector (6) in the plane (P) parallel to the front face (14) of the connector (2) comprise at least an anchoring device (46) for cooperating with at least an abutment projection provided on a wall of a housing (48) for receiving the anchoring device (46) provided in the complementary connector (6).
 9. Electrical connector according to claim 8, wherein
 - the anchoring device (46) comprises an arm (50) extending frontward from the front plate (34), this arm comprising at least a tooth (56),
 - the housing (48) comprises an abutment projection having a smooth slope, enabling the passage of the tooth (56) during the insertion of the arm (50) in the housing (48), and an abutment surface resisting to the passage of the tooth (56) during the withdrawal of the arm (50) from said housing (48).
 10. Electrical connector according to claim 9, wherein the arm (50) comprises an elastic branch (52) and a rigid branch (54), the elastic branch (52) pushing said rigid branch (54) in abutment against the housing (48) for receiving the anchoring device (46) in order to prevent relative movement of the front plate (34) relative to the complementary connector (6) in the plane parallel (P) to the front face (14) of the housing (8).
 11. Connector assembly (1) comprising an electrical connector (2) carrying male terminals (4) and a complementary electrical connector (6) carrying female terminals, wherein the electrical connector (2) carrying male terminals (4) comprises:
 - a housing (8) defining a number of cavities (10) for housing respective male terminals (4), each cavity (10) comprising a front opening (12) provided in the front face (14) of the housing (8) for the passage of a male terminal (4),
 - a front plate (34) comprising apertures (36) for the passage of the male terminals (4), and being movable between a preassembly position, for protecting the terminals (4), and a closed position, designed to be hold when a complementary connector (6) is plugged in with said electrical connector (2) for mating the male terminals (4) with corresponding female terminals provided on the complementary connector (6),
 - the front plate (34) and the housing (8) comprising releasable mutual fixing means (38) for maintaining the front plate (34) in the preassembly position, wherein said releasable mutual fixing means are arranged so that the front plate

(34) is movable, in the preassembly position, in a plane (P) parallel to the front face (14) of the housing (8).

12. Connector assembly according to claim 11, wherein the releasable mutual fixing means of the front plate (34) and the housing (8) are operated by the complementary electrical connector (6) carrying female terminals, said complementary electrical connector (6) comprising a projection for releasing the mutual fixing means and enabling the front plate (34) to move from its preassembly position to its closed position.
13. Connector assembly according to claim 11 or 12, wherein the electrical connector (2) carrying male terminals (4) and the complementary electrical connector (6) carrying female terminals comprise means (46, 48) to maintain the position of the front plate (34) relative to the complementary connector (6) in said plane (P) while plugging the connector (2) with the complementary connector (6).

Patentansprüche

1. Elektrischer Verbinder (2), der aufweist:

- ein Gehäuse (8), das eine Anzahl von Hohlräumen (10) definiert zur Aufnahme jeweiliger Stecker (4), wobei jeder Hohlraum (10) eine vordere Öffnung (12) aufweist, die in der Vorderfläche (14) des Gehäuses (8) vorgesehen ist zum Durchlass eines Steckers (4),
- eine Vorderplatte (34), die Öffnungen (36) aufweist für den Durchlass der Stecker (4) und zwischen einer Vormontageposition, zum Schutz der Anschlüsse (4), und einer geschlossenen Position bewegbar ist, die ausgebildet ist, gehalten zu werden, wenn ein komplementärer Verbinder (6) mit dem elektrischen Verbinder (2) gekoppelt wird zum Verbinden der Stecker (4) mit entsprechenden Buchsen, die an dem komplementären Verbinder (6) vorgesehen sind; **dadurch gekennzeichnet, dass** die Vorderplatte (34) und das Gehäuse (8) lös- bare gegenseitige Befestigungsmittel (38) aufweisen zum Halten der Vorderplatte (34) in der Vormontageposition, wobei die lös- baren gegenseitigen Befestigungsmittel derart angeordnet sind, dass die Vorderplatte (34), in der Vormontageposition, in einer Ebene (P) parallel zu der Vorderfläche (14) des Gehäuses (8) bewegbar ist.

2. Elektrischer Verbinder gemäß Anspruch 1, wobei die Befestigungsmittel (38, 34) Verriegelungsstäbe (38) aufweisen, die sich von der Vorderfläche (14) des

Gehäuses (8) nach vorne erstrecken, wobei die Verriegelungsstäbe (38) zumindest einen Zahn (40) aufweisen zum Verriegeln mit der Vorderplatte (34) und Halten der Vorderplatte (34) in der Vormontageposition.

3. Elektrischer Verbinder gemäß Anspruch 2, wobei die Verriegelungsstäbe (38) mit der Vorderplatte (34) mit einem Zwischenraum (44) in der Vormontageposition zusammenwirken, um eine Bewegung der Vorderplatte (34) in der Ebene (P) parallel zu der Vorderfläche (14) in der Vormontageposition zu ermöglichen.

4. Elektrischer Verbinder gemäß einem der Ansprüche 1 bis 3, wobei die hintere Fläche der Vorderplatte (34) Führungsmittel aufweist, um die Stecker (4) in jeweilige Öffnungen (36) zu führen.

5. Elektrischer Verbinder gemäß Anspruch 4, wobei die Führungsmittel Vorsprünge (37) aufweisen, die sich von der hinteren Fläche der Vorderplatte (34) hin zu dem Gehäuse (8) erstrecken und eine im Wesentlichen Trichterform definieren.

6. Elektrischer Verbinder gemäß einem der Ansprüche 1 bis 5, der Mittel (46, 48) aufweist zum Halten der Position der Vorderplatte (34) relativ zu dem komplementären Verbinder (6) in der Ebene (P) während des Koppelns des Verbinders (2) mit einem komplementären Verbinder (6).

7. Elektrischer Verbinder gemäß Anspruch 6, wobei das Mittel (46, 48) zum Halten der Position der Vorderplatte (34) weiter Hakenmittel aufweist zum Zurückhalten der Vorderplatte (34) und Ziehen dieser bis zu ihrer Vormontageposition, wenn der Verbinder (2) und der komplementäre Verbinder (6) getrennt sind.

8. Elektrischer Verbinder gemäß Anspruch 6 oder 7, wobei die Mittel (46, 48) zum Halten der Position der Vorderplatte (34) relativ zu dem komplementären Verbinder (6) in der Ebene (P) parallel zu der Vorderfläche (14) des Verbinders (2) zumindest eine Verankerungsvorrichtung (46) aufweisen zum Zusammenwirken mit zumindest einem Anschlagvorsprung, der an einer Wand eines Gehäuses (48) vorgesehen ist zur Aufnahme der Verankerungsvorrichtung (46), die in dem komplementären Verbinder (6) vorgesehen ist.

9. Elektrischer Verbinder gemäß Anspruch 8, wobei

- die Verankerungsvorrichtung (46) einen Arm (50) aufweist, der sich von der Vorderplatte (34) nach vorne erstreckt, wobei dieser Arm zumindest einen Zahn (56) aufweist,

- das Gehäuse (48) einen Anschlagvorsprung aufweist mit einer gleichmäßigen Neigung, die den Durchlass des Zahns (56) während des Einfügens des Arms (50) in das Gehäuse (48) ermöglicht, und eine Anschlagfläche, die dem Durchlass des Zahns (56) während des Herausziehens des Arms (50) aus dem Gehäuse (48) widersteht.
10. Elektrischer Verbinder gemäß Anspruch 9, wobei der Arm (50) einen elastischen Abschnitt (52) und einen starren Abschnitt (54) aufweist, wobei der elastische Abschnitt (52) den starren Abschnitt (54) in einen Anschlag gegen das Gehäuse (48) drückt zur Aufnahme der Verankerungsvorrichtung (46), um eine relative Bewegung der Vorderplatte (34) relativ zu dem komplementären Verbinder (6) in der Ebene (P) parallel zu der Vorderfläche (14) des Gehäuses (8) zu verhindern.
11. Verbinderanordnung (1), die einen elektrischen Verbinder (2), der Stecker (4) aufweist, und einen komplementären elektrischen Verbinder (6) aufweist, der Buchsen aufweist, wobei der elektrische Verbinder (2) mit den Steckern (4) aufweist:
- ein Gehäuse (8), das eine Anzahl von Hohlräumen (10) definiert zur Aufnahme jeweiliger Stecker (4), wobei jeder Hohlraum (10) eine vordere Öffnung (12) aufweist, die in der Vorderfläche (14) des Gehäuses (8) vorgesehen ist zum Durchlass eines Steckers (4),
 - eine Vorderplatte (34), die Öffnungen (36) aufweist für den Durchlass der Stecker (4) und die zwischen einer Vormontageposition, zum Schutz der Anschlüsse (4), und einer geschlossenen Position bewegbar ist, die ausgebildet ist, gehalten zu werden, wenn ein komplementärer Verbinder (6) mit dem elektrischen Verbinder (2) gekoppelt wird zum Verbinden der Stecker (4) mit entsprechenden Buchsen, die an dem komplementären Verbinder (6) vorgesehen sind; wobei die Vorderplatte (34) und das Gehäuse (8) lösbare gegenseitige Befestigungsmittel (38) aufweisen zum Halten der Vorderplatte (34) in der Vormontageposition, wobei die lösbaren gegenseitigen Befestigungsmittel derart angeordnet sind, dass die Vorderplatte (34), in der Vormontageposition, in einer Ebene (P) parallel zu der Vorderfläche (14) des Gehäuses (8) bewegbar ist.
12. Verbinderanordnung gemäß Anspruch 11, wobei die lösbaren gegenseitigen Befestigungsmittel der Vorderplatte (34) und des Gehäuses (8) durch den komplementären elektrischen Verbinder (6) betätigt werden, der Buchsen aufweist, wobei der komplementäre elektrische Verbinder (6) einen Vorsprung auf-

weist zum Lösen der gegenseitigen Befestigungsmittel und Ermöglichen für die Vorderplatte (34), aus ihrer Vormontageposition in ihre geschlossene Position zu gehen.

13. Verbinderanordnung gemäß Anspruch 11 oder 12, wobei der elektrische Verbinder (2), der Stecker (4) aufweist, und der komplementäre elektrische Verbinder (6), der Buchsen aufweist, Mittel (46, 48) aufweisen zum Beibehalten der Position der Vorderplatte (34) relativ zu dem komplementären Verbinder (6) in der Ebene (P) während des Verbindens des Verbinders (2) mit dem komplementären Verbinder (6).

Revendications

1. Connecteur électrique (2) comprenant :

- un boîtier (8) définissant un certain nombre de cavités (10) pour loger des bornes mâles respectives (4), chaque cavité (10) comprenant une ouverture frontale (12) prévue dans la face frontale (14) du boîtier (8) pour le passage d'une borne mâle (4),
- une plaque frontale (34) comprenant des ouvertures (36) pour le passage des bornes mâles (4), et étant mobile entre une position de préassemblage, afin de protéger les bornes (4), et une position fermée, conçue pour être maintenue quand un connecteur complémentaire (6) est branché avec ledit connecteur électrique (2) pour accoupler les bornes mâles (4) avec des bornes femelles correspondantes prévues sur le connecteur complémentaire (6) ;

caractérisé en ce que la plaque frontale (34) et le boîtier (8) comprennent des moyens de fixation mutuelle libérables (38) pour maintenir la plaque frontale (34) dans la position de préassemblage, dans lequel lesdits moyens de fixation mutuelle libérables sont agencés de telle façon que la plaque frontale (34) est déplaçable, dans la position de préassemblage, dans un plan (P) parallèle à la face frontale (14) du boîtier (8).

2. Connecteur électrique selon la revendication 1, dans lequel les moyens de fixation (38, 34) comprennent des barres de blocage (38) qui s'étendent vers l'avant depuis la face frontale (14) du boîtier (8), les barres de blocage (38) comprenant au moins une dent (40) pour être interverrouillées avec la plaque frontale (34) et maintenir ladite plaque frontale (34) dans la position de préassemblage.
3. Connecteur électrique selon la revendication 2, dans lequel les barres de blocage (38) coopèrent avec la plaque frontale (34) avec un jeu (44) dans la position

de préassemblage afin de permettre un mouvement de la plaque frontale (34) dans le plan (P) parallèlement à la face frontale (14) dans ladite position de préassemblage.

4. Connecteur électrique selon l'une quelconque des revendications 1 à 3, dans lequel la face postérieure de la plaque frontale (34) comprend des moyens de guidage pour guider les bornes mâles (4) jusque dans des ouvertures respectives (36).

5. Connecteur électrique selon la revendication 4, dans lequel les moyens de guidage comprennent des languettes (37) s'étendant depuis la face postérieure de la plaque frontale (34) vers le boîtier (8) et définissant sensiblement une forme en entonnoir.

6. Connecteur électrique selon l'une quelconque des revendications 1 à 5, comprenant des moyens (46, 48) pour maintenir la position de la plaque frontale (34) par rapport au connecteur complémentaire (6) dans ledit plan (P) pendant l'accouplement du connecteur (2) avec un connecteur complémentaire (6).

7. Connecteur électrique selon la revendication 6, dans lequel les moyens (46, 48) pour maintenir la position de la plaque frontale (34) comprennent également des moyens d'accrochage pour retenir la plaque frontale (34) et la tirer jusqu'à sa position de préassemblage quand le connecteur (2) et le connecteur complémentaire (6) sont débranchés.

8. Connecteur électrique selon la revendication 6 ou 7, dans lequel les moyens (46, 48) pour maintenir la position de la plaque frontale (34) par rapport au connecteur complémentaire (6) dans le plan (P) parallèlement à la plaque frontale (14) du connecteur (2) comprennent au moins un dispositif d'ancrage (46) pour coopérer avec au moins une projection de butée prévue sur une paroi d'un boîtier (48) pour recevoir le dispositif d'ancrage (46) prévu dans le connecteur complémentaire (6).

9. Connecteur électrique selon la revendication 8, dans lequel

- le dispositif d'ancrage (46) comprend un bras (50) qui s'étend vers l'avant depuis la plaque frontale (34), ce bras comprenant au moins une dent (56),
- le boîtier (48) comprend une projection de butée ayant une pente douce, permettant le passage de la dent (56) pendant l'insertion du bras (50) dans le boîtier (48), et une surface de butée qui résiste au passage de la dent (56) pendant l'extraction du bras (50) hors dudit boîtier (48).

10. Connecteur électrique selon la revendication 9, dans

lequel le bras (30) comprend une branche élastique (52) et une branche rigide (54), la branche élastique (52) poussant ladite branche rigide (54) en butée contre le boîtier (48) pour recevoir le dispositif d'ancrage (46) afin d'empêcher un mouvement relatif de la plaque frontale (34) par rapport au connecteur complémentaire (6) dans le plan (P) parallèle à la face frontale (14) du boîtier (8).

11. Assemblage connecteur (1) comprenant un connecteur électrique (2) portant des bornes mâles (4) et un connecteur électrique complémentaire (6) portant des bornes femelles, dans lequel le connecteur électrique (2) portant des bornes mâles (4) comprend :

- un boîtier (8) définissant un certain nombre de cavités (10) pour loger des bornes mâles respectives (4), chaque cavité (10) comprenant une ouverture frontale (12) prévue dans la face frontale (14) du boîtier (8) pour le passage d'une borne mâle (4),
- une plaque frontale (34) comprenant des ouvertures (36) pour le passage des bornes mâles (4), et étant déplaçable entre une position de préassemblage, afin de protéger les bornes (4), et une position fermée, conçue pour être maintenue quand un connecteur complémentaire (6) est branché avec ledit connecteur électrique (2) pour accoupler les bornes mâles (4) avec des bornes femelles correspondantes prévues sur le connecteur complémentaire (6), la plaque frontale (34) et le boîtier (8) comprenant des moyens de fixation mutuelle libérables (38) pour maintenir la plaque frontale (34) dans la position de préassemblage, dans lequel lesdits moyens de fixation mutuelle libérables sont agencés de telle façon que la plaque frontale (34) et déplaçable, dans la position de préassemblage, dans un plan (P) parallèlement à la face frontale (14) du boîtier (8).

12. Assemblage connecteur selon la revendication 11, dans lequel les moyens de fixation mutuelle libérables de la plaque frontale (34) et du boîtier (8) sont actionnés par le connecteur électrique complémentaire (6) portant des bornes femelles, ledit connecteur électrique complémentaire (6) comprenant une projection pour libérer les moyens de fixation mutuelle et permettre à la plaque frontale (34) de se déplacer depuis sa position de préassemblage vers sa position fermée.

13. Assemblage connecteur selon la revendication 11 ou 12, dans lequel le connecteur électrique (2) portant des bornes mâles (4) et le connecteur électrique complémentaire (6) portant des bornes femelles comprennent des moyens (46, 48) pour maintenir la position de la plaque frontale (34) par rapport au con-

necteur complémentaire (6) dans ledit plan (P) lorsque l'on branche le connecteur (2) avec le connecteur complémentaire. (6).

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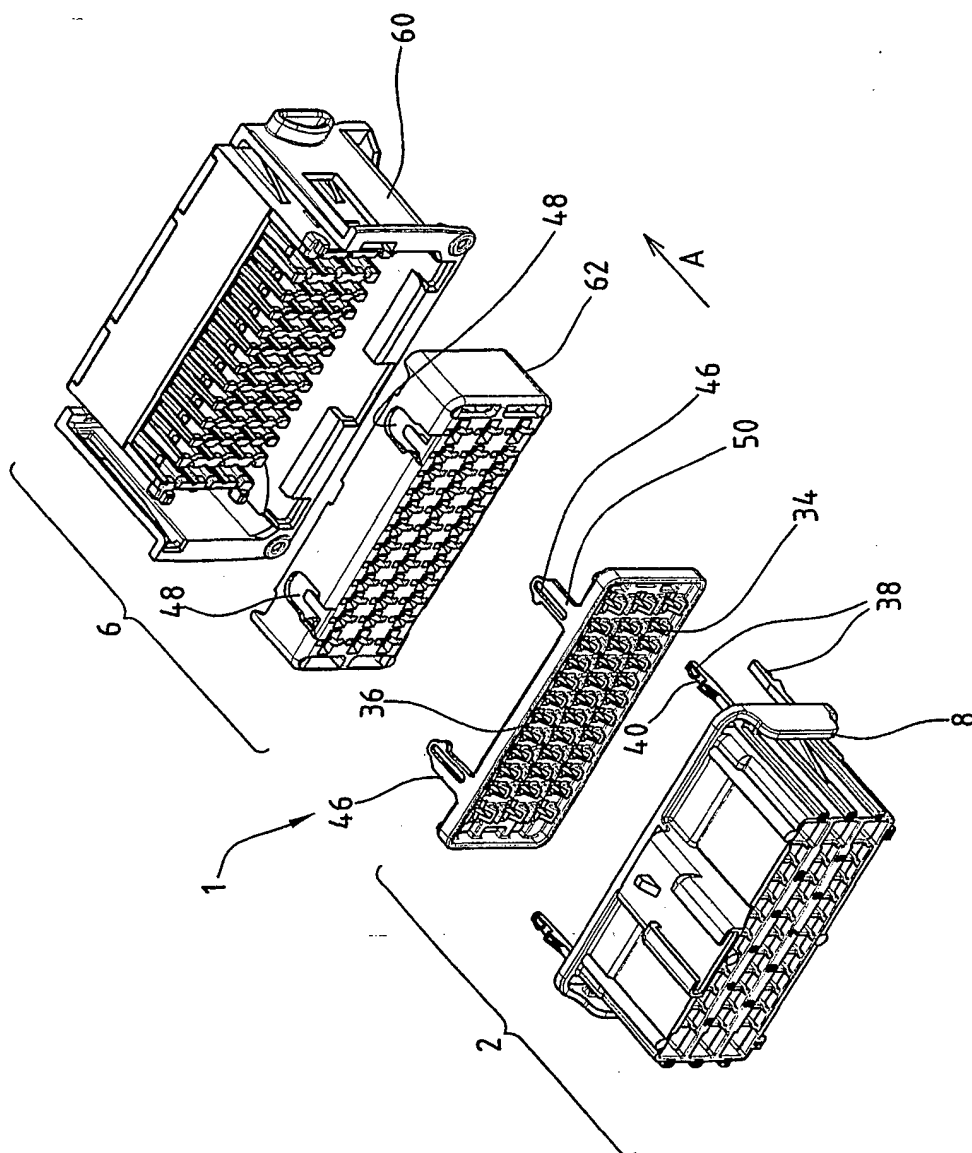


FIG.1

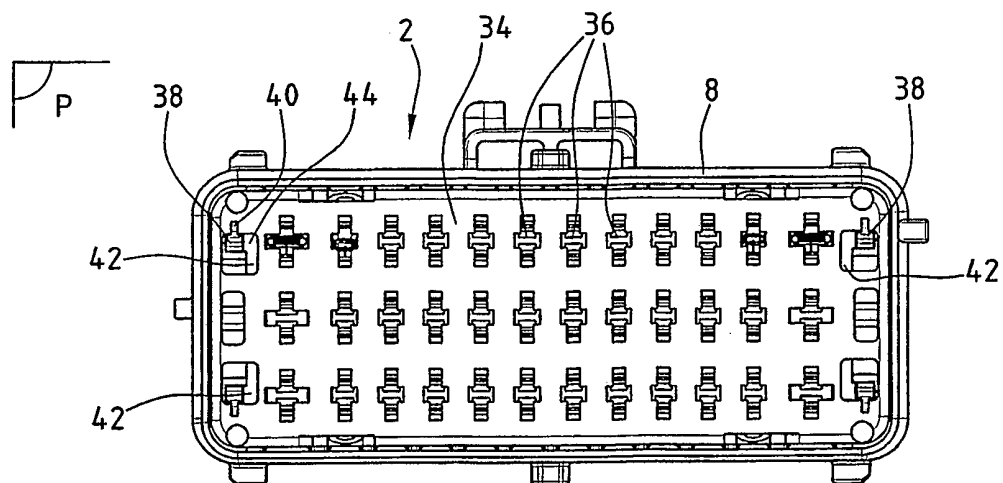


FIG. 2

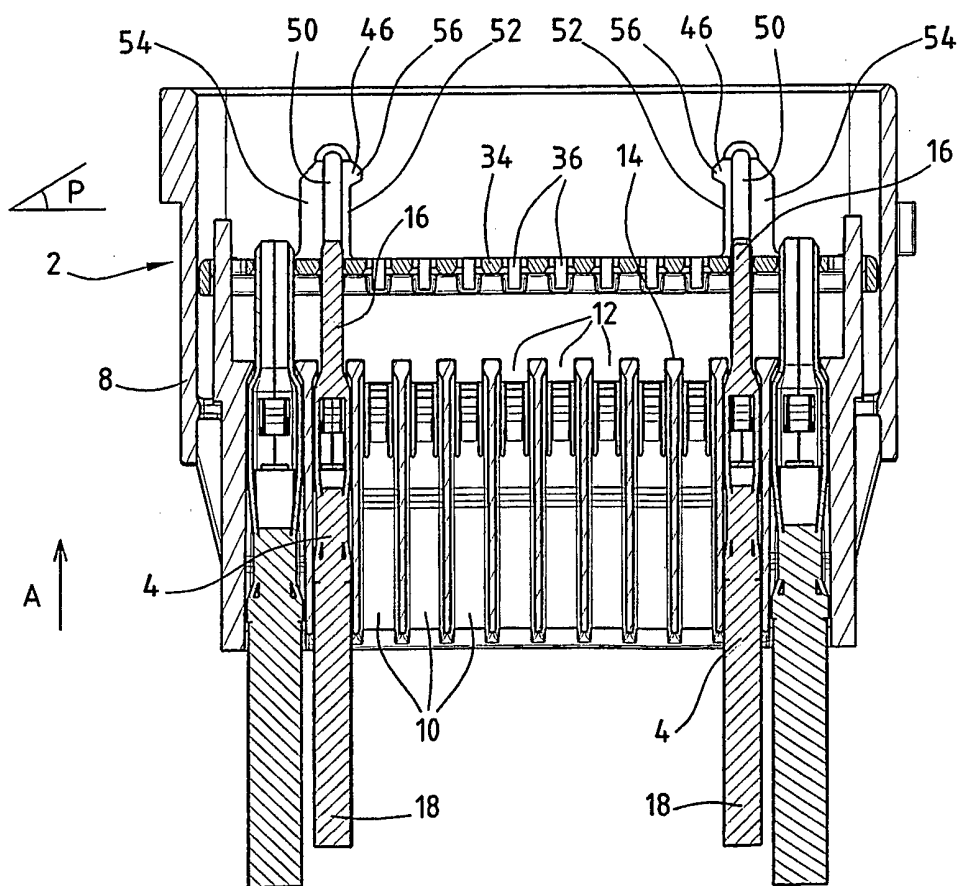
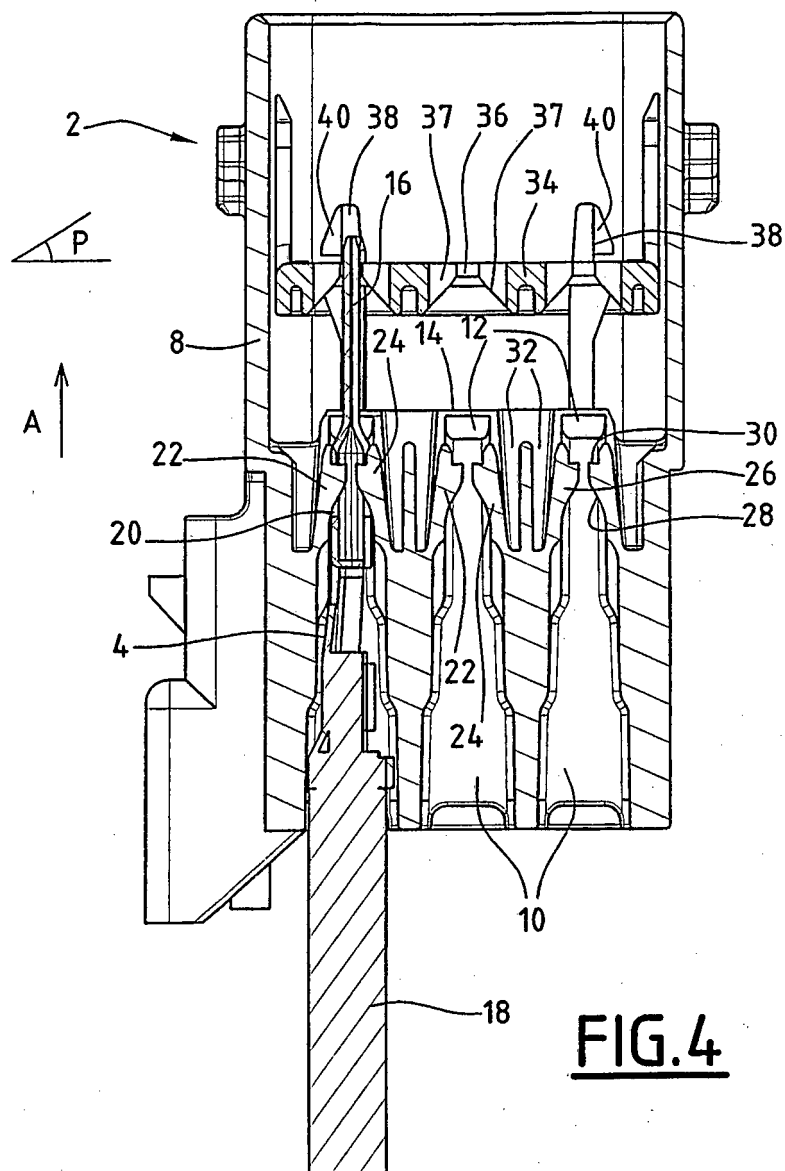


FIG. 3



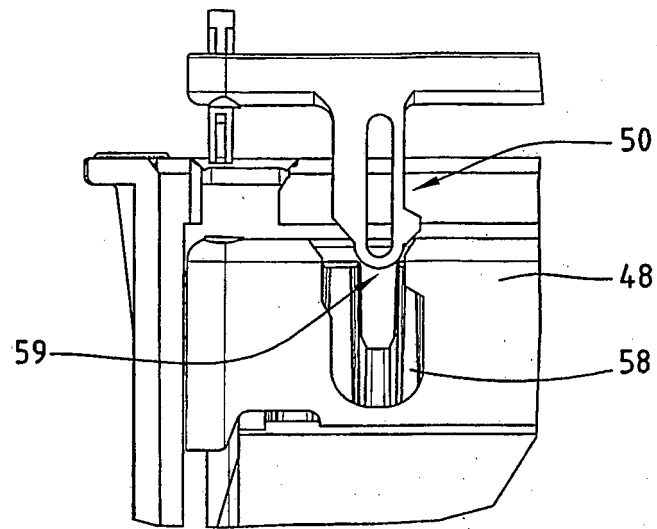


FIG.5A

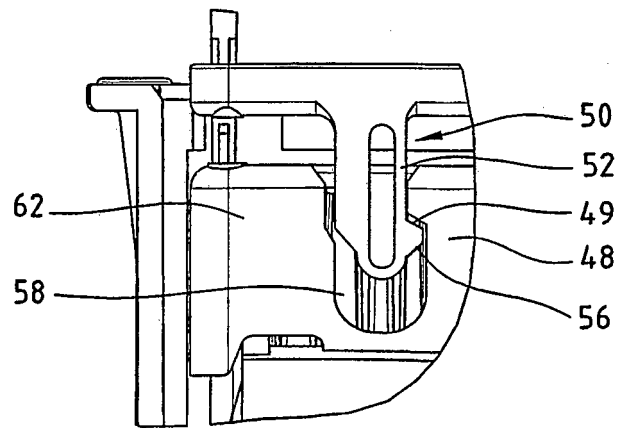


FIG.5B

REFERENCES CITED IN THE DESCRIPTION

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