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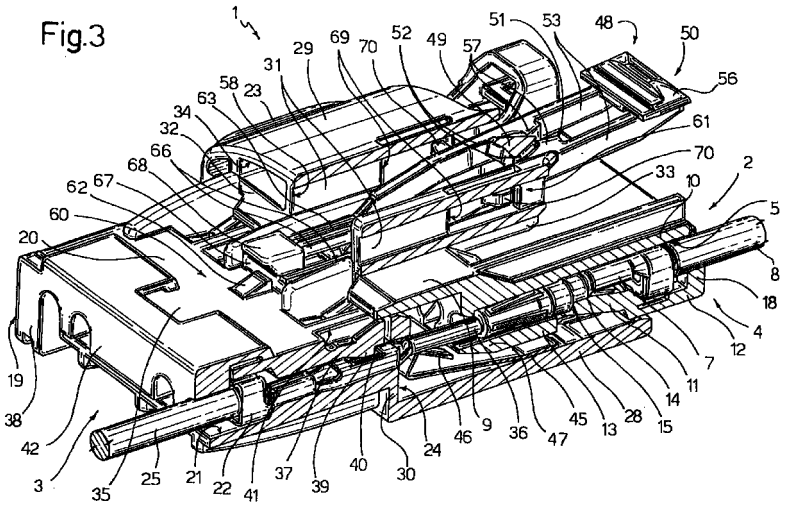
(54) Electric connecting unit

(57) An electric connecting unit (1) having a first and a second electric connector (3, 2) mutually connectable, along a longitudinal axis (A), in a fully assembled position assumed at the end of a mutually engaging movement, and which respectively have a first and a second insulating casing (19, 4), each defining at least two longitudinal cavities (21, 5) for respective electric terminals (22, 7); short-circuit means (45) carried by the first casing (19), and which can be set to a first operating configuration mutually connecting the terminals (22) of the first connector (3), and a second operating configuration assumed when the connectors (3, 2) are in the fully assembled position, and wherein the short-circuit means are isolated electrically from the terminals (22) of the first connector (3); and selectively releasable retaining means (60, 61) interposed between the first and the second casing (19, 4) and activatable in the course of the mutually engaging movement of the connectors (3, 2) to define an intermediate check position wherein the terminals (22) of the first connector (3) are connected mutually by means of the short-circuit means (45), and are connected to the relative terminals (7) of the second connector (2).

Fig.3



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Description

[0001] The present invention relates to an electric connecting unit, in particular for circuits for activating automotive safety systems such as airbags and seat belt tensioning devices, to which the following description refers purely by way of example.

[0002] Connecting units of the above type are known to comprise two electric connectors mutually connectable, along a longitudinal axis, in a fully assembled position assumed at the end of a mutually engaging movement, and which comprise respective insulating casings, each defining at least two longitudinal cavities for respective electric terminals.

[0003] One of the connectors also has an elastic short-circuit blade carried on the connector casing and which can be set to an undeformed enabling configuration mutually connecting the terminals, and a deformed disabling configuration assumed when the connectors are in the fully assembled position, and in which the blade is kept detached from the terminals by a portion of the complementary casing. The short-circuit blade is normally located on the connector connected to a detonating device for activating the safety system, e.g. the airbag, to prevent the detonating device from being activated by the terminals accidentally coming into contact with an electric source, or to prevent electrostatic discharge current flow through the detonating device.

[0004] Being designed for automotive safety systems, known units of the type briefly described above are subjected to rigorous testing both before and during on-vehicle assembly, as described below.

[0005] First of all, the connector without the short-circuit blade is connected to an auxiliary connector, whose load is defined by a resistor of predetermined resistance, to define a test assembly; and the resistance of the electric circuits defined by the test assembly and the connector with the short-circuit blade is then measured to ensure both function properly.

[0006] At this point, the auxiliary connector is removed, the two connectors are fitted together in the fully assembled position with the short-circuit blade in the disabling configuration, and a further resistance measurement is made to ensure the connectors are connected properly.

[0007] Finally, the auxiliary connectors of the connecting units fitted to each vehicle are collected in a container and counted by the fitter once the vehicle is wired, to further ensure all the connections have been made.

[0008] It is an object of the present invention to provide a straightforward, reliable, low-cost electric connecting unit designed to eliminate the above drawback typically associated with known units of the above type, and which in particular provides for a fast assembly check.

[0009] According to the present invention, there is provided an electric connecting unit comprising:

- a first and a second electric connector mutually connectable, along a longitudinal axis, in a fully assembled position assumed at the end of a mutually engaging movement, and which respectively comprise a first and a second insulating casing, each defining at least two longitudinal cavities for respective electric terminals; and
- short-circuit means carried by said first casing, and which can be set to a first operating configuration wherein said short-circuit means mutually connect said terminals of said first connector, and a second operating configuration assumed when said first and said second connector are in said fully assembled position, and wherein said short-circuit means are isolated electrically from said terminals of the first connector;

characterized by comprising selectively releasable retaining means interposed between said first and said second casing and activatable in the course of said mutually engaging movement of said first and said second connector to define an intermediate check position wherein said terminals of said first connector are connected mutually by means of said short-circuit means, and are connected to the relative said terminals of said second connector.

[0010] A preferred, non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a longitudinal section of an electric connecting unit in accordance with the present invention and in the fully assembled position;

Figure 2 shows a partly sectioned top plan view of the Figure 1 unit;

Figure 3 shows a larger-scale, partly sectioned view in perspective of the Figure 1 and 2 unit in the check position.

[0011] Number 1 in the accompanying drawings indicates as a whole an electric connecting unit, in particular for circuits for activating automotive safety systems such as airbags and seat belt tensioning devices.

[0012] In the example shown, unit 1 provides for connecting an airbag detonating device (not shown) to a detonating device control unit (not shown).

[0013] Unit 1 comprises two electric connectors 2, 3 mutually connectable, along a longitudinal axis A, in a fully assembled position (Figures 1 and 2) assumed at the end of a mutually engaging movement.

[0014] It should be pointed out that the terms "top", "bottom", "front", "rear" and similar used in the following description are in no way limiting, and are used purely for descriptive purposes with reference to the position of unit 1 in the accompanying drawings.

[0015] Connector 2 comprises a substantially parallelepiped-shaped insulating casing 4 having four longitudinal cavities 5, which have respective axes parallel to

axis A, are formed in pairs in opposite longitudinal lateral portions 6 of casing 4, and house respective female electric terminals 7. Terminals 7 are crimped to respective electric cables 8 in turn connected to the detonating device control unit.

[0016] Casing 4 also comprises two plates 9 (for the purpose explained later on) projecting frontwards from respective lateral portions 6, and substantially forming an extension of a top wall 10, parallel to axis A, of casing 4.

[0017] Connector 2 also comprises a number of elastic lances 11 for retaining respective terminals 7 in a correct insertion position inside respective cavities 5; and an auxiliary retaining member 12 for ensuring terminals 7 are in the correct insertion position inside cavities 5, and for preventing withdrawal of terminals 7.

[0018] More specifically, each lance 11 projects inside respective cavity 5 from a bottom wall 13 of casing 4 parallel to wall 10, is flexible in a direction B perpendicular to axis A and to wall 13, and, by means of a tooth 14, clicks onto a seat 15 on respective terminal 7 to retain terminal 7 in the correct insertion position inside cavity 5.

[0019] Auxiliary retaining member 12 is defined by a movable flap member integral with casing 4 and hinged to the rear end of wall 13, and rotates between an open position permitting insertion of terminals 7 inside respective cavities 5, and a closed position - only possible when terminals 7 are all in the correct insertion position inside respective cavities 5 - wherein auxiliary retaining member 12 clicks onto casing 4 and prevents withdrawal of terminals 7 from cavities 5.

[0020] More specifically, when viewed from the side, auxiliary retaining member 12 is substantially L-shaped, and comprises a comblike end portion 18 defining a number of U-shaped through openings which, in the closed position, are fitted through with respective electric cables 8, but are so sized as to prevent withdrawal of terminals 7 from casing 4.

[0021] Connector 3 comprises an insulating casing 19 having a substantially parallelepiped-shaped rear portion 20 defining four longitudinal cavities 21 for housing respective male electric terminals 22 connectable to female terminals 7 of connector 2, and a hollow, substantially parallelepiped-shaped front portion 23 defining a compartment 24 for housing connector 2 and communicating with cavities 21. Terminals 22 are crimped to respective electric cables 25 in turn connected to the detonating device.

[0022] More specifically, portion 23 projects outwards along its whole perimeter with respect to portion 20, has a front opening 26 by which to insert casing 4 of connector 2 inside compartment 24, and is defined by two opposite, substantially parallel lateral walls 27, by a substantially flat bottom wall 28 perpendicular to lateral walls 27, by a curved, outwardly convex top wall 29, and by a rear wall 30 opposite opening 26 and partly defining the bottom of compartment 24. Two longitudinal partitions 31 extends inwards of compartment 24 from top wall 29, are parallel to lateral walls 27, and are each connected to the facing lateral wall 27 by a respective flat crosspiece 32 parallel to bottom wall 28.

[0023] Each partition 31 extends beyond relative crosspiece 32 and towards bottom wall 28 in the form of a longitudinal end rib 33 defining, with crosspiece 32 and adjacent lateral wall 27, a C-shaped guide for guiding a respective plate 9 of casing 4 during connection of connectors 2 and 3. More specifically, in the course of the mutually engaging movement of connectors 2 and 3, each plate 9, guided laterally on opposite sides by relative lateral wall 27 and relative rib 33, slides underneath corresponding crosspiece 32 and through a relative opening 34, formed in rear wall 30, into a position, when connectors 2 and 3 are in the fully assembled position, contacting a relative top wall 35 of portion 20.

[0024] Each terminal 22 is inserted inside respective cavity 21 through a rear opening of cavity 21 - from which cable 25 extends in use - so that a contact portion 36 of terminal 22 projects axially inside compartment 24.

[0025] Connector 3 also comprises a number of elastic lances 37 for retaining respective terminals 22 in a correct insertion position inside respective cavities 21; and an auxiliary retaining member 38 for ensuring terminals 22 are in the correct insertion position inside cavities 21, and for preventing withdrawal of terminals 22.

[0026] More specifically, each lance 37 projects inside respective cavity 21 from top wall 35 of portion 20 and in a direction substantially parallel to axis A towards compartment 24, and, by means of a tooth 39, clicks onto a seat 40 on respective terminal 22 to retain terminal 22 in the correct insertion position inside cavity 21.

[0027] Interacting with relative terminal 22, each lance 37 is flexible, parallel to direction B, between an undeformed configuration, wherein tooth 39 engages relative seat 40 and terminal 22 is inserted correctly inside relative cavity 21, and a deformed configuration assumed when terminal 22 is not inserted correctly inside relative cavity 21, and wherein lance 37 is shifted away from the axis of cavity 21 and projects outwards, through a relative through opening 41 formed in top wall 35, so as to interfere with the sliding movement of respective plate 9 of connector 2 and so prevent connectors 2 and 3 from assuming the fully assembled position.

[0028] In this case, too, auxiliary retaining member 38 is defined by a movable flap member integral with casing 19 and hinged to the rear end of top wall 35, and rotates between an open position permitting insertion of terminals 22 inside respective cavities 21, and a closed position - only possible when terminals 22 are all in the correct insertion position inside respective cavities 21 - wherein auxiliary retaining member 38 clicks onto casing 19 and prevents withdrawal of terminals 22 from cavities 21.

[0029] More specifically, when viewed from the side, auxiliary retaining member 38 is substantially L-shaped, and comprises a comblike end portion 42 defining a number of U-shaped through openings which, in the closed position, are fitted through with respective electric cables 25, but are so sized as to prevent withdrawal of terminals 22 from casing 19.

[0030] Finally, connector 3 comprises two short-circuit elements 45 housed inside compartment 24 along bottom wall 28 of portion 23 of casing 19. Each short-circuit element 45 is normally set in an undeformed configuration mutually connecting contact portions 36 of a relative pair of terminals 22, and can be set selectively to a deformed configuration separating terminals 22, when connectors 2 and 3 are in the fully assembled position, by interacting with bottom wall 13 of casing 4, which interposes itself between short-circuit elements 45 and relative terminals 22.

[0031] More specifically, each short-circuit element 45 is defined by a flat elastic blade resting on bottom wall 28 of casing 19 and having an end portion 46, for contacting the relative pair of terminals 22, located adjacent to rear wall 30 and bent into an L towards opening 26.

[0032] When connectors 2 and 3 are in the fully assembled position, a front end portion 47 of wall 13, tapering towards rear wall 30 of compartment 24, is interposed between end portions 46 of short-circuit elements 45 and contact portions 36 of terminals 22, so as to electrically disconnect each pair of terminals 22.

[0033] Unit 1 also comprises a device 48 for clicking connectors 2 and 3 into the fully assembled position.

[0034] Device 48 comprises a male member 49 located close to front opening 26 and projecting integrally inwards of compartment 24 of connector 3 from a central longitudinal portion of top wall 29 extending between partitions 31; and an elastic member 50, which projects longitudinally from an outer face of top wall 10 of casing 4, has a seat 51 for retaining male member 49, and is flexible parallel to direction B to release connectors 2 and 3.

[0035] In the course of the mutually engaging movement of connectors 2 and 3, male member 49 cooperates in sliding manner, parallel to axis A, with seat 51 to assume an engaged position engaging seat 51 and corresponding to the fully assembled position of connectors 2 and 3.

[0036] More specifically, male member 49 is defined by a wedgelike tooth, which is defined by opposite substantially convex longitudinal lateral surfaces, and, in section perpendicular to direction B, is substantially ogival and tapers towards a pointed front end facing front opening 26 of compartment 24. At the opposite end, male member 49 is provided integrally with two lateral projections 52, and is defined, towards rear portion 20 of casing 19, by two rear surfaces forming an obtuse dihedral angle.

[0037] Elastic member 50 comprises two longitudinal, substantially parallel arms 53 symmetrical with respect to an intermediate plane π of connector 2 through axis A and parallel to direction B. Arms 53 extend at a longitudinal central portion 54 of casing 4 interposed between lateral portions 6, are inserted between partitions 31 in the course of the mutually engaging movement of connectors 2 and 3, and each have one end integral with a front transverse edge 55 of wall 10. The respective free ends of arms 53 are connected integrally by a crosspiece 56, which projects outwards from casing 19 of connector 3 in the fully assembled position of connectors 2 and 3, and is pressed manually in direction B towards wall 10 to release connectors 2 and 3.

[0038] Arms 53 comprise respective intermediate teeth 57, which are symmetrical with respect to plane π, extend towards each other, and are substantially in the form of right trapeziums with oblique sides facing each other. Seat 51 has an axis parallel to axis A and lying in plane π, and is defined by teeth 57 and by respective portions of arms 53 extending between teeth 57 and crosspiece 56.

[0039] Arms 53 are flexible in a plane substantially perpendicular to direction B to permit insertion of male member 49 inside seat 51.

[0040] More specifically, teeth 57 define, in between, a section of seat 51 tapering towards front edge 55 of wall 10 and therefore towards portion 20 of casing 19 of connector 3.

[0041] The respective front surfaces of teeth 57 facing front edge 55 of wall 10 define respective temporary stops for projections 52 of male member 49 in the course of the mutually engaging movement of connectors 2 and 3, so that, to connect connectors 2 and 3, sufficient extra force must be applied for male member 49 to click past teeth 57 into the engaged position resting against respective rear surfaces of teeth 57 facing crosspiece 56.

[0042] An important aspect of the present invention lies in unit 1 also comprising selectively releasable first one-way stop means 60 interposed between casings 4 and 19 and activatable, in the course of the mutually engaging movement of connectors 2 and 3, to define an intermediate check position wherein terminals 22 of connector 3 are connected mutually in pairs by relative short-circuit elements 45, and are connected to relative terminals 7 of connector 2. Unit 1 also comprises second one-way stop means 61 interposed between casings 4 and 19 and acting in the opposite direction with respect to stop means 60 to prevent release of connectors 2 and 3 in the check position.

[0043] More specifically, stop means 60 comprise a stop tooth 62 projecting from an outer face of top wall 35 of portion 20 of casing 19, and located adjacent to portion 23; and an elastically deformable lance 63, which projects longitudinally from front edge 55 of wall 10 of casing 4 in the opposite direction to elastic member 50, comes out of compartment 24 of casing 19 through an

opening 58 in rear wall 30, rests against tooth 62 to define the check position of connectors 2 and 3, and is also flexible parallel to direction B to release tooth 62.

[0044] More specifically, tooth 62, viewed from the side, is in the form of a right trapezium, and is defined, on the side interacting with lance 63, by a flat stop surface 64 perpendicular to wall 35, and, on the opposite side, by an oblique side 65.

[0045] Viewed from above, lance 63 is C-shaped (Figure 2), and comprises two longitudinal arms 66 extending from the front edge 55 of wall 10 and substantially forming an extension of arms 53 of elastic member 50; and a crosspiece 67 mutually connecting the respective ends of arms 66 opposite to elastic member 50, and which interacts with stop surface 64 of tooth 62. Over crosspiece 67 there is provided a central grip projection 68 by which to lift lance 63 parallel to direction B to release it from tooth 62.

[0046] Stop means 61 comprise two rectangular through openings 69 formed through respective partitions 31 of casing 19; and two retaining teeth 70 projecting from respective arms 53 of elastic member 50 on the opposite side to teeth 57, and each of which, in the course of the mutually engaging movement of connectors 2 and 3, clicks onto a front edge 71 of relative opening 69 adjacent to front opening 26 of compartment 24.

[0047] More specifically, the length, parallel to axis A, of each opening 69 is such as to enable respective tooth 70 to travel inside opening 69 when moving from the check position to the fully assembled position of connectors 2 and 3.

[0048] In section perpendicular to direction B, each tooth 70 is substantially in the form of a right trapezium, with the oblique side facing front edge 55 of wall 10.

[0049] Unit 1 is assembled by sliding connector 2 longitudinally, along axis A, inside portion 23 of connector 3, once terminals 7, 22 are inserted correctly inside respective cavities 5, 21 and engaged by respective lances 11, 37, and once auxiliary retaining members 12, 38 are set to the closed position closing respective casings 4, 19.

[0050] In the course of the mutually engaging movement of connectors 2 and 3, crosspiece 67 of lance 63 comes to rest against surface 64 of tooth 62 to define the check position (Figure 3) of connectors 2 and 3, wherein short-circuit elements 45 are in the undeformed configuration electrically connecting pairs of terminals 22, and the pointed end of male member 49 is located at the inlet of seat 51 of elastic member 50, on the opposite side to crosspiece 56. At the same time, teeth 70 slide along respective partitions 31 and click inside respective openings 69, the front edges 71 of which define a stop for teeth 70 to prevent withdrawal of connector 2 from compartment 24 of connector 3, and so achieve a stable check position in which to check correct electric connection of unit 1 and the control unit of the airbag system detonating device.

[0051] Once the check is completed, grip projection 68 is used to raise lance 63 with respect to wall 10 of casing 4 and parallel to direction B, so as to release crosspiece 67 from tooth 62, and so enable connectors 2 and 3 to complete the mutually engaging movement along axis A into the fully assembled position (Figures 1 and 2).

[0052] More specifically, in the course of the above mutually engaging movement, male member 49 is inserted inside seat 51 of elastic member 50. And since the section of male member 49 increases towards projections 52, the gradual insertion of male member 49 inside seat 51 flexes arms 53, which part in a plane perpendicular to direction B. At the initial connecting stage, the elastic reaction of arms 53, given the ogival shape of male member 49, is such as to repel connectors 2 and 3, so that, if any one of terminals 7 and/or 22 is not inserted correctly inside respective cavity 5, 21, i.e. auxiliary retaining member 12 is not in the closed position and interferes with bottom wall 28 of compartment 24, and/or respective lance 37 projects outwards through respective opening 41 in wall 35 and interferes with respective plate 9, then connectors 2 and 3 are immediately pushed along axis A in the opposite direction to that of the mutually engaging movement.

[0053] When projections 52 of male member 49 come to rest against teeth 57, male member 49 is arrested temporarily by teeth 57, so that additional thrust is required to elastically part arms 53, which are subjected to a transverse thrust component on account of the front surfaces of projections 52 sloping with respect to axis A. When the thrust applied exceeds a given threshold value defined by the geometry of the contacting surfaces and by the characteristics of the material, projections 52 of male member 49 click past teeth 57, thus enabling male member 49 to move into the engaged position engaging seat 51 and corresponding to the fully assembled position of connectors 2 and 3.

[0054] Since the section of seat 51 increases towards crosspiece 56, as soon as projections 52 are inserted inside seat 51, so that arms 53 begin moving into the undeformed positions, the oblique sides of teeth 57 defining seat 51 exert thrust on male member 49 to push male member 49 irreversibly into the engaged position.

[0055] At the same time, the front end portion 47 of wall 13 of casing 4 slides along contact portions 46 of short-circuit elements 45, so as to flex short-circuit elements 45 towards wall 28 of casing 19, and is interposed between short-circuit elements 45 and terminals 22 to cut off the respective electric short-circuit connections.

[0056] To disconnect connectors 2 and 3, crosspiece 56 is simply pressed manually parallel to direction B to release male member 49 from teeth 57; crosspiece 67 of lance 63 automatically slides over oblique side 65 of tooth 62; and teeth 70 slide past respective openings 69 in partitions 31.

[0057] The advantages of unit 1 according to the present invention will be clear from the foregoing description.

[0058] In particular, by providing stop means 60, 61 defining the check position of unit 1, unit 1 can be tested directly when connecting connectors 2 and 3, with no need for an auxiliary connector connected to and by which to measure the resistance of the connector (2) without the short-circuit blades.

[0059] This therefore provides, unlike the known connectors described in the introduction, for eliminating the need not only for providing an auxiliary connector and connecting/disconnecting the auxiliary connector to/from the connector without the short-circuit blades, but also for counting the auxiliary connectors once the vehicle is wired, thus greatly reducing the on-vehicle assembly time and cost of the units.

[0060] Clearly, changes may be made to unit 1 as described herein without, however, departing from the scope of the present invention.

Claims

1. An electric connecting unit (1) comprising:

- a first and a second electric connector (3, 2) mutually connectable, along a longitudinal axis (A), in a fully assembled position assumed at the end of a mutually engaging movement, and which respectively comprise a first and a second insulating casing (19, 4), each defining at least two longitudinal cavities (21, 5) for respective electric terminals (22, 7); and
- short-circuit means (45) carried by said first casing (19), and which can be set to a first operating configuration wherein said short-circuit means (45) mutually connect said terminals (22) of said first connector (3), and a second operating configuration assumed when said first and said second connector (3, 2) are in said fully assembled position, and wherein said short-circuit means (45) are isolated electrically from said terminals (22) of the first connector (3);

characterized by comprising selectively releasable retaining means (60, 61) interposed between said first and said second casing (19, 4) and activatable in the course of said mutually engaging movement of said first and said second connector (3, 2) to define an intermediate check position wherein said terminals (22) of said first connector (3) are connected mutually by means of said short-circuit means (45), and are connected to the relative said terminals (7) of said second connector (2).

2. A unit as claimed in Claim 1, characterized in that said retaining means comprise first one-way stop means (60) for retaining said first and said second connector (3, 2) in said check position in the course of said mutually engaging movement; and second one-way stop means (61) acting in the opposite direction to said first stop means (60) and activatable in said check position to prevent release of said first and said second connector (3, 2) in a direction opposite to that of said mutually engagement movement; at least said first stop means (60) being selectively deactivatable.

3. A unit as claimed in Claim 2, characterized in that said first stop means (60) comprise at least a first and a second interacting member (62, 67) carried respectively by said first and said second casing (19, 4) and which contact each other in said check position of said first and said second connector (3, 2); and in that one (67) of said first and second interacting members (62, 67) is integral with an elastically deformable lance (63) projecting from one (4) of said first and second casings (19, 4) and flexible crosswise to said longitudinal axis (A) to permit release of the interacting members (62, 67).

4. A unit as claimed in Claim 3, characterized in that said first interacting member (62) is defined by a tooth projecting from a first wall (35) of said first casing (19) and having, towards said second interacting member (67), a stop surface (64) crosswise to said longitudinal axis (A); and in that said second interacting member is defined by an end portion (67) of said lance (63).

5. A unit as claimed in Claim 4, characterized in that said first interacting member (62) is defined, on the opposite side to said stop surface (64), by an oblique side (65).

6. A unit as claimed in Claim 4 or 5, characterized in that, viewed from above, said lance (63) is C-shaped, and comprises two longitudinal arms (66) projecting from a second wall (10) of said second casing (4) in a direction substantially parallel to said longitudinal axis (A), and mutually connected transversely by said end portion (67).

7. A unit as claimed in any one of the foregoing Claims, characterized in that said second stop means (61) comprise first and second engaging means (69, 70) carried respectively by said first and said second casing (19, 4) and which click onto each other in the course of said mutually engaging movement of said first and said second connector (3, 2).

8. A unit as claimed in any one of the foregoing Claims, characterized by comprising a retaining seat (51) carried by one (4) of said first and second

casings (19, 4); and a male member (49) carried by the other (19) of said first and second casings (19, 4), and which cooperates in sliding manner with said retaining seat (51), along said longitudinal axis (A) and in the course of said mutually engaging movement of said first and said second connector (3, 2), to click into an engaged position engaging the retaining seat (51) and corresponding to said fully assembled position of said first and said second connector (3, 2); said male member (49) having at least one lateral projection (52) extending substantially crosswise to said longitudinal axis (A); and said retaining seat (51) having at least one stop portion (57) defining a temporary stop for said projection (52) in the course of said mutually engaging movement of said first and said second connector (3, 2), so that the force required to connect said first and said second connector (3, 2) must be increased to a threshold value sufficient to enable said projection (52) to click past said stop portion (57), and said male member (49) to assume the engaged position.

9. A unit as claimed in Claim 8, characterized in that at least one of said male member (49) and said retaining seat (51) is integral with an elastic member (50) projecting outwards from one (4) of said first and second casings (19, 4) and flexible crosswise to said longitudinal axis (A) to permit release of said first and said second connector (3, 2).

10. A unit as claimed in Claim 8 or 9, characterized in that said male member (49) is defined by a tooth projecting from a third wall (29) of said first casing (19) and having, on opposite sides, two said projections (52); said elastic member (50) extending from said second casing (4) and comprising two elastic arms (53) defining said retaining seat (51) and having respective engaging teeth facing each other and defining respective said stop portions (57) for said projections (52).

11. A unit as claimed in Claim 9 or 10, characterized in that said first engaging means comprise two openings (69) formed through respective longitudinal portions (31) of said first casing (19), between which said elastic member (50) slides in the course of said mutually engaging movement of said first and said second connector (3, 2); and two retaining teeth (70) projecting laterally from opposite sides of said elastic member (50), and each of which clicks onto an edge (71) of the relative said opening (69) crosswise to said longitudinal axis (A).

12. A unit as claimed in Claim 11, characterized in that, parallel to said longitudinal axis (A), each said opening (69) is of such a length as to enable the relative said retaining tooth (70) to travel inside the opening (69) when moving from said check position to said fully assembled position of said first and said second connector (3, 2).

13. A unit as claimed in any one of Claims 9 to 12, characterized in that said lance (63) and said elastic member (50) project from the same portion (55) of said second wall (10) of said second casing (4) in opposite directions substantially parallel to said longitudinal axis (A).

14. A unit as claimed in any one of Claims 9 to 13, characterized in that said first casing (19) comprises a first portion (20) having the relative said cavities (21), and a second portion (23) defining a compartment (24) for housing said second connector (2) and through which said lance (63) and said elastic member (50) project on opposite sides; said male member (49) extending inside said compartment (24) from said third wall (29); and said first interacting member (62) being located outside said first portion (20) of said first casing (19) and facing said compartment (24).

15. A unit as claimed in Claim 14, characterized in that said short-circuit means comprise at least one elastic blade (45), which is housed in said compartment (24) of said first casing (19), cooperates, when undeformed, with respective contact portions (36) of said terminals (22) of said first connector (3) projecting inside said compartment (24), and is detachable from said terminals (22) by interacting with said second casing (4) in said fully assembled position of said first and said second connector (3, 2).

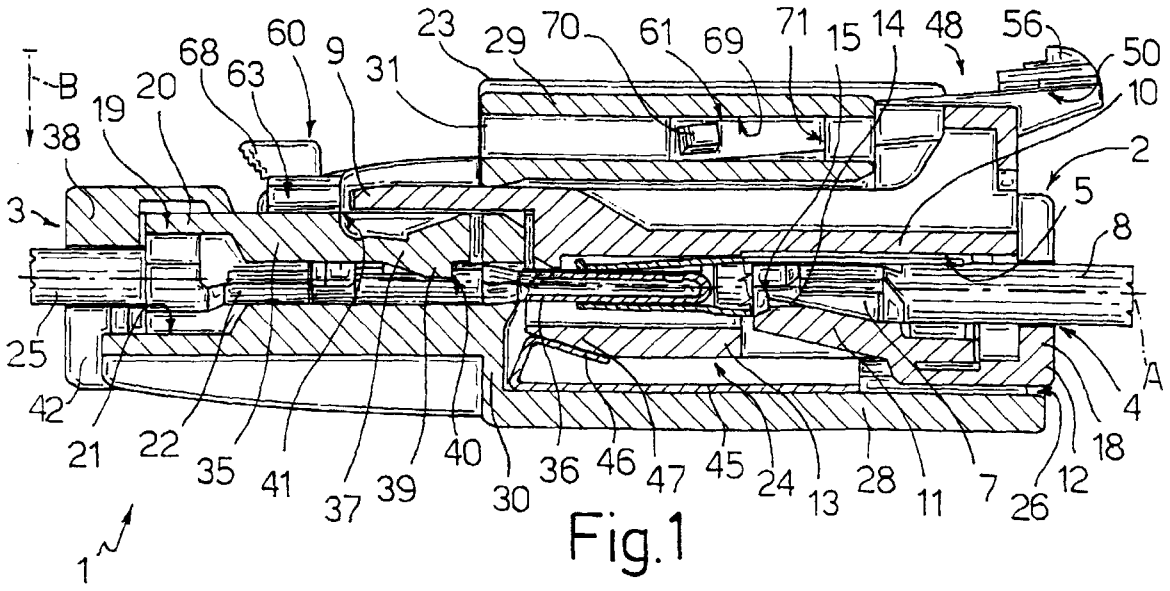
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Fig.1

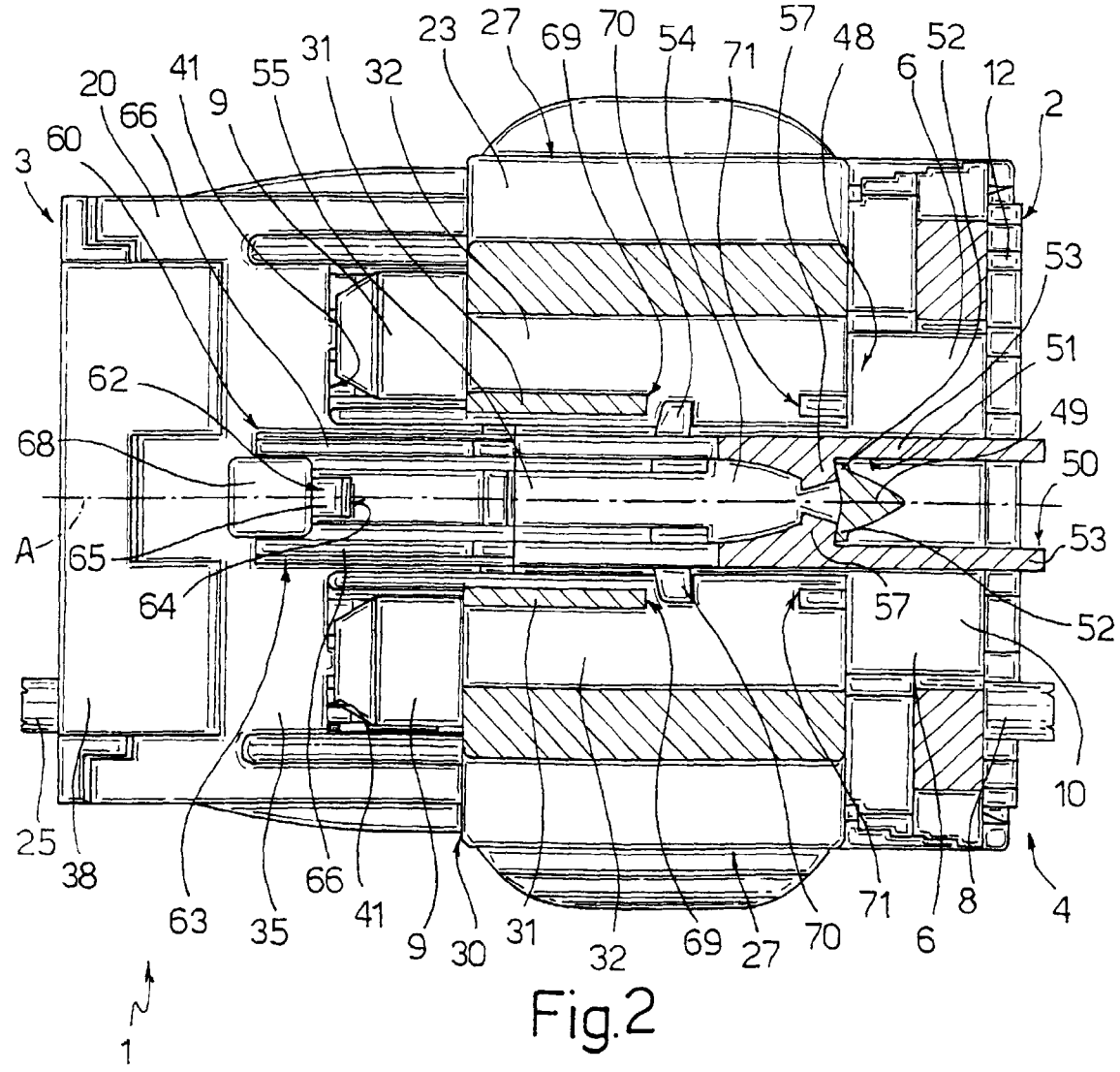
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Fig.2

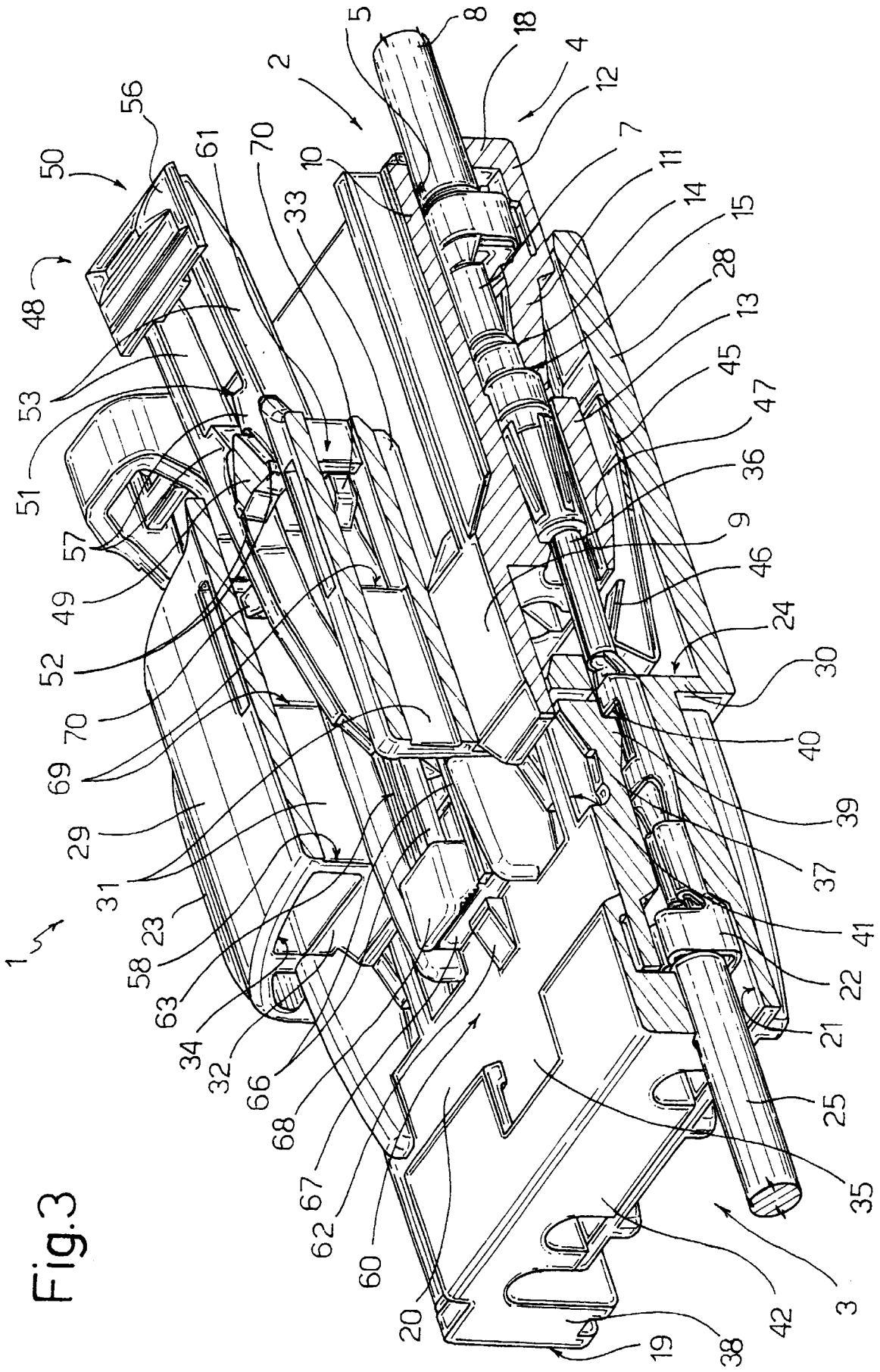
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Fig.3