



(11) **EP 3 799 222 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
31.03.2021 Bulletin 2021/13

(51) Int Cl.:
H01R 13/506 ^(2006.01) **H01R 13/74** ^(2006.01)
H01R 13/52 ^(2006.01) **H01R 13/44** ^(2006.01)

(21) Application number: **19199300.5**

(22) Date of filing: **24.09.2019**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

- **PRASANNA, Ramakrishnan**
600117 Chennai (IN)
- **MALYGIN, Nikolay**
91058 Erlangen (DE)
- **SCHMIDT, Rainer**
90411 Nürnberg (DE)

(71) Applicant: **Aptiv Technologies Limited**
St. Michael (BB)

(74) Representative: **Manitz Finsterwald**
Patent- und Rechtsanwaltspartnerschaft mbB
Martin-Greif-Strasse 1
80336 München (DE)

(72) Inventors:
• **SURESHKUMAR, Nandakumar**
600019 Thiruvottiyur Chennai (IN)

(54) **MALE PLUG, PIN COVER, SYSTEM AND METHOD FOR PROVIDING A MALE PLUG OF A SYSTEM**

(57) The present disclosure relates to a male plug comprising a housing for accommodating at least one pin and a coupling member for mating with a female plug through a panel, with means being provided for interlocking the housing and the coupling member. Further, the

present disclosure relates to a pin cover for protecting the at least one pin of such a male plug and a system of such a male plug and such a pin cover. In addition, the present disclosure relates to a method for providing a male plug of such a system.

EP 3 799 222 A1

Description

FIELD

[0001] The present disclosure relates to a male plug comprising a housing for accommodating at least one pin and a coupling member for mating with a female plug through a panel, with means being provided for interlocking the housing and the coupling member. Further, the present disclosure relates to a pin cover for protecting the at least one pin of a male plug, a system of a male plug and a pin cover, and additionally to a method for providing a male plug of such a system.

BACKGROUND

[0002] Male plugs for connector assemblies are commonly known in the state of the art. Such male plugs can be connected to accordingly constructed female plugs for providing for instance an electronic connection.

[0003] It is known to provide such a male plug as a split type panel-through male plug, for instance for providing a connection through a panel, the male plug comprising a housing for accommodating at least one pin and a coupling member. The housing and the coupling member can be arranged on each other to build the male plug. Prior to this assembling, the at least one pin protrudes from the housing. Hence it is exposed and can get damaged during transportation, storing and/or handling of the housing.

[0004] Accordingly, there is a need to provide protection of the at least one pin of a male plug prior to the final assembling of the male plug.

BACKGROUND

[0005] The present disclosure provides a male plug, a pin cover, a system and a method for providing a male plug of a system according to the independent claims. Embodiments are given in the sub-claims, the description and the drawings.

[0006] In a first aspect, the present disclosure is directed at a male plug comprising a housing for accommodating at least one pin and a coupling member for mating with a female plug through a panel, with means being provided for interlocking the housing and the coupling member, wherein the housing comprises a cover lock adapted to form-fittingly secure a pin cover, and wherein the coupling member comprises a releasing member for releasing a pin cover when the housing and the coupling member are interlocked.

[0007] The male plug according to the present disclosure is a split type male plug, in particular a sealed split-type male plug, comprising a housing and a coupling member. In the housing, at least one pin, in particular a plurality of pins, is accommodated for instance in and/or at a pin area. The coupling member is intended to provide the possibility for mating with a female plug for the in-

tended plug connection through a panel, in particular a sealed and/or water-tight connection through the respective panel. A male plug according to the present disclosure can be used in a plurality of environments, for instance in a vehicle, in a production plant, in an electronic and/or electro mechanic device or similar equipment. The sealed and/or watertight embodiment of a male plug according to the present disclosure can in particular be used in environments where sealing and/or water-tightness panel-through mounting are required.

[0008] In particular, the housing of the male plug according to the present disclosure comprises a cover lock adapted to form-fittingly secure a pin cover. In other words, by providing this cover lock, the housing of the male plug according to the present disclosure is enabled to fix a pin cover by providing a form fit. This pin cover in turn can cover the at least one pin accommodated by the housing. Therefore a protection of this at least one pin can be provided.

[0009] The form-fittingly fixation of the pin cover on the housing provided by the cover lock ensures that a loosening of the pin cover can be prohibited. Hence, the protection of the at least one pin can be provided during storage, transportation and handling of the housing, in particular before a final assembly step, in which the coupling member is interlocked with the housing.

[0010] In addition, the coupling member of a male plug according to the present disclosure comprises a releasing member for releasing a pin cover. This releasing member of the coupling member is especially active and/or activated, respectively, when the housing and the coupling member are interlocked or during the interlocking process, respectively. In other words, during and/or after interlocking of the coupling member and the housing, whereby on the housing a pin cover is form-fittingly secured for a protection of the at least one pin, the releasing member of the coupling member releases the pin cover by lifting the form fit provided by the cover lock. This allows especially easy removing the pin cover after the interlocking of the housing and the coupling member. In particular, no additional external tools or equipment is needed to remove the pin cover, as by interaction of the releasing member of the coupling member with the pin cover a self-unlocking of the pin cover can be provided. A usage of the finally assembled male plug can therefore be started immediately, a sumptuous procedure to remove an attached pin cover can be avoided.

[0011] According to an embodiment of a male plug according to the present disclosure, the cover lock comprises a guiding reception adapted to receive and guide a pin cover along an insertion direction, the guiding reception comprising an insertion opening and extending along the insertion direction. The at least one pin of the male plug according to the present disclosure is arranged at a certain and defined position within the housing. By providing a guiding reception for receiving and guiding a pin cover along an insertion direction it can be ensured that the pin cover is placed exactly at an intended position

at which a protection of the at least one pin can be provided. By comprising an insertion opening and by extending along the insertion direction, the guiding reception forces the pin cover to be placed such on the housing that the pin cover enters the guiding reception through the insertion opening and is linearly moved along the insertion direction. A placement of the pin cover on its intended position on the housing can therefore be provided and ensured more easily.

[0012] Further, a male plug according to the present disclosure can comprise that a cover lock comprises a locking reception adapted to an at least partly form fitting fixation of a pin cover on the housing. In other words, this locking reception is enabled to receive a part of the pin cover, whereby after this insertion of the respective part of the pin cover into the locking reception the form fit between the pin cover and the housing is established. Providing the form-fittingly fixation of a pin cover on the housing can thereby be provided especially easily.

[0013] According an improvement of a male plug according to the present disclosure, the locking reception is arranged in a sidewall of the guiding reception spaced apart from the insertion opening along the insertion direction. In other words, the guiding reception itself provides the locking reception. In particular, the locking reception is arranged in a sidewall of the guiding reception and spaced apart from the insertion opening along the insertion direction. To reach the locking reception, the respective part of the pin cover has to enter the guiding reception and is guided by the guiding reception along the insertion direction. An arrangement of the locking reception in a sidewall of the guiding reception allows an especially easy provision of the form fit between the housing and the pin cover. In addition, by integrating the locking reception into the guiding reception an especially small embodiment of a male plug according to the present disclosure can be provided.

[0014] An additional embodiment of a male plug according to the present disclosure can comprise that the housing comprises a polarization member, in particular a polarization reception, adapted to interact with a pin cover, wherein the polarization member is asymmetrically arranged with respect to a pin area on which the at least one pin is arranged, in particular wherein the polarization member is asymmetrically arranged with respect to the housing. As mentioned above with respect to the guiding reception, a correct placement of a pin cover with respect to the at least one pin is essentially for a protection of the at least one pin. A polarization member, in particular a polarization reception, can provide an additional safety for this correct placement, as it is asymmetrically arranged with respect to a pin area in which the at least one pin is arranged. In other words, as the polarization member is arranged asymmetrically with respect to a pin area, only one orientation of the pin cover with respect to the housing, and therefore with respect to the pin area, allows a placement of the pin cover on the housing. A correct placement of the pin cover on the housing

for a protection of the at least one pin can therefore be provided more easily.

[0015] In a further embodiment of a male plug according to the present disclosure, the housing comprises two or more cover locks. All features described above with respect to a single cover lock, for instance with respect to the guiding reception and/or the locking reception, can be provided in the two or more cover locks of the housing according to this embodiment of the male plug according to the present disclosure. An even better fixation of a pin cover on the respective housing of the male plug can therefore be provided.

[0016] In addition, a male plug according to the present disclosure may comprise that the coupling member comprises an interface shroud for a protection of the at least one pin and in particular for providing a sealed and/or connection with a female plug after interlocking the coupling member with the housing. As mentioned above, after interlocking the coupling member with the housing, the pin cover can be removed. To continue the protection of the at least one pin the coupling member can comprise an interface shroud extending in particular around the at least one pin, for instance parallel to the at least one pin. Impacts on the at least one pin can thereby be prohibited. In particular, the interface shroud can additionally provide a sealed connection to a female plug. A sealed and/or water-tight connection between the male plug according to the present disclosure and a respective female plug can thereby be ensured more easily.

[0017] An additional embodiment of a male plug according to the present disclosure can comprise that the coupling member comprises a polarization member adapted to interact with a pin cover, wherein the polarization member is asymmetrically arranged with respect to a pin area on which the at least one pin is arranged, in particular wherein the polarization member is asymmetrically arranged with respect to the coupling member. This polarization member of the coupling member can be provided alternatively, but in particular also additionally to a polarization member of the housing as described above. As mentioned above, a correct placement of a pin cover with respect to the at least one pin is essentially. This is also valid for the placement of the coupling member, in particular with respect to the at least one pin and/or the housing. By providing an asymmetrically arranged polarization member as part of the coupling member, it can be ensured that the coupling member is positioned correctly with respect to the pin cover and hence in turn also with respect to the housing. In other words, only the correct orientation of the coupling member with respect to the housing of the male plug according to the present disclosure is possible, which can simplify the final assembly and omit twisting of harness, misalignment or false coupling of the components of the male plug according to the present disclosure.

[0018] In a second aspect, the present disclosure is directed to a pin cover for protecting the at least one pin of a male plug according to the first aspect of the disclo-

sure, comprising a cover body, wherein the cover body comprises

- a cover dome enclosing a cover volume for accommodating the at least one pin of the male plug,
- a locking element for interaction with the cover lock of the housing of the male plug for a form-fittingly fixation of the pin cover on the housing, and
- a releasing element adapted to interact with the releasing member of the coupling member for releasing a form-fittingly fixation of the pin cover on the male plug.

[0019] A pin cover according to the second aspect of the present disclosure is intended to be used with a male plug according to the first aspect of the present disclosure for a protection of the at least one pin of the male plug according to the first aspect of the present disclosure. Hence, all features described above with respect to a male plug according to the first aspect of the present disclosure, can also be provided by a pin cover according to the second aspect of the present disclosure.

[0020] In particular, a pin cover according to the present disclosure comprises a cover body. This cover body comprises a cover dome, which encloses a cover volume. In other words, this cover dome can be for instance be a structure closed in five of the six spatial directions, whereby the sixth spatial direction stays uncovered and forms an opening for a placement on the housing of the male plug according to the present disclosure. Hence, the at least one pin arranged on the housing of the male plug can enter the cover volume through the opening of the cover dome and is protected within the cover volume enclosed by the cover dome.

[0021] Further, the pin cover according to the present disclosure and its respective cover body comprises a locking element for an interaction with the cover lock of the housing of the male plug. This locking element in particular provides a form-fittingly fixation of the pin cover on the housing. When arranged on the housing, the locking element interacts with the cover lock and provides the form-fittingly fixation of the pin cover on the housing of the male plug. Therefore the pin cover according to the present disclosure cannot be removed from the housing of the male plug according to the present disclosure, hence providing a safety against losing the pin cover.

[0022] In addition, a pin cover according to the present disclosure and its respective cover body comprises a releasing element for an interaction with the releasing member of the coupling member of the male plug according to the present disclosure. Therefore, a releasing of the form-fittingly fixation between the pin cover and the housing can be easily released by interlocking the coupling member on the housing and after the interlocking of the coupling member and the housing the pin cover can be removed easily. In other words, by providing a releasing element and its ability to interact with the releasing member of the coupling member, a self-unlocking

functionality of the pin cover can be provided. In particular, no additional external tools or equipment is needed to remove the pin cover.

[0023] In an embodiment of a pin cover according to the present disclosure, the cover body comprises a flexible tab extending from the cover dome in an insertion direction, wherein the locking element and the releasing element are arranged at the tab. In other words, both the locking element and the releasing element are arranged at the same section of the cover body of the pin cover. Especially, the tab is a flexible element of the cover body. This especially easily allows releasing of the locking element in particular out of a locking reception of the housing of the male plug by actuating the releasing element and therefore deflecting the tab. An especially compact pin cover can therefore be provided.

[0024] In a further improved embodiment of a pin cover according to the present disclosure, the tab is shaped to form a guiding element adapted to be form-fittingly inserted into a guiding reception of the housing. In this embodiment of a pin cover according to the present disclosure, the compactness of the pin cover can be further improved by also integrating the guiding element into the tab, whereby the tab already comprises the locking element and the releasing element.

[0025] Further, a pin cover according the present disclosure can comprise that the cover body comprises a first polarization element adapted to interact with a polarization member of the housing, in particular adapted to be form-fittingly inserted into a polarization reception of the housing, and/or a second polarization element adapted to interact with a polarization member of the coupling member. Such a first polarization element, in particular by interacting with a respective polarization member of the housing, helps ensuring that the pin cover is placed at the correct position and/or in the correct orientation on the housing of the male plug. Therefore, a protection of the at least one pin arranged in the pin area of the housing can be provided and ensured more easily. Analogous, by providing a second polarization element for interacting with a respective polarization member of the coupling member, a correct placement and orientation of the coupling member with respect to the pin cover and thereby in turn with respect to the housing can be ensured during interlocking the coupling member and the housing. False orientation of the housing with respect to the coupling member and twisting of harness during installation can also be omitted.

[0026] In addition, a pin cover according to the present disclosure can comprise that the cover body comprises a handle, in particular, a handle extending from the cover dome against the insertion direction. Such a handle can for instance be provided as a grip, both for manual and gripper, in particular automated gripper, interaction. Removing the pin cover after interlocking the coupling member and the housing can therefore be provided more easily.

[0027] According to an embodiment, the pin cover ac-

According to the present disclosure comprises that the cover body is monolithically constructed. In other words, the cover body and therefore the pin cover as a whole is constructed as a single piece. In particular, a monolithically constructed pin cover can be produced by a tool without additional sliders or similar elements, therefore minimizing the tool costs for a production of the respective pin cover. For instance, the pin cover can be constructed by an injection moulding process. Time and cost efforts during production of the pin cover can thereby be reduced.

[0028] In a third aspect, the present disclosure is directed to a system of a male plug according to the first aspect and a pin cover according to the second aspect of the present disclosure. All features described with respect to a male plug according to the first aspect of the present disclosure and to a pin cover according to the second aspect of the present disclosure can therefore be provided by a system according to the third aspect of the present disclosure.

[0029] In a fourth aspect, the present disclosure is directed to a method for providing a male plug of a system according to the third aspect of the present disclosure. A method according to the fourth aspect of the present disclosure comprises the steps of

- a) providing the housing, in particular the housing equipped with at least one pin,
- b) fixing the pin cover on the housing,
- c) interlocking the coupling member and the housing through a panel,
- d) releasing the fixation of the pin cover on the housing, and
- e) removing the pin cover.

[0030] A method for providing a male plug of a system according to the first aspect of the present disclosure is intended to be carried out with a system according to the third aspect of the present disclosure. All features described above, with respect to a system according to the third aspect of the present disclosure can therefore be provided by a method for providing a male plug of a system according to the fourth aspect of the present disclosure.

[0031] In a first step a) of a method of the present disclosure, a housing of a male plug is provided. In particular, the provided housing is already equipped with at least one pin, for example arranged in a pin area. Further, the at least one pin can also be connected, for instance to a strand of an electric cable, to form a contact of the male plug. The next step b) is directed on fixing the pin cover on the housing. In other words, after step b), the pin cover is form-fittingly fixed on the housing and therefore a protection of the at least one pin of the housing of the male plug can be provided. Especially, after step b) the housing with the pin cover fixed on the housing can be stored, transported and/or handled without risking a damage on the at least one pin accommodated at the

housing.

[0032] In the next step c) of a method according to the present disclosure, the coupling member is interlocked on the housing through a panel, and afterwards in step d) the fixation of the pin cover on the housing is released. This allows in a last step e) of the method according to the present disclosure to remove the pin cover. In other words, after step e) a male plug is provided, in which the housing is interlocked with the coupling member, whereby the housing and the coupling member are positioned on opposite sides of the respective panel. Therefore a connection of the male plug to an accordingly constructed female plug can be established through the panel, in particular in a sealed and/or water-tight way.

[0033] According to an embodiment, the method according to the present disclosure comprises that step c) and d) are carried out simultaneously, in particular wherein the coupling member interacts during its interlocking on the housing with the pin cover and thereby causes releasing the fixation of the pin cover on the housing. In other words, by interlocking the coupling member on the housing in step c), the coupling member, especially its releasing member, interacts with the releasing element of the pin cover and therefore the form-fittingly fixation of the pin cover on the housing is lifted. Additional steps to release the fixation of the pin cover on the housing can therefore be avoided.

DRAWINGS

[0034] Exemplary embodiments and function of the present disclosure are described herein in conjunction with the following drawings, showing schematically:

- Fig. 1 a pin cover and a housing,
- Fig. 2 a pin cover fixed on the housing;
- Fig. 3 a cross-sectional view of the pin cover and the housing of Fig. 2,
- Fig. 4 the pin cover and the housing and additionally a coupling member,
- Fig. 5 a system comprising the pin cover and the housing with an interlocked coupling member,
- Fig. 6 a cross-sectional view of the system of Fig. 5, and
- Fig. 7 a system with a male plug and a pin cover.

DETAILED DESCRIPTION

[0035] In the following, a system 10 comprising a male plug 20 and a pin cover 60 and a method for providing such a male plug 20 with respect to attaching the pin cover 60 on the housing 30 of the male plug 20 and the

subsequent releasing of the pin cover 60 is described with respect to the accompanying drawings shown in Fig. 1 to 7. Therefore, the Fig. 1 to 7 are described together, whereby each Figure is addressed separately if appropriate.

[0036] Fig. 1 shows the housing 30 of the male plug 20 and the pin cover 60 of the system 10 according to the present disclosure, whereby the pin cover 60 is not yet attached to the housing 30. The housing 30 comprises a pin area 24 in which a plurality of pins 22 is arranged. To protect these pins 22, the pin cover 60 can be arranged on top of the housing 30. For a protection of the pins 22, the pin cover 60 and its respective cover body 62 comprises a cover dome 64, whereby the cover dome 64 encloses a cover volume 66, see for instance Fig. 3. The pin cover 60 can be arranged on the housing 30, especially along an insertion direction 90.

[0037] For a form-fittingly fixation of the pin cover 60 on the housing 30, the pin cover 60 comprises a locking element 72 arranged on a flexible tab 70 extending as part of the cover body 60 from the cover dome 64 along the insertion direction 90. The tab 70 with its locking element 72 on its end can be inserted into a cover lock 32 of the housing 30. Especially, the locking element 72 can be arranged in a locking reception 40 of the housing 30. In addition, the tab 70 can be constructed as guiding element 76 for a form-fittingly guidance in a guiding reception 34 as part of the cover lock 32 of the housing 30 along the insertion direction 90. A secure fixation, especially a form-fittingly fixation, of the pin cover 60 on the housing 30 can therefore be provided. In addition, from the cover body 62 of the pin cover 60 extends also a first polarization element 80 along the insertion direction 90 for an interaction with a polarization member 42, realized as polarization reception 44, of the housing 30. A second polarization element 82 for an interaction with a respective polarization member 56 of the coupling member 50, see Fig. 4, is arranged on the cover dome 64 part of the cover body 62. Especially, the first and second polarization members 42, 56 are asymmetrically arranged with respect to a pin area 24. A placement of the pin cover 60 and of the coupling member 50, respectively, on the housing 30 in the correct position and/or orientation can therefore be ensured.

[0038] As mentioned above, the tab 70 of the pin cover 60 can be inserted as guiding element 76 into a guiding reception 34 of the housing 30. This guiding reception 34 comprises an insertion opening 36 for this movement of the pin cover 60 and its respective tab 70 into the housing 30 along the insertion direction 90. In other words, the insertion opening 36 is the terminal open end of the guiding reception 34, in which the tab 70 of the pin cover 60 can be inserted. In a sidewall 38 of this guiding reception 34, the locking reception 40 is arranged.

[0039] The next Fig. 2 and 3 show the housing 30 of the male plug 20 and the pin cover 60 already described with respect to Fig. 1 arranged on each other, whereby Fig. 2 shows an isometric view and Fig. 3 shows a cross-

sectional view along the line A-A depicted in Fig. 2. Especially in Fig. 3 is clearly visible that the pins 22 are arranged in the cover volume 66 enclosed by the cover dome 64 of the pin cover 60. In addition, also the form-fittingly fixation of the locking element 72 of the pin cover 60 in the locking reception 40 of the cover lock 32 of the housing 30 is clearly shown in Fig. 3. A movement of the pin cover 60 along the insertion direction 90 is prohibited by this form-fit and therefore the pin cover 60 is fixed on the housing 30 and the pins 22 are protected in this state of the system 10, for instance for a transport, storage and/or handling of the housing 30 of the male plug 20.

[0040] Next Fig. 4 shows the last and not yet mentioned element of the system 10 and the male plug 20, the coupling member 50. This coupling member 50 can be arranged and interlocked with the housing 30 to provide the male plug 20. In particular, the depicted embodiment the male plug 20 is a panel-through male plug 20. Hence, the housing 30 and the coupling member 50, respectively, of the male plug 20 are positioned on opposite sides of a panel 100. By interlocking the housing 30 and the coupling member 50, a connection, in particular a sealed and/or water-tight connection, through the panel 100 can be provided. Especially, the coupling member 50 comprises an interface shroud 54, on the one hand for a latter protection of the pins 22 after removing the pin cover 60 and also for providing a connection interface to a mating female plug, in particular a sealed and/or water-tight connection to a mating female plug.

[0041] The subsequent Fig. 5 and 6 show the system 10 in a state where the coupling member 50 is interlocked with the housing 30 through the panel 100, whereby Fig. 5 shows an isometric view of the system 10, Fig. 6 again a cross-sectional view of the system 10 according to the line B-B depicted in Fig. 5. Additionally to the elements of the system 10 already described above with respect to the Fig. 1 to 4, in Fig. 5 and 6 the coupling member 50 is interlocked with the housing 30. Especially, the coupling member 50 interacts via its releasing member 52 with the releasing element 74 arranged on the tab 70 of the pin cover 60. As the tab 70, on which both the locking element 72 and the releasing element 74 are arranged, is a flexible tab 70, this interaction between the releasing member 52 and the releasing element 74 causes a deflection of the tab 70 and essentially results in an unlocking of the form-fit between the locking element 72 and the locking reception 40 of the housing 30. In other words, after interlocking the coupling member 50 on the housing 30 the pin cover 60 is no longer form-fittingly fixed at the housing 30.

[0042] This allows, as depicted in Fig. 7 an easy movement of the pin cover 60 along the insertion direction 90 from the male plug 20 of the system 10 for removing the pin cover 60. As already mentioned, the pin cover 60 can comprise a handle 68, as depicted extending from the cover dome 64 along the insertion direction 90, for manually removing of the pin cover 60. After removing the pin cover 60, the pins 22 accommodated on the housing

30 are accessible and the male plug 20 can be coupled with a female plug to form a plug connection through the likewise depicted panel 100.

Reference numeral list

[0043]

10	System
20	Male plug
22	Pin
24	Pin area
30	Housing
32	Cover lock
34	Guiding reception
36	Insertion opening
38	Side-wall
40	Locking reception
42	Polarization member
44	Polarization reception
50	Coupling member
52	Releasing member
54	Interface shroud
56	Polarization member
60	Pin cover
62	Cover body
64	Cover dome
66	Cover volume
68	Handle
70	Tab
72	Locking element
74	Releasing element
76	Guiding element
80	First polarization element
82	Second polarization element
90	Insertion direction
100	Panel

Claims

1. Male plug (20) comprising a housing (30) for accommodating at least one pin (22) and a coupling member (50) for mating with a female plug through a panel (100), with means being provided for interlocking the housing (30) and the coupling member (50), wherein the housing (30) comprises a cover lock (32) adapted to form-fittingly secure a pin cover (60), and wherein the coupling member (50) comprises a releasing member (52) for releasing a pin cover (60)

when the housing (30) and the coupling member (50) are interlocked.

2. Male plug (20) according to claim 1, wherein the cover lock (32) comprises a guiding reception (34) adapted to receive and guide a pin cover (60) along an insertion direction (90), the guiding reception (34) comprising an insertion opening (36) and extending along the insertion direction (90).
3. Male plug (20) according to claim 1 or 2, wherein the cover lock (32) comprises a locking reception (40) adapted to an at least partly form-fitting fixation of a pin cover (60) on the housing (30).
4. Male plug (20) according to claim 2 and 3, wherein the locking reception (40) is arranged in a side-wall (38) of the guiding reception (34) spaced apart from the insertion opening (36) along the insertion direction (90).
5. Male plug (20) according to one of the preceding claims, wherein the housing (30) comprises a polarization member (42), in particular a polarization reception (44), adapted to interact with a pin cover (60), wherein the polarization member (42) is asymmetrically arranged with respect to a pin area (24) in which the at least one pin (22) is arranged, in particular wherein the polarization member (42) is asymmetrically arranged with respect to the housing (30).
6. Male plug (20) according to one of the preceding claims, wherein the housing (30) comprises two or more cover locks (32).
7. Male plug (20) according to one of the preceding claims, wherein the coupling member (50) comprises an interface shroud (54) for a protection of the at least one pin (22) and in particular for providing a sealed connection with a female plug after interlocking the coupling member (50) with the housing (30).
8. Male plug (20) according to one of the preceding claims, wherein the coupling member (50) comprises a polarization member (56) adapted to interact with a pin cover (60), wherein the polarization member (56) is asymmetrically arranged with respect to a pin area (24) in which the at least one pin (22) is arranged, in particular wherein the polarization member (56) is asymmetrically arranged with respect to the coupling member (50).
9. Pin cover (60) for protecting the at least one pin (22) of a male plug (20) according to one of the preceding

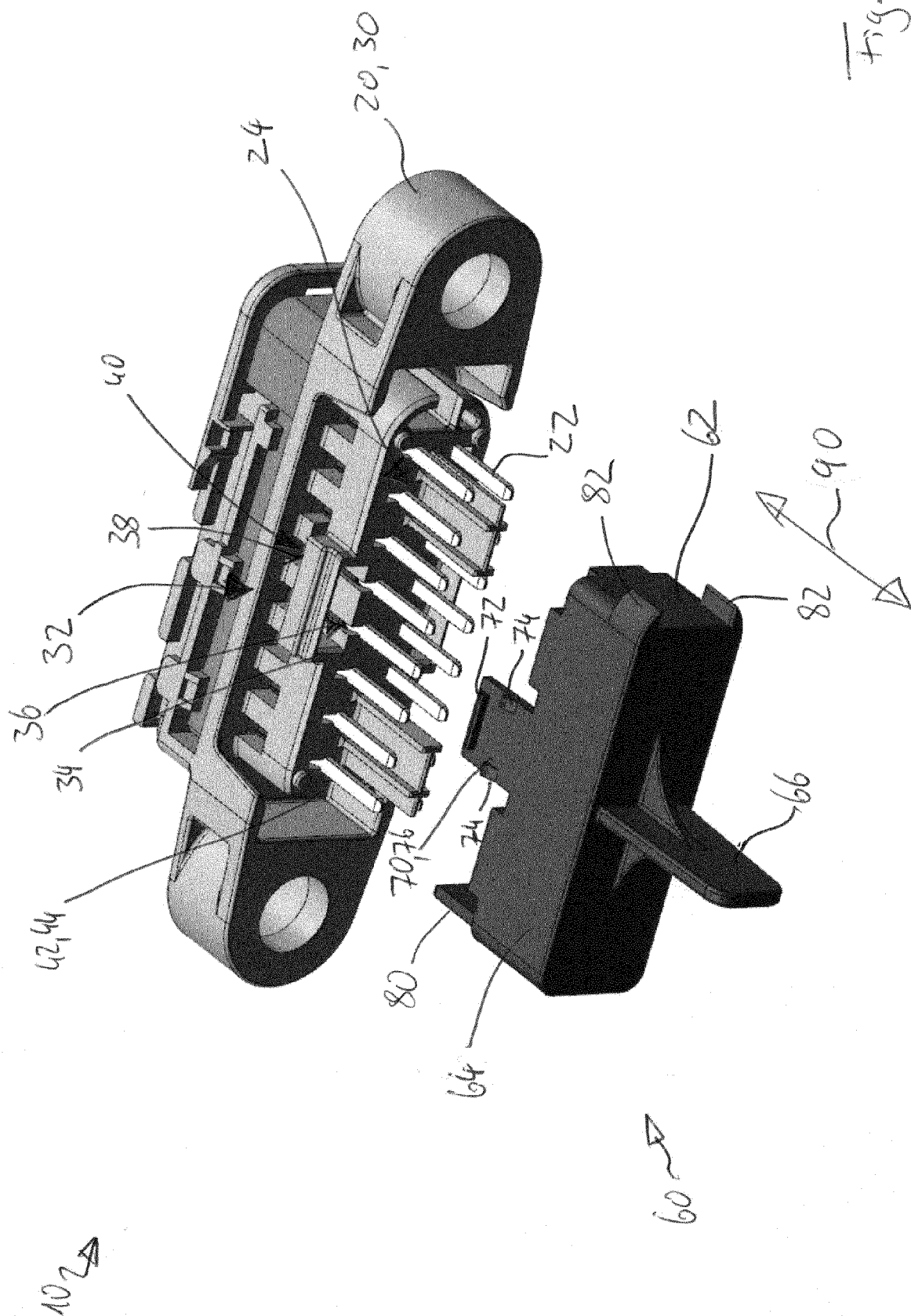
claims, comprising a cover body (62), wherein the cover body (62) comprises

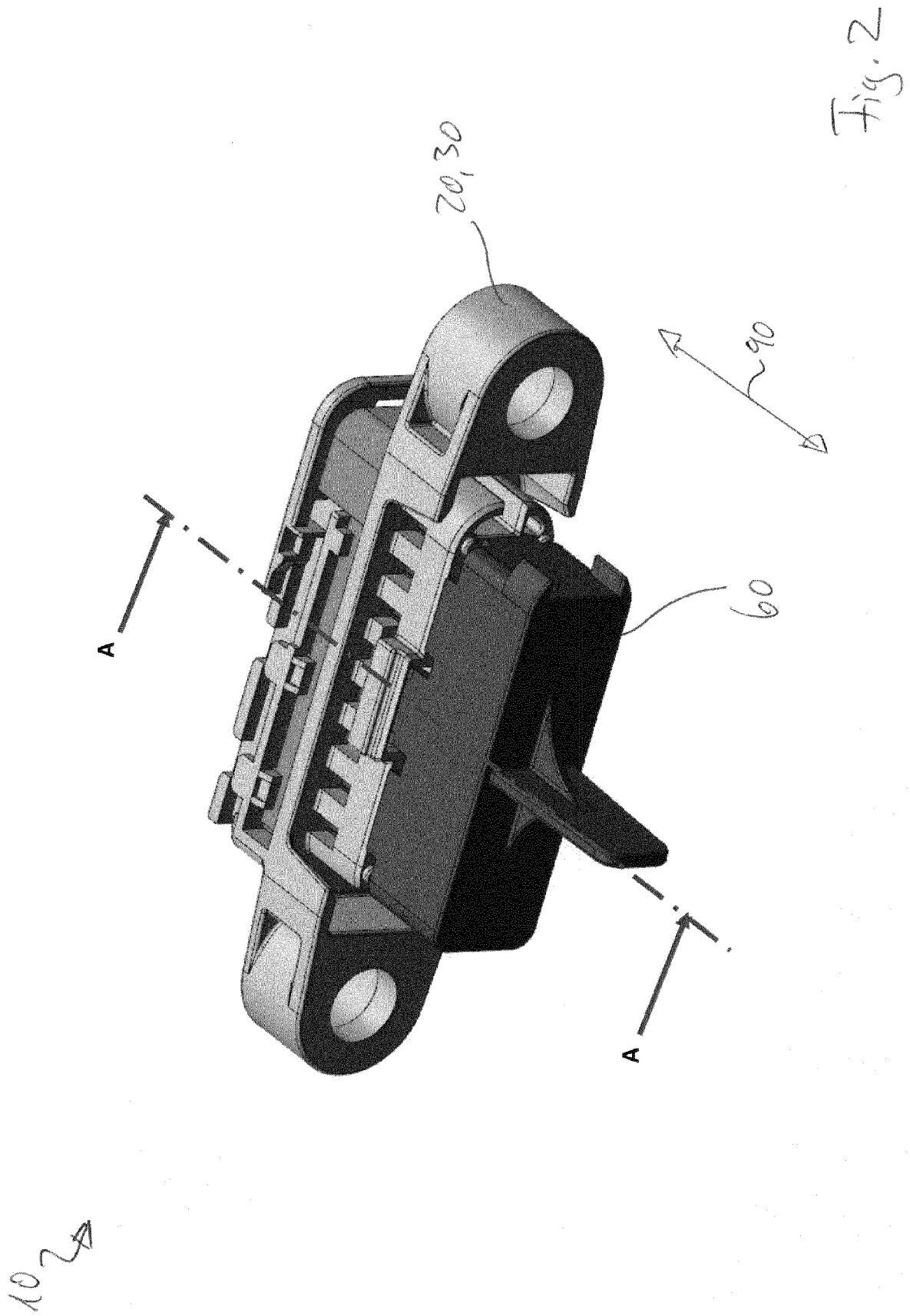
- a cover dome (64) enclosing a cover volume (66) for accommodating the at least one pin (22) of the male plug (20), 5
- a locking element (72) for an interaction with the cover lock (32) of the housing (30) of the male plug (20) for a form-fittingly fixation of the pin cover (60) on the housing (30), and 10
- a releasing element (74) adapted to interact with the releasing member (52) of the coupling member (50) for releasing a form-fittingly fixation of the pin cover (60) on the male plug (20). 15

10. Pin cover (60) according to claim 9, wherein the cover body (62) comprises a flexible tab (70) extending from the cover dome (64) in an insertion direction (90), wherein the locking element (72) and the releasing element (74) are arranged at the tab (70). 20
11. Pin cover (60) according to claim 10, wherein the tab (70) is shaped to form a guiding element (76) adapted to be form-fittingly inserted into a guiding reception (34) of the housing (30). 25
12. Pin cover (60) according to one of the preceding claims 9 to 11, wherein the cover body (62) comprises a first polarization element (80) adapted to interact with a polarization member (42) of the housing (30), in particular adapted to be form-fittingly inserted into a polarization reception (44) of the housing (30), and/or the cover body (62) comprises a second polarization element (82) adapted to interact with a polarization member (56) of the coupling member (50). 30 35
13. Pin cover (60) according to one of the preceding claims 9 to 12, wherein the cover body (62) comprises a handle (68), in particular a handle (68) extending from the cover dome (64) against the insertion direction (90). 40
14. Pin cover (60) according to one of the preceding claims 9 to 13, wherein the cover body (62) is monolithically constructed. 45
15. System (10) of a male plug (20) according to one of the claims 1 to 8 and a pin cover (60) according to one of the claims 9 to 14. 50
16. A method for providing a male plug (20) of a system (10) according to claim 15, comprising the steps of 55
- a) providing the housing (30), in particular the housing (30) equipped with at least one pin (22),

- b) fixing the pin cover (60) on the housing (30),
- c) interlocking the coupling member (50) and the housing (30) through a panel (100),
- d) releasing the fixation of the pin cover (60) on the housing (30), and
- e) removing the pin cover (60).

17. A method according to claim 16, wherein steps c) and d) are carried out simultaneously, in particular wherein the coupling member (50) interacts during its interlocking on the housing (30) with the pin cover (60) and thereby causes releasing the fixation of the pin cover (60) on the housing (30).





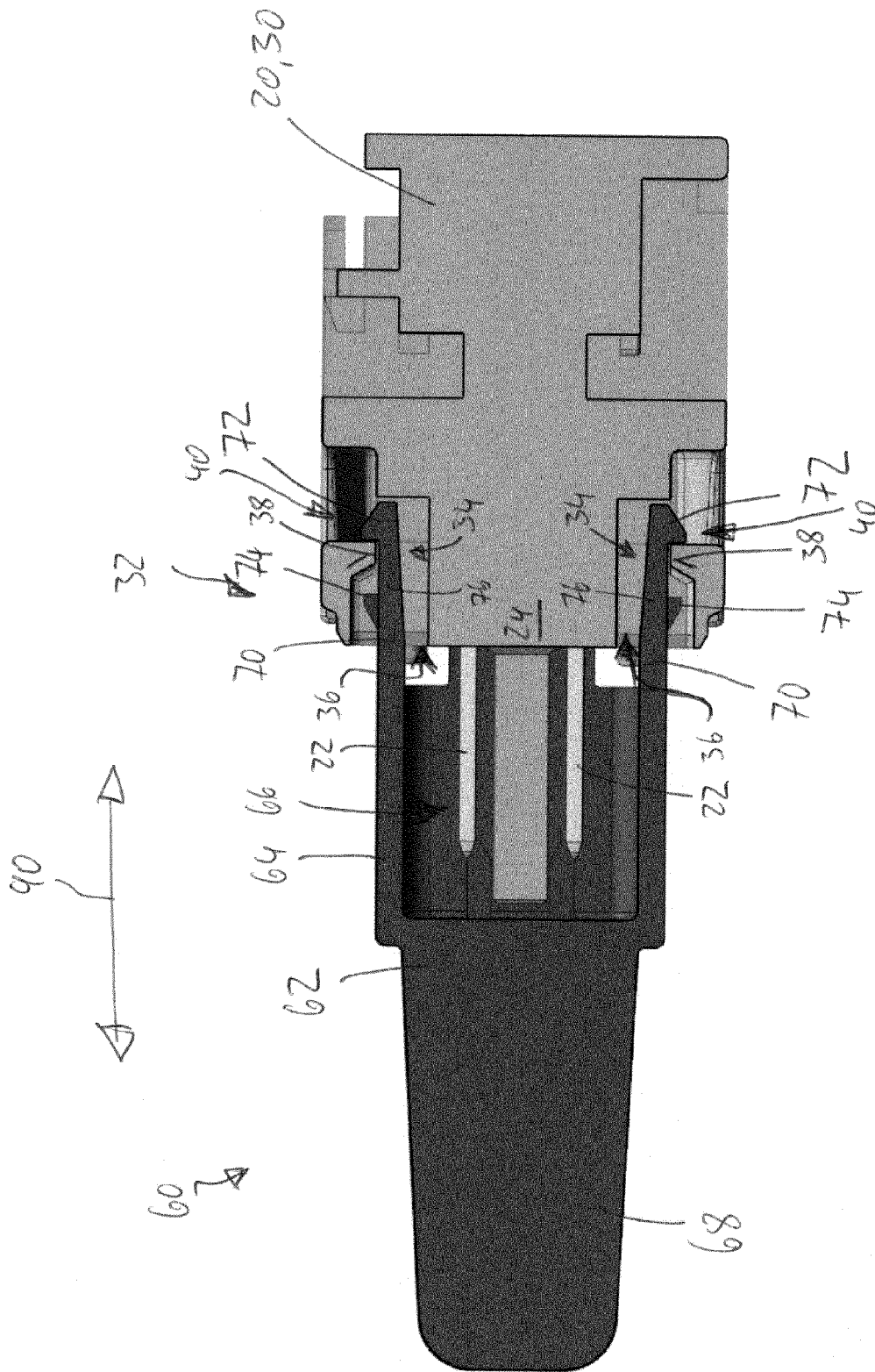
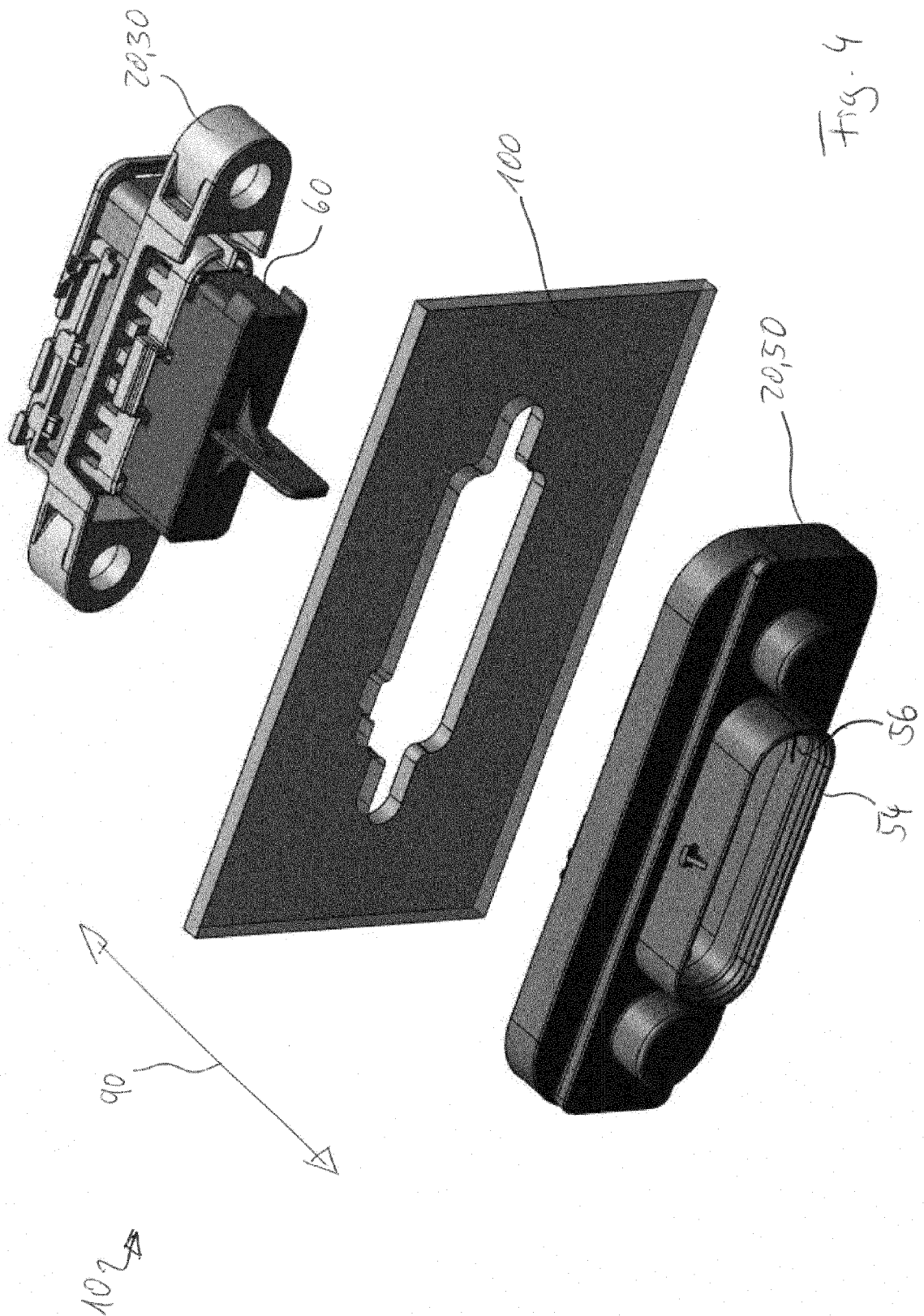


Fig. 3



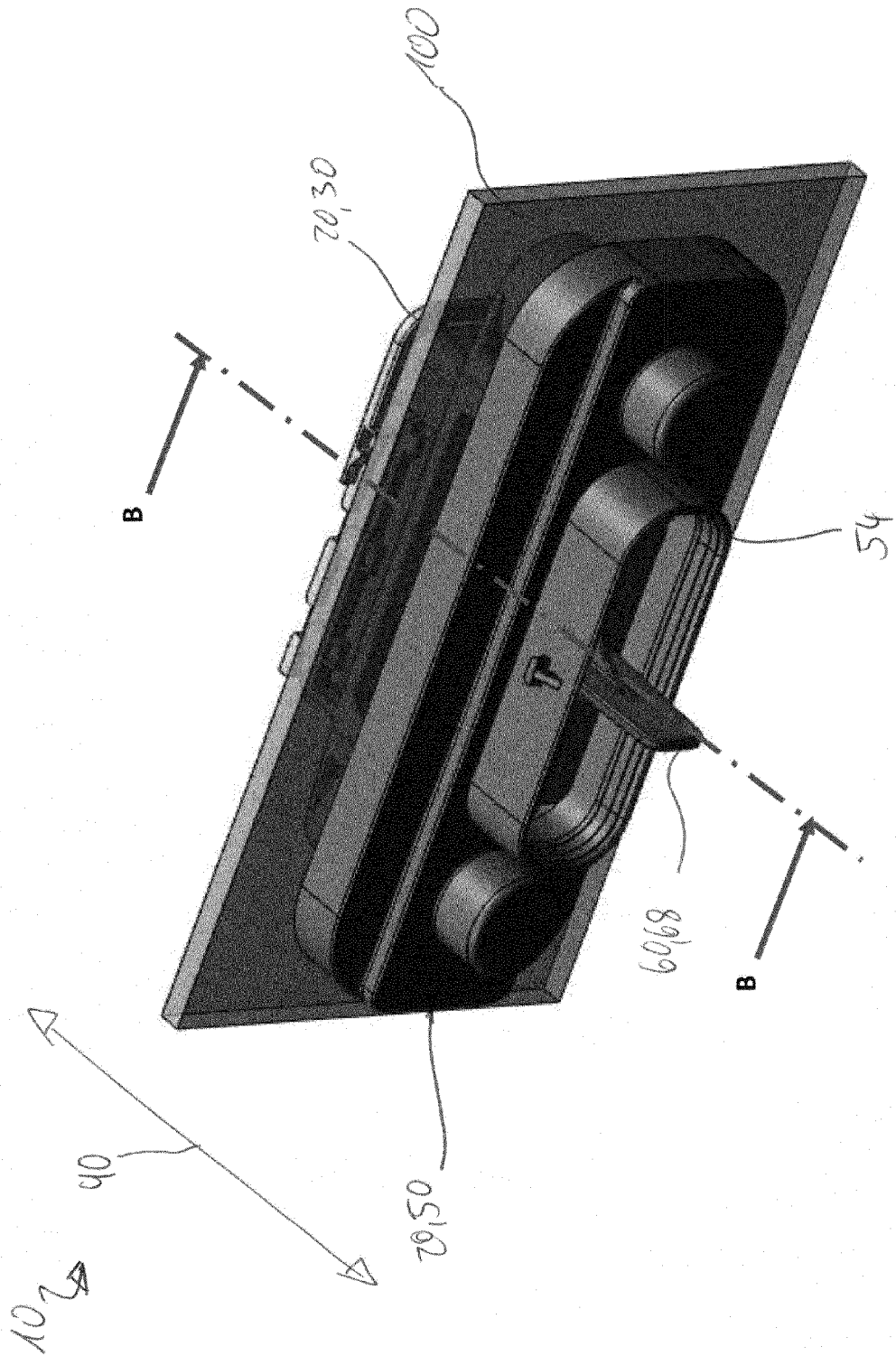
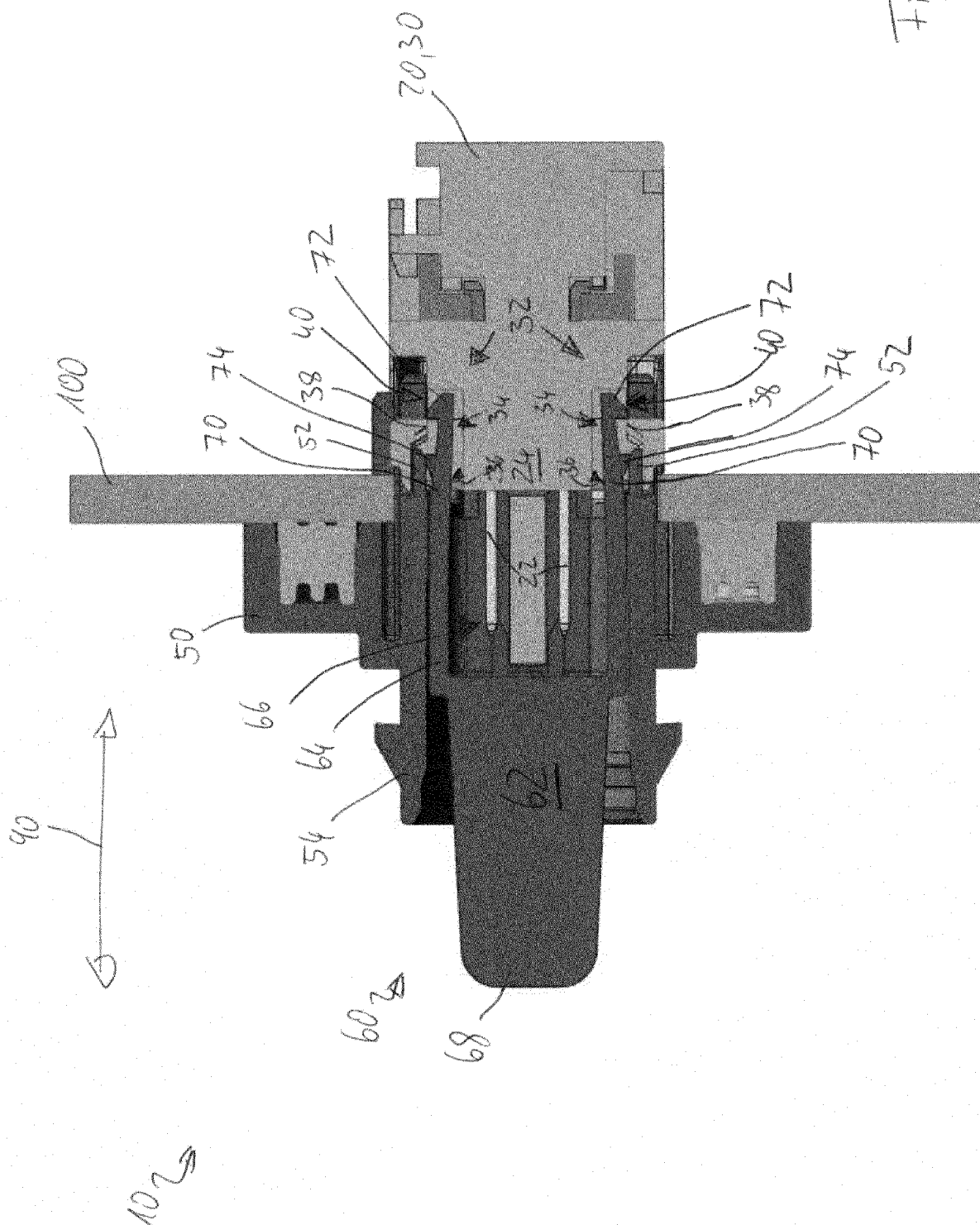
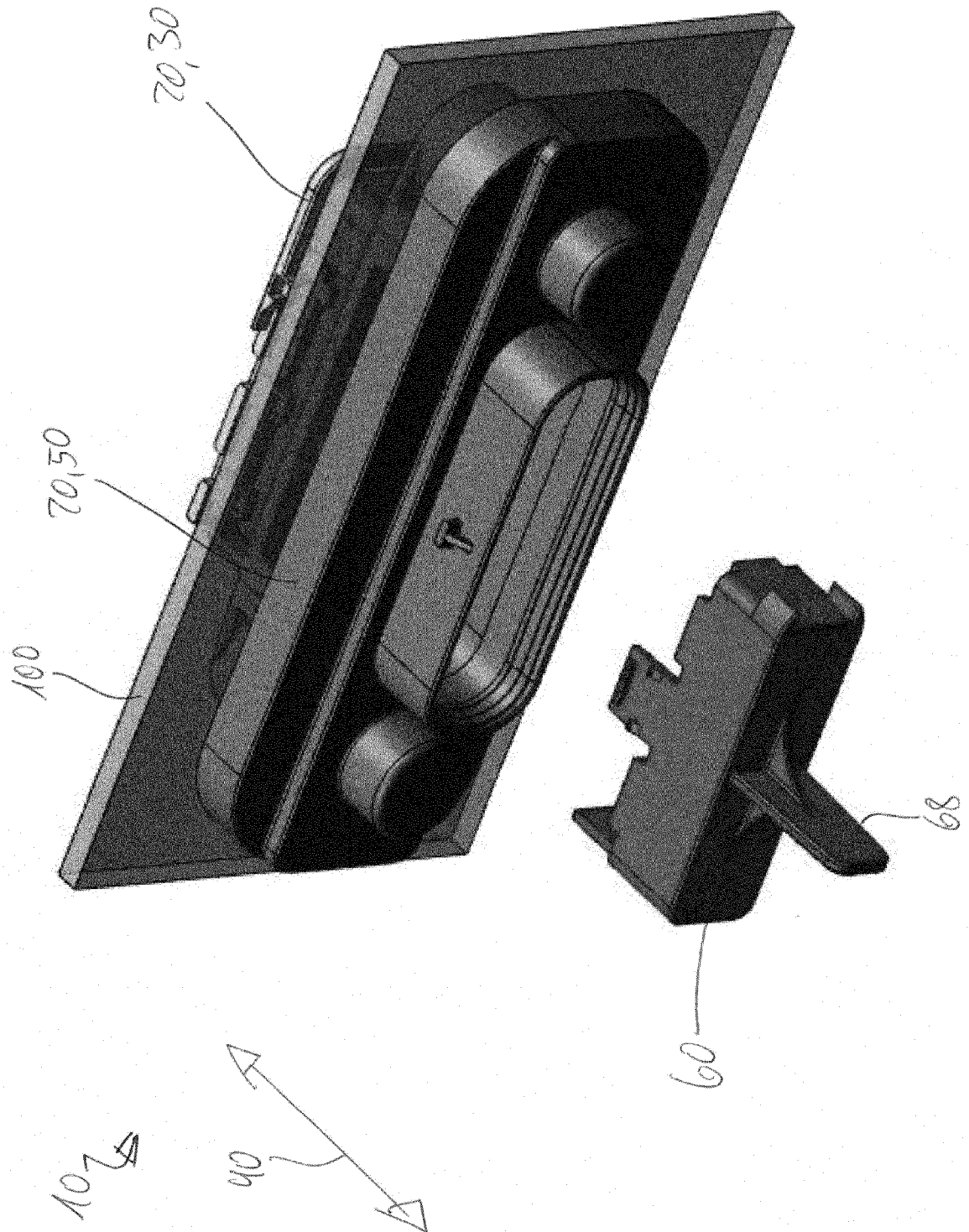


Fig. 5







EUROPEAN SEARCH REPORT

Application Number
EP 19 19 9300

5

10

15

20

25

30

35

40

45

50

55

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2019/006782 A1 (VASBINDER ANDREW JACOB [US] ET AL) 3 January 2019 (2019-01-03)	1-12, 14-17	INV. H01R13/506
Y	* paragraph [0004] - paragraph [0039]; figures 1-6 *	13	H01R13/74
Y	----- CN 106 716 730 B (HARTING ELECTRONICS GMBH) 22 January 2019 (2019-01-22) * paragraph [0042] - paragraph [0042]; figures 1, 5 *	13	ADD. H01R13/52 H01R13/44

			TECHNICAL FIELDS SEARCHED (IPC)
			H01R
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 26 February 2020	Examiner Mateo Segura, C
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 19 9300

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

26-02-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2019006782 A1	03-01-2019	CN 110832708 A	21-02-2020
		US 2019006782 A1	03-01-2019
		WO 2019003063 A1	03-01-2019
-----	-----	-----	-----
CN 106716730 B	22-01-2019	CN 106716730 A	24-05-2017
		DE 102014113324 A1	17-03-2016
		EP 3195418 A1	26-07-2017
		JP 2017530521 A	12-10-2017
		KR 20170057333 A	24-05-2017
		US 2017264042 A1	14-09-2017
		WO 2016041551 A1	24-03-2016
-----	-----	-----	-----