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(54) WATER PROOF CONNECTOR ASSEMBLY

WASSERDICHTER STECKVERBINDERANORDNUNG

ENSEMBLE CONNECTEUR ÉTANCHE À L'EAU

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Description

1. Field of the invention

[0001] The present invention relates to a water proof connector assembly and in particular to a water proof door to body connector assembly for automotive applications.

2. Technical background

[0002] In many fields of applications electrical connectors have to be provided with sealing members to seal connector components against humidity.

For example, door to body connectors for passenger cars, which typically are used to connect electrical components placed in car doors, such as door locks, door airbags, etc. to corresponding control electronics, have to be provided with reliable sealing means. Such connectors usually are placed in the junction in between a car body and the car door and can therefore be exposed to environmental humidity and moisture as car doors are opened and closed regularly. In particular, because of increasing complexity and importance of electronics which have to be connected throughout the mentioned junction, a demand exists for more reliable water proof connector assemblies, in particular for more reliable water proof door to body connector assemblies.

[0003] An example of a connector assembly to be used for example in automotive door to body applications is described in the international patent application WO 2004/047234 A1. In this document, a connector and a corresponding counter connector are described which can be mutually connected through an aperture in a panel, which can for example be part of a car door or body. The transition in between each connector and the panel can be sealed off by means of a seal surrounding the aperture in the panel. In mated condition of the assembly, due to this seal, humidity or moisture cannot enter the assembly through said transition in between the connectors and the panel.

[0004] A further example of a water proof connector assembly, which can be used as a door to body connector assembly, is described in the European patent application EP 1 318 570 A1. Therein, a connector assembly is described with a connector and a counter connector, which can be mated to each other through an aperture in a panel, whereby the mating can be supported by the use of a mate assist device in form of a mate assist lever. The EP'570 provides a connector assembly which is sealed against humidity or moisture, whereby the assembly is provided with sealing elements in between the connector housings which upon mating of the connector housings are compressed only in directions perpendicular to the direction of mating the housings. Thereby, resilient forces or restoring forces which would act against the mating of the connector housings are avoided. Such resilient forces counteracting the connector

mating can for example arise, when sealing members are compressed in between housing components in mating direction of the housings.

A further development of a water proof connector assembly is described in the European patent specification EP 1 745 528 B1. The EP'528 also relates to a connector assembly, whereby a connector can be connected to a counter connector through an aperture in a panel. In this example, the connector mating is facilitated by means of a mate assist slider, which for this purpose can be inserted into a housing of the connector. Upon insertion of the mate assist slider into the connector housing, cam grooves provided in actuating legs of the mate assist slider can interact with corresponding cam pins of the counter connector to assist the connector mating by means of a lever action.

The connector assembly disclosed in the EP'528 is provided with sealing means to seal the connector assembly against humidity and moisture. In addition to a seal surrounding the aperture in the panel, as it is already known for example from the above mentioned WO'234, the connector assembly disclosed in the EP'528 is provided with sealing rings which in mated condition of the assembly are placed around said cam pins in between corresponding faces of the counter connector and side walls of the connector housing. Thereby, in mated condition of connector and counter connector, the interior of the connectors is sealed against humidity. However, these sealing rings are complicated to assemble and they act against the mating direction.

[0005] The document JP 11067350 A discloses a connector assembly according to the preamble of the independent claim 1.

[0006] It is an object of the present invention, to improve the state of the art by providing a connector assembly, in particular with a mate assist device and suitable to be used as a door to body connector for automotive applications, with improved means for sealing the connector assembly against humidity and moisture. It is a further object of the present invention to provide a connector assembly with more reliable sealing means, whereby preferably all components of the connector assembly can be produced as injection moulded parts.

[0007] These and other objects which become apparent upon reading the following description are solved by a connector assembly according to claim 1.

3. Summary of the invention

[0008] According to the invention, a connector assembly comprising a connector housing and a mate assist slider is provided. The connector housing is adapted to be connected to a corresponding counter connector, in a preferred embodiment through an aperture in a panel. Thereby, the connector assembly can for example be used as a door to body connector for automotive applications, for example to connect an electronic door lock, an airbag, etc., provided in a door of a passenger car to

corresponding electronics which typically are placed in the body of the car.

[0009] The mate assist slider is arranged movable between an open and a closed position on the connector housing, whereby the mate assist slider is adapted to interact with the counter connector upon moving from its open position towards its closed position to support mating of the counter connector and the connector housing. The mate assist slider comprises a base portion and at least one actuating leg extending from the base portion, whereby the actuating leg is adapted to be inserted at least partially into the connector housing through at least one corresponding aperture when the mate assist slider is moved towards its closed position. Said aperture can for example be an opening in the connector housing or the opening of a guiding channel for the actuating leg, which channel can for example be provided in side walls of the connector housing.

[0010] To facilitate mating of the connector housing to the counter connector, the actuating leg of the mate assist slider preferably is provided with cam grooves such that when the mate assist slider is placed in its open position in or on the connector housing, upon inserting the counter connector into the connector housing, cam pins of the counter connector are inserted into said cam grooves. The cam grooves can be inclined, i.e. provided at a suitable angle with respect to the insertion direction of the actuating leg into the connector housing, such that upon moving the mate assist slider from its open position towards its closed position, the cam pins slide along the cam grooves, whereby, in analogy to a lever action, the counter connector housing is pulled towards the connector housing. Thereby, the counter connector is mated to the connector housing, or at least the connector mating is facilitated.

[0011] According to the invention, the connector assembly further comprises at least one sealing member which is arranged on the aperture in the connector housing, whereby said sealing member is adapted to be in sealing contact with at least one sealing surface of the mate assist slider, when the actuating leg is at least partially inserted into the aperture to seal off the aperture. Preferably, even if the mate assist slider is not completely placed in its closed position, for example because of displacement due to car vibrations or movement in the case that the connector assembly is used as a car door to body connector, or being displaced by an operator during service, advantageously the connector is sealed against humidity.

In order to provide an optimal sealing function, in a preferred embodiment the mate assist slider is provided with more than one sealing surface. Preferably, at least one actuating leg sealing surface is provided at the actuating leg of the mate assist slider, and at least one base sealing surface is provided on the base portion of the mate assist slider. To provide an optimal sealing function, the sealing member is adapted to simultaneously be in sealing contact with the actuating leg sealing surface and the base

sealing surface, when the mate assist slider is placed in its closed position. This simultaneous sealing contact of the sealing member to two different surfaces is particularly advantageous when the surfaces are for example oriented differently, e.g. perpendicular to each other. Thus the inventive sealing member can provide sealing not only in a single plane, e.g. between two parallel surfaces, but for example also around a sealing corner.

[0012] Because of the inventive sealing concept to provide the sealing member at the aperture of the connector housing, the interior of the connector housing is sealed, and thereby preferably, further complicated interior sealing members such as sealing members provided around the above mentioned cam pins and/or at the cam grooves are not necessary.

4. Description of the preferred embodiments

[0013] In the following, the invention is described exemplarily with reference to the enclosed figures in which:

Fig. 1 shows a schematic illustration of a connector assembly, whereby a mate assist slider is shown in an open position in a connector housing;

Fig. 2 shows the connector assembly of Fig. 1 in a different perspective, whereby the mate assist slider has been removed;

Fig. 3 shows a cross sectional view of the connector assembly of Fig. 1 when the mate assist slider is placed in a closed position;

Fig. 4 shows an enlarged detail of the cross sectional view of Fig. 3; and

Fig. 5 shows a different cross sectional view of the connector assembly, whereby the mate assist slider is placed in a closed position;

Fig. 6 shows the connector assembly of Fig. 1 connected to a counter connector through an aperture in a panel.

[0014] Figure 1 shows a schematic three dimensional view of a connector assembly 100, wherein a mate assist slider 200 is shown being placed in an open position in a connector housing 101. The connector housing 101 is provided with a cable shroud 102, to connect an electrical cable to the connector assembly 100. In Fig. 1, one can see that the mate assist slider 200 has an essentially u-shaped form, being provided with a base portion 201 and two actuating legs 203 which protrude therefrom essentially perpendicular. As it will be clear to the person skilled in the art, in different embodiments, the mate assist slider could be provided only with one actuating leg 203 or with more than two actuating legs 203, in which cases the connector housing 101 would be provided with one or

more than two corresponding apertures 103 (cf. Fig.2).

[0015] Figure 2 shows the connector housing 101 of Fig. 1 from a different perspective, whereby in this figure, the mate assist slider 200 has been removed. As one can see in this figure, the connector assembly 100 is provided with sealing members 301 which are arranged on apertures 103 of the connector housing 101, and with a further optional sealing element 307 which serves to seal a possible transition in between the connector assembly 100 and a panel 700 when the connector assembly is connected to a panel 700 as shown in Fig. 5 below. In the shown embodiment, the two sealing members 301 and the optional sealing element 307 are formed as integral components of a sealing assembly 300, which is a single injection moulded part attached to the connector housing 101. As it will be clear to the skilled person, in different embodiments the sealing members 301 and the sealing element 307 can be single parts attached or not attached to the connector housing 101. The sealing assembly 300 as well as sealing members 301 and sealing element 307 can be made from rubber, plastic, silicon or similar materials which are suitable for sealing purposes.

[0016] In Fig. 2 one can see that the sealing members 301 are provided in form of sealing rings, which are arranged around the apertures 103 of the connector housing 101 and which extend partially into the aperture. The apertures 301 preferably are openings of guiding channels 119 (cf. Fig. 3) and by partially extending into the apertures 103, the sealing members 301 are arranged on inner surfaces of the channels 119. In different embodiments, these sealing members 301 could be shaped differently for example if arranged around a round or differently shaped aperture. Similarly, the sealing members 301 could extend farther or less far into the apertures 103. However, it is important that by extending at least partially into the aperture 103, the sealing member 301 thereby is provided with at least one parallel sealing surface 311, i.e. is arranged essentially parallel to the insertion direction 601 of the actuating legs 203 into the connector housing 101. As one can see in Fig. 2 this sealing surface comprises rounded corners and essentially follows a step into the aperture 103. Even though the exact shape of the parallel sealing surface 311 is not essential for the invention, it is advantageous in that it does not hamper insertion of the actuating legs 203 into the aperture 103 and at the same time can provide an optimized sealing contact to a corresponding actuating leg sealing surface 205 (cf. Fig. 1) of the actuating legs 203.

[0017] Further, in Fig. 2 one can see that the sealing member is provided with perpendicular sealing surfaces 313, which are arranged in a plane essentially perpendicular to the insertion direction 601 (i.e. extending essentially in directions 603, 605 as shown in Fig. 1). These perpendicular sealing surfaces 313 are adapted to be in sealing contact with a base sealing surface 207 (cf. Fig.1), when the mate assist slider 200 is placed in its closed position. Thereby, the parallel sealing surface 311 and the perpendicular sealing surface 313 provide an

advantageous, essentially L-shaped sealing portion which allows for an optimal seal for the aperture 103 and the interior of the connector housing 101. This advantageous L-shaped sealing portion formed by the actuating leg sealing surface 205 and the base sealing surface 207 can best be seen in Figs. 3 and 4. Similar as for the case of the perpendicular sealing surfaces 311, it is not necessary that the perpendicular sealing surfaces 313 are flat, but these surfaces could also be provided in a rounded shape or with further sealing steps or the like to improve sealing contact to corresponding sealing surfaces of the mate assist slider.

[0018] In Figs. 3 and 4, the base portion 201 of the mate assist slider 200 is shown as an essentially flat plate from which the actuating legs 203 extend essentially perpendicular into guiding channels 119 formed by an inner side wall 111 and an outer side wall 113 of the connector housing 101. Due to the flat form of the base portion 201, the base portion fully covers the apertures 103 when the mate assist slider 200 is placed in its closed position as shown in the figures. This is advantageous in that the flat base portion 201 provides a closed sealing surface separate for each single aperture 103 (as opposed for example to a single large sealing ring arranged around both apertures 103) and in that the flat base portion 201 provides also mechanical protection for the perpendicular sealing surfaces 313 and the apertures 103. In the shown embodiment, the flat base portion provides an almost form-fitting closure for the connector housing 101, which provides optimal mechanical stability if the connector assembly is for example moved during service.

[0019] As one can see from Fig. 4, the actuating leg sealing surface 205, is arranged on a proximal leg portion 211 of the actuating leg 203, thereby being adjacent to the base sealing surface 207. Thus, the actuating leg sealing surface 205 and the base sealing surface 207 form an essentially L-shaped counter sealing portion to provide optimal sealing contact with the essentially L-shaped sealing portion formed by the parallel sealing surface 311 and the perpendicular sealing surface 313.

[0020] In order to further enhance the sealing effect of the above mentioned sealing surfaces, the actuating leg 203 is further provided with a widened portion 217 which upon insertion of the actuating leg into said channel 119 is wedged with the sealing ring. As one can see in Figs. 3 and 4, thereby the actuating leg sealing surface 205 is pressed against the parallel sealing surface 311 of the sealing member 301 to enhance the sealing contact between these sealing surfaces.

[0021] As mentioned above in the introduction, if upon mating of connectors or as in the present case, upon insertion of the mate assist slider 200 into the connector housing 101, sealing members are compressed in directions parallel to the insertion direction. This compression leads to restoring forces originating from the compressed sealing members, which act against the mating or insertion process. In this respect, the parallel sealing surfaces 311 are arranged in ideal orientation: When the actuating

legs 203 are inserted, the parallel sealing surfaces can be pressed by the actuating legs 203 only in directions perpendicular to the insertion direction 601. Therefore, also possible restoring forces originating from the compression of the sealing member 301 by pressing of the parallel sealing surfaces 311, can only act in directions perpendicular to the insertion direction 601, and are therefore not opposed to the insertion of the mate assist slider 200.

[0022] To improve the sealing and/or the mechanical connection of the mate assist slider 200 to the connector housing 101, or if necessary, to compensate for possible restoring forces originating from a compression of the sealing member 301 in a direction parallel to the insertion direction 601 e.g. by pressing the base sealing surface 207 against the perpendicular sealing surface 313, the sealing member 301 and the actuating leg sealing surface 205 advantageously comprise respective corresponding lock-sealing means 303, 215. These lock-sealing means 303, 215 are in the shown preferred embodiment realized as a lock-sealing recess 303 provided in the parallel sealing surface 311 of the sealing member 301 and a lock-sealing elevation 215 provided on the actuating leg 203. In the shown embodiment, only one side of each actuating leg 203 is provided with a lock-sealing elevation 215, however, in different preferred embodiments also the other or all sides of the actuating leg 203 could be provided with lock-sealing elevations 215. As the skilled person can derive from Figs. 3 and 4, upon moving the mate assist slider 200 into its closed position, the lock-sealing elevation 215 is disposed into the lock-sealing recess 303, thereby locking the mate assist slider 200 in its closed position. Thereby, preferably these lock-sealing means fulfil an advantageous double function: They lock the mate assist slider 200 in its closed position, thereby compensating for the above mentioned possible restoring force and they advantageously can enhance the sealing effect of the parallel sealing surface 311 and the actuating leg sealing surface 205.

[0023] As one can see in Figs. 3 and 5, to lock the mate assist slider 200 in its closed position, the actuating legs 203 are further provided with further locking means, which in the shown example consist of locking tongues 221 provided on the actuating legs 203 and corresponding locking recesses 115 provided in the inner side walls 111 of the connector housing 101. As one can further see in Fig. 5, the mate assist slider 200 is provided with cam grooves 225 and the connector housing is provided with corresponding cam insertion slots 105, 107, 109. Since the principal function of such mate assist sliders is well known to the skilled person, e.g. from the documents cited in the introductory part above, the function will be described only briefly. As the skilled person will recognize, when the mate assist slider 200 is placed in its open position (and the two cam grooves 225 of the shown actuating leg 203 are aligned with cam insertion slots 105 and 107) the cam grooves 225 are adapted to receive corresponding cam pins of a counter connector

500 (cf. Fig. 6) upon mating of the connector assembly 100 and the counter connector 500. When the mate assist slider is moved from its open position towards its closed position (as shown in Fig. 5), the cam pins move along the cam grooves, thereby pulling the counter connector 500 towards the connector housing 101. Thereby, the actuating legs 203 are provided with an actuating function. However, as it will be clear to the skilled person, the mate assist slider 200 could be provided with only one actuating leg 203 or more than two actuating legs 203. In addition, the mate assist slider could be provided with a leg without the actuating function, which for example only serves to guide the mate assist slider 200 properly into the connector housing 101.

[0024] As one can see in this figure, no sealing members are provided at the cam grooves. Due to the inventive sealing concept to provide sealing member 301 at the aperture 103, no sealing components are necessary in the interior of the connector housing such as at the cam grooves 225 or as well as at the corresponding cam pins although such sealing elements could be provided for additional security. This is advantageous in that such interior sealing components usually are complicated to produce and assemble and act against the assembly of connectors and mate assist devices.

[0025] Figure 6 shows the connector assembly 100 mated to a corresponding counter connector 500 through an aperture in a panel 500. In this mated condition, sealing elements 307 (cf. Figs. 1 to 4) are in sealing contact with corresponding surfaces of the panel 700. The panel 700 can for example be a part of a door of a passenger car or of a body of the passenger car. However, the connector assembly 100 which preferably also comprises the counter connector 500 can of course also be used for different applications.

Claims

1. Connector assembly (100) comprising a connector housing (101) adapted to be connected to a corresponding counter connector (500), and a mate assist slider (200), whereby the mate assist slider (200) is arranged movable between an open and a closed position on the connector housing (101) and is adapted to interact with the counter connector (500) upon moving from its open position towards its closed position to support mating of the counter connector (500) and the connector housing (101), the mate assist slider (200) comprising a base portion (201) and at least one actuating leg (203) extending from the base portion (201), the actuating leg (203) being adapted to be inserted at least partially into the connector housing (101) through at least one corresponding aperture (103) when the mate assist slider (200) is moved towards its closed position, wherein the connector assembly (100) further comprises at least one sealing member (301) which is arranged

on the aperture (103) in the connector housing (101), whereby said sealing member (301) is adapted to be in sealing contact with at least one sealing surface of the mate assist slider (200), when the actuating leg (203) is at least partially inserted into the aperture (103) to seal off the aperture (103); **characterized in that**

the sealing member (301) is a sealing ring and the actuating leg (203) comprises a widened portion (217) which upon insertion of the actuating leg (203) into the connector housing (101) is wedged with the sealing ring; and the sealing member (301) and the actuating leg sealing surface (205) comprise respective corresponding lock-sealing means (303, 215) which are adapted to lock the mate assist slider (200) to the sealing member (301), thereby enhancing the sealing between the sealing member (301) and the actuating leg (203); and the sealing member (301) comprises at least one lock-sealing recess (303) and the actuating leg sealing surface (205) comprises at least one corresponding lock-sealing elevation (215), such that upon moving the mate assist slider (200) into its closed position, the lock-sealing elevation (215) is disposed into the lock-sealing recess (303), thereby locking the mate assist slider (200) in its closed position.

2. Connector assembly (100) according to claim 1, **characterized in that** the actuating leg (203) is provided with at least one actuating leg sealing surface (205), and the base portion (201) is provided with at least one base sealing surface (207), whereby the sealing member (301) is adapted to simultaneously be in sealing contact with the actuating leg sealing surface (205) and with the base sealing surface (207), when the mate assist slider (200) is placed in its closed position.
3. Connector assembly (100) according to any one of claims 1 or 2, **characterized in that** the sealing member (301) extends at least partially into the aperture (103), the sealing member (301) further being provided with at least one parallel sealing surface (311) which is arranged essentially parallel to the insertion direction (601) of the actuating leg (203) into the connector housing (101), and which is adapted to be in sealing contact with the actuating leg sealing surface (205), when the mate assist slider (200) is placed in its closed position.
4. Connector assembly (100) according to claim 3, **characterized in that** the sealing member is further provided with at least one perpendicular sealing surface (313), which is arranged essentially perpendicular to the insertion direction (601) of the actuating leg (203) into the connector housing (101), and which is adapted to be in sealing contact with the base sealing surface (207), when the mate assist slider (200)

is placed in its closed position, the parallel sealing surface (311) and the perpendicular sealing surface (313) forming an essentially L-shaped sealing portion.

5. Connector assembly (100) according to any one of the preceding claims, **characterized in that** the sealing member (301) is a sealing ring which is arranged around the aperture (103) of the connector housing (101), and extends at least partially into the aperture.
6. Connector assembly (100) according to any one of the preceding claims, **characterized in that** the actuating leg sealing surface (205) is arranged on a proximal leg portion (211) of the actuating leg (203) adjacent to the base sealing surface (207).
7. Connector assembly (100) according to any one of the preceding claims, **characterized in that** the base portion (201) is an essentially flat plate from which the actuating leg (203) extends perpendicular in insertion direction (601) of the mate assist slider, and said plate is adapted to fully cover the aperture (103) in closed condition.
8. Connector assembly (100) according to any one of the preceding claims, **characterized in that** the base sealing surface (207) is essentially a flat sealing surface extending in directions (603, 605) essentially perpendicular to the insertion direction (601) of the actuating leg (203).
9. Connector assembly (100) according to any one of the preceding claims, **characterized in that** the actuating leg (203) is provided with cam grooves (225) which are adapted to interact with corresponding cam pins provided on the counter connector (500) upon mating, whereby no sealing members are provided around the cam pins and/or at the cam grooves (225).
10. Connector assembly (100) according to any one of the preceding claims, **characterized in that** the mate assist slider (200) has an essentially u-shaped form comprising at least two actuating legs (203), each actuating leg (203) being provided with at least one cam groove (225) which is adapted to receive a corresponding cam pin of the counter connector (500) upon mating of the connector assembly (100) and the counter connector (500).
11. Connector assembly (100) according to any one of the preceding claims, **characterized in that** the connector assembly (100) is adapted to be mated with the counter connector (500) through an opening (701) in a panel (700), whereby the connector assembly (100) preferably comprises a further sealing

element (307) and when the connector assembly (100) is mated to the counter connector (500) through the opening (701) in the panel (700), the further sealing element (307) being arrangable around the opening (701) in between the connector housing (101) and the panel (700) to seal the connection between the connector housing (101) and the panel (700).

12. Connector assembly (100) according to any one of claims 1 to 11, further comprising the corresponding counter connector (500).

Patentansprüche

1. Verbindieranordnung (100), die ein Verbindergehäuse (101), das ausgebildet ist, mit einem entsprechenden Gegenverbinder (500) verbunden zu werden, und einen Verbindungsunterstützungsschieber (200) aufweist, wobei der Verbindungsunterstützungsschieber (200) zwischen einer offenen und einer geschlossenen Position bewegbar an dem Verbindergehäuse (101) angeordnet ist und ausgebildet ist, mit dem Gegenverbinder (500) bei einer Bewegung von seiner offenen Position in seine geschlossene Position zu interagieren, um ein Zusammenfügen des Gegenverbinders (500) und des Verbindergehäuses (101) zu unterstützen, wobei der Verbindungsunterstützungsschieber (200) einen Basisteil (201) und zumindest einen Betätigungsschenkel (203) aufweist, der sich von dem Basisteil (201) erstreckt, wobei der Betätigungsschenkel (203) ausgebildet ist, um zumindest teilweise in das Verbindergehäuse (101) durch zumindest eine entsprechende Öffnung (103) eingeführt zu werden, wenn der Verbindungsunterstützungsschieber (200) hin zu seiner geschlossenen Position bewegt wird, wobei die Verbindieranordnung (100) weiter zumindest ein Dichtungselement (301) aufweist, das auf der Öffnung (103) in dem Verbindergehäuse (101) angeordnet ist, wobei das Dichtungselement (301) ausgebildet ist, in einem abdichtenden Kontakt mit zumindest einer Abdichtungsoberfläche des Verbindungsunterstützungsschiebers (200) zu sein, wenn der Betätigungsschenkel (203) zumindest teilweise in die Öffnung (103) eingeführt ist, um die Öffnung (103) abzudichten;

dadurch gekennzeichnet, dass

das Dichtungselement (301) ein Dichtungsring ist und der Betätigungsschenkel (203) einen verbreiterten Teil (217) aufweist, der bei einem Einführen des Betätigungsschenkels (203) in das Verbindergehäuse (101) mit dem Dichtungsring verkeilt wird; und das Dichtungselement (301) und die Abdichtungsoberfläche (205) des Betätigungsschenkels jeweilige entsprechende Verriegelungsabdichtungsmittel (303, 215) aufweisen, die ausgebildet sind zum Ver-

riegeln des Verbindungsunterstützungsschiebers (200) mit dem Dichtungselement (301), wodurch die Abdichtung zwischen dem Dichtungselement (301) und dem Betätigungsschenkel (203) verbessert wird; und das Dichtungselement (301) zumindest eine Verriegelungsabdichtungsvertiefung (303) aufweist und die Abdichtungsoberfläche (205) des Betätigungsschenkels zumindest eine entsprechende Verriegelungsabdichtungserhöhung (215) aufweist derart, dass bei einer Bewegung des Verbindungsunterstützungsschiebers (200) in seine geschlossene Position die Verriegelungsabdichtungsvertiefung (303) angeordnet wird, wodurch der Verbindungsunterstützungsschieber (200) in seiner geschlossenen Position verriegelt wird.

2. Verbindieranordnung (100) gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Betätigungsschenkel (203) mit zumindest einer Abdichtungsoberfläche (205) des Betätigungsschenkels vorgesehen ist und der Basisteil (201) mit zumindest einer Abdichtungsoberfläche (207) der Basis vorgesehen ist, wobei das Dichtungselement (301) ausgebildet ist, gleichzeitig in Abdichtungskontakt mit der Abdichtungsoberfläche (205) des Betätigungsschenkels und der Abdichtungsoberfläche (207) der Basis zu sein, wenn der Verbindungsunterstützungsschieber (200) in seine geschlossene Position gesetzt ist.
3. Verbindieranordnung (100) gemäß einem der Ansprüche 1 oder 2, **dadurch gekennzeichnet, dass** sich das Dichtungselement (301) zumindest teilweise in die Öffnung (103) erstreckt, wobei das Dichtungselement (301) weiter mit zumindest einer parallelen Abdichtungsoberfläche (311) vorgesehen ist, die im Wesentlichen parallel zu der Einführrichtung (601) des Betätigungsschenkels (203) in das Verbindergehäuse (101) angeordnet ist, und die ausgebildet ist, in einem abdichtenden Kontakt mit der Abdichtungsoberfläche (205) des Betätigungsschenkels zu sein, wenn der Verbindungsunterstützungsschieber (200) in seine geschlossene Position gesetzt ist.
4. Verbindieranordnung (100) gemäß Anspruch 3, **dadurch gekennzeichnet, dass** das Dichtungselement weiter mit zumindest einer senkrechten Abdichtungsoberfläche (313) vorgesehen ist, die im Wesentlichen senkrecht zu der Einführrichtung (601) des Betätigungsschenkels (203) in das Verbindergehäuse (101) angeordnet ist, und die ausgebildet ist, in einem abdichtenden Kontakt mit der Abdichtungsoberfläche (207) der Basis zu sein, wenn der Verbindungsunterstützungsschieber (200) in seine geschlossene Position gesetzt ist, wobei die parallele Abdichtungsoberfläche (311) und die senkrechte Abdichtungsoberfläche (313) einen im We-

sentlichen L-förmigen Dichtungsteil bilden.

5. Verbinderanordnung (100) gemäß einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass das Dichtungselement (301) ein Dichtungsring ist, der um die Öffnung (103) des Verbindergehäuses (101) angeordnet ist und sich zumindest teilweise in die Öffnung hinein erstreckt.
6. Verbinderanordnung (100) gemäß einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass die Abdichtungsoberfläche (205) des Betätigungsschenkels auf einem proximalen Schenkelteil (211) des Betätigungsschenkels (203) angrenzend an die Abdichtungsoberfläche (207) der Basis angeordnet ist.
7. Verbinderanordnung (100) gemäß einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass der Basisteil (201) eine im Wesentlichen ebene Platte ist, von der sich der Betätigungsschenkel (203) senkrecht in der Einführrichtung (601) des Verbindungsunterstützungsschiebers erstreckt, und die Platte ausgebildet ist, um die Öffnung (103) in einem geschlossenen Zustand vollständig abzudecken.
8. Verbinderanordnung (100) gemäß einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass die Abdichtungsoberfläche (207) der Basis im Wesentlichen eine flache Abdichtungsoberfläche ist, die sich in Richtungen (603, 605) erstreckt, die im Wesentlichen senkrecht zu der Einführrichtung (601) des Betätigungsschenkels (203) sind.
9. Verbinderanordnung (100) gemäß einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass der Betätigungsschenkel (203) mit Nockennuten (225) vorgesehen ist, die ausgebildet sind, mit entsprechenden Nockenstiften, die auf dem Gegenverbinder (500) vorgesehen sind, bei einem Zusammenfügen zu interagieren, wobei keine Dichtungselemente um die Nockenstifte und/oder an den Nockennuten (225) vorgesehen sind.
10. Verbinderanordnung (100) gemäß einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass der Verbindungsunterstützungsschieber (200) eine im Wesentlichen U-förmige Form hat, die zumindest zwei Betätigungsschenkel (203) aufweist, wobei jeder Betätigungsschenkel (203) mit zumindest einer Nockennut (225) vorgesehen ist, die ausgebildet ist zum Aufnehmen eines entsprechenden Nockenstifts des Gegenverbinders (500) bei einem Zusammenfügen

der Verbinderanordnung (100) und des Gegenverbinders (500).

11. Verbinderanordnung (100) gemäß einem der vorhergehenden Ansprüche,
dadurch gekennzeichnet, dass die Verbinderanordnung (100) ausgebildet ist, mit dem Gegenverbinder (500) durch eine Öffnung (701) in einer Platte (700) verbunden zu werden, wobei die Verbinderanordnung (100) vorzugsweise ein weiteres Dichtungselement (307) aufweist, und wenn die Verbinderanordnung (100) mit dem Gegenverbinder (500) durch die Öffnung (701) in der Platte (700) verbunden wird, das weitere Dichtungselement (307) um die Öffnung (701) zwischen dem Verbindergehäuse (101) und der Platte (700) angeordnet werden kann, um die Verbindung zwischen dem Verbindergehäuse (101) und der Platte (700) abzudichten.
12. Verbinderanordnung (100) gemäß einem der Ansprüche 1 bis 11, die weiter den entsprechenden Gegenverbinder (500) aufweist.

Revendications

1. Ensemble connecteur (100) comprenant un boîtier de connecteur (101) adapté à être connecté à un connecteur antagoniste correspondant (500), et un coulisseau d'assistance à l'accouplement (200), tel que le coulisseau d'assistance à l'accouplement (200) est agencé déplaçable entre une position ouverte et une position fermée sur le boîtier de connecteur (101) et est adapté à coopérer avec le connecteur antagoniste (500) lors du déplacement depuis sa position ouverte vers sa position fermée pour assister l'accouplement du connecteur antagoniste (500) et du boîtier de connecteur (101), le coulisseau d'assistance à l'accouplement (200) comprenant une portion de base (201) et au moins un bras d'actionnement (203) s'étendant depuis la portion de base (201), le bras d'actionnement (203) étant adapté à être inséré au moins partiellement dans le boîtier de connecteur (101) à travers au moins une ouverture correspondante (103) quand le coulisseau d'assistance à l'accouplement (200) est déplacé vers sa position fermée, dans lequel l'ensemble connecteur (100) comprend en outre au moins un élément d'étanchement (301) qui est agencé sur l'ouverture (103) dans le boîtier de connecteur (101), grâce à quoi ledit élément d'étanchement (301) est adapté à être en contact d'étanchement avec au moins une surface d'étanchement du coulisseau d'assistance à l'accouplement (200), quand le bras d'actionnement (203) est au moins partiellement inséré dans l'ouverture (103) pour étancher l'ouverture (103);
caractérisé en ce que
l'élément d'étanchement (301) est une bague

- d'étanchement et le bras d'actionnement (203) comprend une portion élargie (217) qui, lors de l'insertion du bras d'actionnement (203) dans le boîtier de connecteur (101), est coincée avec la bague d'étanchement ; et l'élément d'étanchement (301) et la surface d'étanchement (205) du bras d'actionnement comprennent des moyens d'étanchement/verrouillage (203, 215) respectifs correspondants, qui sont adaptés à verrouiller le coulisseau d'assistance à l'accouplement (200) sur l'élément d'étanchement (301), améliorant grâce à cela l'étanchement entre l'élément d'étanchement (301) et le bras d'actionnement (203) ; et l'élément d'étanchement (301) comprend au moins un évidement d'étanchement/verrouillage (303) et la surface d'étanchement (205) du bras d'actionnement comprend au moins une élévation d'étanchement/verrouillage (215) correspondante, de sorte que lors du déplacement du coulisseau d'assistance à l'accouplement (200) jusque dans sa position fermée, l'élévation d'étanchement/verrouillage (215) est disposée dans l'évidement d'étanchement/verrouillage (303), en verrouillant grâce à cela le coulisseau d'assistance à l'accouplement (200) dans sa position fermée.
2. Ensemble connecteur (100) selon la revendication 1, **caractérisé en ce que** le bras d'actionnement (203) est pourvu d'au moins une surface d'étanchement (205) pour bras d'actionnement, et la portion de base (201) est pourvue d'au moins une surface d'étanchement de base (207), grâce à quoi l'élément d'étanchement (301) est adapté à être simultanément en contact d'étanchement avec la surface d'étanchement (205) pour bras d'actionnement et avec la surface d'étanchement de base (207) quand le coulisseau d'assistance à l'accouplement (200) est placé dans sa position fermée.
 3. Ensemble connecteur (100) selon l'une quelconque des revendications 1 ou 2, **caractérisé en ce que** l'élément d'étanchement (301) s'étend au moins partiellement jusque dans l'ouverture (103), l'élément d'étanchement (301) étant en outre pourvu d'au moins une surface d'étanchement parallèle (311) qui est agencée essentiellement parallèle à la direction d'insertion (601) du bras d'actionnement (203) jusque dans le boîtier de connecteur (101), et qui est adaptée à être en contact d'étanchement avec la surface d'étanchement (205) pour le bras d'actionnement, quand le coulisseau d'assistance à l'accouplement (200) est placé dans sa position fermée.
 4. Ensemble connecteur (100) selon la revendication 3, **caractérisé en ce que** l'élément d'étanchement est en outre pourvu d'au moins une surface d'étanchement perpendiculaire (313), qui est agencée essentiellement perpendiculaire à la direction d'insertion (601) du bras d'actionnement (203) vers l'intérieur du boîtier de connecteur (101), et qui est adaptée à être en contact étanche avec la surface d'étanchement de base (207), quand le coulisseau d'assistance à l'accouplement (200) est placé dans sa position fermée, la surface d'étanchement parallèle (311) et la surface d'étanchement perpendiculaire (313) formant une portion d'étanchement essentiellement en forme de L.
 5. Ensemble connecteur (100) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'élément d'étanchement (301) est une bague d'étanchement qui est agencée autour de l'ouverture (103) du boîtier de connecteur (101), et qui s'étend au moins partiellement jusque dans l'ouverture.
 6. Ensemble connecteur (100) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la surface d'étanchement (205) du bras d'actionnement est agencée sur une portion de bras proximale (211) du bras d'actionnement (203) adjacente à la surface d'étanchement de base (207).
 7. Ensemble connecteur (100) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la portion de base (201) est une plaque essentiellement plane depuis laquelle le bras d'actionnement (203) s'étend perpendiculairement en direction d'insertion (601) du coulisseau d'assistance à l'accouplement, et ladite plaque est adaptée à couvrir entièrement l'ouverture (103) dans la condition fermée.
 8. Ensemble connecteur (100) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** la surface d'étanchement de base (207) est essentiellement une surface d'étanchement plane s'étendant dans des directions (603, 605) essentiellement perpendiculaires à la direction d'insertion (601) du bras d'actionnement (203).
 9. Ensemble connecteur (100) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le bras d'actionnement (203) est doté de gorges à came (225) qui sont adaptées à coopérer avec des tiges de came correspondantes prévues sur le connecteur antagoniste (500) lors de l'accouplement, grâce à quoi aucun élément d'étanchement n'est prévu autour des tiges de came et/ou au niveau des gorges à came (225).
 10. Ensemble connecteur (100) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le coulisseau d'assistance à l'accouplement (200) a essentiellement une forme en U comprenant au moins deux bras d'actionnement (203), chaque bras d'actionnement (203) étant pourvu d'au moins une gorge à came (225) qui est adaptée à recevoir

une tige de came correspondante du connecteur antagoniste (500) lors de l'accouplement de l'ensemble connecteur (100) et du connecteur antagoniste (500).

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11. Ensemble connecteur (100) selon l'une quelconque des revendications précédentes, **caractérisé en ce que** l'ensemble connecteur (100) est adapté à être accouplé avec le connecteur antagoniste (500) à travers une ouverture (701) dans un panneau (700), dans lequel l'ensemble connecteur (100) comprend de préférence un autre élément d'étanchement (307) et, quand l'ensemble connecteur (100) est accouplé au connecteur antagoniste (500) à travers l'ouverture (700) dans le panneau (700), l'autre élément d'étanchement (307) est susceptible d'être agencé autour de l'ouverture (701) entre le boîtier de connecteur (101) et le panneau (700) pour étancher la connexion entre le boîtier de connecteur (101) et le panneau (700).

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12. Ensemble connecteur (100) selon l'une quelconque des revendications 1 à 11, comprenant en outre le connecteur antagoniste correspondant (500).

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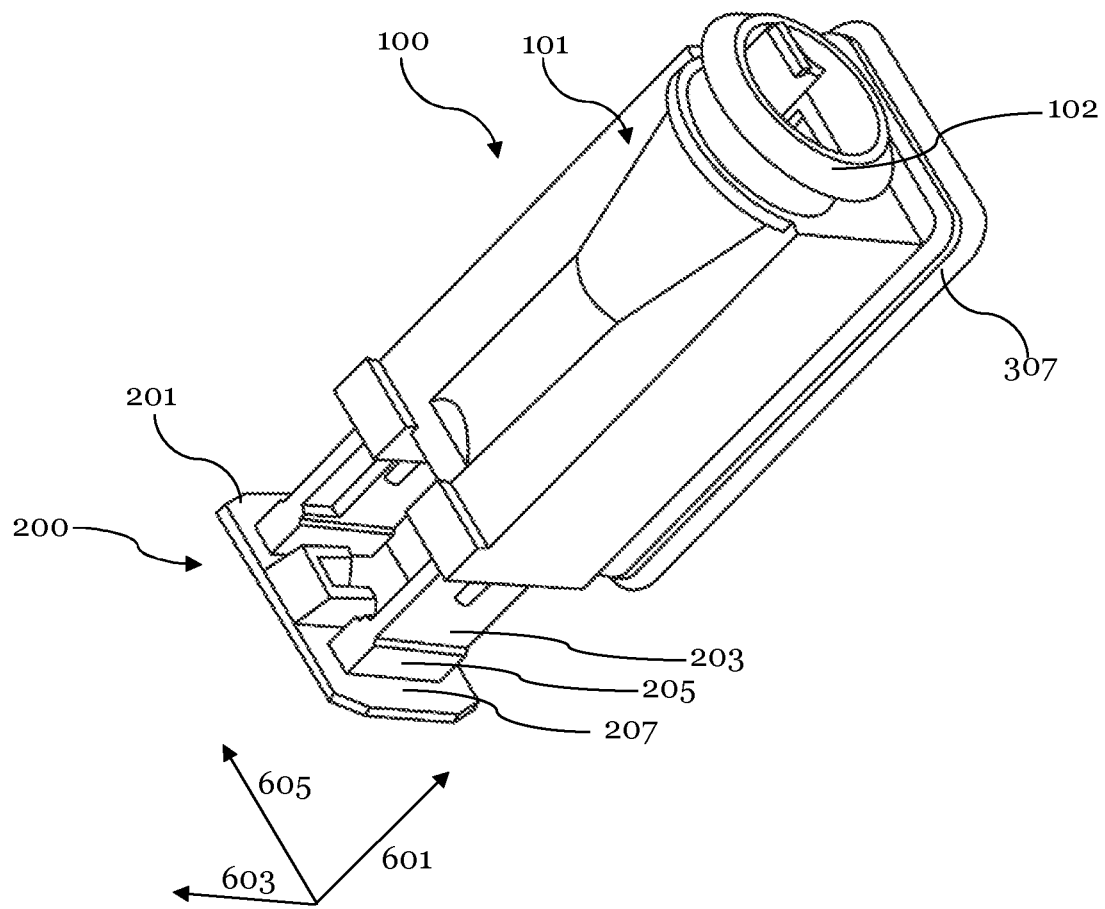


Fig. 1

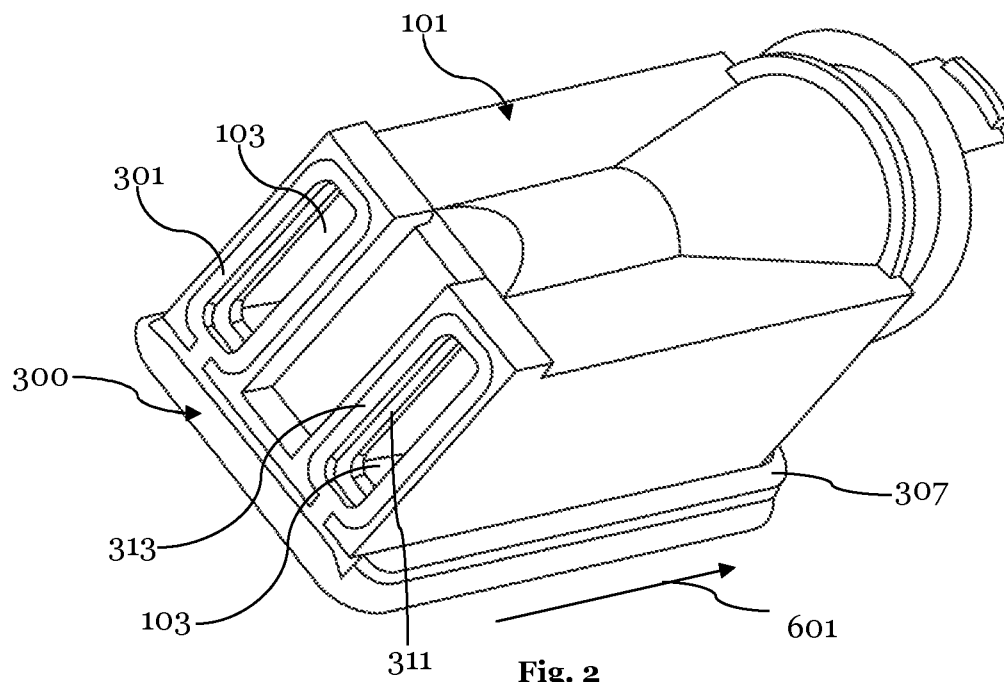
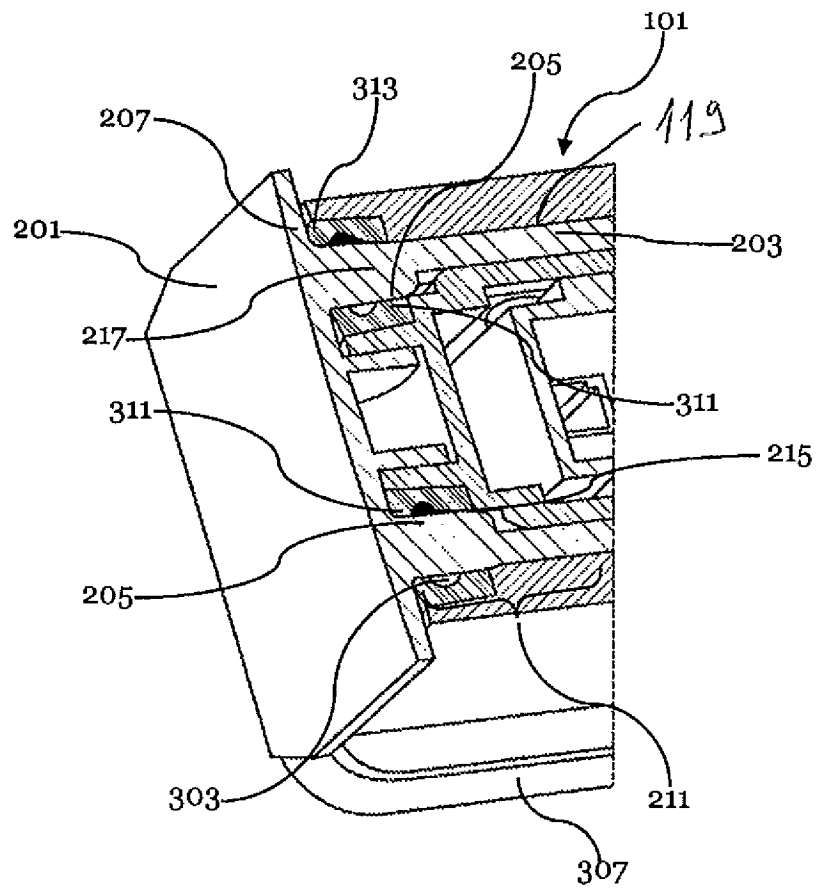
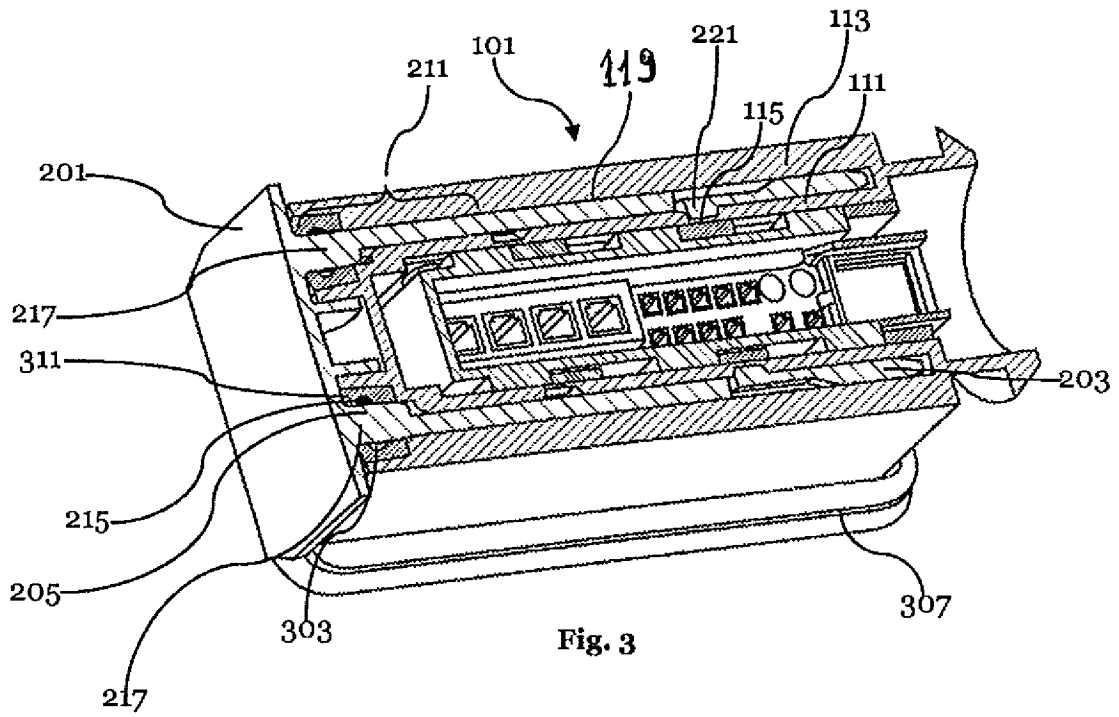


Fig. 2



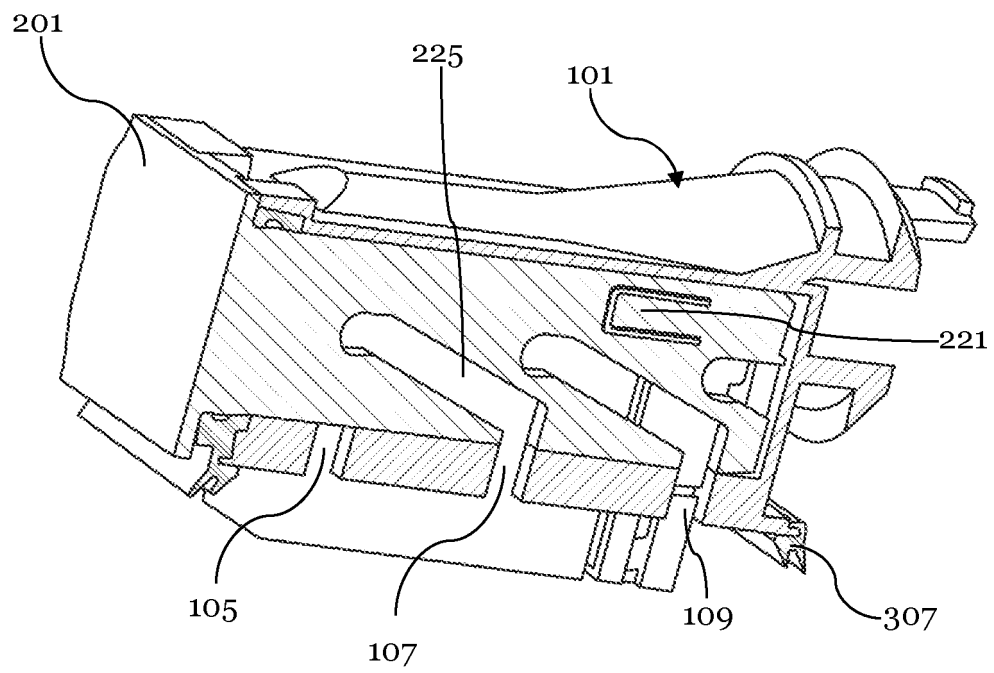


Fig. 5

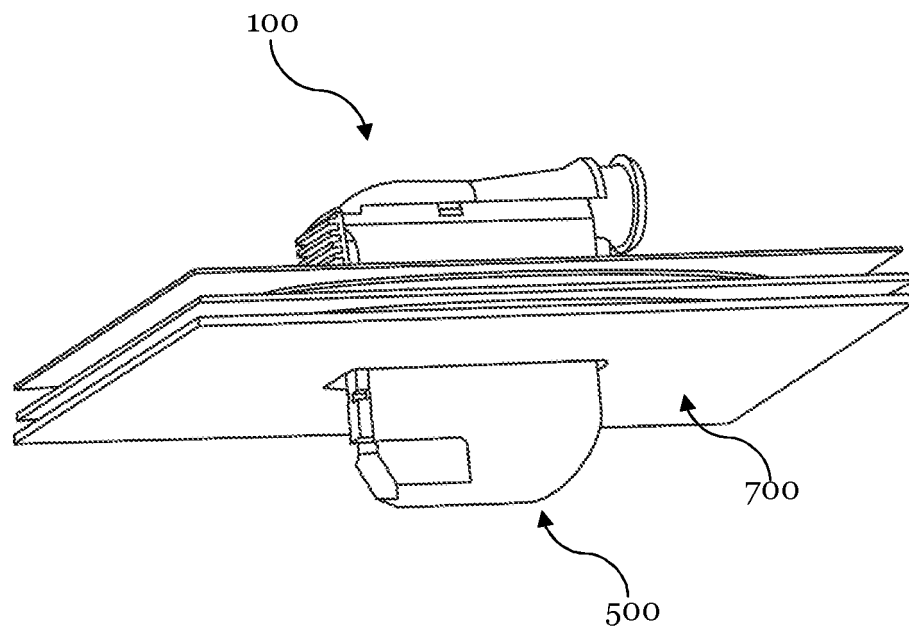


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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