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(54) **Contact securing member for an electrical connector and an electrical connector**

(57) The invention relates to a contact securing member (2) for an electrical connector (1) and an electrical connector (1). An object of the invention is to provide a solution which enables more simple assembly and less complex storage than before. According to the invention, this is achieved by a contact securing member (2) for an

electrical connector (1), which member has at least one securing leg (6) which protrudes in an insertion direction (E), characterised in that the contact securing member has a pot-like base member (8) which is open counter to the insertion direction (E) and the base member (8) has a peripheral seal (9).

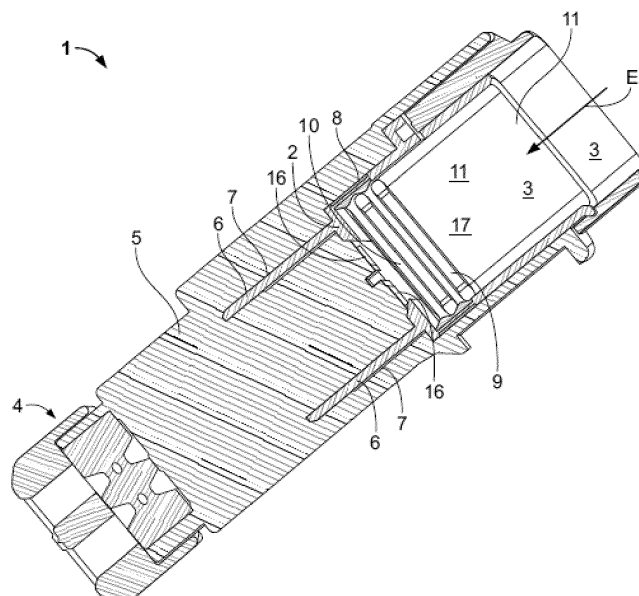


Fig. 1

Description

[0001] The invention relates to a contact securing member for an electrical connector and an electrical connector. Electrical connectors often have contact receiving members for contact elements which are fitted to cable ends. In order to secure the contact elements in the contact receiving members, the connectors have one or more contact securing members. For example, a first contact securing member in the form of a locking arm can engage in a recess of the contact element and a second contact securing member can prevent movement of the first contact securing member when the first contact securing member engages in the contact element. In order to seal an insertion region between the connector and mating connector, such a plug type connection often has a seal which can be inserted. This seal is often retained on the connector by means of a holding-down member which can be engaged with the connector housing so that the seal is not released from the connector before connection to the mating connector. Such plug type connections are therefore complex in terms of assembly and storage.

[0002] An object of the invention is to provide a solution which enables more simple assembly and less complex storage than before.

[0003] This is achieved according to the invention by a contact securing member for an electrical connector, which member has at least one securing leg which protrudes in the insertion direction and which has a pot-like base member which is open counter to the insertion direction, the base member having a peripheral seal.

[0004] The pot-like base member can be used as a receiving member for a mating connector. Since the contact securing member at the same time has a seal, the assembly is facilitated since only a single assembly step, that is to say, the insertion of the contact securing member, is necessary. The complexity for storage is also thereby reduced since only a single component has to be managed.

[0005] The solution according to the invention can be further improved with the following embodiments and developments which are each advantageous per se.

[0006] In order to achieve sealing between the contact securing member and the connector, the contact securing member may have an externally peripheral seal. This may be continuous, in particular around the insertion direction.

[0007] In order to enable sealing of the contact securing member with respect to the mating connector, the contact securing member may have an internally peripheral seal. This may be continuous in particular around the insertion direction.

[0008] A single seal may extend both at the inner side and at the outer side on the base member.

[0009] In order to achieve the best possible sealing action, the seal may comprise a different material from the base member. In particular, it may be softer. For ex-

ample, the seal may comprise an elastomer material. The base member may comprise a thermoplastic or a thermosetting material.

[0010] In a particularly advantageous embodiment, the base member has at least one aperture which is directed from the inner side to the outer side and through which the seal extends. It is thereby, for example, possible for a single seal to seal both at the outer side and at the inner side on the base member. An aperture may, for example, be formed as a slot or a hole. The aperture may retain the seal on the base member. The seal may expand at both sides at the other side of the aperture. This may, for instance, lead to the seal no longer being able to be released from the base member without being destroyed. It is thereby also fitted to the base member in a non-releasable manner.

[0011] An aperture can retain the seal in and counter to the insertion direction in a positive-locking manner. Furthermore, the seal, in particular when it expands at both sides of the aperture, can also retain perpendicularly relative to the insertion direction.

[0012] The base member may extend through the seal in an insertion direction. It is thereby possible to produce transversely relative to the insertion direction a positive-locking connection which retains the seal on the base member.

[0013] In an advantageous embodiment, the base member continues at the side remote from the at least one securing leg at the far side of the seal in the form of a sleeve. Such a sleeve may form a receiving member for the mating connector. Since, owing to the solution according to the invention, the holding-down member known from the prior art for the seal is dispensed with, such a sleeve may be a filling element or a retention element which retains the mating connector in the connector without the mating connector wobbling. A connector which has a contact securing member having a sleeve can be used with the same mating connectors as a connector known from the prior art with a holding-down member for the seal.

[0014] A sleeve may be continuous and closed around the insertion direction or also have free regions in which no material is present, for example, in order to save material and/or weight.

[0015] In an advantageous embodiment, the contact securing member is constructed in a monolithic manner. The at least one securing leg may be integral with the base member. Furthermore, the seal may be integral with the base member. In particular, the seal may be materially engaging with the base member even when the seal comprises a different material to the base member. This may be achieved by means of an appropriate material pairing. A sleeve which may be provided may also be integral with the base member and the at least one securing leg. For example, the securing leg, the base member and the sleeve may be a single injection-moulded component. This injection-moulded component may comprise a thermoplastic material. In a second injection-

moulding step, a seal of a different material can then be fitted.

[0016] In an advantageous embodiment, the seal is formed on, in particular injected round, for example, by means of injection moulding. Other assembly steps are then superfluous. Furthermore, a particularly secure fitting is possible.

[0017] In an advantageous embodiment, the contact securing member has a catch element for connection to a connector housing or a base member of the connector. This is particularly advantageous when the contact securing member has a sleeve since, in the prior art, both the contact securing member and the holding-down member each have at least one catch element. Owing to the continuous construction of the solution according to the invention, only a single catch element is required for securing.

[0018] In an alternative embodiment, two or more catch elements may be provided but are all arranged in a single portion, for example, in the region of the securing legs. These may, for example, then be constructed in such a manner that they can be redirected together from the securing position.

[0019] In an advantageous embodiment, the at least one securing leg terminates in the base member. Secure connection is thereby ensured.

[0020] Alternatively, the securing leg may terminate in an intermediate element, that is to say, a base, which in turn terminates in the base member. A plurality of securing legs may, for example, terminate in a common base.

[0021] A connector according to the invention comprises a contact securing member according to the invention. The contact securing member may be introduced into a receiving member for a mating connector of the connector. The at least one securing leg may secure in the connector a contact element which is inserted, for example, from the side opposite the contact securing member. Such a securing action is carried out, for example, by the contact securing member locking a positive-locking connection between the contact element and the connector.

[0022] In an advantageous embodiment, such a connector may have for the mating connector a receiving member which is at least partially surrounded by the base member. Such a receiving member can be used to connect to the mating connector. The contact securing member may be inserted into the receiving member and seal the connector with respect to the mating connector.

[0023] The invention is explained in greater detail below by way of example with reference to an advantageous embodiment and with reference to the drawings. The features and developments described are advantageous per se and can be freely combined with each other or omitted, if required by the application.

[0024] In the drawings:

Figure 1 is a schematic longitudinal section through a connector according to the invention having a contact securing member according to the invention;

Figure 2 is a perspective view of a contact securing member according to the invention.

[0025] Figure 1 is a longitudinal section of a connector 1 according to the invention having a contact securing member 2 according to the invention. The connector 1 can be connected to a mating connector which is not illustrated. To this end, the mating connector is inserted into a receiving member 3 of the connector 1 in an insertion direction E.

[0026] At a cable-side end 4, cables (not illustrated) may be fitted to the connector 1. To this end, there are fitted at the cable ends contact elements which are inserted into contact receiving members 16 in the connector housing 5. In order to retain the contact elements in the contact receiving members 16, a first contact securing member, for example, in the form of a catch arm which cannot be seen in this step and which engages in a recess in a contact element, is provided. In order to secure these first contact securing members against redirection and consequently to ensure that the contact elements remain in the contact receiving members, the contact securing member 2 according to the invention is fitted in the connector 1. The securing legs 6 thereof prevent redirection of the first contact securing members by blocking a redirection region. To this end, the securing legs 6 protrude in the insertion direction E and fill hollow spaces 7.

[0027] In the connector 1 according to the invention, contact elements may be constructed as sockets or pins. The pins may, for example, protrude into the receiving member 3. In the case of a construction as sockets, pin elements of the mating connector may protrude into contact receiving members 16 and touch the contact elements.

[0028] The contact securing member 2 further has a pot-like base member 8 which is open counter to the insertion direction E. The base member 8 has a peripheral seal 9. The seal 9 prevents, for example, water or contamination from entering the insertion region 10. In order to achieve secure sealing between the connector housing 5 and the contact securing member 2, the seal 9 extends at the outer side in a continuous manner on the base member 8 around the insertion direction E. In order to also achieve sealing of the contact securing member 2 with the mating connector, the seal 9 also extends continuously at the inner side around the insertion direction E. It is a single seal 9 which extends through apertures in the base member 8 which are directed from the inner side to the outer side. A good connection is thereby achieved, which in particular achieves a good positive-locking connection in and counter to the insertion direction E and perpendicularly relative thereto. The base member 8 further extends through the seal 9 in the insertion direction E.

[0029] The seal 9 comprises a different material to the base member 8. The seal 9 is of a soft material, whereas the base member 8 is of a hard material such as a thermoplastic material. A high level of stability of the contact

securing member 2 with a good sealing effect can thereby be achieved.

[0030] The base member 8 of the contact securing member 2 continues at the side 17 remote from the securing legs 6 at the far side of the seal 9 in the form of a sleeve 11. This sleeve 11 forms a receiving member 3 for the mating connector. This receiving member may guide and/or retain the mating connector. In particular, it is therefore possible to use a mating connector which can also be used with the previous connector from the prior art, in which a holding-down member is required for the seal.

[0031] The sleeve 11 shown here is closed around the insertion direction E. Alternatively, the sleeve 11 could also not be continuous, for example, could have slots or holes and serve only to prevent the mating connector from wobbling in the connector 1.

[0032] In Figure 2, the contact securing member 2 is illustrated individually.

[0033] It is possible to see the securing legs 6 which are fitted to the pot-like base member 8 by means of a common base 12.

[0034] The base member 8 is continued at the far side of the seal 9 in the form of a sleeve 11.

[0035] The seal 9 extends both at an outer side 13 and at an inner side 14 in a continuous manner on the base member 8 around the insertion direction E.

[0036] The entire contact securing member 2 is constructed in a monolithic manner. It comprises a single component. The securing legs 6 are integral with the base 12, the base member 8 and the sleeve 11. Furthermore, the seal 9 is formed in a single piece. The contact securing member 2 comprises in this instance two different materials. The seal 9 was formed on the remainder of the contact securing member 2. The remainder of the contact securing member 2 was produced in a first injection moulding step from a hard material, for example, from a thermoplastic or thermosetting material. In a following injection moulding step, the seal 9, which comprises a softer material, for example, an elastomer material or a resiliently flexible material, is injected onto the remainder. Owing to an appropriate selection of material, the seal 9 can in this instance be connected to the remainder of the contact securing member 2 in a materially engaging manner.

[0037] The base member 8 further has apertures which are concealed by the seal 9 and through which the seal 9 extends. The apertures extend from the inner side 14 to the outer side 13. In this instance, the base member 8 extends through the seal 9 in the insertion direction E. The seal 9 and the base member 8 therefore each extend through the other. An intimate connection between the two is thereby ensured. In particular, positive-locking connections in and counter to the insertion direction E and perpendicularly relative to the insertion direction E are provided and retain the seal 9 on the base member 8. Therefore, the seal 9 is in particular non-releasable.

[0038] As a result of the apertures, it is also possible

to inject the seal 9 on the base member 8 in a particularly easy manner since material has to be injected at only one location. For example, it is possible to inject material only at an outer side, which material then flows inwards through the apertures. In this instance, only a single step for shaping the seal 9 is necessary.

[0039] The contact securing member 2 shown here has a plurality of catch elements 15. A first catch element 15 is arranged in the region of the securing legs 6. Another catch element 15 is arranged on the sleeve 11. In another embodiment not illustrated, the contact securing member 2 may also have only a single catch element 15 since, in contrast to the prior art, a securing action at a single location is sufficient. Preferably, such securing is arranged via a catch element 15 in the region of the securing legs 6.

LIST OF REFERENCE NUMERALS

[0040]

1	Connector
2	Contact securing member
3	Receiving member
4	Cable-side end
5	Connector housing
6	Securing legs
7	Hollow space
8	Base member
9	Seal
10	Insertion region
11	Sleeve
12	Base
13	Outer side
14	Inner side
15	Catch element
16	Contact receiving member
17	Side remote from the securing legs
E	Insertion direction

Claims

1. Contact securing member (2) for an electrical connector (1), which member has at least one securing leg (6) which protrudes in the insertion direction (E), **characterised in that** the contact securing member (2) has a pot-like base member (8) which is open counter to the insertion direction (E) and the base member (8) has a peripheral seal (9).
2. Contact securing member (2) according to claim 1, **characterised in that** the seal (9) extends at the outer side on the base member (8).
3. Contact securing member (2) according to either claim 1 or claim 2, **characterised in that** the seal (9) extends at the inner side on the base member (8).

4. Contact securing member (2) according to any one of claims 1 to 3, **characterised in that** the seal (9) comprises a different material from the base member (8). 5
5. Contact securing member (2) according to any one of claims 1 to 4, **characterised in that** the base member (8) has at least one aperture which is directed from the inner side to the outer side and through which the seal (9) extends. 10
6. Contact securing member (2) according to any one of claims 1 to 5, **characterised in that** the base member (8) extends through the seal (9) in an insertion direction (E). 15
7. Contact securing member (2) according to any one of claims 1 to 6, **characterised in that** the base member (8) continues at the side (17) remote from the at least one securing leg (6) at the far side of the seal (9) in the form of a sleeve (11). 20
8. Contact securing member (2) according to any one of claims 1 to 7, **characterised in that** the contact securing member (2) is constructed in a monolithic manner. 25
9. Contact securing member (2) according to any one of claims 1 to 8, **characterised in that** the seal (9) is formed on. 30
10. Contact securing member (2) according to any one of claims 1 to 9, **characterised in that** the contact securing member (2) has precisely one catch element (15) for connection to the one connector housing (5). 35
11. Contact securing member (2) according to any one of claims 1 to 10, **characterised in that** the securing legs (6) terminate in the base member (8). 40
12. Connector (1) comprising a contact securing member (2) according to any one of claims 1 to 11.
13. Connector (1) according to claim 12, **characterised in that** it has for the mating connector a receiving member (3) which is at least partially surrounded by the base member (8). 45

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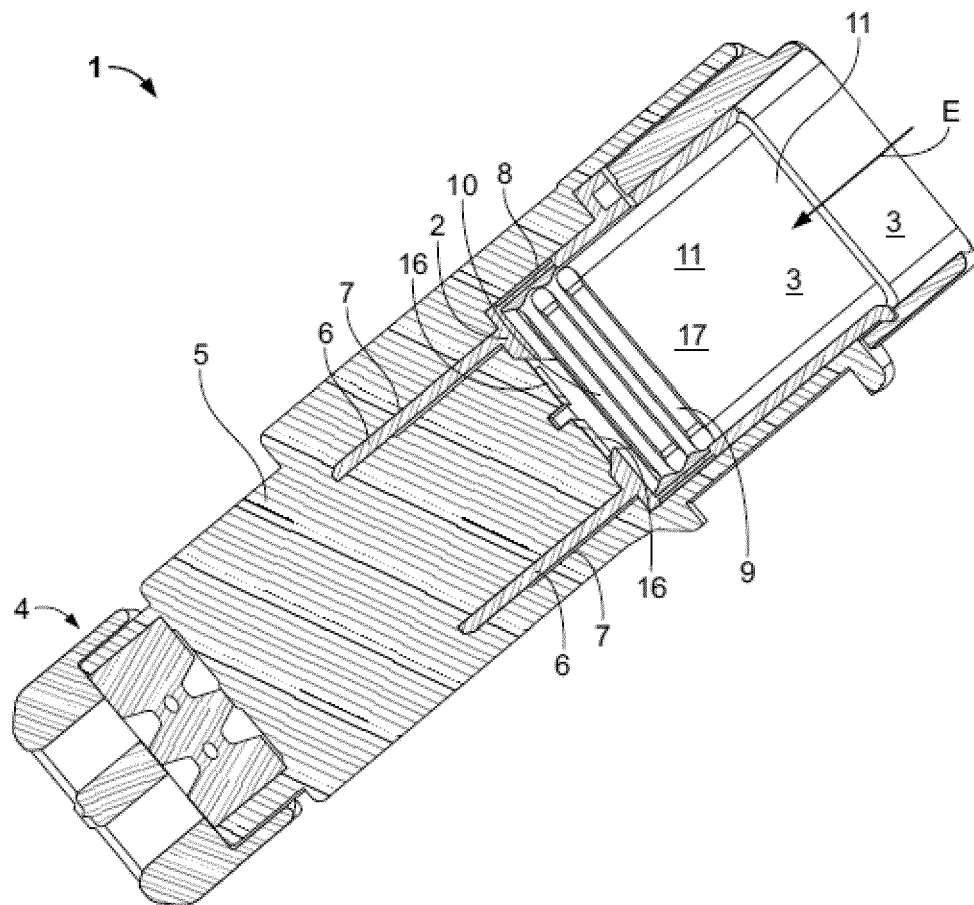


Fig. 1

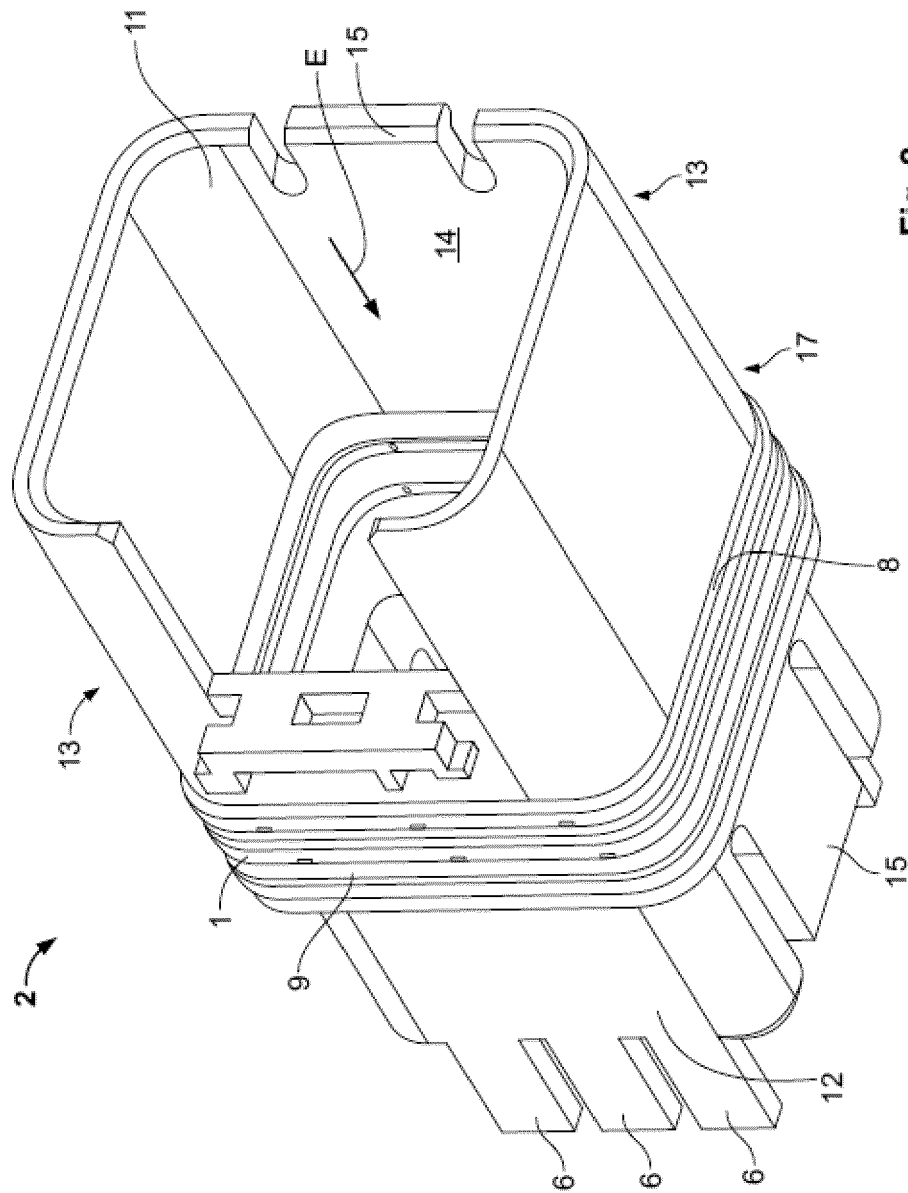


Fig. 2



EUROPEAN SEARCH REPORT

Application Number
EP 14 18 5049

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X	WO 96/13079 A1 (WHITAKER CORP [US]; CANUTO OSCARE [IT]; CASTELLO PAOLO [IT]) 2 May 1996 (1996-05-02) * figures 1-4 * -----	1-13	INV. H01R13/504 H01R13/52 ADD. H01R13/506 H01R43/18
			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 16 January 2015	Examiner Esmiol, Marc-Olivier
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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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
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82