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(54) **CONNECTION ASSEMBLY**

(57) The application shows a connection assembly (1) comprising a bulkhead connector (2), the bulkhead connector (2) being adapted for installation in a wall (3) and comprising a partition wall (4), the connection assembly (1) further comprising an adaptor (5) comprising

a standardized connector face (6), the adaptor (5) extending through the partition wall (4) and being fixed to the bulkhead connector (2) by fixing means (7) that are accessible from one side (41) of the partition wall (4).

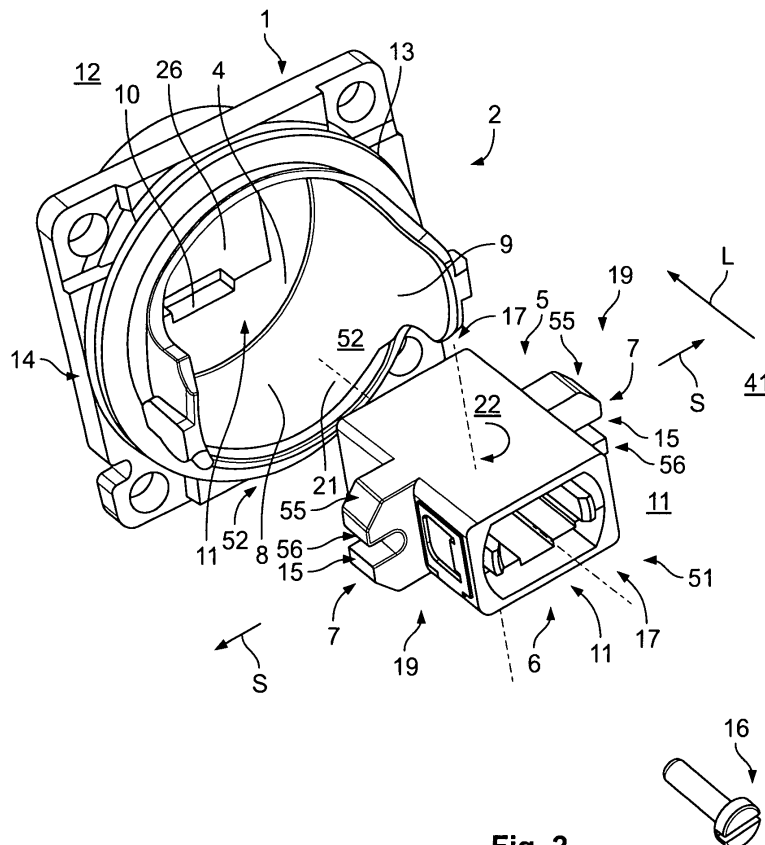


Fig. 2

Description

[0001] The invention relates to a connection assembly which comprises a bulkhead connector.

[0002] Such a connection assembly can for example be used to attach a cable to a wall in which the bulkhead connector is mounted. Via the bulkhead connector cables on both sides of the wall may be connected with each other.

[0003] The object of the invention is to provide a solution that allows for easy installation of a cable to the bulkhead connector.

[0004] This object is achieved by a connection assembly comprising a bulkhead connector, the bulkhead connector being adapted for installation in a wall and comprising a partition wall, the connection assembly further comprising an adaptor comprising a standardized connector face, the adaptor extending through the partition wall and being fixed to the bulkhead connector by fixing means that are accessible from one side of the partition wall.

[0005] The bulkhead connector can be installed for example in a wall of a housing surrounding the receiving unit. The cable can be attached to the adaptor so that it terminates in the area of the wall and it is no longer necessary to feed the entire cable through the wall of the bulkhead connector. The accessibility of the fixing means from one side allows an easy installation.

[0006] The inventive solution can be improved by the following further improvements and advantageous embodiments, which are advantageous on their own and can be combined arbitrarily as desired.

[0007] To allow, in particular an easy installation, the fixing means can be accessible from an outside, for example an outside of the housing of the receiving unit. The installation can thus be performed without opening the housing.

[0008] In order to protect the adaptor, the bulkhead connector can comprise at least on one side of the partition wall a recessed receptacle for the adaptor, wherein the receptacle projects beyond the adaptor. Such a receptacle can provide a mechanical and/or electromagnetic protection. The receptacle can comprise materials that can resist mechanical forces and can provide an electromagnetic shielding. The receptacle can, for example, comprise metal or a coating with a metallic layer for electromagnetic shielding. The receptacle can be pot-like, for example having a basically cylindrical shape to allow a good volume-to-wall ratio. The receptacle can also provide a closed shielding with no gaps except for the side where the cable enters and the holes for the adaptor to provide a good sealing effect.

[0009] A bottom of the receptacle can be formed by the partition wall. Such a connector is particularly simple in its construction.

[0010] In an embodiment that provides good protection and a simple construction, the receptacle is circumferentially enclosed by a housing wall of the bulkhead con-

necter, the housing wall projecting beyond the adaptor.

[0011] In an advantageous embodiment, the partition housing wall can protrude from the partition wall to allow a simple construction.

[0012] The receptacle, in particular the bottom, can comprise holes for the adaptor. The adaptor and/or the receptacle can be designed such that in an assembled state, the holes for the adaptor are sealed by the adaptor and a tight connection, in particular a water-tight connection, is formed. This gives an additional sealing effect.

[0013] The standardised connector face can in particular be located on a side that faces outwards to allow an easy installation of the connector to the adaptor.

[0014] On a second side, the adaptor can comprise a non-standardised connector face that can, for example, be optimised for electrical and space requirements inside the housing. A non-standardised connector face can, for example, be more space-saving than standardised connector faces or be optimised for connection to a very space-saving standardised connector. Further, electrical connections that are not needed in a specific case can be omitted.

[0015] In an advantageous embodiment, the adaptor can comprise a standardised connector face on the second side to allow an easy connection to a standardised connector so that the connection assembly can be used for a multitude of applications.

[0016] The adaptor does not necessarily have to have a second connector face on the second side. It can, for example, also comprise wires or cables that can be attached to a receiving unit in the housing or similar other electrical or optical units.

[0017] In an advantageous embodiment, the adaptor is attached on the second side, for example in a housing, with a cable that has a little extra slack. The adaptor can then be released and pulled out at least a short distance, allowing an easy cleaning or exchanging of the adaptor. If the adaptor is for instance installed to a housing, the housing does not have to be opened if the adaptor has to be removed or disassembled, which makes the operation much easier.

[0018] In order to allow a particular easy installation, the adaptor can be accessible from both sides of the partition wall.

[0019] The connector face can, in particular, be adapted for connection to an MPO (Multifiber Push-On) connector, in particular an MTO (Mass Transfer Push-On) connector that are used for the connection of optical fibres. In an alternative, the connector face can be adapted for connection to a standard LC (little connector) connector.

[0020] In order to allow in particular a protection against the ingress of dirt or water, the bulkhead connector can comprise a sealing on an outer circumference. The sealing can have a closed construction so that a protection around the entire circumference is possible. The sealing can for example comprise rubber or other elastic materials. It can for example be a ring with a cir-

cular overall shape.

[0021] The fixation means can comprise at least one receptacle for a screw to allow an easy fixation with screws that are usually standardised.

[0022] The fixation means can have an elongated shape perpendicular to a longitudinal direction of a cable to allow for tolerances or movements perpendicular to the longitudinal direction. For example, the receptacle for a screw can be slit-like.

[0023] The fixation means can comprise latching means for a simple connection. For example, the adaptor can comprise a first part of latching means and the bulkhead connector can comprise a second part of latching means adapted for connection to the first part.

[0024] The latching means can, for example, serve to snap the adaptor to the bulkhead connector.

[0025] In an advantageous embodiment, the fixation means are arranged symmetrically. This can allow a good force distribution, in particular an equal force distribution.

[0026] The adaptor can be symmetrical. This can, for example, allow an easy installation of the adaptor. The adaptor can for example have a twofold rotational symmetry around a longitudinal direction so that it can be installed in any of the two rotational positions. The adaptor can have a twofold rotational symmetry around an axis that is perpendicular to the longitudinal direction. This can, for example, allow an installation of the adaptor without having to consider which part faces to an inside and which part faces to an outside of the housing. Advantageously, the symmetries are combined so that an installer does not have to consider in which orientation the adaptor has to be installed. Installation is thus very easy.

[0027] The fixation means can be configured for fixing along a longitudinal direction so that the installation is possible even if little space is available to the sides. For example, the fixation means can be adapted for screws that are screwed along a longitudinal direction of a cable. The fixation means for the screws, for example holes for the screws, can extend along a longitudinal direction of a cable.

[0028] The fixation means can be arranged on a side face of the adaptor. This allows a compact design in a longitudinal direction. Fixation means can be projections that project away from the rest of the adaptor in a side direction.

[0029] The connection assembly can further comprise a cover sleeve adapted for being connected to the bulkhead connector and a cable, where in an assembled state, the bulkhead connector and the cover sleeve form a watertight connection around the cable. Through this, an interior defined by the bulkhead connector and the cover sleeve is protected against the ingress of dirt or water. In particular, an interior of the housing can also be protected against dirt or water. This allows the use of such a connection assembly in hostile environments, for example outside of buildings.

[0030] The degree of protection against dirt or water can, in particular, be according to internal or external standards like IPxx, for example IP67.

[0031] In the following, the inventive solutions will be explained in more detail and with reference to the drawings. The features shown in the further developments and advantageous embodiments can be combined as desired and are advantageous on their own.

[0032] In the figures:

Fig. 1 shows a schematic perspective view of a connection assembly;

Fig. 2 shows a schematic perspective view of the connection assembly of Fig. 1 in a disassembled state; and

Fig. 3 shows a schematic perspective view of a connection assembly comprising a cover sleeve.

[0033] Figs. 1 and 2 show a connection assembly 1 comprising a bulkhead connector 2 and an adaptor 5 in a mounted and an unmounted state respectively. The bulkhead connector 2 can, for example, be mounted to a wall 3 as schematically shown in Fig. 1. The wall 3 can, in particular, be the wall 3 of a housing in which for example a receiving unit is located and to which receiving unit a connection should be made through the wall 3 from an outside 41.

[0034] The bulkhead connector 2 comprises a partition wall 4 for separating the inside 42 of the housing from the outside 41 when the adaptor 5 is inserted into a hole 26 in the partition wall 4. The adaptor 5 comprises a standardised connector face 6 on one side 51 of the adaptor 5. In this case, the standardised connector face 6 is adapted for mating with an MPO/MTP adaptor that is used for optical fibres that can be part of a cable 24. In an alternative embodiment, the adaptor and the connector face could be adapted for mating with an LC connector.

[0035] Further, fixing means 7 can be found on the adaptor 5. The fixation means 7 comprise projections 55 that protrude in a direction S that is perpendicular to a longitudinal direction L of the cable 24. The projections 55 comprise holes 56 that are elongated along the perpendicular direction S to allow a lateral movement of the adaptor 5 in the bulkhead connector 2. The holes 56 serve as receptacles 15 for screws 16 with which the adaptor 5 can be fixed to the bulkhead connector 2. When the screws 16 are tightened, a watertight connection between the adaptor 5 and the bulkhead connector 2 can result. Two projections 55 are arranged symmetrically on two side faces (19) of the adaptor (5).

[0036] In the mounted state shown in Fig. 1, the adaptor 5 extends through the partition wall 4 and is fixed to the bulkhead connector 2 by the fixing means 7 which are accessible from one side 11 of the partition wall 4. The one side 11 is in this case an outside 41 so that the

installation of the connection assembly is possible from an outside 41 without opening the housing 40.

[0037] The bulkhead connector 2 comprises a recessed receptacle 9 in which the adaptor 4 is located in the mounted state. The receptacle 9 projects beyond the adaptor 4 in the mounted state so that a mechanical and electromagnetic shielding for the adaptor 4 is provided. The receptacle 9 extends further in a direction counter to the longitudinal direction L than the adaptor 5.

[0038] The partition wall 4 forms a bottom 10 of the receptacle 9. From the bottom 10, the housing wall 8 of the receptacle 9 protrudes counter to the longitudinal direction L. The receptacle 9 is thus circumferentially enclosed by the housing wall 18 of the bulkhead connector 2.

[0039] In the example shown in the figures, the adaptor 5 is accessible from both sides 11, 12 of the partition wall 4 in a state when the cover sleeve 23 is not installed. This allows an easy access and thus a simple installation.

[0040] For easy connection of the adaptor 5 to further elements that are located on the inside 42, the adaptor 5 can have a second standardised connector face 6 on a second side 52 of the adaptor 5. In another embodiment, a non-standardised connector face 17 can be located on the second side 52 or the connection of for example a cable to a receiving unit located at an inside 12 can be made with fixed elements that cannot be detached. If the adaptor 5 is connected to a further part on the inside 12 with a cable that is long enough, the adaptor 5 can be removed from the bulkhead connector 2 without removing the bulkhead connector 2 from the housing 40 and without opening the housing 40. Cleaning or exchanging the adaptor 5 is thus simplified.

[0041] The bulkhead connector 2 comprises a sealing 13 that is adapted for being connected to the cover sleeve 23. The sealing 13 extends around an outer circumference 14 and serves to seal the space defined by the bulkhead connector 2 and the cover sleeve 23 against ingress of dirt and water, for example according to the IPxx standard.

[0042] The bulkhead connector 2 can, for example, be designed according to the FullAXS specifications.

[0043] The bulkhead connector 2 can, for example, be made from metal or be an injection molded part that is covered with a metallic layer for electromagnetic protection. The adaptor 5 can be an injection molded part as the adaptor 5 does not have to be as stable as the bulkhead connector 2.

[0044] The fixation means 7 are arranged symmetrically around a first symmetry axis 11 that is parallel to the longitudinal direction L. An operator can thus install the adaptor 5 in two possible rotational positions. The adaptor 5 can also be symmetrical around a second rotational axis 12 that is perpendicular to the longitudinal direction L. In this case, the installation is further simplified as it is not necessary to check which side of the adaptor 5 must face an inside 42 and which side must face an outside 41.

REFERENCE NUMERALS

[0045]

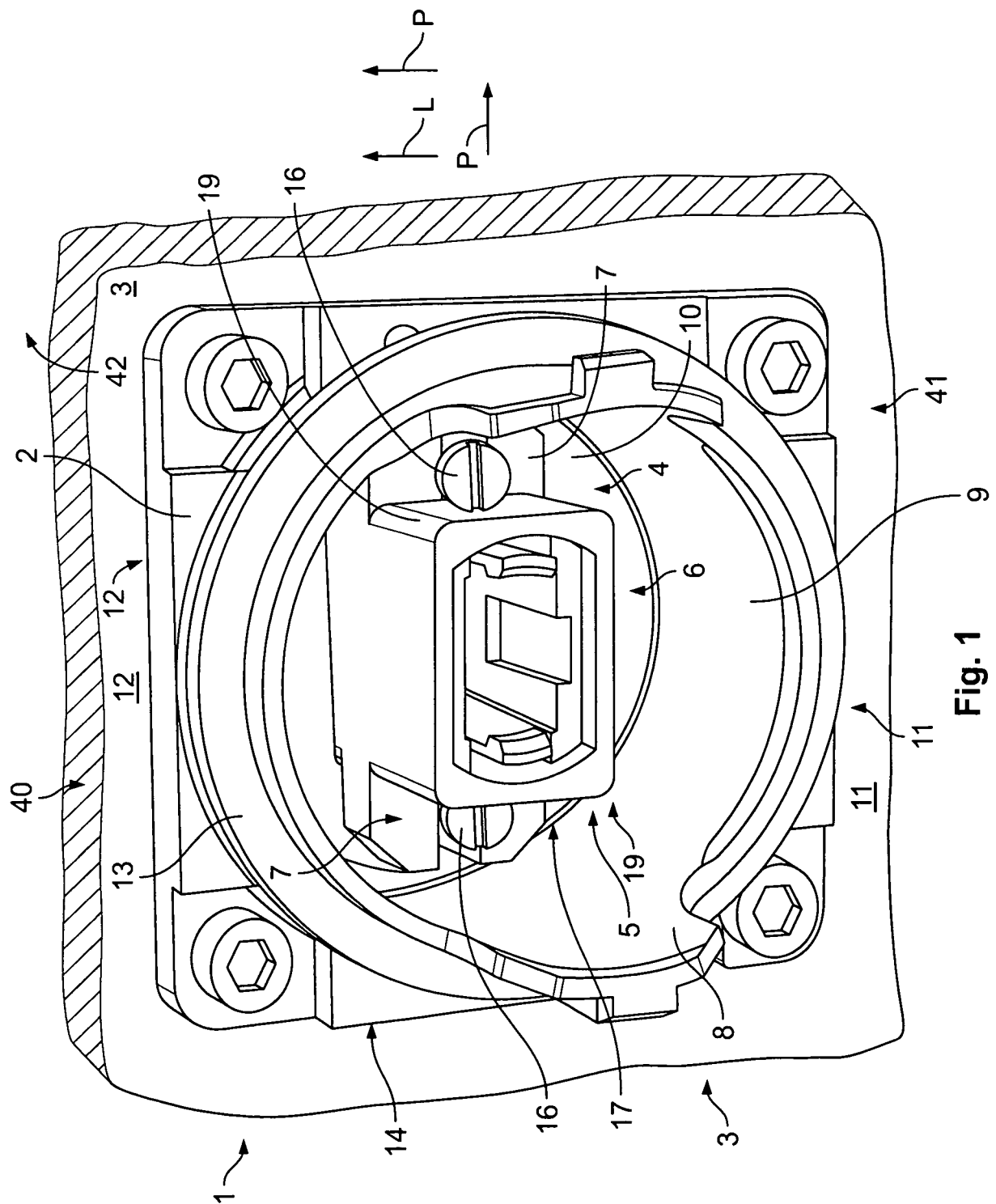
5	1	connection assembly
	2	bulkhead connector
	3	wall
	4	partition wall
	5	adaptor
10	6	standardised connector face
	7	fixing means
	8	housing wall
	9	receptacle
	10	bottom of the receptacle
15	11	side of partition wall
	12	side of partition wall
	13	sealing
	14	outer circumference
	15	receptacle for a screw
20	16	screw
	17	connector face
	18	housing wall
	19	side face
	20	longitudinal direction
25	21	first symmetry axis
	22	second symmetry axis
	23	cover sleeve
	24	cable
	25	assembled state
30	26	hole
	40	housing
	41	outside
	42	inside
	51	one side of adaptor
35	52	second side of adaptor
	55	projection
	56	hole
	L	longitudinal direction
40	S	direction perpendicular to the longitudinal direction

Claims

1. Connection assembly (1), comprising a bulkhead connector (2), the bulkhead connector (2) being adapted for installation in a wall (3) and comprising a partition wall (4), the connection assembly (1) further comprising an adaptor (5) comprising a standardized connector face (6), the adaptor (5) extending through the partition wall (4) and being fixed to the bulkhead connector (2) by fixing means (7) that are accessible from one side (41) of the partition wall (4).
2. Connection assembly (1) according to claim 1, wherein the bulkhead connector (2) comprises at least on one side (41) of the partition wall (4) a recessed receptacle (9) for the adaptor (5) and the receptacle (9) projects beyond the adaptor (5).

3. Connection assembly (1) according to claim 1 or 2, wherein a bottom (10) of the receptacle (9) is formed by the partition wall (4).
4. Connection assembly (1) according to one of claims 1 to 3, wherein the receptacle (9) is circumferentially enclosed by a housing wall (8) of the bulkhead connector (2), the housing wall (8) projecting beyond the adaptor (5).
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5. Connection assembly (1) according to one of claims 1 to 4, wherein the adaptor (5) is accessible from both sides (41, 42) of the partition wall (4).
6. Connection assembly (1) according to one of claims 1 to 5, wherein the bulkhead connector (2) comprises a sealing (13) on an outer circumference (14).
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7. Connection assembly (1) according to one of claims 1 to 6, wherein the fixation means (7) comprise a receptacle (15) for a screw (16).
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8. Connection assembly (1) according to one of claims 1 to 7, wherein the fixation means (7) are arranged symmetrical.
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9. Connection assembly (1) according to one of claims 1 to 8, wherein the fixation (7) means are arranged on a side face (19) of the adaptor (5).
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10. Connection assembly (1) according to one of claims 1 to 9, wherein the fixation means (7) extend along a longitudinal direction (L) of a cable (24).
11. Connection assembly (1) according to one of claims 1 to 10, wherein the adaptor (5) is configured to be connected to standardized connectors on two sides (51, 52).
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12. Connection assembly (1) according to one of claims 1 to 11, wherein the adaptor (5) is symmetrical.
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13. Connection assembly (1) according to one of claims 1 to 12, wherein the connection assembly (1) further comprises a cover sleeve (25) adapted for being connected to the bulkhead connector (2) and a cable (24), wherein in an assembled state, the bulkhead connector (2) and the cover sleeve (25) form a watertight connection around the cable (24).
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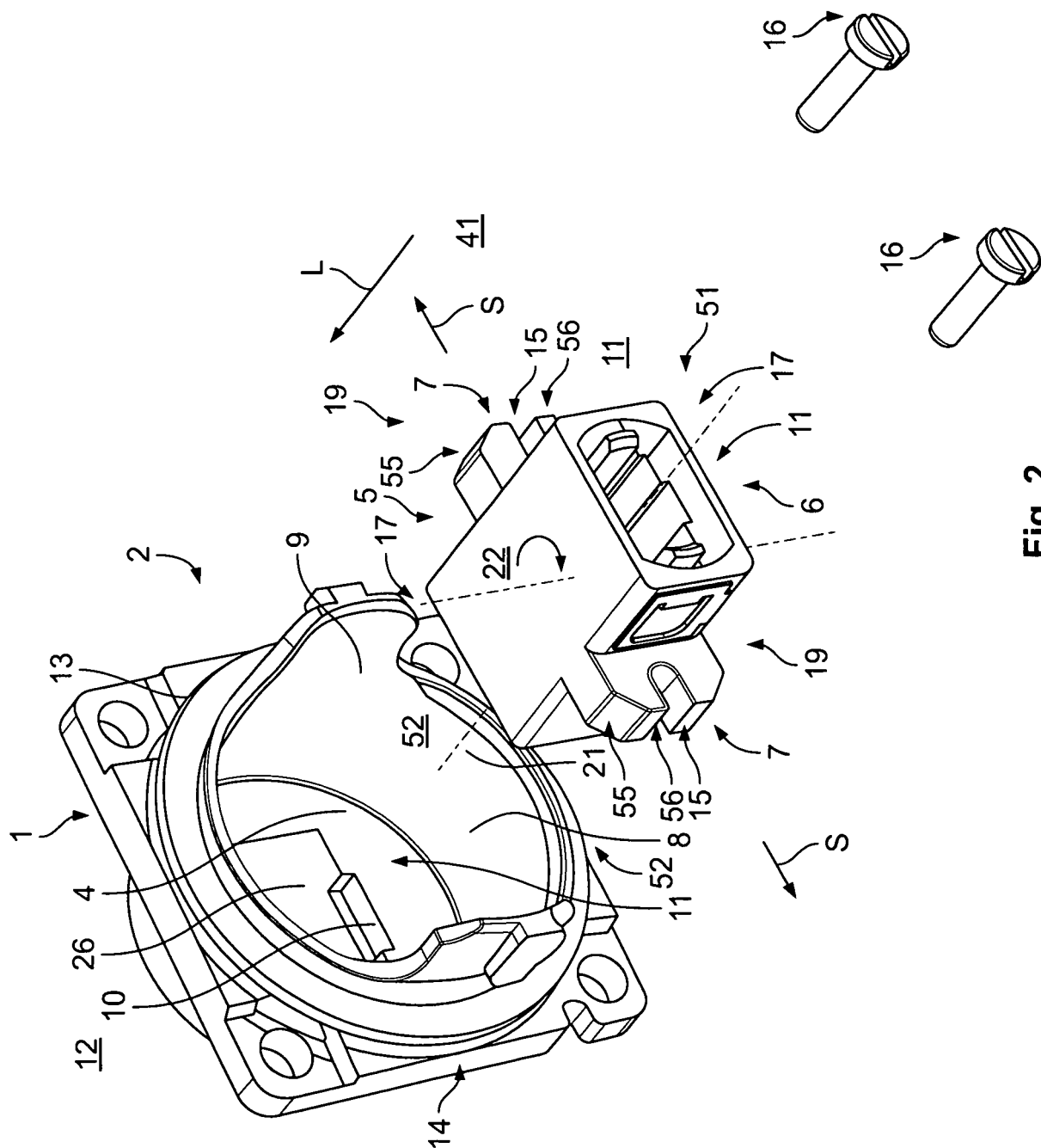


Fig. 2

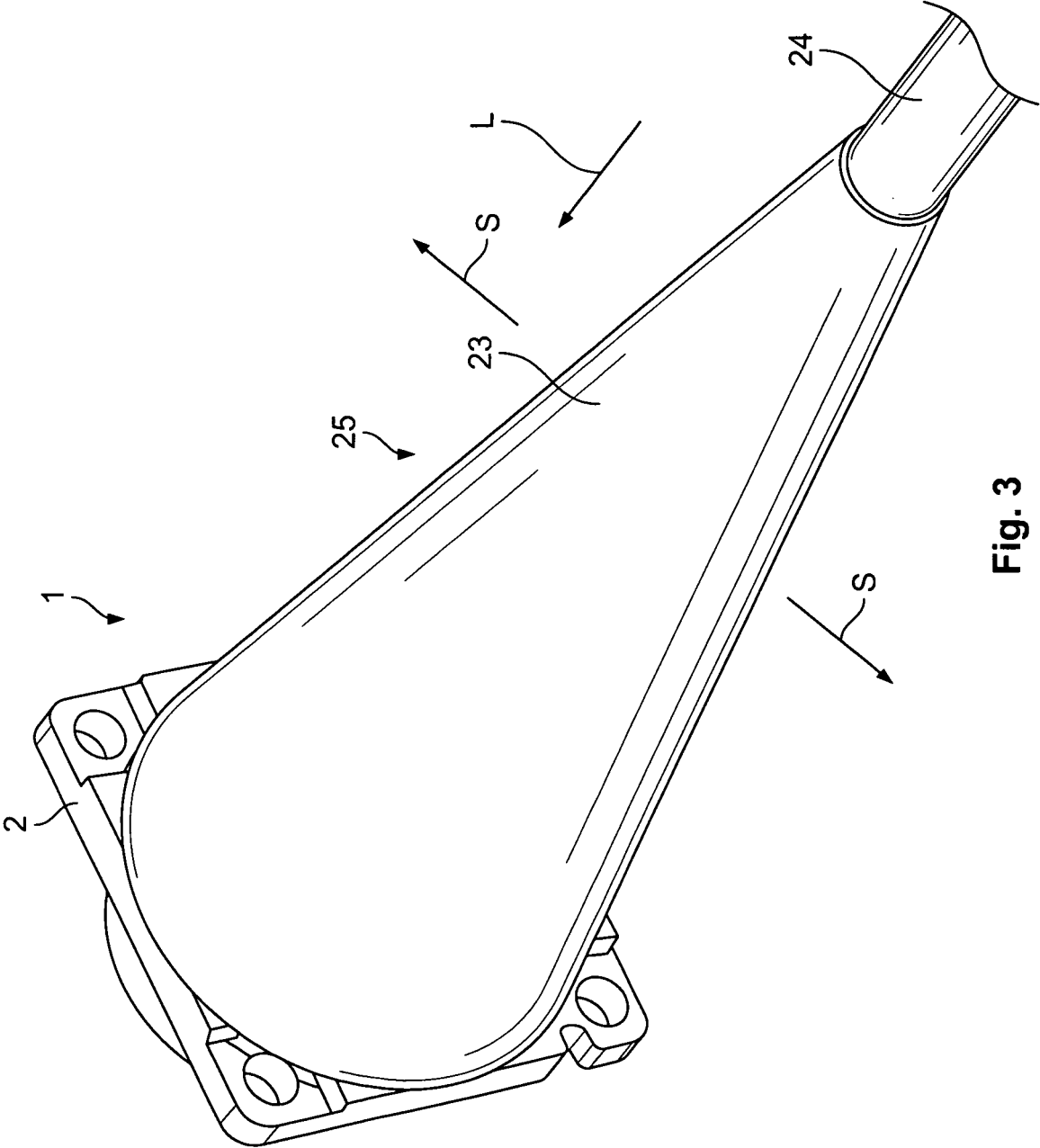


Fig. 3



EUROPEAN SEARCH REPORT

Application Number
EP 16 18 3243

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EPO FORM 1503 03.82 (P04C01)

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Y	* paragraph [0025] - paragraph [0033] * * figures 1, 2 *	6,13	
Y	----- US 2012/270444 A1 (KAWAMURA MASAYUKI [JP]) 25 October 2012 (2012-10-25) * paragraph [0020] - paragraph [0021] * * paragraph [0037] - paragraph [0038] * * figures 1, 4 * -----	6,13	
			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 2 December 2016	Examiner Henrich, Jean-Pascal
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			

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

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