



HU000026174T2

(19) **HU**(11) Lajstromszám: **E 026 174**(13) **T2****MAGYARORSZÁG**
Szellemi Tulajdon Nemzeti Hivatala**EURÓPAI SZABADALOM**
SZÖVEGÉNEK FORDÍTÁSA(21) Magyar ügyszám: **E 12 704223**(51) Int. Cl.: **H01R 135/18** (2006.01)(22) A bejelentés napja: **2012. 01. 23.****H01R 101/00** (2006.01)

(96) Az európai bejelentés bejelentési száma:

(86) A nemzetközi (PCT) bejelentési szám:

EP 20120704223**PCT/DE 12/100016**

(97) Az európai bejelentés közzétételi adatai:

(87) A nemzetközi közzétételi szám:

EP 2681813 A1 **2012. 09. 07.****WO 12116692**

(97) Az európai szabadalom megadásának meghirdetési adatai:

EP 2681813 B1 **2015. 04. 01.**

(30) Elsőbbségi adatok:

102011001064 **2011. 03. 03.** **DE**

(73) Jogosult(ak):

Harting Electric GmbH & Co. KG, 32339
Espelkamp (DE)

(72) Feltaláló(k):

SCHLEGEL, Bernard, 32369 Rahden (DE)

(74) Képviselő:

dr. Harangozó Gábor, DANUBIA Szabadalmi
és Jogi Iroda Kft., Budapest

(54)

Moduláris dugós csatlakozó

Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

A fordítást a szabadalmas az 1995. évi XXXIII. törvény 84/H. §-a szerint nyújtotta be. A fordítás tartalmi helyességét a Szellemi Tulajdon Nemzeti Hivatala nem vizsgálta.

MODULAR PLUG CONNECTOR

Description

The invention relates to a plug connector according to the preamble portion of claim 1.

Plug connectors of this type are needed in order to establish contact between the individual conductors of a connected cable and the contacts of a mating plug or of a socket of a device. The individual conductors of the connected cable can be metallic conductors, but also glass fibers or a comparable material.

Prior Art

US 3 824 553 A, DE 36 27 899 C1 and DE 80 10 524 U1 each show plug connector systems in which the individual plug connector housings have means by which they can be connected to one another. Further, they also include fixing means by which they can be fastened, singly or in a group, to mounting rails.

DE 20 2008 006 934 U1 shows a plug connector for optical waveguides. The housing bodies each carry only one contacting element and can be fitted to one another in line in that webs integrally molded with the housing body are guided into matching recesses of a neighboring housing body.

If the number of plug connectors fitted to one another in line exceeds a certain number, the row of plug connectors becomes unstable, so that a base, such as, for example, a mounting rail would be advantageous (top hat rail). The housing bodies of DE 20 2008 006 934 U1 have, however, no suitable fixing means at all for mounting onto such a mounting rail. Therefore, such plug connectors cannot, for example, be employed in a switching cabinet.

Definition of the Object

The object of the invention consists in proposing a plug connector which is simple to manufacture and versatile to use.

The object is achieved by the characterizing features of claim 1.

Advantageous further configurations of the invention are indicated in the dependent claims.

The plug connector according to the invention is surrounded by a housing body.

The housing body is advantageously configured in one piece. This can be implemented by known plastic injection molding techniques - in the case of a plastic housing - or by known zinc diecasting processes - in the case of a metallic housing.

It is also possible to configure the housing body from a composite material, for example from a combination of metal and plastic.

A holding cage is captively locked in place within the housing body.

The holding cage is configured substantially as a hollow cylinder. At one end, the holding cage includes two arms which point in the axial direction and captively engage around a contacting element. At the other end, the holding cage engages around the cable sheath of a cable to be connected to the plug connector. A conductor of the cable is contacted with the contacting element by means of a crimped connection, for example.

Coupling elements are provided on the outside of the housing body on both sides, which allow two or more plug connectors with housing bodies of the same type to be coupled to one another.

Preferably, one coupling element is formed as an arcuate groove and the other coupling element is formed as a cylindrical pin. The cylindrical pin of one housing body is designed to be inserted into the arcuate groove of the housing body that is of the same type and to be coupled. In this way, several plug connectors with housing bodies of the same type can be fitted to one another in line.

When fitting the plug connectors to one another in line, only the housing bodies need to be of the same type. The inner workings of the plug connectors may be quite different. Thus, for instance, multi-pole electrical plug connectors can be combined with single-pole optical waveguide plug connectors. As a result, a high modularity of a plug connector arrangement can be achieved. A plug connector arrangement here is also referred to as a system of plug connectors.

In addition, fixing means are integrally molded on the outside of the housing body, the fixing means allowing the plug connector to be fixed to a mounting rail, for example a top hat rail.

The plug connectors may be coupled to each other and among one another by means of the coupling elements and may additionally be captively fixed on a mounting rail.

The fixing means consist of a combination of fixing noses and spring pins. The fixing noses project in the axial direction and engage in a collar of the mounting rail. The fixing pins are designed to be springy and can at first yield when snapping onto the mounting rail, before they snap in behind a further collar of the mounting rail.

The plug connector is completed by a screwed cable gland which ensures the cable strain relief and the sealing of the housing body against such media as dust and water.

When a desired number of plug connectors are fitted in a row on a mounting rail, this is also referred to as a system of plug connectors.

For contacting two systems of plug connectors with each other, the mounting rails on which each of the systems of plug connectors is located must be brought together. This is realized by means of a locking device which connects the individual mounting rails captively with one another, so that the opposite plug connectors are also contacted with one another.

The locking device consists of a passive locking part and an active locking part. The active locking part bears the locking elements with which the passive locking part is connected with the active locking part.

When locking the active locking part with the passive one, the mounting rails of the systems of plug connectors are brought towards each other and connected with each other. Moreover, the individual, mutually opposite, plug connectors are contacted with each other.

Advantageously, the locking elements of the passive locking part form a toggle lever locking mechanism. This results in a particularly stable locking mechanism.

To facilitate the bringing together of the mounting rails to be connected with each other, the locking device includes a guide. The guide consists of a bolt on the active locking part, the bolt being guided into a dedicated opening in the passive locking part during the locking process.

The passive locking part comprises fixing means on both sides, the fixing means being adapted to fix a mounting rail in place. This allows two mounting rails to be arranged in a statically stable manner on top of each other - that is, horizontally spaced from each other. Based on the coupling of the passive and the active

locking part to each other, contacted systems of plug connectors can then be arranged to be horizontally spaced and statically stable. By means of the locking device, any desired number of systems of plug connectors may be arranged on top of one another, and so-called plug connector arrays may be formed.

Exemplary Embodiment

An exemplary embodiment of the invention is illustrated in the drawings and will be discussed in more detail below. In the drawings:

- Fig. 1 shows a perspective illustration of a plug connector;
- Fig. 2 shows a further perspective illustration of the plug connector;
- Fig. 3 shows a perspective illustration of the plug connector without a base body;
- Fig. 4 shows a perspective illustration of a contacting element;
- Fig. 5 shows a side view of the plug connector mounted on a mounting rail;
- Fig. 6 shows a perspective illustration of two plug connectors during the coupling process;
- Fig. 7 shows a perspective view of two systems of plug connectors connected to each other; and
- Fig. 8 shows a side view of the locking device.

Figures 1 and 2 show perspective illustrations of an exemplary embodiment of the plug connector according to the invention. The invention is, however, not limited to the exemplary embodiment shown here.

The plug connector 1 is enclosed by a base body 2. A holding cage 10 is captively latched in place inside the hollow base body 2. Figure 3 shows the plug connector 1 without the base body 2. The holding cage 10 includes snap-in elements 12 at one end, which engage in matching undercuts (not shown) within the base body and in this way fix the holding cage 10 in the base body 2. The cable sheath of the cable to be connected (not shown) also penetrates the holding cage at this end.

At another end, the holding cage includes arms 11 which engage around the contacting element 20. Thereby, the contacting element 20 is fixed in the base body 2 along the axial axis of symmetry.

As already mentioned above, the opposite end of the holding cage 10 is penetrated by the cable sheath of the cable to be connected. The conductor of the cable to be connected is crimped with the contacting element 20.

Figure 4 shows the perspective illustration of the contacting element 20. On one side, the contacting element 20 includes a crimp opening 21 for receiving the conductor of the cable to be connected. In this exemplary embodiment, the other side of the contacting element 20 is in the form of a pin contact 22. However, provision may also be made for a socket contact.

The invention is not limited to single-contact plug connectors. The contacting element 20 may also include a plurality of crimp openings 21 and contacts 22 for connecting multicore cables.

The base body 2 comprises a cylindrical pin 3 on one side and, opposite thereto, an arcuate groove 4. The pin 3 of a plug connector 1 is suitable for being inserted into the groove 4 of a further plug connector 1. In this way, a plurality of plug connectors 1 are fitted to one another in line or coupled to each other. When a desired number of plug connectors has been reached, this is referred to as a system of plug connectors 1, 1'.

Furthermore provided on the base body 2 are fixing noses 5 and spring pins 6, which together allow the plug connector 1 to be reversibly fixed on a mounting rail 30. The fixing noses 5 engage in the undercut 31 of

the mounting rail 30. When the plug connector 1 is folded down towards the mounting rail 30, the spring pins are first bent back by a beveled rim 33, in order to then engage into a further undercut 32 of the mounting rail 30.

The base body 2 further comprises supporting contours 7 which prevent that upon a movement of the plug connector 1 on the mounting rail 30 in the plug-in direction, the force resulting therefrom need not be fully taken up by the spring pins.

The plug connector 1 is provided with a screwed cable gland 40 which is generally known from the prior art. The screwed cable gland will therefore not be discussed in more detail here. The screwed cable gland 40 serves as a strain relief of the cable to be connected and for sealing the base body 2 against such media as dust and water.

Figure 6 shows the coupling process of two plug connectors on the mounting rail 30. A plug connector 1a is already fixed on the mounting rail here. The fixing noses 5 of the plug connector 1b to be coupled thereto are at first placed in the undercut 31. The plug connector 1b can then be moved towards the mounting rail 30 in the direction of the arrow 7. The arcuate groove of the plug connector 1b engages behind the cylindrical pin 3 of the plug connector 1a. Due to the arc shape of the groove 4, the plug connector 1b can be guided in the direction of the arrow 7. Subsequently, the spring pins snap into the undercut 32 of the mounting rail 30, as already described above. The plug connectors 1a and 1b are both coupled to each other and also fixed on the mounting rail 30.

Exactly the reverse process occurs when a plug connector is uncoupled from a modular system of plug connectors. The spring pins 6 must first be manually pushed out of the undercut 32. The plug connector can then be detached from the neighboring plug connector and the mounting rail 30 contrary to the direction of the arrow 7.

Figure 8 shows the side view of a locking device 50. The locking device 50 consists of a passive locking part 51 and an active locking part 52.

Both the active 52 and the passive locking part 51 include noses 56 which are adapted to be inserted in the undercuts 31 of the mounting rail 30. Both locking parts 51, 52 can be fixed on the respective mounting rail 30, 30' by means of a connector 55. In the process, the connector 55 simultaneously engages in a notch 57, 58 of the locking part 51, 52 and in a rear groove 34 of the mounting rail 30.

A guide is provided in order to allow the locking parts 51, 52 to be brought together easily. The passive locking part 51 comprises an opening 54 into which a bolt 53 of the active locking part 52 can be inserted.

The locking of the two locking parts 51, 52 is implemented by means of a tensioning spring 59 which is attached to the active locking part 52 and is connected with a tensioning lever 60 (likewise attached to the active locking part 52). The tensioning spring 59 is placed over a tensioning lug 61 of the passive locking part 51. By actuating the tensioning lever 60, the two locking parts 51, 52 are brought together and reversibly connected with each other. The combination of the tensioning lug 61, the tensioning spring 59 and the tensioning lever 60 functions on the toggle lever principle and thereby at the same time produces a particularly stable coupling of the locking parts 51, 52 and the plug connectors 1, 1' contacted with each other. In addition, the toggle lever principle assists in the unlocking process.

Figure 7 shows several levels of systems of plug connectors 1, 1'. Two systems of plug connectors 1, 1' located opposite each other are contacted with each other by means of the locking device 50. A mounting rail

30, 30' can be fixed onto the locking device 50 on both sides. This allows a plurality of systems of plug connectors 1, 1' to be arranged equally spaced one on top of the other.

LIST OF REFERENCE NUMBERS

Modular Plug Connector

1	plug connector	10	holding cage
2	base body	11	arm
3	cylindrical pin	12	snap-in element
4	arcuate groove		
5	fixing noses		
6	spring pins	20	contacting element
7	supporting contour	21	crimp opening
30	mounting rail	50	locking device
31	undercut	51	passive locking part
32	undercut	52	active locking part
33	rim	53	bolt
34	groove	54	opening
		55	connector
40	screwed cable gland	56	nose
		57	notch
		58	notch
		59	tensioning spring
		60	tensioning lever
		61	tensioning lug

MODULÁRIS DUGÓS CSATLAKOZÓ

SZABADALMI IGÉNYPONTOK

1. Szerelésinre (30) rögzíthető dugós csatlakozó (1), ahol
 - a dugós csatlakozónak (1) a szerelésinre (30) történő rögzítéséhez a dugós csatlakozó (1) háztestén (2) kívül rögzítőeszközök (5, 6) vannak elrendezve, és ahol
 - a dugós csatlakozó (1) háztestében (2) egy tartófoglalat (10) van rögzítve,

- amely tartófoglalat (10) az egyik végénél egy csatlakoztatandó kábel egyik vezetékével való villamos csatlakozás létrehozásához egy érintkezőelemhez (20) kapcsolódik, másik végénél pedig a csatlakoztatandó kábel köpenyéhez kapcsolódik,

azzal jellemezve, hogy

- egy további, azonos kialakítású háztettel (2) rendelkező dugós csatlakozóhoz (1) való reverzibilis csatlakoztatás céljából a házteten (2) kívül mindkét oldalon kapcsolóelemek (3, 4) vannak elrendezve,
 - továbbá az egyik kapcsolóelem íves horonyként (4), a másik kapcsolóelem pedig henger alakú csapként (3) van kiképezve.
2. Az 1. igénypont szerinti dugós csatlakozó, **azzal jellemezve, hogy** a kábelben ébredő feszültség csökkentésére, valamint tömítés céljából a háztet (2) egy menetes kábelcsatlakozót (40) tartalmaz.
 3. Az előző igénypontok bármelyike szerinti dugós csatlakozó, **azzal jellemezve, hogy** a háztet (2) egy darabként van kialakítva.
 4. Az előző igénypontok bármelyike szerinti dugós csatlakozó, **azzal jellemezve, hogy** a rögzítőeszközök rögzítőorrok (5) és rugós csapok (6) együtteseként van kialakítva.

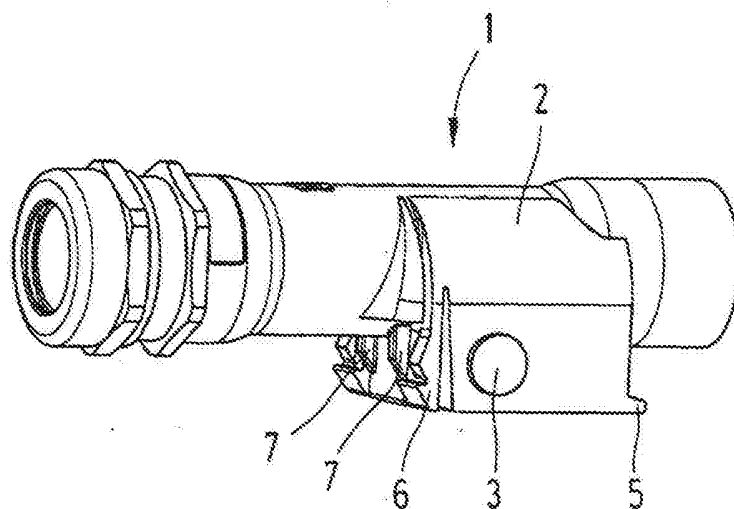


Fig. 1

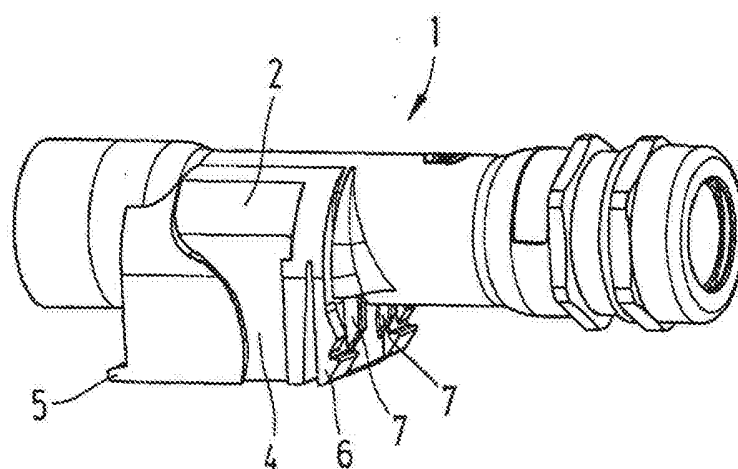


Fig. 2

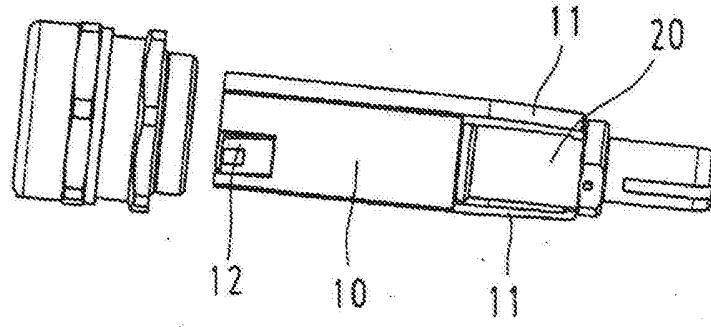


Fig. 3

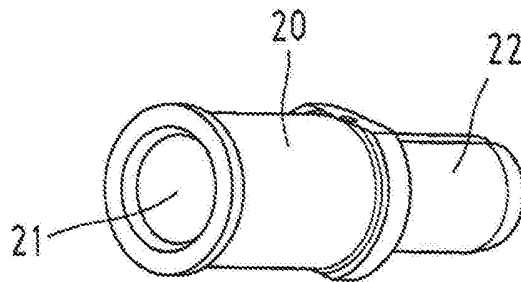


Fig. 4

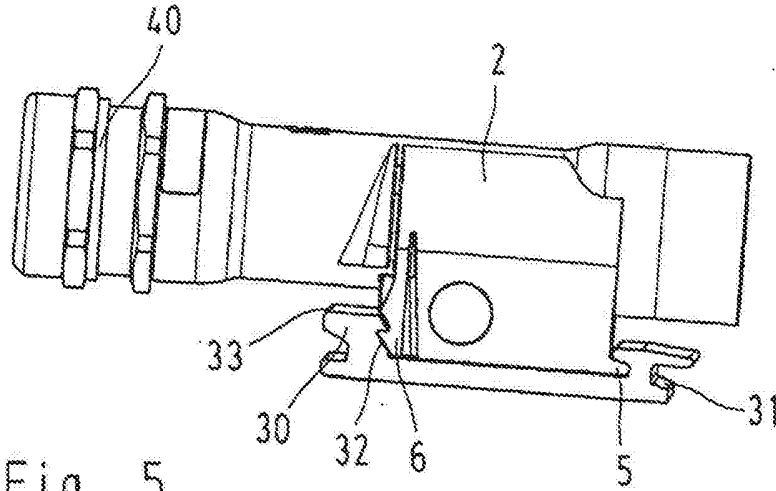


Fig. 5

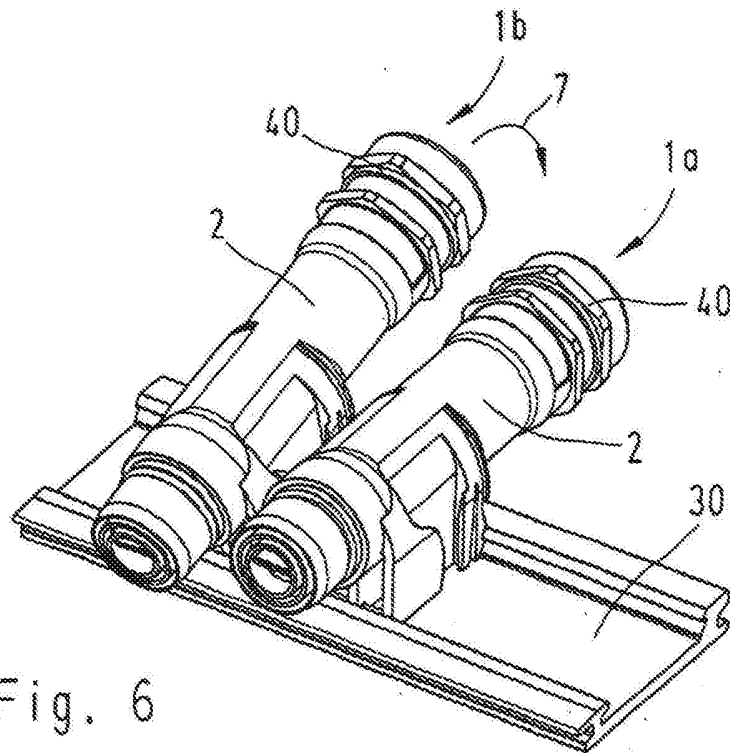


Fig. 6

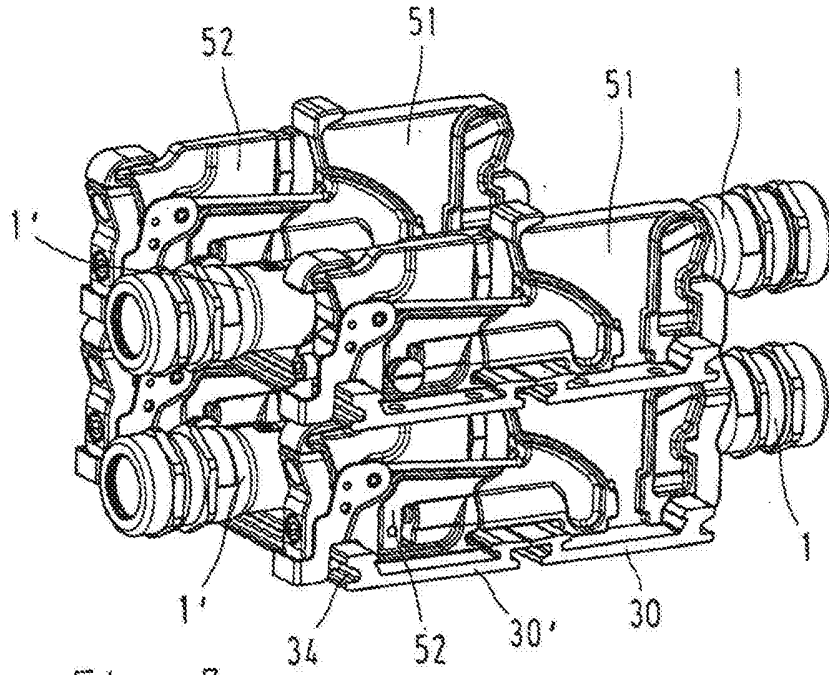


Fig. 7

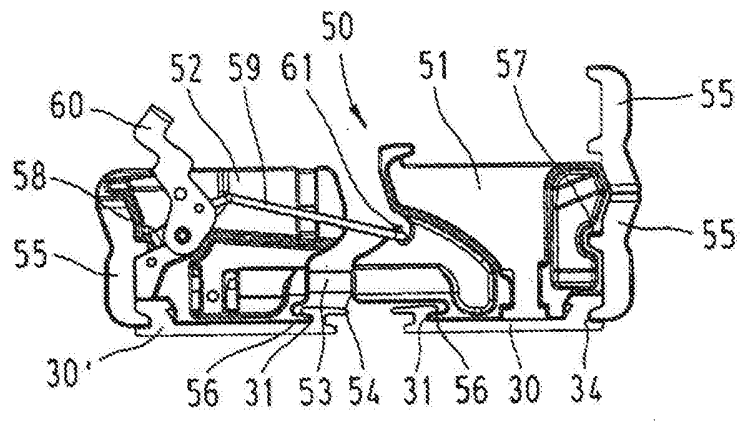


Fig. 8