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(54) **Connector**

(57) The object of the present invention is a connector (1) for connecting an electric conductor to an electric device (11). In order to provide a simple, safe and cost-effective connector, the connector (1) comprises a body (2), from which electric contacts (3) project and which includes a cable securing part (4) and conductor securing parts (22). To the body (2) there is movably attached a spacer (6) whose side (7) facing away from the body (2) comprises openings (8) for electric contacts (3). The connector includes a blocking plate (9) that is movable between a blocking position and a connecting position, whereby in the blocking position the openings (10) of the blocking plate (9) are offset in relation to the electric contacts (3) and thus the blocking plate (9) prevents the electric contacts (3) from projecting through the blocking plate (9), whereas in the connecting position the openings (10) of the blocking plate (9) are in alignment with the electric contacts (3) enabling the projection of the electric contacts (3) through the blocking plate (9) further towards said openings (8) of the spacer (6).

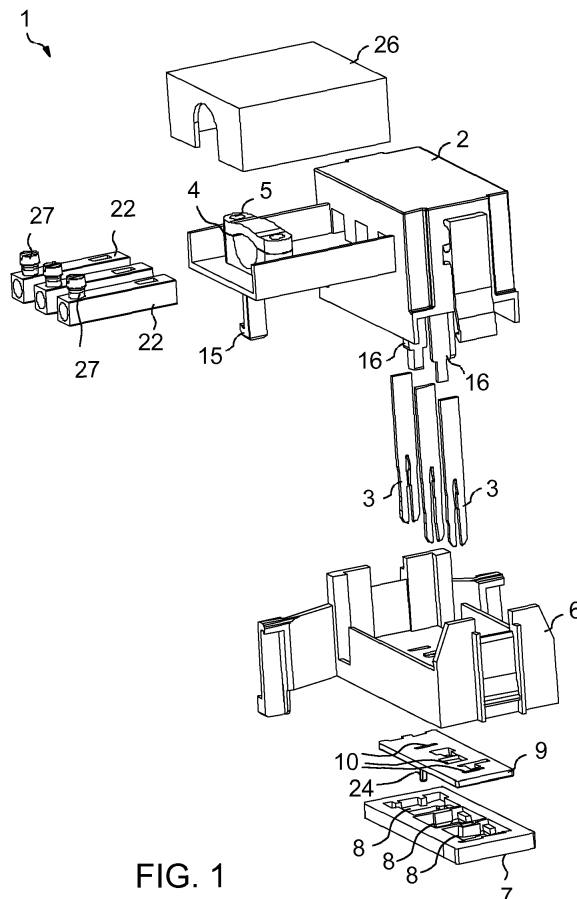


FIG. 1

Description

FIELD OF THE INVENTION

[0001] The invention relates to a connector for connecting an electric conductor to an electric device, and, in particular, to a connector, through which electricity is supplied to the electric device.

DESCRIPTION OF PRIOR ART

[0002] In connection with mounting electric devices in buildings, for instance, there is a need to connect an electric device to a power supply network in a manner which makes mounting work as reliable, simple and fast as possible. In mounting work of this kind a possibility of utilizing connectors mounted in advance in cables expedites the mounting work significantly. In that case the cables used may be prefabricated to given dimensions and their ends may be furnished with suitable connectors.

[0003] In practice, the mounting of electric devices is often implemented such that power supply will have a star-like configuration, i.e. power supply is provided by a separate branch or socket with a separate cable to each electric device. Thus, the connection point of the electric device is a terminating one, i.e. at the connection point there is no need to branch supply to other devices. Because no branching is made at the connection point, this solution allows reduction in the number of components. Thus, material savings are achieved.

[0004] In connection with electric installations, it is to be noted, however, that in case the electric device has to be detached later for servicing, for instance, the cable detached from the electric device and the relating connector may be live, i.e. connected to the power supply network, which has to be considered in the structure of the connector, so that a risk of an electric shock may be eliminated.

[0005] Currently known connectors are not able to meet the above requirements in a satisfactory manner.

SUMMARY OF THE INVENTION

[0006] The object of the present invention is to solve the above-described problem and to provide a new connector, which enables simple, safe and cost-effective electric connection of electric devices. This is achieved by a connector in accordance with independent claim 1.

[0007] By means of cable securing parts the connector may be secured directly to an electric cable without extra parts. By means of a spacer and a blocking plate it is made sure that there is no access to electric contacts of the connector before the connector is reliably secured to a connector counterpart. In this manner connecting becomes simple, safe and cost-effective.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] In the following, the invention will be described in greater detail, by way of example, with reference to the attached drawings, in which

Figure 1 is an explosion view of a first embodiment of a connector,
Figures 2 and 3 illustrate the connector of Figure 1 in a first state,
Figure 4 illustrates a counterpart of the connector and
Figures 5 and 6 illustrate the connector of Figure 1 in a second state.

DESCRIPTION OF AT LEAST ONE EMBODIMENT

[0009] Figure 1 is an explosion view of a first embodiment of a connector 1, and in Figures 2 and 3 the connector 1 is seen in a first state, where it is not connected to a counterpart of the connector 1. Figure 2 is a side view of an assembled connector, seen obliquely, and Figure 3 is a cross-sectional view of the connector 1.

[0010] The connector 1 includes a body 2, wherefrom project electric contacts 3. The body also includes a cable securing part 4, which in this example consists of parts which are arranged on opposite sides of the electric cable and whose mutual distance, and consequently pressing force exerted on the cable, is adjustable by means of screws 5. By means of the cable securing part 4 it is thus possible to implement effective strain relief for the cable. Alternatively, the cable securing part may consist of a body 2 and a cover 26 attachable thereto, between which the cable is pressed when the cover is secured to place. Securing of the cover 26 may be carried out by screws, for instance.

[0011] The connector 1 also includes conductor securing parts 22 for receiving individual conductors of the electric cable and for connecting them to the electric contacts 3. In the example of the figures, the conductor securing parts 22 are implemented by securing screws 26, which press the conductors arranged in the conductor securing parts 22 against the walls of the conductor securing parts 22 in order to provide electrical contact. Alternatively, the conductor securing parts may consist of spring connectors or clamp connectors, for instance.

[0012] To the body 2 there is movably attached a spacer 6 whose side 7 facing away from the body 2 is provided with openings 8 for electric contacts 3. The spacer is movable between a detached position and an attached position. In Figures 2 and 3 the spacer 6 is seen in the detached position, where it is when the connector 1 is not attached to the counterpart of the connector 1. In the detached position the electric contacts 3 are in a space defined by the body and the spacer 6, i.e. they do not project from the openings 8 on the side 7 of the spacer. Hence, a person handling the connector 1 cannot touch the electric contacts 3 by accident and a risk of electric

shock can be eliminated.

[0013] The connector 1 also includes a blocking plate 9, which is movable between a blocking position and a connecting position. In the blocking position the openings are offset in relation to the electric contacts 3, i.e. even though the body 2 and the spacer 6 are pressed against one another to make the spacer shift from the detached position to the attached position, the electric contacts are not able to penetrate through the openings 10 in the blocking plate 9, but the electric contacts 3 hit the blocking plate. By contrast, when the blocking plate 9 is moved to the connecting position, the openings 10 in the blocking plate 9 are in alignment with the electric contacts 3 such that pressing the body 2 and the spacer 6 towards one another to make the spacer 6 shift to the attached position makes the electric contacts 3 penetrate through the openings in the blocking plate 9. In that case the electric contacts 3 project from the connector 1 and they may form electrical contact with corresponding contacts in the counterpart of the connector.

[0014] Figure 1 also shows a projection 24 from the blocking plate 9, which projection goes through an opening 8 on the side 7 when the connector 1 is assembled. By means of said projection 24 the blocking plate is translatable between the blocking position and the connecting position in a manner to be described later.

[0015] The body, spacer and blocking plate of the connector may be made of a suitable isolating material, such as plastic. The electric contacts and the conductor securing parts connected thereto, in turn, may be made of a suitable electrically conductive metal alloy.

[0016] Figure 4 illustrates a counterpart of the connector 1 applicable for being utilized together with the connector 1 shown in Figures 1 to 3 and 5 to 6.

[0017] In this example the counterpart 21 of the connector is attached to an electric device 11 that may be an illuminator, for instance. In this manner, electricity can be supplied to the illuminator by means of the connector.

[0018] The counterpart 21 includes a part inside the electric device, which part comprises conductor securing parts 12 for receiving the electric conductors by which the internal circuitry of the electric device is implemented. In the example of Figure 4 it is assumed that said conductor securing parts 12 are spring clips. Projections 12 having electric contacts 14 for receiving the electric contacts 3 of the connector 1 project from the counterpart 21 outside of the electric device through the openings in the electric device.

[0019] In order to attach and electrically connect the connector to the counterpart 21 the connector 1 is first set on the projections 13 of the counterpart 21. At the same time, a hook 15 (or hooks) in the body of the connector penetrates into an opening 23 in the electric device 11. In the example of Figure 4, a projection 24 of the blocking plate 9, which is in the blocking position, penetrates into an opening 25 in the middle projection 13 of the counterpart 21. The openings 8 on the side 7 facing away from the body 2 of the connector 1 are designed

to have such dimensions that in this situation the connector 1 may be moved laterally along the surface of the device 11. By the effect of this lateral movement the blocking plate 9, whose projection 24 is engaged in the opening 25 of the projection 13, remains in place with respect to the electric device 11, whereas other parts of the connector 1 move in the lateral direction. By the effect of the lateral movement the blocking plate 9 moves in the connector 1 from the original blocking position to the connecting position. So the openings 10 in the blocking plate 9 are placed in alignment with the electric contacts 3 of the connector 1.

[0020] Thanks to the lateral movement, pins 16 projecting from the body will also be aligned with openings 17 in the counterpart 21. In this situation the body 2 may be pressed towards the spacer 6 and the electric device 11, whereby the openings 10 in the blocking plate 9 allow the electric contacts 3 to penetrate out of the connector 1 and further into the electric contacts 14 in the projections 13. At the same time, the pins 16 also penetrate into the openings 17 in the counterpart 21.

[0021] In this manner the connector 1 will be attached to the counterpart 21. Thanks to the lateral movement the hook 5 or hooks have moved in the openings 23 to a position, in which they grip the electric device 11. This enhances the attachment of the connector 1 to the electric device.

[0022] Figures 5 and 6 illustrate the connector of Figure 1 in the second state. Figure 5 is a side view of an assembled connector 1, seen obliquely, and Figure 6 is a cross-sectional view of the connector 1. Figure 5 also shows an electric cable 18 that is attached to the connector 1 for providing power supply to the electric device 11 through the connector 1.

[0023] In Figures 5 and 6 the spacer 6 is seen in the attached position, in which it is when the connector 1 is attached to the counterpart 21 of the connector 1. When Figures 2 and 3 are compared with Figures 5 and 6, it is noted that in the attached position the spacer 6 has moved from the detached position towards the body 2. Hence, the projections 3 attached to the body 2 have been able to protrude through the openings 10 in the blocking plate and the openings 8 on the side 7.

[0024] It is also seen in Figure 5 that the body 2 and the spacer 6 include gripping parts 19 and 20, which, the spacer 6 being in the attached position, interlock the body 2 and the spacer 6 thus preventing their mutual movement. The gripping part 19 of the body 2 may consist of a hook, for instance, and the gripping part 20 of the spacer may consist of a shoulder, whereby the hook grips the shoulder, when the body and the spacer are pressed against one another such that the spacer shifts to the attached position. By bending the hook the gripping parts 19 and 20 may be detached from one another when it is time to remove the connector 1 from the counterpart 21.

[0025] By means of design and dimensions the openings 8 on the side 7 of the connector 1 may be coded such that the connector 1 is connectable only to a correct

counterpart 21. In other words, in case the shapes of the counterpart projections 13 and the openings 8 are not compatible, the attachment of the connector 1 to the counterpart 21 will not succeed.

[0026] It is to be understood that the above description and the relating figures are only intended to illustrate the present invention. It is apparent to a person skilled in the art that the invention may be modified and altered in a variety of ways without deviating from the scope of the invention.

Claims

1. A connector (1) for connecting an electric conductor to an electric device (11), **characterized in that** the connector (1) comprises:

a body (2), from which electric contacts (3) project for providing electrical contact with electric contacts (14) of a connector counterpart (21), and which includes a cable securing part (4) and conductor securing parts (22) for receiving an electric cable (18) and for connecting individual conductors in said electric cable to said electric contacts (3),

a spacer (6) which is movably connected to the body (2) and whose side (7) facing away from the body (2) comprises openings (8) for the electric contacts (3) and which is movable between a detached and an attached position with respect to the body (2), whereby, the spacer (6) being in the detached position, said electric contacts (3) are located in a space defined by the body (2) and the spacer (6), and, the spacer (6) having been moved from the detached position towards the body (2) and having reached the attached position, the electric contacts (3) project from the openings (8) on the side (7) of the spacer (6), and

a blocking plate (9) which is located in the vicinity of the spacer side (7) comprising openings (8) and which comprises openings (10), whereby said blocking plate (9) is movable between a blocking position and a connecting position, whereby in the blocking position the openings (10) of the blocking plate (9) are offset in relation to the electric contacts (3) and thus the blocking plate prevents the electric contacts (3) from projecting through the blocking plate (9), whereas in the connecting position the openings (10) of the blocking plate (9) are in alignment with the electric contacts (3) enabling projection of the electric contacts (3) through the blocking plate (9) and further towards the openings (8) of the spacer (6), and

that at least one of the openings (8) on the side (7) of the spacer (6) is designed to allow pene-

tration of a projection (24) in the blocking plate (9) into an opening (25) of a connector counterpart (21) and to allow a lateral movement of the body (2) and the spacer (6), while said projection (24) is in the opening (25) of the counterpart (21), so as to move said blocking plate (9) from the blocking position to the connecting position.

2. The connector of claim 1, **characterized in that** in the body (2) of the connector (1) there is formed a hook (15), which, the connector (1) being attached to the connector counterpart (21), grips the connector counterpart (21) or the electric device (11) to which the counterpart (21) is attached.
3. The connector of any one of claims 1 to 2, **characterized in that** the connector (1) is a power supply connector, through which electricity is supplied to an electric device (11).
4. The connector of any one of claims 1 to 3, **characterized in that** the electric device (11) is an illuminator.
5. The connector of any one of claims 1 to 4, **characterized in that** the cable securing part (4) comprises parts which are arranged on the opposite sides of the electric cable (18) and whose mutual distance, and consequently pressing force exerted on the cable, is adjustable by means of screws (5).
6. The connector of any one of claims 1 to 5, **characterized in that** the conductor securing parts (22) comprise securing screws (26) or springs for pressing the conductors against the walls of the conductor securing parts (22).
7. The connector of any one of claims 1 to 6, **characterized in that** the openings (8) on the side (7) of the spacer (6) of the connector (1) are coded, by means of their design, to be compatible only with a connector counterpart (21) having a predetermined design.
8. The connector of any one of claims 1 to 7, **characterized in that** the body (2) and the spacer (6) are provided with gripping parts (19, 20), which, the spacer (6) being in the attached position, interlock the body (2) and the spacer (6) thus preventing their mutual movement.

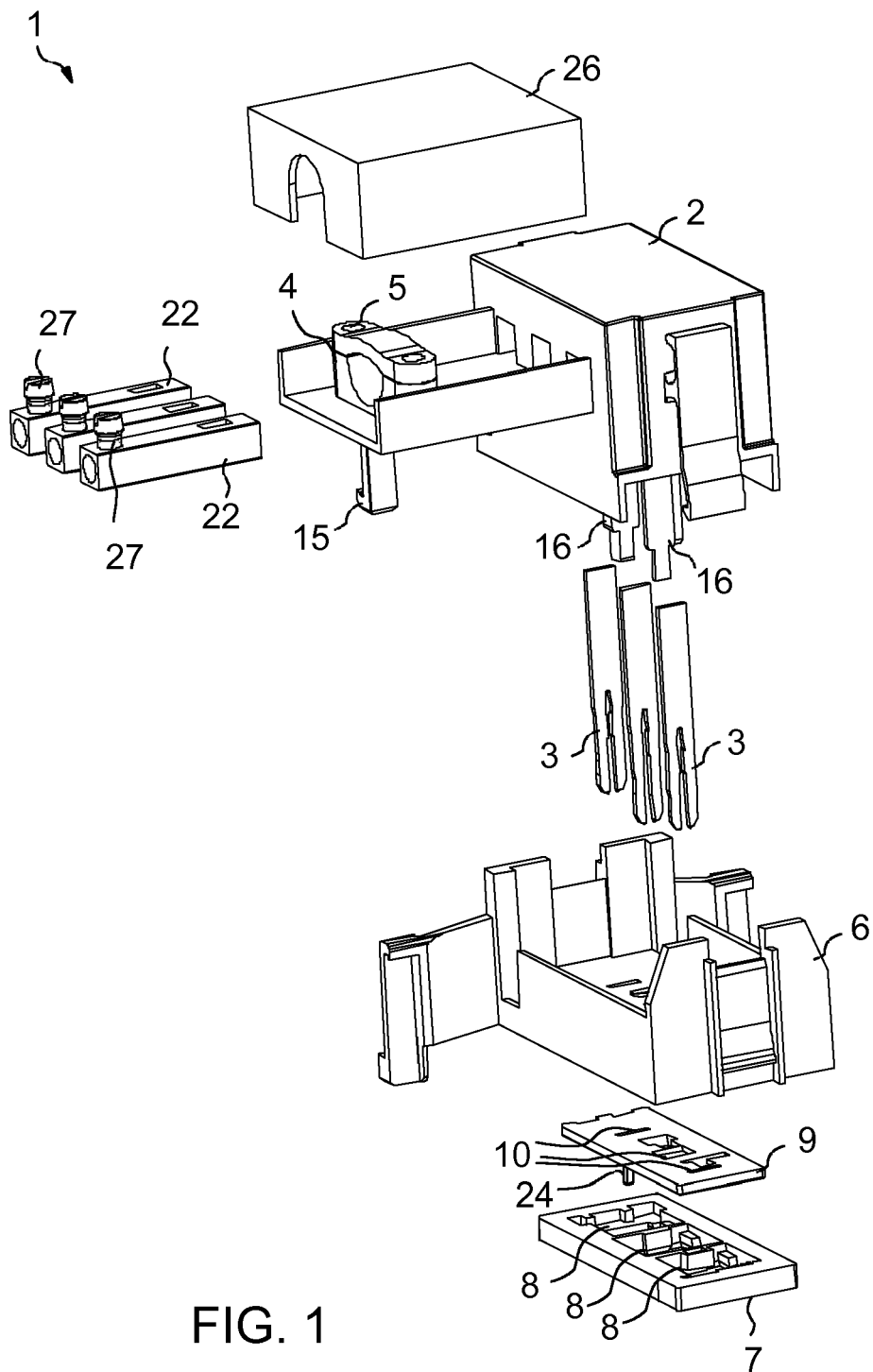


FIG. 1

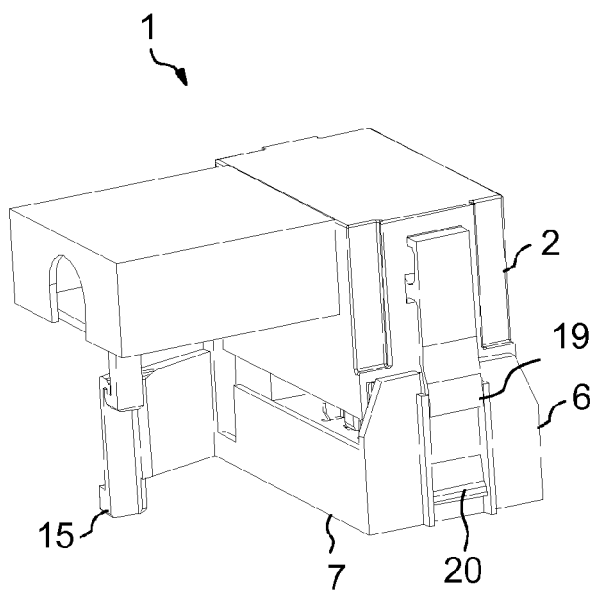


FIG. 2

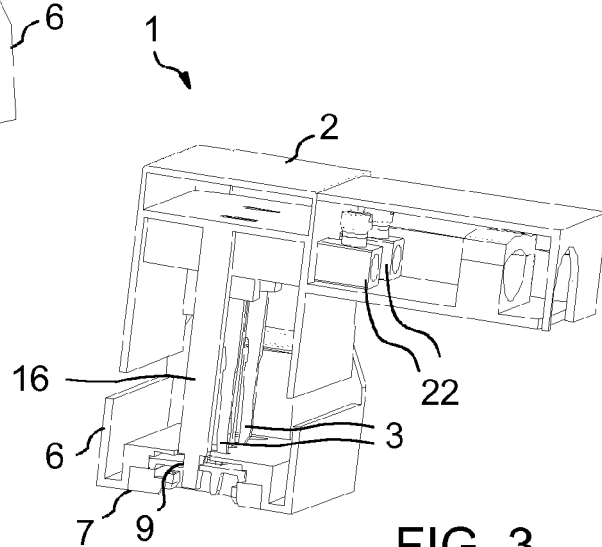


FIG. 3

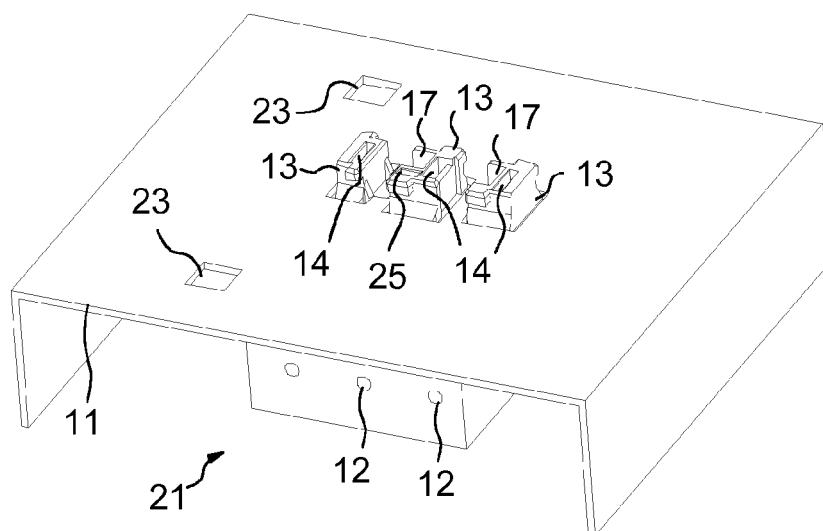
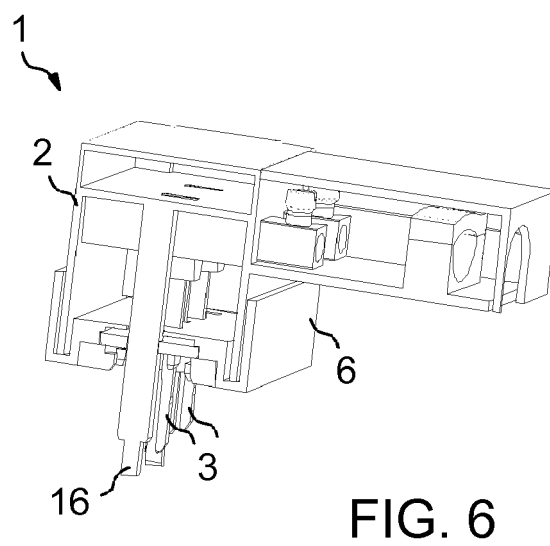
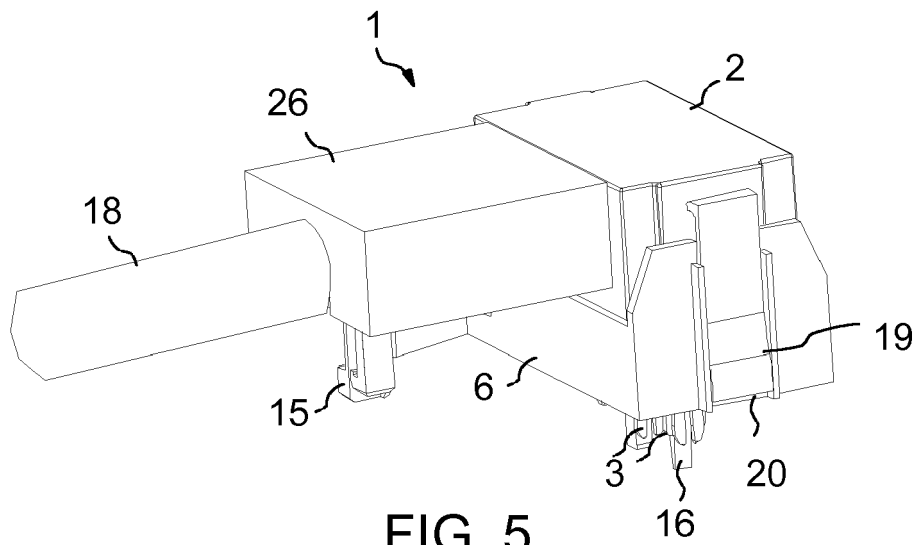


FIG. 4





EUROPEAN SEARCH REPORT

Application Number
EP 11 15 3997

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			H01R
Place of search		Date of completion of the search	Examiner
Munich		29 April 2011	Serrano Funcia, J
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