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(72) Inventor: **Mans, Paul**  
**Wembley, Middlesex HA0 1RR (GB)**

(74) Representative: **ip21 Ltd**  
**Central Formalities Department**  
**Norwich Research Park**  
**Colney**  
**Norwich**  
**NR4 7UT (GB)**

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(71) Applicant: **C.p. Electronics Limited**  
**Wembley**  
**London**  
**Greater London HA0 1RR (GB)**

(54) **Modular marshalling system**

(57) This invention provides a system for controlling electrical appliances. The system comprises: a marshalling device which comprises an input port connectable to at least one output port and to at least one connection port; and an extension device which comprises at least one output

port and a connection port,

wherein, in use, the extension device is connected to the marshalling device through the connection ports such that the output port of the extension device is connectable to the input port of the marshalling device.

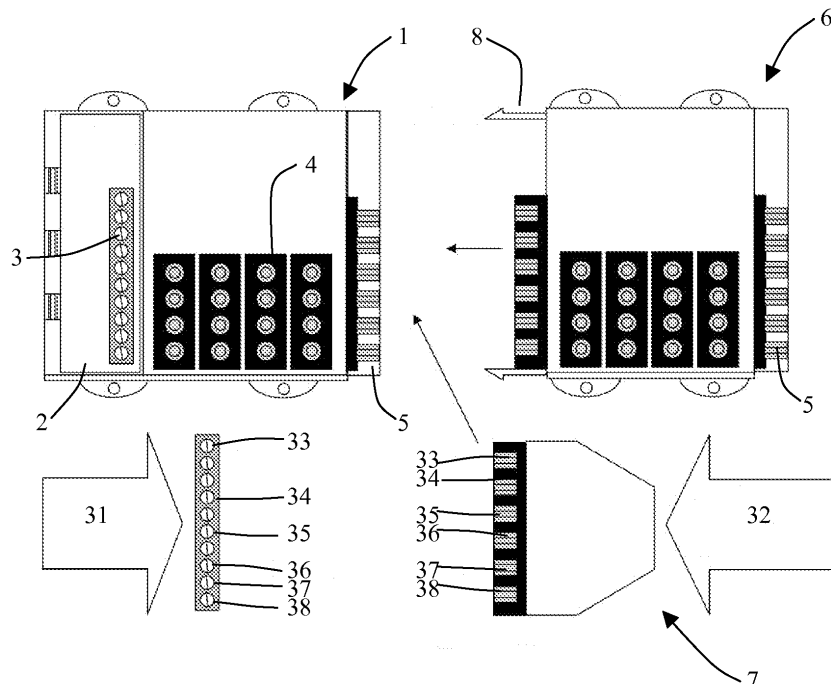


Fig. 1

**Description**

Field of the Invention

5 **[0001]** This invention relates to a system for controlling electrical appliances.

Background to the Invention

10 **[0002]** There is an increasing trend in the building and construction industry to reduce the amount of labour required on site by the use of pre-fabricated materials, generally made off site in a factory. Specifically in the electrical industry, luminaires or light fittings are commonly pre-wired with a cable or lead having a plug on the end. This plug is then inserted into a corresponding port in a "marshalling box". The marshalling box has many such ports, and is also connected to mains electricity, switches, automatic presence detectors etc, and is used to switch the luminaires. Increasing use of dimming luminaires also lends itself to the use of marshalling boxes, whereby the dimming signals are also distributed using the plug and socket arrangement.

15 **[0003]** One of the drawbacks with currently available marshalling boxes is that they have a fixed number of ports. The implications of this are that the installation needs to be accurately estimated in advance so that the correct size of box can be procured; additional luminaires cannot be added at a later stage if all of the ports have been used up; the manufacturer and stockist of the marshalling boxes have to have many different models in stock to suit different sizes of installation.

20 **[0004]** This invention describes a new form of modular marshalling system whereby the marshalling box can be scaled to the size of the installation.

Summary of the Invention

25 **[0005]** Accordingly, this invention provides a system for controlling electrical appliances. The system comprises:

a marshalling device which comprises an input port connectable to at least one output port and to at least one connection port; and

30 an extension device which comprises at least one output port and a connection port,

wherein, in use, the extension device is connected to the marshalling device through the connection ports such that the output port of the extension device is connectable to the input port of the marshalling device.

35 **[0006]** It may be that the extension device comprises at least one further connection port.

**[0007]** Typically, the further connection port of the extension device is suitable for connecting a second extension device such that the output port of the second extension device is connectable to at least one input port of the marshalling device.

40 **[0008]** It may be that the system further comprises a control device which comprises at least one connection port. In use, the control device is connected to the marshalling device or an extension device through the connection ports such that the control device controls the flow of power from at least one input port to at least one output port. Often, the control device comprises a switch. It may be that the control device is configured to generate a dimming signal.

**[0009]** Typically the input port is located within a wiring compartment of the marshalling device.

**[0010]** It may be that the system is a lighting controller.

45 **[0011]** Often, the system further comprises a first wireless communication extension device which comprises a connection port and a wireless transmitter. Then, in use, signals received through the connection port of the wireless transmission extension device can be transmitted wirelessly.

**[0012]** Alternatively or additionally, the system further may further comprise a second wireless communication extension device which comprises a connection port and a wireless receiver. Then, in use, signals received through the wireless receiver can be transmitted through the connection port of the wireless communication extension device

50 **[0013]** The invention further provides a marshalling device suitable for use in the systems described above, and an extension device suitable for use in the systems described above.

Detailed Description of Exemplary Embodiments

55 **[0014]** This invention consists of a starter unit and an extension unit.

**[0015]** Referring to Figure 1, the first starter unit 1 has a wiring compartment 2 with a number of screw terminals 3. The installer wires a fixed mains supply into the first starter unit 1, together with any necessary switches. A cable clamping arrangement secures the cable into the wiring compartment 2 and a cover is fitted over the compartment. The luminaires

are plugged into the output ports 4 - the diagram shows four ports, but there could be any number. The connection port 5 allows either a first extension unit 6 or a connection plug 7 to be connected.

**[0016]** The extension unit plugs into the connection port 5 and provides a further number of output ports 4 for luminaire connection. The fixing clips 8 improve mechanical coupling between the first starter unit 1 and first extension unit 6. The connection port 5 continues the wiring from the wiring compartment 2 directly to the newly introduced first extension unit 6.

**[0017]** The fixing clips 8 project in the direction of the connection ports of the extension unit. They are an integral part of the extension unit's housing. They incorporate a catch at their free extremity. The catch reduces in width towards the free end of the clip. Corresponding recesses are provided in corresponding starter or extension units, which are shaped and configured to receive and secure the fixing clips 8. The attachment between units is preferably releasable. The extension plugs incorporate a longitudinal outer projection acting as a guide when inserted into sockets provided with a correspondingly inner longitudinal trough.

**[0018]** The connection plug 7 allows an installer to pre-wire switches, presence detectors or other peripherals, and then plug the peripherals into the first starter unit 1 or first extension unit 6. The system advantageously provides an increase in capacity and connectivity. When the desired number of output ports 4 has been achieved, the connection plug simply plugs into the last remaining connection port 5.

**[0019]** Using the combination of first starter unit 1 and first extension units 6 allows the installer to customise the number of output ports 4 in the installation whilst only ever carrying two parts. If at a later stage more luminaires are added, then further first extension units 6 can be added without re-wiring the system.

**[0020]** The use of the connection plug 7, fitted into the last connection port 5 of the system means that there are no wasted connectors, and that the installer has the ability to plug in peripherals. Other available systems would have a fixed connection point on each marshalling box.

**[0021]** Each unit can be mounted to a support surface. A plurality of laterally extending ears are provided with holes to receive an appropriately sized fastener. Ears are provided extending from both side faces as shown in the figure.

**[0022]** Figure 2 shows a similar unit suitable for dimming systems. Instead of a four pole output connector, there is a six pole connector 9 for carrying dimming signals. Further there are more input connections to connect the dimming source.

**[0023]** Figure 3 shows a third extension unit 11 from a third embodiment of the invention, designed to work with a starter unit and other extension units as described above. The third extension unit 11 comprises four six-pole output connectors 12 which are capable of carrying dimming signals as in the second embodiment of the invention.

**[0024]** The third extension comprises a connection port 13, which is made up of nine plugs. There are nine sockets on the rear of the third extension (not shown) so that a further extension or a connection plug can be fitted there. The nine plugs are not all identical, and they are also not all symmetrical. The shapes of the plugs used are chosen so as to prevent the plugs being plugged into sockets upside-down or out of alignment.

**[0025]** Three tabs 14, 15 are provided to lock and/or releasably secure the third extension unit into place when it is connected to a starter unit or another third extension unit. The uppermost tab 14 is designed to fit into a first slot 16 at the back of rear of each third extension unit. Further slots are provided for the lower tabs 15. These tabs extend in a direction parallel to the support structure. The tabs extend themselves from a wing with holes for securing the unit to a support structure.

**[0026]** The extension unit also comprises screw holes 17, so that it can easily be fastened into place on a wall, ceiling or floor if required. The configuration provides a particularly stable and secure mode of attachment.

**[0027]** Figures 4 and 5 show a luminaire connector 21 according to the invention. This luminaire connector 21 comprises six plugs designed to fit the six pole output connectors 12 used in the third extension unit 11, or a similarly suitable starter unit.

**[0028]** The Luminaire connector 21 also comprises an arm 22 which extends in the same direction as the six plugs. The arm includes a first protrusion 23. A second protrusion 24 extends from the main body of the luminaire connector 21. The first and second protrusion are included to help secure the luminaire connector 21 to the third extension unit 11, by fastening to the third tab 18 and a fourth tab 19 respectively, in use. Lastly, the Luminaire connector 21 comprises a loop 25. In use, this loop 25 fits into the hole 20 cut for it on the third extension unit 11, where a further catch is provided to secure it. These protrusions and loops also help to ensure that luminaire connector 21 can only be fitted in the correct orientation.

**[0029]** In a fourth embodiment according to the invention, starter units, extension units and connection plugs are supplied as described above. However, the fourth embodiment also comprises a wireless connection extension unit. The wireless connection extension unit can be connected to a starter unit or an extension unit using a connection port. Typically, the wireless connection extension unit does not have its own connection port, but wireless extension units with connection ports can be provided, if required, so that further extension units or a connection plug can be fitted.

**[0030]** The wireless transmission extension unit comprises a wireless transceiver, which can be used to transmit radio-frequency signals to other components. These other components might be lighting control devices such as switches and dials, or they might be lights which are too remote to be connected directly using wires. A marshalling box according to the invention can also use the wireless transmission extension unit to send and receive signals from a further marshalling

box, so that the two components can effectively operate as one control system. Commands given to the first control box can be passed onto the second control box wirelessly, allowing a user to control devices connected to both boxes.

**[0031]** While the wireless transmission extension unit is a transceiver, in most installations it will be used primarily as a receiver. A separate device (usually a wireless sensor or switch) would be used to send a signal to the wireless transmission extension in order to cause the marshalling unit switch or dim output channels on the marshalling box. The transmitter part can be used for status information.

Figure Key

**[0032]**

Number	Description
Figure 1	Modular Marshalling System Switching Applications
Figure 2	Modular Marshalling System Dimming Applications
1	Starter Unit with Wiring Compartment
2	Wiring Compartment
4	Output Ports
5	Connection Port
6	Extentsion Unit
7	6 Pole Plug Supplied with Starter Unit
8	Fixing Clip
31	Supply, Switch, Emergency test, Absence switch
32	Switch, Emergency test, Presence Detector, Absence Detector
33	live supply
34	earth
35	neutral
36	perm live
37	switch live
38	absence live
39	On/Up switch
40	Off/Down switch
41	Dimming source (DIM-)
42	Dimming source (DIM+)
43	Supply, Switch, Emergency test, Up/Down switch
44	Starter Unit with Wiring Compartment
45	Extentsion Unit
46	9 Pole Plug Supplied with Starter Unit

**Claims**

1. A system for controlling electrical appliances, the system comprising:

- a marshalling device which comprises an input port connectable to at least one output port and to at least one connection port; and
- an extension device which comprises at least one output port and a connection port,

wherein, in use, the extension device is connected to the marshalling device through the connection ports such that the output port of the extension device is connectable to the input port of the marshalling device.

5 2. A system as claimed in claim 1, wherein the extension device comprises at least one further connection port.

3. A system as claimed in claim 2, wherein the further connection port of the extension device is suitable for connecting a second extension device such that the output port of the second extension device is connectable to at least one input port of the marshalling device.

10 4. A system as claimed in any preceding claim, the system further comprising:

a control device which comprises at least one connection port,

15 wherein, in use, the control device is connected to the marshalling device or an extension device through the connection ports such that the control device controls the flow of power from at least one input port to at least one output port.

5. A system as claimed in claim 4, wherein the control device comprises a switch.

20 6. A system as claimed in claim 4 or claim 5, wherein the control device is configured to generate a dimming signal.

7. A system as claimed in any preceding claim wherein the input port is located within a wiring compartment of the marshalling device.

25 8. A system as claimed in any preceding claim, wherein the system is a lighting controller.

9. A system as claimed in any preceding claim, wherein the system further comprises:

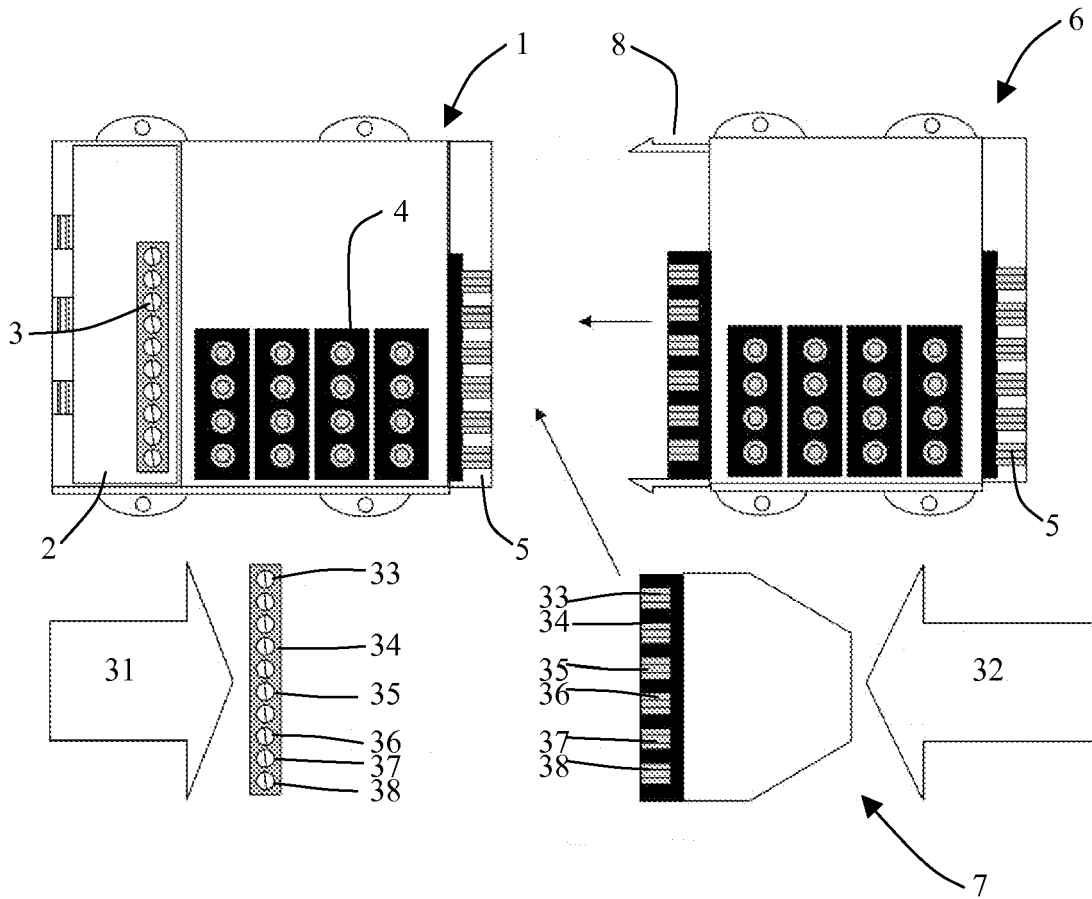
30 A first wireless communication extension device which comprises a connection port and a wireless transmitter, such that, in use, signals received through the connection port of the wireless transmission extension device can be transmitted wirelessly.

10. A system as claimed in any preceding claim, wherein the system further comprises:

35 a second wireless communication extension device which comprises a connection port and a wireless receiver, such that, in use, signals received through the wireless receiver can be transmitted through the connection port of the wireless communication extension device

40 11. A marshalling device suitable for use in the system of any preceding claim.

12. An extension device suitable for use in the system of any of claims 1 to 10.



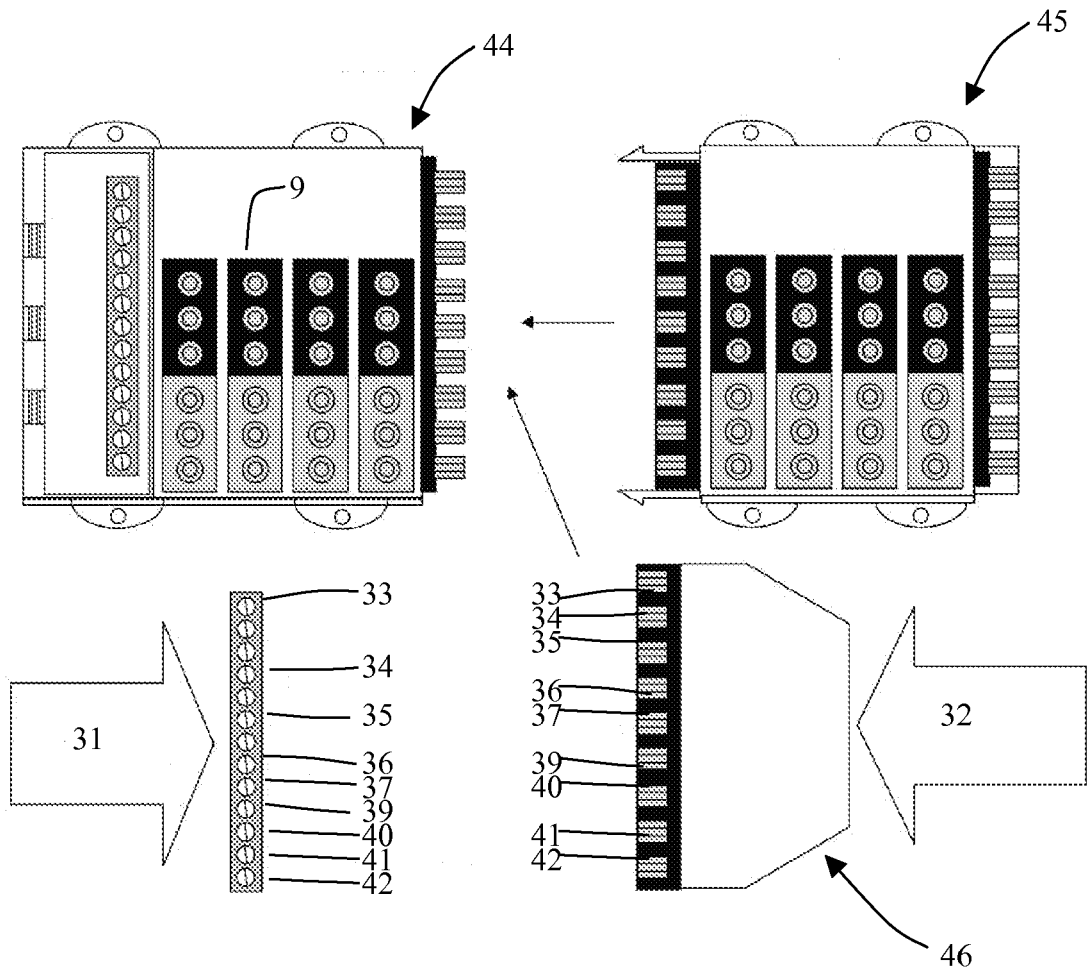


Fig. 2

Fig. 3

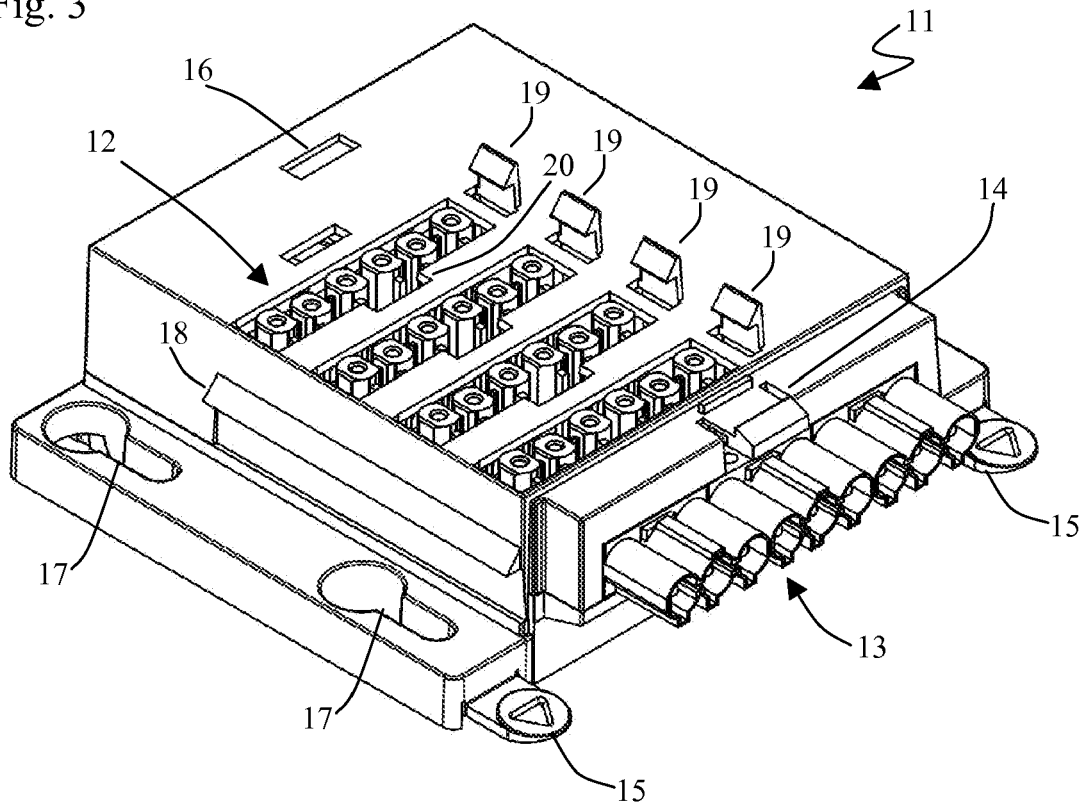


Fig. 4

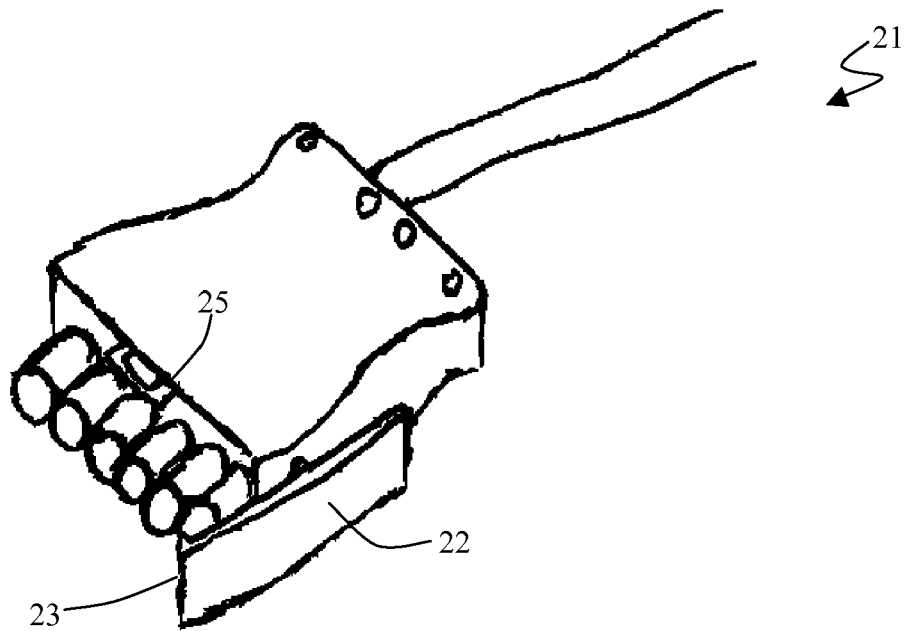


Fig. 5

