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(51) INT CL:
**H01R 4/24** (2006.01)

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**H2E** EPAC EPSA EPSX

(56) Documents Cited:
**GB 2333909 A**
**GB 1486075 A**
**GB 0504422 A**
**US 5362251 A**
**US 5199899 A**
**US 4941843 A**
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**US 5295857 A**
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(58) Field of Search:
UK CL (Edition W ) **H2E**
INT CL[7] **H01R**
Other: **On-line: WPI, JAPIO, EPODOC**

(54) Abstract Title: **Insulation displacement contacts**

(57) Insulation displacement contacts 4 connect to conductors of a cable (figure 2), alternatively as opposed pairs (figure 4). A knife associated with an insulation displacement contact may sever the cable (figure 5). The contacts may be used in junction boxes, plugs, and sockets, and for wiring spurs without severing a main cable (figure 9). Contacts may be held in place on a cable by push-fit, by snap-fit or by screwing.

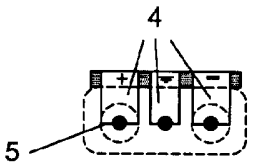


FIGURE 2

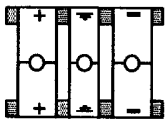

FIGURE 4

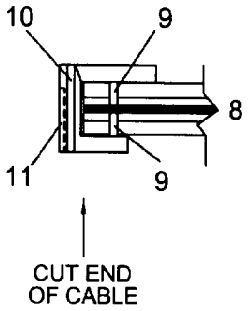


FIGURE 5

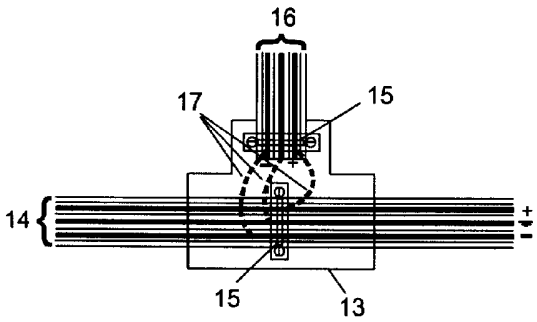


FIGURE 9

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DRAWINGS 1/2

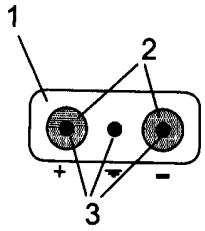


FIGURE 1

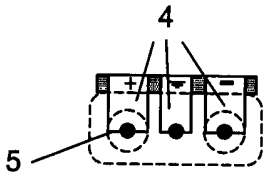


FIGURE 2

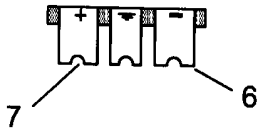


FIGURE 3

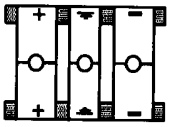

FIGURE 4

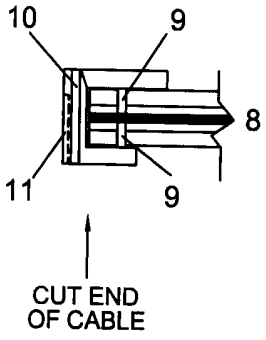


FIGURE 5

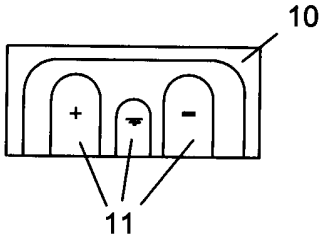


FIGURE 6

DRAWINGS 2/2

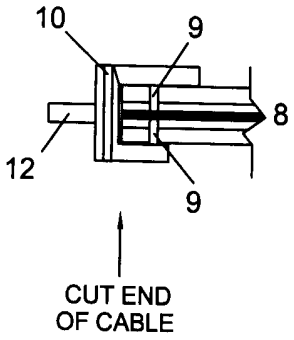


FIGURE 7

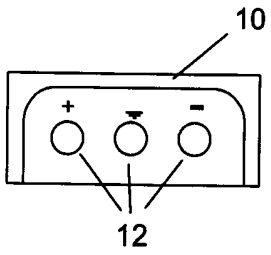


FIGURE 8

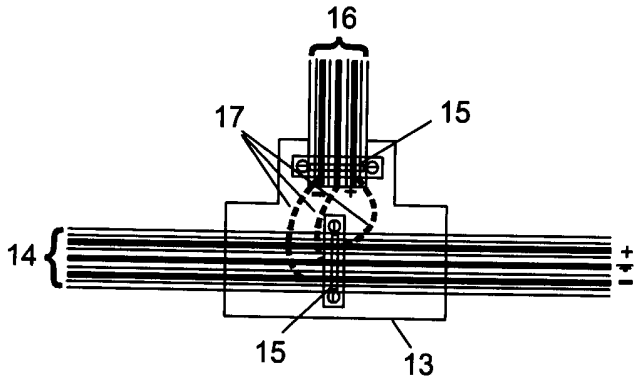


FIGURE 9

# LANCE TYPE WIRING CONNECTOR

Typically, the wiring of domestic and commercial properties, either ring main or lighting circuits for example, or the formation of computer network cabling, involves the laying of rolled cables and incorporating junction boxes, sockets and the like along the circuit. In order to wire these devices to form the circuit, the cable is cut, the individual wires along the cable at the ends stripped and bared and the individual exposed wires connected to the junction boxes, sockets or other devices, typically using screw in connectors. For twin and earth cables for example, this involves individually stripping the outer sheath and then the individual inner sheaths of the live and neutral wires. This process is time-consuming and somewhat fiddly.

**The invention provides a means of achieving electrical connections, without the need for stripping and baring wire ends, by providing a simple lance-type connector that penetrates the insulation sheath of the wire and contacts with the current carrying copper wire within the cables.** Specifically, this is achieved by a shaped, conducting lance, or "bayonet" to pierce the insulation and connect to the copper wire within the cable. The connecting lance terminal, or lances, are formed from a conducting metal, shaped to pierce the insulating sheath and make as much contact with the current carrying wire within the cable. The three elements of the circuit, the live, neutral and earth wires are kept separate by way of insulation or "bridges" within the penetrating lance, or "bayonet". Optimum connectivity with the wires of the cables, to ensure sufficient current is passed through the connection, can be achieved using double, or multiple lance connections, or using upper and lower lance connections to connect to the current carrying wire from two sides.

Primarily, the invention is intended to be integrated into and form a separate end connector that quickly provides end connectivity to cables and allows for rapid installation of electrical circuits and devices. Alternatively however, the lance type connector can be used to tie into a cable without even cutting the wire. This could be used to spur from an existing power cable, without the need for a traditional junction box, for example. Also, by integrating lance type connectors to junction boxes, plug sockets or even suitable appliances, this provides the ability to quickly and easily attach suitable cabling to a range of devices that utilise standard non-circular cables.

A preferred embodiment of the invention will now be described with reference to the accompanying drawing in which:

Figure 1 shows a typical section through a cable, in this example the cable being twin and earth, showing the outer insulation sheath, 1, the inner insulation sheaths, 2, and the current carrying copper wires, 3, within the cable.

Figure 2 shows the lance type connector and how it interacts with the wire by piercing the insulation sheaths. Shown in Figure 2, in this instance, as a single lance connector, the conducting lance connectors, 4, make individual contact, 5, with the wires. The size, shape and configuration of the lances is adaptable, for the range of cables available, and the specific application of its use.

Figure 3 is an indicative representation of a lance type connector, with a sharp leading edge, 6, and optional shaped end, 7, to make as much contact with the wires as possible.

Figure 4, omitting the wire for clarity, shows how upper and lower lance connectors interact to improve connectivity with the wire, by connecting from 2 sides. Alternatively, multiple lance connections from 1 or more sides can provide better connectivity with the wire.

Figure 5 shows the most relevant application of lance type connections. The figure shows a typical cable end connector incorporating, in this instance, a double lance connector (one fixed,

one push down in this instance), and a simple end plate connector, in section. The cable, 8, cut cleanly at the end, is penetrated through the insulation sheath, by lance connectors, 9. The end connector in this case is a simple hinged plastic attachment, 10, incorporating simple end plate contacts, 11.

Figure 6 shows a typical simple end plate contact connector, face on, showing end fitting, 10, and simple plate contacts, 11.

Figure 7 shows a similar end connector incorporating a bayonet style end connector, 12. Push or clip in, or other plug type attachments are also possible.

Figure 8 shows the bayonet style end connector, face on.

Figure 9 shows a possible lance connector wiring spur, which enables attachment onto a running cable, using the lance type connectors, without the need to cut the running wire. The spur box, 13, is attached to the running cable, 14, (shown here as a typical twin and earth), using lance connectors, 15. The spurred cable, 16, is similarly attached to the box using lance connectors. Internal wiring/circuitry, 17, to the spur box, either supplied or an integral part of the box, or fitted on installation, completes the wiring.

# CLAIMS

1. A lance or "bayonet" style connector for electrical cables, to provide end connectivity to wires and remove the need to individually strip down wire/cable ends to make wiring connections.

2. A lance or "bayonet" style connector for electrical cables, as claimed in claim 1, utilising a "push fit" or "snap fit" means of connection of the connecting lance to contact with the current carrying element of the cable.

3. A lance or "bayonet" style connector for electrical cables, as claimed in claim 1, utilising a screw down, rather than simple push down, means of penetrating the lance through the insulating sheath and connecting with the current carrying element of the cable.

4. A lance or "bayonet" style connector for electrical cables, as claimed in claims 1, 2 or 3, incorporating a male/female bayonet style end fitting for simple "plug in" installation of cabling within junction boxes, sockets or other devices, or appliances.

5. A lance or "bayonet" style connector for electrical cables, as claimed in claims 1, 2, or 3, incorporating a simple flat contact end fitting for simple "plug in" installation of cabling within junction boxes, sockets or other devices, or appliances.

6. A lance or "bayonet" style connector for electrical cables, as claimed in claims 1, 2, or 3, to form a cable spur, enabling spurring of current from an uncut cable.

7. A lance or "bayonet" style connector for electrical cables as herein described above and illustrated in the accompanying drawings or description.

**Application No:** GB0416460.4 **Examiner:** Mr Frederick Fee

**Claims searched:** 1 to 7 **Date of search:** 27 October 2004

# Patents Act 1977: Search Report under Section 17

**Documents considered to be relevant:**

| Category | Relevant to claims | Identity of document and passage or figure of particular relevance |
|---|---|---|
| X | 1, 3 and 6 | GB 2333909 A [MICROM] |
| X | 1, 2, 4 and 5 | GB 2291546 A [STEVENS] |
| X | 1, 2 and 4 | GB 1486075 A [AMP] |
| X | 1, 2, 4 and 5 | GB 1462920 A [AMP] |
| X | 1, 3, 5 and 6 | GB 504422 A [STC] |
| X | 1, 2 and 5 | US 2001/0016448 A1 [DAOUD] |
| X | 1, 2 and 4 | US 5362251 A [BIELAK] |
| X | 1, 2, 4 and 5 | US 5295857 A [TOLY] |
| X | 1, 2, 4 and 5 | US 5174783 A [STASSEN] |
| X | 1, 2, 5 and 6 | US 5199899 A [ITTAH] |
| X | 1, 2, 5 and 6 | US 4941843 A [BOCK] |

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|---|---|---|
| X | 1, 2, 5 and 6 | US 4444448 A [SIBERNAGEL] |
| X | 1, 2 and 5 | FR 2507393 A1 [NOZICK] knife 3 of insulation displacement terminal severs cable 6 |

Categories:

| | | | |
|---|---|---|---|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| & | Member of the same patent family | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |

**Field of Search:**

Search of GB, EP, WO & US patent documents classified in the following areas of the UKC$^{W}$ :

H2E

Worldwide search of patent documents classified in the following areas of the IPC$^{07}$

H01R

The following online and other databases have been used in the preparation of this search report

WPI, JAPIO, EPODOC