CONDUIT AND BOX CONNECTING DEVICE

A device (20) is used for connecting conduit (22) to enclosure (24). The enclosure (24) has a first surface (26), a first aperture (28) extending therethrough and a plane (30) of surface 26 is not perpendicular to an axis (32) of conduit (22). Device 20 has a conduit receiving portion (34) having a second aperture (36) extending therethrough, and a surface engaging portion (38) which extends from conduit receiving portion (34) to surface (26) and has a surface (40) for engaging surface (26). Surface engaging portion (38) is adapted to engage fixing means (42) which engages a threaded portion (44) with a threaded internal surface of a third aperture (46) in surface engaging portion (38). An axis of second aperture (36), which is coaxial with axis (32), is not perpendicular with the second surface (40).
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG). For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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CONDUIT AND BOX CONNECTING DEVICE

The present invention relates to a device for connecting a length of conduit to an object such as a box or enclosure, and relates particularly, but not exclusively, to a device for providing a connecting junction between an enclosure and a length of conduit used in industries where very high standards of hygiene are required.

Figures 1 and 2 show a typical example of a connecting device 10 for connecting conduit 12 to enclosure 14. Conduit 12 typically carries electrical cables and enclosure 14 may have a facia (not shown) carrying a switch, socket or the like. A threaded fixing device 16 is used to hold the connecting device 10 in position on enclosure 14. Fixing device 16 is attached from inside the enclosure 14 and has an aperture extending through its length allowing any wires from conduit 12 to enter the enclosure 14.

In industries where hygiene is extremely important, such as the food, beverage or pharmaceutical industries, it is important that items, such as tools used in the maintenance of machinery, cannot accidentally be left resting on such an enclosure. For example, if a tool is left on such an enclosure and subsequently falls into a food preparation production process, it would generally be necessary to stop the production process, remove the tool and destroy all of the food in the process at that point. As a result the loss of production time and the waste of product would be significant.

In an attempt to overcome this problem, an enclosure having a sloping top roof may be used such as that shown in Figure 3. The sloping roof is angled such that most objects will slip from the roof if placed thereon and as a result the enclosure
is unlikely to be used as a temporary storage location for tools.

When the roof of the enclosure is angled as described above, in order to use the connecting device 10, it is necessary to bend conduit 12 in order that it approaches the connecting device 10 perpendicular to the surface upon which the connecting device 10 is to be attached. For many types of conduit this is a straightforward if time consuming operation. However, where a high quality stainless steel conduit is used, typically the food, beverage and pharmaceutical industries, the bending of such a conduit is not as easy. Similarly bending plastic conduit can result in damage to the conduit rather than neat curved bends. Furthermore, putting such bends into a conduit adds time to the installation of such an enclosure and the result is not as aesthetically pleasing as a conduit having no bends in it.

Preferred embodiments of the present invention seek to overcome the above described disadvantages of the prior art.

According to the present invention, there is provided a device for connecting a length of conduit to an object having a first surface with a first aperture extending therethrough, the first surface having a substantially planar area around said first aperture, the plane of said area not being perpendicular to the axis of a portion of the conduit adjacent a junction between the device and the conduit, the device comprising:-

a conduit receiving portion having a second aperture extending therethrough and adapted to receive an end of a conduit; and

a surface engaging portion extending from said conduit receiving portion and having a substantially planar second surface for engaging said substantially planar area and having a third aperture extending therethrough, the surface engaging
portion being adapted to engage a fixing means engaging said device from an opposite side of said first surface to secure the device to the object, such that an axis of the end of the conduit received in said conduit receiving portion is not perpendicular to said second surface.

By providing a connecting device as described above, the advantage is provided that an object such as a junction enclosure with a sloping roof, which prevents other objects from being accidentally left on top of the enclosure, can be arranged to have a conduit extend straight into the junction with the enclosure without the need to bend the conduit. There is therefore no weakening of the conduit, nor is the diameter of the conduit altered by the bending, and the time required to create the generally two bends required is eliminated. The straight entry of the conduit into the junction enclosure is also more aesthetically pleasing than conduit having bends, especially where a number of conduit and objects are positioned adjacent one another, since it is difficult to create bends evenly and consistently throughout each of the conduits. Where such conduit and junction enclosures are used in the food, beverage or pharmaceutical industries, where hygiene standards must be very high, bends in conduit can lead to cracking or kinking of the conduit which creates difficult to clean areas which may attract dirt and contamination. As a result, the time required in cleaning such areas is increased.

In a preferred embodiment said surface engaging portion engages said fixing means by means of respective mutually engaging threads on an external surface of said fixing means and an internal surface of said third aperture.

In a preferred embodiment said conduit receiving portion receives said end of the conduit in use by means of a self tapping thread on an internal surface of said second aperture.
In a preferred embodiment the respective threads in said second and third apertures are linked as a single thread.

A preferred embodiment of the present invention will now be described, by way of example only, and not in any limitative sense, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of an enclosure, conduit and connecting device of the prior art;

Figure 2 is a partial cross-sectional view of the prior art of Figure 1;

Figure 3 is a perspective view of a further enclosure of the prior art; and

Figure 4 is a partial cross-sectional view of an enclosure, conduit connecting means embodying of the present invention connected to an enclosure.

Referring to Figure 4, a device 20 is used for connecting conduit 22 to enclosure 24. The enclosure 24 has a first surface 26 and a first aperture 28 extending therethrough. A plane 30 of surface 26 is not perpendicular to an axis 32 of conduit 22, ie plane 30 is not perpendicular to at least one axial plane of conduit 22

Device 20 has a conduit receiving portion 34 having a second aperture 36 extending therethrough. The device 20 also has a surface engaging portion 38 which extends from conduit receiving portion 34 to surface 26 and has a surface 40 for engaging surface 26.

Surface engaging portion 38 is adapted to engage fixing means 42 which engages a threaded portion 44 with a threaded internal surface (not shown) of a third aperture 46 in surface engaging portion 38.
An axis of second aperture 36, which is coaxial with axis 32, is not perpendicular with the second surface 40.

In use a length of conduit 22 is inserted into second aperture 36 of conduit receiving portion 34 of device 20. Second aperture 36 is provided with a thread and conduit 22 is either provided with a thread or the thread in second aperture 36 is a self tapping thread which cuts into the material of conduit length 22 thereby securing it to device 20.

Device 20 is brought into contact with enclosure 24, which is an enclosure of the type shown in Figure 3 having an additional first aperture 28. The third aperture 46 is aligned with first aperture 28 and fixing means 42 is engaged by means of thread 42 with the thread in first aperture 28. Electrical cables are able to pass through conduit 22 through second aperture 36, third aperture 46, first aperture 28 and a fourth aperture (not shown) extending through fixing means 42.

It will be appreciate by persons skilled in the art that the embodiment has been described by way of example only, and not in any limitative sense, and that various alterations and modifications are possible without departure from the scope of the invention as defined by the appended claims.
Claims

1. A device for connecting a length of conduit to an object having a first surface with a first aperture extending therethrough, the first surface having a substantially planar area around said first aperture, the plane of said area not being perpendicular to the axis of a portion of the conduit adjacent a junction between the device and the conduit, the device comprising:

   a conduit receiving portion having a second aperture extending therethrough and adapted to receive an end of a conduit; and

   a surface engaging portion extending from said conduit receiving portion and having a substantially planar second surface for engaging said substantially planar area and having a third aperture extending therethrough, the surface engaging portion being adapted to engage a fixing means engaging said device from an opposite side of said first surface to secure the device to the object, such that an axis of the end of the conduit received in said conduit receiving portion is not perpendicular to said second surface.

2. A device according to claim 1, wherein said surface engaging portion engages said fixing means by means of respective mutually engaging threads on an external surface of said fixing means and an internal surface of said third aperture.

3. A device according to either claim 1 or 2, wherein said conduit receiving portion receives said end of the conduit in use by means of a self tapping thread on an internal surface of said second aperture.
4. A device according to any one of the preceding claims the respective threads in said second and third apertures are linked as a single thread.

5. A device for connecting a length of conduit to an object substantially as hereinbefore described with reference to Figure 4 of the accompanying drawing.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

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<th>IPC</th>
<th>F16L41/00</th>
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According to International Patent Classification (IPC) or to both national classification and IPC.

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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* Further documents are listed in the continuation of box C.

**X** Patent family members are listed in annex.

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**Date of the actual completion of the international search**

25 June 2002

**Date of mailing of the international search report**

04/07/2002

**Form PCT/ISA/01 (second sheet) (July 1992)**
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