(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number : **0 683 544 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number : **95303252.1**

(22) Date of filing : **16.05.95**

(51) Int. Cl.[6] : **H01R 4/64**

(30) Priority : **18.05.94 GB 9409878**

(43) Date of publication of application :
22.11.95 Bulletin 95/47

(84) Designated Contracting States :
AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL PT SE

(71) Applicant : **HAWKE CABLE GLANDS LIMITED**
Leighswood Road,
Aldridge
Walsall, West Midlands WS9 8DS (GB)

(72) Inventor : **Hand, Edward**
141 Mottram Road
Stalybridge, Cheshire, SK15 2QU (GB)

(74) Representative : **Knowles, Audrey Elizabeth**
624 Pershore Road
Selly Park Birmingham B29 7HG (GB)

(54) Earth bonding device.

(57) A device (1) for grounding an insulated cable (3) having the insulation (10) removed at a location to expose a conductor (2), the device (1) comprising a bush (4) through which the cable (3) can extend at the location, a connector (5) for making electrical contact with the exposed conductor (2) between opposite ends of the bush (4) and being accessible externally of the bush (4) for connection to ground, and a clamp (6) for compressing the bush (4) for sealing engagement with the insulation (10) at opposite ends of the bush (4).

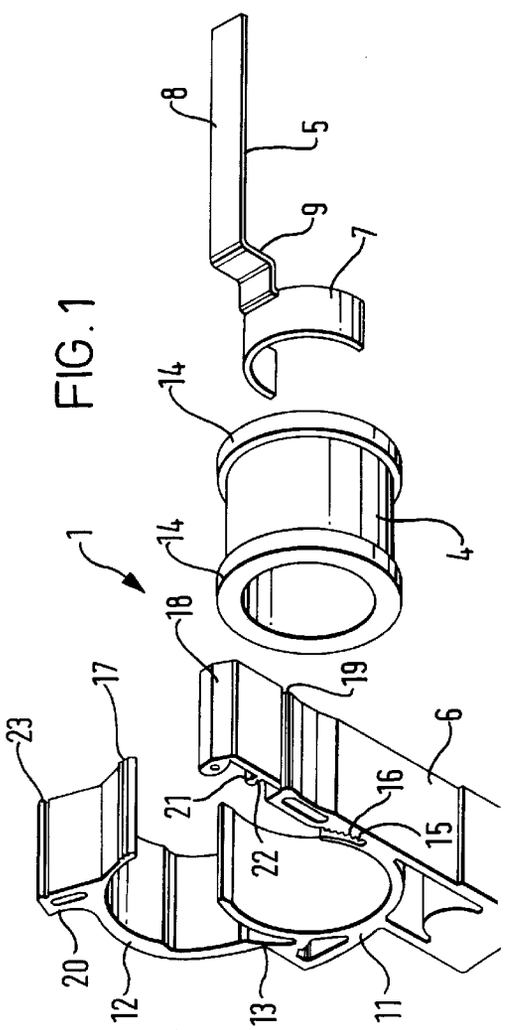

FIG. 1

EP 0 683 544 A2

This invention relates to earth bonding devices for coaxial cables, waveguides and the like. More particularly, the invention is concerned with a device for providing an earth connection between the outer conductor of coaxial cable and an earth conductor, for example to establish a lightening path to earth for an antenna.

An earth connection is generally required at the top of the cable close to the antenna and at the bottom of the cable where it enters a building. For some installations additional earth connections may also be required between the top and bottom of the cable. Typically, for long cable runs, an earth connection may be provided every 50 feet along the run.

Hitherto it has been the usual practice to use an earth strap wrapped around the outer conductor and connected to the earth conductor by an earth wire to provide the earth connection. For this the outer insulation of the coaxial cable is removed to expose the outer conductor and the connection to the outer conductor is sealed by wrapping butyl tape followed by electrical tape around the entire connection.

Wrapping the connection with butyl tape and electrical tape is laborious and often has to be done in difficult conditions requiring considerable care to ensure an adequate seal is obtained. This increases the time for installation of an antenna, especially where several earth connections are required. In addition, the presence of the tape hinders inspection of the condition of the connection for maintenance or safety checks.

The present invention has been made from a consideration of this problem.

According to the present invention an earth bonding device for a cable having a conductor covered by insulation such as a coaxial cable, waveguide and the like comprises a bush of electrically insulating material for surrounding the cable at a location where the insulation has been removed to expose the conductor between opposite ends of the bush, a connector of electrically conductive material for making electrical contact with the exposed conductor and accessible externally of the bush for connection to an earth conductor, and means for compressing the bush for sealing engagement with the insulation on either side of the exposed conductor.

Preferably, the connector has a resilient contact portion sized to fit the exposed conductor of the cable to which the device is fitted, for example by a snap or push fit of the contact portion on the conductor.

Advantageously, the connector has an attachment portion that extends generally parallel to and is radially spaced from the cable to which the device is fitted.

In a preferred construction, the attachment portion extends from one end of the bush.

Preferably, the bush has an axially extending radial slit for insertion of the cable to which the device is fitted.

Advantageously, the compression means comprises an annular clamp arranged to surround the bush.

Preferably, the clamp comprises a first part having a seating for the bush, a second part for closing the clamp around the bush to compress radially the bush, and a third part for securing the first and second parts to maintain the compression of the bush.

Advantageously, the second and third parts are connected to the first part by respective integral hinges.

Preferably, the bush has formations for axially locating the clamp between the ends of the bush.

According to another aspect of the invention a device for grounding an insulated cable at a location where the insulation is removed to expose a conductor comprises a bush of electrically insulating material through which the cable can extend at the location with the exposed conductor located between opposite ends of the bush, a connector of electrically conductive material for making electrical contact with the exposed conductor within the bush and accessible externally of the bush for connection to ground, and means for compressing the bush for sealing engagement with the insulation at opposite ends of the bush.

Other features, benefits and advantages of the invention will be understood from the following description of an exemplary embodiment with reference to the accompanying drawings.

FIGURE 1 is an exploded isometric view of the component parts of an earth bonding device according to the present invention; and

FIGURE 2 shows, partly in section, the device of Figure 1 fitted to a coaxial cable.

With reference to the drawings, an earth bonding device 1 for an outer conductor 2 of a coaxial cable 3 comprises a tubular bush 4, a connector 5 and a clamp 6.

The bush 4 is made of resilient electrically insulating material such as rubber and has a cylindrical through bore sized to match the outer diameter of the cable 3 with an axially extending radial slit (not shown) in the wall so that the bush 4 can be pulled open to fit over the cable 3.

The connector 5 is made of electrically conductive material such as copper and has a contact portion 7 for making electrical contact with the outer conductor 2 of the cable 3 and an attachment portion 8 for connection to an earth conductor (not shown), for example to establish a lightening path to earth for an antenna connected to the cable 3.

The connector 5 is moulded into the bush 4 so that the contact portion 7 is located within the bush 4 and the attachment portion 8 extends outwardly at one end of the bush 4.

The contact portion 7 is of semi-circular shape sized to fit the outer conductor 2 and may be resilient

so that the connector 5 can be sprung onto the outer conductor 2 at a location where the outer insulation 10 of the cable 3 has been removed to establish a good contact.

The attachment portion 8 is cranked at 9 so as to extend parallel to and radially spaced from the outer insulation 10 of the cable 3 for the major part of its length to facilitate connection to the earth conductor by an earth wire (not shown).

The clamp 6 is a one piece moulding of non-conducting plastics material and has a main body 11 connected to a closure strap 12 by an integral flexible hinge 13 so that the clamp 6 can fit over the cylindrical body of the bush 4 between external flanges 14 at opposite ends of the bush 4.

The body 11 has a recess 15 with ratchet teeth 16 to receive the end of the strap 12 remote from the hinge 13 to close the clamp 6 around the bush 4 to compress the bush 4 radially inwards for sealing engagement at opposite ends with the outer insulation 10 of the cable 3 on either side of the outer conductor 2.

The strap 12 is formed with ratchet teeth 17 that co-operate with the ratchet teeth 16 in the recess 15 to retain the strap 12 on tightening the clamp 6 to compress the bush 4.

The closure strap 12 is secured by a retainer flap 18 connected to the body 11 by an integral flexible hinge 19 so that the clamp 6 can be locked to maintain sealing engagement of the bush 4.

The retainer flap 18 fits over an external rib 20 on the closure strap 12 when the clamp 6 is closed and is fastened by snap engagement of an edge lip 21 of a flange 22 on the underside in a groove 23 on the side of the rib 20.

It will be realised from the foregoing description that the invention provides an earth bonding device for establishing an effective earth connection between the outer conductor of coaxial cable and an earth conductor that is reliably sealed by compression of the bush.

In this way, wrapping with butyl tape and electrical tape to seal the connection can be dispensed with so that installation is simplified, especially where several earth connections have to be made along the length of the cable, and the condition of the connection can be readily inspected by releasing the clamp for maintenance or safety checks.

It will be understood that the invention is not limited to the embodiment above-described.

For example, the device may be fitted to cables of circular, oval, elliptical or other cross-section by providing the bush with a through bore of matching cross-section.

The radial slit for fitting the bush over the cable may be omitted and the bush slid along the cable to the required position for making the earth connection.

The contact portion of the connector may be of different shape for making electrical contact with oval, elliptical or any other shape of conductor.

The attachment portion may be adapted for connection to the earth conductor by an earth wire or any other suitable means.

Any suitable means may be employed for compressing the bush to seal around the cable on either side of the outer conductor.

Claims

1. An earth bonding device (1) for a cable (3) having a conductor (2) covered by insulation (10) such as a coaxial cable, waveguide and the like characterised by a bush (4) of electrically insulating material for surrounding the cable (3) at a location where the insulation (10) has been removed to expose the conductor (2) between opposite ends of the bush (4), a connector (5) of electrically conductive material for making electrical contact with the exposed conductor (2) and accessible externally of the bush (4) for connection to an earth conductor, and means (6) for compressing the bush (4) for sealing engagement with the insulation (10) on either side of the exposed conductor (2).

2. A device according to Claim 1 characterised in that the connector (5) has a resilient contact portion (7) sized to fit the conductor (2) of the cable (3) to which the device (1) is fitted, for example by a snap or push fit of the contact portion (7) on the conductor (2).

3. A device according to Claim 1 or Claim 2 characterised in that the connector (5) has an attachment portion (8) that extends generally parallel to and is radially spaced from the cable (3) to which the device (1) is fitted.

4. A device according to any one of the preceding Claims characterised in that the attachment portion (8) extends from one end of the bush (4).

5. A device according to any one of the preceding Claims characterised in that the bush (4) has an axially extending radial slit for insertion of the cable (3) to which the device (1) is fitted.

6. A device according to any one of the preceding Claims characterised in that the compression means (6) comprises an annular clamp (6) arranged to surround the bush (4).

7. A device according to Claim 6 characterised in that the clamp (6) comprises a first part (11) having a seating for the bush (4), a second part (12) for closing the clamp (6) around the bush (4) to

compress radially the bush (4), and a third part (18) for securing the first and second parts (11,12) to maintain the compression of the bush (4).

8. A device according to Claim 7 characterised in that the second and third parts (12,18) are connected to the first part (11) by respective integral hinges (13,19).

9. A device according to any one of Claims 6 to 8 characterised in that the bush (4) has formations (14) for axially locating the clamp (6) between the ends of the bush (4).

10. A device (1) for grounding an insulated cable (3) at a location where the insulation (10) is removed to expose a conductor (2), the device (1) comprising a bush (4) of electrically insulating material through which the cable (3) can extend at the location with the exposed conductor (2) located between opposite ends of the bush (4), a connector (5) of electrically conductive material for making electrical contact with the exposed conductor (2) within the bush (4) and accessible externally of the bush (4) for connection to ground, and means (6) for compressing the bush (4) for sealing engagement with the insulation (10) at opposite ends of the bush (4).

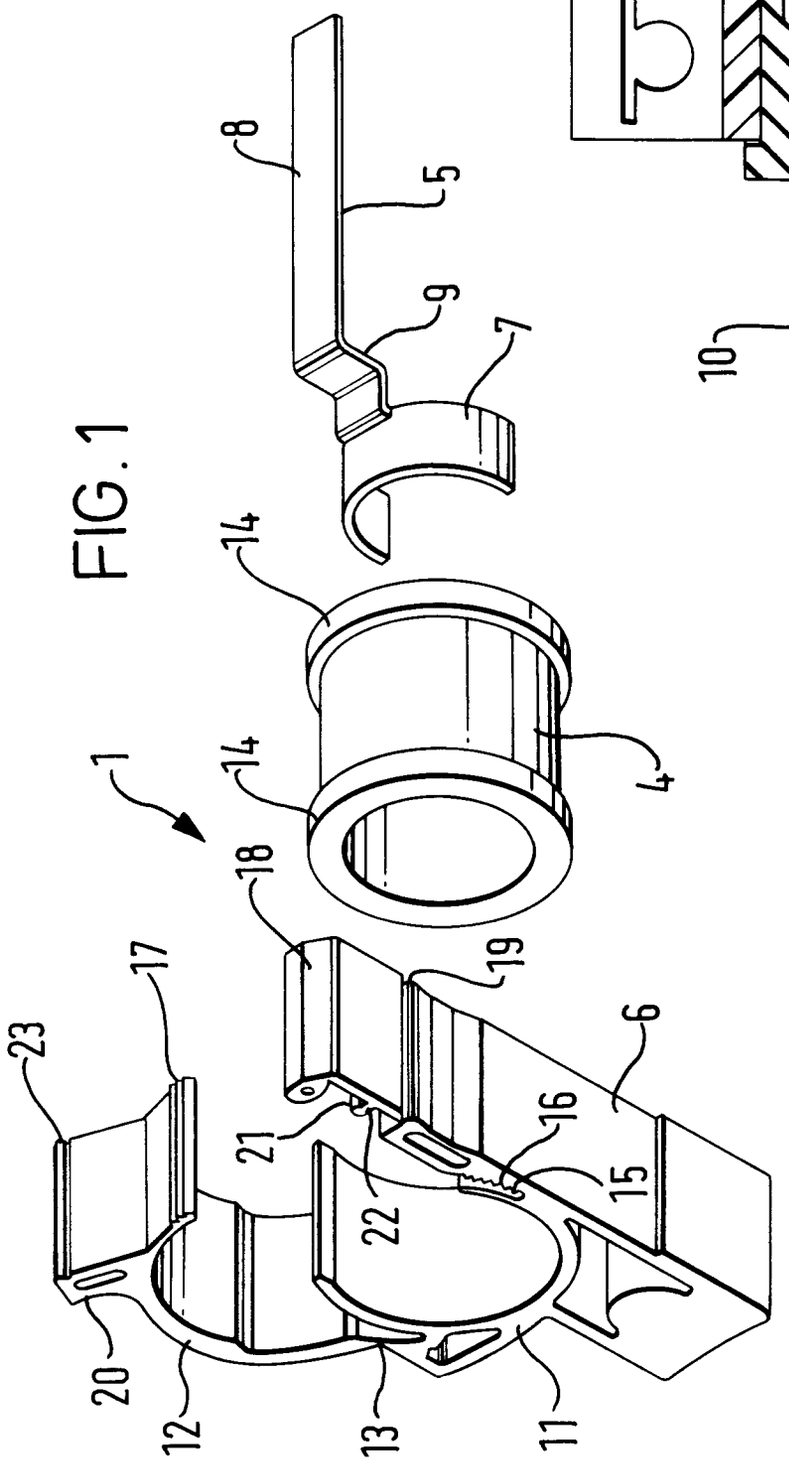

FIG. 1

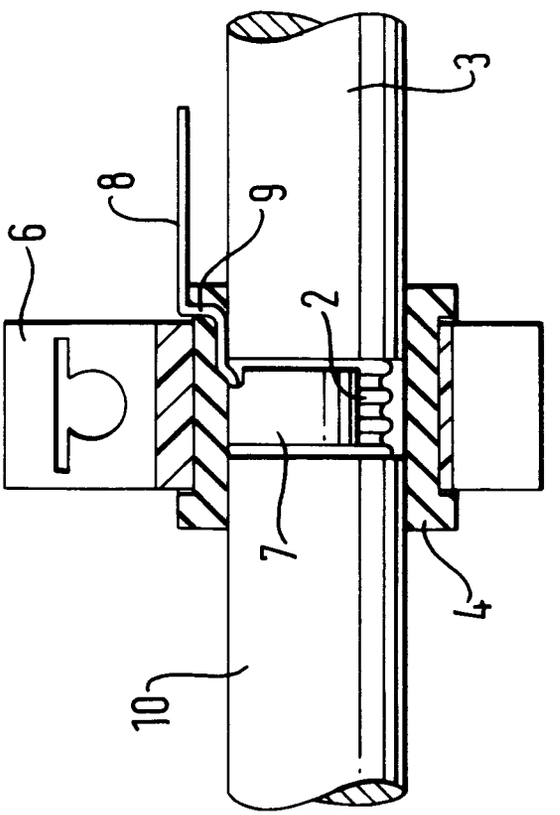

FIG. 2