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(71) Applicant: **Technetix PLC**
Henfield, West Sussex, BN5 9BJ (GB)

(72) Inventor: **Chapman, Paul, c/o Technetix PLC**
Hurstpierpoint Rd, Henfield, BN5 9BJ (GB)

(74) Representative: **Forsyth, Helen Jane**
Keith W Nash & Co,
90-92 Regent Street
Cambridge CB2 1DP (GB)

(54) Cable connection device

(57) There is provided a cable connection device (20) comprising an electrical output (34) and a connector (26) rotatable between a first position and a second position spaced at approximately 90° to each other so as to allow a cable to be secured to the connector in either the first or second position. This allows the connection device (20) to be used to secure cables that run either parallel or perpendicular to a surface on which the connection device is mounted whilst maintaining the integrity of electrical screening associated with the cable. The cable connection device (20) comprises a body into which the connector (26) is press fitted, a conductor (40) passing between the connector (26) and the output (34) to provide an electrical path within the device separate from any cable with which the device is used.

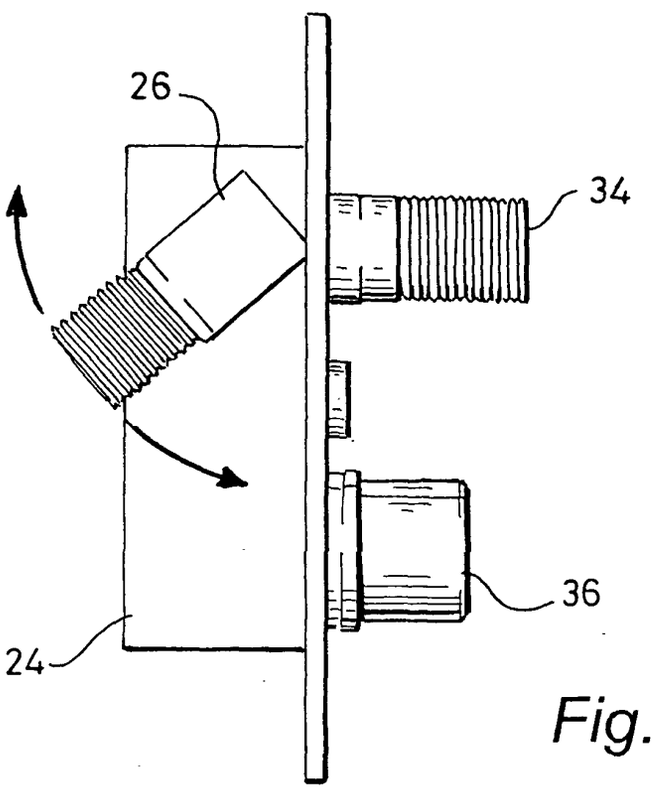

Fig. 5

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Description

Field of the invention

[0001] The invention relates to cable connection devices used to connect equipment in Cable TV subscriber's dwellings to a Cable TV (CATV) provider's network.

Background to the invention

[0002] For the connection of CATV subscribers to a CATV network, cable connection devices are used at the interface between a coaxial cable connected to the network and the subscriber's dwelling.

[0003] Conventional CATV outlets are positioned inside a subscriber's dwelling, either mounted on the surface of a wall in a small surface box or embedded within a wall to be flush with a wall surface. Where a cable comes through the wall, the outlet is positioned over a hole through which the cable passes to allow connection to the subscriber's equipment. The standard hole size used across continental Europe is 60mm.

[0004] As the input coaxial cable approaches the outlet, it either travels along the wall parallel to the surface or comes through the wall perpendicular to the surface. The cable is then connected to the outlet by one of two methods:

1. The cable insulation is stripped back, the exposed parts of the cable are inserted into a socket on the outlet and clamped in place with a metal plate.
2. The cable is terminated with a connector (normally "F-Type") and is mated with a connector on the outlet body.

[0005] Method 1 does not provide good electromagnetic screening. Method 2 provides good screening but takes up more space.

[0006] The input connector on a conventional outlet device is mounted parallel to the wall surface. When the outlet device is mounted over a 60mm hole with the cable coming through the wall, the cable has to be bent through 90° before it can be connected to the outlet connector. This involves the cable being bent with a bend radius less than the recommended minimum for normal coaxial cable, so distorting the outer conductor of the cable and impairing the electromagnetic screening provided by the outer conductor.

[0007] It is an aim of the present invention to provide a cable connection device which overcomes problems associated with prior art connection devices.

Summary of the invention

[0008] In accordance with the present invention, there is provided a cable connection device comprising an electrical output and a connector for securing a cable in electrical communication with the output, wherein the connector is rotatable between a first position and a second position thereby to allow a cable to be secured to the connector in either the first or the second position. This allows the connection device to be used to secure cables that run either parallel or perpendicular to a surface on which the connection device is mounted whilst maintaining the integrity of electrical screening associated with the cable. Thus by having a rotatable connector, there is no need to exceed the minimum bend radius of the cable to achieve electrical communication between the cable and the output.

[0009] Preferably the first position and the second position are spaced at approximately 90° to each other although they can be spaced at an angle which represents the minimum bend radius of the cable.

[0010] Preferably the output extends in a primary direction, with the connector having an axis running parallel to the primary direction when in the second position and an axis perpendicular to the primary direction when in the first position.

[0011] By using a rotatable connector, the same connection device can be used for situations in which cables run either parallel or perpendicular to a surface. This reduces the types of parts that an engineer needs to carry when installing connections such as those required for cable television or satellite television networks.

[0012] The cable connection device may further comprise a body into which the connector is press fitted, a conductor passing between the connector and the output, the conductor remaining in engagement with both the output and the connector upon rotation of the connector. The conductor ensures an electrical path is provided within the device separate from any cable with which the device is used.

[0013] Preferably the conductor communicates with a resiliently biased contact capable of engaging with electrical circuitry associated with the output. The resiliently biased contact ensures that electrical communication is maintained between the conductor and the output at the first position, the second position, and any position intermediate thereof.

[0014] The cable connection device may be provided with integral signal filtering circuitry and/or over-voltage protection circuitry.

[0015] The invention will now be described, by way of example, with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a prior art wall outlet with an "F" connector input;
Figure 2 is a view from one side of the prior art wall outlet of Figure 1 when positioned on a wall;
Figure 3 is a perspective view of a cable connection device in accordance with the present invention;
Figure 4 shows a perspective view from one side of the connection device;
Figure 5 shows a side view of the connection de-

vice;

Figure 6 shows an exploded view of part of the device illustrating assembly of a rotating connector; and

Figure 7 shows a detailed view of part of the device illustrating connection of the connector to electrical circuitry within the device.

Description

[0016] With the introduction of digital TV and broadband services, cable providers have become concerned about electromagnetic screening. To ensure good electromagnetic screening, cable service providers are using "F" connectors on the input of the wall outlets. This in turn introduces the problem of damaged cable when these devices are used in through wall applications, and negates any improvement in electromagnetic screening introduced by the connector.

[0017] Figures 1 and 2 show a conventional wall outlet 10 positioned on the inner surface 12 of a subscriber's wall with an "F" connector input 14 where the outlet is to receive a coaxial cable 16 passing through a 60mm hole in the wall. The minimum internal bend radius of the CATV coaxial cable is 3 x cable diameter. The minimum cable diameter used for these applications is 7mm. Therefore the minimum internal bend radius is 21mm.

[0018] Figure 2 shows the input cable 16 bent with an internal radius of 21mm. It will not fit within the 60mm hole and also connect to input 14. Thus in practice, to join with the outlet 10, the cable 16 must be bent through a smaller radius than the minimum bend radius. This distorts the outer sheathing of the coaxial cable and impairs the electromagnetic screening provided by the conductive sheathing.

[0019] There is therefore an application for a wall outlet with connectors that provide good electromagnetic screening and can be used for both surface mount and through wall applications.

[0020] An example of a cable connection device in accordance with the invention is shown in Figures 3 to 7.

[0021] The cable connection device 20 shown in Figure 3 comprises a body 22 moulded from plastics material which incorporates wall outlet housing 24 to which a rotatable connector body 26 is pivotally attached. A rotating female "F" connector 30 within body 26 is capable of receiving a male "F" connector attached to a coaxial cable 16 from the CATV network. Figure 3 illustrates the rotatable connector 26 in a first position where it receives a cable 16 running parallel to the wall surface. Figure 4 illustrates the same connection device when the rotatable connector 26 is in a second position substantially at right angles to the first position and substantially parallel to the direction in which output 34 extends. In this position the connector receives a cable running through a subscriber's wall from the outside to internal surface 12. The moulded front face 32 of the device is also shown in Figure 4, the fixed output connectors 34 and 36 being the only part of the device to which the subscriber has ready access for attaching cables associated with their home television equipment.

[0022] Figure 5 illustrates the rotatable connector 26 at a position intermediate the first position and the second position as it is adjusted to the position required for the cable configuration in that application, i.e. whether the cable runs parallel or perpendicular to the wall surface. This rotary connection for coaxial cables can be moved through 90° whilst maintaining good electromagnetic screening. This enables the outlet device to be either surface box mounted on a wall and connected to an input cable running parallel to the wall surface or flush mounted and connected to an input cable coming through the wall without the necessity of having to bend the cable.

[0023] Detailed internal assembly of that part of the device incorporating the rotating connector 26 can be seen in Figure 6. The female connector insert 30 held within connector body 26 is in permanent electrical communication with a printed circuit board held within housing 24. This is achieved by means of centre conductor 40 which extends from the female connector insert 30 to pass through a link cylinder 42. This cylinder 42 is secured over aperture 50 of the housing 24 so that the centre conductor 40 engages with spring contact insert 44 within the housing.

[0024] The spring contact insert 44 communicates with a printed circuit board connection cylinder 46 in electrical communication with the printed circuit board (PCB) 48. The printed circuit board 48 is the interface between the fixed output connectors 34, 36, which are accessible by the subscriber, and the input signal received from the network. As the connector moves between the first position and the second position, the spring contact insert 44 adjusts its position to maintain connection with the centre conductor 40 and so enables the connector to be positioned at any angle whilst maintaining a screened electrical connection.

[0025] A perspective view of the various integers shown in Figure 6 can be seen in Figure 7.

[0026] To assemble the device, the "female" connector insert 30 is press fitted into the connector body 26 with the centre conductor 40 passing out through the centre of a hole in the side of the connector body.

[0027] The link cylinder 42 is then stamped (press fitted) into the connector body 26 to form a permanent joint.

[0028] A "Tulip spring" insert 44 is fitted into PCB connection cylinder 46 and this assembly fixed to a PCB by means of soldered wire links, see Figure 7. This assembly is the same as that used for the centre connections in the "F-type" female connector above. Other types of "F-type" connector centre connections could be used.

[0029] The PCB 48 is fitted in the wall outlet housing 24 with the PCB connection cylinder 46 lining up with the centre of input connector hole 50.

[0030] Finally the input port assembly (i.e. link cylinder 41, centre conductor 40, connector body 26 and connector insert 30) is partially inserted through the hole 50 in the housing wall with a crinkle or domed spring washer 52 between the link cylinder 42 and the wall 24. Alternatively a rubber o-ring may be used instead of the washer. The centre conductor 40 is located in the PCB connection cylinder 46 and the assembly is secured with a circlip 54 located in a groove within the link cylinder 42.

[0031] Over-voltage protection and/or signal filtering circuitry may incorporated in the device.

[0032] The use of a rotatable connector 26 ensures that a single type of connection device can be used to accommodate cables either running parallel or perpendicular to a surface. This reduces the different types of connection device that an engineer needs to carry. The connection device can be used in any suitable radio frequency application where different direction cables need to be accommodated.

Claims

1. A cable connection device comprising an electrical output and a connector for securing a cable in electrical communication with the output, **characterised in that** the connector is rotatable between a first position and a second position thereby to allow a cable to be secured to the connector in either the first or the second position.

2. A cable connection device according to claim 1, wherein the first position and the second position are spaced at approximately 90° to each other.

3. A cable connection device according to claim 1, wherein the first position and the second position are spaced at an angle which represents the minimum bend radius of the cable.

4. A cable connection device according to any of the preceding claims, wherein the output extends in a primary direction, with the connector having an axis running parallel to the primary direction when in the second position and an axis perpendicular to the primary direction when in the first position.

5. A cable connection device according to any of the preceding claims, wherein the cable connection device further comprises a body into which the connector is press fitted, a conductor passing between the connector and the output, the conductor remaining in engagement with both the output and the connector upon rotation of the connector.

6. A cable connection device according to any of the preceding claims, wherein the conductor communicates with a resiliently biased contact capable of engaging with electrical circuitry associated with the output.

7. A cable connection device according to any of the preceding claims, wherein the cable connection device is provided with integral signal filtering circuitry and/or over-voltage protection circuitry.

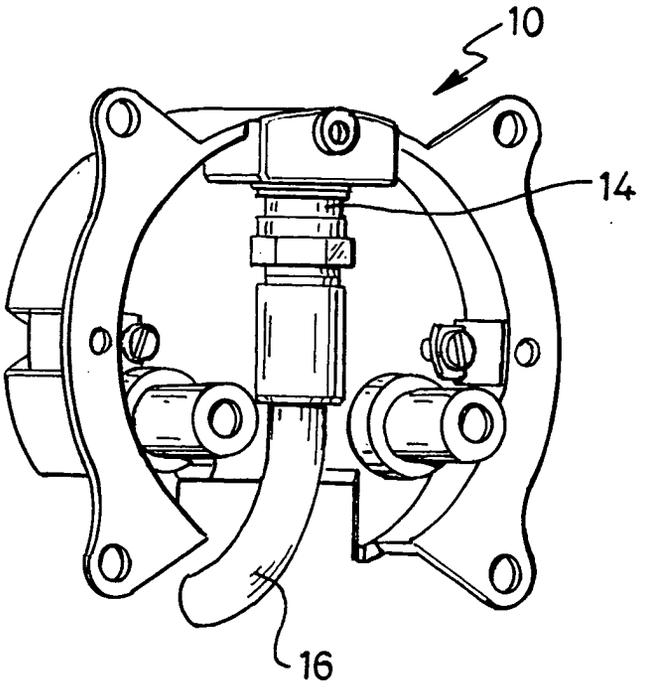

Fig. 1

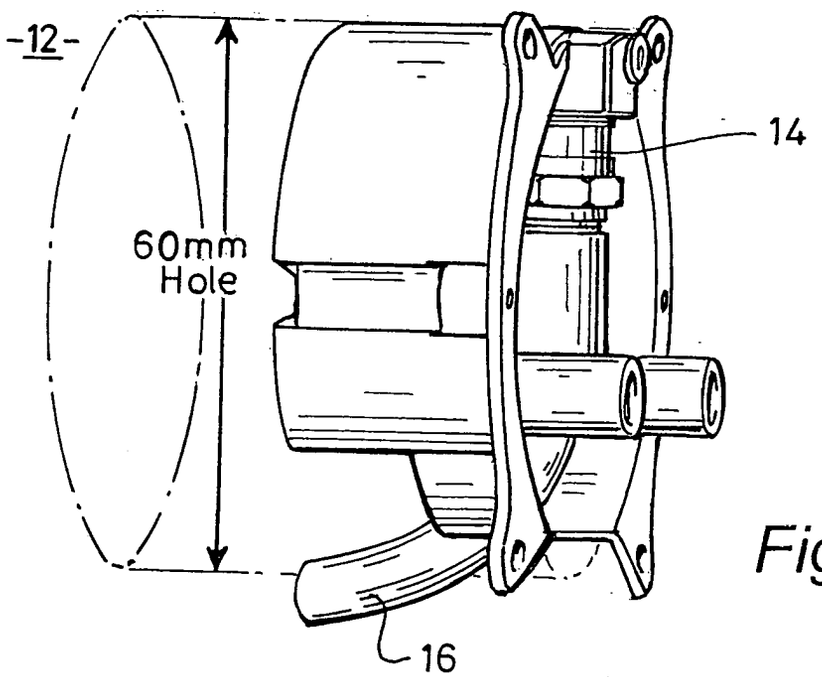

Fig. 2

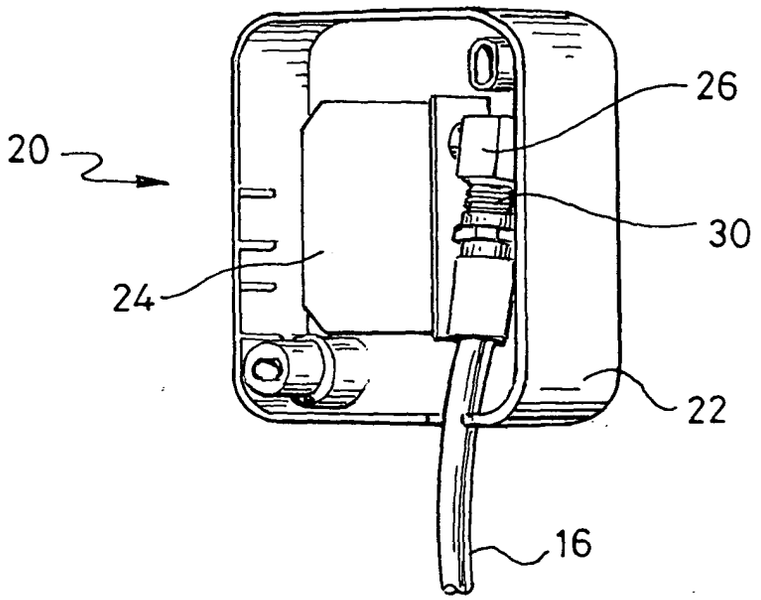

Fig. 3

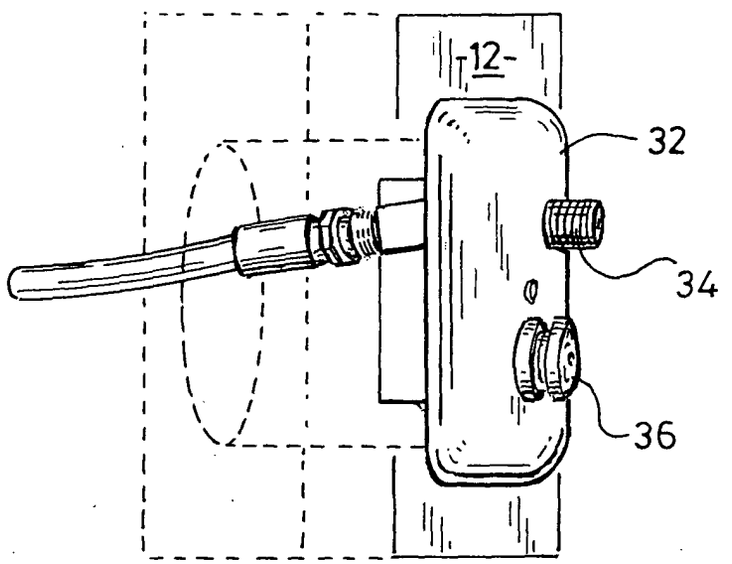

Fig. 4

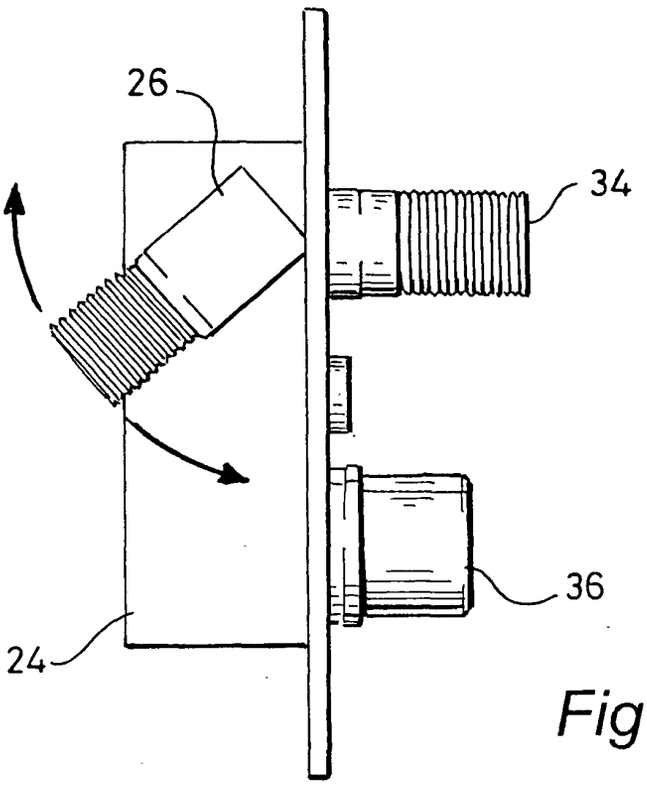

Fig. 5

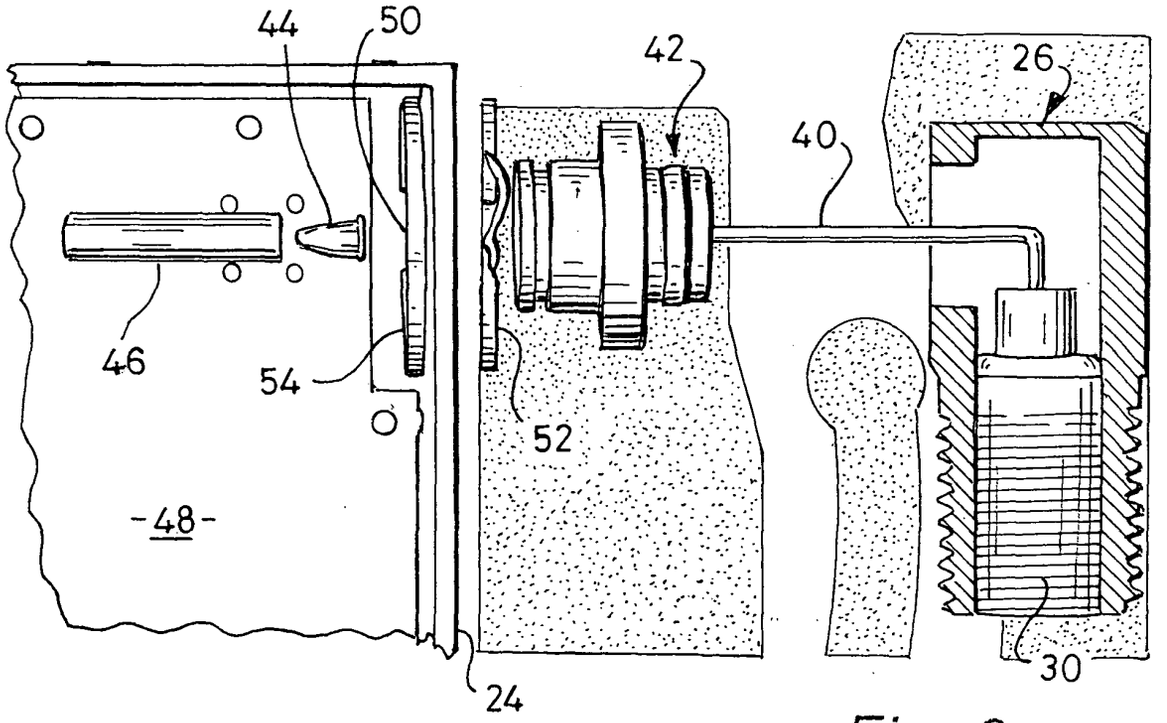

Fig. 6

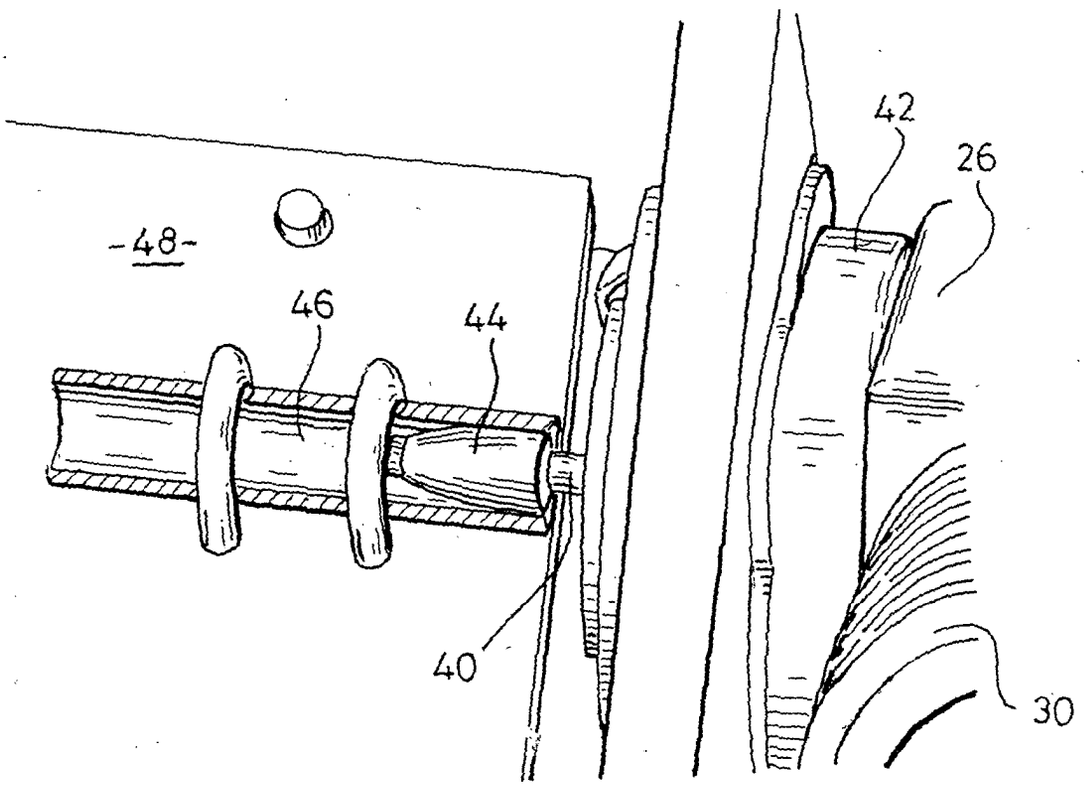

Fig. 7

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EUROPEAN SEARCH REPORT

Application Number
EP 04 25 1690

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 198 29 653 A (KATHREIN WERKE KG) 20 January 2000 (2000-01-20) * column 3, line 34 - column 4, line 61; figures 3,4 *	1-4	H01R13/646
A	US 5 002 502 A (HILL ROBERT D) 26 March 1991 (1991-03-26) * column 2, line 31 - column 3, line 42; figures 1,2 *	1-7	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

H01R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Berlin	27 August 2004	Stirn, J-P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 25 1690

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27-08-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 19829653 A	20-01-2000	DE 19829653 A1	20-01-2000
US 5002502 A	26-03-1991	NONE	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82