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(54) **A system for connecting an electric power supply cable to a domestic appliance**

(57) A system for connecting an electric power supply cable (10) to a domestic appliance includes a first connector member (14) fixed to the appliance so as to be accessible from the outside and connected electrically to the internal electrical circuit of the appliance and a second connector member (16) fixed to one end of the

cable (10). The first and second connector members (14, 16) can be coupled together so as to ensure electrical continuity between the cable (10) and the internal electrical circuit of the appliance and have retaining means for holding them together once they are coupled and for preventing them from becoming detached as a result of manual attempts at separation.

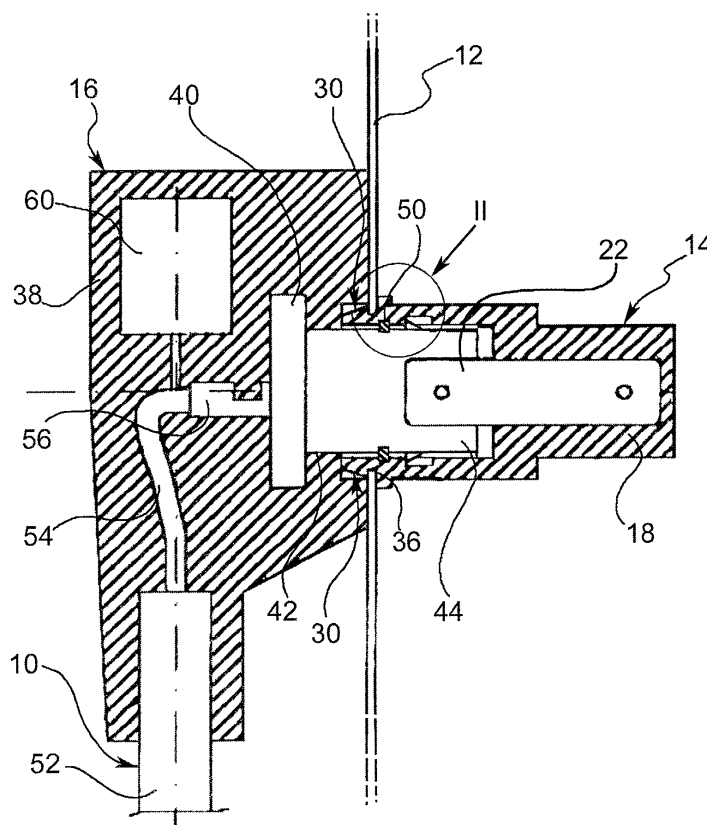


Fig.1

Description

[0001] The present invention relates to a system for connecting an electric power supply cable to a domestic appliance.

[0002] In the prior art, domestic appliances are connected to an associated electric power supply cable during the manufacturing process. The cable is then fixed to the outside of the casing of the domestic appliance, typically by means of a special clip, so that particular protective packaging is required. This increases the space taken up by the appliance, thereby creating additional problems when moving the item within its production site and transporting it to a sales outlet and to its final place of use.

[0003] The object of the present invention is make it possible to connect an electric power supply cable to a domestic appliance overcoming the above-indicated disadvantages of the prior art.

[0004] According to the present invention this object is achieved by a system for connecting an electric power supply cable to a domestic appliance, which includes a first connector member fixed to the said domestic appliance in such a way that it is accessible from the outside and connected electrically to the electrical circuit inside the appliance, and a second connector member fixed to one end of the said cable, the said first and second connector members being connectable together to ensure electrical continuity between the electric power supply cable and the electrical circuit inside the appliance and having retaining means for holding them together once they are coupled and for preventing them from being separated as a result of forces exerted manually.

[0005] Thanks to the system of the invention, the final connection between the electric power cable and the domestic appliance can be deferred until the apparatus is in its final place of use. This means that the domestic appliance and the associated cable can be kept separately, in individual packaging, during the various manufacturing steps and during the process of retailing the appliance and delivering it to a customer, thereby simplifying material logistics and the production flows.

[0006] At the end of the production line, it is advantageous if the separately packaged cable can be stored in a cavity in the appliance, ensuring that the two are kept together, without taking up more space or requiring special clips.

[0007] In addition, the connection system of the invention offers the advantage of making it possible to test the appliance automatically which is provided of the first connector member. The appliance can be connected temporarily to the terminals of a test power supply having a connector mating with the first connector member, so that its operation can be checked very quickly.

[0008] As stated above, once coupled together, the first and second connector members will not become disengaged as a result of manual forces. Should separation be necessary, they can be separated by using a

special mechanical tool.

[0009] A further subject of the present invention is constituted by a domestic appliance which includes a first connector member of a connection system of the type described above.

[0010] An additional subject of the present invention is constituted by an electric power supply cable which includes a second connector member of a connection system of the type described above.

[0011] Further characteristics and advantages of the present invention will become apparent from the detailed description which follows, provided purely by way of non-limitative example with reference to the appended drawings, in which:

Figure 1 is a sectioned view of the connection system of the invention with the first and second connector members in a coupled configuration;

Figure 2 is an enlarged scale view of a detail of Figure 1,

Figure 3 is a plan view of the first connector member of the system of Figure 1,

Figure 4 is a front view of the first connector member of Figure 3,

Figure 5 is a section taken on the line V-V of Figure 3,

Figure 6 is a plan view of the second connector member of the system of Figure 1,

Figure 7 is a front view of the second connector member of Figure 6, and

Figure 8 is a section taken on the line VIII-VIII of Figure 6.

[0012] A system for connecting an electric power supply cable 10 to a domestic appliance - of which for the sake of simplicity Figure 1 shows only a portion of the casing wall 12 - includes a first connector member 14 fixed to the wall 12 of the domestic appliance and a second connector member 16 fixed to one end of the cable 10.

[0013] The first connector member 14 includes (see Figures 3-5) a body 18 with a cavity 20 open to the outside and with blade pins 22 protruding therein which are electrically connected in a conventional manner to the internal electrical circuit of the domestic appliance.

[0014] The cavity 20 is substantially rectangular in shape with first and second notches 24 in two opposite walls respectively and a continuous groove 26 formed in a plane substantially parallel to the mouth 28 of the cavity 20.

[0015] Outside the mouth 28, the body 18 has first and second projections 30 facing each other and each having a surface 32 inclined towards the mouth 28 and terminating in a groove 34 parallel to the mouth 28.

[0016] Thanks to the inclined surfaces 32 and the grooves 34, the first connector member 14 can be snap engaged (Figure 1) in an appropriately shaped opening 36 in the wall 12 of the domestic appliance.

[0017] The second connector member 16 includes (Figures 6-8) a body 38 in which is embedded the base 40 of an extension 42 having a projecting portion 44 of a substantially rectangular shape complementary to that of the cavity 20 in the first connector member 14 and having first and second wedge-shaped formations 46 on two respective opposite surfaces. A continuous groove 48 is also formed in the outer surface of the projecting portion 44, with a sealing ring 50 housed therein as shown in Figure 1.

[0018] Also embedded in the body 38 is one end of an electricity cable 52 with wires 54 with electrical terminals 56 protruding therefrom and connected to hollow seats 58 formed in the extension 42, as well as a filter 60 connected to the wires 54.

[0019] In dependence on the requirements of each application, the filter 60 can include various resistor, capacitor or inductor components, thereby being operable to eliminate any electromagnetic disturbances originating either from the power network or from the appliance. In alternative embodiments of the invention, not shown in the drawings, the filter 60 could also be associated with the first connector member 14 instead of the second member 16.

[0020] In order to couple together the connectors 14, 16, and thus the cable 10 to the domestic appliance, one need only (see Figures 1-2) insert the projecting portion 44 of the extension 42 of the second member 16 into the complementary cavity 20 in the first member 14, taking advantage of the resilience of the walls of the latter, until the wedge-shaped formations 46 engage the respective notches 24. The wedge-shaped formations 46 and the notches 24 act as retaining means, holding the members 14 and 16 together once they are coupled and preventing them from becoming separated during manual attempts at separation, thereby avoiding undesired tampering. This separation can however be effected by using a suitable mechanical tool so as to allow, for example, the performance of maintenance operations or replacement of the cable 10 by specialist technical personnel.

[0021] In the coupled configuration, the blade pins 22 of the first connector 14 penetrate into the hollow seats 58 formed in the extension 42 of the second member 16, thereby ensuring electrical continuity between the electric supply cable 10 and the internal electrical circuit of the domestic appliance. Meanwhile, the seal 50 is housed in the two facing grooves 26, 48, thereby preventing moisture from entering the cavity 20. In addition, the front surface of the member 16 is in contact with the wall 12 and has cavities for housing the projections 30 of the body 18 of the connector 14, thus making sure that the connection is watertight.

[0022] It is advantageous if the members 14, 16 are connected only at the site where the domestic appliance is to be installed. This gives the advantage of keeping the appliance and the cable 10 separate during the production cycle and during transport, storage and delivery

to a customer, thereby simplifying the logistics of these operations.

[0023] Naturally, the principle of the invention remaining unchanged, embodiments and manufacturing details may vary widely from those described and illustrated purely by way of non-limitative example, without departing thereby from the scope of the invention. For example, the shape of the connector members, and in particular of the retaining means, may vary at will, provided they can still engage with each other. Furthermore, an electronic interface, operable to exchange data with the control unit of the domestic appliance, could be integrated into one of the connectors.

Claims

1. A system for connecting an electric power supply cable (10) to a domestic appliance, which includes a first connector member (14) fixed to the said domestic appliance in such a way that it is accessible from the outside and connected electrically to the electrical circuit inside the appliance, and a second connector member (16) fixed to one end of the said cable (10), the said first and second connector members (14, 16) being connectable together to ensure electrical continuity between the electric power supply cable (10) and the electrical circuit inside the appliance and having retaining means for holding them together once they are coupled and for preventing them from being separated as a result of forces exerted manually.
2. A system according to Claim 1, in which the said first connector member (14) includes a body (18) having a cavity (20) open to the outside with blade pins (22) protruding therein which are connected electrically to the internal electrical circuit of the appliance, at least one notch (24) being formed in the walls of the said cavity (20).
3. A system according to Claim 2, in which, outside the mouth (28) of the cavity (20), the said body (18) has first and second projections (30) facing each other and having a surface (32) inclined towards the mouth (28) and terminating in a groove (34) parallel to the said mouth (28).
4. A system according to Claims 2 or 3, in which the shape of the said cavity (20) is substantially rectangular and it has first and second notches (24) in respective opposite walls.
5. A system according to any of Claims 2 to 4, in which a continuous groove (26), substantially parallel to the mouth (28) of the cavity (20), is formed in the inner wall of the said cavity (20).

6. A system according to any preceding Claim, in which a filter operable to eliminate electromagnetic disturbances is fitted in the body (18) of the first connector member (14).
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7. A system according to any Claim from 2 to 6, in which the said second connector member (16) includes a body (38) in which is embedded the base (40) of an extension (42) with a projecting portion (44) of a shape complementary to that of the cavity (20) of the first connector member (14) and having at least one wedge-shape formation (46) on its outer surface, for engaging in the said notch (24) in the cavity (20).
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8. A system according to Claim 7, in which the said projecting portion (44) is of a substantially rectangular shape and has first and second wedge-shape formations (46) on two respective opposite surfaces.
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9. A system according to Claim 7 or Claim 8, in which a continuous groove (48) is formed in the outer surface of the said projecting portion (44) for housing a seal (50).
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10. A system according to any of Claims 7 to 9, in which one end (52) of an electric power supply cable (10) is embedded in the body (38) of the second connector member (16) with wires (54) extending therefrom having electrical terminals (56) connected to hollow seats (58) in the said extension (42) and engageable with the said blade pins (22) of the first connector member (14).
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11. A system according to any of Claims 7 to 10, in which a filter (60), connected to the said wires (54) and operable to eliminate electromagnetic disturbance, is embedded in the body (38) of the second connector member (16).
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12. A system according to any preceding Claim, in which one of the said connector members (14, 16) has an integrated electronic interface.
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13. A domestic appliance which includes a first connector member (14) of a connection system according to any preceding Claim.
14. An electric supply cable (10) which includes a second connector member (16) of a connection system according to any of Claims from 1 to 12.
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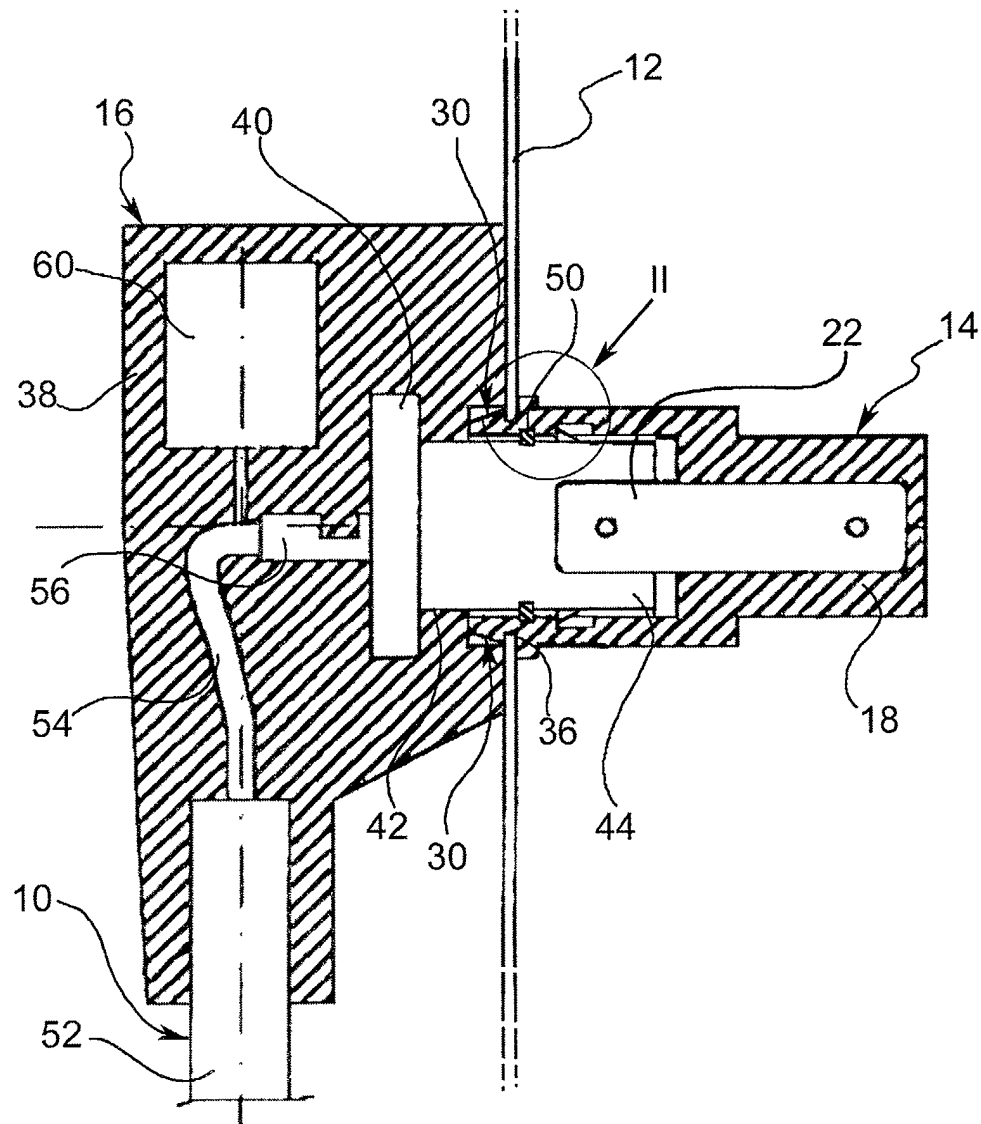
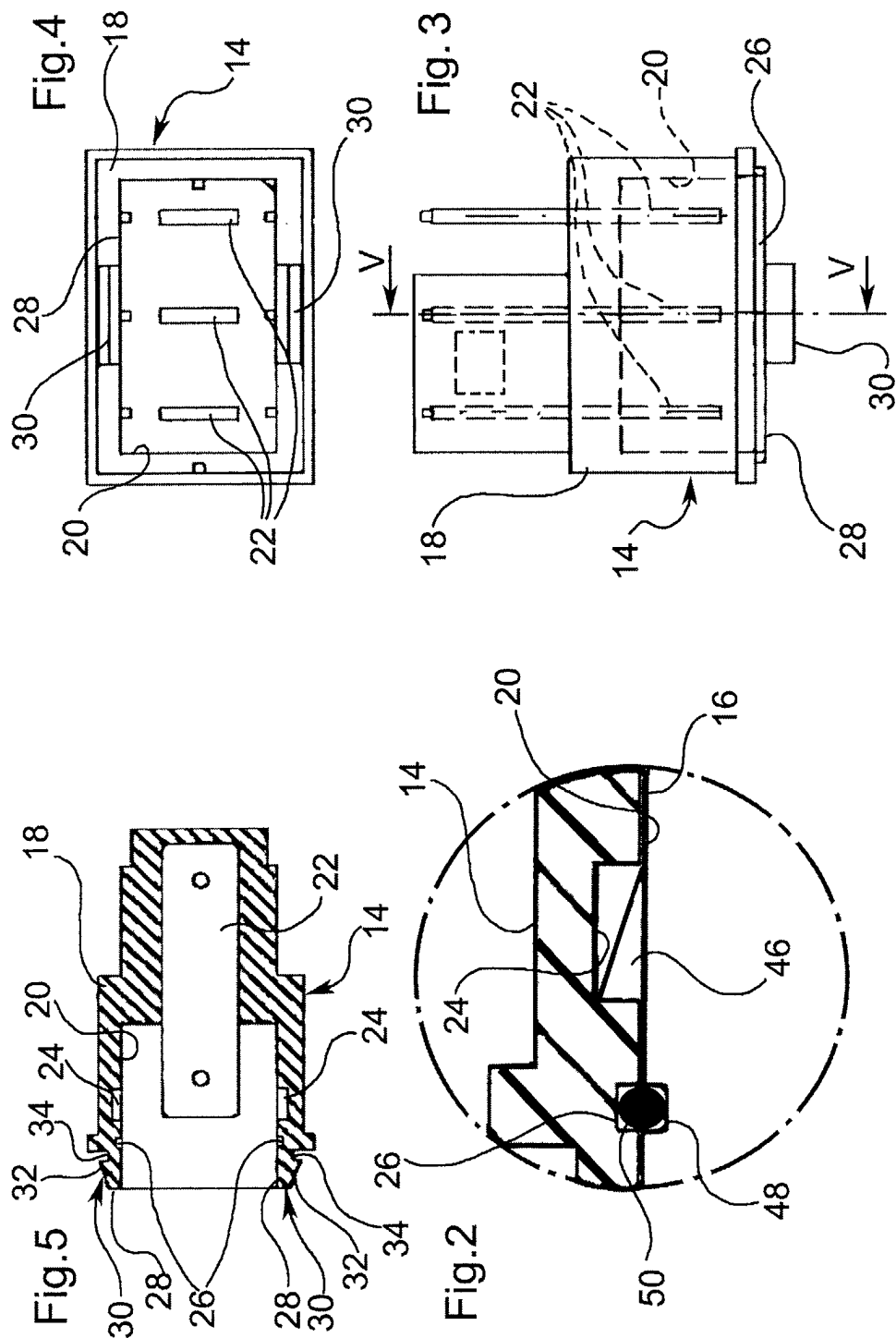
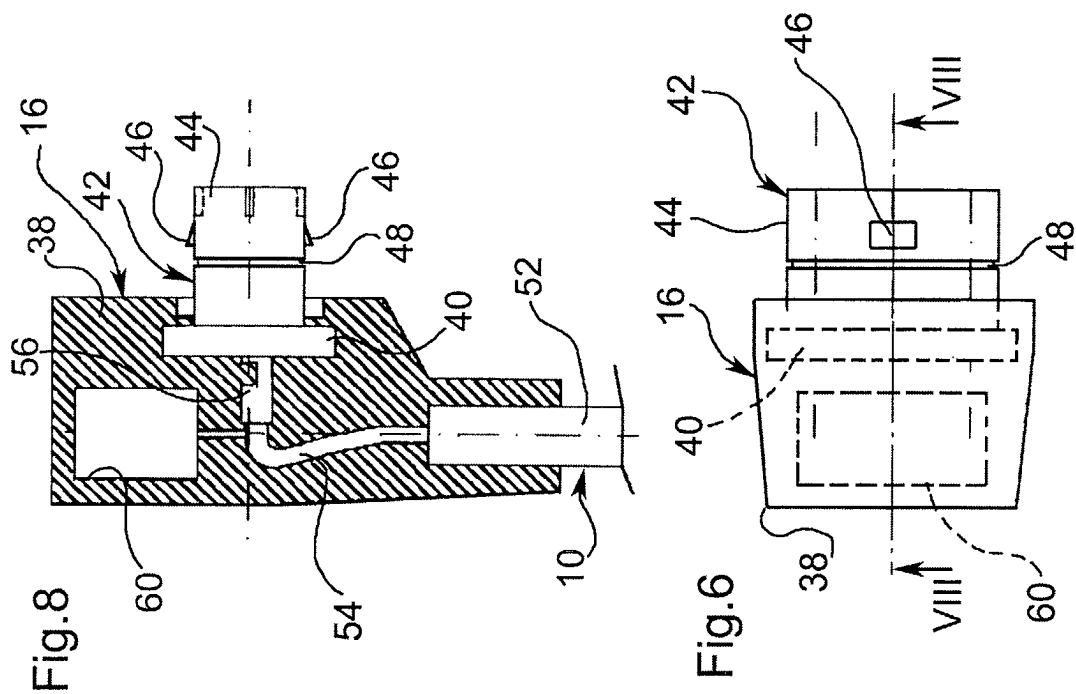


Fig.1







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EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5462

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 197 37 500 A (PHILIPS PATENTVERWALTUNG) 4 March 1999 (1999-03-04)	1,2,4, 7-10,13, 14	H01R13/639
Y	* column 2, line 30 - line 61; figure 5 *	6,11,12	

Y	US 6 392 554 B1 (KIM KYE SAM ET AL) 21 May 2002 (2002-05-21) * column 3, line 3 - line 39; figure 1 *	6,11,12	

A	US 5 454 729 A (WEN-TE CHUANG) 3 October 1995 (1995-10-03) * column 2, line 46 - column 3, line 40; figure 1 *	1,13,14	

			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			H01R
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 10 December 2002	Examiner Stirn, J-P
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 02 42 5462

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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10-12-2002

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