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(54) **Electrical accessory**

(57) An electrical accessory comprises a housing 11 including one part of a plug and socket electrical connector, for example a mains socket 16, which is

rotatable relative to the housing between at least two angular positions.

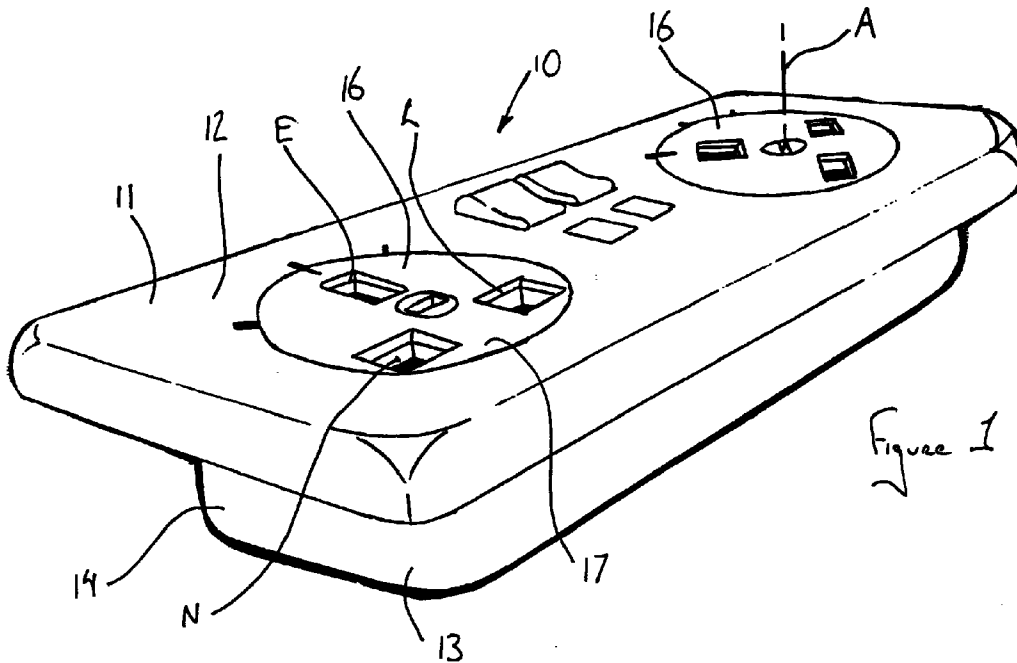


Figure 1

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## Description

The present invention relates to an electrical accessory.

According to the present invention there is provided an electrical accessory comprising a housing containing one part of a plug and socket electrical connector, characterised in that the one connector part is rotatable relative to the housing between at least two angular positions.

Embodiments of 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 an electrical accessory according to a first embodiment of the invention;

Figures 2(a) to (c) are front elevation views of the electrical accessory of Figure 1 in first, intermediate and second positions respectively;

Figure 3 is an exploded view of a socket module housed in the electrical accessory of Figure 1;

Figure 4 is an assembled view of the socket module of Figure 3 in conjunction with a screwdriver;

Figure 5 is a perspective view of a keyway housed within the socket module of Figure 3;

Figures 6(a) and (b) are cross-sectional views along the line V-V of Figure 5 showing the keyway in engaged and disengaged positions respectively;

Figure 7 is a cross-sectional view of an alternative keyway to that shown in Figure 5; and

Figure 8 is a plan view of the keyway of Figure 7.

Referring now to the drawings wherein similar numerals have been used to indicate like parts, there is shown an electrical accessory generally indicated at 10 according to the invention. The electrical accessory 10 of Figure 1 comprises a housing 11 conforming to the dimensions of a conventional dual socket for three-pin plugs. The housing 11 includes a cover 12 fastened to a backing box 13 having a side wall 14 and a back wall (backplate) 15. The cover 12 projects beyond the edges of the sidewall 14 to form a flange so that the housing may be seated in a conventional manner into a suitable recess or aperture formed in a wall or electrical conduit.

A pair of circular apertures are formed in the cover 12. A pair of socket modules 16 are mounted within the housing 11. Each socket module 16 includes a circular faceplate 17 in which three apertures E, L, N are formed, each for receiving respective earth, live and neutral pins on a conventional plug (not shown). Each faceplate 17 fits into a respective aperture from the rear

of the cover 12 to provide a flush cover surface. It will be understood that the housing 11 could contain only one or more than two socket modules 16, and where two-pin plugs are to be used two-hole socket modules could be used instead of the three-hole modules illustrated.

Each socket module 16 is rotatably mounted within the housing for limited angular movement about an axis A perpendicular to the cover 12. Each socket module 16 rotates to move the faceplate 17 from a first position, Figure 2(a), through an intermediate position, Figure 2(b), to a second position Figure 2(c). Three notches 60 are marked on the cover 12 around the faceplate 17. A notch 61 is also marked on the faceplate 17 above the E aperture. Thus, alignment of the notch 61 with the notches 60 indicates the position of a socket module 16.

The intermediate position corresponds with the position of conventional sockets in their housings. Where several such sockets are used to power a group of electrical appliances, such as computer workstations which can employ several power leads, it is often required in the interest of both neatness and safety for the leads to be grouped together or loomed. If the appliances lie to the side of the sockets, then drawing the leads to the side can cause undue stress on the wiring of the plug which connects each power lead to a respective socket. It is therefore a great advantage for the socket to be able to point in the direction of the appliance. In the case of a frequently moved appliance connected to a socket, it is also a great advantage to be able to adjust the position of the socket when required to point in the direction of the appliance.

Thus, in the first position, Figure 2(a), each socket module 16 points to an appliance disposed to the right of the socket module 16 and vice versa for the second position, Figure 2(c). It will be seen that power leads extending from plugs connected to sockets in corresponding positions may be drawn neatly together to be easily loomed without undue strain on the wiring.

Figure 3 shows the elements comprising each socket module 16. The faceplate 17 is fixedly mounted on an adaptor 18. The adaptor 18 includes recesses 19, 20 and 21 which lie in register with respective E, L and N apertures and which house a terminal (not shown) for electrically connecting each respective plug pin to its corresponding mains supply line. Wires, such as a neutral wire 50, Figure 4, extend from the side of the adaptor to connect each terminal to its respective mains supply line via a terminal on a further connector (not shown) formed within the housing 12. This simplifies wiring of the housing as the socket can be wired without needing to access the socket modules directly. It also ensures that the optimum length of wire is used to allow rotation of the socket module 16.

A keyway 22 is fitted into the underside of the adaptor 18, Figure 3. The keyway 22 includes a cylindrical base portion 23 having a solid upper surface 25, in which an aperture is formed, and an open lower face. Clips 26 are formed around the periphery of the lower edge of the base portion 23. In use, the clips 26 engage

corresponding holes formed in the backplate 15 of the housing to fix the keyway to the housing, Figure 4.

A substantially cylindrical shaft 24 fits into the aperture formed in the upper surface 25 of the base portion 23. The distal end 40 of the shaft 24 is fitted into a cooperating channel 27 formed in the centre of the adaptor 18, Figure 6(b). A longitudinal rib 29 is formed along part of the length of the shaft 24. The rib 29 fits into a corresponding groove (not shown) formed in the channel 27 so that the shaft 24 is rotationally keyed to the adaptor 18 for rotation about the axis A. Thus, rotation of the shaft 24 within the base portion 23 causes corresponding rotation of the adaptor 18 and faceplate 17 within the housing 11.

A flange 41 is formed around the top of the adaptor 18. The flange is substantially circular and has a wider diameter than the faceplate 17. The aggregate height of the base portion 23 and the adaptor 18 is substantially equal to the distance between the backplate 15 and the underside of the cover 12. Thus, when the cover 12 is fixed to the backing box 13, each faceplate 17 sits into a respective aperture in the cover 12 to fix the socket module 16 laterally within the housing, while the adaptor is held against the base portion 23. As such, only the keyway 22 is free to move along the axis A.

It is not always desirable for a socket module 16 to be freely rotatable within the housing. This can cause unintended rotation of the socket module 16 within the housing. Therefore in the preferred embodiment, the portion of the shaft 24 enclosed within the base portion 23 is adapted to lock the socket module 16 in each of the first, intermediate and second positions.

A flat disc 30 is formed at the base of the shaft 24. The disc 30 extends to just fit within the base portion 23. The underside of the disc is recessed and a compression spring 33 is located in the recess fitting between disc 30 and the backplate 15. An upwardly projecting tooth 31 is formed on the upper surface of the disc 30. Three detents in the form of recesses are formed on the underside of the upper surface 25 of the base portion 23 (these recesses are not shown in Figure 1 to 6 but are shown at 54 in the alternative keyway shown in Figures 7 and 8). The spring 33 urges the shaft 24 upwards so that the tooth 31 engages the underside of the upper surface 25 and, when the shaft is at an angular position corresponding to one of the three detent recesses, engages in that recess. The three recesses are angularly separated from one another at positions corresponding respectively to the angular positions of the first, intermediate and second positions of the socket module 16.

A circular aperture 44 is formed in the centre of the faceplate 17 on the axis of rotation A. A top part 40 of the shaft 24 of reduced diameter extends upwardly into the aperture 44 so that when the tooth 31 is seated in one of the three detent recesses, the top surface of the part 40 of the shaft lies just below the surface of the faceplate 17, Figures 1, 4 and 6(a). A recess 42 is formed in the top surface of the part 40 of the shaft and

is of a size capable of receiving a conventional screwdriver 43, Figure 4.

To move the socket module between the first, intermediate and second positions, the screwdriver is inserted into the recess 42 and is pushed against the bias of the spring 33 so that the shaft 24 retracts into the base portion 23, Figure 6(b). This urges the tooth 31 out of the particular detent recess in which it is seated so that the shaft 24 can be rotated to each of the other positions indicated at 31' and 31'', Figure 5. The screwdriver 43 is then released and the shaft 24 is urged out of the base portion 23 under the force of the extending spring 33 until the tooth 31 is fully seated in one of the three detent recesses.

It will be noted that in use the aperture 44 lies under a plug and thus no inadvertent adjustment of the socket module 16 position can be made with an appliance connected to the socket.

A screw (not shown) is conventionally used to hold two parts of the plug together. If not fully inserted, the screw can protrude from the underside of the plug and, in use, bear against the faceplate 17. It will be seen that the size and shape of the aperture 44 and recess 42, prevents the screw from pushing the shaft 24 into the base portion and allowing rotation of the socket module.

Referring now to Figures 7 and 8, an alternative construction of keyway 22 is shown. This differs from the keyway described above in four main respects.

First, the cylindrical base portion 23 is replaced by a quadrant-shaped base portion 23'. Since the shaft 24 and socket module 16 are only required to be rotatable through an angle of about 90 degrees, as seen in Figures 2(a) and 2(c), this simply removes redundant parts of the base portion 23 and provides more room in the housing 11 for other circuit elements associated with the sockets, for example an RCD.

Second, the disc 30 is replaced by a triangular spur 30', which is necessary to permit the shaft 24 to be rotated through the full 90 degree range of movement.

Third, the base portion 23' is made integral with the baseplate 15 rather than being a separate item which is clipped to the baseplate 15 by clips 26, Figures 3 and 4. Consequentially, the open face of the base portion 23' is closed by a snap-in closure member 50.

Finally, the rib 29 is replaced by a flat 52 on the shaft 24, and the channel 27 in the adapter 18 is formed with a corresponding flat (not shown), so that the shaft 24 and adapter 18 are rotationally and slidably coupled functionally the same as described above for the keyway shown in Figures 1 to 6.

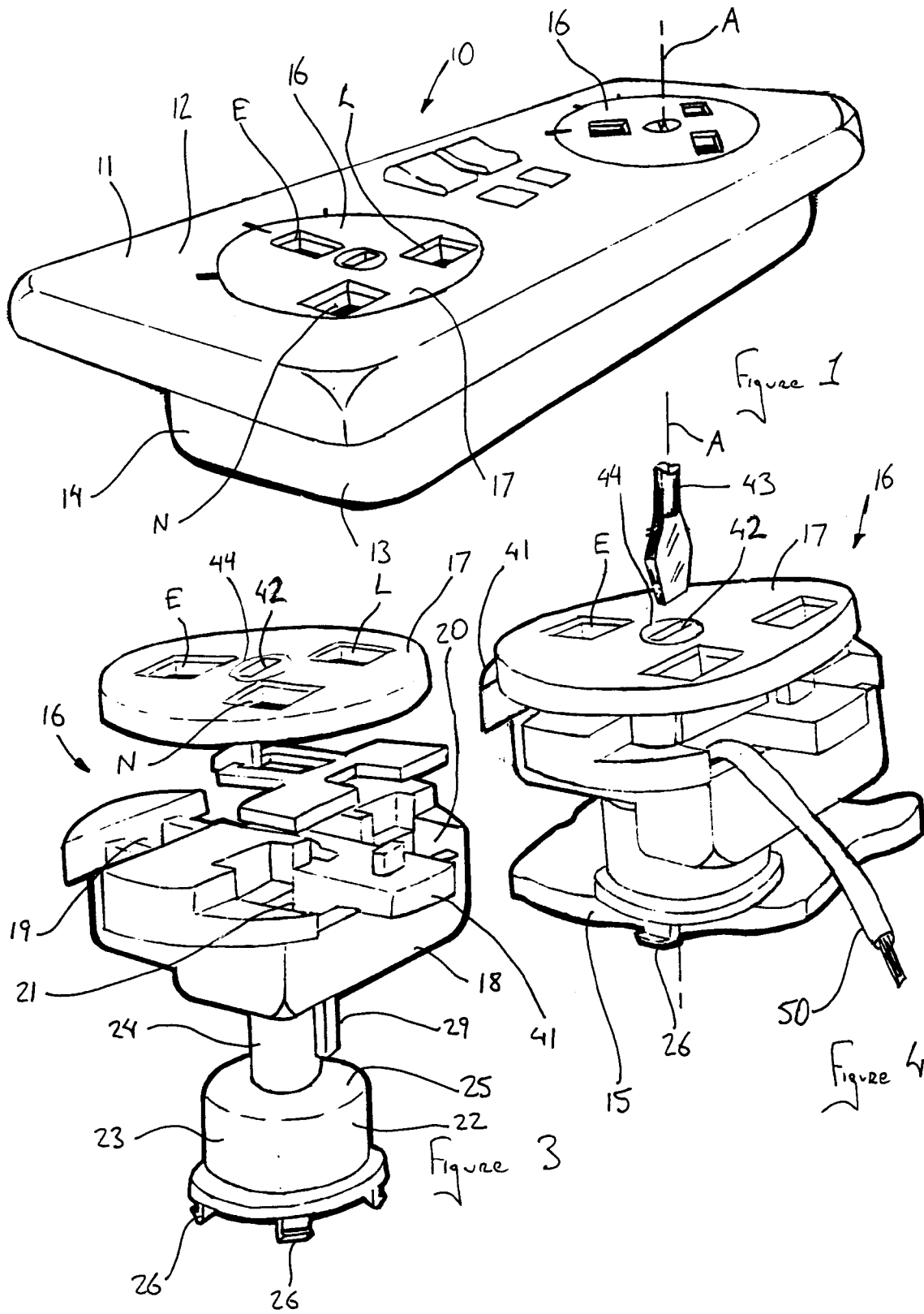
In a further variation of the present embodiments, the shaft 24 is connected by at least one spring (not shown) to the base portion 23 or the housing 11. The spring(s) bias the shaft towards the first, second or intermediate positions. Thus, if an operator releases the shaft 24 between these positions, the entire socket module 16 reverts under spring bias back to one of the first, second or intermediate positions.

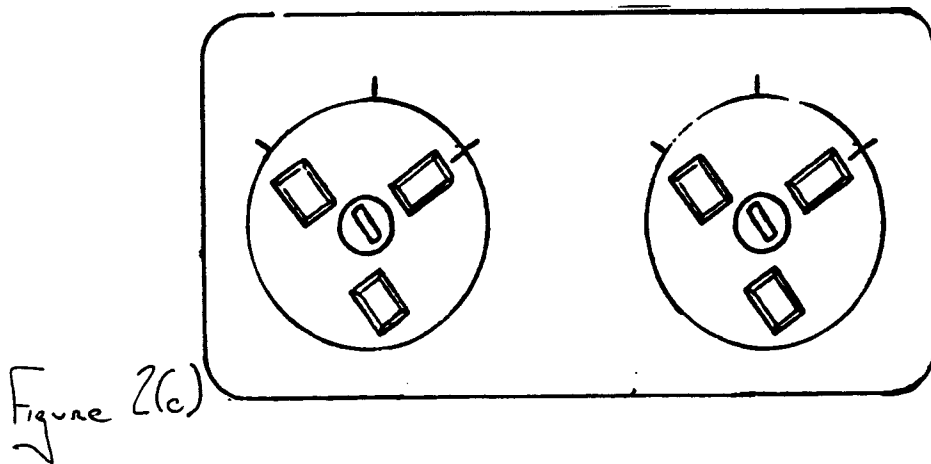
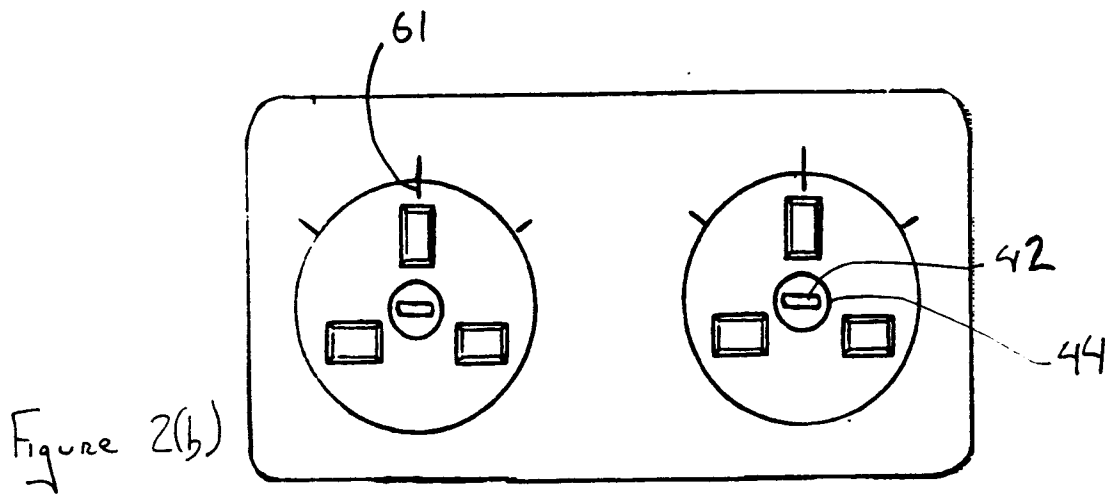
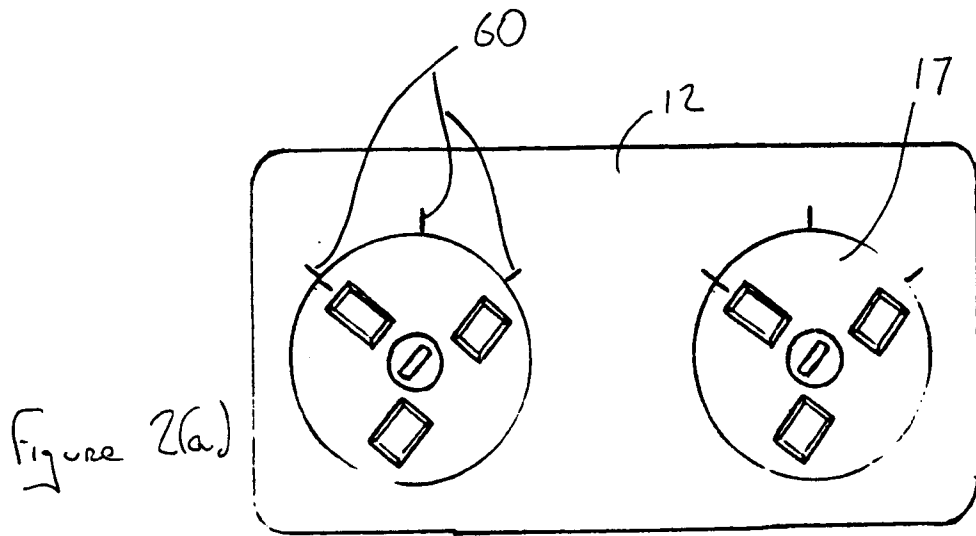
The invention is not limited to the embodiments described herein which may be modified or varied without departing from the scope of the invention.

### Claims

1. An electrical accessory comprising a housing (11) containing one part (16) of a plug and socket electrical connector, characterised in that the one connector part (16) is rotatable relative to the housing between at least two angular positions (Fig. 2a, Fig. 2c). 5  
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2. An electrical accessory as claimed in claim 1, wherein the one connector part (16) is an electrical socket. 15
3. An electrical accessory as claimed in claim 1 or 2, further including means (22) in the housing for releasably locking the one connector part (16) selectively in either one of the two angular positions. 20
4. An electrical accessory as claimed in claim 3, wherein a member (24) is mounted in the housing (11) for both rotation about and sliding movement along the axis of rotation (A) of the one connector part (16), the one connector part (16) being keyed to the member (24) such that rotation of the member (24) effects rotation of the one connector part (16), and means (33) are provided in the housing (11) for resiliently biasing the member (24) into an axial position (Fig. 6a) wherein the member (24) can selectively engage one of at least two angularly spaced detents (54) corresponding respectively to the two angular positions of the one connector part (16), the member (24) being displaceable out of the said axial position against the resilient bias (33) so that the member (24) can rotate to the other angular position and there engage the other detent (54) upon release of the member (24). 25  
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35  
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5. An electrical accessory as claimed in claim 4, wherein the one connector part (16) has an aperture (44) on its axis of rotation through which aperture the member (24) is accessible from outside the housing (11) to effect manual displacement and rotation of the member (24). 45
6. An electrical accessory as claimed in claim 5, wherein the aperture (44) is covered by the other connecting part of the electrical connector when the latter engages the one connector part (16) thereby preventing rotation of the one connecting part (16) in the housing (11). 50  
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7. An electrical accessory as claimed in any preceding claim, wherein the housing (11) contains two or 5
8. An electrical accessory as claimed in claim 4 wherein the member (24) is connected by resilient means to the housing (11) so that, when the member (24) is displaced from the said axial position, the connector part (16) is biased to rotate towards one of the angular positions (Fig. 2a, Fig. 2b, Fig. 2c). 10

more electrical connector parts (16) each independently rotatable relative to the housing.





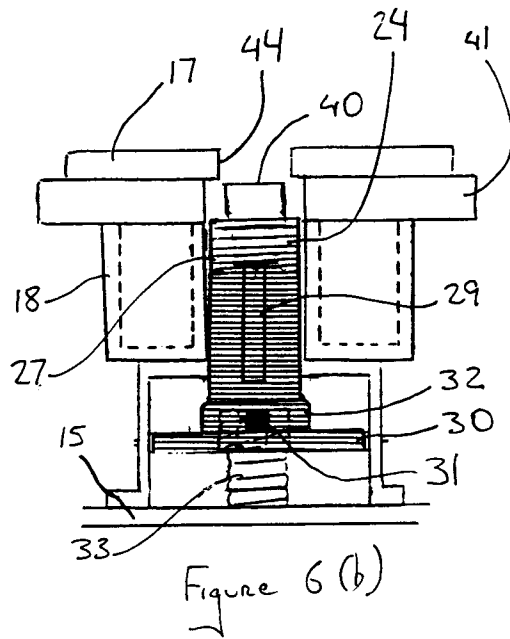
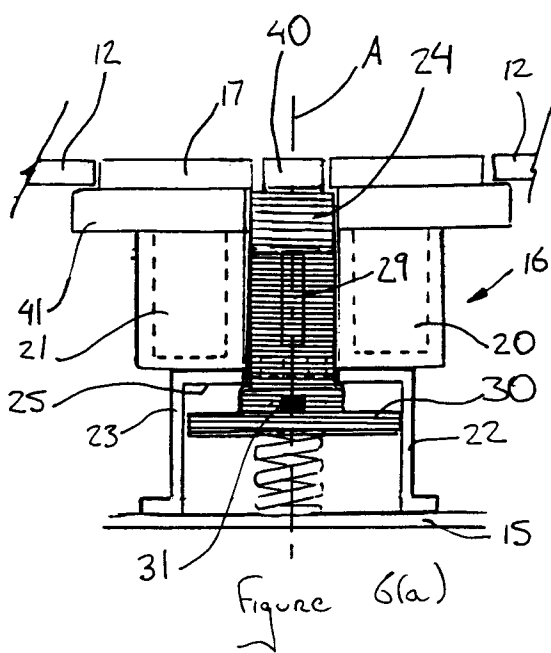
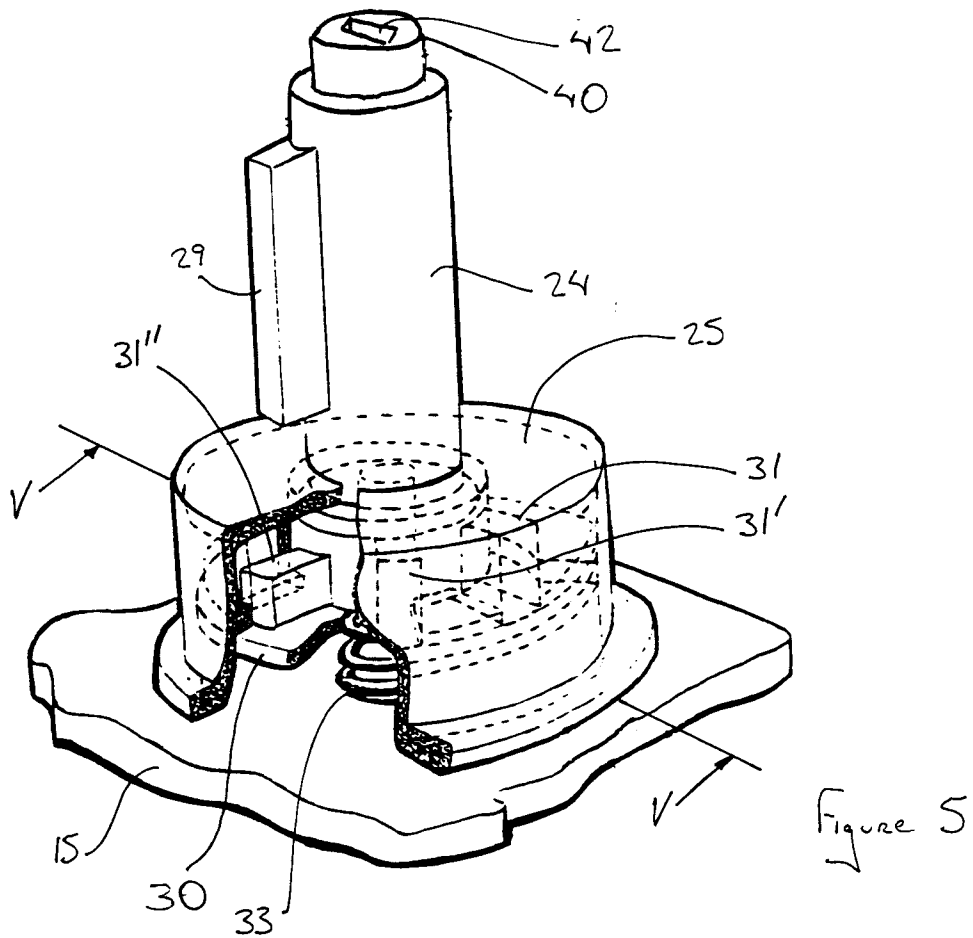


Fig. 8

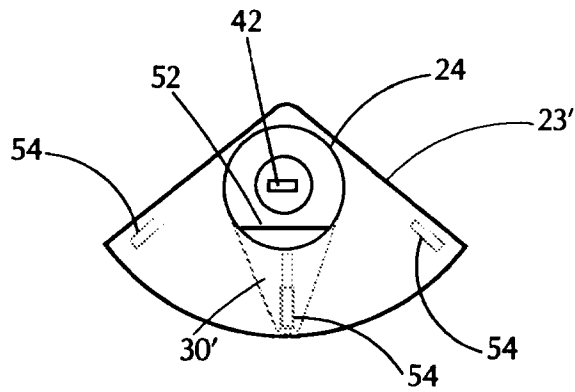
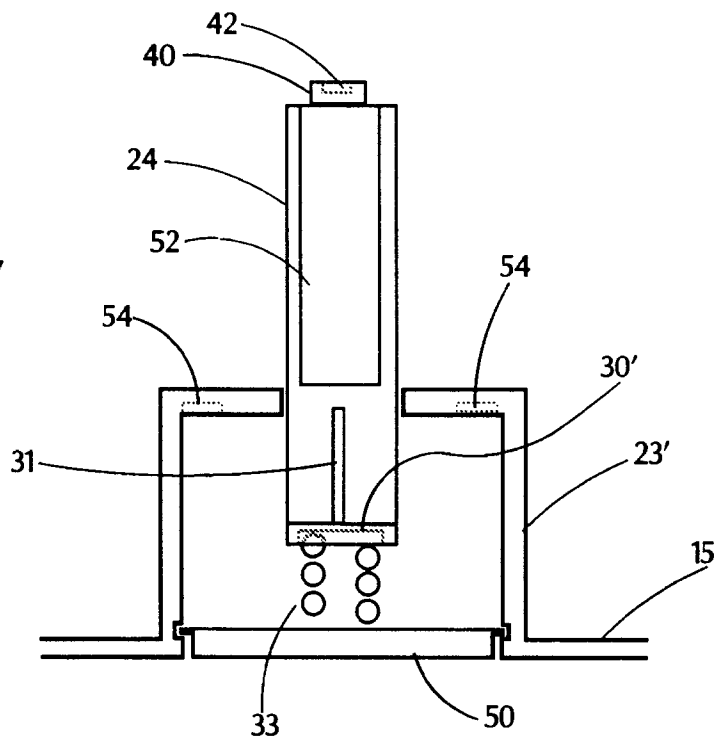


Fig. 7







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EUROPEAN SEARCH REPORT

Application Number  
EP 95 65 0043

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.6)
X	DE-A-42 22 656 (ABB PATENT GMBH) 13 January 1994 * the whole document * ---	1-3	H01R25/00 H01R35/00
X	FR-A-2 054 888 (CALOR) 7 May 1971 * the whole document * ---	1-3	
X	DE-U-79 06 089 (WESTDEUTSCHE ELEKTROGERÄTEBAU) 28 February 1980 * page 19; figures * ---	1-3	
A	WO-A-87 04570 (KOPP GMBH & CO KG HEINRICH) 30 July 1987 * claims; figures * ---	1-8	
A	WO-A-93 19506 (TORE SOERENSEN ELEKTRONIKK AS) 30 September 1993 * claims; figures * -----	1-8	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H01R
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		8 January 1996	Durand, F
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