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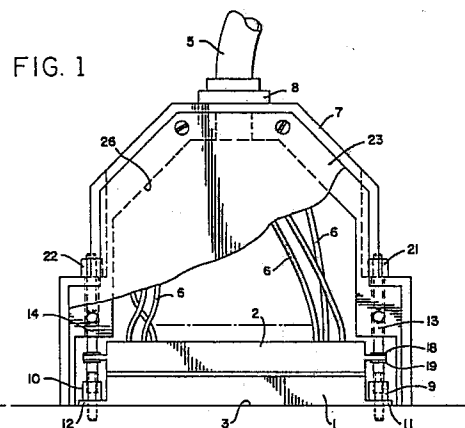
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54 **Screened electrical connector assemblies.**

57 A screwed electrical connector assembly has a first surface mounted multi-contact connector 1 which receives a second plug-in connector 2 the connector 2 being retained in position by circlips on studs 13 and 14 which screw into the heads of mounting screws 9 and 10 for the first connector, the studs 13 and 14 passing through a screening back shell 7 which is thus retained in engagement with the mounting surface 3 by nuts 21 and 22.



Description

Screened Electrical Connector Assemblies

The invention relates to a screened electrical connector assembly and relates especially but not exclusively to an enclosure for a connector of a multi-core cable to an electrical equipment case.

Sub-miniature multi-contact electrical connectors are well known for making interconnections between items of communication, control or computer systems via multi-core cables. Typically, an interconnection may comprise a cable carrying at each end a plug-in connector which is insertable into a socket or receptacle attached to an outer surface of a respective equipment case. It is, therefore, desirable to provide for such connector assemblies to have electromagnetic interference and contamination-proof shells and the present invention seeks to provide a simple, secure and readily mountable assembly.

According to the present invention there is provided a screened electrical connector assembly comprising a first surface-mountable connector element having a plurality of contacts cooperable for connection with respective contacts of a second connector element when in assembled relationship therewith to provide electrical connection with respective conductors of a multi-core cable, said assembly having an enclosing shell formed of electromagnetic inductive screening material and the assembly having common means for separately retaining the second connector element in an assembled position and for retaining said shell in enclosing relationship to a mounting surface.

Preferably, the said common means includes a common screw or stud carrying respective means engaging the second element and the shell.

By designing the shell to have screw or stud spacings identical to such spacings of the first and second connector elements, the first connector element, the second connector element and the shell may each be precisely positioned as required in relation to a mounting surface without additional space requirements for further fastening or positioning means for the shell.

In order that the invention may be more clearly understood and readily carried into effect, the same will be further described by way of example with reference to the accompanying drawing of which:

Fig. 1 illustrates on an enlarged scale a partly cut-away view of a screened electrical connector assembly;

Fig. 2 illustrates an end view looking inwards on the shell of the assembly of Figure 1 in the direction of the arrow;

Fig. 3 illustrates an edge view of the partly cut-away cover of the assembly of Figure 1; and

Fig. 4 illustrates on an even larger scale a threaded stud of the type used in the assembly of Figure 1.

Referring to Figure 1, the screened assembly comprises a first surface-mountable multicontact connector element denoted by reference 1 and a further plug-in element denoted by reference 2. The

connector elements 1 and 2 are of known form, typically each comprising two linearly arranged rows of contacts, one row being staggered in relation to the other. Such contacts are, typically, either nine, fifteen, twenty-five, thirty-seven or fifty in number. Contacts of one of the elements therefore provide pins and those on the other provide receptacles for the respective pins. Connections to the contacts of element 1 on the mounting surface 3 may be made either by solder connections to the contacts or by insulation displacement connections (I.D.C.). Similarly, the separate conductor cores 6 from an incoming cable 5 (only six of which are shown) are connected to respective contacts of element 2 by soldering or I.D.C. The assembly further comprises a shell having a main body part 7 and a recessed cover part 23 formed of conducting material, typically aluminum alloy, produced in two parts by investment casting and through an aperture of which the cable 5 passes via a cable screen trap 8. The first surface mountable connector element 1 is mounted to the mounting surface 3 by means of a screw having a hexagonal head 9 and a further screw having a hexagonal head 10. The heads of screws 9 and 10 engage flanges 11 and 12 respectively for secure surface mounting and the heads 9 and 10 are provided with threaded bores in their upper ends for receiving screw-threaded ends of respective mounting studs 13 and 14, the form of which is more clearly illustrated on an enlarged scale in Figure 4.

Referring to Figure 4, it is to be seen that the stud 13 has a relatively short threaded portion 15 at the left-hand end, followed by two annular grooves 16 and 17 for receiving small circlips 18 and 19 respectively (Figure 1). The other end of the rod is threaded at 20 for finally receiving a suitable threaded nut 21 which is one of two fastening nuts 21 and 22 as shown in Figure 1 for retaining the shell 7 in position. The right-hand end also carries a hexagonal hole to receive an Allen key for tightening.

The cover part 23 of the shell which is denoted by reference 23 and shown in part cut-away form in Figure 1 is to be seen edgewise in Figure 3 wherein four screw holes 24 are also indicated and a thickened area 25 fits snugly within the inner peripheral surface 26 of the shell part 7.

Referring briefly to Figure 2, this illustrates an end view of the main shell part 7 taken from mounting surface 3 wherein the surface mounted periphery 27, apertures 28 and 29 for the mounting studs 13 and 14 and solid and/or broken outlines are shown at 30, these have optional cable inlet positions which can be occupied by one, two or three screentrap as required.

In order to put the assembly together, the incoming screened cable 5 is assembled into its screentrap 8 and mounted in the shell 7 with sufficient lengths of conductors 6 inside the shell to permit connection in known manner to the contacts of connector element 2. The element 2 has studs 13 and 14 assembled to its mounted flanges by means

of the respective circlips such as 18 and 29. With the surface mountable connector element 1 fixed in position on the surface 3 by its respective mounting screws 9 and 10, the second connector element 2 is plugged in to 1 and the studs 13 and 14 are screwed into the respective threaded apertures of heads 9 and 10, thus firmly positioning 2 in relation to 1. Rotation of the studs 13 and 14 is readily achieved by means of miniature Allen key engagement with the hexagonal hole 31 as indicated in Figure 4. The shell part 7 has its recessed cover part 23 attached by means of self-tapping screws through apertures 24 and is then introduced over studs 13 and 14 passing through holes 28 and 29 before final screwing down by means of fastening nuts 21 and 22.

It is, therefore, seen that the fastening means comprising the respective studs 13 and 14 and the circlips 18, 19 and nuts 21 and 22 when attached to screws 9 and 10, provide for separate positioning and retainment of the connector element 2 and the shell 7. This means that given standard spacings for the studs 13 and 14 and corresponding apertures of the mounting flanges of connector elements 1 and 2 different shapes and sizes of the elements may be mounted in a common housing or shell. A typical alternative shape will be imposed for example, if the element 2 is replaced by a filter connector.

In certain applications the first surface mounted conductor element may be mounted on a surface part which is recessed behind the surface against which the enclosing shell is mounted. In that case the lengths of studs such as 13 and 14 may be longer in order still to afford common means for separately retaining the second connector elements and the shell in their assigned positions.

Claims

1. A screened electrical connector assembly comprising a first surface-mountable connector element having a plurality of contacts cooperable with respective contacts of a second connector element when in assembled relationship therewith to provide electrical connection with respective conductors of a multi-core cable, said assembly having an enclosing shell formed of electromagnetic inductive screening material and the assembly having common means for separately retaining the second connector in an assembled position and for retaining said shell in enclosing relationship to a mounting surface.

2. A connector assembly as claimed in Claim (1) wherein said common means comprises a screw or stud carrying respective means engaging the second element and the shell.

3. A connector assembly as claimed in Claim (2) wherein said screw or stud cooperates with further means fixing the first element to said surface.

4. A connector assembly as claimed in Claim (3), said further means comprising a screw means, the head of which is threaded to receive

said threaded stud of the common means.

5. A connector assembly as claimed in Claim (2), said screw or stud having locating means for locating it on the second element.

6. A connector assembly as claimed in Claim 5, said locating means comprising annular groove and circlips positioned therein.

7. A connector assembly as claimed in Claim (2), the outer end of said screw or stud being provided with means for receiving a key for tightening during assembly.

8. A connector assembly as claimed in Claim (1), further comprising a closed end adapted for receiving a multi-core cable and an open end adapted to receive said second element and to abut on said surface to complete the enclosure thereof.

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FIG. 1

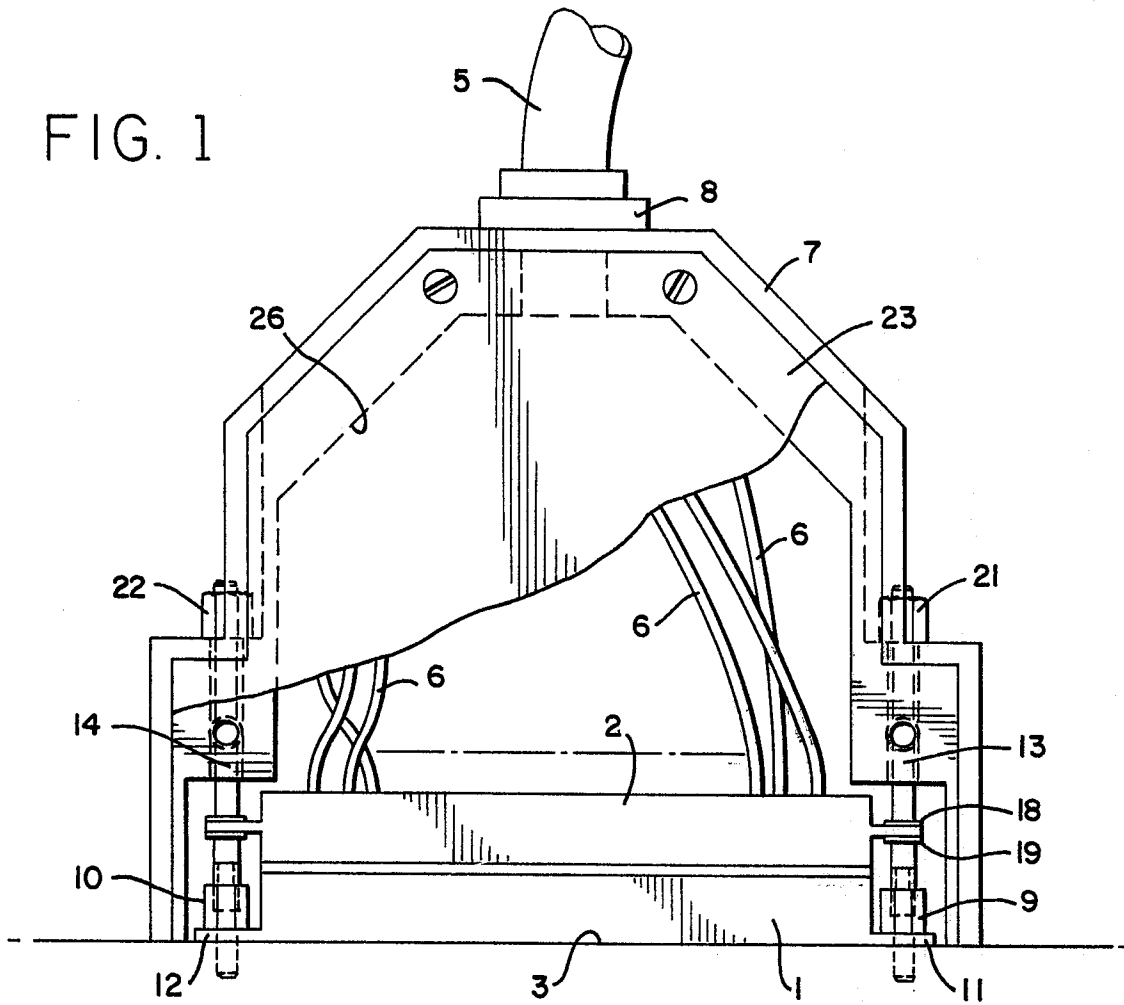


FIG. 2

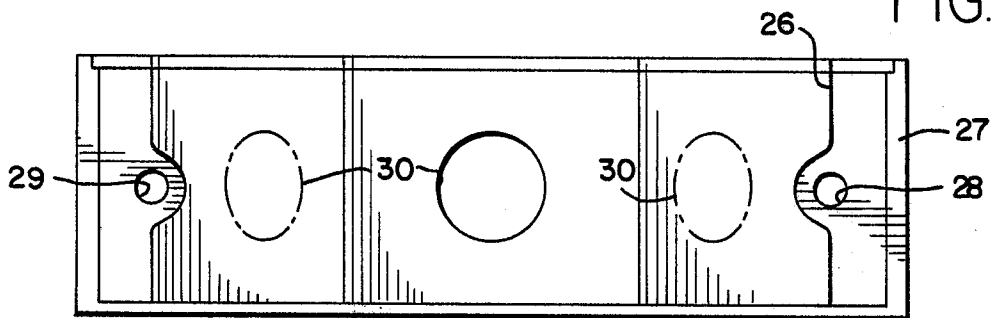


FIG. 3

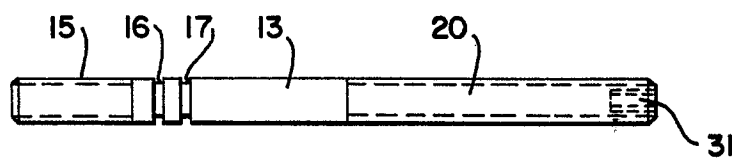
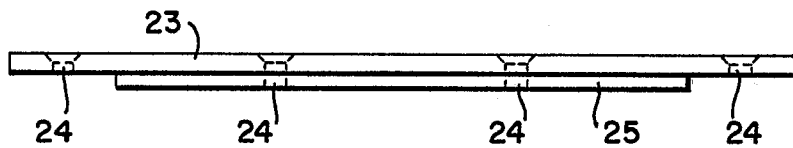


FIG. 4