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(72) Inventor: **Higgs, Conrad**  
**King's Lynn, Norfolk PE33 0AT (GB)**

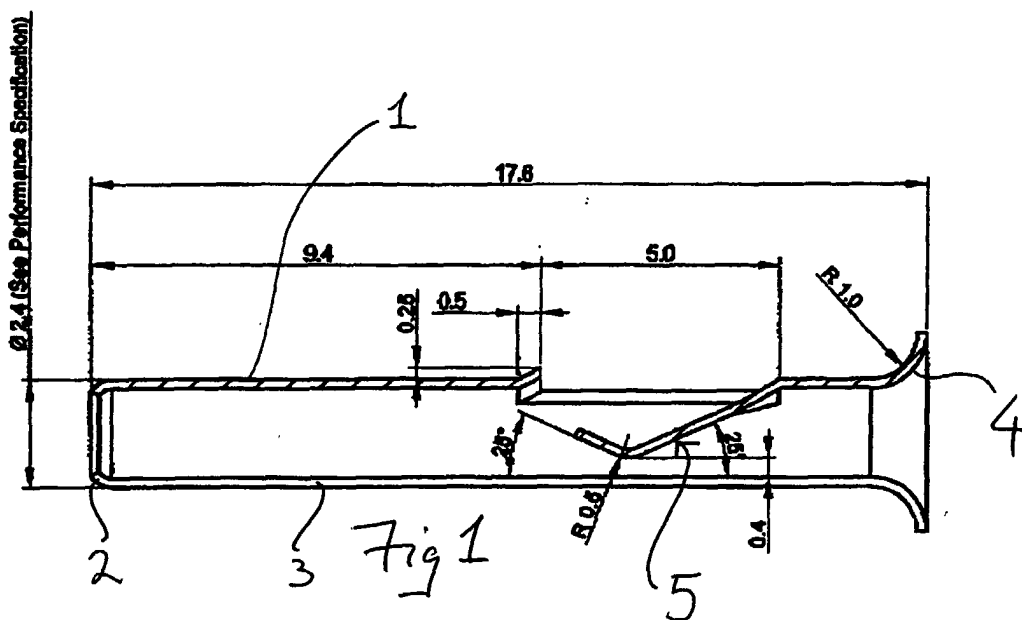
(74) Representative: **Bubb, Antony John Allen et al**  
**Wilson Gunn Gee,**  
**Chancery House,**  
**Chancery Lane**  
**London WC2A 1QU (GB)**

(71) Applicant: **MAXVIEW LIMITED**  
**King's Lynn Norfolk PE33 0AT (GB)**

(54) **Improvements in or relating to electrical connectors**

(57) A pin contact intended to form the centre pin of a co-axial cable connector comprises a generally cylindrical wall portion (1) a longitudinal portion of which is partially severed to define an internally extending spring finger (5) for engagement with an electrical cable conductor inserted within the hollow pin connector. The

spring finger (5) may include a reversely angled portion (7A) defining an elbow, the arrangement being such that, in use, the elbow is held in engagement with a cable conductor by contact of the angled portion (7A) against an insulating member surrounding the external wall of the contact pin.



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## Description

**[0001]** This invention concerns improvements in electrical connectors, and relates more especially, but not exclusively, to co-axial connectors of the kind utilised for connecting the cables of television antennas to associated equipment.

**[0002]** Hitherto known co-axial connectors of this kind generally comprise an outer cylindrical sleeve within which is supported a hollow centre pin via an insulating spacer. The outer cylindrical sleeve is secured within, or is integral with, a male threaded housing member that engages with a female threaded housing cap having a central aperture through which the co-axial cable can pass. Between the threaded portions of the housing is arranged a collapsible contact element that is placed around the braided conductor of the co-axial cable in order to provide an electrical connection between the latter and the outer cylindrical sleeve. The electrically insulated centre core of the cable is stripped to expose the centre conductor of the co-axial cable, which is normally a single strand of copper wire, and the latter is inserted within the hollow centre pin of the electrical connector.

**[0003]** Various means have hitherto been proposed for establishing electrical connect between the hollow centre pin and the wire conductor inserted therein, including the use of clamping screws or a soldered connection. These are, however, labour intensive, and in many cases an operative will simply leave the single strand of copper wire loosely inserted within the centre pin, an electrical contact being promoted by slightly kinking the wire conductor. Whilst the latter form of connection may well serve sufficiently to enable conduction of an analogue television signal from an antenna, an improved electrical connection is required where the transmission of digital television signals is concerned. Since the same antenna may be used for the receipt of both analogue and digital television signals, reception problems may thus occur with digital signals when a co-axial connector is assembled to the antenna cable in the conventional manner.

**[0004]** Accordingly it is an object of the invention to provide an electrical connector that can be connected to an electrical cable in a simple manner whilst ensuring a reliable electrical contact between a wire conductor of the cable and a hollow pin contact of the connector.

**[0005]** In accordance with the invention a pin contact of an electrical cable connector is formed as a hollow generally cylindrical metal sleeve arranged to receive therein a wire conductor of an electrical cable, characterised in that a longitudinally extending portion of the wall of the hollow pin is partially severed therefrom and angled inwardly in order to define an inwardly extending spring finger arranged to make pressure contact with a wire conductor inserted within the hollow pin.

**[0006]** Advantageously, a free edge of an aperture defined in the wall of said pin contact by the severance of

said spring finger is angled outwardly to retain the pin contact within an annular insulator by snap engagement therein.

**[0007]** The invention is illustrated by way of example in the accompanying drawings, in which,

Figure 1 is a longitudinal sectional view of one embodiment of pin contact in accordance with the invention, taken on the line A-A of Fig. 2,

Figure 2 is a plan view of the pin contact shown in Fig. 1,

Figure 3 is a perspective view of the pin contact of Figs. 1 and 2,

Figure 4 is an axial cross section of an assembled co-axial connector incorporating the contact pin of Figs. 1 to 3, and

Figure 5 is an enlarged fragmentary view showing a portion of the connector shown in Fig. 4.

**[0008]** Referring to Figs. 1 to 3 of the drawings, a generally cylindrical contact pin is formed by rolling from sheet metal to the shape illustrated and is composed of suitable electrical contact material such as nickel plated brass or phosphor bronze.

**[0009]** The dimensions of the pin correspond to those of a standard co-axial television cable connector and, typically, the pin would be of approximately 17.5mm in length and 2.4mm in external diameter. The cylindrical wall 1 of the contact is tapered inwardly at one end 2, in a conventional manner, and has a longitudinal slit 3 formed by the abutting edges of the rolled sheet from which the contact is formed. An opposite end of the contact has a trumpet shaped mouth 4 to facilitate insertion of an electrical conductor and to retain the pin within an outer insulator as described below.

**[0010]** As can be seen from Figs. 1 and 3, an internally angled spring finger 5 is formed by severing a portion of the cylindrical wall 1 of the contact pin and folding this inwardly to the shape illustrated. Thus, the internally directed spring finger 5 has a shoulder portion 6 forming a transition between the cylindrical wall 1 of the contact pin and a flattened portion 7 that is angled inwardly relatively to the axis of the contact pin, for example at an angle of approximately 155°. A flattened end portion 7A of the spring finger 5 is angled away from the longitudinal axis of the contact, at an angle of, for example, 25°, to form an elbow in the contact finger 5 as shown in Fig. 1. The residual aperture left in the wall of the cylindrical contact terminates at a free edge in an outwardly angled lip 8, as can be seen from Figs. 1 and 3.

**[0011]** Referring to Figs. 4 and 5, a complete electrical connector incorporating the contact of Figs. 1 and 3 comprises a generally cylindrical metal sleeve 9 secured within a male screw threaded housing member 10

and having a portion 9A of wider diameter and a narrow portion 9B.

[0012] An annular member 11 of electrically insulating material is located within the sleeve 9 and has a wider portion 11A fitting within the wider portion 9A of the conductor sleeve 9, and a narrow portion 11B fitting within the narrow portion 9B of the sleeve 9. The insulator 11 is located axially by means of a shoulder of the sleeve 9 between the wider and narrower portions 9A and 9B.

[0013] As illustrated more clearly in Fig. 5, the contact pin 1 is a push fit within a central aperture of the annular insulator 11, the lip 8 of the contact 1 serving as an abutment to snap engage with one end of the insulator 11 and the widened trumpet mouth 4 abutting against the other end. The contact pin 1 is thus retained therein against relative displacement, in use.

[0014] As can also be seen from Fig. 5, the internal wall of the insulator 11 overlies the aperture in the wall of the contact pin 1, and thus presents the end 7A of the spring finger 5 from being displaced outwardly through the aperture in the wall 1 of the contact. Thus, upon insertion of a central wire conductor into the contact pin, the portion 7 of the spring finger 5 is firstly engaged by the wire conductor and displaced outwardly until the free end 7A contacts the internal surface of the insulator 11. Thereafter, upon further insertion of the conductor wire, the two angled portions 7, 7A of the finger 5 are flexed relatively to one another in order to ensure firm contact between the spring finger 5 and the conductor wire.

[0015] After insertion of a central conductor of a co-axial cable into the contact pin, the cable is retained in place in conventional manner by securing a female threaded cap 12 on to the male threaded housing member 10, a collapsible contact member 13 providing an electrical connection between the outer conductor of the co-axial cable and the cylindrical sleeve 9 in a conventional manner that is well known to those skilled in the art.

[0016] Although the above described arrangement comprises one exemplary embodiment of the invention, it will be appreciated that various modifications and alternations may be made thereto without departing from the scope of the invention as defined in the appended Claims.

## Claims

1. A pin contact for incorporation in an electrical cable connector, comprising a hollow generally cylindrical metal sleeve arranged to receive therein a wire conductor of an electrical cable, **characterised in that** a longitudinally extending portion of the wall (1) of the hollow pin is partially severed therefrom and angled inwardly (7) in order to define an inwardly extending spring finger (5) arranged to make pressure contact with a wire conductor inserted within the hollow pin.

2. A pin contact according to Claim 1 wherein a free edge of an aperture defined in the wall (1) of said pin contact by the severance of said spring finger (5) is angled outwardly (8) to retain the pin contact within an annular insulator by snap engagement therein.

3. A pin contact according to Claim 1 or 2, wherein the portion of said pin wall (1) defining said aperture is held within an annular insulator surrounding said pin contact, and said spring finger (5) has an end portion (7A) that is angled to define an elbow, the arrangement being such that upon insertion of a wire conductor within the hollow pin, said elbow portion is held in engagement therein by contact of said end portion (7A) against the internal wall of said annular insulator (11).

4. A contact pin according to any one of Claims 1 to 3, wherein said pin contact is incorporated within a co-axial cable connector to form the centre pin thereof.

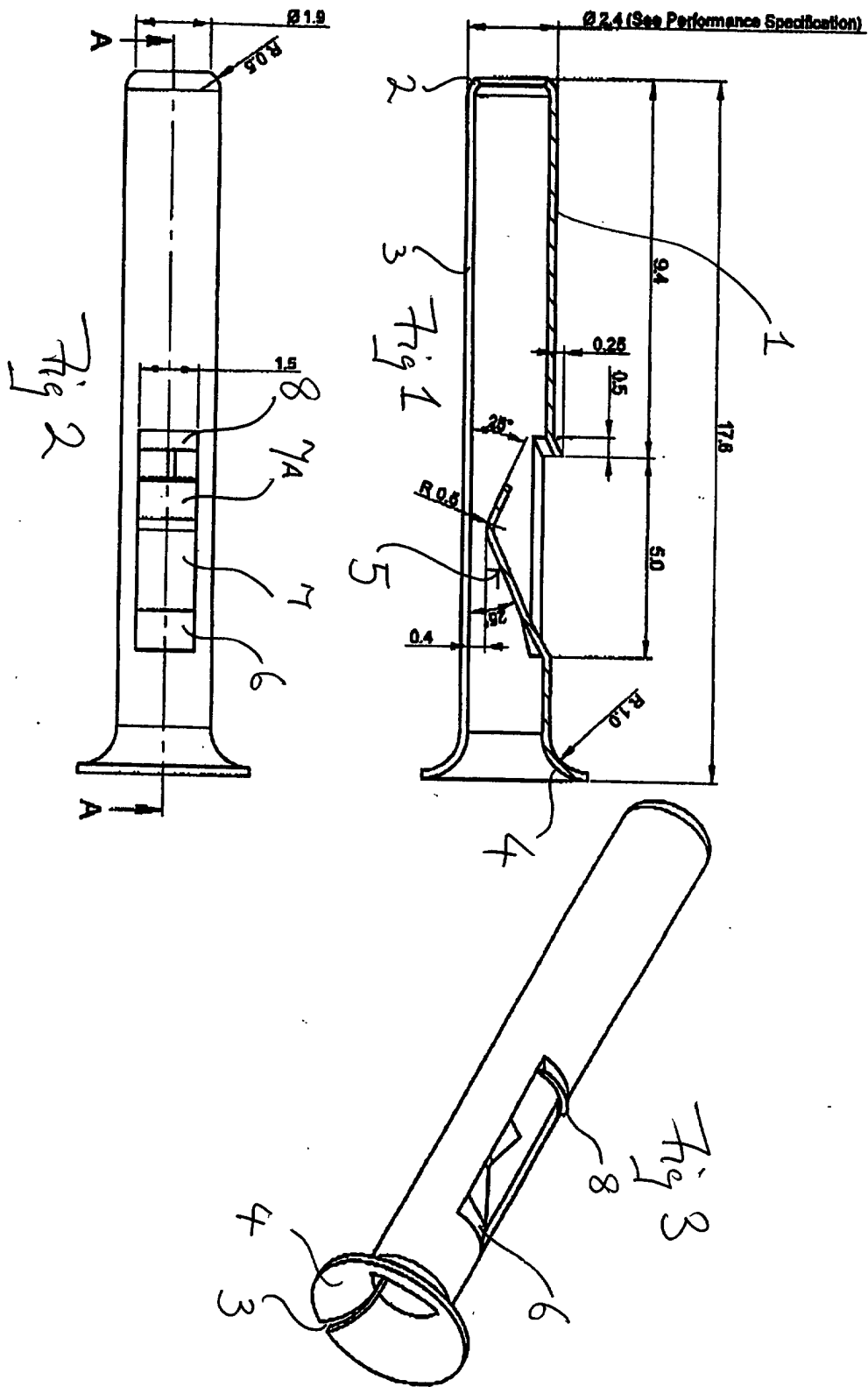
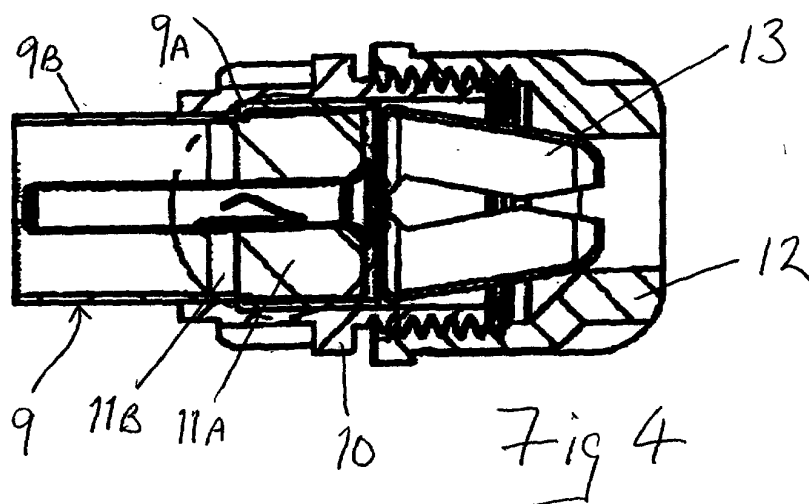
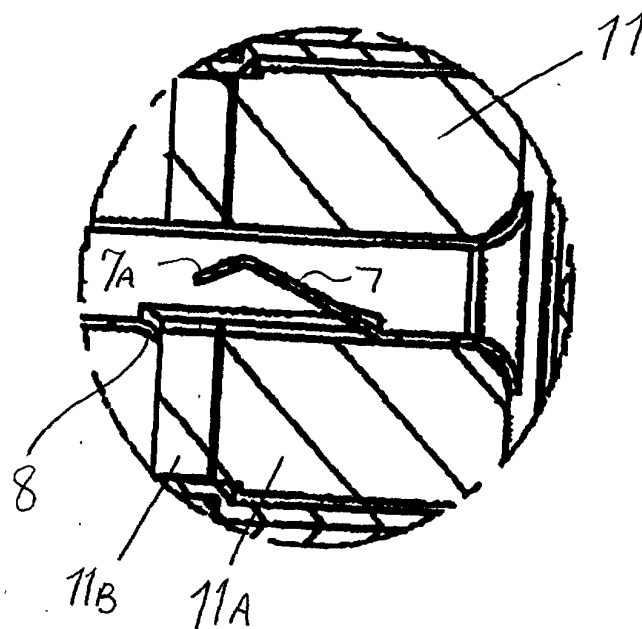


Fig 5





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# EUROPEAN SEARCH REPORT

Application Number  
EP 01 30 1442

| 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) |
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| Y                                                                                                                                                                                                                                                      | * column 2, line 66 - column 4, line 41;<br>figures 2B,4 *                    | 3                                                                                                                                                                                                                                                                            |                                              |
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|                                                                                                                                                                                                                                                        | * column 11, line 5 - line 30; figure 4 *                                     |                                                                                                                                                                                                                                                                              |                                              |
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|                                                                                                                                                                                                                                                        | * column 2, line 27 - line 40; figure 6 *                                     |                                                                                                                                                                                                                                                                              |                                              |
|                                                                                                                                                                                                                                                        | -----                                                                         |                                                                                                                                                                                                                                                                              |                                              |
| The present search report has been drawn up for all claims                                                                                                                                                                                             |                                                                               |                                                                                                                                                                                                                                                                              |                                              |
| Place of search<br><b>BERLIN</b>                                                                                                                                                                                                                       |                                                                               | Date of completion of the search<br><b>18 June 2001</b>                                                                                                                                                                                                                      | Examiner<br><b>Stirn, J-P</b>                |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                               | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                              |

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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EP 01 30 1442

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The members are as contained in the European Patent Office EDP file on  
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