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AT BE CH DE FR IT LI LU NL SE(71) Applicant: PLESSEY OVERSEAS LIMITED
Vicarage Lane
Ilford Essex IG1 4AQ(GB)(72) Inventor: Jolly, Ronald Henry Charles
G23 Empetroca Calpe
Benisa Alicante(ES)(74) Representative: Sorenti, Gino
Intellectual Property Department The Plessey Company
plc 2-60 Vicarage Lane
Ilford Essex IG1 4AQ(GB)

(54) Aerials.

(57) A monopole aerial comprises a plurality of conductive elements (1, 2) and a transmission line (3) coupled between at least one pair of adjacent elements thereby providing capacitive coupling therebetween. The transmission line (3) com-

prises at least two conductors (5, 6) one of which is electrically connected to one of the elements and the other is electrically connected to the other element.

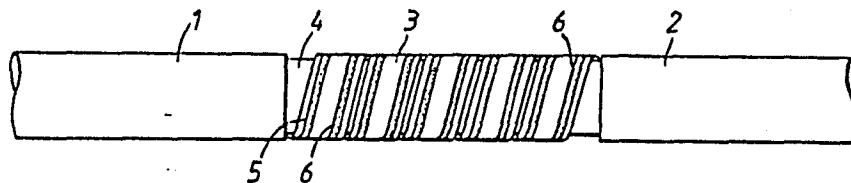


FIG. 1.

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AERIALS

This invention relates to aerials and more especially it relates to monopole aeralis.

Due to the impedance variation of aeralis over a given frequency band such as the HF or VHF bands for example, it is necessary to provide between an aerial and radio equipment with which it is operatively associated, an impedance matching unit the characteristics of which should ideally be modified in accordance with a frequency received if matching is to be optimised.

In order to reduce the impedance variations over a frequency band of interest so that the band can be covered with one matching unit, it is known to provide aeralis comprising a plurality of capacitively coupled elements.

It is an object of the present invention to provide an aerial having elements electrically linked by means of an improved capacitive coupling.

According to the present invention there is provided an aerial which comprises a plurality of electrically isolated conductive elements adjacent elements of which are coupled capacitively by means of a transmission line, the transmission line comprising at least two conductors one of which is electrically connected to one of the elements and the other is electrically connected to the

other element.

The conductive elements and the transmission line may be supported by means of an insulating material, for example, fibre glass.

5 The two conductors of the transmission line preferably lie substantially parallel with respect to one another and may be supported in an insulating flat strip which is wound around the insulating material between the adjacent elements.

10 The end portions of the elements may be substantially the same diameter.

The aerial may be a monopole aerial.

Embodiments according to the present invention are advantageous in that the capacitive coupling is frequency
15 dependent and a substantially 90° phase shift can be maintained between adjacent elements over a wide frequency band.

The invention will now be described by way of example with reference to the accompanying drawings:

20 Figure 1 shows part of a monopole aerial, in which a transmission line is wound around an insulating material between two adjacent elements of the aerial;

Figure 2 shows the transmission line comprising two conductors supported by an insulating flat strip; and

25 Figure 3 is a circuit diagram of a matching unit

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associated with the monopole aerial of Figure 1.

In Figure 1, two adjacent conductive elements 1 and 2, which form part of a monopole aerial, are capacitively coupled by means of a transmission line 3. The conductive elements 1 and 2 may comprise fibre glass coated with a conductive material such as copper. The adjacent elements 1 and 2 are mechanically linked by means of an insulating section 4, of for example fibre glass, which may be formed integrally with the elements 1 and 2.

Figure 2 shows the transmission line 3 before attachment to the elements 1 and 2. The transmission line 3 comprises two conductors 5 and 6 which are supported in parallel relationship by a flat insulating strip 7.

Alternatively, the transmission line 3 may comprise more than two conductors and may be round, instead of flat, in cross-section.

When the transmission line 3 is wound around the insulating section 4, it can be coupled to the elements 1 and 2 by electrically connecting one end of the conductor 5 to the conductive part of the element 1 and by electrically connecting the conductor 6 (at the other end of the transmission line 3) to the conductive part of the element 2.

The length of the transmission line 3, for the desired operating frequency band, is preferably such that

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the effective distributed capacity along the transmission line 3 varies with the impedance between the monopole aerial and the earth plane over which it is erected.

Figure 3 is a circuit diagram of a matching unit associated with a monopole aerial 11, which aerial can be constructed as described above. The monopole aerial 11 is arranged to be coupled via a matching unit to radio apparatus (not shown) with which it is to be operatively associated. The matching unit comprises a T filter which includes serially connected conductors 12 and 13 and a shunt capacitor 14. The T filter is coupled to the monopole aerial 11 via a co-axial line 15 having a screen 16. The screen 16 is connected to an earth rail 17 via conductors 18 and 19. In use, the monopole aerial 11 is coupled to radio apparatus via a socket 18 which is connected to the inductor 12 of the T filter.

By constructing a monopole aerial with capacitively coupled elements as described above, radio apparatus may be fed from such an aerial via a single matching unit of the kind described with reference to Figure 3.

CLAIMS:

1. An aerial comprising a plurality of electrically isolated conductive elements (1, 2), adjacent elements (1, 2) of which are coupled capacitively, characterised in that the adjacent elements are coupled capacitively by means of a transmission line (3), the conductive elements and the transmission line are supported by means of an insulating member (4), and the transmission line (3) comprises at least two conductors (5, 6) one of which is electrically connected to one of the elements and the other is electrically connected to the other element, the two conductors (5, 6) of the transmission line (3) lying substantially parallel with respect to one another and being supported in an insulating flat strip (7) which is wound around the insulating member between the adjacent elements.

2. An aerial according to claim 1, wherein the insulating member (4) is of fibreglass.

3. An aerial according to claims 1 or 2, wherein the elements (1, 2) are substantially the same diameter.

4. An monopole aerial according to any one of the preceding claims.

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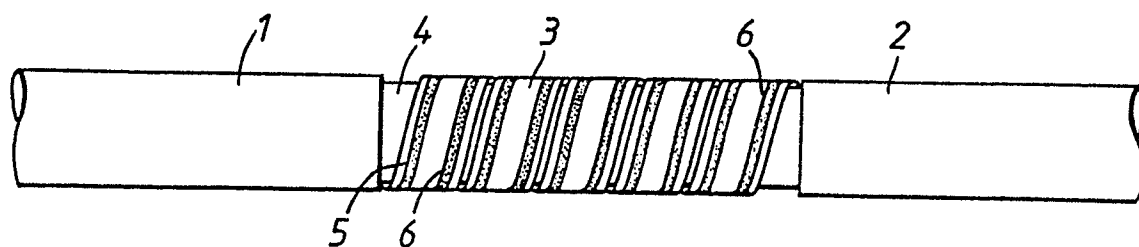


FIG. 1.

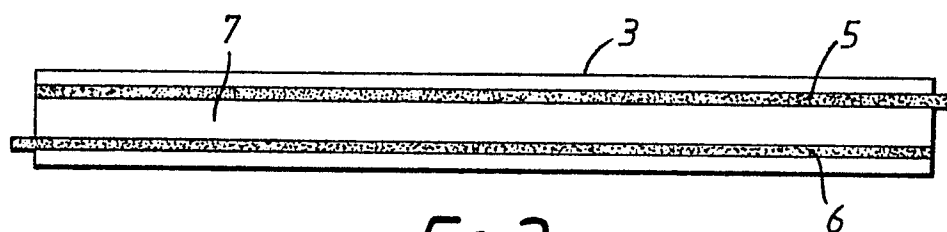


FIG. 2.

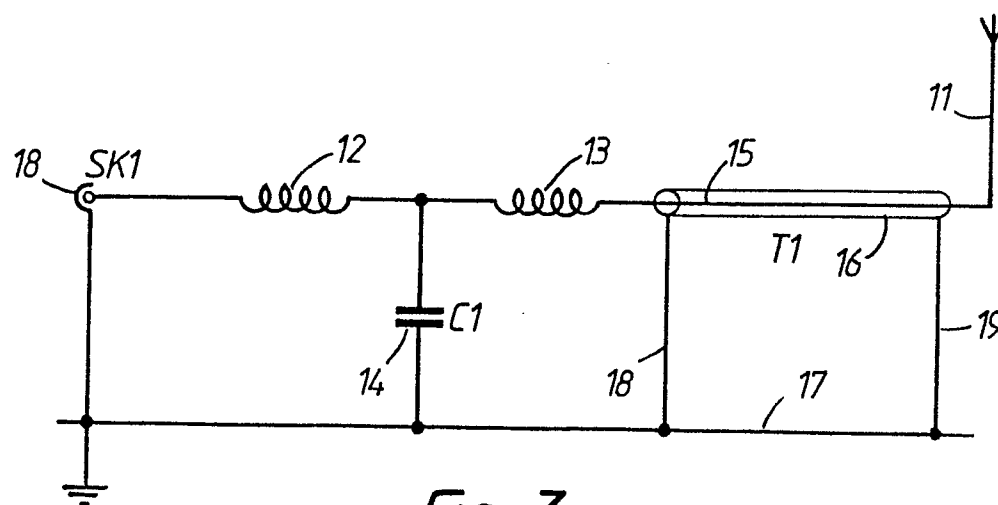


FIG. 3.



| 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. 4) |
| Y | GB-A-1 547 136 (MARCONI) * figure 3; page 1, lines 38-59 * | 1 | H 01 Q 9/30 |
| A | * page 2, lines 12-27 * | 2 | |
| Y | --- US-A-4 335 386 (R.H. JOHNS) * figure 1, abstract * | 1 | |
| A | --- US-A-3 747 112 (K. HIDAKA) * figure 1, abstract * | | |
| A | --- US-A-2 636 122 (A.C. HAYES) * figure 1 * | | |
| A | --- US-A-2 688 083 (E.G. HILLS) * figure 7 * | | |
| A | --- US-A-2 769 169 (A.L. MUNZIG) * figure 1 * | | TECHNICAL FIELDS SEARCHED (Int. Cl. 4) H 01 Q 5/02 H 01 Q 9/16 H 01 Q 9/30 |
| The present search report has been drawn up for all claims | | | |
| Place of search BERLIN | | Date of completion of the search 12-08-1986 | Examiner BREUSING J |
| 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 | | | |