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PATENT SPECIFICATION

(11) 1 322 300

DRAWINGS ATTACHED

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(19)

(54) IMPROVEMENTS IN OR RELATING TO AERIALS

(71) We, TELECOMMUNICATIONS LIMITED of Finglas, Dublin 11, Republic of Ireland, a company registered in the Republic of Ireland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a folded dipole aerial of the kind (hereinafter called "the kind referred to") comprising two interconnected parallel dipoles separated by a small fraction of the wavelength of operation and connected together at their outer ends wherein one dipole is interrupted adjacent its centre to provide a pair of adjoining terminals whereby energy can be fed to or from the aerial and wherein the other dipole is uninterrupted throughout its length.

When a balanced aerial is fed by a coaxial line, which is a form of unbalanced transmission line, it is advisable to interpose between the aerial and the line a balanced-to-unbalanced transformer or balun in order to prevent the flow of radio frequency currents along the outer conductor of the coaxial line, since these currents have the effect of disturbing the radiation pattern of the antenna in an unpredictable way. Furthermore, such currents increase the possibility of mutual interference between radio systems with aerials on the same mast and also increase susceptibility to electrical noise.

A variety of designs exists which achieve the balanced-to-unbalanced transformation. Some designs involve an impedance transformation; some impose a limitation on the power handling capacity of the antenna; some introduce band-width restrictions; and many are expensive to manufacture because of mechanical considerations and weatherproofing requirements.

According to the present invention in a folded dipole aerial of the kind referred to and adapted to feed or be fed from a coaxial line through the two terminals at the interruption, the centre of the uninterrupted dipole is directly electrically connected to one terminal at the interruption whereby the said terminal, the outer conductor of a coaxial line and the centre of the uninterrupted dipole can be connected together. Preferably the centre of the uninterrupted dipole and the terminal to which it is connected are also electrically connected to an earth conductor. Suitably, an aerial system comprising such a folded dipole aerial also includes a conductive member which supports the folded dipole aerial and also provides an earth conductor.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 shows a known arrangement of dipole aerial,

Figure 2 illustrates a dipole aerial embodying the invention; and

Figure 3 illustrates an aerial system embodying the invention. Corresponding portions of the aerials are indicated by like references in the various Figures.

Referring to Figure 1, this shows a folded dipole aerial of familiar configuration and comprising an uninterrupted dipole D together with a dipole formed of two limbs E and F interrupted adjacent its centre to provide two terminals A and B to which an unbalanced line in the form of a coaxial cable G can be connected. The outer conductor of the cable G is connected to the terminal B on limb E and the inner conductor of the cable is connected to terminal A on the limb F. At the centre of the uninterrupted conductor D there appears a balance point C which although not connected to an earth point can nevertheless be regarded as being at earth potential as indicated by the broken-line connection on Figure 1.

Because the folded dipole itself is a balanced aerial, then half the feed voltage,

irrespective of whether the aerial is a receiving or a transmitting element, will appear between each terminal A and B and the virtual earth presented at C so that it follows that half the feed voltage will appear, relative to earth, on the outer conductor of the cable G, leading to the undesirable effects mentioned earlier.

Referring now to Figure 2 this illustrates a folded dipole aerial embodying the invention. Here, the centre point of C of the uninterrupted conductor D is connected to the outer conductor of the coaxial cable G so that the portion E of the interrupted dipole and the part of the uninterrupted dipole D at the left hand side of the cable G as viewed in Figure 2 become, electrically, a single conductor effectively one quarter-wavelength long which thus provides an effective earth at the point C. Further, the terminal B is also connected electrically to the outer conductor of the cable G which now, being at virtual earth potential, has no currents flowing in it and therefore can be connected directly to earth as indicated on Figure 2.

Referring now to Figure 3 this illustrates an aerial system comprising a folded dipole aerial of the configuration illustrated in Figure 2 supported upon a conductive support member in the well known form of a boom H. The centre point of the uninterrupted dipole D is bolted at C to the boom H as is also at B the terminal formed by the inner end of the dipole portion E so that the point C is electrically connected to the point B by means of the boom H, the outer conductor of the cable G is also connected to the point B. The other feed terminal of the aerial again is the point A on the inner end of the dipole portion F and this is connected to the inner conductor of the cable G. Suitably, an insulating member J is mounted on the boom and can serve as a mechanical support, if desired, for the inner end of the dipole portion F.

It has been found that the feed impedance of the folded dipole aerial illustrated in Figures 2 and 3 is not substantially changed relative to the configuration illustrated in Figure 1, and no additional matching has been found to be necessary where the folded dipole element is used in an array for instance a Yagi array.

It will of course be understood that where the impedance presented by the folded dipole aerial differs from that of a main coaxial feeder, the customary quarter-wave section of coaxial cable of suitable impedance is still necessary in order to match the main feeder to the aerial.

WHAT WE CLAIM IS:—

1. A folded dipole aerial of the kind referred to and adapted to feed or be fed from a coaxial line through the two terminals at the interruption, wherein the centre of the uninterrupted dipole is directly electrically connected to one terminal at the interruption whereby the said terminal, the outer conductor of a coaxial line and the centre of the uninterrupted dipole can be connected together.

2. A folded dipole aerial as claimed in claim 1, wherein the centre of the uninterrupted dipole and the terminal to which it is connected are also electrically connected to an earth conductor.

3. A folded dipole aerial as claimed in claim 1 or claim 2 arranged to operate substantially as herein described with reference to Figure 2 of the accompanying drawings.

4. An aerial system comprising a folded dipole aerial as claimed in claim 2 or claim 3 together with a conductive member which supports the folded dipole aerial and provides an earth conductor.

5. An aerial system as claimed in claim 4 substantially as herein described with reference to Figure 3 of the accompanying drawings.

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1322300 COMPLETE SPECIFICATION

1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

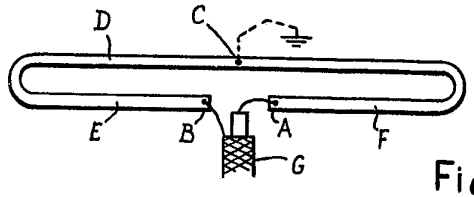

Fig.1

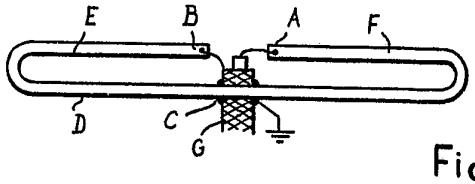

Fig.2

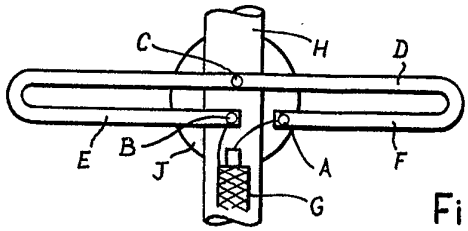

Fig.3