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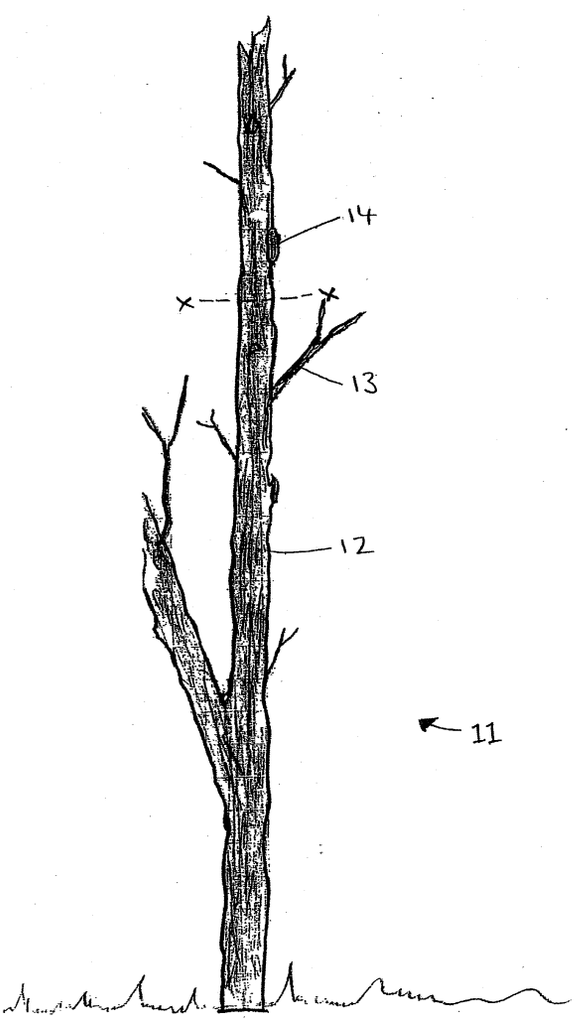
(54) Communications mast

(57) A communications mast comprises a housing enclosing the antenna, in which the housing comprises fixed and movable portions, the movable portion being attached to the fixed portion of structure for movement between open and closed portions, the open portion providing access to the antenna.

Figure 1



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Description

[0001] This invention relates to communications masts supporting antennae for receiving and transmitting electromagnetic signals, especially to such masts for locating in environmentally-sensitive positions. Generally, such masts are self-supporting.

[0002] There are an increasing number of masts, for receiving and/or transmitting electromagnetic signals, such as radio or microwaves, for the purpose of mobile phone networks or such like, being erected. These structures are typically 15 to 25 metres in height and therefore cause a large impact on the environment. Methods of concealment of these masts are known in the prior art. Many such arrangements involve disguising the mast for instance by simulating the appearance of a natural structure, such as a tree. This enables the mast to be less obtrusive in the overall appearance of the landscape and thus to reduce the adverse impact on the environment.

[0003] In addition to masts, other structures may be used in order to mount antennae. Lamp posts, advertising hoardings or other such street furniture may, for example, have antennae mounted thereon and would require to be protected from damage by the elements or vandals.

[0004] In masts of the type described, the antennae may be partly or completely concealed by a shroud and for installation or maintenance purposes part of the shroud would need to be removed in order to gain access to the antennae themselves. Typically, part of the shroud is removed in order to expose the antennae by the use of suitable access equipment, for example a cherry picker, a ladder or other means for providing a raised platform. In another method as shown in GB2333645, the mast itself is formed as a simulated tree which may be hingedly attached to its concrete base, so that the whole structure may be laid horizontally on the ground for maintenance and subsequently raised into its operational position when required.

[0005] These methods of exposing the antennae can be time consuming, involve the use of complex equipment, can be costly and also pose a health and safely risk to the workforce.

[0006] The present invention provides a communications mast which overcomes the problems as described above.

[0007] According to one aspect, the present invention provides a communications mast comprising a housing enclosing the antennae, in which the housing comprises fixed and movable portions, the movable portion being attached to the fixed portion of the structure for movement between open and closed positions, the open position providing access to the antennae.

[0008] The housing may comprise a plain upstanding structure or other structure such as an advertising hoarding, street lamp or other item of general street furniture. The housing may simulate a natural feature such as a tree, preferably a dead tree to avoid simulated foliage-bearing branches occluding or attenuating the electromagnetic signals. The tree structure may be erected so as to stand at a slight tilt, for example at an angle of about 2.5°, and the simulated trunk is preferably made from a material transparent, or substantially transparent, to electromagnetic waves. The trunk may also include appendages which simulate branches and/or apertures which simulate knots thereon, in order to enable the structure to look as realistic as possible. The apertures may also provide an opening for the positioning of dish type antennae.

[0009] Preferably, the movable portion is attached to the fixed portion by a hinge means. The hinge means may be positioned with the hinge axis disposed horizontally at the lower edge of the movable portion, whereby the movable portion swings down from the upper edge to the open position. Alternatively, the hinge means may be positioned with the hinge axis disposed horizontally at the upper edge of the moveable portion, whereby the movable portion swings up from the lower edge to the open position, or with the hinge axis disposed vertically, whereby the movable portion swings sideways to the open position.

[0010] Alternatively, the hinge means may comprise arms which are pivotably attached to the fixed and movable portions and which permit the movable portion to translate either laterally or vertically in moving between the open and closed positions.

[0011] The movable portion may be held in the closed position by a releasable latch means. The latch means is preferably situated at the opposite end of the movable portion to the hinge means. The latch means may be released directly from its position or may be remotely released from ground level.

[0012] The movable portion may be attached to cords, ropes or cables which are passed over pulley means to allow the displacement of the portion to be controlled with ease, from either the ground or from an elevated position up the mast.

[0013] In order to allow the movable portion to open to a certain, predetermined, position, stays may be attached between the movable and fixed portions. The stays preferably comprise cables, in a lower-hinged arrangement or releasable lid-stays or equivalents thereof in an upper-hinged arrangement.

[0014] In use, an operative climbs the mast and releases the latch means to enable the movable portion to be displaced from the closed position to the open position in order to gain access to the antennae contained within. Alternatively, the latch means may be remotely released from ground level before the operative climbs the mast.

[0015] Embodiments of the invention will now be described by way of example with reference to the accompanying drawings, of which

Figure 1 is a side elevation of a simulated tree struc-

ture covering a mast;

Figure 2 is a a front elevation showing the layout of the antennae inside the simulated tree structure;

Figure 3 is a side view of the layout as shown in Figure 2;

Figure 4 is a side elevation of one embodiment of a tree structure with the antennae exposed;

Figure 5 is a side elevation of another embodiment of a tree structure with the antennae exposed; and

Figure 6 is a side elevation of yet a further embodiment of a tree structure with the antennae exposed.

[0016] With reference firstly to Figure 1, a hollow housing formed as a simulated dead tree structure 11 is set into the ground and has a trunk 12, branches 13 and knots or knot holes 14. The structure is 15m high and it stands at a slightly tilted angle, 2.5° to the vertical, to enable the structure to look more realistic. The upper part of the trunk, above line X-X, is formed with hinge means, as more particularly described below with reference to Figures 4 to 6, to provide portions which are displaceable to enable operatives to gain access to the antennae contained within the housing.

[0017] With reference to Figures 2 and 3, the upper part of the trunk 12, above line X-X, has been removed in order to show the layout of the antennae inside. The mast 22, with latching points 27, supports mast head amplifiers (MHA's) 23, a radio unit 24, a microwave dish 25 and panel antenna 26. The invention can be applied to other antennae such as, for example, drum-type antennae. A pulley system 28, to aid in the movement of the displaceable portions of the structure, is positioned at the top end of the structure.

[0018] Figures 4, 5 and 6 show different embodiments of the hinge means.

[0019] With reference to Figure 4, the base portion 41 of the structure is fixed; the movable portions 43 are attached at their lower ends to the base portion by hinges 42. The movable portions can be swung downwards from their upper ends in order to gain access to the mast 49 supporting the MHA's 45, radio unit 46, microwave dish 47 and panel antenna 48. Cables 44 allow the movable portions to swing downwards to a predetermined portion where the cables are under tension and act as stays.

[0020] Similarly, with reference to Figure 5, the base portion 51 is fixed; the movable portions 56 are attached at their upper ends to the top part 59 of the structure by hinges 58. The movable portions can be swung upwardly from their lower ends in order to gain access to the mast 60 supporting the MHA's 52, radio unit 53, microwave dish 54 and panel antenna 55. Stays 57 limit the upwards or outwards movement of the openable portions or panels and retain them in the open position by an over-centre locking action.

[0021] With reference to Figure 6, the base 61 of the structure is fixed and the movable portion 66 is attached to the base portion by a vertical hinge, whereby the movable portion can be swung sideways in order to gain access to the mast 67 supporting the MHA's 62, radio unit 63, microwave dish 64 and panel antenna 65.

Claims

1. A communications mast comprising a housing enclosing antenna, in which the housing comprises fixed and movable portions, the movable portion being attached to the fixed portion of the structure for movement between open and closed positions, the open position providing access to the antenna.

2. A communications mast according to claim 1, in which the housing simulates a tree.

3. A communications mast according to claim 2, in which the trunk of the simulated tree is made from a material substantially transparent to electromagnetic waves.

4. A communications mast according to claim 2 or claim 3 further including appendages to the trunk to simulate branches and/or apertures to simulate knots.

5. A communications mast according to any preceding claim, in which the movable portion is attached to the fixed portion by hinge means.

6. A communications mast according to claim 5, in which the hinge means comprises arms which are pivotably attached to the fixed and movable portions and which permit the movable portion to translate either laterally or vertically in moving between the open and closed positions

7. A communications mast according to any preceding claim in which the movable portion is held in the closed position by a releasable latch means.

8. A communications mast according to claim 7, in which the latch means is remotely releasable from the ground level.

9. A communications mast according to any preceding claim in which the movable portion is operatively connected to a pulley means to allow movement of the portion to be controlled.

10. A communications mast according to any preceding claim further including stays attached between the

movable and fixed portions.

Figure 1

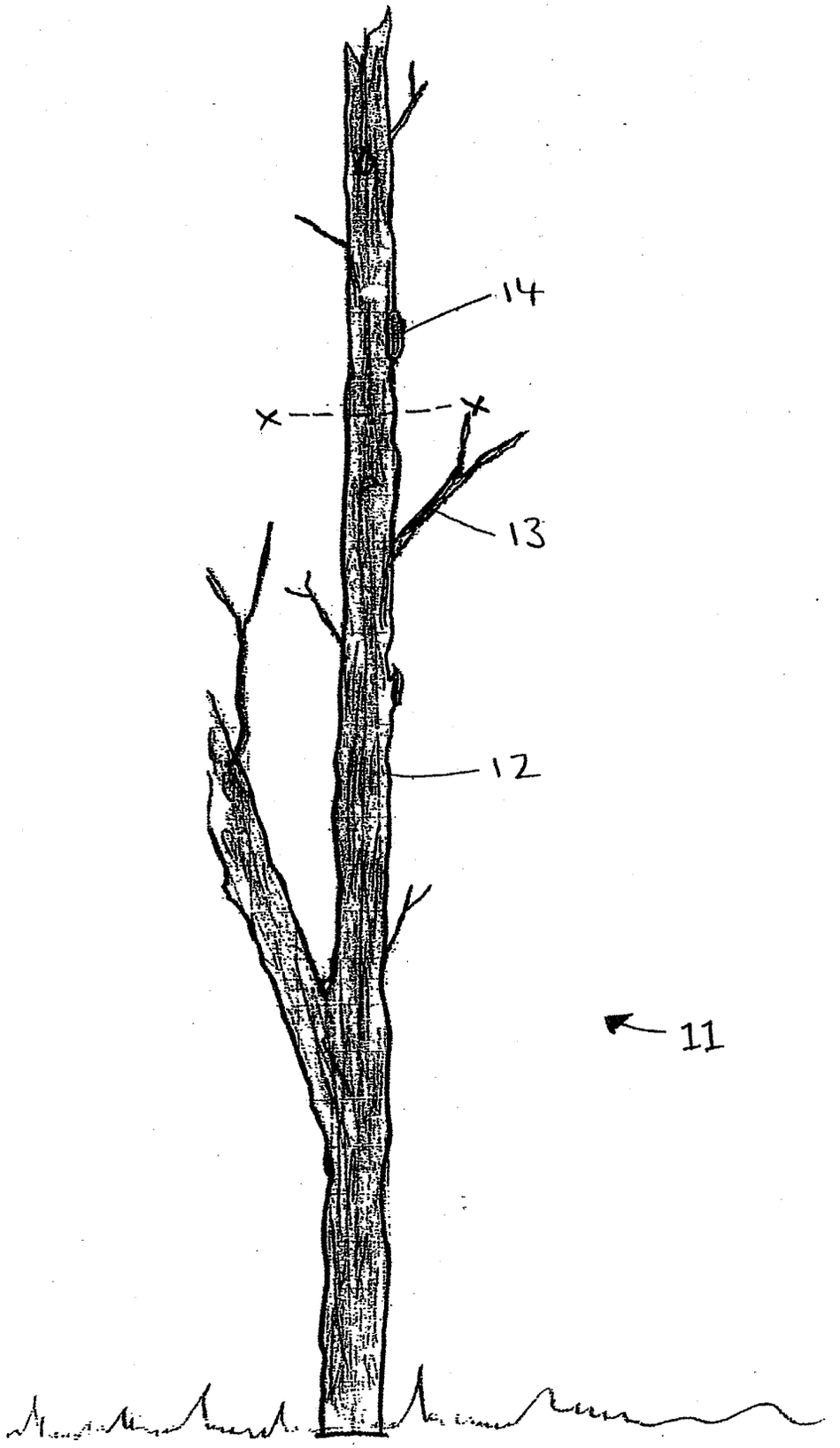


Figure 2

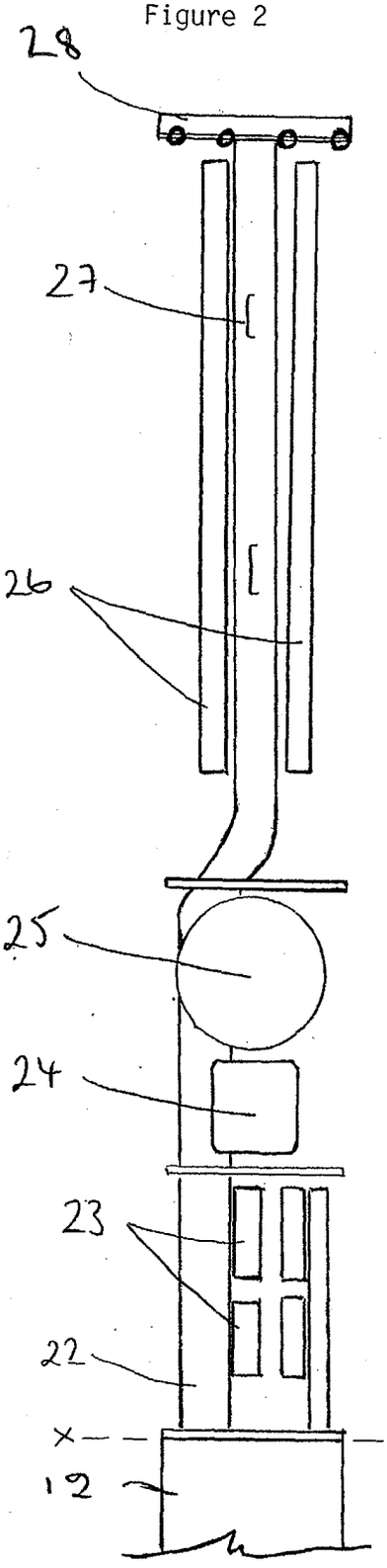
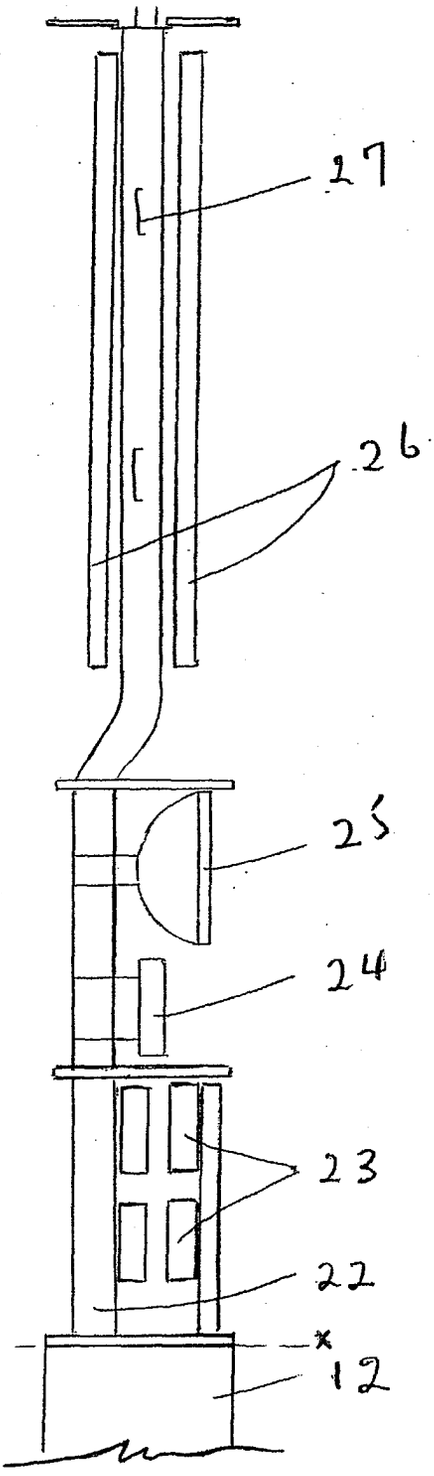


Figure 3



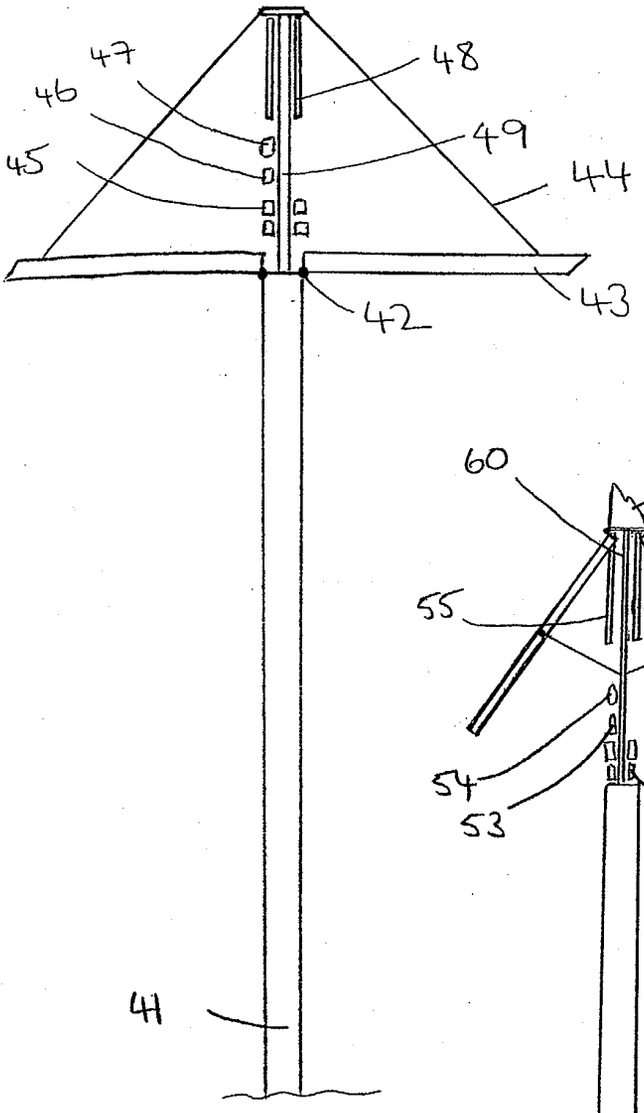


Figure 4

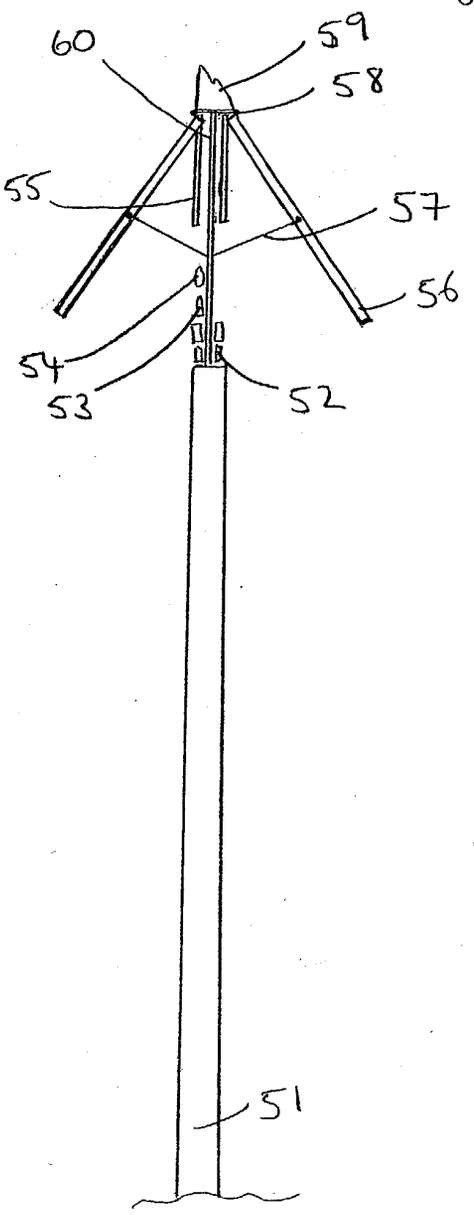


Figure 5

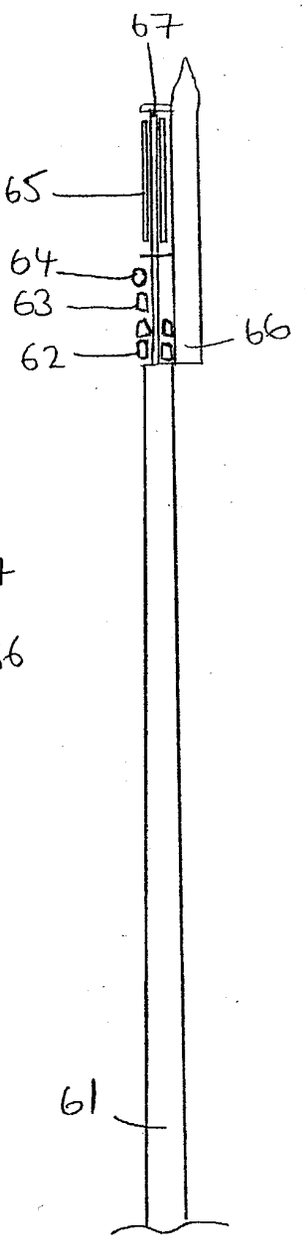


Figure 6

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EUROPEAN SEARCH REPORT

Application Number
EP 04 25 1066

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)
X	US 2002/184833 A1 (JONES DOUGLAS) 12 December 2002 (2002-12-12) * abstract; claims 8-10; figures 8-11 * * paragraphs [0044] - [0046], [0053] *	1-10	H01Q1/12 H01Q1/44
X	ALAN DICK & COMPANY: "Lightning Tree" WWW.ALANDICK.COM, [Online] 9 July 2001 (2001-07-09), XP002283035 Retrieved from the Internet: URL:http://web.archive.org/web/20010709231608/www.alandick.com/pages/enviro/lightning_tree.html> [retrieved on 2004-06-03] * the whole document *	1-5,7	
D,A	GB 2 333 645 A (VODAFONE LTD) 28 July 1999 (1999-07-28) * abstract; claims 1,3,7,8,10; figures 1,3,7 * * page 7, line 10 - line 11 *	1-5,7	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7) H01Q

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 June 2004	Jäschke, H

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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03-06-2004

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82