

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 884 796 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
24.03.1999 Bulletin 1999/12

(51) Int. Cl.⁶: **H01Q 1/36**, H01Q 9/42,
H01Q 9/26

(43) Date of publication A2:
16.12.1998 Bulletin 1998/51

(21) Application number: **98110723.8**

(22) Date of filing: **10.06.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **11.06.1997 JP 153205/97**
30.07.1997 JP 204019/97

(71) Applicant:
Matsushita Electric Industrial Co., Ltd.
Kadoma-shi, Osaka 571-0050 (JP)

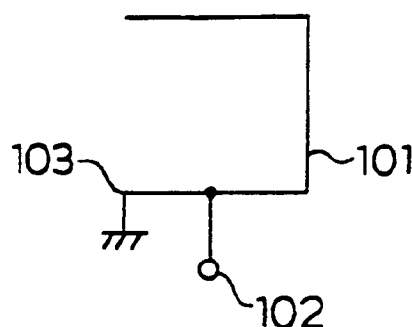
(72) Inventors:
• **Kane, Joji**
Nara-shi, Nara 631-0804 (JP)
• **Yosida, Takasi**
Ikoma-shi, Nara 630-0213 (JP)
• **Nomura, Noboru**
Kyoto-shi, Kyoto 612-0889 (JP)

(74) Representative:
Grünecker, Kinkeldey,
Stockmair & Schwanhäusser
Anwaltssozietät
Maximilianstrasse 58
80538 München (DE)

(54) **Antenna device consisting of bent or curved portions of linear conductor**

(57) An antenna device has at least one linear conductor each having one or more bent or curved portions for a feeder section.

F i g . 1 (a)



EP 0 884 796 A3



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 11 0723

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.6)
X	AU 55898 73 A (ANTENNA ENGINEERING AUSTRALIA) 21 November 1974	1,2,7,9, 16,17, 43,52, 58-60, 64, 77-83, 86-88	H01Q1/36 H01Q9/42 H01Q9/26
Y	* page 2 - page 6; figures 2,6,7,9,10 *	3-6,17	
X	WO 93 12559 A (SIEMENS ÖSTERREICH) 24 June 1993	1,2,7,9, 16,17, 43,52, 58-60, 64,69,70	
Y	* page 2, line 4 - page 5, line 4; figures 1-3 *	4-6,17	
X	EP 0 777 293 A (MURATA) 4 June 1997 * column 2, line 42 - column 4, line 32; figures 1-8 *	18-27,73	
X	DE 37 32 994 A (MENZLEWSKI) 13 April 1989 * column 1, line 60 - column 2, line 25; figures A-C *	18-24	TECHNICAL FIELDS SEARCHED (Int.Cl.6) H01Q
X	US 5 585 807 A (TAKEI) 17 December 1996 * column 4, line 61 - column 8, line 14; figures 7-20 *	49,66	
X	US 4 571 596 A (HODGKINSON) 18 February 1986 * abstract; figures 1,2 *	41	
X	US 4 207 574 A (TOIA) 10 June 1980 * abstract; figures 1,3 *	41	
X	US 3 858 220 A (ARNOW) 31 December 1974 * abstract; figures 1-5 *	42	
-/--			
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 27 January 1999	Examiner Angrabeit, F
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			

EPO FORM 1503 03/82 (P04C01)



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 11 0723

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.6)
X	GB 1 020 727 A (FUBA) * claim 1; figures 1-3 *	42	
Y	US 5 517 206 A (BOONE ET AL.) 14 May 1996 * abstract *	3,17	
Y	WO 85 02719 A (MOTOROLA) 20 June 1985 * page 4, line 11 - page 5, line 26; figures 1-4 *	4-6	
Y	BOIFOT A M: "SHORTENED, DIRECTIVE DIPOLE FOR ARRAY ANTENNAS" INTERNATIONAL JOURNAL OF ELECTRONICS, vol. 71, no. 1, 1 July 1991, pages 127-137, XP000240504 * page 127, paragraph 2. - page 131; figures 3,4 *	4-6	
Y	FR 2 553 584 A (SOCIETE TECHNIQUE D APPLICATION) 19 April 1985 * page 6, line 31 - page 7, column 9, line 9; figure 4 *	17	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
Place of search		Date of completion of the search	Examiner
THE HAGUE		27 January 1999	Angrabeit, F
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			

EPO FORM 1503 03/82 (P04C01)



European Patent
Office

Application Number
EP 98 11 0723

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
1-9, 16, 17, 18-36, 41, 42, 43-49, 52-54, 58-60, 64-88
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-9,16,17,43-48,52-54,58-60,64-70,72,76-83,86-88

Antenna device consisting of a linear conductor with bent or curved or spirally wound portions mounted over a ground plane with a connection to the ground plane used in portable telephone or vehicle

2. Claims: 10-13

Directivity or polarisation control with switching elements

3. Claims: 14,15

Directivity control by changing distance between antenna and conductive base plate

4. Claims: 18-36,49,66,73-75,84,85

Plurality of different antenna elements for multiband use

5. Claims: 37-40

Means for tuning frequency

6. Claims: 41,42

Coil connection

7. Claim : 61

Means for rotating the antenna device

8. Claim : 62

Directivity control by use of ferroelectrics

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 11 0723

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

27-01-1999

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
AU 5589873 A	21-11-1974	NONE	
WO 9312559 A	24-06-1993	AT 396532 B	27-09-1993
		AT 245991 A	15-01-1993
		AT 126629 T	15-09-1995
		DE 59203316 D	21-09-1995
		EP 0616734 A	28-09-1994
EP 0777293 A	04-06-1997	JP 9162624 A	20-06-1997
DE 3732994 A	13-04-1989	NONE	
US 5585807 A	17-12-1996	JP 7193421 A	28-07-1995
US 4571596 A	18-02-1986	NONE	
US 4207574 A	10-06-1980	NONE	
US 3858220 A	31-12-1974	NONE	
GB 1020727 A		BE 646915 A	17-08-1964
		BE 631321 A	
		FR 85636 E	17-12-1965
		FR 1355445 A	19-06-1964
		NL 291434 A	
		NL 6404466 A	26-07-1965
US 5517206 A	14-05-1996	NONE	
WO 8502719 A	20-06-1985	US 4571595 A	18-02-1986
		EP 0165264 A	27-12-1985
FR 2553584 A	19-04-1985	CA 1224562 A	21-07-1987