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**Declaration under Rule 4.17:**  
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(i))

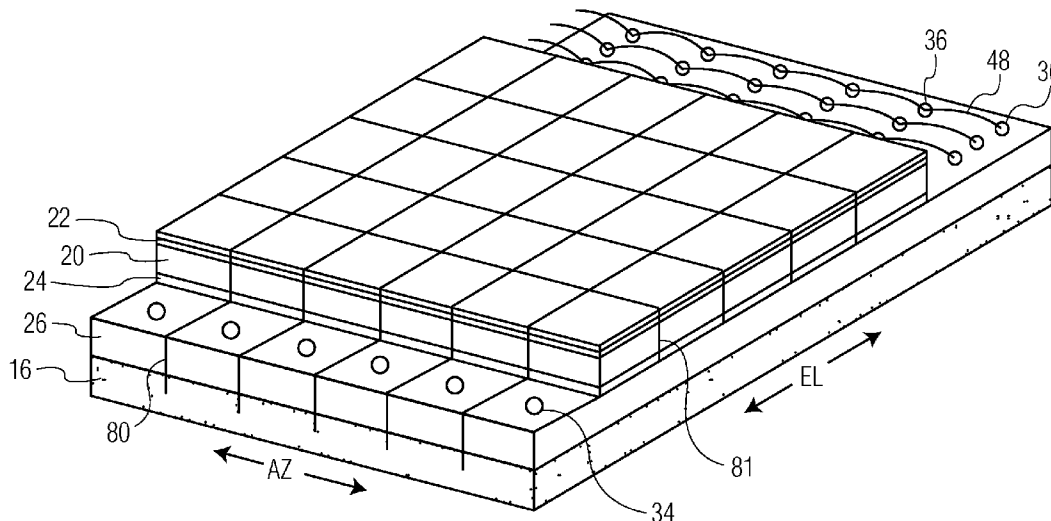
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- (81) **Designated States (unless otherwise indicated, for every kind of national protection available):** AE, AG, AL, AM,

(54) **Title:** CURVED TWO DIMENSIONAL ARRAY TRANSDUCER



(57) **Abstract:** A curved two dimensional array transducer includes a layer of piezoelectric material (20) overlaying a layer of ASICs (26) which is attached to a backing wing (16). The piezoelectric material (20) is diced in orthogonal azimuth and elevation directions to form a two dimensional array of transducer elements, with the dicing cuts in the elevation direction extending through the ASIC layer (26) so that the piezoelectric layer (20) and the ASIC layer (26) can be bent in the azimuth direction. The backing wing (16) provides a flexible substrate which can be bent while supporting the ASIC layer (26) and piezoelectric elements (20). In a second example the piezoelectric layer (20) and ASIC layer (26) are attached to opposite sides of flex circuit which provides the flexible substrate after the piezoelectric layer (20) and ASIC layer (26) are diced.

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# INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2006/052535

A. CLASSIFICATION OF SUBJECT MATTER  
INV. B06B1/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
B06B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No
X	US 5 648 942 A (KUNKEL III HARRY A [US]) 15 July 1997 (1997-07-15) column 1, line 18 - line 29 column 3, line 24 - line 28 column 4, line 47 - line 52 column 5, line 13 - line 34 figures 1,4	1-3
A	----- US 2004/048470 A1 (DINET DOMINIQUE [FR] ET AL) 11 March 2004 (2004-03-11) paragraphs [0053], [0054], [0089], [0090] figures 15-18 ----- -/---	1-10

Further documents are listed in the continuation of Box C

See patent family annex

\* Special categories of cited documents

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

5 January 2007

Date of mailing of the international search report

10/05/2007

Name and mailing address of the ISA/

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## INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2006/052535

## C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with Indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 03/000137 A (BAE SYSTEMS INFORMATION [US]) 3 January 2003 (2003-01-03) page 4, line 9 - line 10 page 5, line 19 - line 22 page 21, line 21 - page 22, line 6 figure 12  -----	1-10
A	US 6 263 551 B1 (LORRAINE PETER WILLIAM [US] ET AL) 24 July 2001 (2001-07-24) column 5, line 41 - line 57 column 6, line 16 - line 34 figures 4,6  -----	1-10

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2006/052535

**Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

- 1.  Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
- 2.  Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
- 3.  Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

- 1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
- 2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
- 3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
- 4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-10

Remark on **Protest**

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-10

In addition to the common concept invention I defines a layer of backing material in order to attenuate unwanted acoustic energy emitted from the back of the array.

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2. claims: 11-17

In addition to the common concept invention II defines a layer of flex circuitry in order to promote the curvature of the array.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2006/052535

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
<b>US</b> 5648942	<b>A</b>	15-07-1997	<b>NONE</b>
<b>us</b> 2004048470	<b>A1</b>	11-03-2004	<b>NONE</b>
<b>WO</b> 03000137	<b>A</b>	03-01-2003	<b>NONE</b>
<b>us</b> 6263551	<b>B1</b>	24-07-2001	<b>NONE</b>