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(54) Title: ULTRA WIDE BANDWIDTH TRANSDUCER WITH DUAL ELECTRODE

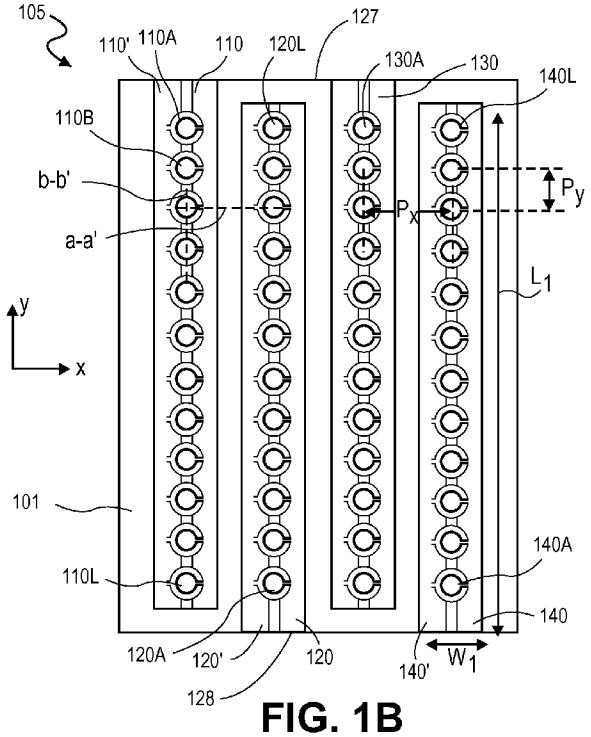

FIG. 1B

(57) Abstract: Wide bandwidth piezoelectric micromachined ultrasonic transducers (pMUTs), pMUT arrays and systems having wide bandwidth pMUT arrays are described herein. For example, a piezoelectric micromachined ultrasonic transducer (pMUT) includes a piezoelectric membrane disposed on a substrate. A reference electrode is coupled to the membrane. First and second drive/sense electrodes are coupled to the membrane to drive or sense a first and second mode of vibration in the membrane.

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MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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A. CLASSIFICATION OF SUBJECT MATTER
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ADD.

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 H01L

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 practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	US 2003/137224 A1 (ZLOTER YITZHAK [IL] ET AL ZIOTER YITZHAK [IL] ET AL) 24 July 2003 (2003-07-24) abstract; figures 3,16 paragraphs [0001], [0012], [0013], [0020], [0021], [0071] - [0080]	1-19
A	US 2011/074248 A1 (HISHINUMA YOSHIKAZU [JP]) 31 March 2011 (2011-03-31) abstract; figures 1,2,4a,4b paragraphs [0001], [0005], [0006], [0009], [0010], [0050] - [0055]	1-19

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	WO 2011/094393 A1 (RES TRIANGLE INST [US]; DAUSCH DAVID EDWARD [US]) 4 August 2011 (2011-08-04) pages 1,6,14	1-19
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