



(51) International Patent Classification:

B41J 2/14 (2006.01) *G01N 29/24* (2006.01)
B06B 1/02 (2006.01)

(21) International Application Number:

PCT/US2012/033864

(22) International Filing Date:

17 April 2012 (17.04.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

13/089,532 19 April 2011 (19.04.2011) US
13/089,541 19 April 2011 (19.04.2011) US

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

AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, 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).

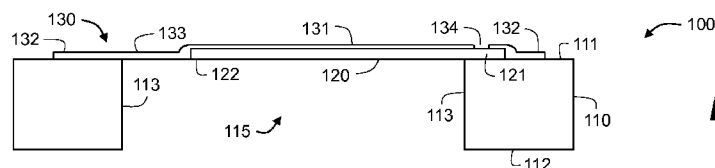
Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

15 August 2013

(54) Title: MEMS COMPOSITE TRANSDUCER INCLUDING COMPLIANT MEMBRANE

**FIG. 1B**

(57) **Abstract:** A MEMS composite transducer (100) includes a substrate (110), a MEMS transducer (120), and a compliant membrane (130). Portions of the substrate define an outer boundary of a cavity (115). A first portion (121) of the MEMS transducing member is anchored to the substrate. A second portion of the MEMS transducing member extends over at least a portion of the cavity and is free to move relative to the cavity. The compliant membrane is positioned in contact with the MEMS transducing member. A first portion (131) of the compliant membrane covers the MEMS transducing member and a second portion (132) of the compliant membrane is anchored to the substrate.

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/033864

A. CLASSIFICATION OF SUBJECT MATTER
INV. B41J2/14 B06B1/02 G01N29/24
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)

B41J B06B G01N

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)

EP0-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 2006/132546 A1 (GAU TIEN-HO [TW] ET AL) 22 June 2006 (2006-06-22)	1-6, 18-21, 24,26, 27,33-35
Y	the whole document	22,23, 25, 28-32, 36-39, 41-76
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☒ 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 application or patent 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

25 March 2013

Date of mailing of the international search report

11/06/2013

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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2012/033864

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2005/046672 A1 (CABAL ANTONIO [US] ET AL) 3 March 2005 (2005-03-03) paragraph [0003]; figures 10c,11a,11b,13a,13b,15a,15b paragraph [0043] - paragraph [0048] paragraph [0053] - paragraph [0075] -----	22,23, 25, 28-30, 36-39, 43-76
Y	US 2007/245827 A1 (WANG LI-PENG [US]) 25 October 2007 (2007-10-25) abstract; figures 5,6,8 -----	41,42
Y	EP 1 630 416 A1 (PALO ALTO RES CT INC [US]) 1 March 2006 (2006-03-01) abstract -----	31,32

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/033864

Box No. 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 No. 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 fees, this Authority did not invite payment of additional fees.
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.:

1-6, 18-39, 41-76

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ 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: 1-6, 18-39, 41-76

A MEMS composite transducer comprising a beam having a first end and a second end wherein the first end and the second end are each anchored to the substrate.

2. claims: 7-17

A MEMS composite transducer comprising a beam including a first width at its first end and a second width at its second end, wherein the first width is greater than the second width.

3. claim: 40

A MEMS composite transducer, wherein the compliant membrane includes a hole.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2012/033864

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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