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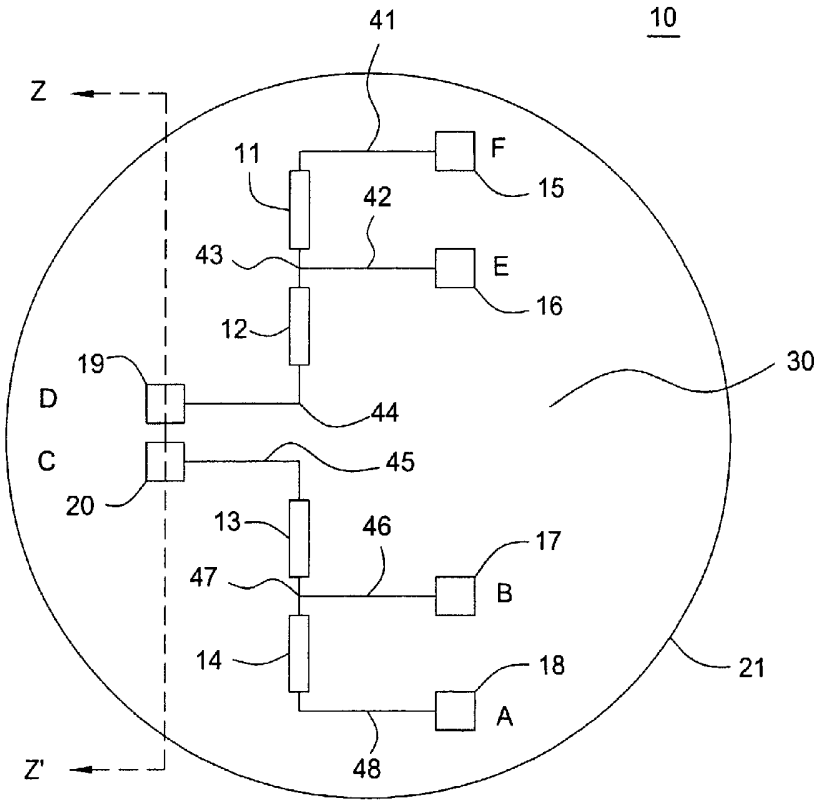
(54) Title: FLEXIBLE THIN FILM PRESSURE SENSOR



(57) Abstract: Low pressure sensing and imperviousness to corrosion and to the effects of harsh environments are achieved in a pressure sensor that employs a flexible membrane supporting piezoresistive elements. A plurality of piezoresistive elements are aligned substantially collinearly across one surface of the flexible membrane. Innermost piezoresistive elements are disposed in such a way that they experience tension in response to an applied pressure, whereas outermost piezoresistive elements are disposed in such a way that they experience compression in response to the same applied pressure. Contact pads for each end of each piezoresistive element allow the elements to be configured in any number of desirable arrangements. In one exemplary embodiment, four piezoresistive elements are disposed along a main central axis of the membrane. The contacts of the elements are connected to form a Wheatstone bridge. Conventional Wheatstone bridge techniques are utilized to convert an applied pressure into an output electrical signal. The membrane includes amorphous or nanocrystalline semiconductor layers grown on a flexible substrate such as Kapton or suitable plastic materials.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/19509

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G01L 19/04

US CL : 73/715

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)

U.S. : 73/715, 708, 721, 727, 726, 719, 720; 361/283.1

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

NONE

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

Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X --- Y	US 6,006,607 A (BRYZEK et al) 28 December 1999 (28.12.1999), Figures 1c, 1d, 7; column 3, lines 20-22; column 4, lines 10-15; abstract.	1-4 --- 5-9
Y	HOROWITZ et al, Differential and Instrumentation Amplifiers, Cambridge University Press, 1989, page 421.	5
Y	US 5,867,886 A (RATELL et al) 09 February 1999 (09.02.1999), column 1, lines 15-32; column 6, line 14.	6-9
Y	MALHAIRE et al, Design of a polysilicon-on-insulator pressure sensor with original polysilicon layout for harsh environment, Thin Soild Films, Vol. 427, Issue 1, 03 March 2003 (03.03.2003), pages 362-366.	7, 9
A	US 3,328,653 A (WOLF, JR.) 27 June 1967 (27.06.1967), see entire document.	1-9
A	US 4,685,469 A (KELLER) 11 August 1987 (11.08.1987), see entire document.	1-9
A	US 5,432,372 A (OHTANI) 11 July 1995 (11.07.1995), see entire document.	1-9

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,668,320 A (COWAN) 16 September 1997 (16.09.1997), see entire document.	1-9
A	US 5,681,997 A (MCHALE et al) 28 October 1997 (28.10.1997), see entire document.	1-9
A	US 6,131,466 A (VIGNA et al) 17 October 2000 (17.10.2000), see entire document.	1-9
A	US 6,568,276 B1 (CIMINELLI) 27 May 2003 (27.05.2003), see entire document.	1-9
A,P	US 6,700,174 B1 (MIU et al) 02 March 2004 (02.03.2004), see entire document.	1-9

Continuation of B. FIELDS SEARCHED Item 3:
EAST: US-PGPUB; USPAT; DERWENT
search terms: thin adj film adj pressure adj (sensor transducer); thin adj film adj pressure adj (sensor transducer).ti.; 73/727; 73/727 and flexible near2 substrate; 73/720; first adj piezoresistive adj elements and flexible; first adl piezoresistive adj elements; 73/721; ("4685469").PN.; ("3328653").PN.; pressure adj (sensor transducer) and piezoresistive adn thin adj film; (piezoresistive wheatstone); collinearly; flexible adj substrate adn pieziresist$3; flexible adj substrate adn piezo-resistive