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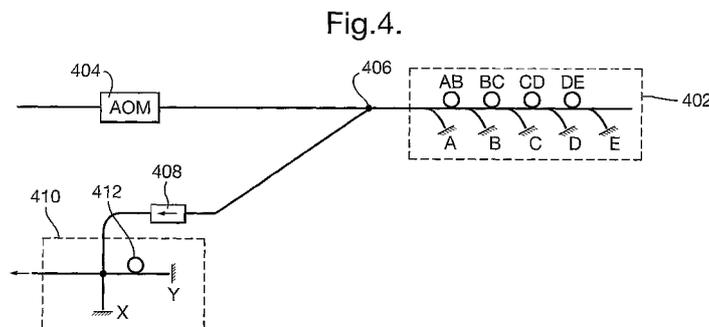
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(54) Title: PHASE BASED SENSING



(57) Abstract: Interrogation of a phase based transducer is performed by comparing the state of the transducer at two points in time to determine the rate of change with time of the measurand represented as a phase change. The rate of change, or derivative of the phase change typically has a much smaller amplitude than the signal itself, and the derivative measurement can therefore be thought of as a low sensitivity measurement to be used instead of or in combination with the normal signal measurement having higher sensitivity. In this way, large amplitude signals which might otherwise be subject to overscaling effects can be measured more effectively. For a signal with the majority of its energy centred at approximately 800Hz, for example, the derivative of that signal will typically be attenuated by 60dB with a period between the two measurement times of 200ns.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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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)
G01D G01H

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 770 535 A (KIM BYOUNG Y [US] ET AL) 13 September 1988 (1988-09-13) figure 5 claims column 15, line 11 - column 16, line 53 -----	1-33
X	US 5 140 154 A (YUREK AILEEN M [US] ET AL) 18 August 1992 (1992-08-18) figure 2D column 1, line 51 - column 2, line 10 -----	1-33
X	WO 00/12977 A (INPUT OUTPUT INC [US]) 9 March 2000 (2000-03-09) figure 5 claims -----	1, 15
X	US 6 449 046 B1 (HUANG SHIH-CHU [TW] ET AL) 10 September 2002 (2002-09-10) claim 1 -----	1, 15

Further documents are listed in the continuation of Box C.

See patent family annex.

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Publication date	Patent family member(s)	Publication date
US 4770535	A	13-09-1988	NONE	
US 5140154	A	18-08-1992	NONE	
WO 0012977	A	09-03-2000	AU 768115 B2	04-12-2003
			AU 6241899 A	21-03-2000
			CA 2342639 A1	09-03-2000
			EP 1110066 A1	27-06-2001
			NO 994212 A	02-03-2000
			US 6522797 B1	18-02-2003
			US 6591025 B1	08-07-2003
US 6449046	B1	10-09-2002	NONE	