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<p>(21) International Application Number: PCT/US96/14477 (22) International Filing Date: 10 September 1996 (10.09.96) (30) Priority Data: 60/003,682 11 September 1995 (11.09.95) US (71)(72) Applicants and Inventors: NOLAN, James, A. [US/US]; P.O. Box 567, Conifer, CO 80433 (US). MOODY, Trevor, J. [AU/US]; 115 E. 34th Street, No. 11C, New York, NY 10016 (US). (74) Agent: SMITH, Brian, D.; Suite 1800, 1700 Broadway, Denver, CO 80290 (US).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, US, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p> <p>(88) Date of publication of the international search report: 5 June 1997 (05.06.97)</p>
<p>(54) Title: METHOD AND APPARATUS FOR CONTINUOUS, NON-INVASIVE MONITORING OF BLOOD PRESSURE PARAMETERS</p>		
<p>(57) Abstract</p>		
<p>Continuous, non-invasive method and apparatus for measuring blood pressure parameters and the like are disclosed. The apparatus includes an earpiece (10) for sealing an individual's ear canal so that arterial blood pressure changes adjacent the sealed ear canal (12) produce air pressure changes in the sealed ear canal (12). The apparatus further includes pressure sensing means (24) for measuring the air pressure changes in the sealed ear canal (12) and producing a signal related to the measured air pressure changes. In addition, the apparatus preferably includes processing means (52) for processing the signal to measure</p>		
<p>blood pressure parameters, as well as means for displaying (58) and/or recording (50) the processed signal. The method may be used to determine heart rate, blood pressure, cardiac output, stroke volume, cardiac function, circulatory function, and other parameters. To obtain absolute pressure readings, two sensors (24a, 24b), one in each ear, may be used to monitor pulse time transit delay.</p>		

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INTERNATIONAL SEARCH REPORT

Internat. Application No
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A. CLASSIFICATION OF SUBJECT MATTER IPC 6 A61B5/021				
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) IPC 6 A61B				
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)				
C. DOCUMENTS CONSIDERED TO BE RELEVANT				
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
A	GB 2 162 325 A (ELECTRONIC IDENTIFICATION SYSTEMS SILKEBORG A S) 29 January 1986 see abstract see page 1, line 56 - line 126 see figures 1-4 ---	1,14,15, 17-19, 21,22, 30,35		
A	GB 2 210 168 A (MARCHBANKS) 1 June 1989 see page 2, line 31 - page 3, line 27 see page 4, line 12 - page 7, line 34 see figures 1-3 --- -/--	1,3,5-7, 10-12, 14-16, 19-22, 25-27, 29,30, 32,33,37		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.				
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Date of the actual completion of the international search 27 February 1997	Date of mailing of the international search report <p style="text-align: center; font-weight: bold; font-size: 1.2em;">19. 03. 97</p>			
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl, Fax (+ 31-70) 340-3016	Authorized officer <p style="text-align: center; font-weight: bold; font-size: 1.2em;">Chen, A</p>			

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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	GB 2 284 060 A (HORTON) 24 May 1995 see page 3, line 28 - page 6, line 2 see figure <p style="text-align: center;">-----</p>	1,3,11, 15-18, 27,33, 35,36

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 96/14477

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2162325 A	29-01-86	DE 3525855 A JP 61041450 A NL 8502139 A SE 451176 B SE 8504037 A US 4651750 A	30-01-86 27-02-86 17-02-86 14-09-87 01-03-87 24-03-87

GB 2210168 A	01-06-89	NONE	

GB 2284060 A	24-05-95	NONE	
