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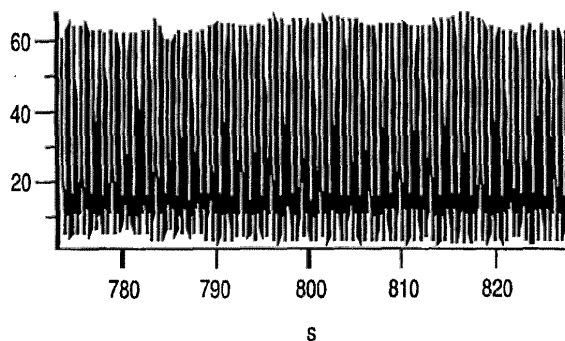
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(54) **Method of assessing blood volume using photoelectric plethysmography**

(57) A method and system for assessing blood volume within a subject includes generating a cardiovascular waveform representing physiological characteristics of a subject and determining blood volume of the subject by analyzing the cardiovascular waveform. The step of analyzing includes generating a first trace of the per heart-beat maximums of the cardiovascular waveform, which is representative of the systolic pressure upon the cardiovascular signal, generating a second trace of the

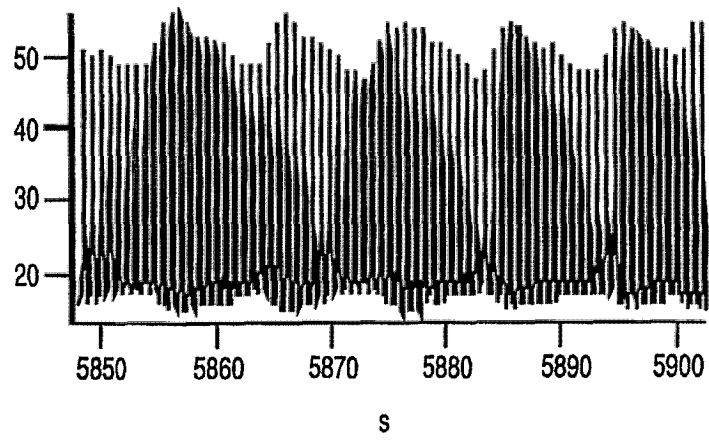
per heart-beat minimums of the cardiovascular waveform, which is representative of the diastolic pressure upon the cardiovascular signal, and comparing the respective first trace and the second trace to generate an estimate of relative blood volume within the subject. In accordance with an alternate method of analyzing harmonic analysis is applied to the cardiovascular waveform, extracting a frequency signal created by ventilation and applying the extracted frequency signal in determining blood volume of the subject.

FIG.1a



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FIG.1b





PARTIAL EUROPEAN SEARCH REPORT

Application Number

under Rule 62a and/or 63 of the European Patent Convention.
This report shall be considered, for the purposes of subsequent proceedings, as the European search report

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JIMÉNEZ R F ET AL: "Time-frequency analysis of arterial pressure oscillations in anesthetized dogs: effects of standardized hemorrhages", SHOCK (PHILADELPHIA): INJURY, INFLAMMATION, AND SEPSIS: LABORATORY AND CLINICAL APPROACHES, LIPPINCOTT WILLIAMS & WILKINS, US, vol. 15, no. 2, 1 February 2001 (2001-02-01), pages 143-150, XP008147700, ISSN: 1073-2322 * see items "Introduction" and "Results", in particular the description of figures 1 and 2. * ----- -/--	1	INV. A61B5/024 A61B5/00 G06F19/00
			TECHNICAL FIELDS SEARCHED (IPC)
			A61B G06F
INCOMPLETE SEARCH			
The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC so that only a partial search (R.62a, 63) has been carried out.			
Claims searched completely :			
Claims searched incompletely :			
Claims not searched :			
Reason for the limitation of the search: see sheet C			
Place of search		Date of completion of the search	Examiner
The Hague		24 January 2012	Dhervé, Gwenaëlle
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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PARTIAL EUROPEAN SEARCH REPORT

Application Number
EP 11 17 9769

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (IPC)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	<p>VARANINI M ET AL: "Spectral analysis of cardiovascular time series by the S-transform", COMPUTERS IN CARDIOLOGY 1997 LUND, SWEDEN 7-10 SEPT. 1997, NEW YORK, NY, USA, IEEE, US, 7 September 1997 (1997-09-07), pages 383-386, XP010264536, DOI: 10.1109/CIC.1997.647913 ISBN: 978-0-7803-4445-7 * abstract * * see items "2.Methods" and "4.2. real signals" *</p> <p style="text-align: center;">-----</p>	1	
			TECHNICAL FIELDS SEARCHED (IPC)

EPO FORM 1503 03.82 (P04C10) 2



**INCOMPLETE SEARCH
SHEET C**

Application Number

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Claim(s) completely searchable:

2-21

Claim(s) searched incompletely:

1

Reason for the limitation of the search:

Contrary to the requirement of Article 76(1) EPC, the subject-matter of the present divisional application extends beyond the content of the earlier application 04700084.9, as filed (see the published PCT version WO-A-2004/080300), for the following reasons at least.

No basis can be found in the original disclosure of the parent application for the definition of a method and an apparatus "for facilitating detection of physiological changes" as defined in the independent claims 1 and 21 of the present divisional application. Indeed, the parent application described two ways for monitoring blood volume. In a first embodiment (see, in particular, page 10, line 2-page 14, line 6 and figures 1-5), originally covered by claims 1-14, 27-36 and 46-55 of the published parent application, the said monitoring is performed by comparing a generated first trace of the per heart-beat maximums of a cardiovascular waveform and a generated second trace of the per heart-beat minimums of said cardiovascular waveform. In a described second embodiment (see, in particular, page 14, line 7-page 20, line 20 and figures 6-12), originally covered by claims 15-26, 37 and 56-65 of the published parent application, the said monitoring is performed by applying harmonic analysis to a cardiovascular waveform (joint time-frequency analysis) and extracting a frequency signal created by ventilation. However, the independent claims of the present divisional application neither refer to the generation of two traces from a cardiovascular waveform, nor to the application of harmonic analysis to a cardiovascular waveform.

Most of the additional features defined in the dependent claims 2-20 are not present in any of the originally filed claims of the root application.

In view of the additional features defined in the filed dependent claims, in particular the reference to the use of an harmonic analysis in claims 7-11 (but no reference to the generations of traces) and taking into account the applicant's reference to the independent claim 37 of the original parent application, the search report has been drawn up on the basis of the subject-matter defined in the original independent claim 37 of the parent application (Rule 63(2) EPC).

The applicant's attention is drawn to the fact that the application will be further prosecuted on the basis of subject-matter for which a search has been carried out and that the claims should be limited to that subject-matter at a later stage of the proceedings (Rule 63(3) EPC).

专利名称(译)	使用光电体积描记法评估血容量的方法		
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申请号	EP2011179769	申请日	2004-01-02
[标]申请(专利权)人(译)	耶鲁大学		
申请(专利权)人(译)	耶鲁大学		
当前申请(专利权)人(译)	耶鲁大学		
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发明人	SHELLEY, KIRK SILVERMAN, DAVID G. SHELLEY, ADAM STOUT, ROBERT G.		
IPC分类号	A61B5/024 A61B5/00 G06F19/00 A61B5/02		
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代理机构(译)	哈利, STEPHEN		
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其他公开文献	EP2392257A2		
外部链接	Espacenet		

摘要(译)

用于评估受试者体内血液体积的方法和系统包括产生表示受试者的生理特征的心血管波形，并通过分析心血管波形来确定受试者的血量。分析步骤包括产生心血管波形的每心跳最大值的第一迹线，其表示心血管信号上的收缩压，产生心血管波形的每心跳最小值的第二迹线，其中表示心血管信号的舒张压，并比较相应的第一迹线和第二迹线以产生对象内相对血容量的估计值。根据分析谐波分析的另一方法，将谐波分析应用于心血管波形，提取由通气产生的频率信号，并应用提取的频率信号确定受试者的血容量。

FIG.1a

