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(54) **Laser diode optical transducer assembly for non-invasive spectrophotometric blood oxygenation monitoring**

(57) A non-invasive near infrared spectrophotometric monitoring transducer assembly includes a housing member which is adhered directly on a patient's skin. The housing member contains a cluster of laser diodes which emit infrared light in different wavelengths which are necessary to monitor the level of blood oxygenation in the patient. The assembly also contains a light guide mounted in the housing member, which light guide contacts the patient's skin when the housing member is adhered to the patient's skin. The light guide controls the spacing between the laser diodes and the patient's skin, and therefore controls the intensity of the area on the patient's skin which is illuminated by the laser diodes. The light guide also provides a planar interface between the assembly and the patient's skin which the laser diodes are illuminating. The light guide may include a light attenuator and/or diffuser, such as a filter,

which allows the usage of higher energy laser diodes to produce a safer lower energy light field on the patient's skin. The assembly also includes an LED safety device which is operable to turn the laser diodes off in the event that the assembly accidentally becomes detached from the patient's skin. The housing member contains a photodiode assembly which detects the infrared light at a second location on the skin to determine light absorption. The photodiode assembly is preferably shielded from ambient EMI interference. The housing may be associated with a disposable sterile hydrogel coated adhesive envelope, or pad, which when applied to the patient's skin will adhere the housing to the patient's skin. The transducer assembly will thus be reusable, and skin-contacting part of the device, i.e., the envelope or pad can be discarded after a single use.

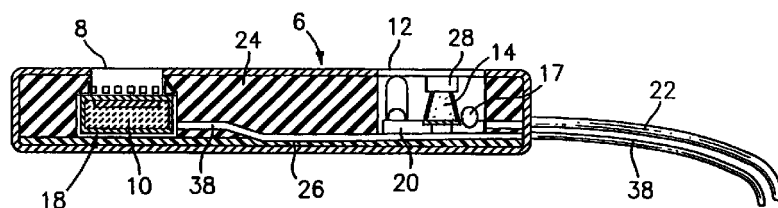


FIG. 2



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 8665

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17 January 2001	Examiner Manschot, J
CATEGORY OF CITED DOCUMENTS 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 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			

EPO FORM 1503 03/82 (P04C01)



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 11 8665

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		17 January 2001	Manscot, J
CATEGORY OF CITED DOCUMENTS			
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		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	

EPO FORM 1503 03 82 (P04Co1)



European Patent
Office

Application Number

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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

- Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-3,5,9-13

Near infrared spectrophotometric monitoring assembly with probe detachment detection

2. Claims: 1,4,15

Near infrared spectrophotometric monitoring assembly with electromagnetic shield

3. Claims: 1,6,7,16

Near infrared spectrophotometric monitoring assembly transparent light guide overlaying laser diodes

4. Claims: 1,8,14

Near infrared spectrophotometric monitoring assembly with disposable adhesive envelope or pad

5. Claims: 17-19

Near infrared spectrophotometric monitoring assembly with connector housing an encoding mechanism

6. Claim : 20

Near infrared spectrophotometric monitoring assembly with thermistor for monitoring laser diode temperature

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 11 8665

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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专利名称(译)	用于无创分光光度血氧监测的激光二极管光学换能器组件		
公开(公告)号	EP1080683A3	公开(公告)日	2001-03-14
申请号	EP2000118665	申请日	2000-08-29
申请(专利权)人(译)	CAS医疗系统, INC.		
当前申请(专利权)人(译)	CAS医疗系统, INC.		
[标]发明人	BENNI PAUL		
发明人	BENNI, PAUL		
IPC分类号	G01N21/35 A61B5/00 A61B5/145 A61B5/1455		
CPC分类号	A61B5/14553		
代理机构(译)	HIRSCH, PETER		
优先权	60/151319 1999-08-30 US 09/434142 1999-11-04 US		
其他公开文献	EP1080683A2		
外部链接	Espacenet		

摘要(译)

一种非侵入式近红外分光光度监测换能器组件，包括直接粘附在患者皮肤上的壳体构件。壳体构件包含一组激光二极管，其发射不同波长的红外光，这是监测患者血液氧合水平所必需的。该组件还包括安装在壳体构件中的光导，当壳体构件粘附到患者的皮肤上时，该光导接触患者的皮肤。光导控制激光二极管和患者皮肤之间的间隔，因此控制激光二极管照射的患者皮肤区域的强度。光导还在组件和患者皮肤之间提供激光二极管照射的平面界面。光导可包括光衰减器和/或漫射器，例如滤光器，其允许使用更高能量的激光二极管在患者皮肤上产生更安全的低能量光场。该组件还包括LED安全装置，其可操作以在组件意外地从患者的皮肤上脱离的情况下关闭激光二极管。壳体构件包含光电二极管组件，其检测皮肤上的第二位置处的红外光以确定光吸收。光电二极管组件优选地屏蔽环境EMI干扰。外壳可以与一次性无菌水凝胶涂覆的粘合剂封套或垫相关联，当将其施加到患者的皮肤上时，将外壳粘附到患者的皮肤上。换能器组件因此是可重复使用的，并且装置的皮肤接触部分，即，信封或垫可以在单个之后被丢弃。使用。

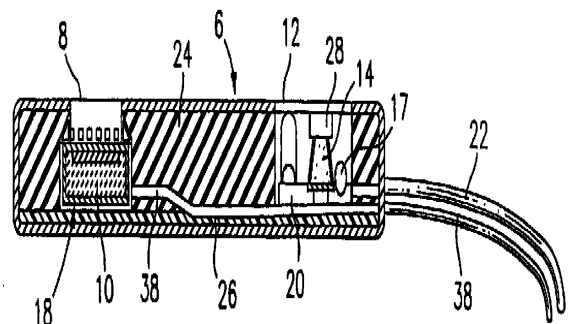


FIG. 2