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(54) Apparatus for monitoring heart failure via respiratory patterns

(57) The present invention provides an apparatus (20) for monitoring the condition of a heart failure patient (118) using respiration patterns. An implantable or other ambulatory monitor (20) senses the patient's respiratory patterns to identify the presence of periodic breathing or Cheyne-Stokes respiration. In a first embodiment, mechanical changes of the thorax due to breathing are detected and this data is used to recognize hyperventilation and apnea or hypoventilation. In a second embodiment of the invention, Cheyne-Stokes respiration is recognized by detecting changes in blood or tissue pH (416) or CO_2 concentration (414; 434) and partial pressure. In another embodiment of the invention, changes in pulse amplitude (420; 440) associated with Cheyne-Stokes respiration are detected. Alternating loss and return of respiration-induced amplitude modulation or pulse-interval variation may also be used to identify the presence of Cheyne-Stokes respiration. In yet another embodiment of the invention, modulation of the average heart rate (418; 438) over time is monitored and its absence is used as an indicator of Cheyne-Stokes respiration. This information may be used to warn the patient (118) or healthcare provider of changes in the patient's condition warranting attention (Fig. 1).

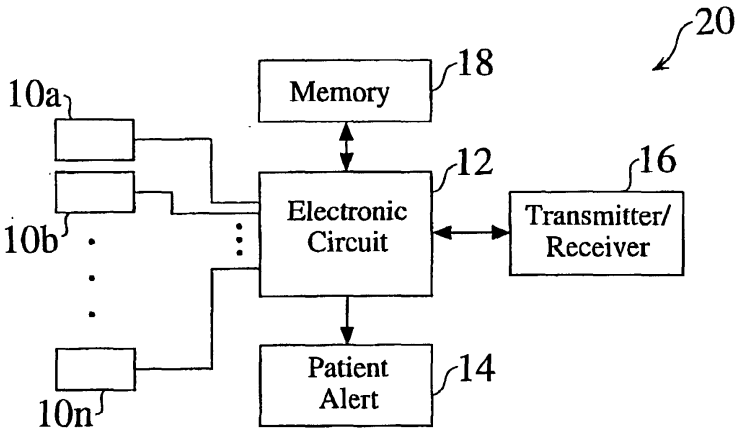

Fig. 1

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DECLARATION

which under Rule 45 of the European Patent Convention shall be considered, for the purposes of subsequent proceedings, as the European search report

Application Number EP 01 11 0076

The Search Division considers that the present application, does not comply with the provisions of the EPC to such an extent that it is not possible to carry out a meaningful search into the state of the art on the basis of all claims

Reason:

The subject-matter defined in independent claims 1, 7, 8, 9 and 11 relates to different sensing modes, i.e. mechanical detection of respiratory cycles, measurement of pH level, measurement of CO2 (concentration or partial pressure), measurement of arterial pulse amplitude and measurement of arterial pulse interval. Consequently, in view of the number of different possibilities which render it difficult, if not impossible, to determine the matter for which protection is sought, the present application fails to comply with the clarity and conciseness requirements of Article 84 EPC (see also Rule 29(5) EPC) to such an extent that a meaningful search is impossible.

In view of this objection, no search report can be established for the present application.

The applicant's attention is drawn to the fact that a search may be carried out during examination following a declaration of no search under Rule 45 EPC, should the problems which led to the declaration being issued be overcome (see EPC Guideline C-VI, 8.5).

CLASSIFICATION OF THE APPLICATION (Int.Cl.7)

A61B5/0205
A61B5/08
A61B5/00
A61B7/04

Place of search	Date	Examiner
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专利名称(译)	通过呼吸模式监测心力衰竭的装置		
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摘要(译)

本发明提供了一种用于使用呼吸模式监测心力衰竭患者（118）的状况的装置（20）。可植入或其他移动监测器（20）感测患者的呼吸模式以识别周期性呼吸或Cheyne-Stokes呼吸的存在。在第一实施例中，检测由呼吸引起的胸腔的机械变化，并且该数据用于识别过度通气和呼吸暂停或通气不足。在本发明的第二实施方案中，通过检测血液或组织pH（416）或CO 2浓度（414; 434）和分压的变化来识别Cheyne-Stokes呼吸。在本发明的另一个实施例中，检测与Cheyne-Stokes呼吸相关的脉冲幅度（420; 440）的变化。呼吸引起的振幅调制或脉冲间隔变化的交替损失和返回也可用于识别Cheyne-Stokes呼吸的存在。在本发明的另一个实施方案中，监测平均心率（418; 438）随时间的调节，并且其不存在用作Cheyne-Stokes呼吸的指示。该信息可用于警告患者（118）或医疗保健提供者患者注意力的变化（图1）。

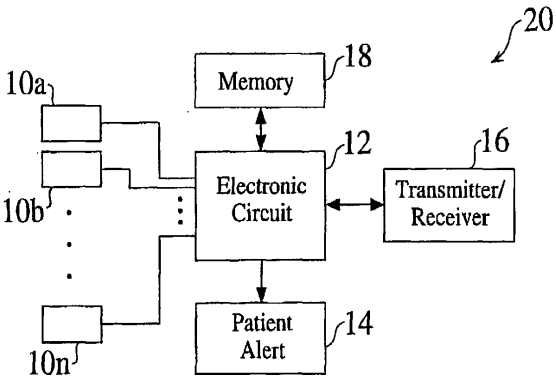

Fig. 1