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(54) **SYSTEM AND METHOD FOR AUTOMATIC MONITORING OF THE HEALTH OF A USER**

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(57) **ABSTRACT**

A system and method for automatically monitoring at least one physiological function of the user, without active intervention by the user, in a non-invasive manner. Such monitoring may be used to detect a deterioration in the health of the user. Preferably, the system according to the present invention features at least one physiological sensor for measuring the physiological parameter of the user to obtain the measurement of a physiological function, a local processing unit for extracting medical information from the physiological measurement, and a main server for processing the medical information in order to evaluate the health of the user. Such an evaluation is preferably performed by comparing medical information which has been obtained from a plurality of physiological measurements. Optionally and more preferably, the user is alerted if the evaluation detects a deterioration in at least one physiological function.

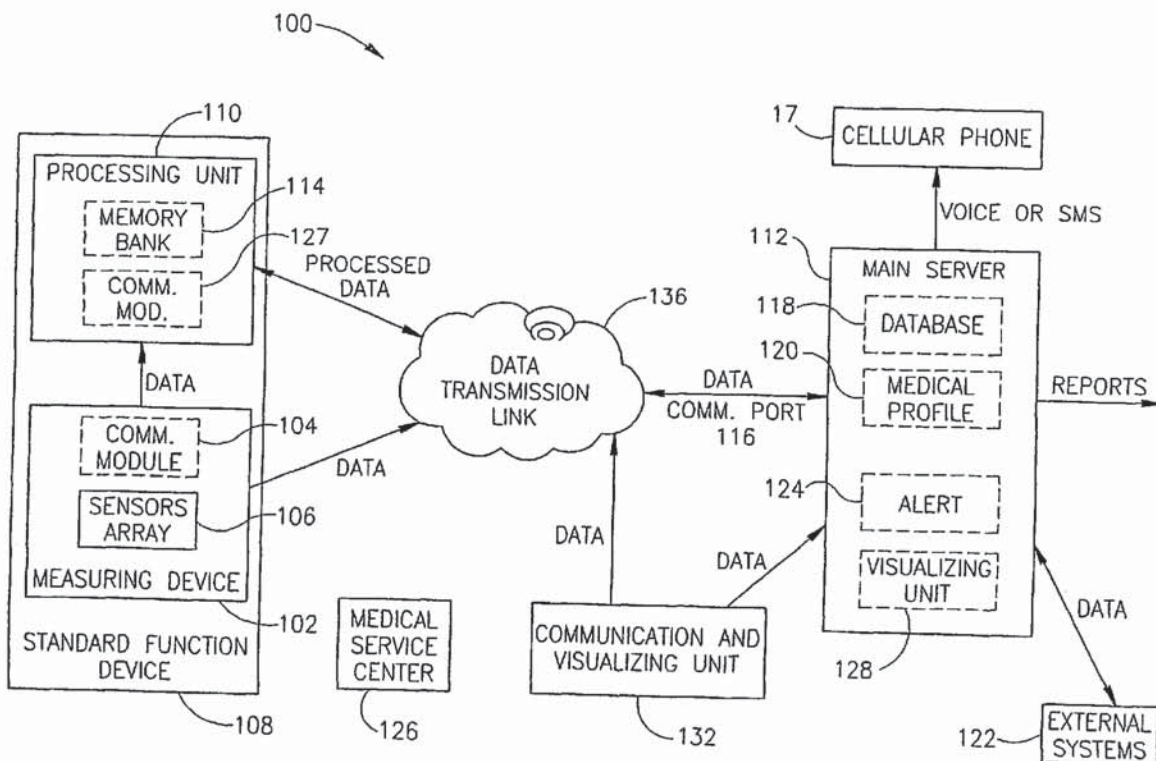
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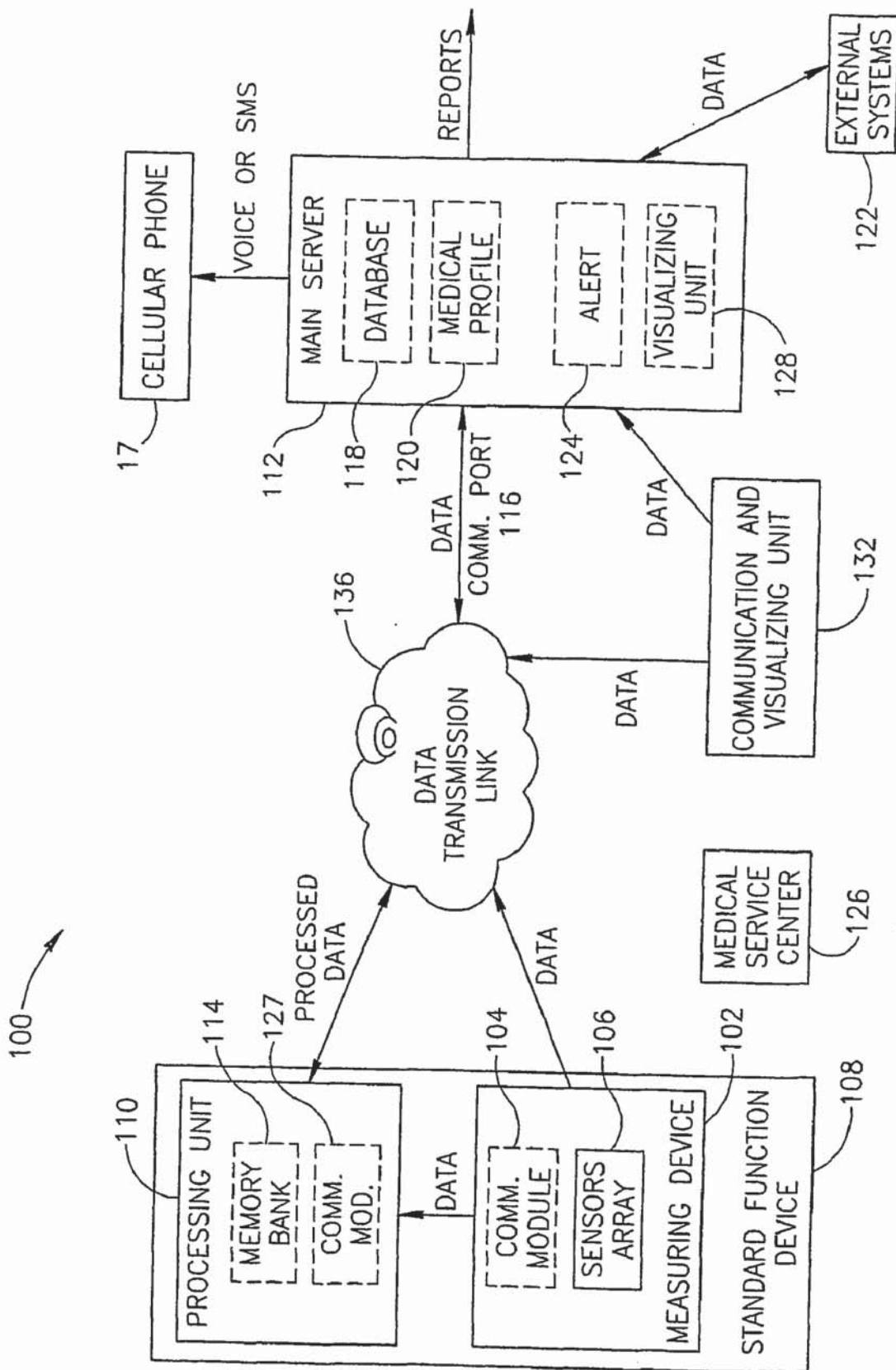


FIG.1

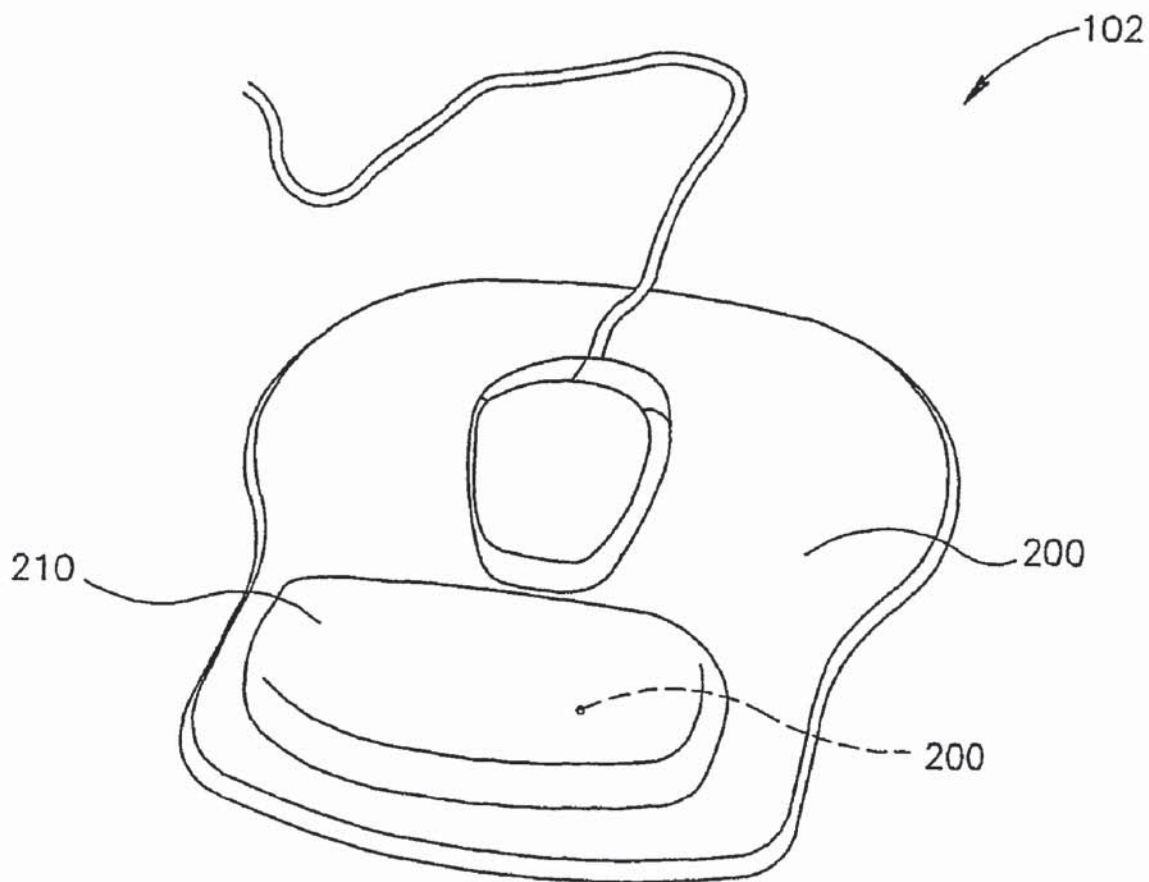


FIG. 2

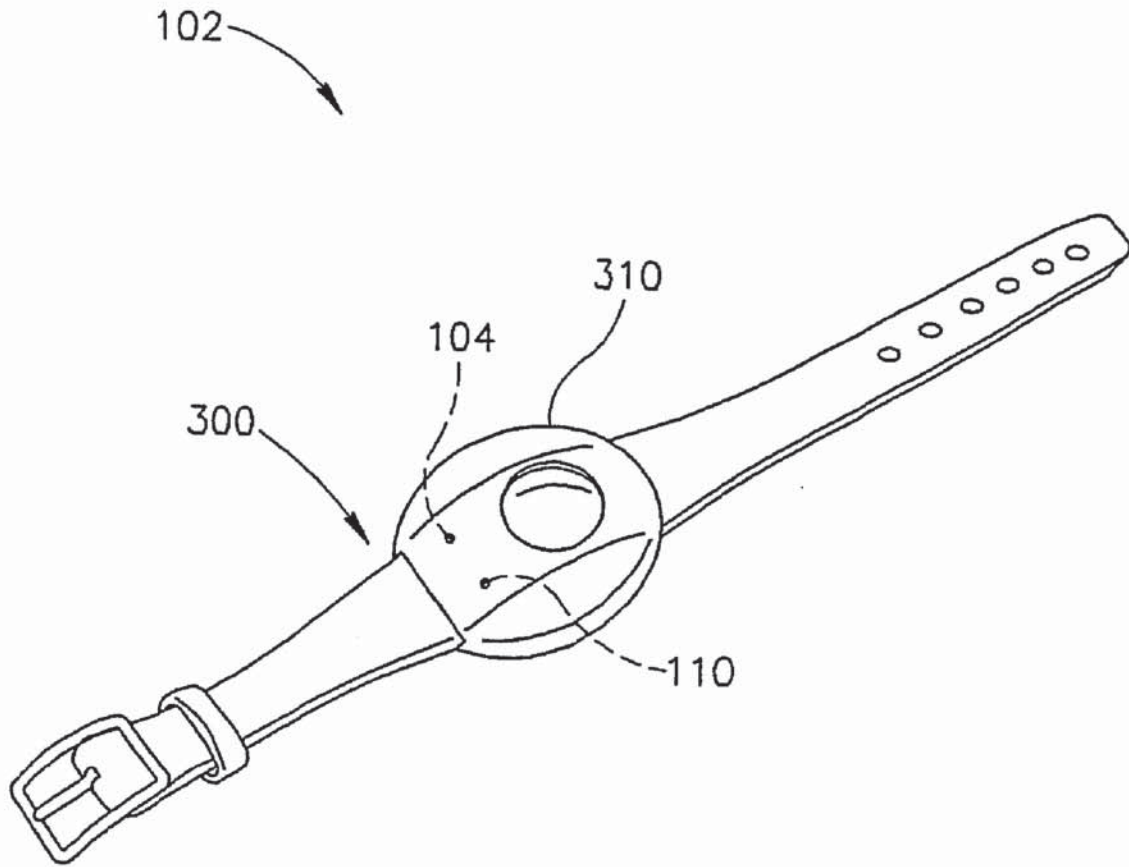


FIG. 3



## SYSTEM AND METHOD FOR AUTOMATIC MONITORING OF THE HEALTH OF A USER

### FIELD OF THE INVENTION

[0001] The present invention relates to a method and system for automatically monitoring the health of a user with at least one measuring device, and in particular, to such a system and method in which the measurements are performed automatically without the intervention of the user.

### DESCRIPTION OF THE BACKGROUND ART

[0002] Many different types of diseases are preventable or at least treatable if early detection of one or more symptoms or aspect of the disease is possible. Such early detection is currently performed by requiring the subject to receive regular examinations by a doctor, such as an annual examination for example. However, even annual examinations may not be sufficiently frequent in order to detect early signs of disease, yet requiring more frequent examinations could result in reduced compliance of the subject and increased cost.

[0003] One example of a disease for which more frequent monitoring could be useful is cardiac disease. Early detection of symptoms of cardiac disease, such as an increase in blood pressure, decrease in overall cardiac function, and/or development of a cardiac arrhythmia for example, could result in earlier and more effective treatment.

[0004] As is well known in the background art, monitoring a subject for one or more symptoms of heart disease is primarily based on the measurement of the vital signs of the subject, such as heart beat, the pattern of cardiac function such as arrhythmia, heart rate variability, ECG measurements, blood pressure, and optionally also body temperature and respiration parameters, at regular intervals. These measurement(s) are performed in order to ensure that the blood pressure level, heart beat rate and/or other aspects of cardiac function remain within the normal area.

[0005] However, in the present health care system it is not possible for financial and practical reasons for a person specialized in treating heart disease to personally monitor continuously the health of a subject. Therefore, as previously described, the subject must be examined periodically by medical personnel. However, periodic examinations may not be performed with sufficient frequency to detect a health problem and/or deterioration in the function of the body of the subject, until such deterioration has already become pronounced. A more effective type of examination would therefore allow the subject to perform at least some aspects of the examination outside of a medical environment, without direct assistance from medical personnel, for example at home.

[0006] In order to perform such an examination at home, the subject would need to obtain one or more measurements. Currently, the subject needs to use a medical instrument, such as a manual or an automatic blood pressure inflating cuff device. Blood pressure measurements are usually performed by the home (non-medical) subject once a day. Such medical instruments are difficult and awkward for the subject to operate, such that the subject compliance may be reduced. Furthermore, the measurements are generally only

the user is required. Thus, such measurements are not typically performed on a regular basis by individuals who are not known to be suffering from reduced cardiac function.

[0007] On other hand, regular monitoring of one or more vital signs, for example on a daily or weekly schedule, without interfering with the normal habits of the subject and/or becoming a nuisance to the subject, is clearly helpful for monitoring the health condition of the subject and to alert the subject in case of deterioration in the health of the subject. From the health care system point of view, it is a method to filter the needed users from the rest of the healthy population, so they could receive medical treatment as soon as the symptoms are detected; saving hospitalization days by implementing preventive medication for those needed users.

### SUMMARY OF THE INVENTION

[0008] The background art does not teach or suggest a system or method for automatically monitoring the health of the user, without requiring active intervention by the user. Furthermore, the background art does not teach or suggest a mechanism for automatically monitoring at least one physiological function of the user. The background art also does not teach or suggest such a mechanism, which can be easily operated outside of the medical environment. Such a system or method would clearly be useful, as it would enable the health of the user to be monitored frequently, thereby enabling earlier detection of a deterioration in the health of the user, with the possibility of early treatment.

[0009] The present invention overcomes these deficiencies of the background art by providing a system and method for automatically monitoring at least one physiological function of the user, without active intervention by the user, in a non-invasive manner. Such monitoring may be used to detect a deterioration in the health of the user. Preferably, the system according to the present invention features at least one physiological sensor for measuring at least one physiological parameter of the user, a local processing unit for extracting medical information by measuring at least one physiological function of the human body according to information obtained from the measurements, and a main server for processing the medical information in order to evaluate the health of the user. Such an evaluation is preferably performed by comparing medical information, which has been obtained from a plurality of physiological measurements. Optionally and more preferably, the user is alerted if the evaluation detects a deterioration in at least one physiological function.

[0010] According to a preferred embodiment of the present invention, the physiological measurements and/or the obtained medical information are stored in a database. Optionally and more preferably, such stored data is provided to medical personnel who are treating the user, for example for more accurate diagnosis. Also optionally and more preferably, medical personnel receive an alert if a deterioration in one or more physiological functions is detected.

[0011] Examples of physiological functions and medical information which may optionally be monitored by the present invention include, but are not limited to: heart rate, arrhythmia, heart rate variability, ECG, blood pressure, body temperature and respiration rate. As used herein, the term "physiological measurements" refers to any signal which is

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