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(54) **Measuring system**

Messsystem

Système de mesure

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Description

[0001] The invention lies in the field of simultaneous measurement of a number of variable quantities.

[0002] The invention has for its object to embody a measuring system such that a number of users can acquire permanent insight into measurement values relevant to them, while each user is nevertheless free to move at a distance from the object being subjected to measurement. For this purpose the invention generally provides a measuring system according to claim 1.

[0003] This system according to the invention makes use of the basic principle applied in paging systems. The system according to the invention can transmit measurement values in wireless manner to a relevant official. The receiver can in this way be considered a wireless measuring instrument on which the user can read the information of importance to him at any desired moment.

[0004] As is known, paging is a means of communication which is suitable for transmitting limited amounts of information directed at a specific user or group of users. For example, from GB-A-2 219 423 a paging system is known for receiving data whose value may change periodically. When used as a portable measuring instrument there is the danger of the paging communication channel becoming overloaded. To prevent this the invention as defined by claim 1 provides:

- a memory for successively storing the values of the measurement signals; and
- comparing means for determining the difference between the current value of a measurement signal and the associated value stored in the memory and feeding the relevant difference to the marking means;

and wherein each receiver comprises:

a memory for storing and feeding to the display means the most recent value of the second signal. The central signal processing unit evaluates in this embodiment whether the provided measurement data differs from the previously provided information. If this is indeed the case, then only the difference relative to the preceding measurement value is transmitted remotely to the receiver. The latter processes this change and the display means show the new measurement value.

[0005] In another embodiment the measuring system comprises a signal processing unit which is connected between the input unit and the display unit and which has a memory for storing a preselected value of a measurement signal;

comparing means for determining the difference between the current value of this measurement sig-

nal and the associated content of the memory and for generating an alarm signal when a difference is detected; and

reproducing means present in a receiver which are adapted to reproduce this alarm signal.

[0006] This embodiment enables determining of alarm limit values on either the transmitting side or on the receiving side, at exceeding of which a user or group of users must be alerted by means of light signalling, generating of an acoustic signal or generating of a control signal to a vibrator present in the receiver which makes the alarm signal tangible to the user.

[0007] It may be advisable to transmit an alarm situation relating to a particular sensor to a larger group of users other than the user who has insight into the relevant measurement values in normal conditions. A variant of the system according to the invention has in this respect the special feature that the marking means are controlled by the comparing means.

[0008] In addition, the invention provides a measuring system wherein the display means comprise two display parts, the first of which displays a measurement value and the second of which is controlled by the associated marking and displays an identification of the relevant sensor. The presentation of the measurement value can take place in numeric or analog (bar graphs) manner, while the identification of the relevant sensor can relate to a particular machine, a tunnel, a runway etc. This second display part can moreover be used for normal paging messages and for instance indicate a code, for instance "phone back".

[0009] The invention will now be elucidated with reference to the annexed drawing. In the drawing:

figure 1a and 1b show respectively the transmitting side and the receiving side of a measuring system according to the invention in block diagram form; and

figure 2 shows a front view of an example of a receiver.

[0010] Measuring sensors 1, 2, 3, 4, 5 feed their output signals, which are representative of measured quantities, to an interface 6 which supplies a multiplex output signal to an input/output unit 7. The output signals coming therefrom are fed to a central processing unit or CPU 8, the output signals of which are fed to a transmitter 9 with an aerial 10. CPU 8 can further receive input signals from an adjusting unit 11 which can be operated by operating means and in which for instance alarm thresholds, limit values and other relevant data can be stored in advance by the user. The stored data relating for instance to alarm thresholds is compared in the CPU with the current values of the corresponding signals of sensors 1-5, wherein, when an alarm threshold is exceeded, a corresponding signal can be transmitted by the transmitter 9. The most recent

measurement value can always be stored in a memory 12. Due to a permanent comparison between the output signal of unit 7 and memory 12 a status changing signal can only be supplied to transmitter 9 in the case of a detected difference to bring up to date the presentation of the measurement values to be described hereinafter.

[0011] The receiver according to figure 1b comprises an aerial 13 which feeds its signals to a tuning unit 14. This is tuned to the frequency transmitted by transmitter 9. The tuner 14 supplies its detected output signals to a central processing unit or CPU 15. Like the CPU 8, this CPU 15 is connected to a unit 16 in which reference settings and the like can be held, as well as to a memory 17 for the most recent measurement value. Operating means 18 can control the CPU, inter alia for displaying the data relating to one of the sensors 1-5. The CPU supplies the relevant output signals to a first display unit 19 which displays the measurement values and to a second display unit 20 which provides identification of the relevant sensor.

[0012] The system according to the invention offers the possibility that a receiver receives specific, selected information. The associated user is competent to monitor specific measurement values, while another user carrying another receiver monitors other measurement values. The CPU comprises for this purpose marking means for marking the measurement signals originating from measuring sensors 1-5. Depending on the setting of these marking means, which can take place by making use of the adjusting unit 11, a determined routing of a measurement signal can take place. A measurement signal can for instance be sent to one selected receiver, while alternatively a selected group of receivers can also receive this measurement signal. It will be apparent that the marking means thus possess a matrix function. A determination is made of incoming signals from which sensor they originate, which value they have and to which receiver they must be transmitted in accordance with the set instruction.

[0013] This matrix setting can be dynamic and depend for instance on measurement values. This can be of particular importance in alarm situations.

[0014] Figure 2 shows by way of random example a receiver 21 with an LCD screen in which the designation "MACHINE 1" identifies the relevant sensor, the designation "PRESSURE 18 BAR" indicates the pressure measured by a sensor with thereunder an LCD bar to display the corresponding value in analog manner, with thereunder in this case the designation "TEMP 49 C" as temperature value with thereunder the corresponding LCD bar. Situated right at the bottom are two energized arrow-like indications which show that the temperature displays a rising trend.

[0015] The LCD screen 22 consists of an upper first portion in which is contained an identification relating to the machine "MACHINE 1", while the lower second portion displays information relating to the measured quantities, in this case "PRESSURE 18 BAR" and "TEMP 49

C".

[0016] The reference numeral 23 in figure 1b designates an alarm signalling device, in particular a buzzer.

[0017] Situated on the underside of the receiver 21 shown in figure 2 is a keyboard 24 for entering data into the CPU 15, for instance entering alarm threshold data into the unit 16.

Claims

1. Measuring system comprising:

a first input unit (7) which is connected to a number of sensors (1-5) for respective quantities for measuring, which sensors are each adapted to generate a measurement signal representative of the value of the relevant quantity,
a first signal processing unit (8) which is connected to this input unit (7) and which comprises marking means for marking the measurement signals, a first memory (12) for successively storing the values of the measurement signals and first comparing means, such as an adjusting unit (11), for determining the difference between the current value of a measurement signal and the associated value stored in the first memory (12) and feeding the relevant difference to the marking means,
a transmitter (9) which is connected to this first signal processing unit (8) and which can transmit radio signals containing the marked measurement signals,
portable receivers (21), such as pagers, which can receive these radio signals and which each comprise detection means detecting at least one measurement signal with a preselected marking and
display means (19, 20) which are connected to these detection means for displaying the relevant measurement value.

2. Measuring system as claimed in claim 1, comprising:

a second signal processing unit (15) which is connected between a second input unit (14) and the display means (19, 20) and which has a second memory (17) for storing a preselected value of a measurement signal,
second comparing means (16) for determining the difference between the current value of this measurement signal and the associated content of the second memory (17) and for generating an alarm signal when a positive difference is detected and
reproducing means present in the receiver (21) which are adapted to reproduce this alarm sig-

nal.

3. Measuring system as claimed in claim 1, wherein the marking means are controlled by the first comparing means (11).

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4. Measuring system as claimed in claim 2, wherein the display means comprise two display parts (19, 20), the first of which (19) displays a measurement value and the second of which (20) is controlled by the associated marking and displays an identification of the relevant sensor (1-5).

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Patentansprüche

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1. Meßsystem, das folgendes umfaßt:

eine erste Eingabeeinheit (7), die an eine Reihe von Sensoren (1 - 5) für jeweilige Größen zur Messung angeschlossen ist, wobei die Sensoren jeweils ausgelegt sind, ein den Wert der relevanten Größe darstellendes Meßsignal zu erzeugen,
eine erste Signalverarbeitungseinheit (8), die an diese Eingabeeinheit (7) angeschlossen ist und die folgendes umfaßt: Markiermittel zum Markieren der Meßsignale, einen ersten Speicher (12), um nacheinander die Werte der Meßsignale zu speichern, und ein erstes Vergleichsmittel, wie etwa eine Einstelleinheit (11), zum Bestimmen der Differenz zwischen dem aktuellen Wert eines Meßsignals und dem in dem ersten Speicher (12) gespeicherten zugeordneten Wert und Zuführen der relevanten Differenz zu dem Markiermittel,
einen Sender (9), der an diese erste Signalverarbeitungseinheit (8) angeschlossen ist und die markierten Meßsignale enthaltende Funksignale senden kann,
tragbare Empfänger (21), wie beispielsweise Rufempfänger, die diese Funksignale empfangen können und die jeweils ein Erfassungsmittel umfassen, das mindestens ein Meßsignal mit einer vorgewählten Markierung erfaßt, und Anzeigemittel (19, 20), die an diese Erfassungsmittel angeschlossen sind, um den relevanten Meßwert anzuzeigen.

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2. Meßsystem nach Anspruch 1, das folgendes umfaßt: eine zweite Signalverarbeitungseinheit (15), die zwischen einer zweiten Eingabeeinheit (14) und dem Anzeigemittel (19, 20) angeschlossen ist und die einen zweiten Speicher (17) zum Speichern eines vorgewählten Werts eines Meßsignals aufweist,

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ein zweites Vergleichsmittel (16) zum Bestimmen der Differenz zwischen dem aktuellen

Wert dieses Meßsignals und dem zugeordneten Inhalt des zweiten Speichers (17) und zum Erzeugen eines Alarmsignals bei Erkennen einer positiven Differenz und ein Reproduziermittel, das in dem Empfänger (21) vorliegt und dazu ausgelegt ist, dieses Alarmsignal zu reproduzieren.

3. Meßsystem nach Anspruch 1, wobei die Markiermittel durch das erste Vergleichsmittel (11) gesteuert werden.

4. Meßsystem nach Anspruch 2, bei dem die Anzeigemittel zwei Anzeigeteile (19, 20) umfassen, wobei der erste (19) einen Meßwert anzeigt und der zweite (20) durch die zugeordnete Markierung gesteuert wird und eine Identifikation des relevanten Sensors (1 - 5) anzeigt.

Revendications

1. Système de mesure comprenant:

une première unité d'entrée (7) qui est raccordée à plusieurs capteurs (1-5) pour des grandeurs de mesure respectives, lesdits capteurs étant chacun conçus pour générer un signal de mesure représentatif de la valeur de la grandeur pertinente,
une première unité de traitement de signaux (8) qui est raccordée à cette unité d'entrée (7) et qui comprend un moyen de marquage pour marquer les signaux de mesure, une première mémoire (12) pour mémoriser de manière successive les valeurs des signaux de mesure et un premier moyen de comparaison tel qu'une unité de réglage (11) pour déterminer la différence entre la valeur en vigueur d'un signal de mesure et la valeur associée mémorisée dans la première mémoire (12) et pour acheminer la différence pertinente au moyen de marquage, un transmetteur (9) qui est relié à cette première unité de traitement de signaux (8) et qui peut transmettre des signaux radio contenant les signaux de mesure marqués, des récepteurs portables (21) tels que des signaleurs d'appels qui sont en mesure de recevoir ces signaux radio et qui comprennent chacun des moyens de détection qui détectent au moins un signal de mesure muni d'une marque présélectionnée, et des moyens d'affichage (19, 20) qui sont reliés à ces moyens de détection pour afficher la valeur de mesure pertinente.

2. Système de mesure selon la revendication 1, comprenant:

une seconde unité de traitement de signaux (15) qui est reliée entre une seconde unité d'entrée (14) et les moyens d'affichage (19, 20), et qui possède une seconde mémoire (17) pour mémoriser une valeur présélectionnée d'un signal de mesure, 5

un second moyen de comparaison (16) pour déterminer la différence entre la valeur en vigueur de ce signal de mesure et la teneur associée de la seconde mémoire (17), et pour 10
générer un signal sonore lorsqu'une différence positive est détectée, et
des moyens de reproduction présents dans le récepteur (21) qui sont conçus pour reproduire 15
ce signal sonore.

3. Système de mesure selon la revendication 1, dans lequel les moyens de marquage sont commandés par le premier moyen de comparaison (11). 20
4. Système de mesure selon la revendication 2, dans lequel les moyens d'affichage comprennent deux éléments d'affichage (19, 20), le premier élément (19) affichant une valeur de mesure et le 25
second élément (20) étant commandé par le marquage associé et affichant une identification du capteur pertinent (1-5).

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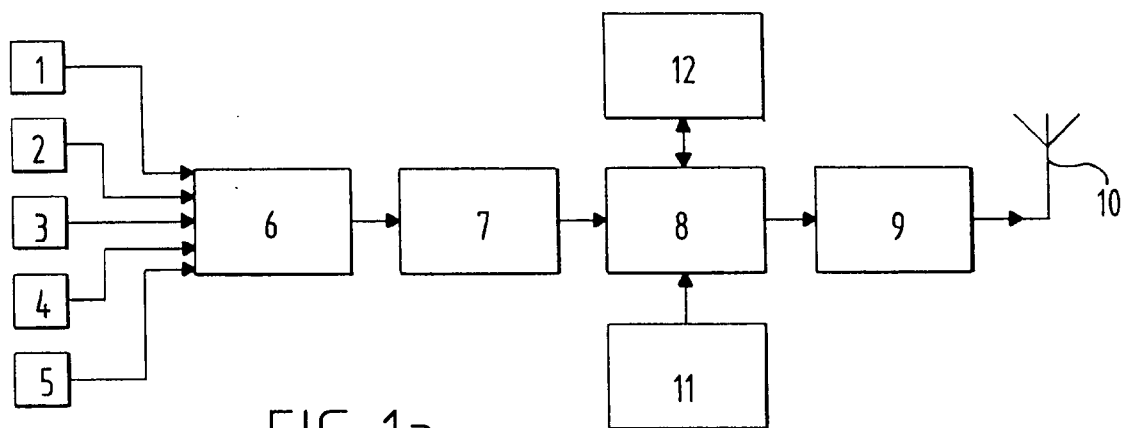


FIG. 1a

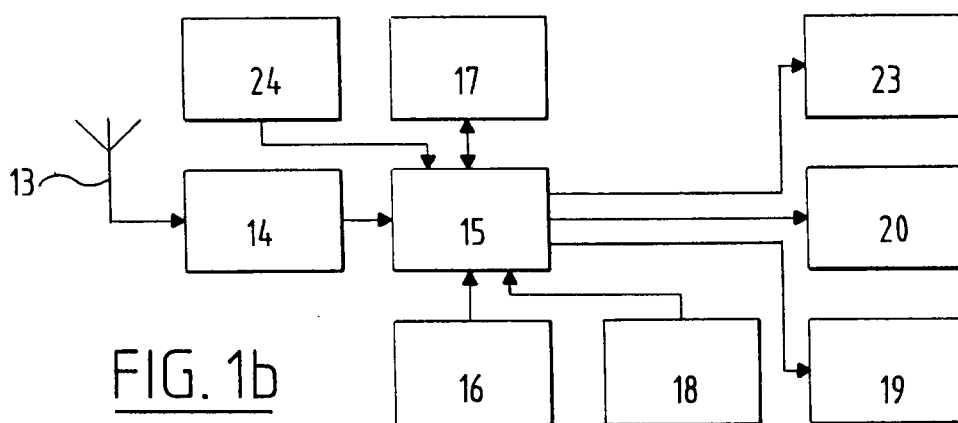


FIG. 1b

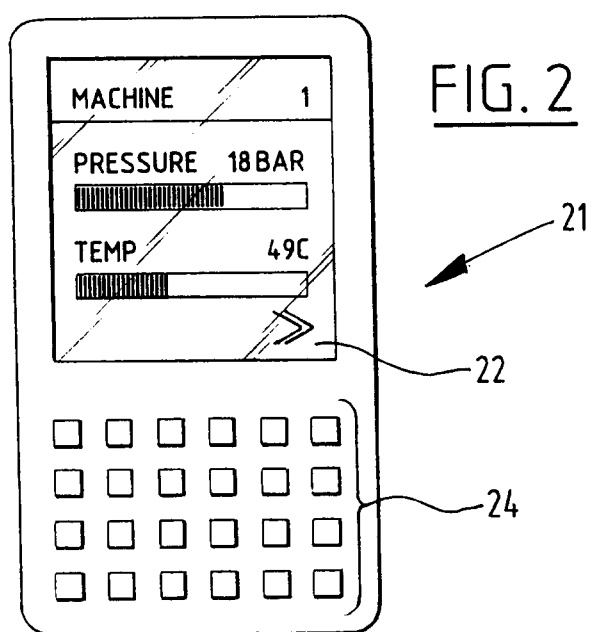


FIG. 2