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(54) **A TELECOMMUNICATION SYSTEM FOR EXCHANGING PHYSIOLOGICAL STATE INFORMATION BETWEEN A PHYSICAL PERSON AND AN INFORMATION SYSTEM**

TELKOMMUNIKATIONSSYSTEM ZUM AUSTAUSCH VON INFORMATIONEN ÜBER
PHYSIOLOGISCHE ZUSTÄNDE ZWISCHEN EINER PERSON UND EINEM INFORMATIONSSYSTEM
SYSTEME DE TELECOMMUNICATION DESTINE A ECHANGER DES INFORMATIONS RELATIVES
A L'ETAT PHYSIOLOGIQUE ENTRE UNE PERSONNE PHYSIQUE ET UN SYSTEME
D'INFORMATION

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EP-A- 0 710 465 **WO-A-97/11753**
US-A- 5 546 943

EP 1 087 824 B1

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Description

Technical Field

[0001] The present invention relates to the technical field of information systems in general which allow an exchange of information between a user and a data base or a network; in particular this system can be correlated to the fitness or wellness sector and integrated with exercise machines for training, re-educating and maintaining the well-being of the body.

Background Art

[0002] Exercise machines of more modern and advanced conception, both professional and amateur-oriented, are designed in such a way as to allow the user to plan his/her physical activities in relation with his/her own personal characteristics and requirements.

[0003] For this purpose machines are known which, although conceived for a general employment able to meet the diversified demands of a plurality of users, can then be pre-set on each occasion as a function of each individual user and of the workout plan the user actually intends to follow. A personalised management system for this type of machined is, for instance, already known from the patent IT-1.274.053 in the name of the same Applicant.

[0004] From EP710465 it is known a monitoring system of patients in hospitalized environment, which interfaces a telemetry subsystem with a network. In this known system the telemetry subsystem includes one or more monitoring instruments and may be operated to implement network-based, control of one or more of the patient monitoring functions performed in the system.

[0005] From WO9711753 it is also disclosed an exercise device with display and recording devices provided to display/store various information relating to an exercise routine and to parameters relating to the user of the exercise device. The device is further provided with means for remotely transmitting and storing the information obtained.

[0006] From US5546943 it is disclosed a visualization system using a computer connected via telephone line to exchange information with a patient and to provide the patient with a view of physiological information based on medical scan data obtained from three-dimensional scanning system.

Disclosure of Invention

[0007] The present invention more particularly relates to a telecommunication system which extends beyond the physical borders of a gym or of a physical education venue in general, and has the fundamental aim of allowing a further advancement of the individual management of physical activities and a more advanced and accurate personalisation so as to take into consideration the per-

son's actual physiological conditions, enabling to take into account also a series of other parameters such as those concerning his/her nutrition and those concerning the energy consumption linked with that person's actual daily lifestyle.

[0008] According to the invention this aim is achieved by a telecommunication system for exchanging information concerning physiological state parameters between a physical person and an information system, characterised in that it comprises measuring means for measuring physiological parameters directly from the physical person; and processing means interconnected with the measuring means and with the information system to transmit to the information system at least input signals corresponding to the acquired physical parameters and to transmit to the physical person output information corresponding with those received in return from the information system.

[0009] The invention allows the quantification and the scientifically planned graduation of the workload as a function of the measurement and processing of a set of physiological parameters which are significant for representing the physical condition of the user and whose control allows in the first place to monitor the reaching of reference or target thresholds of each individual users.

[0010] The system comprises a terminal that allows the user to interface with the processing means, to enter personal and specific data therein, the user's activity can also be planned as a function of other information wherefrom it is possible, for instance, to deduce: the energetic content stored with daily nutrition or referable to a different time interval; and/or the portion of energy content dissipated through the user's work activity. All this to allow to manage the user's physical activity on the exercise machine in a personalised, rational manner as a function of a realistic energy budget. Similarly with regard to the management of diets, nutrition, linked to the aforesaid physical activities or otherwise.

[0011] The terminal allows the user to connect also to the information system both locally and remotely. It can be connected to the information system by means of a terminal comprising a radiotelephone, allowing the wireless exchange of information between the user and the information system. The exchange of information is easy, immediate and possible on a global and planetary scale.

[0012] Providing the terminal with appropriate interface means, such as a board with miniaturised circuitry, in addition to the acquisition of information from the information system it is also possible to store signals which can allow to query the data base or the network or to configure in a personalised and automated manner the exercise machines of the gym normally attended by the user or any other gym he/she may desire to access, for instance when staying in a location more or less distant from his/her habitual residence.

[0013] Naturally, the aforesaid personalisation of the configuration of the machines is not limited to exercise machines, but can be extended also to electrical appli-

ances or to machines finding more general employment whose functionalities allow, for instance, to interact in the broadest sense of the term with the physical well-being of the user and/or with his/her energy exchanges with the surrounding environment.

[0014] If the system according to the invention is provided with suitable communication software constituted for instance by a standard operating system such as Windows CE, the telecommunication system according to the invention can advantageously interconnect with local area networks such as intranets or with the global network, the Internet, and dialogue with data bases, with processing centres or intelligent software systems able to manage incoming and output information about person's physical condition, physical activities and/or medical and scientific information connectable thereto.

[0015] To assure on the one hand the confidentiality of the data and on the other the security of a specific personalisation, the system can advantageously be equipped also with means for recognising the person embodied for instance by means of a fingerprint reader or a retinal image reader.

Description of the Drawings

[0016] The technical features of the invention, according to the aforesaid aims, can clearly be noted from the content of the claims set out below and its advantages shall become more readily apparent in the detailed description that follows, made with reference to the accompanying drawings, which represent an embodiment provided purely by way of non-limiting example, in which:

- Figure 1 is a schematic block function representation of the telecommunication system according to the invention; and
- Figure 2 is a detailed block function representation of a variation in the execution of the system of Figure 1.

Description of the Illustrative Embodiment

[0017] With reference to the accompanying drawings, the number 1 indicates in its entirety a telecommunication system for exchanging information concerning personal physiological state parameters between a physical person and an information system 2.

[0018] The system 1 essentially comprises measuring means 3, such as a cardiac frequency meter, for measuring directly from the physical person physiological parameters significant for monitoring his/her physical condition; and processing means 4 which include a software for processing and handling information pertaining to physiological condition parameters of the person and which are interconnected with the measuring means and with the information system 2, to transmit to the information system 2 this information in the form of input signals a1 and to transmit to the physical person output informa-

tion b, c corresponding with that received in return from the information system 2.

[0019] The processing means 4 [Figure 1] comprise a microprocessor device 5, a terminal 6 and first interface means 7, 8, 9, 10. The microprocessor device 5 is provided with a central processing unit CPU; with means 40, 41, 42 for storing data, programs and information for external peripheral units, and with a signal modulation and demodulation unit - modem 43.

[0020] The terminal 6 is preferably of the portable, palmtop type and it is integrated in a single body with the microprocessor device 5. Moreover, according to the embodiment shown in Figure 2, it comprises a radiotelephone which allows the person to be connected with the information system 2 according to a wireless mode.

[0021] The interface means 7, 8, 9, 10 are interconnected with the measuring means 3 and can be interconnected with an input device 13 and with means 15, 16 for identifying the person. The input device 13 can be embodied by a keyboard or by a barcode reader. The means 15, 16 for identifying the person can be embodied by a fingerprint reader and/or also by a retinal image reader.

[0022] The first interface means 7, 8, 9, 10 in combination with the microprocessor device 5 allow to enter into the information system 2, and through the first interface means 7, 8, 9, 10 and the microprocessor device 5, information that is understandable for the operating system suitably converting the signals 1a of the measuring means 3 and of the information a2, a3, a4 entered by the person by means of the input device 13 and/or through identification means 15, 16.

[0023] Clearly, the information that can be entered into the information system 2 can be the most disparate, as it is easy to understand that through the keyboard the physical person can enter the most widely varied information establishing, through the software that equips the processing means 4, a veritable dialogue with the information system 2. The insertion of information through the bar code reader can allow to send to the information system 2, in a rapid and complete manner, information for instance on the nature, quality and quantity of food products consumed by the user with his/her daily nutrition; information which can then be processed by the information system 2 for a whole series of diet and energy information which can be both aimed at informing the physical person or at being exploited to quantify and modulate the workload needed by the physical person to work them off.

[0024] For the communication to the physical person of the data b1, b2, b3 processed by the information system 2, the processing means 4 can be provided with an output device 20, 21, 22 interconnected with related second interface means 29, 30, 31. The output device can present the most disparate embodiments and can be embodied for instance by a video 20, by a display 21, by a printer 22 and can lastly be integrated in the same processing means 4 and, more in particular in the port-

able terminal 6 or even in the radiotelephone itself which an integrate in a single body also the second interface means 29, 30, 31 themselves.

[0025] The processing means 4 also comprise third interface means 35, 36, 37 connected with an output device 23, 24 which receives from the information system 2 information in the form of appropriately processed signals c1, c2, c3. The third interface means 35, 36, 37 can be integrated in the same portable terminal 6 or even in the radiotelephone. The output device connected thereto can assume a broad range of concrete embodiments, represented by way of non limiting example by a board 23 with miniaturised circuitry able to store said signals c1, c2, c3; or by a directly connected machine 24, 25 whose functionalities can be modulated according to the person's physiological parameters.

[0026] The board 23 can be of the kind employed by the system for managing the personalisation of exercise machines already subjected to patent protection by the same Applicant, and can allow the physical person to store through the communication system 1 the signals which will be necessary for configuring the exercise machines when the physical person accesses his/her own gym.

[0027] Naturally, through portable processing means 4 it is possible to connect to the operating system 2 the exercise machine 24 of one's own gym or in general any other electrical appliance 25 able to interact energetically with the person and to download in real time from the operating system 2 the configuration parameters necessary for personalising the machine 24, 25.

[0028] As to the information system 2, from the above description one can observe that it can include a computerised data base and/or even the software for processing the physical person's own personal data as well as data contained in the data base. Moreover, the information system 2 can reside within a local computer or otherwise can be contained in a remote server reachable by the processing means 4 through a telecommunication and information network 28 which can be local, remote, fixed or wireless like those currently employed for mobile telephony. Interactivity with the network 28 shall be enabled by providing the processing means 4 with suitable software, for instance of the Windows CE type, which is found to be particularly well suited to equip portable, palmtop processing means 4.

Claims

1. A telecommunication system exchanging information concerning personalised physiological state parameters between a physical person and an information system (2), comprising means (3) for measuring physiological parameters from the physical person; and processing means (4) interconnected with the measuring means (3) and with the information system (2), for transmitting to the information

system (2) at least input signals (a1) corresponding to the physiological parameters acquired from the person and transmitting to the physical person output information (b; c) corresponding to those received in return from the information system (2)

the measuring means (3) comprising a cardiac frequency meter for monitoring the person's physical condition,

the processing means (4) comprising a microprocessor device (5), a terminal (6) connecting the person to the information system and at least first interface means (7, 8, 9, 10), which are interconnected to each other and with the measuring means (3) to send to the information system (2) at least information in the form of input signals (a1) coming from the user, **characterised in that** the terminal (6) includes a radiotelephone, which is wireless and interactively connected with the remote information system (2) through a mobile telephone network (28).

2. A system as claimed in claim 1, **characterised in that** the terminal (6) and the microprocessor device (5) are integrated in a single body.

3. A system as claimed in claim 1, **characterised in that** it comprises a data input device (13) connected to the interface means (7, 8, 9, 10), through which the person sends information in the form of data (a2) to the processing means (4).

4. A system as claimed in claim 1, **characterised in that** it comprises means (14, 15) for personally identifying the person.

5. A system as claimed in claim 4, **characterised in that** the personal identification means include a reader (14) of the person's fingerprint.

6. A system as claimed in claim 4, **characterised in that** the personal identification means include a reader (15) of the person's retinal image.

7. A system as claimed in claim 4, **characterised in that** the interface means (7, 8, 9, 10) are functionally interconnected with the personal identification means (14, 15) to send to the information system (2) corresponding input information (a3, a4) coming from the person.

8. A system as claimed in claim 1, **characterised in that** the processing means (4) comprise second interface means (29, 30, 31) for at least a data output device (20, 21, 22) provided to transmit to the person information in the form of data (b1, b2, b3) coming from the information system (2).

9. A system as claimed in claim 1, **characterised in that** the processing means (4) comprise at least third

interface means (35, 36, 37) for a device (23, 24) for outputting information in the form of signals (c1, c2, c3) processed by the processing means (4) based on information (c) coming from the information system (2).

10. A system as claimed in claim 9, **characterised in that** the output device is a machine (24, 25) having functionalities which can be modulated as a function of the person's physiological parameters.
11. A system as claimed in claim 10, **characterised in that** said machine is an exercise machine (24).
12. A system as claimed in claim 10, **characterised in that** the machine is an electrical appliance (25) interacting with the physical person.
13. A system as claimed in any of the previous claims, **characterised in that** the information system (2) includes a computerised data base.
14. A system as claimed in any of the previous claims, **characterised in that** the processing means (4) include a software for processing and managing information pertaining to the person's physiological state parameters.

Patentansprüche

1. Telekommunikationssystem zum Austausch von Informationen betreffend die persönlich gestalteten Parameter des physiologischen Zustandes zwischen einer physischen Person und einem Informationssystem (2), enthaltend Mittel (3) zum Messen der physiologischen Parameter der physischen Person; und Verarbeitungsmittel (4), verbunden mit den Messmitteln (3) und mit dem Informationssystem (2), um an das Informationssystem (2) wenigstens Eingangssignale (a1) entsprechend den von der Person aufgenommenen physiologischen Parametern auszusenden und an die physische Person Ausgangsinformationen (b; c) zu übermitteln, die den von dem Informationssystem (2) zurück erhaltenen entsprechen, wobei die Messmittel (3) einen Herzfrequenzmesser zum Überwachen des physischen Zustandes der Person enthalten, wobei die Verarbeitungsmittel (4) eine Mikroprozessoreinheit (5) enthalten, und wobei ein Terminal (6) die Person mit dem Informationssystem (2) verbindet, sowie wenigstens erste Schnittstellenmittel (7, 8, 9, 10), welche miteinander und mit den Messmitteln (3) verbunden sind, um an das Informationssystem (2) wenigstens Informationen in Form eines von dem Benutzer kommenden Ausgangssignals (a1) zu senden, **dadurch gekennzeichnet, dass** das Terminal (6) ein Funktelefon enthält, welches drahtlos ist und interaktiv über

ein mobiles Telefonnetz (28) mit dem entfernten Informationssystem (2) verbunden ist.

2. System nach Patentanspruch 1, **dadurch gekennzeichnet, dass** das Terminal (6) und die Mikroprozessoreinheit (5) in einem einzigen Körper vereint sind.
3. System nach Patentanspruch 1, **dadurch gekennzeichnet, dass** es eine Dateneingangsvorrichtung (13) enthält, angeschlossen an die Schnittstellenmittel (7, 8, 9, 10), durch welche die Person Informationen in Form von Daten (a2) an die Verarbeitungsmittel (4) sendet.
4. System nach Patentanspruch 1, **dadurch gekennzeichnet, dass** es Mittel (14, 15) zur individuellen Identifizierung der Person enthält.
5. System nach Patentanspruch 4, **dadurch gekennzeichnet, dass** die persönlichen Identifikationsmittel einen Leser (14) des Fingerabdrucks der Person enthalten.
6. System nach Patentanspruch 4, **dadurch gekennzeichnet, dass** die persönlichen Identifikationsmittel einen Leser (15) des Netzhautbildes der Person enthalten.
7. System nach Patentanspruch 4, **dadurch gekennzeichnet, dass** die Schnittstellenmittel (7, 8, 9, 10) funktionell mit den persönlichen Identifikationsmitteln (14, 15) verbunden sind, um an das Informationssystem (2) entsprechende, von der Person kommende Informationen (a3, a4) zu senden.
8. System nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die Verarbeitungsmittel (4) zweite Schnittstellenmittel (29, 30, 31) für wenigstens eine Datenausgangsvorrichtung (20, 21, 22) enthalten, vorgesehen zum Übermitteln von Informationen in Form von Daten (b1, b2, b3), die von dem Informationssystem (2) kommen, an die Person.
9. System nach Patentanspruch 1, **dadurch gekennzeichnet, dass** die Verarbeitungsmittel (4) wenigstens dritte Schnittstellenmittel (35, 36, 37) für eine Vorrichtung (23, 24) zum Aussenden von Informationen in Form von Signalen (c1, c2, c3) enthalten, die durch die Verarbeitungsmittel (4) verarbeitet sind und auf Informationen (c) basieren, die von dem Informationssystem (2) kommen.
10. System nach Patentanspruch 9, **dadurch gekennzeichnet, dass** die Ausgangsvorrichtung eine Maschine (24, 25) ist, welche Funktionen hat, die je nach den physiologischen Parametern einer Person moduliert werden können.

11. System nach Patentanspruch 10, **dadurch gekennzeichnet, dass** die genannte Maschine eine Trainingsmaschine (24) ist.
12. System nach Patentanspruch 10, **dadurch gekennzeichnet, dass** die Maschine ein elektrisches Gerät (25) ist, das mit der physischen Person zusammenwirkt.
13. System nach einem beliebigen der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** das Informationssystem (2) eine computerisierte Datenbank enthält.
14. System nach einem beliebigen der vorstehenden Patentansprüche, **dadurch gekennzeichnet, dass** die Verarbeitungsmittel (4) eine Software zum Verarbeiten und Verwalten der Informationen enthält, die sich auf die Parameter des physiologischen Zustandes der Person beziehen.
3. Le système selon la revendication 1, **caractérisé en ce qu'**il comprend un dispositif (13) d'entrée de données relié aux moyens d'interface (7, 8, 9, 10), par l'intermédiaire duquel la personne envoie des informations sous forme de données (a2) aux moyens de traitement (4).
4. Le système selon la revendication 1, **caractérisé en ce qu'**il comprend des moyens (14, 15) pour identifier personnellement la personne.
5. Le système selon la revendication 4, **caractérisé en ce que** les moyens d'identification personnelle comprennent un lecteur (14) de l'empreinte digitale de la personne.
6. Le système selon la revendication 4, **caractérisé en ce que** les moyens d'identification personnelle comprennent un lecteur (15) de l'image rétinienne de la personne.

Revendications

1. Un système de télécommunication échangeant des informations relatives à des paramètres d'état physiologique personnalisés entre une personne physique et un système d'information (2), comprenant des moyens (3) destinés à mesurer des paramètres physiologiques de la personne physique en question ; et des moyens de traitement (4) interconnectés avec les moyens de mesure (3) et avec le système d'information (2) afin de transmettre au système d'information (2) au moins des signaux d'entrée (a1) correspondant aux paramètres physiologiques acquis à partir de la personne et afin de transmettre à la personne physique des informations de sortie (b; c) correspondant aux informations reçues en retour à partir du système d'information (2), les moyens de mesure (3) comprenant un fréquencemètre cardiaque destiné à surveiller la condition physique de la personne, les moyens de traitement (4) comprenant un dispositif à microprocesseur (5), un terminal (6) reliant la personne au système d'information et au moins des premiers moyens d'interface (7, 8, 9, 10) qui sont interconnectés entre eux et avec les moyens de mesure (3) afin d'envoyer au système d'information (2) au moins des informations sous forme de signaux d'entrée (a1) provenant de l'utilisateur, ledit système étant **caractérisé en ce que** le terminal (6) comprend un radiotéléphone qui est sans fil et relié de façon interactive avec le système d'information à distance (2) via un réseau de téléphonie mobile (28).
2. Le système selon la revendication 1, **caractérisé en ce que** le terminal (6) et le dispositif à microprocesseur (5) sont intégrés en un corps unique.
7. Le système selon la revendication 4, **caractérisé en ce que** les moyens d'interface (7, 8, 9, 10) sont fonctionnellement interconnectés avec les moyens d'identification personnelle (14, 15) afin d'envoyer au système d'information (2) des informations d'entrée (a3, a4) correspondantes provenant de la personne.
8. Le système selon la revendication 1, **caractérisé en ce que** les moyens de traitement (4) comprennent des deuxièmes moyens d'interface (29, 30, 31) pour au moins un dispositif (20, 21, 22) de sortie des données destiné à transmettre à la personne des informations sous forme de données (b1, b2, b3) provenant du système d'information (2).
9. Le système selon la revendication 1, **caractérisé en ce que** les moyens de traitement (4) comprennent au moins des troisièmes moyens d'interface (35, 36, 37) pour un dispositif (23, 24) de sortie d'informations sous forme de signaux (c1, c2, c3) traités par les moyens de traitement (4) sur la base d'informations (c) provenant du système d'information (2).
10. Le système selon la revendication 9, **caractérisé en ce que** le dispositif de sortie est une machine (24, 25) ayant des fonctionnalités qui peuvent être modulées en fonction des paramètres physiologiques de la personne.
11. Le système selon la revendication 10, **caractérisé en ce que** ladite machine est une machine d'exercices (24).
12. Le système selon la revendication 10, **caractérisé en ce que** la machine est un appareil électrique (25) interagissant avec la personne physique.

13. Le système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** le système d'information (2) comprend une base de données informatisée.

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14. Le système selon l'une quelconque des revendications précédentes, **caractérisé en ce que** les moyens de traitement (4) incluent un logiciel pour le traitement et la gestion des informations relatives aux paramètres d'état physiologique de la personne.

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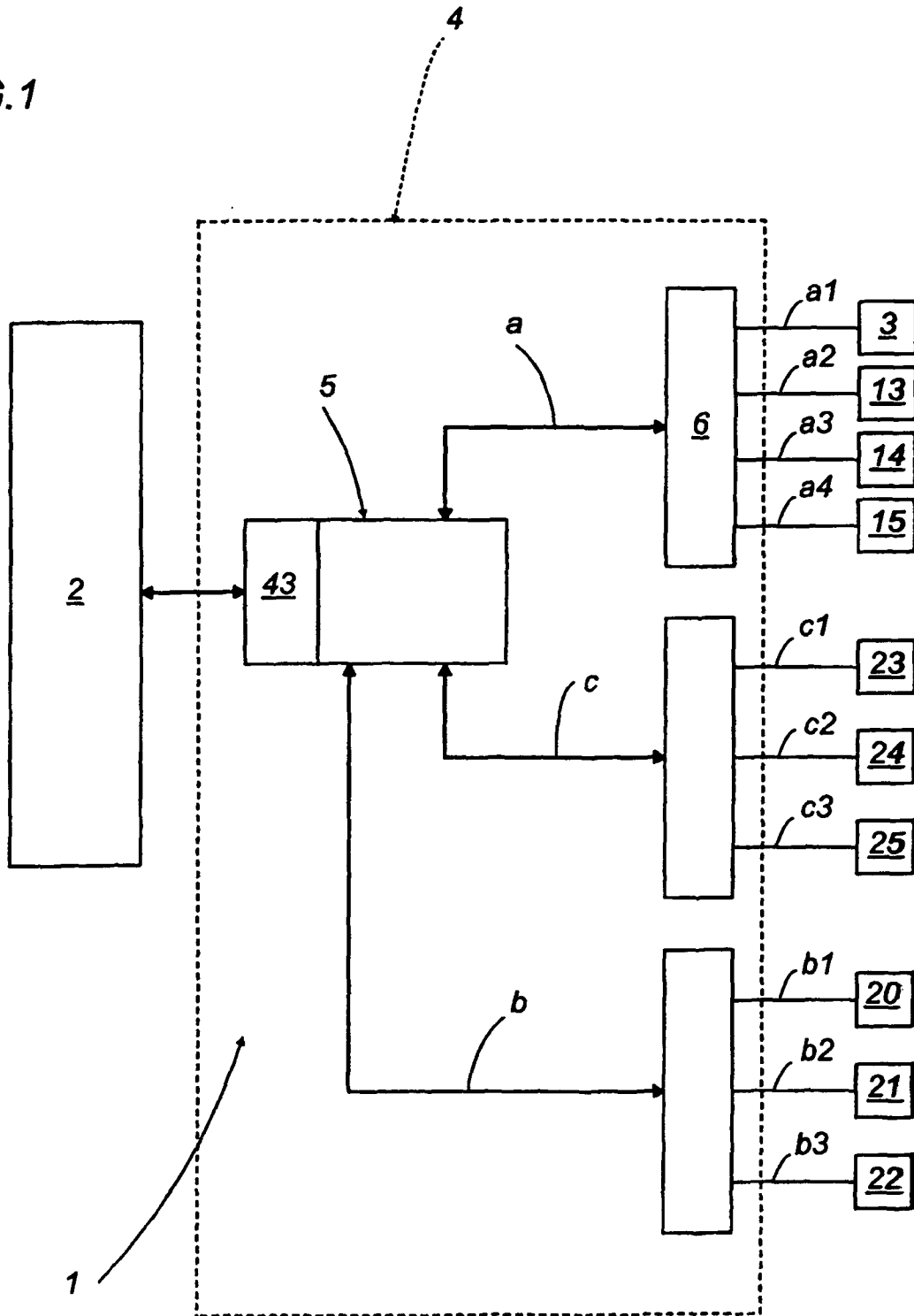
40

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FIG.1



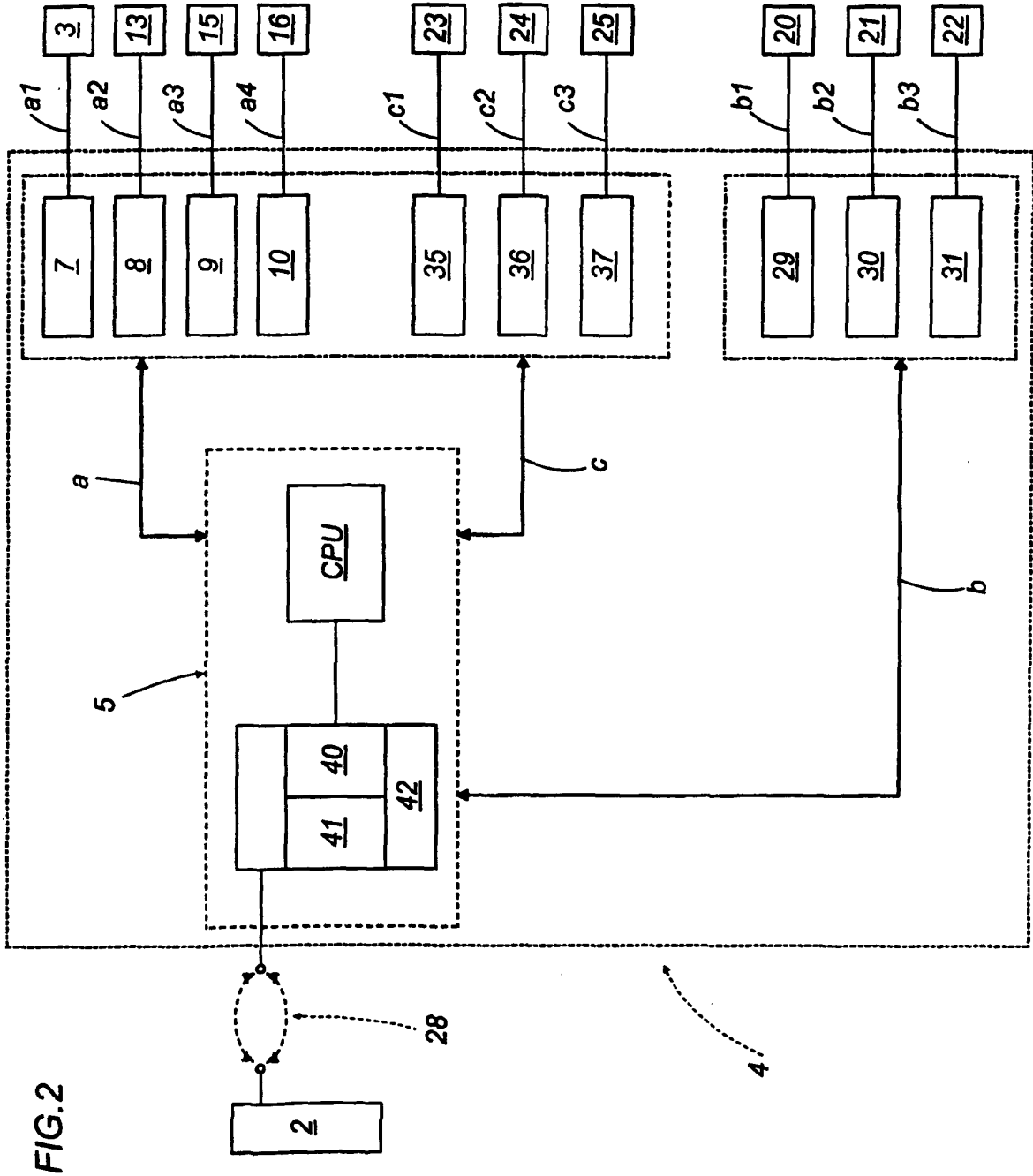


FIG. 2

专利名称(译)	一种用于在物理人和信息系统之间交换生理状态信息的电信系统		
公开(公告)号	EP1087824B1	公开(公告)日	2006-03-08
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[标]申请(专利权)人(译)	泰诺健股份公司		
申请(专利权)人(译)	TECHNOGYM S.R.L.		
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IPC分类号	A63B24/00 A61B5/00 G06F19/00 A63B69/00		
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优先权	BO1999000179 1999-04-16 IT		
其他公开文献	EP1087824A1		
外部链接	Espacenet		

摘要(译)

一种用于在物理人和信息系统(2)之间交换关于生理状态的个性化参数的信息的电信系统包括:用于测量身体人的生理参数的测量装置(3)以及与所述测量装置(3)和所述信息系统(2)互连的处理装置(4),用于向所述信息系统(2)传送至少对应于由所述人获取的生理参数的输入信号(a1)向所述物理人传输与从所述信息系统(2)返回接收的信息相对应的输出信息(b;c)。电信系统(1)允许物理人和信息系统(2)之间的对话以科学上准确和个性化的方式控制他/她自己的身体状况。

