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(54) **System for controlling and/or recording and/or indicating of elapsed time and/or of events following one another in the time**

System zum Kontrollieren und/oder Aufzeichnen und/oder Anzeigen von verstrichener Zeit und/oder zeitlich aufeinanderfolgender Ereignisse

Système de contrôle et/ou d'enregistrement et/ou d'indication des temps écoulés et/ou des événements successifs dans le temps

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(56) References cited:

<b>EP-A- 0 139 340</b>	<b>DE-A- 3 624 752</b>
<b>US-A- 3 889 103</b>	<b>US-A- 4 297 569</b>
<b>US-A- 4 323 771</b>	<b>US-A- 4 628 193</b>
<b>US-A- 4 639 583</b>	<b>US-A- 4 924 451</b>

- **IBM TECHNICAL DISCLOSURE BULLETIN** vol. 23, no. 7A, December 1980,, page 2744  
**BELASCO 'data recorder with time stamping'**
- **PATENT ABSTRACTS OF JAPAN** vol. 11 no. 84 (P-556) [2531] ,13 March 1987 & JP-A-61 239385 (MATSUSHITA ELECTRIC)

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## Description

The present invention relates to a system for controlling and/or recording and/or indicating of elapsed time and/or of events following one another in the time.

More particularly, the present invention relates to an admittance control system which is able to confidentially store in a memory the displacements and/or the passages of persons within a given place or a given area.

In some places, e.g. building yards, hotels, supermarkets, joinery workshops etc., it is necessary to have an admittance control system which is able to confidentially record the displacements and/or the passages of persons, so that the situation of the presences within said place is continuously available.

A system which is normally used in a plurality of working places is constituted by the so-called "presence booklets", which are manually filled out and which allow the presences of operators to be checked.

However, such system involves disadvantages and drawbacks, since it causes data writing and/or transcription errors, and it causes a large waste of time and work to the presence checking operators (especially in the case where the staff is numerous); furthermore, the data may easily be modified by persons who do not act in a real good faith.

Thus, such system may not be considered as reliable.

Another known presence control system, which is for instance used in building yards, makes use of a magnetic card which is associated to each operator, and of suitable computing means (e.g. a PC) which are installed by the yard and which may elaborate, for instance, the entry and exit data or the working time of a given person who would insert said magnetic card in a suitable reading device.

Such system is certainly more advantageous in respect of the system making use of presence booklets; however, it also involves disadvantages and drawbacks which greatly limit the possibilities of using this system.

In fact it requires the presence, for each individual yard, of a fixed PC suitable for processing the data, of specific PC operators, and of a magnetic card reading device; on these grounds, such system is relatively little used, since it does not allow any flexibility of use; as a matter of fact, this system may only be individually used for a single yard, and it requires the installation of a specific PC for each individual yard.

This substantial irremovability causes, from an economical point of view, very high costs in order to check, for instance, the presence of a working team acting in different yards during a given lapse of time.

EP-A-0 139 340 discloses a system as specified in the preamble of claim 1. This prior art system is used for recording the working times of truck drivers. It comprises a unit that is fixedly mounted in the truck, in which each driver can insert an identification card. The unit comprises a date clock circuit and a microprocessor with

associated memory. The unit associates identification data read from an inserted card with data from the date clock circuit and records these data in a removable data cassette in the form of a RAM buffered by a battery.

IBM Technical Disclosure Bulletin, vol. 23, No. 7A, December 1980, page 2744 discloses a data recorder with time stamping. Said recorder comprises a portable data collection device including a scanner for reading data from a magnetic card and recording said data in a magnetic tape cassette. A time-of-day and data calculator within said device provides a coded representation of date and time to be recorded, along with each data entry made by said scanner; periodically said cassette is placed in a tape reader connected to a control processing unit in which the collected data are processed and interpreted.

Another identification system is disclosed in document US-A-4,639,583; in this case too, collected data are associated to a time code and recorded in a magnetic tape cassette which may then be placed in a control processing unit for further data evaluation.

Document US-A-4,323,771 discloses an automated employee time and attendance system having a central processor and a plurality of sub-systems which are capable of providing data used by the central processor in payroll determination. In this case the collected data are temporarily stored in a magnetic disk.

Document US-A-3,889,103 discloses an electronic timer for producing a printed record of time intervals. The timer includes manual, photoelectric, acoustic signal, and other trigger source actuation and can simultaneously measure and record two or more events on separate channels and produce printed records of each. The apparatus is powered by self contained batteries which power a clock oscillator, all electronic timing circuitry and the record or paper tape mechanism.

The systems disclosed in said background art documents involve some major disadvantages which strongly limit their performances.

Actually, some of these devices have to be powered by connecting them to the mains, in order to provide for a continuous and stabilized electrical supply of the different mechanisms of the tape or disk recorders. Thus, they cannot be defined as "portable", since their use is always dependent on the presence of an electric socket for connecting them to the electric network. In the case where these devices were provided with batteries, many other problems could arise, since tape and disk recorders are characterised by relatively high electrical energy absorption rates; therefore, a daily use of these known devices would involve a frequent replacement of the batteries and, in any case, a relatively high device weight.

The present invention aims to obviate to the disadvantages and drawbacks which are typical of the background art, and to provide, thus, for a system for controlling and/or recording and/or indicating of elapsed time and/or of events following one another in the time which is transportable from one place to another, which

has an extremely low electrical energy absorption rate, which allows a centralized processing of the available data and which warrants the confidentiality of the detected data.

This is achieved by means of a system having the features specified in the main claim 1.

The dependent claims describe advantageous forms of embodiment of the invention.

The system according to the invention provides for the use of a completely autonomous unit, which is fed by a battery and which is easily transportable from one place to another one, said unit comprising a reading device suitable for receiving a series of data provided in a suitable data carrier which is associated to a given person, and a static memory suitable for recording said series of data.

According to a feature of the invention, said static memory is provided with autonomous feeding means and may be removed from said unit in order to be inserted into a centralized data processing device which processes the data coming from said static memory, as well as the data coming from other static memories, and which provides for the presentation of the processed data in a visualized way or on a suitable carrier, e.g. on paper or on a magnetic carrier.

According to an advantageous form of embodiment of the invention, said data carrier on which are recorded the data identifying the carrier itself and/or the data associated to a given person, is constituted by a key including an EPROM-type memory.

Such key is inserted by the operator into a suitable reading device which is incorporated in said autonomous unit, said device transferring such data into the static memory which is removable from the unit.

Once this static memory is removed from the autonomous unit and is inserted into the central unit, the program which is set in said central unit compares the data recorded in said memory to those which are relative, for instance, to the admittance permission of a given key inside of a given place, and it produces, in the most suitable way, the results of such comparison.

In this way it is possible to check whether, for instance, a given key has been used for entering a yard for which the key had previously been entitled to or not.

According to an advantageous form of embodiment of the invention, said autonomous unit is provided with a visual and/or acoustical signalling device, e.g. a pair of light emitting diodes and/or a buzzer, which allow the person who inserts the key into the reading device to immediately get from the autonomous unit a series of informations, e.g. about the carried out recording of the key data, or about the admittance approval into said specific place, or other.

Moreover, according to another advantageous form of embodiment of the invention, the autonomous unit may be provided with a data inputting means (e.g. a keyboard) and with a data visualizing means (e.g. a monitor screen); such configuration allows an operator em-

ployed for using the autonomous unit to immediately carry out presence checks, either in a merely numerical form or by checking predetermined persons; therefore, it is possible to obtain in a visual way a general layout of the entries and exits in a given lapse of time.

Other features and advantages of the invention will become apparent by reading the following description, given as a nonlimiting example, with the help of the figure illustrated in the annexed sheet, which shows a simplified layout of the apparatus constituting the system according to the invention.

In the figure, reference sign 10 generally indicates an autonomous unit belonging to the system according to the invention.

Unit 10 is fed by means of a suitable battery 11, by way of example a rechargeable Ni-Cd buffer battery, and it comprises a pair of reading devices 14, 15 suitable for receiving, each, an information recorded on a suitable data carrier 12 which, in this case, is constituted by a key housing an EPROM-type memory on which some significant data are recorded, e.g. identification data of the respective key, or codes for identifying the person who inserts the key, or accession codes etc..

According to the invention, each reading device 14, 15 is connected to a memory block 16 which may be removed from said autonomous unit 10 and which respectively comprises a smart card provided with its own CPU in order to decode and to amplify the coded signals coming from reading devices 14, 15, a memory for recording said data, which is suitably buffered by its own rechargeable battery (e.g. a Ni-Cd battery), a date clock circuit, which is buffered by the same battery, an electric connector for coupling block 16 to unit 10, and a suitable interface 17, e.g. a serial gate RS 232 for enabling a possible connection of block 16 to a central unit, advantageously to a PC.

Moreover, according to a first form of embodiment, the removable memory block 16 is connected to a data displaying device 19 (e.g. a display or a monitor screen) and to a data inputting device 20 (e.g. a keyboard).

According to a second form of embodiment, unit 10 is not provided with said data displaying and inputting devices; in this case, memory block 16 is connected to an indicating device 18 comprising a pair of light emitting diodes (LED), whose operating way will be hereinafter disclosed in detail.

Furthermore, each reading device 14, 15 houses a signalling buzzer as well as a switch which, as will be described later, allows the system to be fed only if a key 12 is inserted into one of reading devices 14, 15.

Alternately, the activation of the memory may be carried out by a suitable software.

In the following a particular form of embodiment of the system according to the invention will be described, according to which the system is used for carrying out a presence check inside a working environment, e.g. a building yard.

A key 12, which respectively serves for entering and

exiting the yard, and which is provided with a prerecorded carrier (e.g. a specific memory) carrying a series of informations for identifying the same key, is given each operator whose presence in the yard is authorized.

By the yard entrance there is an autonomous unit 10 and each operator inserts his accession key into a suitable reading device 14.

In the case where key 12 has been correctly inserted into the reading device 14, the same key operates the switch contained in the reading device, said switch closing then the feeding circuit of battery 11; unit 10 is then immediately ready, and the buzzer of reading device 14 gives out an acoustic signal indicating that a key has been correctly inserted.

Alternately, the insertion of a key may run a suitable software program for recognizing the same key, said program recording and processing the data carried by the key.

Now, according to a form of embodiment, a visual signalling device 18 gives an indication about the fact that data have been recorded and/or about the operator accession permission to the yard.

Alternately, according to another form of embodiment, the autonomous unit is provided with a display 19 and with a keyboard 20 by means of which a checking operator may directly and immediately verify the number of presences inside of the yard, as well as, for instance, the entry time and other significant data.

At the end of the working period, the operator inserts key 12 into reading device 15 and a procedure similar to the preceding one is repeated.

Thereafter, memory block 16 may be removed from autonomous unit 10 and it may be inserted into a central unit which, by means of a suitable software, specifically processes the data recorded by that autonomous unit, as well as the data coming from other possible autonomous units which were present by other yards, thereby giving the checking operator a graphical, or magnetical, presentation of the presence situation in a specific yard, or in a plurality of yards, relative to a predetermined lapse of time.

It appears to be evident that, in accordance to the installed software, it will be possible to verify and to ascertain the presence of each operator inside of one or more yards, thereby providing for each operator a personalized card bearing his presence periods.

It may still be noted that, since memory block 16 is provided with a suitable interface 17 allowing the block to be connected to a PC, of a fixed or of a portable type, a checking operator may at any time have available any kind of data processing relative to the presences inside of a given yard.

The invention has been previously described with reference to an advantageous form of embodiment thereof.

However, it appears to be clear that the invention is certainly not limited to that form of embodiment; rather, it comprises several variants falling within its scope.

By way of example, the apparatus may be directly connected either to an informatics network or to a printer.

Moreover, although the keys which have been described are constituted by elements containing an EPROM memory, the invention comprises forms of embodiment according to which the keys are of another kind, such as for instance magnetic cards, badges, etc., as well as forms of embodiment according to which a single reading device is provided for each unit.

It should also be clear that the system according to the invention may easily be adapted, according to different requirements, to carry out control operations differing from the disclosed ones.

By way of example, the system may easily be adapted in order to check the time which has effectively been worked by specific operators; furthermore, the system is absolutely not limited to applications as the previously described one, i.e. for checking presences inside of building yards.

In fact, the system may easily be adapted for carrying out controls and verifications inside of the most different environments, such as for instance supermarkets, hotels, joinery workshops, small workshops, stores, laboratories, fashion-houses, purchasing centers, banks, saw-mills, transportation firms, firms operating in the field of assembling and internal or external maintenance, wine cooperative stores, cleaning companies, bakeries, confectioner's shops, or for checking labourer's work etc.

## Claims

1. System (10) for recording elapsed time and/or events following one another in the time, comprising a unit (10) a first data carrier (12), a second data carrier (16), and a unit (10) comprising at least one reading device (14, 15) for reading data recorded on said first carrier (12), the second carrier being constituted by a memory block (16) which is removable from said unit (10) and may be inserted into a central unit for further processing and presentation of the data recorded thereon, said memory block (16) comprising a memory for recording said data, which is buffered by a battery, an electric connector for coupling said memory block (16) to said unit (10), and an interface (17) for enabling said memory block (16) to be connected to a central unit, the system further comprising a date clock circuit giving a signal of elapsed time and an electronic circuit suitable for processing the data read on said first carrier, associating them to the signals coming from said date clock circuit and recording them on said second carrier (16), characterised in that said unit (10) is completely autonomous and fed by a battery and in that said removable memory block (16) comprises an electron-

ic card provided with its own CPU in order to decode and amplify the coded signals coming from said at least one reading device (14, 15), said memory for recording said data, which is buffered by said battery, said date clock circuit, which is also buffered by said battery, said electric connector for coupling said memory block (16) to said unit (10), and said interface (17) for enabling said memory block (16) to be connected to a central unit.

2. System (10) according to claim 1, characterised in that said unit (10) further comprises a data displaying device (18, 19) and/or a data inputting device (20).
3. System according to claim 2, characterised in that said displaying device (18, 19) is constituted by a pair of light emitting diodes (18) or by a display (19).
4. System (10) according to anyone of the preceding claims, characterised in that said unit (10) further comprises an acoustical signalling device suitable for emitting an acoustical signal indicating a correct recording operation of the data coming from said first carrier (12).
5. System (10) according to anyone of the preceding claims, characterised in that said first carrier (12) rammable-and-erasable memory, or a magnetic card, or a carrier for a suitable code, e.g. a bar code.

#### Patentansprüche

1. System zur Aufzeichnung von Zeitabläufen und/oder Ereignissen in zeitlicher Abfolge, das eine Einheit (10), einen ersten Datenträger (12), einen zweiten Datenträger (16) und eine Einheit (10) mit mindestens einer Ablesevorrichtung (14, 15) zum Ablesen der auf dem ersten Datenträger (12) aufgezeichneten Daten umfaßt, wobei der zweite Datenträger aus einem Speicherblock (16) besteht, der von der Einheit (10) entfernbar ist und in eine Zentraleinheit zu weiteren Verarbeitungen und zur Vorlegung der in ihm aufgezeichneten Daten eingefügt werden kann, wobei dieser Speicherblock (16) einen von einer Batterie gepufferten Speicher zur Aufzeichnung dieser Daten, einen elektrischen Verbinder zum Verbinden des Speicherblocks (16) an die Einheit (10) und eine Schnittstelle (17) um der Speicherblock (16) mit einer Zentraleinheit verbinden zu können, umfaßt, wobei das System darüberhinaus eine Taktgeberschaltung, die ein Signal der ablaufenden Zeit abgibt, und eine elektronische Schaltung zur Verarbeitung der auf dem ersten Datenträger abgelesenen Daten umfaßt, das die Daten den von der Taktgeberschaltung stammenden Signalen zuordnet und sie auf den zweiten Daten-

träger (16) aufzeichnet, dadurch gekennzeichnet, daß diese Einheit (10) völlig selbständig ist, und von einer Batterie gespeist wird, und daß dieser entfernbare Speicherblock (16)

- eine elektronische Karte mit eigener Zentraleinheit, um die von dieser mindestens einen Ablesevorrichtung (14, 15) stammenden kodierten Signale zu decodieren und zu verstärken,
  - den von einer Batterie gepufferten Speicher zur Aufzeichnung der Daten,
  - die von dieser Batterie gepufferte Taktgeberschaltung,
  - den elektrischen Verbinder zum Anschluß des Speicherblocks (16) an diese Einheit (10),
  - und die Schnittstelle (17) um der Speicherblock (16) mit der Zentraleinheit verbinden zu können umfaßt.
2. System (10) nach Anspruch 1, dadurch gekennzeichnet, daß die Einheit (10) ferner eine Datenanzeigevorrichtung (18, 19) und/oder eine Dateneingabevorrichtung (20) umfaßt.
  3. System nach Anspruch 2, dadurch gekennzeichnet, daß die Anzeigevorrichtung (18, 19) ein Leuchtdiodenpaar (18, 19) oder eine Anzeige (20) umfaßt.
  4. System (10) nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß die Einheit (10) ferner eine akustische Signalisierungsvorrichtung umfaßt, um ein akustisches Signal zu geben, das den ordnungsgemäßen Aufzeichnungsvorgang der Daten, die vom ersten Datenträger (12) stammen, signalisiert.
  5. System (10) nach einem der vorherigen Ansprüche, dadurch gekennzeichnet, daß der erste Datenträger (12) einen Schlüssel umfaßt, in dem ein EPROM-Speicher oder eine magnetische Karte oder ein Träger für einen passenden Kode, z.B. einen Strichkode, enthalten ist.

#### Revendications

1. Système d'enregistrement de temps passé et/ou d'événements se succédant l'un après de l'autre dans le temps, comportant une unité (10), un premier support de données (12), un deuxième support de données (16) et une unité (10) ayant au moins un dispositif de lecture (14, 15) pour lire les données enregistrées dans le premier support de données (12), dans lequel le deuxième support de données est constitué par un bloc de mémoire (16) amovible de ladite unité (10) et pouvant être inséré dans une unité centrale pour élaborations ultérieures et pour

la présentation des données enregistrées, dans lequel ledit bloc de mémoire (16) comporte une mémoire, tamponnée par une batterie, pour enregistrer lesdites données, un connecteur électrique pour accoupler ledit bloc de mémoire (16) à ladite unité (10), et une interface (17) pour permettre le branchement dudit bloc de mémoire (16) à une unité centrale, le système comportant de plus un circuit horloge délivrant un signal de temps écoulé, et un circuit électronique pouvant élaborer les données lues dans ledit premier support de données, les associer aux signaux venant dudit circuit horloge, ainsi qu'à les enregistrer dans ledit deuxième support de données (16), caractérisé en ce que ladite unité (10) est entièrement autonome et elle est alimentée par une batterie, et en ce que ledit bloc de mémoire (16) amovible comporte une carte électronique dotée d'une unité centrale d'élaboration, au but de décoder et d'amplifier les signaux codifiés venant dudit au moins un dispositif de lecture (14, 15), ladite mémoire pour enregistrer lesdites données, tamponnée par ladite batterie, ledit circuit horloge, tamponné par ladite batterie, ledit connecteur électrique pour accoupler ledit bloc de mémoire (16) à ladite unité (10), ainsi que ladite interface (17) permettant le branchement dudit bloc de mémoire (16) à l'unité centrale.

2. Système (10) selon la revendication 1, caractérisé en ce que ladite unité comporte de plus un dispositif d'affichage des données (18, 19), ainsi qu'un dispositif d'introduction des données (20).
3. Système selon la revendication 2, caractérisé en ce que ledit dispositif d'affichage (18, 19) est constitué par une paire de diodes électroluminescentes (18) ou bien par un afficheur (19).
4. Système selon l'une quelconque des revendications précédentes, caractérisé en ce que ladite unité (10) comporte de plus un dispositif de signalisation acoustique pouvant émettre un signal acoustique indiquant une opération correcte d'enregistrement des données venant dudit premier support (12).
5. Système (10) selon l'une quelconque des revendications précédentes, caractérisé en ce que ledit premier support (12) est constitué par une clef comportant une mémoire EPROM, ou par une carte magnétique, ou bien par un support pour un code opportun, par exemple un code à barres.

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