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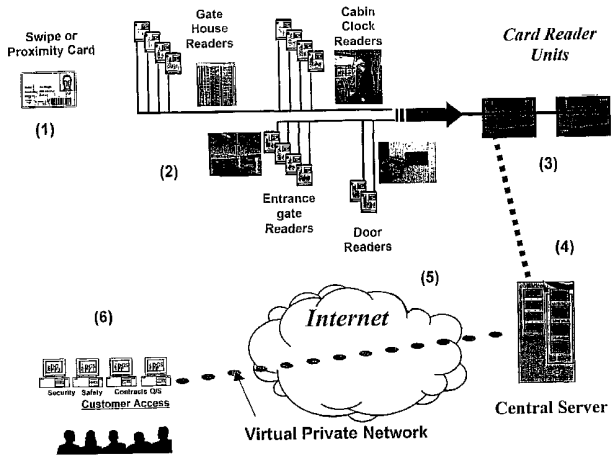
(54) Title: METHOD AND APPARATUS FOR REMOTELY MONITORING THE TIME AND ATTENDANCE OF WORKERS



(57) Abstract: A method and apparatus for enabling the remote monitoring of the time and attendance of a plurality of workers at various work locations is described. In use, unique swipe or proximity cards allow each respective worker to gain access to various work locations by swiping the card through a respective reader means located at, for example, the turnstile or entrance gate. The time of entry and departure of each respective worker is then retained by the reader means, which is then routinely polled by a remote server, over a wireless telecommunication link. At regular intervals, the server polls each of the reader means sequentially and checks them for the swipe times recorded by the unit, and this data is then written to an appropriate database, via the server. In the database, the entry and departure times of each respective worker in each respective work location are processed and combined into readily accessible information. In use, the remote user can then access the database over, for example, an encrypted link on a public network, such as the Internet. In this way, it is possible to remotely cover many work locations and, as such, readily monitor workers employed on short term contracts or temporary work sites, from anywhere in the world.

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METHOD AND APPARATUS FOR REMOTELY MONITORING THE TIME AND ATTENDANCE OF WORKERS

This invention relates to a method and apparatus for enabling the remote monitoring of the time and attendance of workers at various work locations. Remote user access to said time and attendance information being provided on a secure link over a public network, such as the Internet.

In recent years, the integration of access and security systems with time and attendance systems has meant that employers can both secure their premises and generate valuable time and attendance data for payroll and other services. Generally, in these systems, swipe or proximity cards are used to unlock doors or turnstiles, which in turn also generates information concerning the time that the respective employee swiped the card. However, the problems associated with this approach are that such systems are generally hardwired and, as such, tend to be expensive and time-consuming to install. Also, for shorter-term contract work on a variety of sites, this technique is clearly unsuitable. Other limitations are that, generally, such time and attendance information is held on a local server within the workplace, without remote access.

It is an object of the present invention to provide a method and apparatus for enabling the remote monitoring of the time and attendance of a plurality of workers at various work locations. Remote access of said time and attendance data being achieved over an encrypted link on a public network, such as the Internet. The implementation of the present invention, using wireless-based technology, allows for savings in both installation costs and time.

According to the present invention there is provided a method for enabling the remote monitoring of the time and attendance of a plurality of workers at a plurality of work locations, details of each respective worker being held on a unique identification means, the entry and departure of said respective worker to a respective work location being detected by the interaction of said unique identification means with at least one reader means, said reader means retaining details of each entry and departure time occurrence, the method comprising the steps of:

remotely accessing each said reader means and recording the entry and departure times of each respective worker detected therein, via a server means;

processing and combining said entry and departure times of each respective worker at each respective work location into readily accessible information using a database means held on said server means; and

providing remote user access to said entry and departure times of each respective worker using an encrypted communication means, via said server means over a public network.

In a preferred embodiment, said unique identification means may be provided using swipe or proximity cards or hand or thumbprints. Said swipe cards may be provided with a bar code or magnetic strip which stores encoded details of the respective worker thereon. Said encoded details of the respective worker being detected on passing said swipe card through said reader means.

Occurrences of entry and departure may be detected using said plurality of reader means situated at various locations around the workplace. Preferably, said plurality of reader means being provided by turnstile gates, clock readers, entrance gates and door readers. On detecting said respective worker, said reader means may also be programmed to unlock doors or turnstiles, or to control access to restricted areas. Said reader means may be

provided with a Global System for Mobile Communication (GSM) module for remote communication with said server means, such as a Siemens™ M20 GSM telephone module.

Using an existing Internet dial-up account, the remote user may call up said server means over said encrypted connection means implemented, preferably, using a Virtual Private Network (VPN), such as a Shiva™ LanRover VPN Gateway. Such an encrypted link provides a secure path for network applications which require no changes to the application. As such, this provides desktop to gateway security within a Local Area Network (LAN) or across a Wide Area Network (WAN).

Remote user processing of the time and attendance data may be provided using 'thin client' technology which allows the remote user access to said database means without the need for it to be installed or licensed on the local machine. Using, preferably, a 32-bit client software, the remote user may access said server means, for example, to cut and paste information from said database means into an application running locally, use short cut keys, run applications remotely or print to a local printer from applications running on said server means.

Further preferably, the remote user may use local application software to interpret the swipe times gathered by the clock readers and to produce reports which may include, for example, personnel currently on site, number and cost of hours worked in any given period, accident statistics and labor returns, etc. It can also keep track of employee training, disciplinary action, visitors to site and controls the issue of new swipe or proximity cards. Said local application software being implemented suitably using Microsoft™ Access.

Also according to the present invention there is provided an apparatus for enabling the remote monitoring of the time and attendance of a plurality of workers at a plurality of work locations, comprising:

at least one reader means, which, in use, can record the entry and departure times of each respective worker;

database means, being in communication with each said reader means via a server means, for processing and combining said entry and departure times of each respective worker at each respective work location into readily accessible information; and

encrypted communication means, which, in use, provides remote user access to entry and departure times of each respective worker held on said database means, via said server means over a public network.

Further according to the present invention there is provided a computer program product for enabling the remote monitoring of the time and attendance of a plurality of workers at a plurality of work locations, details of each respective worker being held on a unique identification means, the entry and departure of said respective worker to a respective work location being detected by the interaction of said unique identification means with at least one reader means, said reader means retaining details of each entry and departure time occurrence, comprising:

computer program means for remotely accessing each said reader means and recording the entry and departure times of each respective worker detected therein, via a server means;

computer program means for processing and combining said entry and departure times of each respective worker at each respective work location into readily accessible information using a database means held on said server means; and

computer program means for providing remote user access to said entry and departure times of each respective worker using over an encrypted communication means, via said server means over a public network.

The advantages of the present invention are that the remote user can quickly and easily access secure time and attendance data for a variety of different work locations anywhere in the world. The implementation of the present invention, using wireless-based technology, allows for savings in both installation costs and time. In this way, it is also possible to cover many work locations and, as such, readily monitor workers employed on short-term contracts or temporary work sites.

It will be obvious to those skilled in the art that variations of the present invention are possible, and it is intended that the present invention may be used other than specifically as described herein.

A specific non-limiting embodiment of the invention will be described by way of example and with reference to the accompanying drawings, in which:-

Figure 1 illustrates a schematic diagram of the present invention.

Referring now to the drawings, the proposed scheme is illustrated in Figure 1, wherein swipe or proximity cards or hand or thumb prints are used to collect data at various work locations. In use, the reader means identify which worker is swiping by reading the bar code printed on each clock card. Swipe cards may be manufactured using a digital camera and card printer. An image of the cardholder can be captured and instantaneously printed onto a swipe card, together with encoded details of the respective worker.

In a preferred embodiment, a proximity card may be used wherein a magnetic signal is induced into a coil embedded into the card and this transmits the encoded card number back to the reader means to be read and authorised, as appropriate. Such proximity card being primarily used for

hands free operation where the user is not required to present a token to a specific reader means.

At regular intervals, said server means dials each said reader means sequentially and checks them for any swipe times recorded by the unit. Such data is then written to said database means via said server means over a wireless GSM platform. Suitably, each said reader means is equipped with a Siemens™ M20 GSM telephone module. This performs the same functions as a mobile phone and modem built into one, though without a numeric keypad or dial out facility, and can be contacted via an external aerial. Thus, as long as there is a convenient power supply then the data recorded within the unit can be accessed from any personal computer and modem.

Data of employees' entry and departure times obtained by said reader means are processed and combined using said database means. Such data may be grouped into selectable fields which may include, but are not limited to, employees currently on a certain site, current number and cost of hours worked, lateness and unauthorised absence records, etc.

Using an existing Internet dial-up account, the remote user may call up said server means over an encrypted connection. Suitably, a Shiva™ LanRover VPN Gateway provides secure virtual private networking between said remote user and server means. In this way, time and attendance data can be securely delivered to the remote user anywhere in the world. The remote user may then, using Windows™ 32-bit Terminal Services Client software, remotely execute said database means on the Windows™ based server from a wide range of devices over virtually any type of network connection.

The remote user may then use any compatible local application software to interpret and manage the swipe times gathered by the clock

readers. Suitably, this is performed using a Microsoft™ Access based user interface.

CLAIMS

1. A method for enabling the remote monitoring of the time and attendance of a plurality of workers at a plurality of work locations, details of each respective worker being held on a unique identification means, the entry and departure of said respective worker to a respective work location being detected by the interaction of said unique identification means with at least one reader means, said reader means retaining details of each entry and departure time occurrence, the method comprising the steps of:

remotely accessing each said reader means and recording the entry and departure times of each respective worker detected therein, via a server means;

processing and combining said entry and departure times of each respective worker at each respective work location into readily accessible information using a database means held on said server means; and

providing remote user access to said entry and departure times of each respective worker using an encrypted communication means, via said server means over a public network.

2. A method as claimed in Claim 1, wherein said unique identification means further comprises swipe or proximity cards, or hand or thumb prints.

3. A method as claimed in Claim 2, wherein the entry and departure of said respective worker to a respective work location being detected by the interaction of said unique identification means with at least one reader means further comprises the step of said respective worker swiping the respective swipe card through said reader means.

4. A method as claimed in Claims 2 or 3, wherein the respective swipe cards is provided with a bar code or magnetic strip which stores encoded details of the respective worker thereon.

5. A method as claimed in Claim 2, wherein the entry and departure of said respective worker to a respective work location being detected by the interaction of said unique identification means with at least one reader means further comprises the step of said respective worker holding the respective proximity card in close proximity to said reader means.

6. A method as claimed in Claims 2 or 5, wherein the respective proximity cards is provided with a coil embedded therein which is capable of inducing an unique magnetic signal in said reader means.

7. A method as claimed in Claim 1, wherein the step of remotely accessing each said reader means and recording the entry and departure times of each respective worker detected therein, via a server means, further comprises the step of dialing-up each said reader means sequentially and writing said entry and departure times of each respective worker to said server means.

8. A method as claimed in Claim 1, wherein the step of processing and combining said entry and departure times of each respective worker at each respective work location into readily accessible information using a database means held on said server means further comprises the step of grouping said entry and departure times of each respective worker into selectable fields, which may include the number of employees currently on a certain site, current number and cost of hours worked, lateness and unauthorised absence records.

9. A method as claimed in Claim 1, wherein the step of providing remote user access to said entry and departure times of each respective worker using an encrypted communication means, via said server means over a public

network further comprises the step of dialing-up said server means using an existing Internet dial-up account.

10. An apparatus for enabling the remote monitoring of the time and attendance of a plurality of workers at a plurality of work locations, comprising:

at least one reader means, which, in use, can record the entry and departure times of each respective worker;

database means, being in communication with each said reader means via a server means, for processing and combining said entry and departure times of each respective worker at each respective work location into readily accessible information; and

encrypted communication means, which, in use, provides remote user access to entry and departure times of each respective worker held on said database means, via said server means over a public network.

11. An apparatus as claimed in Claim 10, wherein said at least one reader means is located at turnstile gates, clock readers or entrance gates.

12. An apparatus as claimed in Claims 10 or 11, wherein said at least one reader means is further programmed to unlock doors or turnstiles, or to control access to restricted areas.

13. An apparatus as claimed in any of Claims 10 to 12, wherein said at least one reader means is in communication with said database means via a respective wireless telecommunication device.

14. An apparatus as claimed in Claim 13, wherein said wireless telecommunication device is a Global System for Mobile Communication (GSM) module.

15. An apparatus as claimed in Claim 10, wherein said database means further comprises an appropriate database software to efficiently interpret and manage said entry and departure times of each respective worker.

16. An apparatus as claimed in Claim 10, wherein said encrypted communication means further comprises a secure Internet dial-up account.

17. An apparatus as claimed in Claim 16, wherein secure Internet dial-up account is provided by a Virtual Private Network (VPN).

18. An apparatus as claimed in Claim 10, wherein remote user access to entry and departure times of each respective worker held on said database means, via said server means over a public network, is provided by client software.

19. An apparatus as claimed in Claim 18, wherein said client software allows the remote user to remotely execute said database means and transfer said entry and departure times of each respective worker into local application software.

20. An apparatus as claimed in claim 19, wherein said local application software can produce reports which may include, for example, the number of personnel currently on site, number and costs of hours worked in any given period, accident statistics or labour returns.

21. A computer program product for enabling the remote monitoring of the time and attendance of a plurality of workers at a plurality of work locations, details of each respective worker being held on a unique identification means, the entry and departure of said respective worker to a respective work location being detected by the interaction of said unique identification means

with at least one reader means, said reader means retaining details of each entry and departure time occurrence, comprising:

computer program means for remotely accessing each said reader means and recording the entry and departure times of each respective worker detected therein, via a server means;

computer program means for processing and combining said entry and departure times of each respective worker at each respective work location into readily accessible information using a database means held on said server means; and

computer program means for providing remote user access to said entry and departure times of each respective worker using over an encrypted communication means, via said server means over a public network.

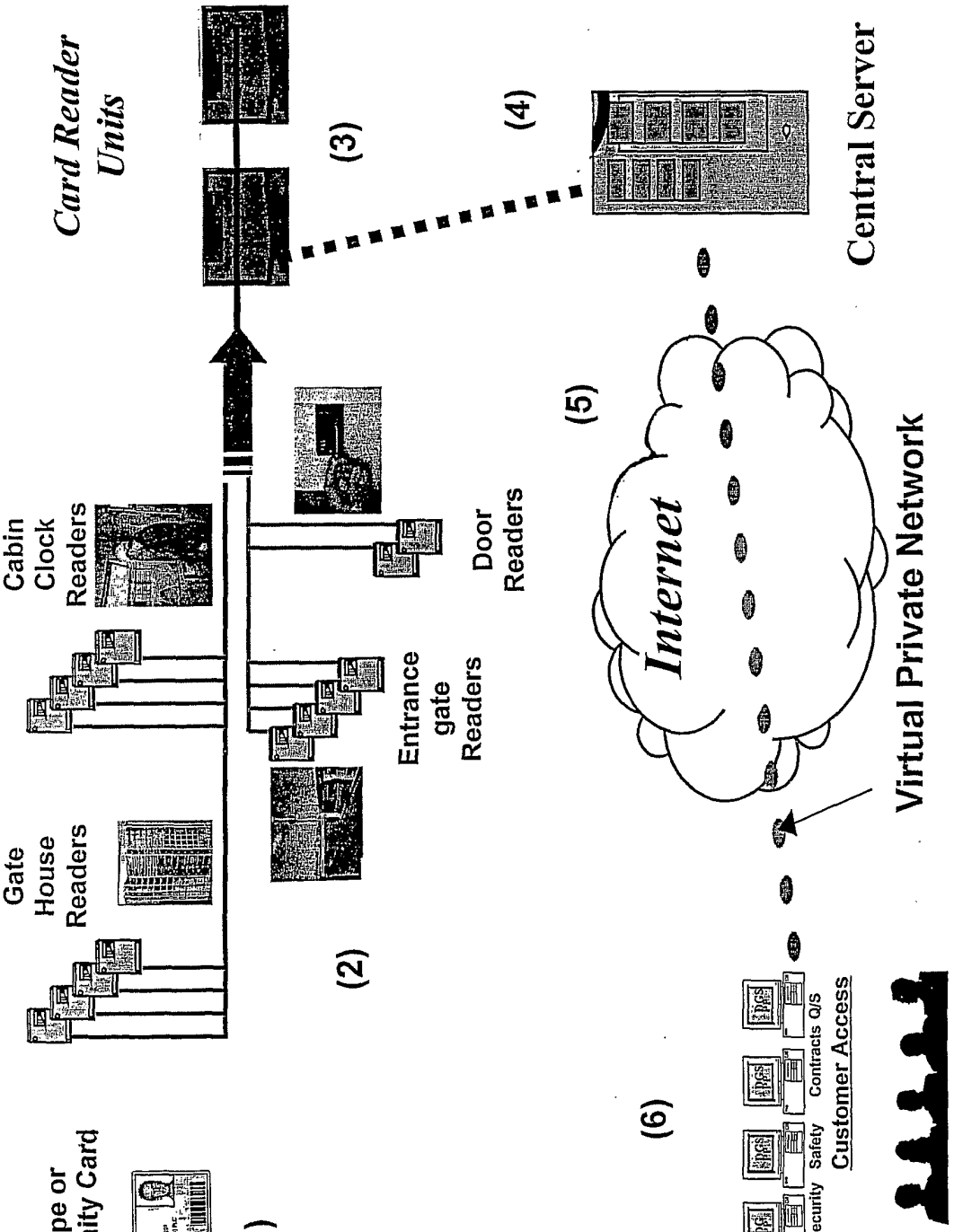
Card Reader Units
Swipe or Proximity Card
(1)
Gate House Readers
Cabin Clock Readers
(2)
Entrance gate Readers
Door Readers
(3)
(4)
Central Server
(5)
Internet
Virtual Private Network
(6)
Security
Safety
Contracts
Q/S
Customer Access

Fig. 1

INTERNATIONAL SEARCH REPORT

Inte ıal Application No
PC ı/ GB 01/04788

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G07C1/14 G07C9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 751 814 A (GEMPLUS CARD INT) 30 January 1998 (1998-01-30) abstract; claims; figures page 7, line 1 -page 11, line 30 page 13, line 15 -page 14, line 27 page 15, line 19 -page 16, line 23 ---	1,2,7, 10,15, 18-21
Y	US 5 717 867 A (D AMICO MICHAEL H ET AL) 10 February 1998 (1998-02-10) abstract; claims; figures column 6, line 3 -column 7, line 33 column 8, line 20 -column 9, line 44 --- -/--	1-21

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
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INTERNATIONAL SEARCH REPORT

Int nal Application No
PCT/GB 01/04788

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 99 53389 A (BIANCHINI KEVIN J ;KARP EDWARD W (US); CYBERHEALTH INC (US); FINE) 21 October 1999 (1999-10-21) abstract; claims; figures page 4, line 17 -page 8, line 30 page 20, line 14 -page 21, line 4	1-4,10, 13-15, 18-21
Y	US 5 682 142 A (JAGID BRUCE ET AL) 28 October 1997 (1997-10-28) abstract; figures	5,6,11, 12
A	column 8, line 21 -column 9, line 16	1-3,10, 15,20,21
Y	EP 0 621 565 A (FH2I S A SOC) 26 October 1994 (1994-10-26) abstract; claims; figures column 3, line 15 - line 47 column 5, line 43 -column 7, line 53	7
A		1-4,8, 10-12, 15,18-21
Y	US 5 600 554 A (WILLIAMS DALE H) 4 February 1997 (1997-02-04) abstract; claims; figures column 2, line 46 -column 3, line 18 column 4, line 42 -column 6, line 3 column 13, line 42 - line 54	8,9
A		1,10, 13-15, 18-21
Y	US 6 092 113 A (ASAMI TOHRU ET AL) 18 July 2000 (2000-07-18) abstract; figures column 1, line 11 - line 38	16,17
A	EP 0 813 171 A (BOSCH GMBH ROBERT) 17 December 1997 (1997-12-17) abstract; claims; figures	1,2,5,6
A	WO 00 41104 A (CT MOTION LTD ;GAON YAIR (IL); KATZ RAFI (IL)) 13 July 2000 (2000-07-13)	

INTERNATIONAL SEARCH REPORT

ormation on patent family members

Inte ·nal Application No
PC1/GB 01/04788

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2751814 A	30-01-1998	FR 2751814 A1	30-01-1998
		AU 738947 B2	27-09-2001
		AU 3774297 A	10-02-1998
		BR 9710397 A	17-08-1999
		EP 0928464 A1	14-07-1999
		WO 9803940 A1	29-01-1998
		JP 2000515283 T	14-11-2000
US 5717867 A	10-02-1998	US 5459657 A	17-10-1995
WO 9953389 A	21-10-1999	AU 3748699 A	01-11-1999
		EP 1031071 A2	30-08-2000
		WO 9953389 A2	21-10-1999
		US 2001047286 A1	29-11-2001
US 5682142 A	28-10-1997	NONE	
EP 0621565 A	26-10-1994	FR 2704335 A1	28-10-1994
		AT 155597 T	15-08-1997
		DE 69404207 D1	21-08-1997
		DE 69404207 T2	11-12-1997
		EP 0621565 A1	26-10-1994
		ES 2106483 T3	01-11-1997
US 5600554 A	04-02-1997	NONE	
US 6092113 A	18-07-2000	JP 10070566 A	10-03-1998
		GB 2317308 A ,B	18-03-1998
EP 0813171 A	17-12-1997	DE 19623561 A1	18-12-1997
		EP 0813171 A2	17-12-1997
WO 0041104 A	13-07-2000	AU 1795800 A	24-07-2000
		WO 0041104 A2	13-07-2000