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(54) **Detection system of the presence of a plurality of workers in a workplace**

(57) Described herein is a detection system of the presence of a plurality of workers in a workplace. Advantageously according to the invention, the system comprises at least a mobile input peripheral device (8) provided with input means (13) adapted to receive data (A')

uniquely associated to workers (2) and means (111) for the detection of the position (D') of the workplace on the terrestrial globe.

In addition, described herein is a method for detecting the presence of a plurality of workers in a workplace.

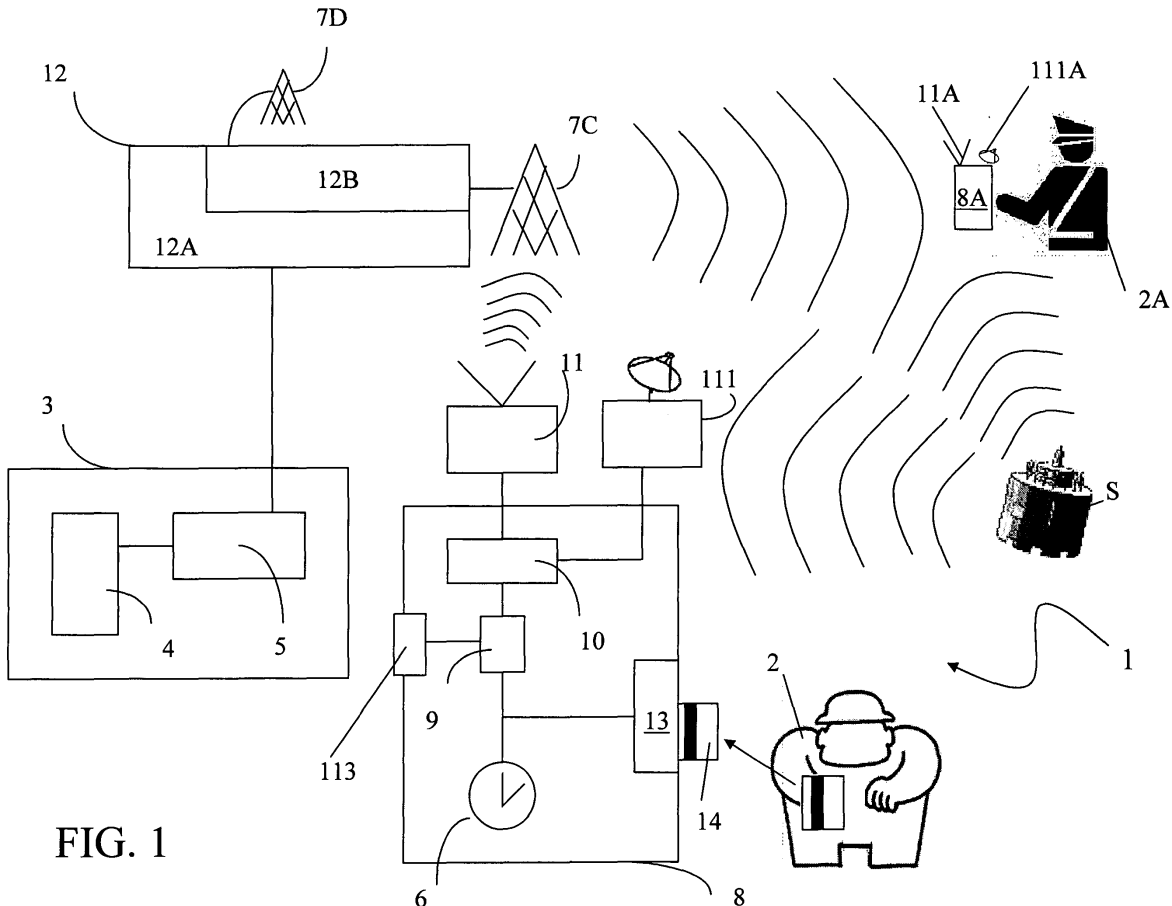


FIG. 1

DescriptionField of application

[0001] The present invention has the object of providing a detection system of the presence of a plurality of workers in a workplace.

[0002] In particular, the present invention has the object of providing a detection system of a plurality of workers in a workplace based on an identification of the position of the workplace on the terrestrial globe.

Prior Art

[0003] The problem regarding undeclared employment is known. Thousands of people work without standard workers rights because they are not declared by their respective employers.

[0004] Public authorities have adopted various measures to try to solve such social problem.

[0005] For example, in construction sites, there are known systems for registering workers, who have to be registered in a presence book, made available at the construction site, bearing an identification code and the worker's personal information. Ministry inspectors sent on site have the right to demand the presence book and check the correspondence between the workers found on the construction site and the workers registered and encoded in the presence book.

[0006] However, the presence book constitutes obviously an encumbrance in that it requires constant updating and needs to be carried even in scarcely accessible work areas. Furthermore, it is impossible to ascertain whether clocking in operations were performed on the workplace. Given that the presence book can be filled at different times with respect to the time indicated or in a mendacious manner, the manual writing on the presence book does not certify the date, the time and the workplace. Additionally, the presence book can be destroyed or lost, thus jeopardizing the certainty of obtaining the data by the ministry authorities. Ministry inspectors are not in a position to know in real time whether work is in progress at a given site.

[0007] According to this document, workplace indicates a site to which a worker is associated during the performance of his professional duties: therefore, a workplace is not necessarily a fixed place and associated permanently to the work company (such as an office or a production factory), but it could also vary from day to day (for example for the construction workers the workplace is represented by the construction site), otherwise it could also vary rapidly (for example for delivery jobs, the workplace changes continuously, and it can be represented by the route covered by the worker).

[0008] According to the prior art, there are no automatic systems neither capable assisting the inspectors in their activity nor replacing the presence book.

[0009] It is the objective of the present invention to pro-

vide a computerised and telecommunication system capable of overcoming the use of the presence book.

Summary of the invention

[0010] The idea of the solution on which the present invention is based is that of providing a detection system of the presence of a plurality of workers in a workplace comprising the association of the workplace to the detection of the presence of the worker by means of a unique code alongside the position of the workplace on the terrestrial globe.

[0011] According to the present invention, the technical problem is overcome by means of a detection system according to claim 1.

[0012] Furthermore, such technical problem is overcome by a method according to claim 13.

[0013] In this manner, ascertainment of the legality of the presence of a worker at the workplace by the inspector is supported perfectly.

[0014] Characteristics of the present invention shall be made clearer by the description, outlined hereinafter, of an embodiment provided for illustrative and non-limiting purposes with reference to the drawings attached.

Brief description of the drawings**[0015]**

Figure 1 schematically shows the structure of a presence detection system according to the invention;

Figure 2 shows the operation of the system of figure 1 from a data exchange point of view;

Figure 3 shows an example of database used by the system of figure 1.

Detailed description

[0016] A detection system of the presence of a plurality of workers in a workplace according to the invention is illustrated in figure 1, indicated in its entirety by 1. In particular, the system 1 comprises a central system 3, in turn comprising a server 4 and an ADSL modem 5 continuously connected to a geographic telephone network 12, represented as subdivided into a fixed telephone network 12A and a mobile telephone network 12B to which common cellular telephones can be connected through repeaters 7C, 7D.

[0017] A mobile input peripheral device 8, provided to a company, is provided with a microprocessor 9, input means comprising an identification card reader 13 (a magnetic card reader in this specific case), a digital clock 6, a GPRS modem 10, an output screen 113 and GPS-based means, among which a GPS antenna 111 capable of allowing the microprocessor 9 to calculate the instantaneous position of the mobile input peripheral device 8

according to the waves received from the satellites; a satellite S is exemplified for strictly illustrative purposes.

[0018] In other embodiments of the same invention, the GPS-based means could be replaced by other means capable of detecting the position on the terrestrial globe.

[0019] The worker 2 is provided with an identification card (a magnetic card 14 in this specific case) in which a code uniquely associated to the worker 2 and readable by the magnetic card reader 13 is encoded.

[0020] The mobile input peripheral device 8 is, through the GPRS modem 10, continuously connected to the mobile telephone network 12B (in the case represented in figure 1 it is connected to the repeater 7C), through which it is capable of delivering to the central system 3 the data gathered, that is data uniquely associated to the worker, obtained through the magnetic card reader 13, the data associated to the workplace, that is the position on the terrestrial globe obtained through the GPS means 111 and the time data regarding the instant of detection, obtained by means of the digital clock 6.

[0021] In this manner, through a digital communication network of the internet type, the server 4 and the microprocessor 9 are capable of exchanging data by delivering digital data packets in the network.

[0022] The server 4 comprises a database I, illustrated in figure 3. The database is updated in real time, it contains the data A' associated uniquely to the worker (obtained by means of the reader 13), the data indicating the time B' when the detection was performed (obtained by means of the digital clock 6) and the position data D' (obtained through the GPS 111). Thus there are three types of information for each record regarding a detection operation.

[0023] An inspector 2A is provided with a mobile output peripheral device 8A, in this case a palmtop computer. The palmtop computer is connected, through a radio-receiver/transmitter means 11A, to the digital telecommunication network in such a manner to be connected to the central system 3 and capable of downloading, at least partially, the database I, and in particular the data A', B' and D'.

[0024] Obviously, the palmtop computer can be provided with a GPS peripheral device 111A in such a manner to be capable of accurately locating the position of the inspector.

[0025] In this manner, the identification and ascertainment of the legality of the presence of such worker in the workplace is a simple operation for the inspector provided with such mobile output peripheral device.

[0026] According to a particularly advantageous embodiment of the present invention, such at least one mobile input peripheral device comprises, as hardware means, radio-reception/transmission means (for example according to the GSM/GPRS standards), capable of being connected to fixed radio-reception/transmission means (for example repeaters) associated to the telephone network. The mobile input peripheral device comprises, as hardware means, a modem capable of allowing

mobile navigation in a network of the internet type, in such a manner to allow the abovementioned remote connection through simple transmission of data packets.

[0027] Therefore, thanks to the present invention, ascertainment of the legality of the presence of workers becomes an operation similar to the use of a common remote data exchange software provided with mobile means.

[0028] The input means of the mobile input peripheral devices possibly comprise a reader for identification cards (for example magnetic cards, proximity cards or microchip cards) which encode a code uniquely associated to the respective worker. In such case, this enhances simplification, in that provided with known hardware components for reading identification cards; even health cards or fiscal codes of each worker could be possibly used. Otherwise, the mobile input peripheral devices comprise, alternatively, a reader for the biometric data of the workers (for example fingerprints). In such case, the lower degree of simplification of the system could be counterbalanced by an advantageous reliability of the system when it comes identifying the worker.

[0029] Advantageously, the central system can also operate in multitasking and use algorithms to process the simultaneous multiple connections by several mobile peripheral devices located in various areas on the national territory.

[0030] According to a particularly advantageous embodiment, the mobile input peripheral device calculates time by means of a common digital clock, and thus it is capable of associating a time indication to the detection of the workers. Such information is sent to said central system through the delivery of a data packet through telecommunication systems, in combination with the data associated to the workplace possibly obtained through the GPS system.

[0031] The mobile input peripheral device may comprise, in some embodiments, as hardware means, at least a microprocessor, a modem according to the GPRS standards for broad band connections and a GSM/GPRS radio-transmitter/receiver.

[0032] Following is an illustration, with the help of figure 3, of the operation of the system from a data transmission A', B', D' point of view through telecommunication systems. The data A', B' and D' are respectively obtained through the microprocessor 9 respectively through the input means 13, the digital clock 6 and the GPS antenna 111, and subsequently delivered to the server 4 with subsequent transmissions comprising the GPRS modem 10, the GSM antenna 11, the repeater 7C, the geographic telephone network 12 (through which the internet network is supported), the ADSL modem 5 and lastly the server 4. In all stages the data A', B' and D' change format for adaptation to their respective standards. The server 4, delivers the data back to the output peripheral device 8A, and possibly to computer systems connected to the ministry authorities.

[0033] An example of how the database I is updated

is shown by figure 3 itself. According to such example, on 21st June 2007, in a construction site located at an imaginary point of the terrestrial globe whose coordinates are 45°N and 10°W, there are legally registered workers of a given company.

[0034] At 8.15 AM, one first worker Giorgio Verdi, identified with the unique code 123123123 stored in his magnetic card, slides the magnetic card on the reader 13. At 8.16 AM, a second worker Luigi Gialli, identified with the unique code 123123124 slides his magnetic card.

[0035] From a telecommunications point of view, the fact that standard communication protocols are used allows to overcome possible conflicts between simultaneous deliveries of presence data by the various mobile peripheral devices through algorithms typical of such communication protocols. Likewise, the server, which is a computer capable of operating in multitasking, can establish connections with more than one mobile input peripheral device at a time according to known multitasking algorithms, even further avoiding generation of conflict between various mobile peripheral devices.

[0036] Therefore, advantageously designing a system according to the invention is made easier.

[0037] Furthermore, the speed of all the components present, including the telephone network through remote GSM-based connection, advantageously ensures a speed otherwise unattainable.

[0038] It should be born in mind that connection to the telephone network by the mobile peripheral device does not necessarily have to be constant. As a matter of fact, it is possible that over given periods of time during the day, when no access is scheduled, such connection can be disabled. Data regarding workers whose presence is expected at the workplace can be downloaded, once and for all, upon request by the inspector when entering the workplace.

[0039] Additionally, a system according to the present invention has the advantage of being programmable in such a manner that even persons not employed by the company can be recorded, thus even artisans, subcontractors, or other entities provided for by other forms of contracts. It shall be possible to use identification cards issued by national authorities in the field of health and social welfare, but provided that they are characterised by the presence of a code uniquely associated to a worker, in a such manner to allow to locate both the worker and his employer.

[0040] The mobile input peripheral device 8 can be transferred and it has a cigar lighter receptacle type of power supply or a connection to the national electrical system.

[0041] Obviously, the telecommunication connection does not necessarily have to be in real time, but it can be spaced in time and database download sessions can be scheduled at periods differing from the inspection periods of the minister inspectors.

[0042] The mobile input peripheral device 8 can definitely operate even in case of lack of satellite coverage,

operating in such case using only the last value of position on the terrestrial globe obtained.

[0043] Further advantages are due to the fact that the data obtained in the database I can possibly be transferred to other authorities, for example in the field pension, certification, insurance or social welfare; possibly, connections with computers used by banking, insurance, and labour consultancy companies can be provided in such a manner to perform operations or transactions regarding the presence of workers at the workplace. For example, companies providing payslip preparation services may advantageously widely use the connection of their computer networks with the system according to the present invention.

[0044] It is clear that such a system does not persecute persons working under the law, while it is capable of detecting undeclared work relationships.

[0045] The invention also regards a method for detecting the presence of a plurality of workers in a workplace, comprising the following steps:

- A step of detection of a presence data A' of a worker in a workplace through a unique code on an automatic device 8; and
- A step of association of the presence data A' of the worker to the position D' on the terrestrial globe of the automatic device 8.

[0046] Advantageously, according to the invention, the method additionally comprises a step of association of the presence data A' to the instant B' when the detection of the presence data A' is performed.

[0047] Advantageously according to the invention, the method further comprises:

A step of delivery of such presence and position data to a central system; and

A step of redelivery of such presence and position data from the central system to a palmtop computer.

[0048] The automatic device is preferably the mobile input peripheral device 8. The unique code is preferably associated to the abovementioned identification card. The position of the automatic device on the terrestrial globe is preferably obtained through GPS. The central system preferably comprises a server capable of operating in multitasking. Delivery and redelivery of presence data is preferably obtained through a digital telecommunication network of the internet type. Operation protocols of such digital network are preferably in compliance with the GPRS standards. Even the palmtop computer is preferably provided with GPS circuitry, and it is capable of communicating with wireless means. Furthermore, the automatic device may be provided with a digital clock capable of detecting even the time data when the identification occurred, such time data being further delivered

alongside the presence data and the time data.

[0049] Obviously, alongside the system and the method described above a man skilled in the art, with the objective of meeting incidental and specific requirements, shall perform various modifications and variants, all of which fall within the scope of protection of the invention as described by the following claims.

Claims

1. Detection system of the presence of a plurality of workers in a workplace, **characterised in that** it comprises at least a mobile input peripheral device (8) provided with input means (13) adapted to receive data (A') uniquely associated to the workers (2) and means (111) for the detection of the position (D') of the workplace on the terrestrial globe.
2. System according to claim 1, **characterised in that** said means (111) for the detection of the position of the workplace (D') on the terrestrial globe comprise GPS-based means.
3. System according to one of claims 1 or 2, **characterised in that** it comprises a central system (3) provided with at least one server (4), hardware means (9, 10, 11, 5) being provided for in said central system (3) and in said at least one mobile input peripheral device (8) for connecting to a telephone network (12) and establish a remote connection between said central system (3) and said at least one mobile input peripheral device (8), said remote connection being of the digital telecommunication type.
4. System according to one of claims 1 - 3, **characterised in that** said at least one mobile input peripheral device (8) comprises at least one microprocessor (9), radio-reception/transmission means (11) capable of being connected to fixed radio-reception/transmission means (7D, 7C) associated to said telephone network (12) and a modem (10) capable of allowing a mobile navigation.
5. System according to any of the preceding claims, **characterised in that** it comprises at least one database (I) capable of associating, in real time, data (A') uniquely associated to each worker to data associated to the position (D') of the workplace and the instant (B') when the ascertainment is performed.
6. System according to any of claims 3 - 5, **characterised in that** said system comprises at least one mobile output peripheral device (8A) capable of downloading, at least partially, said data (A') uniquely associated to the workers (2) and said data (D') associated to the workplace from said central system (3).
7. System according to claim 6, **characterised in that** said at least one mobile output peripheral device (8A) is connected, through suitable radio-reception/transmission means (11A), to said central system (3).
8. System according to claim 6, **characterised in that** said at least one mobile output peripheral device (8A) is a palmtop computer.
9. System according to any of the preceding claims, **characterised in that** said input means (13) of said at least one mobile input peripheral device (8) comprise an identification card (14) reader (13), each of said identification cards (14) being uniquely assigned to a respective worker and bearing a code readable by said magnetic card reader (13), said code constituting a data (A') uniquely associated to the respective worker.
10. System according to any of claims 1 - 9, **characterised in that** said input means (13) of said at least one mobile input peripheral device (8) comprise a workers (2) biometric data reader, said first and second database uniquely identifying the workers (2) according to said biometric data, said biometric data being uniquely associated to the workers in such a manner to constitute said data (A') uniquely associated to the workers.
11. System according to any of claims 3 - 10, **characterised in that** said digital telecommunication connection is of the internet type and it occurs through exchange of data packets between said central system (3) and said at least one mobile input peripheral device (8).
12. System according to any of the preceding claims, **characterised in that** said at least one mobile input peripheral device (8) comprises, as hardware means, at least one modem (10) according to the GPRS standard for broadband connections and a GSM/GPRS radio-transmitter/ receiver (11).
13. Method for detecting the presence of a plurality of workers in a workplace, comprising the following steps:
 - A step of detecting a presence data (A') of a worker in a workplace through a unique code on an automatic device (8);
 - A step of association of said presence data (A') of the worker to the position on the terrestrial globe (D') of said automatic device (8).
14. Method according to claim 13, **characterised in that** it comprises a step of delivery of said presence and position data (A' and D') to a central system (3).

15. Method according to claim 14, **characterised in that** it comprises a step of redelivery, at least partial, of said presence (A') and position (D') data from said central system (3) to at least one palmtop computer (8A). 5
16. Method according to any of claims 13-15, **characterised in that** it comprises a step of association of said presence data (A') of the worker at the instant (B') when the detection of said presence data (A') is performed. 10

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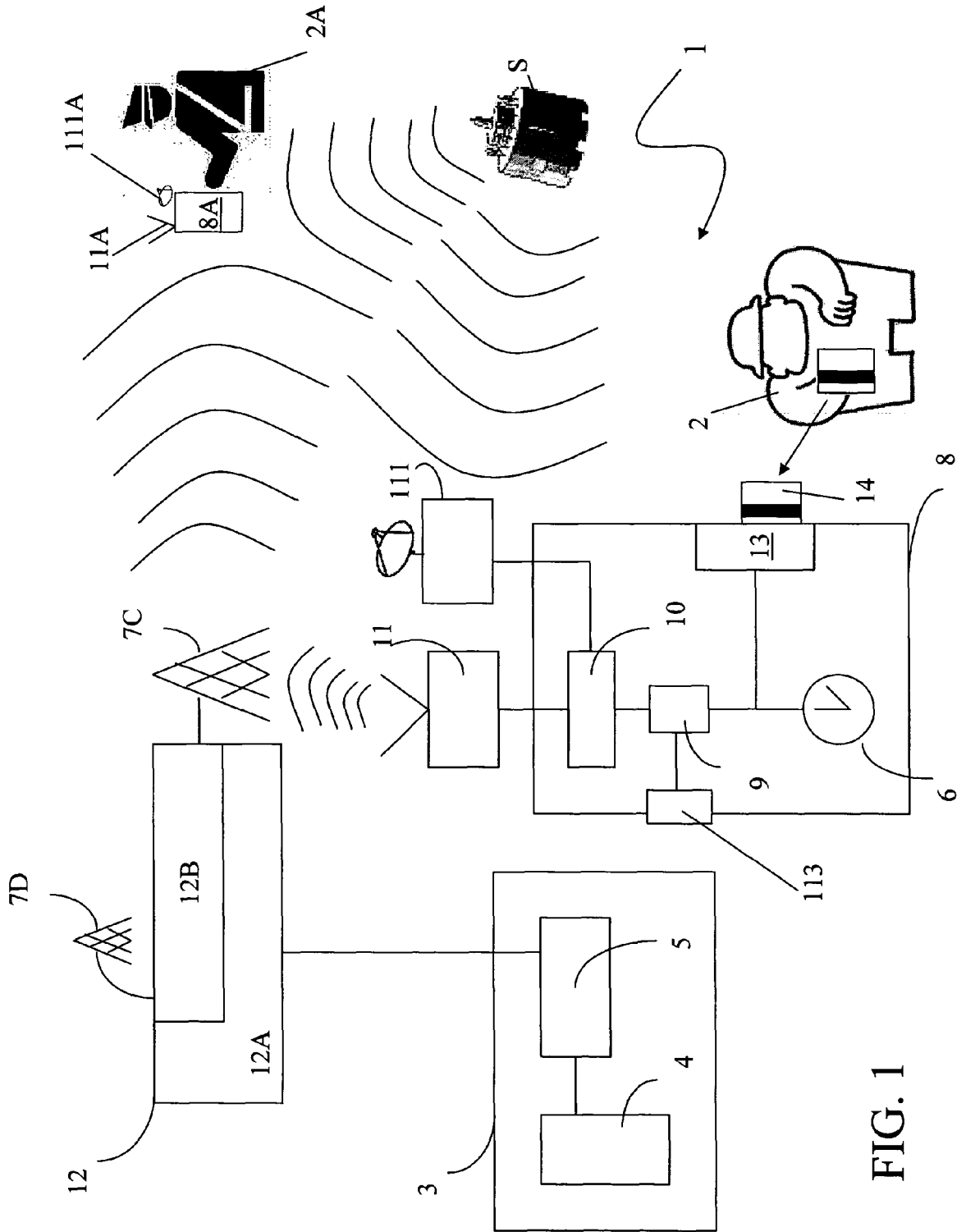


FIG. 1

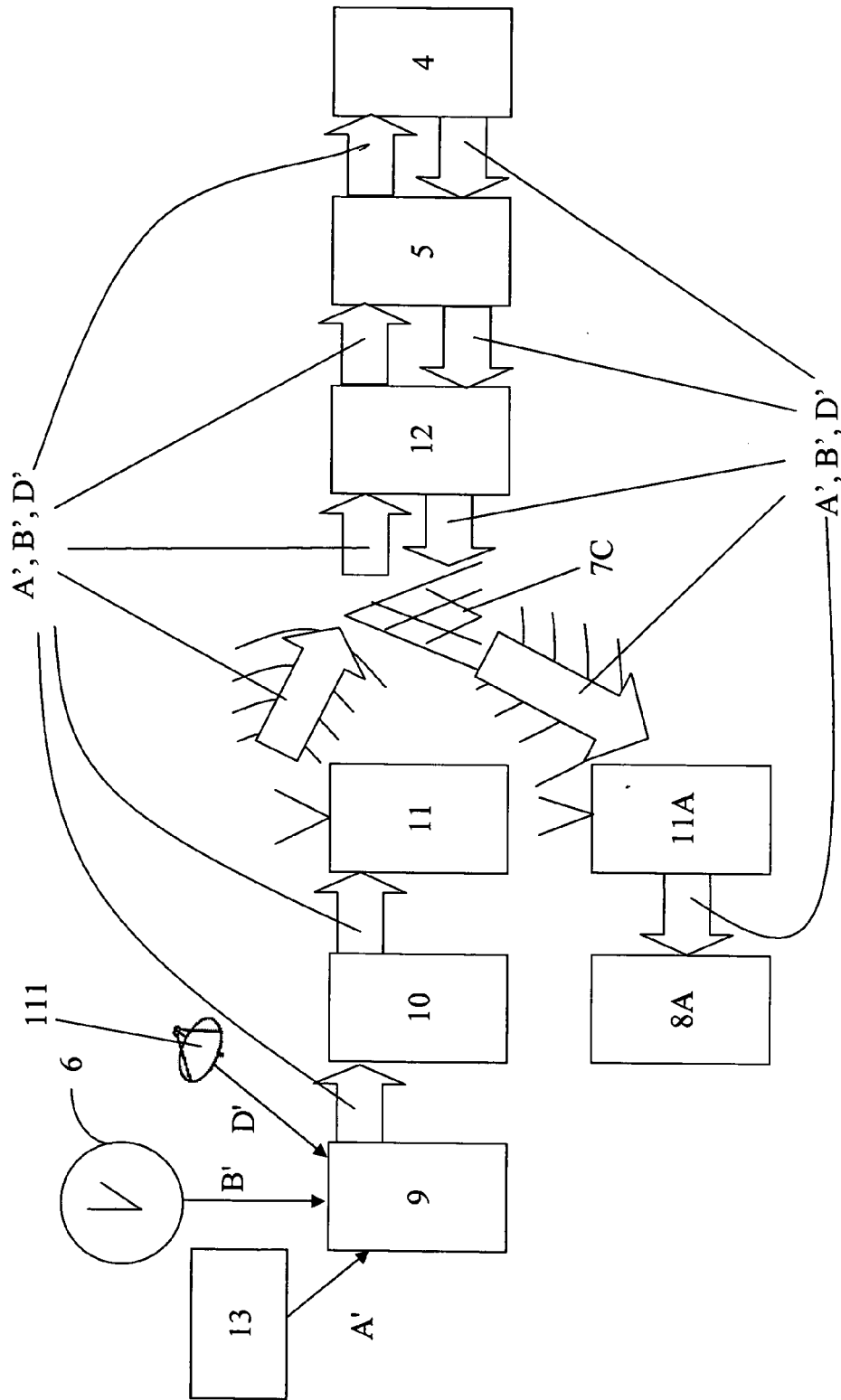


FIG. 2

I

D'	B'	A'
45°N, 10°W	21.06.2007, h 8,15	123123123
45°N, 10°W	21.06.2007, h 8,16	123123124

FIG.3



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	GB 2 408 616 A (GAMBLE MARK MAURICE [GB]) 1 June 2005 (2005-06-01)	1-5,9-16	INV. G07C1/14
Y	* pages 2-4; claims 1-10; figures 1-4 * -----	6-8,15	
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Y	WO 02/37427 A (DATASCOPE PLC [GB]; BUTT ADRIAN [GB]) 10 May 2002 (2002-05-10) * page 1, lines 19-21 * * claim 1 * -----	6-8,15	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			G07C
Place of search		Date of completion of the search	Examiner
Munich		11 March 2008	Johansson, Roland
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EPO FORM 1503 03.82 (P/MC01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 07 42 5633

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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11-03-2008

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