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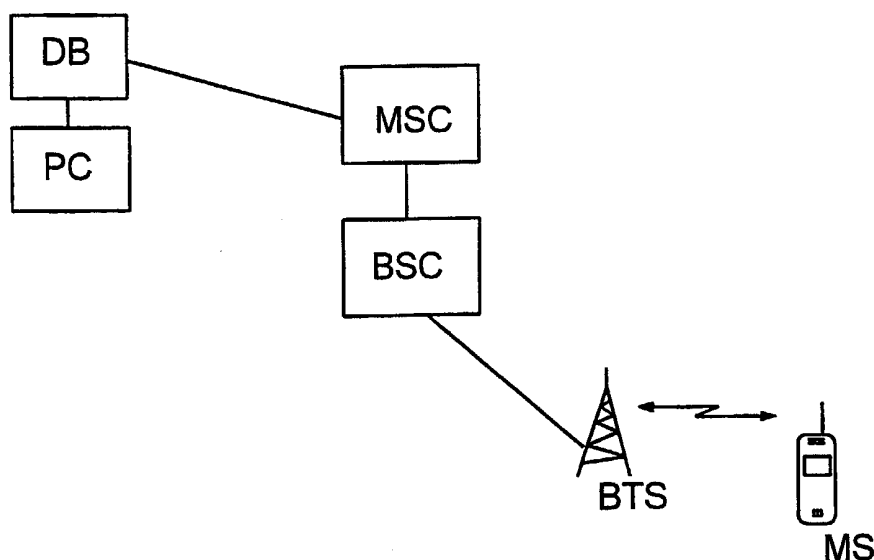
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(54) Title: DATA PROCESSING IN TIMEKEEPING



(57) Abstract: The present invention relates to a system comprising at least a timekeeping system (DB) and a mobile telecommunication terminal (MS) communicating with the timekeeping system (DB) for processing data on the use of time. The mobile telecommunication terminal (MS) comprises means for receiving task titles; a user interface for selecting a task title; means for recording time via the user interface on a selected task title starting from the moment of selecting the task title onward until an end title or the desired next task title is selected via the user interface or a selection terminating the timekeeping application is made; and means for transmitting the data recorded on the use of time to a timekeeping system (DB), and the timekeeping system (DB) comprises means for receiving data on the use of time from the mobile telecommunication terminal (MS).



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DATA PROCESSING IN TIMEKEEPING

The present invention relates to a method of data processing in timekeeping, the method comprising recording data on a person's use of time, the data indicating at least a task title and the time used, and gathering the recorded data on the use of time to a timekeeping system. The invention also relates to a system comprising at least a timekeeping system and a mobile telecommunication terminal communicating with the timekeeping system for processing data on the use of time. The invention further relates to a mobile telecommunication terminal comprising a user interface.

The invention relates to timekeeping and is suitable for use in all situations requiring monitoring of the time used for different tasks or functions. The invention is applicable to one person or a larger group, and the tasks the time taken up by which is to be recorded can be associated with both work and free time. Herein, the invention is applied to employee timekeeping by way of example.

It is known that companies implement employee timekeeping by means of computer software, each employee recording the time used for different tasks or tasks into their computers daily or weekly, for example. The data input by the employees can be gathered to a common system at given intervals. The data input can act as the basis for, for example, production follow-up and payroll computation, enabling calculation of turnaround times for tasks or products, for example. A small-scale timekeeping system may comprise a single PC, and at its widest, a timekeeping system can be installed in the server of a company's local area network. This allows work time to be recorded from all workstations in the network.

A problem in the above arrangement is that work time data is often not recorded into a computer after each work step because of lack of time, for example. Since time data can most often be recorded only at the actual workplace, work time spent elsewhere, for example on business trips, is not recorded until the employee returns to the workplace. This means that several days' hours have to be recorded at the same time, and it may be difficult to remember afterwards the amount of time spent on each task or task. Consequently, as several employees' hours may be flawed or not updated, a company may find it difficult to create a reliable account of employee timekeeping.

It is an object of the present invention to solve the above problems and to provide a method of implementing timekeeping more easily and expe-

ditionously than before. This object is achieved with the method of the invention, characterized by recording data on the use of time with a mobile telecommunication terminal, whereby a group of task titles is transferred to the mobile telecommunication terminal; the desired task title is selected with the mobile telecommunication terminal from the group of task titles at the start of timekeeping, whereby time is recorded on the selected task title from that moment onward; when the recording of time for the task should stop, an end title or the desired next task title is selected or a selection terminating the timekeeping application is made, whereby time is no longer recorded on the previous task title; and the data recorded on the use of time is transmitted to the timekeeping system.

The invention also relates to a system in which the method of the invention can be utilized. The system of the invention is characterized in that the mobile telecommunication terminal comprises means for receiving task titles; a user interface for selecting a task title; means for recording time via the user interface on a selected task title starting from the moment of selecting the task title onward until an end title or the desired next task title is selected via the user interface or a selection terminating the timekeeping application is made; and means for transmitting the data recorded on the use of time to the timekeeping system; and the timekeeping system comprises means for receiving data on the use of time from the mobile telecommunication terminal.

The invention further relates to a mobile telecommunication terminal to be used in the system of the invention. The mobile telecommunication terminal of the invention is characterized in that the mobile telecommunication terminal comprises means for receiving task titles; a user interface for selecting a task title; means for recording time via the user interface on a selected task title starting from the moment of selecting the task title onward until an end title or the desired next task title is selected via the user interface or a selection terminating the timekeeping application is made; and means for transmitting the data recorded on the use of time to a timekeeping system.

The invention is based on the idea that timekeeping becomes easier and more reliable than before when time is recorded with a mobile telecommunication terminal. Recording with a mobile telecommunication terminal is rapid and can be carried out anywhere. This means that, for example in employee timekeeping, employees are able to record the hours immediately, which brings about the advantage that the work time data stored in the time-

keeping system is up-to-date.

The method of the invention is applicable either in a mobile communication network, whereby data on the use of time is transmitted via a mobile telephone exchange to a timekeeping system immediately upon recording, or independent of the network, whereby data on the use of time is recorded and stored in a mobile telecommunication terminal and transmitted later from the mobile telecommunication terminal to the timekeeping system.

In a preferred embodiment of the invention, data on the use of time is transmitted by means of short messages from a mobile telecommunication terminal to the timekeeping system. This is a fast way to transmit data, but it is subject to the mobile telecommunication terminal being located within the area of the mobile communication network at the moment of data transmission. This manner of transmission works well with small amounts of data.

In a second preferred embodiment of the method of the invention, data on the use of time is transmitted as packet data from a mobile telecommunication terminal to the timekeeping system. This is subject to the mobile telecommunication terminal being located in a mobile communication network comprising packet data services, for example the GPRS (General Packet Radio Service). Larger amounts of data can also be transmitted as packet data. This technology is suitable particularly for the transmission of bursty data.

In a third preferred embodiment of the method of the invention, data on the use of time is transmitted on a radio-frequency connection from a mobile telecommunication terminal to the timekeeping system. For example the Bluetooth technology enables fast wireless data transmission without a mobile communication network, but, however, only over a distance of about 10 to 30 metres.

In a fourth preferred embodiment of the method of the invention, the data recorded on the use of time is transmitted from a mobile telecommunication terminal to the timekeeping system over an infrared connection. In this case the mobile telecommunication terminal does not have to be located within the area of a mobile communication network, but a prerequisite is a very short distance to the timekeeping system.

In a fifth preferred embodiment of the method of the invention, the data recorded on the use of time is transmitted from a mobile telecommunication terminal to the timekeeping system over an interface cable. This is a simple way of transmission that does not require a mobile communication net-

work, but the transmission can naturally only take place when the mobile telecommunication terminal is in the immediate vicinity of the timekeeping system.

The method of the invention allows task titles to be transferred from a computer unit to a mobile telecommunication terminal by the use of, for example, the data transmission methods described in connection with the transmission of the data recorded on the use of time, whereby the task titles do not have to be manually keyed in to the mobile telecommunication terminal.

In a preferred embodiment of the system of the invention, the system comprises a computer unit in which task titles are stored and from which titles can be transferred to a mobile telecommunication terminal. When task titles are added to the computer unit, e.g. a PC, the group of task titles of several mobile telecommunication terminals can be easily updated by means of short messages, for example.

The preferred embodiments of the method, system and mobile telecommunication terminal of the invention are disclosed in the attached dependent claims.

In the following the invention will be described by way of example with reference to the accompanying drawings, in which

Figure 1 is a flow diagram of a method of the invention,
Figures 2A and 2B are block diagrams of a system of the invention,
and

Figure 3 illustrates a mobile telecommunication terminal of the invention.

Figure 1 is a flow diagram of a method of the invention. The flow diagram shows an exemplary case of employee timekeeping, but a similar method is very well applicable also to leisure timekeeping.

In step 1A in Figure 1, a group of task titles is transferred to a mobile telecommunication terminal. If timekeeping involves several employees, the group of task titles may be the same for all employees, and it can be transferred to the employees' mobile telecommunication terminals by means of short messages, for example. Other transfer methods include packet data transmission or data transmission over an infrared connection, a radio-frequency connection or an interface cable. Short message and packet data transmissions are subject to the mobile telecommunication terminal being located within the area of a mobile communication network, at least during reception. The infrared connection, radio-frequency connection and interface

cable do not require a mobile communication network, but do require a short transmission distance. Task titles may also be manually keyed in to the mobile telecommunication terminal. When new task titles are taken into use for example in the entire company or in a task group, the list of task titles in different employees' mobile telecommunication terminals can be updated for example by means of new short messages. In step 1B, the user interface of the mobile telecommunication terminal is used to select the task title corresponding to the task to be initiated from among the task titles. This selection determines the starting moment of the task, i.e. time is recorded from that moment onward on the task title selected. When the recording of time for the task should stop, the selection of step 1C follows. Another task is selected by selecting the desired task title from among the task titles in step 1B, or timekeeping is terminated by selecting an end title in step 1D. A third alternative is to end the timekeeping application with the mobile telecommunication terminal. When moving from one task to the next, the selection of a new task title determines both the starting moment of the new task and the finishing moment of the previous task. Starting from the moment of selection, time is no longer recorded on the previous task title, but on the new task title selected. Selecting an end title for example at the end of a working day or finishing the entire timekeeping application also stops time from being recorded on the previous task title. Any task can be accessed again later, allowing the time to be recorded for said task to be added to the time previously recorded for that task. In step 1E, the data recorded on the use of time is transmitted to the timekeeping system. This can be accomplished via a mobile communication system for example by means of short messages or packet data transmissions, or locally for example by means of an infrared connection, a radio-frequency connection or an interface cable. This transmission of data on the use of time can be carried out for example at the end of each working day, whereby one day's data is always stored in the mobile telecommunication terminal at a time. A higher or lower transmission frequency is also feasible. The movement of the mobile telecommunication terminal in the network or outside thereof may also affect the choice of the moment of transmission, since some transmission methods only operate within the area of a network and others require an extremely short transmission distance.

35 Work time data, which in accordance with the above example is first stored in a mobile telecommunication terminal and then transferred to a time-

keeping system, comprises at least a task title, which is for example an alpha-
betic or numerical code, and the time consumed by the task title. The time can
be stored either as two points of time, i.e. starting and ending points of time, or
as the duration of the task calculated as the difference between the two points
5 of time.

As distinct from the example presented, the mobile telecommunica-
tion terminal may also communicate during recording with the timekeeping
system in a mobile communication network, for example during initiation and
termination of a task, so that the choice of task title or the choice to end is di-
10 rectly transferred to the timekeeping system. This way no separate recording
of work time data in the mobile telecommunication terminal is necessary. The
list of task titles may be transferred to the mobile telecommunication terminal
by the use of for example the WAP protocol (Wireless Application Protocol),
whereby the mobile telecommunication terminal establishes a connection to a
15 WAP server for selecting a task title. A menu for selecting the desired task title
by the mobile telecommunication terminal is transferred from the WAP server
to the mobile telecommunication terminal. As a result of the selection, the time
starting from the selection is recorded on said task title until a new connection
is established to the WAP server and a new task or end title is selected. This
20 way, work time data is stored in the WAP server, not in the mobile telecommu-
nication terminal. The entire group of task titles does not have to be trans-
ferred to and stored in the memory of the mobile telecommunication terminal in
advance.

Figures 2A and 2B are block diagrams of a system of the invention.
25 The systems in the figures are described by means of examples of employee
timekeeping, but they are also applicable to other timekeeping applications.

The system described in Figure 2A shows employee timekeeping in
for example a company having several employees who record their work time
with their mobile telecommunication terminals, from which work time data is
30 transferred to a common employee timekeeping system. The system de-
scribed comprises a mobile telecommunication terminal MS, an employee
timekeeping system DB (Data Base) and a computer unit PC in which task
titles are stored, and a base transceiver station BTS, a base station controller
BSC and a mobile services switching centre MSC for establishing a data
35 transmission connection between the mobile telecommunication terminal MS
and the employee timekeeping system DB. In this example the employee

timekeeping system DB is a database, in which work time data is recorded and from which work time data is transferred from the mobile telecommunication terminal MS via a mobile communication network. A group of task titles is transferred from the computer unit PC, which may be a personal computer, to
5 the mobile telecommunication terminal MS by means of short messages, for example. In practice, a single computer including software suitable for implementing employee timekeeping can attend to the functions of both the employee timekeeping system DB and the computer unit PC.

As distinct from the previous example, the system does not have to
10 comprise a base station BTS, a base station controller BSC and a mobile services switching centre MSC, in case task titles are transferred to the mobile telecommunication terminal MS locally, for example by keying in manually, via an infrared connection, a radio-frequency connection, such as Bluetooth, or an interface cable, and the work time data recorded is transferred to the employee timekeeping system DB using one of said transmission methods. In this
15 case the mobile telecommunication terminal MS is not at all dependent on a mobile communication network as regards recording work time.

Figure 2B shows an embodiment of the system of the invention, in which the mobile telecommunication terminal MS transmits work time data recorded and stored in the mobile telecommunication terminal MS over a radio-frequency connection to the employee timekeeping system DB without a mobile communication network. Other transmission methods that are independent of a mobile communication system can also be used in said system. At its simplest, the system only comprises a mobile telecommunication terminal MS,
20 a timekeeping system DB and a computer unit PC, in which the task titles are stored. The timekeeping system DB may be a database, but the operations of both the timekeeping system DB and the computer unit PC can be carried out by a single personal computer or workstation comprising software suitable for carrying out timekeeping. This is true for example when a person keeps track
25 of his/her work time without a connection to a wider system, for example the entire company's common system.
30

In leisure timekeeping, a home computer may comprise a timekeeping program for transferring task titles from the PC to a mobile telecommunication terminal MS and the data on the use of time recorded in the mobile telecommunication terminal MS is transferred from the mobile telecommunication terminal to the PC. In this case the system only needs a PC and a mobile
35

telecommunication terminal MS. Task titles may also be manually keyed in to the mobile telecommunication terminal.

Each employee in a company may transfer the work time data recorded with the mobile telecommunication terminal MS first to a personal
5 computer or workstation, which comprises necessary timekeeping software and from which the data can be transferred to a common database or system at regular intervals, for example once a month. In this case, the concept 'timekeeping system' employed in the description of the present invention is to be understood to include both personal computers or work stations, to which
10 data recorded on the use of time is transferred from a mobile telecommunication terminal, and a common database or system, in which the data is finally collected.

Figure 3 illustrates a mobile telecommunication terminal of the invention. The mobile telecommunication terminal comprises a user interface
15 31, 32 including a display 31 and a keyboard 32 for selecting the desired task title. The mobile telecommunication terminal of the invention also comprises means for receiving task titles, for recording time on a selected task title and for transferring the recorded work time data to a timekeeping system. These means can be implemented by timekeeping software in the mobile telecommunication terminal and by reception and transmission means, which depend
20 on the data transmission method used. The mobile telecommunication terminal also has to comprise a clock for recording the starting and finishing times unless work time is recorded entirely via the mobile communication system and the timekeeping system, in which case the mobile telecommunication terminal
25 does not have to comprise a clock.

Figure 3 shows an example of a user interface in a mobile telecommunication terminal of the invention. When recording of time is started, a list of selectable titles is retrieved on the display 31. This list may be stored in the mobile telecommunication terminal, to which it has been transferred from a
30 PC, for example. If the WAP protocol is used, the task titles are transferred to the display 31 of the mobile telecommunication terminal once a connection is established to a WAP server. Arrow keys are used to browse the list of titles until the cursor points to the desired task title or an end title. The task or end title is selected with the OK key. Starting from the moment a task title was selected,
35 time starts to be recorded on the selected task title and the recording ends when an end title is selected. Time recording on the task title selected

also stops if the timekeeping application is ended in the mobile telecommunication terminal in the middle of timekeeping. As distinct from the example of Figure 3, speech control is also feasible for the user interface.

5 It is to be understood that the above description and the related figures are only intended to illustrate the present invention. Different variations and modifications of the invention will be apparent to those skilled in the art without deviating from the scope and spirit of the invention as defined in the attached claims.

CLAIMS

1. A method of data processing in timekeeping, the method comprising recording data on a person's use of time, the data indicating at least a task title and the time used, and gathering the recorded data on the use of
5 time to a timekeeping system (DB), **characterized** by recording the data on the use of time with a mobile telecommunication terminal (MS), whereby

a group of task titles is transferred to the mobile telecommunication terminal (MS);

10 the desired task title is selected with the mobile telecommunication terminal (MS) from the group of task titles at the start of timekeeping, whereby time is recorded on the selected task title from that moment onward;

when the recording of time for the task should stop, an end title or the desired next task title is selected or a selection terminating the timekeeping application is made, whereby time is no longer recorded on the previous
15 task title; and

the data recorded on the use of time is transmitted to the timekeeping system (DB).

2. A method as claimed in claim 1, **characterized** by storing
20 the data on the use of time in the mobile telecommunication terminal (MS) and transferring the data via a mobile communication system to the timekeeping system (DB).

3. A method as claimed in claim 1 or 2, **characterized** by transferring the data on the use of time by means of short messages to the
25 timekeeping system (DB).

4. A method as claimed in claim 1 or 2, **characterized** by transferring the data on the use of time as packet data to the timekeeping system (DB).

5. A method as claimed in claim 1, **characterized** by storing
30 the data on the use of time in the mobile telecommunication terminal (MS) and transferring the data directly from the mobile telecommunication terminal (MS) to the timekeeping system (DB).

6. A method as claimed in claim 1 or 5, **characterized** by transferring the data on the use of time on a radio-frequency connection to the
35 timekeeping system (DB).

7. A method as claimed in claim 1 or 5, **characterized** by transferring the data on the use of time on an infrared connection to the timekeeping system (DB).

5 8. A method as claimed in claim 1 or 5, **characterized** by transferring the data on the use of time by means of an interface cable to the timekeeping system (DB).

9. A method as claimed in any one of claims 1 to 8, **characterized** by transferring the task titles to the mobile telecommunication terminal (MS) via a mobile communication system.

10 10. A method as claimed in any one of claims 1 to 9, **characterized** by transferring the task titles to the mobile telecommunication terminal (MS) by means of short messages.

11. A method as claimed in any one of claims 1 to 9, **characterized** by transferring the task titles to the mobile telecommunication terminal (MS) as packet data.

12. A method as claimed in any one of claims 1 to 8, **characterized** by transferring the task titles directly to the mobile telecommunication terminal (MS).

13. A method as claimed in any one of claims 1 to 8 or 12, **characterized** by transferring the task titles to the mobile telecommunication terminal (MS) on a radio-frequency connection.

14. A method as claimed in any one of claims 1 to 8 or 12, **characterized** by transferring the task titles to the mobile telecommunication terminal (MS) on an infrared connection.

25 15. A method as claimed in any one of claims 1 to 8 or 12, **characterized** by transferring the task titles to the mobile telecommunication terminal (MS) by means of an interface cable.

16. A method as claimed in any one of claims 1 to 15, **characterized** by transferring the data on the use of time to the timekeeping system (DB) in response to the selection of a task or end title or a selection terminating the timekeeping application.

17. A method as claimed in any one of claims 1 to 16, **characterized** in that the method is used in employee timekeeping, whereby the mobile telecommunication terminal is used to record an employee's work time data indicating at least a task title and the time used, and collecting the recorded work time data to the timekeeping system.

18. A method as claimed in any one of claims 1 to 16, **characterized** in that the method is used in leisure timekeeping, whereby the mobile telecommunication terminal is used to record a person's leisure time data indicating at least a task title and the time used, and collecting the recorded leisure time data to the timekeeping system.

19. A system comprising at least a timekeeping system (DB) and a terminal communicating with the timekeeping system (DB) for processing data on the use of time, **characterized** in that

the terminal is a mobile telecommunication terminal (MS), which comprises means for receiving task titles; a user interface (31, 32) for selecting a task title; means for recording time via the user interface (31, 32) on a selected task title starting from the moment of selecting the task title onward until an end title or the desired next task title is selected via the user interface (31, 32) or a selection terminating the timekeeping application is made; and means for transmitting the data recorded on the use of time to the timekeeping system (DB); and

the timekeeping system (DB) comprises means for receiving data on the use of time from the mobile telecommunication terminal (MS).

20. A system as claimed in claim 19, **characterized** in that the system further comprises a computer unit (PC) in which the task titles are stored and from which the task titles are transferred to the mobile telecommunication terminal (MS).

21. A system as claimed in claim 19 or 20, **characterized** in that the mobile telecommunication terminal (MS) records time by sending data on the use of time indicating the title or end selections made to the timekeeping system (DB), the timekeeping system (DB) being arranged to receive data on the use of time after the selection of a task or end title or a selection terminating the timekeeping application.

22. A mobile telecommunication terminal (MS) comprising a user interface (31, 32), **characterized** in that

the mobile telecommunication terminal (MS) comprises means for receiving task titles; a user interface (31, 32) for selecting a task title; means for recording time via the user interface (31, 32) on a selected task title starting from the moment of selecting the task title onward until an end title or the desired next task title is selected via the user interface (31, 32) or a selection terminating the timekeeping application is made; and means for transmitting

the data recorded on the use of time to a timekeeping system (DB).

23. A mobile telecommunication terminal (MS) as claimed in claim 22, **characterized** in that the mobile telecommunication terminal (MS) comprises means for transferring the recorded data on the use of time via a
5 mobile communication system to the timekeeping system (DB).

24. A mobile telecommunication terminal (MS) as claimed in claim 22 or 23, **characterized** in that the mobile telecommunication terminal (MS) comprises means for transferring the recorded data on the use of time by means of short messages to the timekeeping system (DB).

10 25. A mobile telecommunication terminal (MS) as claimed in any one of claims 22 to 24, **characterized** in that the mobile telecommunication terminal (MS) comprises means for transferring the recorded data on the use of time as packet data to the timekeeping system (DB).

15 26. A mobile telecommunication terminal (MS) as claimed in any one of claims 22 to 25, **characterized** in that the mobile telecommunication terminal (MS) comprises means for transferring the recorded data on the use of time directly from the mobile telecommunication terminal (MS) to the timekeeping system (DB).

20 27. A mobile telecommunication terminal (MS) as claimed in any one of claims 22 to 26, **characterized** in that the mobile telecommunication terminal (MS) comprises means for transferring the recorded data on the use of time on a radio-frequency connection to the timekeeping system (DB).

25 28. A mobile telecommunication terminal (MS) as claimed in any one of claims 22 to 27, **characterized** in that the mobile telecommunication terminal (MS) comprises means for transferring the recorded data on the use of time on an infrared connection to the timekeeping system (DB).

30 29. A mobile telecommunication terminal (MS) as claimed in any one of claims 22 to 28, **characterized** in that the mobile telecommunication terminal (MS) comprises means for transferring the recorded data on the use of time by means of an interface cable to the timekeeping system (DB).

35 30. A mobile telecommunication terminal (MS) as claimed in any one of claims 22 to 29, **characterized** in that the mobile telecommunication terminal (MS) comprises means for recording time by sending data on the use of time indicating the performed title or end selections to the time-

keeping system (DB), the timekeeping system (DB) being arranged to receive data on the use of time after the selection of a task or end title or a selection terminating the timekeeping application.

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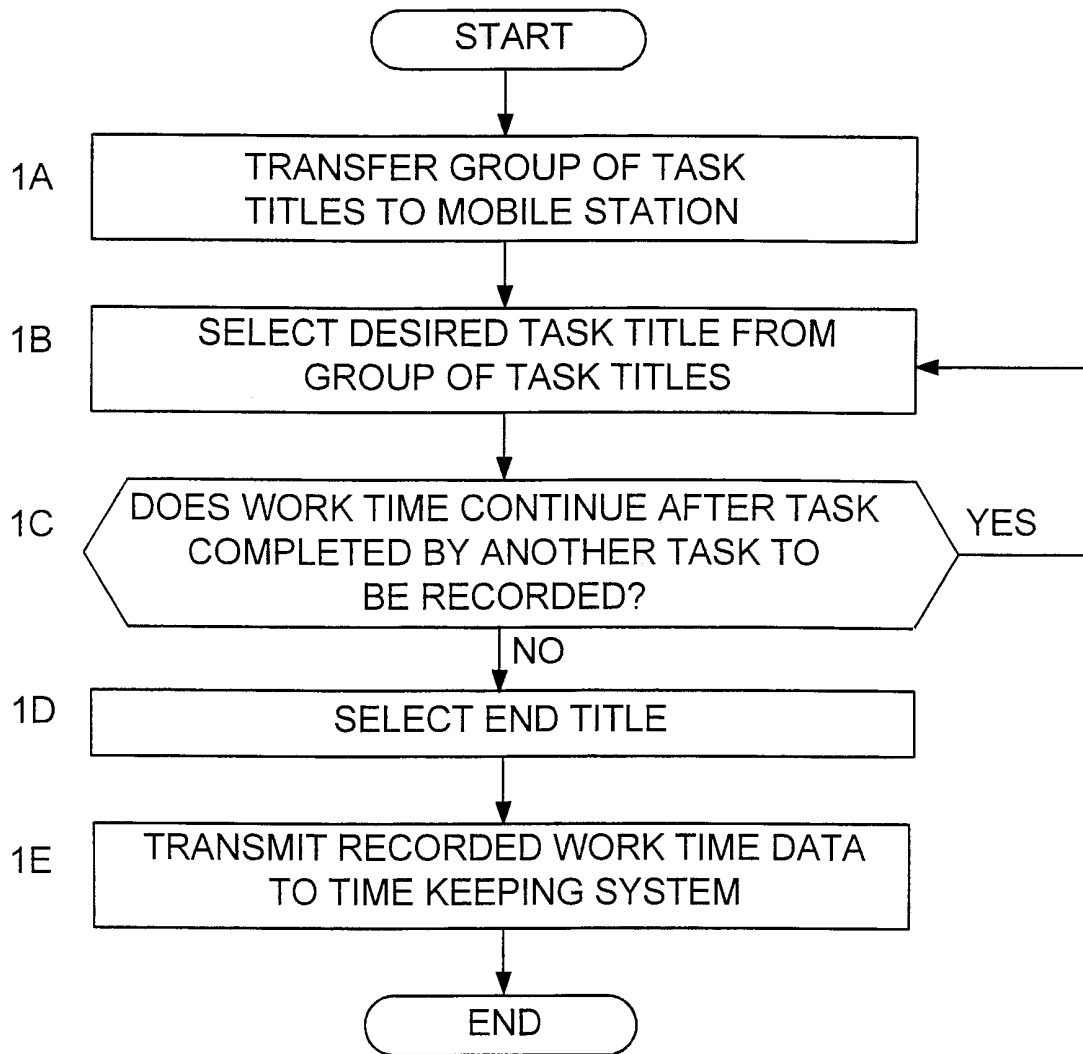


FIG. 1

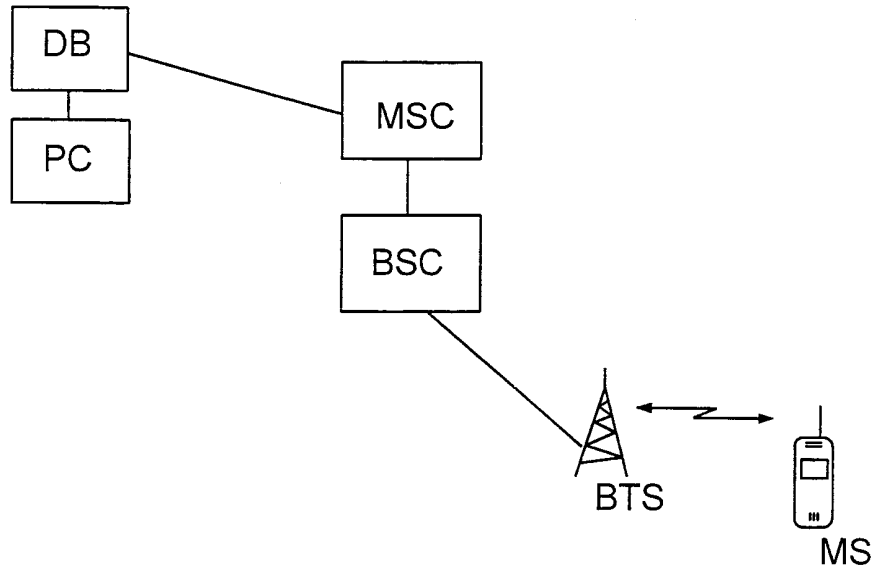


FIG. 2A

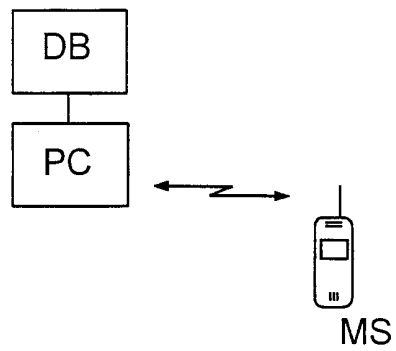


FIG. 2B

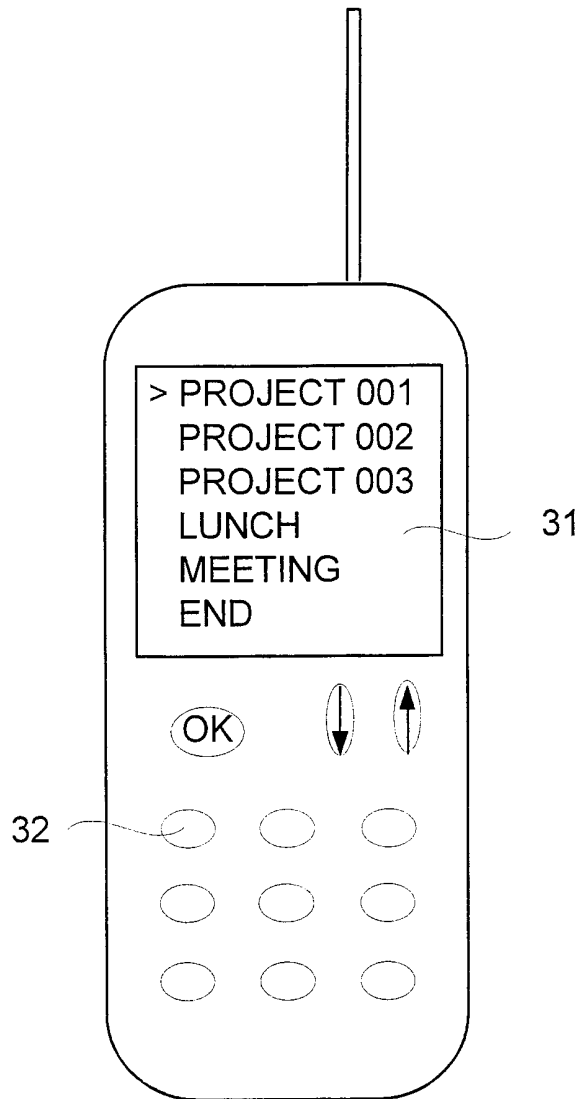


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 00/00993

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G07C 1/10

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)

IPC7: G06F, G07C, H04M

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

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

IEEE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 4447320 A1 (MÜLLER, WINFRIED), 4 July 1996 (04.07.96), column 3, line 35 - column 4, line 38, claims 1,12-17 --	1-30
X	WO 9941707 A1 (WARBURG, COLIN, FRANCIS), 19 August 1999 (19.08.99), page 2, line 3 - page 3, line 10; page 4, line 23 - page 5, line 19; page 12, line 13 - line 27 --	1-30
X	EP 0637807 A2 (RANK XEROX LIMITED), 8 February 1995 (08.02.95), page 2, line 49 - page 3, line 34, figures 1,2,5,6 --	1-30

 Further documents are listed in the continuation of Box C.
 See patent family annex.

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International application No.

PCT/FI 00/00993

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