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(71) Applicant *(for all designated States except US)*: TUNSTALL GROUP PLC [GB/GB]; Whitley Lodge, Whitley Bridge, Yorkshire DN14 0HR (GB).

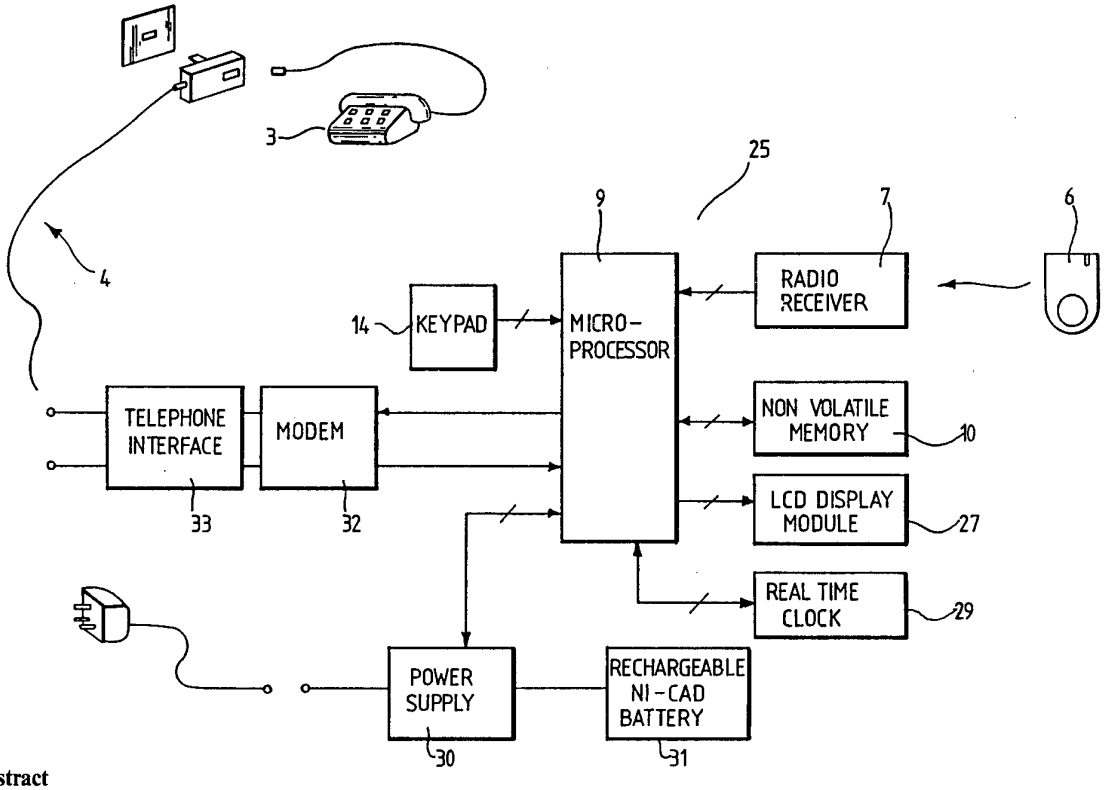
(72) Inventors; and
(75) Inventors/Applicants *(for US only)* : WAPPETT, Michael, Stanley [GB/GB]; 6 Grasmere Avenue, Linton Park, Wetherby, West Yorkshire LS22 4YT (GB). HARRIS, Geoff, Jonathan [GB/GB]; Longfold, Church Street, Kirkhammerton, York YO5 8DD (GB). STOREY, Nigel, Alwyne [GB/GB]; 15 Tower Avenue, Pontefract, West Yorkshire WF9 1ED (GB). BINGHAM, David, Antony [GB/GB]; 14 Windsor Walk, Scawsby, Doncaster DN5 8NQ (GB).

(74) Agent: VINSOME, Rex, Martin; Dibb Lupton Broomhead, Fountain Precinct, Balm Green, Sheffield S1 1RZ (GB).

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(57) Abstract

A portable device (25) for recording data relating to a provided service is disclosed. The device (25) includes a keypad (14) for enabling a service provider to enter data relating to the service into a microprocessor (9). Data is entered into the microprocessor (9) in response to access means provided at the location where the service provided.

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REMOTE ACTIVITY MONITORING SYSTEM AND METHOD

The present invention relates to a system and method for monitoring activity remotely, especially for monitoring services provided at a residential or business property, and to a portable service provision monitoring device to be carried by a service provider.

It can be desirable to monitor activity remotely at properties. For example, a residential property occupied by an elderly, handicapped or otherwise incapacitated person, may need to be monitored remotely to determine whether the occupant requires assistance. Residential and business properties may alternatively or in addition be monitored remotely to determine whether, for example, an intruder has entered the premises or whether there is a fire.

GB A 2166321 discloses a telephone unit for use in an emergency system, which includes a memory for storing an emergency telephone number, an automatic dialling device, and a hand-held transmitter by which the dialling device can be activated to dial the stored number. The unit allows an incapacitated person carrying the transmitter to contact another person using a public switched telephone network (PSTN) to obtain help, for example in the case of an injury. Units of this kind find particular application in sheltered housing complexes which are often occupied by elderly people, where a central monitoring system can be

used to coordinate the provision of assistance to persons occupying a number of separate properties.

US A 4647914 discloses a security apparatus which can carry out automatic telephone dialling to a central security monitoring device having computerised stored information about the caller. However, there is no disclosure of monitoring of a provided service.

US A 4284849 discloses a monitoring and signal system comprising a remote control unit communicating with a communications centre by means of a telephone network, such that an alarm signal can be transmitted to the communications centre by means of the telephone network. However, this prior art device also does not relate to the monitoring of a provided service.

US A 4137429 discloses a digital dialling system wherein an alarm indication can be transmitted to a remote station via a telephone line. However, this prior art arrangement again does not relate to the monitoring of a provided service.

The present invention seeks to provide a system by which activities can be monitored, for example to determine and to record that an activity has taken place, or to determine and record the timing and frequency of activities, and the period over which they take place. The invention also seeks to provide a device which enables a service provider to record details relating to a service when that service is provided in order to monitor the provision of that service, for example for accounting

purposes or for coordinating the provision of that service with the provision of other services to the same recipient.

According to one aspect of the present invention there is provided a remote activity monitoring system, which comprises:

(a) a telephone device which includes a memory for at least one stored telephone number, and means for dialling the number stored in the memory;

(b) an alarm trigger, by which transmission of an alarm signal can be triggered;

(c) an input device by which a plurality of unique identification codes can be entered into the telephone device; and

(d) message reception apparatus to which a telecommunications link from the telephone device can be established using a number stored in the memory of the telephone device, the message reception apparatus including means for receiving data transmitted from the telephone device in response to input of an identification code into the telephone device using the input device or to an alarm signal, and a memory for data corresponding to the said plurality of identification codes.

Activities which the system of the invention may be used to monitor in the context of a residential property may include the provision of services by a visiting provider. For example, for an elderly person in a sheltered housing complex, services may be provided by a supplier of meals, a doctor or a nurse, a hairdresser, a

warden and so on. Each provider can be supplied with a code, by which he or she or the service being provided can be identified. The provider code may comprise two parts - one part to identify the provider organisation, the other to identify the individual who is providing the service. The system of the invention can then be used to provide a record of the provision of the service, using a telephone device by which data relating to the provision of the service can be transmitted to centralised message reception apparatus. That apparatus can then be used to record information relating to the service, for example to record simply that the service has taken place, which might be useful for accounting purposes if it is necessary to levy a charge for the service. Alternatively or in addition, the apparatus may record the time at which the service was provided, which might be useful for medical purposes, for example in the situation where it is necessary to keep records of the frequency with which a doctor calls on an individual. The system of the invention allows this monitoring function to be achieved in conjunction with apparatus used to transmit an alarm signal using common telephone communications equipment, and is therefore particularly appropriate for use by persons who require their properties to be monitored for assistance, such as those in sheltered housing complexes.

The message reception apparatus may be simply a telephone by which a spoken message (generally recorded) can be received by an operator from the telephone device

associated with the input device. Alternatively or in addition, the apparatus may include a data handling machine which may be used for example for interpreting, transmitting, recording, or modifying the data. The message reception apparatus can be located at a central monitoring station, used to monitor a number of properties. When the system of the invention is used in a sheltered housing complex, the message reception apparatus may be located in a warden's office.

The memory in the telephone device will generally store a telephone number which allows a connection to be made to the location of the message reception apparatus. Generally, the memory will store more than one such number, to provide for a failed connection or a busy line.

The input device may include a keypad, by which code can be inputted into the system, for example, a four digit numeric code. That code may identify a person providing a service, the company which is providing the service, or the nature of the service. The keypad may be a part of conventional telephone apparatus which includes software to enable the keypad to be operated in this way. The keypad may be provided as an auxiliary keypad, in addition to any other keypad associated with the telephone device in the conventional manner.

Preferably the input device of the system referred to above has a dormant condition which it adopts during periods of inactivity, and an active condition in which it can receive a signal transmitted from a remote device.

This embodiment of the system allows data to be created about an activity carried out without direct access to the input device of the system. For example, it allows activities carried out outside a property in which the input device is located to be monitored for example for recordal. Activities which might be monitored in this way include, for example, the provision of services such as gardening, window cleaning, building, delivery, and other services. The provider of the service will be provided with a remote transmitter for transmitting a signal to the input device, the signal being appropriately coded to identify the person providing the service, the company which is providing the service, or the nature of the service, as desired. The signal can provide the required identification by use of, for example, appropriate codes of a single frequency, or different frequencies.

The use of an input device which remains dormant until triggered makes it possible for data to be transmitted to a selected input device, while other input devices in its vicinity remain dormant and do not therefore receive the data. Preferably, the system referred to above includes an activating trigger, by which the input device can be switched from its dormant condition to its active condition. The trigger can be connected to the input device by means of electrical conductors, and might take the form of, for example, a switch. The trigger can include means for transmitting an activating signal to the input device wirelessly, for example as an RF signal. In

this embodiment the signal will generally be a unique signal for the input device associated with it and will be capable of being distinguished from RF signals associated with input devices in other properties, and from RF signals which might be used to transmit identification data to the input device once activated. The distinction will generally be achieved by use of appropriate codes at a single frequency, or different frequencies. The system of the invention may include at least one remote transmitter device for transmitting a signal to the input device which will generally be received by the input device when in an active condition in which it is capable of receiving the signal.

When the system includes an input device by which an input code can be inputted manually, and an input device which operates in conjunction with a transmitter device by which a code can be inputted remotely, the two input devices will preferably be incorporated into a common housing. However, they might be incorporated into separate housings, which gives rise to the advantages of flexibility provided by a modular system.

According to another aspect of the invention, there is provided a remote activity monitoring system, which comprises:

(a) a telephone device which includes a memory for at least one stored telephone number and means for dialling a number stored in the memory;

(b) an input device by which a plurality of unique identification codes can be received from respective transmitters and entered into the telephone device, the input device having a dormant condition which it adopts during periods of inactivity, and an active condition in which it can receive a signal transmitted from a remote device;

(c) at least one remote transmitter device for transmitting a signal to the input device;

(d) an activating trigger, by which the input device can be switched from its dormant condition to its active condition; and

(e) message reception apparatus to which a telecommunications link from the telephone device can be established using a number stored in the memory of the telephone device, the message reception apparatus including means for receiving data transmitted from the telephone device in response to input of an identification code into the telephone device using the input device, and a memory for data corresponding to the said plurality of identification codes.

The system of this aspect of the invention can include an alarm trigger by which transmission of an alarm signal can be triggered, the data receiving means and the message reception apparatus including means for receiving data transmitted from the telephone device in response to an alarm signal.

The system can include means for calculating a time period between a first input and a second input and for generating data corresponding to that time period for transmission to the message reception apparatus.

According to a further aspect of the invention, there is provided a portable service provision monitoring device to be carried by a service provider, the device comprising memory means for at least temporarily storing data relating to a service provided at a particular location and user interface means for inputting said data to said memory means, wherein the user interface means is actuated in use in response to access means provided at the location where the service is provided.

It can thus be seen that this aspect of the present invention has the advantage that a portable unit carried by a service provider, such as a provider of a service in a sheltered housing complex, can be used to record, at the location of provision of a service, data relating to the service provided, until that data can be retrieved at a suitable time after service providing visits to several such locations.

The device preferably further comprises timer means for enabling said memory means to store the data including data relating to a time interval over which the service is provided.

This optional feature gives the advantage that as well as logging data relating to the nature of the service, the time over which the service is provided can be recorded for

use in such cases as when a charge is being levied which depends on the duration of the provision of the service. The device is also suitable for use when it is desired to record data corresponding to the time at which a service was provided, for example, a meal delivery.

The device may be adapted to be activated by access means comprising a radio transmitter means.

This provides the advantage that the device can be activated in response to radio transmitter means provided as part of a remote activity monitoring system as defined above.

Alteratively, or in addition, the access means may comprise a magnetic card and user interface means may comprise magnetic card reading means.

In a preferred embodiment of the invention the device has a dormant condition which it adopts during periods of inactivity, and an active condition in which it can be actuated in response to the access means.

This clearly provides the advantage that the device can be designed such that it uses less power, whether electrical mains, battery or both, during periods of inactivity, so that the cost of running the device is kept to a minimum, as is the cost and inconvenience of replacing any replenishable power supply such as a battery.

The device may further comprise warning means for providing a warning of imminent malfunction of the device.

Thus a warning is given of imminent malfunction such as low battery power or low remaining available memory

capacity in good time to enable the fault to be corrected before serious malfunction of the device occurs.

The device may also comprise data transmission means for enabling a telecommunications link to be established between the device and message reception apparatus in order that said data can be transmitted to said apparatus via said link.

The advantage of this feature is that data stored in the device can be transmitted from any location with a telecommunications connection via the telecommunications link to the message reception apparatus which may be a control centre in a sheltered housing complex. This avoids the inconvenience of the service provider having to go to a specified location to transfer data from the device when the memory becomes full.

The data transmission means may comprise a modem, which then enables the device to transmit data via the conventional telephone system.

In a preferred embodiment of the invention, the data transmission means is adapted to enable the device to receive data and/or instructions via said link.

This clearly provides the advantage that as well as being capable of downloading data to a specified location such as a control centre, the device may be programmed from the control centre via the telecommunications link.

According to a further aspect of the invention, there is provided a service provision monitoring system comprising a device as defined above and message reception

apparatus to which a communications link can be established from the device.

The system preferably further comprises access means provided in use at least one location where the service is provided.

The access means preferably comprises at least one radio transmitter means. Alternatively or in addition, the access means comprises at least one magnetic card.

According to a further aspect of the invention, there is provided a remote activity monitoring method comprising the steps of actuating an input device to enter one or more unique identification codes into a telephone device, wherein data relating to a provided service is transmitted via a telecommunications link from the telephone device to a message reception apparatus in response to said actuation of said input device.

The method may further comprise the step of actuating a remote device to transmit a signal which can be received by the input device in an active condition thereof.

In a preferred embodiment, the method further comprises the step of actuating an activating trigger for switching the input device from a dormant condition thereof to said active condition.

According to a yet further aspect of the invention, there is provided a remote activity monitoring method comprising the steps of actuating an activating trigger for enabling an input device, by which a plurality of unique identification codes can be entered into a telephone

device, to be switched from a dormant condition to an active condition thereof, and actuating at least one remote transmitter device for transmitting a signal to the input device wherein said signal can be received by the input device in said active condition such that a telecommunications link is established between said telephone device and a message reception apparatus for transmitting data relating to a provided service.

The or each said remote transmitter device may comprise a radio transmitter device.

The method preferably further comprises the step of establishing a two-way telecommunications link between the telephone device and the message reception apparatus.

According to a further aspect of the invention, there is provided a service monitoring method comprising inputting data relating to a provided service into a portable device at a service provision location for at least temporarily storing said data, wherein said data is inputted in response to actuation of access means provided at said service provision location.

The method may further comprise the step of automatically recording the duration of provision of said service.

In a preferred embodiment, the method further comprises the step of establishing a telecommunications link between said portable device and message reception apparatus to enable said data to be transmitted to said apparatus via said link.

The method may further comprise the step of establishing a two-way telecommunications link between said device and said apparatus.

Embodiments of the present invention will now be described by way of example, with reference to the accompanying drawings, in which:-

Figure 1 shows a block diagram showing components of a system embodying an aspect of the invention; and

Figure 2 shows a block diagram showing components of a system embodying another aspect of the invention.

Figure 1 shows a remote activity monitoring system, which comprises telecommunications apparatus 1 of the type disclosed in GB A 2166321, the entire disclosure of which is incorporated herein by reference. The apparatus 1 is connected to a public switched telephone network (PSTN) 4 by way of which calls can be made to an emergency call receiving station 2, or to a subscriber's telephone 3. The telecommunications apparatus 1 incorporates a microprocessor and application specific integrated circuit 9 by which it is controlled. It further includes a radio signal receiver 7, an automatic dialler 8, a non-volatile memory 10, such as an EEPROM, a loud speaker and microphone unit 11, a handset 12, a voice switching unit 13, a keypad 14, a call switch 15, a ring detector unit 16 having a first normal switching condition, a line switch 17, a tone ringer 18 and a tone signaller 19.

The apparatus 1 also has associated with it one or more sensors 5. These might include, for example, a manually operated switch or switches mounted on the unit or remote therefrom, together with environmental detectors such as a smoke detector or a fire detector. Also associated with the apparatus is a control signal generator comprising a radio signal transmitter 6, in a form which may be conveniently be carried by a subscriber. A suitable generator might be worn on a cord around the neck of the subscriber, carried in the hand or a pocket, fastened to clothing or worn on the body using a "wristwatch" type strap.

The memory 10 stores information concerned with the emergency call function of the unit and containing the emergency telephone number or numbers and unique identification code of the unit. The memory is also capable of storing telephone numbers for normal non-emergency use.

In operation of the apparatus, an emergency call is initiated by operation of any one of the sensors 5, or by operation of the radio signal transmitter 6. In order to reassure the subscriber that an emergency call has been made, a call progress light on the apparatus will flash, and a reassurance tone will sound from the speaker. During this period, the alarm may be reset using a cancel switch on the apparatus, in order to abort the call, and to return the apparatus to standby mode. If, after a predetermined period, no cancel signal has been generated, an alarm

signal is applied to the microprocessor 9, which causes a call to be placed to a control centre, whose telephone number is retrieved from the memory 10. The call is placed by means of the automatic dialler 8 to a receiving station 2.

When a call is received at the receiving station 2, the PSTN line is looped, and a hand-shaking routine is exchanged between the receiving station 2 and the apparatus of the invention. A hand-shake signal is received and decoded at the apparatus by the tone signaller 19. Once the hand-shaking routine has been completed, the microprocessor 9 transmits via the tone signaller 19, information coded appropriately for transmission over the PSTN, the information indicating at least the identity of the unit from which the call has originated, and the nature of the call (for example, as to whether the call is generated manually or in response to an alarm signal). Speech communication is then possible between the receiving station 2 and the subscriber, the subscriber using for example the loud speaker and microphone unit 11.

The memory 10 may contain further emergency telephone numbers that can be used by the microprocessor 9 to initiate automatically dialled calls in the event that a first emergency call fails.

Detailed information concerning the structure and operation of the alarm trigger aspect of the telephone device, including information concerning the interactions

which are the component features of the device, is disclosed in GB A 2166321.

The numbers stored in the memory 10 of the device will be that of the message reception centre 2, at which message reception apparatus is located. The memory 10 can store information regarding the alarm call function of the telephone device, including an identification code unique to the device. The apparatus includes means 20 for receiving data transmitted from the telephone device in response to input of an identification code or to an alarm signal, and a memory 22 for data corresponding to a plurality of identification codes which may be transmitted to it from the telephone device.

The telephone device has associated with it an input device which comprises the keypad 14, which in normal operation of the telephone device can be used to input the number of another subscriber.

The input device includes at least one remote RF transmitter 24 for transmitting an identification signal to the input device to identify a service provider. The input device has a dormant condition which it adopts during periods of inactivity and an active condition in which it can receive a signal transmitted from the transmitter 24. The device includes an activating trigger 26 in the form of an electric switch connected to the device by means of a pair of copper conductors 28 to switch the input device from its dormant condition to its active condition.

Transmission of data to the message reception apparatus 2 (other than an alarm signal) can be initiated by entering an identification code using the keypad 14 of the input device. The code might identify, for example, a person providing a service, the company which is providing the service, or the nature of the service.

On input of a code, the input device causes the automatic dialling device 8 to connect the telephone apparatus 1 to the message reception apparatus 2 using a telephone number stored in the memory 10. Alternatively, an identification code can be entered into the input device when direct access to the device is not available, using the activating trigger 26 and the remote transmitter device 24. In this situation, the trigger 26 is used to switch the input device from its dormant condition to its active condition, in which it can receive a signal from the transmitter 24. Such a signal would include a code, for example to identify a person or company providing a service, or the nature of a service. On receipt of a signal from the transmitter 24, the input device causes the automatic dialling device 8 to connect the telephone apparatus 1 to the message receiving apparatus 2, in the manner described above.

There are two main methods of logging service provider information. These are: entering a series of identification codes into the telephone apparatus by means of the keypad; or, by use of an appropriately coded radio trigger.

Using the keypad method, a service provider may activate the telephone apparatus (by pressing a special key on the keypad), enter an appropriate code number (such as a personal identification number followed by a service code number), then log the commencement or end of the service (by pressing another key on the keypad).

Using the radio trigger method, a service provider may activate the telephone apparatus (by pressing a special button located outside the premises), then activate a suitably coded radio trigger. This method logs the time the service was provided, as well as details of the service provider. It also allows the service call to be logged quickly without requiring entry to the premises. The use of a suitable button also ensures that the radio trigger activates only the telephone apparatus within the premises, and not other telephone apparatus which is in range.

When it is desired to record a period of time over which an activity takes place, the system of the invention can be used to measure that period. A person involved in the activity, for example a provider of a service (such as a hairdresser visiting a resident in a sheltered housing complex), can input a code into the input device when the activity starts. A code can then be inputted into the device when the activity is completed. The device (or other component of the system) calculates the period between the times that the activity was started and completed, and information related to the period can be transmitted to the message receiving apparatus 2, for

example to be recorded. The operation of an apparatus recording a period of time over which an activity takes place will be described in further detail below with reference to Figure 2.

Operation of the device will generally be controlled by means of a microprocessor 9, for example using components of the call unit disclosed in GB A 2266321.

Referring to Figure 2, there is shown a portable service provision monitoring device 25 embodying another aspect of the invention, in which parts common to the embodiment of Figure 1 are denoted by like reference numerals. The device 25 is suitable for use when it is desired to record data corresponding to the period of time during which a service is provided, for example, for accounting purposes. The device is also suitable for use when it is desired to record data corresponding to the time at which a service was provided, for example, a meal delivery. The device 25 is designed to be carried by the service provider so that details regarding the nature and duration of a service to be provided can be recorded at the location at which the service is provided. Accordingly, the device 25 is designed to be hand-held, and typically has dimensions of the order of 185x85x35mm, and a weight of generally less than 500g. The device 25 incorporates a microprocessor by which it is controlled, a radio receiver 7, a keypad 14, a non-volatile memory 10 such as an EEPROM, an LCD display module 27, a real time clock 29, a power supply 30, and a rechargeable power supply 31 such as a

nickel cadmium battery. The device 25 also incorporates an integral modem 32 and interface means 33 for connecting the modem to the PSTN. The nickel cadmium battery 31 and power supply 30 are so arranged that the battery 31 can be recharged from the mains power supply at any appropriate location (such as the service provider's home or base). The power supply 30 includes a transformer (such as a plug-top transformer), which enables the device to be powered by mains electricity at any appropriate location.

In the embodiment of Figure 2, the device 25 is powered by the battery 31 when the device is used for entering and recording data relating to the nature and duration of the service provided and the identity of the recipient of the service. The modem 32 is provided for transmitting data stored in the device to a receiving station 2 (not shown in Figure 2) of the type shown in Figure 1 after a suitable number of service provider visits. It is designed so that it is powered in use from the mains by means of the power supply 30. The power supply 30 also includes circuiting for monitoring the terminal voltage of the battery 31 and causing the microprocessor 9 to display a warning signal on the LCD display module 27 when the remaining battery capacity is low.

The radio receiver 7 of the embodiment of Figure 2 is activated by means of a remote RF transmitter 6, which, as described above, is supplied in a form which may conveniently be carried by a subscriber, such as worn on a

cord around the neck of the subscriber, carried in the hand or a pocket, fastened to clothing or worn on the body using a "wristwatch" type strap.

In operation of the device 25, the service provider enters information relating to the nature of the service provided into the microprocessor 9 by means of the keypad 14. They then activate the device 25 from its dormant condition into its active condition (for example, by pressing a START button).

If a service is provided, for which it is desired to record the duration (i.e. a timed service), then the information entered into the microprocessor 9 will include an indication of the time of commencement of the service, by means of the real time clock 29. The time of commencement of the service is logged in response to the subscriber activating their radio transmitter 6 (or swiping their magnetic stripe card through a card reader). The radio transmitter 6 sends a unique identification signal to the radio receiver 7, which then enables data relating to the subscriber, such as the name and address of the subscriber to be entered into the microprocessor 9 along with the time and data entered by means of the keypad. To record the time of completion of the service, the service provider enters information relating to the nature of the service provided into the microprocessor by means of the keypad 14. They then activate the device from its dormant condition to its active condition (for example, by pressing

an END button). They then activate the radio transmitter 6 (or swipe the magnetic card) as before.

An untimed service is defined as one in which it is desired to record the time at which the service was provided, but not the duration. If it is desired to record the time an untimed service was provided, the service provider enters information relating to the nature of the service provided using the keypad 14. They then activate the device from its dormant to its active condition (for example by pressing an END button). They then activate the radio transmitter 6 twice (or swipe the magnetic card twice).

If the service provider provides the same service to a series of subscribers, they will not need to enter the information relating to the nature of the service at each visit. The device will recall the previous service type setting in memory, so that at each visit the service provider needs only to check that the service set on the device is the same as the service being provided, before, for example pressing the START or END button.

With this embodiment, the memory 10 is designed such that it is capable of storing the data relating to of the order of 300 to 400 non-timed services, as well as other information relating to the functionality of the device 25. When the remaining memory capacity available is becoming low, a warning message indicates this on the LCD display module 27, which alerts the service provider to the low

remaining memory capacity and the need to download the data stored in the memory 10.

When it is desired to download the data stored in the memory 10, the service provider can download the data by means of the modem 32 and telephone interface 33 via the PSTN to the message reception apparatus. The device 25 can also store data received from the message reception apparatus 2. By this method, it is possible to ensure that the real time clock 29 of the device maintains the same time as the message reception apparatus 2. It is also possible to amend any service provider codes or descriptions stored within the device 25.

It will be appreciated that the embodiment described above are given by way of example only and are in no way intended to limit the scope of the invention claimed, and it will be apparent to persons skilled in the art that various modifications and alternatives may be used in the apparatus. For example, in the embodiment of Figure 2, instead of or in addition to the radio receiver 7 and integral modem 32, respectively, a magnetic card reading means or a separate modem may be provided.

The reader's attention is directed to all papers and documents which are filed concurrently with this specification and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All the features disclosed in this specification (including any accompanying claims, abstract and drawings),

and/or all of the steps or any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

CLAIMS

1. A remote activity monitoring system, which comprises:

(a) a telephone device which includes a memory for at least one stored telephone number, and means for dialling a number stored in the memory;

(b) an alarm trigger, by which transmission of an alarm signal can be triggered;

(c) an input device by which a plurality of unique identification codes can be entered into the telephone device; and

(d) message reception apparatus to which a telecommunications link from the telephone device can be established using a number stored in the memory of the telephone device, the message reception apparatus including means for receiving data transmitted from the telephone device in response to input of an identification code into the telephone device using the input device or to an alarm signal, and a memory for data corresponding to the said plurality of identification codes.

2. A monitoring system as claimed in claim 1, in which the input device has a dormant condition which it adopts during periods of inactivity, and an active condition in which it can receive a signal transmitted from a remote device.

3. A monitoring system as claimed in claim 2, which includes at least one remote transmitter device for transmitting a signal to the input device.

4. A monitoring system as claimed in claim 2 or claim 3, which includes an activating trigger, by which the input device can be switched from its dormant condition to its active condition.

5. A remote activity monitoring system, which comprises:

(a) a telephone device which includes a memory for at least one stored telephone number, and means for dialling a number stored in the memory;

(b) an input device by which a plurality of unique identification codes can be received from respective transmitters and entered into the telephone device, the input device having a dormant condition which it adopts during periods of inactivity, and an active condition in which it can receive a signal transmitted from a remote device;

(c) at least one remote transmitter device for transmitting a signal to the input device;

(d) an activating trigger, by which the input device can be switched from its dormant condition to its active condition; and

(e) message reception apparatus to which a telecommunications link from the telephone device can be established using a number stored in the memory of the telephone device, the message reception apparatus including means for receiving data transmitted from the telephone device in response to input of an identification code into the telephone device using the input device, and a memory

for data corresponding to the said plurality of identification codes.

6. A monitoring system as claimed in claim 5, which includes an alarm trigger by which transmission of an alarm signal can be triggered, the data receiving means in the message reception apparatus includes means for receiving data transmitted from the telephone device in response to an alarm signal.

7. A monitoring system as claimed in any one of claims 4 to 6, in which the activating trigger is connected to the input device by means of electrical conductors.

8. A monitoring system as claimed in any one of claims 4 to 6, in which the activating trigger includes means for transmitting an activating signal to the input device wirelessly.

9. A monitoring system as claimed in any one of the preceding claims, in which the input device comprises a keypad.

10. A monitoring system as claimed in claim 9, in which the said keypad is provided as an auxiliary keypad, in addition to any other keypad associated with the telephone device in conventional manner.

11. A monitoring system as claimed in any one of the preceding claims, which includes means for calculating a time period between a first code input and a second code input, and for generating data corresponding to that time period for transmission to the message reception apparatus.

12. A portable service provision monitoring device to be carried by a service provider, the device comprising:-

memory means for at least temporarily storing data relating to a service provided at a particular location; and

user interface means for inputting said data to said memory means, wherein the user interface means is actuated in use in response to access means provided at the location where the service is provided.

13. A device according to claim 12, further comprising timer means for enabling said memory means to store said data including data relating to a time interval over which the service is provided.

14. A device according to claim 12, further comprising timer means for enabling said memory means to store said data including data relating to a time at which the service was provided.

15. A device according to any one of claims 12 to 14, wherein the device is adapted to be actuated by access means comprising a radio transmitter means.

16. A device according to any one of claims 12 to 15, wherein said user interface means comprises magnetic card reading means.

17. A device according to any one of claims 12 to 16, wherein the device has a dormant condition which it adopts during periods of inactivity, and an active condition in which it can be actuated in response to the access means.

18. A device according to any one of claims 12 to 17, further comprising warning means for providing a warning of imminent malfunction of the device.

19. A device according to claim 18, wherein the warning of the imminent malfunction includes a low battery power and/or a low memory message.

20. A device according to any one of claims 12 to 19, further comprising data transmission means for enabling a telecommunications link to be established between the device and message reception apparatus in order that said data can be transmitted to said apparatus via said link.

21. A device according to claim 20, wherein said data transmission means comprises a modem.

22. A device according to claim 20 or 21, wherein said data transmission means is adapted to enable the device to receive data and/or instructions via said link.

23. A service provision monitoring system comprising a device according to any one of claims 20 to 22 and message reception apparatus to which a telecommunications link can be established from the device.

24. A system according to claim 23, further comprising access means provided in use at least one location where the service is provided.

25. A system according to claim 24, wherein said access means comprises at least one radio transmitter means.

26. A system according to claim 24 or 25, wherein said access means comprises at least one magnetic card.

27. A remote activity monitoring method comprising the steps of actuating an input device to enter one or more unique identification codes into a telephone device, wherein data relating to a provided service is transmitted via a telecommunications link from the telephone device to a message reception apparatus in response to said actuation of said input device.

28. A method according to claim 27, further comprising the step of actuating a remote device to transmit a signal which can be received by the input device in an active condition thereof.

29. A method according to claim 28, further comprising the step of actuating an activating trigger for switching the input device from a dormant condition thereof to said active condition.

30. A remote activity monitoring method comprising the steps of actuating an activating trigger for enabling an input device, by which a plurality of unique identification codes can be entered into a telephone device, to be switched from a dormant condition to an active condition thereof, and actuating at least one remote transmitter device for transmitting a signal to the input device wherein said signal can be received by the input device in said active condition such that a telecommunications link is established between said telephone device and a message reception apparatus for transmitting data relating to a provided service.

31. A method according to claim 30, wherein the or each said remote transmitter device comprises a radio transmitter device.

32. A method according to any one of claims 27 to 31, further comprising the step of establishing a two-way telecommunications link between the telephone device and the message reception apparatus.

33. A service monitoring method comprising inputting data relating to a provided service into a portable device at a service provision location for at least temporarily storing said data, wherein said data is inputted in response to actuation of access means provided at said service provision location.

34. A method according to claim 33, further comprising the step of automatically recording the duration of provision of said service.

35. A method according to claim 33 or 34, further comprising the step of establishing a telecommunications link between said portable device and message reception apparatus to enable said data to be transmitted to said apparatus via said link.

36. A method according to claim 35, further comprising the step of establishing a two-way telecommunications link between said device and said apparatus.

37. A remote activity monitoring system substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

38. A service provision monitoring system substantially as hereinbefore described with reference to the accompanying drawings.

39. A portable service provision monitoring device to be carried by a service provider, the device substantially as hereinbefore described with reference to the accompanying drawings.

40. A remote activity monitoring method substantially as herinbefore described with reference to the accompanying drawings.

41. A service monitoring method substantially as hereinbefore described with reference to the accompanying drawings.

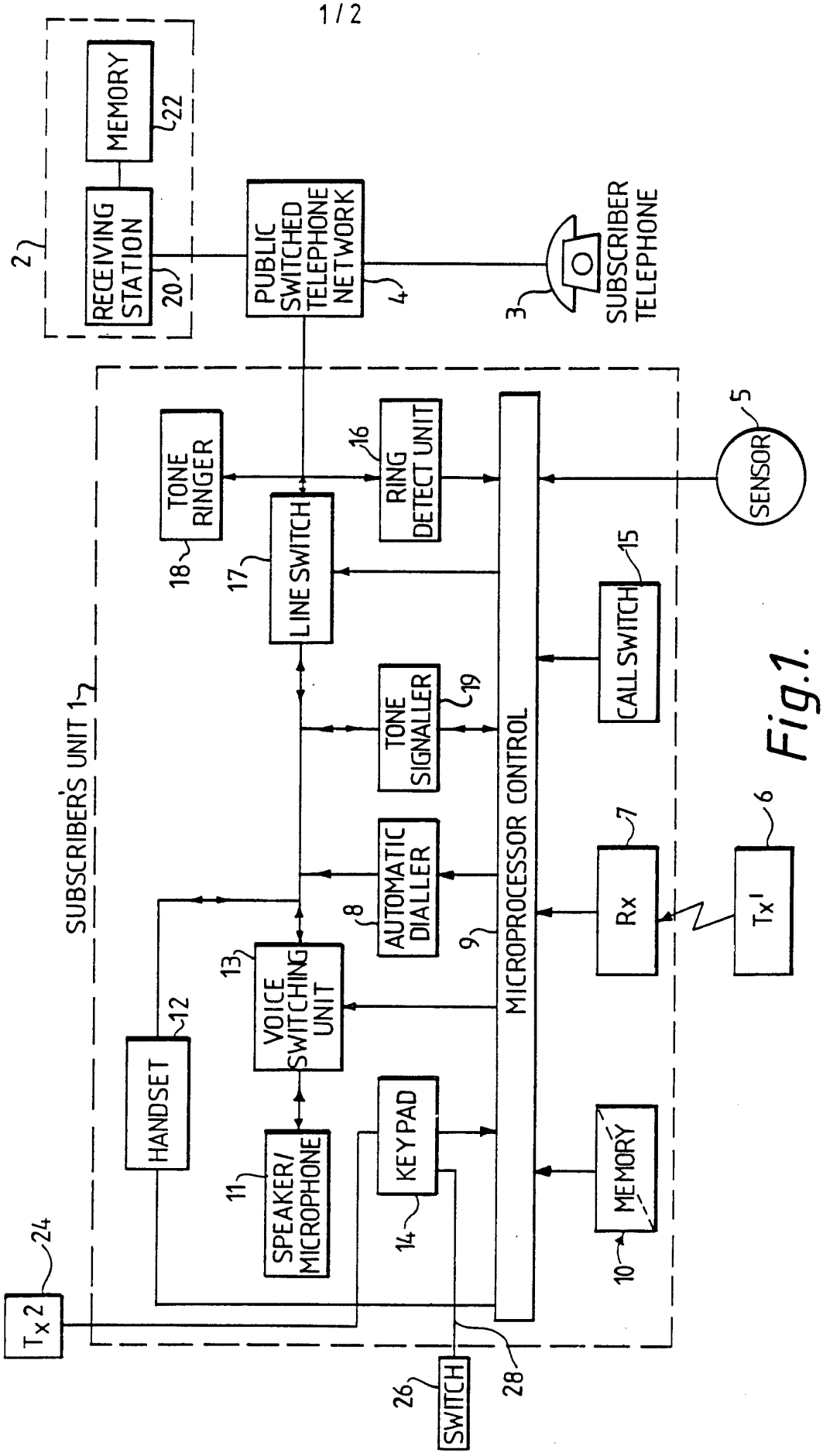

2
RECEIVING STATION
20
MEMORY
22
PUBLIC SWITCHED TELEPHONE NETWORK
4
3
SUBSCRIBER TELEPHONE
SUBSCRIBER'S UNIT 1
TONE RINGER
18
LINE SWITCH
17
RING DETECT UNIT
16
SENSOR
5
CALL SWITCH
15
TONE SIGNALLER
19
AUTOMATIC DIALLER
8
MICROPROCESSOR CONTROL
9
Rx
7
Tx'
6
HANDSET
12
VOICE SWITCHING UNIT
13
SPEAKER/ MICROPHONE
11
KEY PAD
14
MEMORY
10
Tx 2
24
SWITCH
26
28

Fig.1.

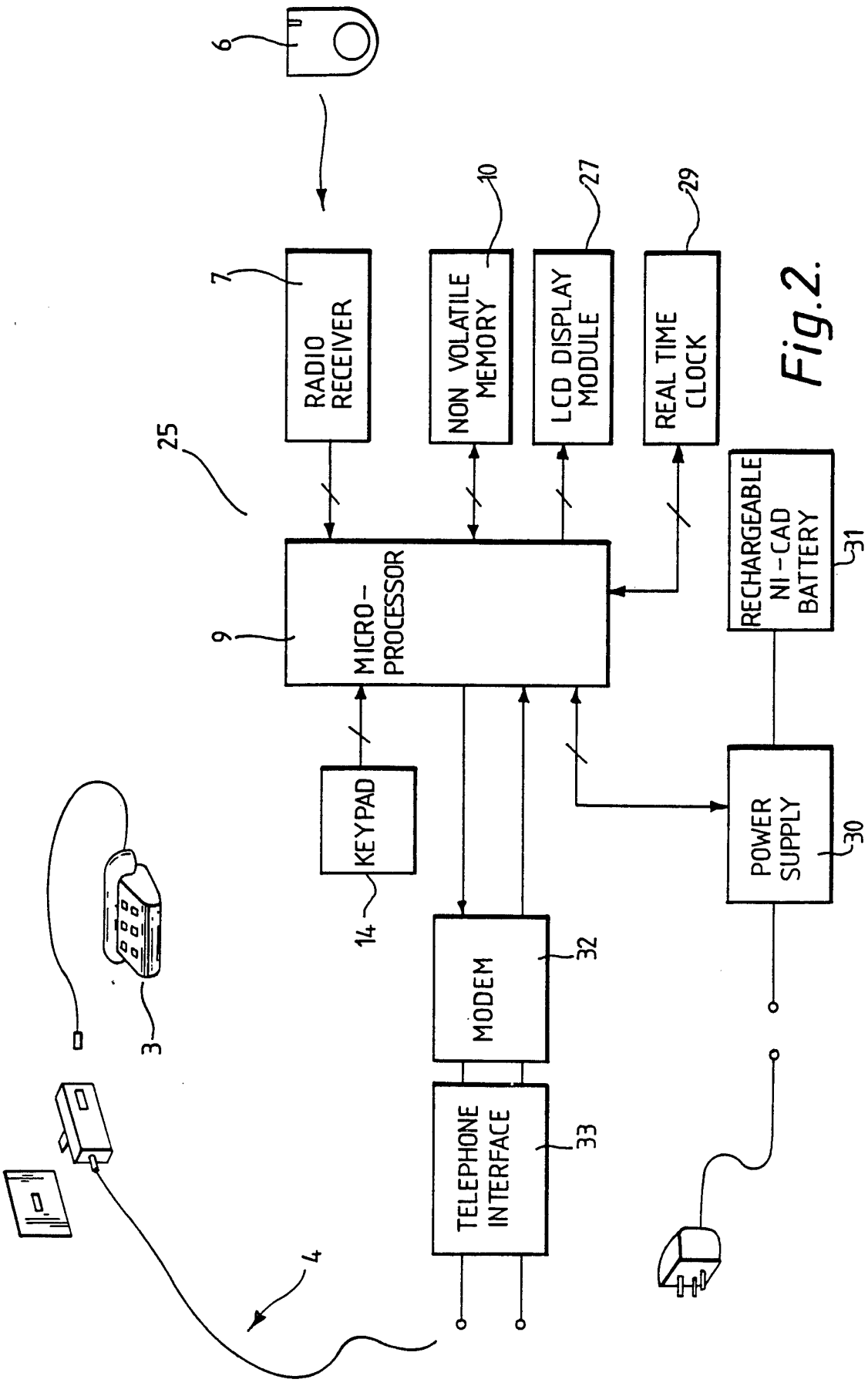

6
7
RADIO RECEIVER
10
NON VOLATILE MEMORY
27
LCD DISPLAY MODULE
29
REAL TIME CLOCK
25
9
MICRO-PROCESSOR
RECHARGEABLE NI-CAD BATTERY
31
KEYPAD
14
POWER SUPPLY
30
MODEM
32
TELEPHONE INTERFACE
33
3
4

Fig.2.

INTERNATIONAL SEARCH REPORT

Intern al Application No
PCT/GB 93/01966

A. CLASSIFICATION OF SUBJECT MATTER
IPC 5 H04M11/04 G07C1/10

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)
IPC 5 H04M G06K 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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO,A,85 01582 (B. I. INCORPORATED) 11 April 1985 see abstract see page 9, line 27 - page 12, line 31 see page 24, line 12 - line 22	12-15, 17, 20-25, 33-36
Y		1-11, 27-32
A		16,18, 19,26

Y	WO,A,92 14225 (MODERN VITACALL LIMITED) 20 August 1992 see the whole document	1-11, 27-32

	-/--	

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

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
6 January 1994	28. 01. 94

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Mikkelsen, C

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Intern. ..al Application No
PCT/GB 93/01966

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP,A,0 451 288 (HITACHI) 16 October 1991 see column 6, line 8 - column 9, line 39	12,16, 20,26, 33,35
A	WO,A,87 07106 (CLINICOM INCORPORATED) 19 November 1987 see page 15, line 34 - page 17, line 21 see page 24, line 6 - line 8	12,15, 17-25, 33,35,36

1

INTERNATIONAL SEARCH REPORT

Int. ational application No.
PCT/GB93/01966

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims: 1-11,30-32,37,38,40,41
2. Claims: 12-26,33-36,39

see annex _/--

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☒ As all searchable claims could be searches without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/210

LACK OF UNITY OF INVENTION

Since there exist no common technical features which can be considered as special technical features within the meaning of PCT, Rule 13.2, no technical relationship can be seen between the different inventions as stated below:

1. Claims 1-11,30-32,37,38,40,41 :

   A remote activity monitoring system comprising a telephone device.

2. Claims 12-16,33-36,39 :

   A portable service provision monitoring device.

INTERNATIONAL SEARCH REPORT

...information on patent family members

Inter. nal Application No
PCT/GB 93/01966

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO-A-8501582	11-04-85	US-A-	4549264	22-10-85
		AU-B-	585488	22-06-89
		AU-A-	3509584	23-04-85
		CA-A-	1214875	02-12-86
		EP-A-	0172833	05-03-86
		JP-T-	61500284	20-02-86
		US-A-	4658357	14-04-87
WO-A-9214225	20-08-92	NONE		
EP-A-0451288	16-10-91	JP-A-	3127288	30-05-91
		WO-A-	9106067	02-05-91
WO-A-8707106	19-11-87	AU-A-	6547686	01-12-87
		CA-A-	1268253	24-04-90
		US-A-	4850009	18-07-89