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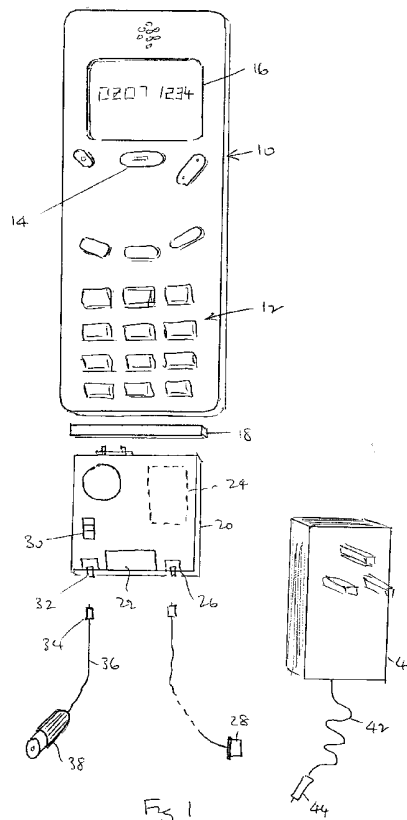
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GB 2334409 A **GB 1393122 A**
US 5473322 A
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(54) Abstract Title: **Security system using telephone communication**

(57) In a method of checking for the occurrence of an undesired event, a condition related to the event is monitored by a detector 20, a signal is generated in response to a detected change in the condition, and the signal causes data to be stored such that it can be subsequently accessed by an incoming call to a telephone 10 associated with the detector. Alternatively, the signal causes a call to be made to another telephone *via* a cellular telephone network. The method may be adapted for checking if goods in transit have been tampered with, whether a container has been broken into or simply contains unauthorised contents (such as illegal immigrants), whether a device has been turned on and/or tampered with by an unauthorised person (such as a PC requiring a password or a motor vehicle requiring a code to be entered before or after the ignition is switched on), or that an alarm condition has been triggered by a person wearing or carrying a panic-alarm device.



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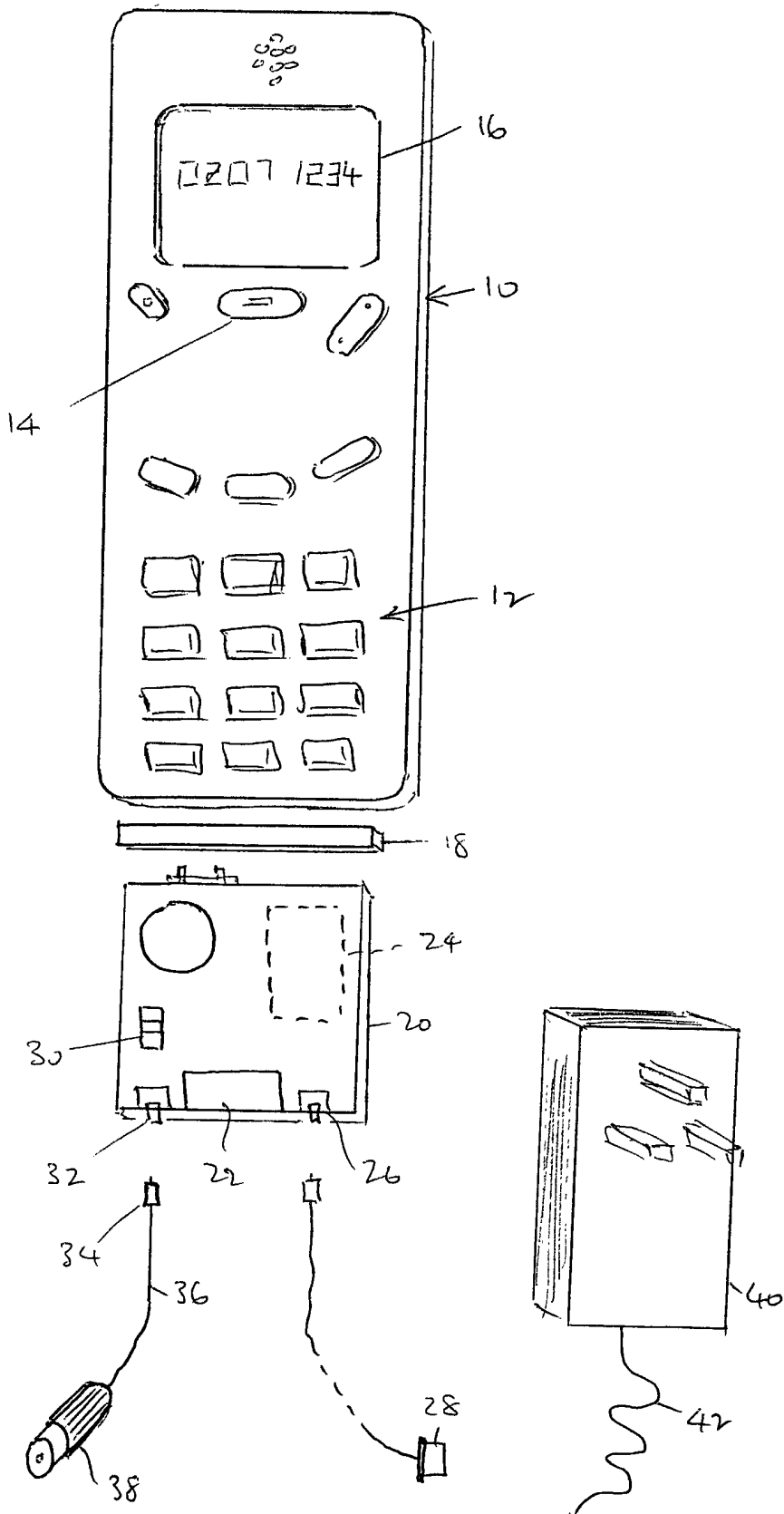


Fig 1

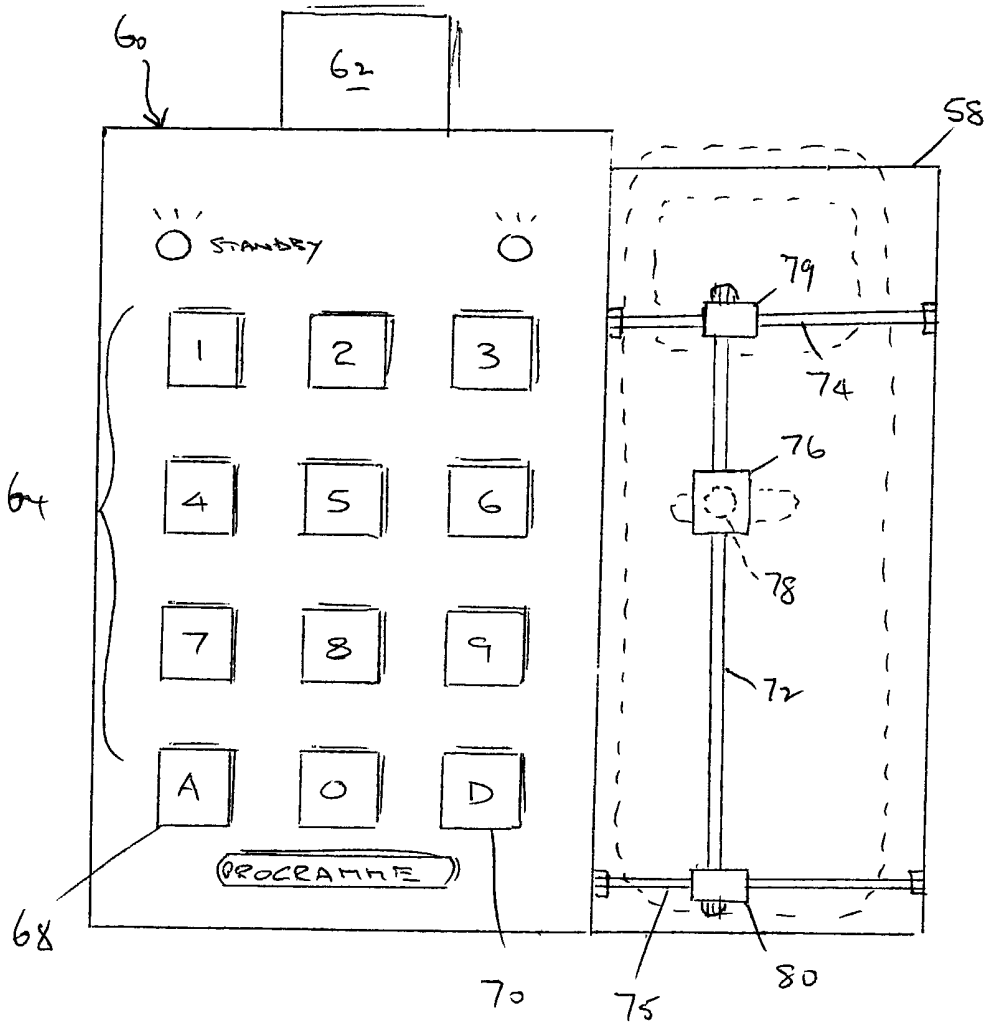


Fig 3

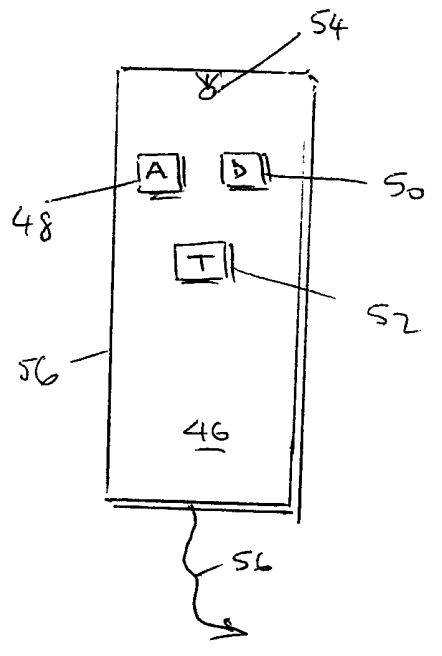


Fig 2

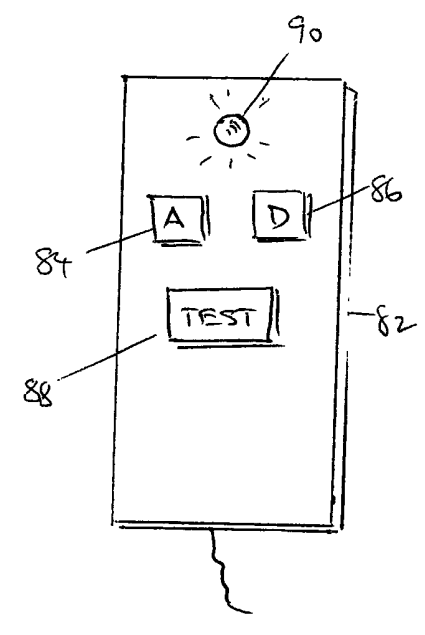


Fig 4

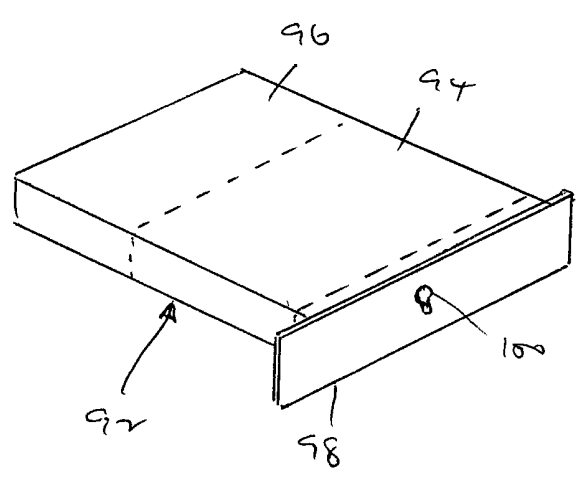


Fig 5A

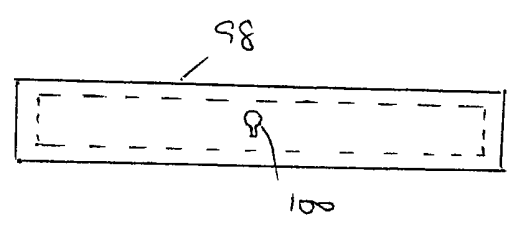


Fig 5B

Title: Security System

Field of the Invention

This invention concerns the remote signalling of a monitored condition, to alert the recipient of the information that the particular change or event has occurred.

Background to the invention

It is known to provide an auto dialling facility to alert a monitoring organisation or the local police if an intruder alarm system has been triggered by unauthorised entry into a building, or room in a building.

It is an object of the present invention to extend this principle to other applications, and to provide a simple and inexpensive apparatus for warning a person or organisation that the state of a monitored condition has altered.

Systems satisfying this objective may be adapted to alert the person/organisation at the time the monitored condition changes, or when addressed at a later point in time, that the monitored condition has changed.

Summary of the Invention

According to of the present invention there is provided a method of checking if goods in transit have been tampered with, or whether a container has been broken into or simply contains unauthorised contents (such as illegal immigrants), whether a device has been turned on and/or tampered with by an unauthorised person (such as a PC requiring a password or a motor vehicle requiring a code to be entered before or after the ignition is

switched on), or that an alarm condition has been triggered by a person wearing or carrying a panic-alarm device, involving:-

- (1) monitoring the condition using a detector,
- (2) generating a signal in response to a change in the condition monitored by the detector, and
- (3) storing data in a memory device for subsequent access via a telephone call to telecommunication apparatus associated with the detector, or causing a telephone call to be made to another telephone by the said telecommunication apparatus via a cellular telephone network.

Typically the telecommunication apparatus is a mobile 'phone.

Preferably the call is terminated after the called 'phone has answered.

Preferably the called 'phone or network stores the number of the mobile 'phone making the first call, to enable the calling 'phone to be recalled either by the first called phone, or by the network, or by the police, for the purpose of either interrogating the region where the mobile 'phone is located, and audibly monitoring any sound such as a conversation that is occurring therein, and/or for determining its position.

Preferably the mobile 'phone is programmed so as not to ring on receipt of an incoming call, so as not to alert anyone to its presence.

The detector may be adapted to monitor a defined condition and produce a change in an electrical circuit, or generate an electrical signal.

The telecommunication apparatus can respond to the change in the circuit or generated signal to establish a link to the cellular network and establish a call to at least one

telephone customer and either transmit at least one alarm message when the dialled number answers, or store in a permanent or semi-permanent manner information relating to the time when a change in the monitored condition has occurred, or merely that the change has occurred, whereby if the number of the telecommunication apparatus is dialled and a link is established from another telephone via the cellular network, the stored information can be accessed by the calling telephone.

In the latter event, access to the stored information is preferably only possible after a code or password has been entered by the calling subscriber.

The telecommunication apparatus may be a conventional portable telephone with its own self-contained power supply, with an electrical link to circuit means which is thereby adapted to respond to an incoming call received by the telephone, or for establishing a call from the telephone to a selected telephone number determined by the circuit means.

Where it is only desired that an outgoing call is to be established as soon as a change in the monitored condition is detected, and a conventional portable telephone is to be employed as the telecommunications apparatus for establishing the call, the electrical circuit means may include electromagnetically operated mechanical means for operating the keypad of the 'phone, to dial-up the wanted number.

In a particularly simple arrangement, the portable telephone may be primed by dialling the number which is to be called, leaving only the transmit key needing to be depressed to establish the call to the network (and thence to the called number), and the mechanical means needs only to be a single plunger or lever mechanism adapted to depress the transmit key when activated.

In such an arrangement as aforesaid, the activation of the lever may be by way of an actuator such as an electromagnet or electric motor, which may be powered by a separate power supply from that of the telephone, with a control circuit for converting a change of circuit condition or signal instigated by the detector into an electric current suitable for

operating the actuator, or a relay device which in turn controls operating current to the actuator, or a solid state switching device, adapted to control the flow of operating current to the actuator.

In one embodiment the actuator is located in a housing which is adapted to receive the telephone, and the detector may be incorporated into the housing, or mounted adjacent the housing, or may be adapted to be mounted remote from the housing and be connected thereto by a cable or by a wireless link, in which event a simple one-way radio link is required to be built in, or adapted to respond to, the signal generated by, or circuit change of state brought about by, the detector responding to a monitored condition change.

Where a supplementary power supply is available, such as a starter battery in a motor vehicle, power for operating the detector, any wireless link if fitted, actuator and even the portable telephone, may be derived from the supplementary power supply. However, where a covert monitoring device is desired, which cannot be rendered inoperable simply by interfering with connections to such a supplementary power supply such as a vehicle battery, the detector, actuator and telephone, preferably operate from one or more independent separate power supplies, although these may be of a rechargeable variety, in which event a connection may be made from a charging source (such as from a vehicle alternator charging circuit) to keep the independent supply/supplies in a fully charged condition.

The invention may be used to monitor the interior of a vehicle for intruders, and relaying information either immediately (or subsequently when addressed) that an intruder has gained access to the vehicle, and may still be inside. By way of example the vehicle may be a powered vehicle such as a car, van, motorhome, lorry, bus, railway rolling stock, boat or aeroplane, or may be a trailer or caravan, railway carriage or truck which is trailed by a powered vehicle, or a glider. The list is not intended to be exhaustive.

Apparatus may be adapted to be mounted covertly so as not to be evident in such a vehicle for the aforesaid purpose.

The device may comprise a computer, briefcase, musical instrument case, valuables case, or item of furniture, when fitted with apparatus as aforesaid, which instigates a call to a predetermined telephone number if the apparatus is moved, or (where appropriate) switched on, or an attempt is made to operate it without performing a specific task (such as entering a password or specific code by way of a data entry device such as a keyboard or keypad).

The device may comprise a computer motherboard when adapted to include at least the telecommunication apparatus as aforesaid when programmed to cause the telecommunication apparatus to dial a predetermined telephone number.

The device may comprise a modular device adapted to be fitted to electronic equipment such as a removable computer disc drive, CD-Rom drive, supplementary power supply, modem or the like, when fitted with telecommunications apparatus as aforesaid which is adapted to establish a call to a predetermined telephone number for example if the apparatus is merely turned on, or is turned on and used without entry of a particular password, or if the modular device is removed from the apparatus.

The device may comprise a portable device such as a belt, handbag, briefcase, watch, bracelet or brooch, when fitted with telecommunication apparatus as aforesaid, together with a detector in the form of a panic button switch operable by the person carrying or wearing the portable device, in the event of an attack or threatened attack or if they merely feel unwell, wherein the telecommunication apparatus in that event is adapted to dial a predetermined number and transmit a predetermined (perhaps pre-recorded) message to raise the alarm by virtue of the message delivered by the telecommunication apparatus to the called telephone.

Where a pre-recorded message is required to be transmitted by the calling telecommunication apparatus a signal storage device is provided, typically a digital store, for storing digital information which when read out and suitably assembled will produce a

synthesised voice recording of a pre-recorded message and to this end, reference to telecommunication apparatus herein, is intended to mean such apparatus in combination with digital storage means containing digital data for generating a synthesised voice message for transmitting by the telecommunication apparatus once the call is established.

The telecommunication apparatus may have integrated therein or form part of, or be combined with a GPS receiver capable of determining from satellite radio beacons the latitude and longitude of the receiver, and means is provided for relaying the latitude and longitude co-ordinates via the mobile telephone link, so that an accurate position fix is obtainable all the time the mobile phone call remains established to the network.

This feature enables the police or the owner to trace the whereabouts of a vehicle or any other item (e.g. a computer) which has been stolen, and moved from where it was left.

Where the cellular telephone network can, in known manner itself be employed to locate the geographical position of any 'phone which has called the network and established a call – or can be called by the network so as to establish a call, a method of locating the whereabouts of a vehicle or other article which has been fitted with a device as aforesaid, involves establishing a call between the mobile 'phone telecommunication apparatus in the vehicle (or article) and employing the known technique for identifying the position of the 'phone as by using signals from other cells in the network.

The invention is of particular application in checking if goods in transit have been tampered with, whether a container has been broken into or simply contains unauthorised contents (such as illegal immigrants), whether a device has been turned on and/or tampered with by an unauthorised person (such as a PC requiring a password or a motor vehicle requiring a code to be entered before or after the ignition is switched-on), or that an alarm condition has been triggered by a person wearing or carrying a panic-alarm device.

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

Fig 1 shows how a portable telephone can be adapted to constitute a remote monitoring device, for use in a method according to the invention,

Fig 2 shows how such a device can be controlled from a remote location,

Fig 3 shows a unit which can be adapted to receive and operate any one of a number of different mobile 'phones,

Fig 4 shows a remote control device for the unit of Fig 3, and

Figs 5A and 5B show a modified modular unit adapted to fit into a portable/laptop computer, in place of a modular unit which could normally occupy that position in the computer.

In Fig 1 a standard mobile 'phone 10 includes a keypad 12 for entry of numerals 0 - 9 to make up the number of a subscriber to be called and a transmit button 14 which is depressed after the subscriber number has been entered and the display 16 has been checked, to establish a radio link with the cellular net work within which the 'phone operates and thereby make a call to the number which has been entered.

By entering a number it is only necessary thereafter to press button 14 to establish the call, and in general, providing power is left ON, the call can be established at any time thereafter (many hours later if desired).

Most portable 'phones include an edge connector, usually at the base of the 'phone (not shown), to give access to the circuits within the 'phone for externally controlling the phone functions and/or programming the phone. A charging connection is also usually provided (again not shown in Fig 1). To this end an adapter 18 is provided adapted to make a multi-way connection with the edge connector and provide connection to a detector unit 20 which contains a PIR 22, and may contain a battery 24 (which may be rechargeable).

A socket 26 provides for connection to 20, via a lead 27 and plug 29, of a second PIR 28.

A switch 30 allows one or other or both PIRs to be selected and rendered active.

A socket 32 allows for connection to an external power supply such as via a plug 34, lead 36 and connector 39, to a vehicle cigar lighter socket (not shown).

A separate charger unit adapted to be connected to a domestic electricity supply main as via a 13A plug and socket may be provided as at 40, with a lead 42 and plug 44 to connect to the socket 32 in place of plug 34.

Remote control of the unit 20 and 'phone 10 is achieved by a hand held device 46 having three buttons 48, 50, 52 labelled ARM, DISARM and TEST respectively. An LED 54 lights up to indicate the unit 46 is working correctly.

Connection between 46 and 20 may be by cable such as 56 or a wireless link, in which latter case both 46 and 20 need to have wireless transceivers incorporated with appropriate antennae, and 46 would need a power supply such as a battery.

The adapter 18 may to advantage be one of a number of different devices, each adapted to connect to the unit 20, and to one of a range of 'phones – each of the other adapters being adapted to connect to another of the phones in the range.

The combination of 'phone 10 and unit 20 is such that if a PIR such as 22 detects movement, then an electrical signal is supplied via 18 and the edge connector to the 'phone to cause the 'phone to dial a predetermined number (or merely call a number already keyed in and held in the display memory awaiting the transmit instruction). This obviates the need to mechanically depress the transmit button 14 on the 'phone.

The combination can be mounted within an enclosed space such as a vehicle interior, and after the 'phone has been programmed with the number to call, the space can be secured and left. Any intrusion will cause the phone to establish the call to the dialled number (or predetermined number stored in 20). This of course requires the 'phone 10 and unit 20 to be visible.

Alternatively the 'phone 10 and unit 20 may be stored out of sight (e.g. locked in a glove compartment in a car) and a remote PIR 28 discreetly connected via a thin cable to the socket 26, and the remote PIR can be camouflaged or otherwise hidden as much as possible, so as not to be evident to a casual observer. In this event the unit 20 need not actually include a PIR in the simplest case.

Where the 'phone allows a message to be stored for transmission when a number is called, this internal facility may be employed to transmit an "alarm" message.

Alternatively unit 20 may include a further memory (not shown) for storing a pre-recorded message either via a separate microphone or via the 'phone microphone, and this message is transmitted electrically to the 'phone to be transmitted when the call is established.

In one embodiment the 'phone 10 is arranged to dial the number of a mobile 'phone which is carried by the owner of or person responsible for an article such as a vehicle, and in the simplest case, if that mobile 'phone rings, and the number displayed on the called 'phone is that of the mobile in the vehicle – the recipient will know that the vehicle has been tampered with, or unauthorised entry gained to the vehicle. After terminating the incoming call in the usual way on the receiving 'phone, the recipient can investigate and/or make a 999 call to the police, and give details of the article such as registration number, colour and type of vehicle and place where it was parked, giving the police a good chance of apprehending anyone who is interfering with or has gained access to and is driving away such a vehicle.

Where it is possible for the cellular 'phone network to identify the position of a calling 'phone, the owner and/or police can obtain further assistance by asking the network company to trace the position of the mobile 'phone in the vehicle. Alternatively or in addition a GPS transceiver (not shown) may be incorporated into unit 20 to allow the position of unit 20 to be identified and transmitted by the mobile phone associated with unit 20.

Fig 3 illustrates an alternative arrangement in which a pocket 58 for a mobile 'phone (not shown) is provided to the side of a sensor unit 60. A detector 62 such as a PIR is mounted at the top of the unit 60 and a keypad 64 and associated electronic circuits (not shown) and battery (not shown), allow a code to be entered and to arm and disarm the device, by first entering (say) a four digit number (which has previously been selected and entered by depressing a PROGRAMME button 66), and thereafter depressing either the ARM button 68 or the DISARM button 70.

To the side of the unit 60 is an adjustable rail assembly 72, 74, 75 with a solenoid actuator mounted on a carriage 76 which is slideable up and down 72 to adjust the height of the solenoid plunger 78 (shown dotted). Lateral adjustment of its position is achieved by sliding the rail 72 relative to 74 and 75 to which end 72 is carried at opposite ends in trunnions 79, 80 which slide along the rails 74 and 75 respectively. By appropriate movement along 72 and relative to 74, 75 so solenoid plunger 78 can be positioned opposite the transmit/establish call button of any mobile 'phone located in the pocket 58.

Although not shown further adjustable devices may be provided to grip the sides and/or back and/or front and/or top of a mobile 'phone in the pocket 58, to securely position the 'phone in the pocket.

As with the arrangement of Fig 1, a remote control device 82 may be provided connected to the unit 60 by a cable or by a wireless link. The unit 82 has an ARM button 84, a DISARM button 86, a TEST button 88 and a test LED 90.

As shown in Figs 5A and 5B in the case of a portable or laptop computer which has one or more modular units which can be removed from the computer housing (e.g. a modem module containing a PCMCIA card). The latter may be replaced by a similarly sized module 92 adapted to fit in the same way into the bay normally occupied by the PCMCIA card module, and a GSM 'phone device 94 and associated battery 96 are mounted within the modular body 92. A front panel 98 (see Fig 5B) includes a key hole 100 leading to an internal lock which when operated prevents the body 92 from being removed from the computer housing.

The front panel 98 may be attached to the body 92 via a weak-link, so that if force is applied, the weak link breaks and the front panel comes away leaving the body embedded in the computer housing, and difficult to remove

A link (not shown) from the computer motherboard to the GSM 'phone device 94, is adapted to convey signals which will cause the latter to establish a call to a network if for example the computer is turned ON or OFF, or if in a standby mode is reactivated, without first a secret code or password being entered via the computer keyboard.

A GPS location determining device (not shown) may be combined with the GSM 'phone device to provide latitude and longitude position data for transmission via the GSM 'phone to assist in the identification of the location of the computer if stolen.

Preferably the GSM 'phone device is silenced so as not to ring if called by the network.

As shown in Figs 5A and 5B the unit consists of a power pack and GSM Cell-phone construction of such a nature that when fitted it locks itself securely to the computer and can only be removed with a suitable key (possibly a self contained chip key as used with modern motor vehicles). If the unit is forcibly removed, the front section 98 breaks away leaving the main unit 92 in place and very difficult to remove without dismantling the computer.

The function of the device is to alert the owner of the computer of unauthorised use and to telephone a predetermined number of the owner's choice as soon as the computer is put to any use, without a password having been entered (or an incorrect password is entered), and being GSM its position could be located by the network.

The device 94 may be programmable with software which enables the function of the unit to be overridden on entering the usual password for the computer, but if the password is not entered within a specified time (or an incorrect password is entered) the GSM 'phone will be activated. In one arrangement, the unit can be removed only after entering an appropriate password, for example to enable the normal module to be inserted in its place. In this event, if there is an attempt to remove the module 92 without having entered the password, the GSM 'phone is activated.

The invention could be incorporated into a computer by means of any other port or port replicator, internally or externally at the manufacturer's discretion, and preferably the GSM device is included on the motherboard at the time of production.

In general the present invention provides electronic telecommunication apparatus for transmitting to and receiving signals from a cellular telephone network which is incorporated into a detector to form a combined detector-transceiver, for placement in a position in which the detector can respond to a change in a defined condition and produce a change in an electrical circuit, or generate an electrical signal.

Likewise the invention provides a detector adapted to monitor a defined condition and produce a change in an electrical circuit, or generate an electrical signal has incorporated therein electronic telecommunication apparatus for transmitting to and receiving signals from a cellular telephone network.

In either case the telecommunication apparatus can respond to the change in the circuit or generated signal to establish a link to the cellular network and establish a call to at least one telephone customer and either transmit at least one alarm message when the dialled

number answers, or store in a permanent or semi-permanent manner information relating to the time when a change in the monitored condition has occurred, or merely that the change has occurred, whereby if the number of the telecommunication apparatus is dialled and a link is established from another telephone via the cellular network, the stored information can be accessed by the calling telephone.

The invention thus also lies in apparatus for monitoring the interior of a vehicle for intruders, and relaying information either immediately (or subsequently when addressed) that an intruder has gained access to the vehicle, and may still be inside. By way of example the vehicle may be a powered vehicle such as a car, van, motorhome, lorry, bus, railway rolling stock, boat or aeroplane, or may be a trailer or caravan, railway carriage or truck which is trailed by a powered vehicle, or a glider. The list is not intended to be exhaustive.

The invention also lies in apparatus adapted to be mounted preferably covertly so as not to be evident in such a vehicle for the aforesaid purpose and in a vehicle when such apparatus has been fitted thereto.

The invention also lies in portable apparatus such as a computer, briefcase, musical instrument case, valuables case, or item of furniture, when fitted with apparatus as aforesaid, which instigates a call to a predetermined telephone number if the apparatus is moved, or (where appropriate) switched on, or an attempt is made to operate it without performing a specific task (such as entering a password or specific code by way of a data entry device such as a keyboard or keypad).

The invention is of particular application in checking if goods in transit have been tampered with, whether a container has been broken into or simply contains unauthorised contents (such as illegal immigrants), whether a device has been turned on and/or tampered with by an unauthorised person (such as a PC requiring a password or a motor vehicle requiring a code to be entered before or after the ignition is switched-on), or that an alarm condition has been triggered by a person wearing or carrying a panic-alarm device.

Claims

1. A method of checking if goods in transit have been tampered with, or whether a container has been broken into or simply contains unauthorised contents (such as illegal immigrants), whether a device has been turned on and/or tampered with by an unauthorised person (such as a PC requiring a password or a motor vehicle requiring a code to be entered before or after the ignition is switched on), or that an alarm condition has been triggered by a person wearing or carrying a panic-alarm device, involving:-
 - (1) monitoring the condition using a detector,
 - (2) generating a signal in response to a change in the condition monitored by the detector, and
 - (3) storing data in a memory device for subsequent access via a telephone call to telecommunication apparatus associated with the detector, or causing a telephone call to be made to another telephone by the said telecommunication apparatus via a cellular telephone network.
2. A method as claimed in claim 2 wherein the telecommunication apparatus is a mobile 'phone.
3. A method as claimed in claim 2 wherein the call is terminated after the called 'phone has answered.
4. A method as claimed in claim 3 wherein the called 'phone or network stores the number of the mobile 'phone making the first call, to enable the calling 'phone to be recalled either by the first called 'phone or by the network, or by the police, for the purpose of either interrogating the region where the mobile 'phone is located, and audibly

monitoring any sound such as conversation that is occurring therein, and/or for determining its position.

5. A method as claimed in claim 4 wherein the mobile 'phone is programmed so as not to ring on receipt of an incoming call, so as not to alert anyone to its presence.



INVESTOR IN PEOPLE

Application No: GB 0323882.1
Claims searched: 1-5

Examiner: David Brunt
Date of search: 26 February 2004

Patents Act 1977 : Search Report under Section 17

Documents considered to be relevant:

| Category | Relevant to claims | Identity of document and passage or figure of particular relevance |
|----------|--------------------|--|
| X | 1 | US 5473322 (CARNEY) see abstract & col.7 ll.16-65 |
| X | 1,2 | GB 2334409 A (LEIGHTON) see whole document |
| X | 1 | GB 1393122 (WESTINGHOUSE) see p.4 ll.105-124 & p.7 ll.17-27 |

Categories:

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|---|--|
| X Document indicating lack of novelty or inventive step | A Document indicating technological background and/or state of the art |
| Y Document indicating lack of inventive step if combined with one or more other documents of same category. | P Document published on or after the declared priority date but before the filing date of this invention. |
| & Member of the same patent family | E Patent document published on or after, but with priority date earlier than, the filing date of this application. |

Field of Search:

Search of GB, EP, WO, & US patent documents classified in the following areas of the UKC^w:

G4H, G4N, H2K

Worldwide search of patent documents classified in the following areas of the IPC⁷ :

G08B

The following online and other databases have been used in the preparation of this search report :

Online: EPODOC, JAPIO, WPI