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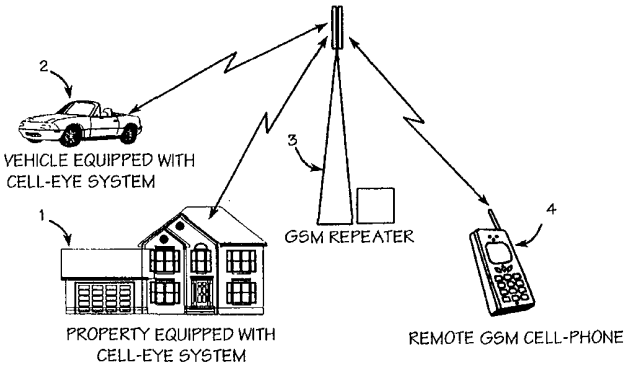

(57) Abstract

A security system called CELL–EYE is disclosed. The system is designed for protecting specific property, human life and the prevention of vehicle–theft and irregular and willful intrusion of property through the detection and automatic reporting of security violations to a specific GSM mobile unit via the DATA and SMS service of the GSM mobile telephone network. The CELL–EYE system includes a controller and memory unit for the verification of the identity of incoming calls, and the activation, deactivation and programming of the CELL–EYE via validated incoming calls received by an alarm linked GSM mobile unit and modem from a remote GSM mobile unit. When activated the controller performs a mode 1 alarm procedure which monitors the alarm outputs of a vehicle or property security system via an alarm sensing interface. When an alarm is detected, the controller automatically places an outgoing call to a designated remote GSM mobile unit and indicates the nature of the alarm via a GSM SMS message. The CELL–EYE controller also includes a program to perform a mode 2 localization procedure which automatically reports the location of the GSM repeater station nearest to the CELL–EYE GSM unit to a remote GSM mobile unit via a GSM SMS message when the CELL–EYE is remotely programmed to do so, thus facilitating the localization and tracking of a stolen vehicle equipped with a CELL–EYE system. The CELL–EYE also includes a vehicle immobilizer and protection interface for performing a mode 3 procedure upon the reception of an incoming call to the vehicle–installed GSM mobile unit. A mode 3 procedure activates the immobilizer systems in a stolen vehicle to facilitate the rapid recovery of the vehicle.

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ALARM AND IMMOBILISER WITH GSM CELLULAR PHONE

TECHNICAL FIELD OF THE INVENTION

The present invention relates generally to vehicle and property security and alarm equipment, vehicle tracking equipment and stolen vehicle recovery equipment. More specifically, the present invention relates to a system to interface conventional vehicle and property security and alarm equipment and vehicle immobilization equipment to a linked GSM mobile telephone system to detect alarms, to report such alarms to the owner or security service provider, to report the location of a vehicle to the owner or security service provider and to remotely activate conventional immobilization equipment installed in a vehicle.

BACKGROUND TO THE INVENTION

Residential housebreaking and vehicle theft are among the five most frequently occurring crimes. An increasing number of residential property owners possess security systems for the detection of irregular or willful intrusion linked to audible alarm systems for alerting others to a potential crime. An increasing number of vehicle owners possess vehicles equipped with intrusion detection systems and vehicle immobilization systems aimed at reducing the incidence of vehicle theft or hijacking or theft from motor vehicles. Most housebreakings, vehicle thefts and hijacks occur in metropolitan areas and along highways. Most stolen and hijacked vehicles are removed to particular locations along known metropolitan routes. Vehicle and property insurance rates are generally increasing. The number of users of cellular mobile telephone systems are also daily expanding. Most metropolitan areas and highways are serviced by the GSM mobile cellular phone network. The proliferation of GSM cell-phone users and the proliferation of conventional alarm systems without a direct link to the owner or to a security service provider, presents an opportunity for linking the two systems via a dedicated and integrated controller integrated with an installed GSM cell-phone system which permits two-way communication between the owner or security service provider and an unattended cell-phone unit installed in a vehicle or property.

Alarm notification and reporting systems which use conventional telephone lines are available for use in connection with residential property and other buildings. Such systems provide for automatic calls to a security service provider when a security violation has occurred. Such systems can be rendered useless when the phone lines are cut or when the conventional phone system is not functional. The reliability of such building-installed alarm systems can be enhanced by means of an unattended GSM cellular phone equipped with an automatic call initiating controller.

Sophisticated vehicle tracking systems are available for use in stolen vehicle recovery systems and fleet management systems which use a Global Positioning Satellite System (GPS) device installed in the vehicle to pinpoint the vehicle location. Such systems also require a dedicated radio communication system to report the vehicle location to the tracking service, often via satellite communication system. Such systems require the involvement of a security service provider which is equipped with appropriate mobile reception equipment and vehicle location display equipment in order to process the GPS data. There is a need for a low cost vehicle tracking system which uses the GSM mobile phone network and which permits the owner to take control of the action following a vehicle theft or hijack or to make use of any security service provider equipped with a GSM mobile phone in assisting him to take action following an alarm, theft or hijack.

By the remote activation of vehicle immobilization systems including fuel starvation valves and interruption of current to the ignition system, stolen vehicles can be immobilized by the use of a GSM cell-phone before such vehicles reach inaccessible or high risk areas and thus the rapid recovery of such vehicles can be facilitated.

SUMMARY OF THE INVENTION

Owner controlled security: The invention called a CELL-EYE system relates to an owner controlled remote alerting device comprising a method of and apparatus for using the GSM cellular phone network to send a message to the owner of a vehicle equipped with a CELL-EYE device or to the owner of a property equipped with such a device or to a designated security service provider in order to alert such owner or security provider of an attempted intrusion of the property, or attempted theft of a vehicle or of attempted theft from a vehicle.

Elements of the system: The CELL-EYE system comprises am installed battery operated GSM mobile unit which will be referred to as the Alarm Linked Unit (ALU). The ALU is linked with a controller and memory unit which inturn is linked with a vehicle security system or a property security system and its alarms via appropriate interfaces. The interfaces of said CELL-EYE system comprises an alarm sensing interface and

a controller with signalling means for generating an outgoing call and a SMS message from the installed GSM mobile unit to a remote GSM cellular phone in response to a number of alarm conditions which correspond to irregular or willful disturbance of the vehicle or property, and an immobilizer/protection interface to activate a vehicle immobilizer or protection unit when an instruction for such action is received via an incoming call to the installed GSM mobile unit.

Purpose of the CELL-EYE: It is the purpose of the said CELL-EYE system to assist the owner or security service provider to protect specific property, human life, and to prevent any criminal intervention thereon, to reduce the likelihood of successful housebreaking, to assist owners, security service providers and police departments in recovering stolen vehicles, to assist security service providers and police departments in apprehending criminals and to reduce insurance rates.

Definitions: To be consistent with GSM vocabulary a call from the ALU to the GSM network is named "mobile originated call" or "outgoing call" and a call from the GSM network to an ALU is called "mobile terminated call" or "incoming call".

The GSM mobile unit which is installed in the vehicle or property and linked to the vehicle or property security system will be referred to as the Alarm Linked Unit (ALU) in order to distinguish it from other GSM mobile units which may be used in the utilization of the invention. Likewise the specific remote GSM mobile unit which is used to receive messages sent by the CELL-EYE and to communicate with the ALU will be referred to as the Remote Message Unit (RMU).

Automatic owner alerting function: The said CELL-EYE system is designed to automatically initiate an outgoing call to a preprogrammed RMU and indicate by means of a SMS message the nature of the disturbance. The message sent by the ALU is intended to alert the owner or security service provider of a criminal act perpetrated on the said vehicle or property and in the case of a vehicle to report to the owner or security service provider the location of the cellular mobile phone repeater station within whose immediate surroundings the ALU is located.

Remote activation: The controller of the said CELL-EYE system is designed to be activated by remote control via an incoming call carrying a coded Short Message Service (SMS) message. The said CELL-EYE system also allows the owner or security service provider to remotely activate a vehicle immobilization or protection system via the ALU.

Improvement in property-installed security systems: Low cost property-installed intrusion detection and alarms systems without an automatic dialling facility to a security service provider can be enhanced without the involvement of a dedicated security service provider though the addition of the said CELL-EYE system which can be programmed to contact the owner via the GSM cellular phone network and report to the owner the nature of the security violation. The owner can then, if necessary contact a security service provider or police department. Through its link to the GSM cellular phone system via a controller and memory unit the said CELL-EYE system also permits the remote activation or deactivation of alarms in the property protected by such a device.

Vehicle localization and tracking: The present invention provides also for a vehicle localization and tracking facility through an interface which relays the locality of the GSM cellular network repeater station nearest to the unattended GSM cellular mobile phone installed in a vehicle to the owner or security service provider by means of the GSM short message service (SMS). Thus the present invention provides a low cost alternative to satellite linked vehicle tracking systems by the use of the information available through the GSM network which indicates on any active mobile unit the location of the nearest GSM network repeater tower.

Remote immobilization and protection: The present invention also provides for a remote activation interface which links vehicle immobilization systems to the ALU installed in the vehicle. Such remote activation is an extension of existing systems which permit remote activation of a vehicle tracking transmitter installed in the vehicle. Furthermore, hijacked vehicles can be immobilized only when they are well away from an abandoned owner or driver thus reducing the likelihood of retaliation by the hijackers. The immobilization facility together with the localization and tracking facility provided by the CELL-EYE invention, promotes rapid recovery of a stolen vehicle.

Remote programming: A further advantage of the two-way communication between an owner and the protected which is possible with the present invention, is the facility which allows the owner to remotely

activate or program the security system by means of a telephone call from the owner's cellular phone to the CELL-EYE installed in the vehicle or property. Such programming could include periodic customization of the level of security appropriate for a particular situation and presetting alarm parameters such as the numbers that must be dialled when an alarm condition is detected, how frequently such calls need to be repeated and what to do if connection to a particular called number is not available at the time. Remote activation and programming of the device also alleviates the need for a user accessible interface to the CELL-EYE system.

Panic button function: If a panic button in the hijacked vehicle or in the protected property is depressed by an occupant, the said CELL-EYE system will automatically be activated and initiate an outgoing call and send a SMS message to a preprogrammed RMU which could be a number different from that used for mode 1 operation. The said RMU will display the number of the ALU that originated the call and then a SMS message will indicate that the call originated with the depression of a panic button. In the case of a vehicle installed CELL-EYE system, the system will then automatically go into mode 2 operation and indicate the location of the GMS repeater nearest to the ALU until by means of a SMS message on the RMU until the said CELL-EYE system is de-activated from a RMU by an incoming call to the ALU followed by a request and validation of the PIN code. The said automatic initiation of an outgoing call will be initiated without the CELL-EYE system having first been activated by means of an incoming call. This function of the said CELL-EYE system is intended to alert a friend or security service provider to take action to come to the aid of the person who depressed the panic button.

Identification of ALU originating the outgoing call: The said CELL-EYE system facilitates owner controlled handling of security violations in either vehicles or property through the messages received on his RMU. The ALU originating the outgoing call to the RMU is identified by means of the caller line identification feature which is available on most GSM cellular phone units. This feature will indicate to the owner or security service provider the cell-phone number of the ALU which originated the call and SMS message.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

Without limiting the scope of the present invention an example of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a diagram depicting the environment in which the present invention is designed to operate.

Figure 2 is block diagram of a preferred embodiment of the present invention. Figure 2 depicts the elements which comprise the CELL-EYE system incorporating an installed GSM mobile unit without keypad and with a linked modem. The arrows in the block diagram indicate the direction of information flow.

Figure 3 is a block diagram depicting the elements which replace the modem in a CELL-EYE system incorporating an installed GSM mobile unit with keypad and without a linked modem, where the GSM mobile unit is linked to the controller and memory unit via electromechanical interfaces. The arrows in the block diagram indicate the direction of information flow.

A more complete understanding of the present invention may be derived by referring to the detailed description and claims when considered in connection with the FIGURES. In the accompanying FIGURES the same reference numbers refer to the same elements of the system throughout the FIGURES.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the accompanying drawing in Figure 1 the said CELL-EYE system is designed to operate in an environment where:

property 1 is a property which is equipped with a property security system and said CELL-EYE system installed near the controller or alarms of the property security system,

vehicle 2 is a vehicle which may, but need not include with a hidden vehicle security system which may include an alarm and a vehicle immobilization and protection system.

Said CELL-EYE system is installed in said vehicle, and said property or said vehicle are linked to a GSM

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