

Title: Alarm Systems

Description of Invention

This invention is concerned with improvements relating to alarm systems, particularly such as are used to protect premises (such as homes, offices, shops and the like) against unlawful intrusion.

A conventional alarm system comprises one or more sensors located within and/or around the premises to be protected, connected either directly or by remote signalling means to a control unit. On arming the alarm system the operator has a specific period of time to vacate the premises leaving the sensors in a state of quiescence, and on entering the premises a specific period of time subsequent to initial activation to disarm the alarm system, for example by a key or by the input of a PIN number, or both. In the event that the alarm system is not disarmed during this period of time, the sensor unit generates a trigger signal which in addition to activating an alarm signal, may also initiate an alarm message to a police station or a security office, who will investigate the situation. Notwithstanding, during a further specific period of time after activation the operator may telephone a central control station and by quoting an identification code may cancel the call-out.

Unnecessary call-outs are a pain, both in that they are chargeable by the police and are a waste of police time. In particular, an unnecessary call-out may delay response to a second incident which could have serious implications.

On the other hand, it may not be desirable in general to enhance (either by length of time or by an audio/visual indication) said specific periods of time, on the grounds that such action will also alert an intruder to the fact that the alarm has been activated.

According to this invention there is provided an alarm unit for an alarm system of the kind which is responsive to a trigger signal produced in response to activation of sensing devices of the alarm system to generate an alarm signal, wherein the unit is adapted when activated to generate an audio and/or visual advisory message advising of activation of the alarm system.

The alarm signal may be an audio and/or visual signal, for example a flashing light or a loud noise, or a combination thereof, and preferably the advisory message is generated in addition to the alarm signal. However if desired the advisory message may be generated in certain circumstances (e.g. at certain times of the day) prior to the generation of the alarm signal.

Thus when the alarm system is triggered inadvertently by failure to adopt the correct procedure during activation/deactivation (arming/disarming), the user will be alerted to the fact that a trigger signal has been or is to be generated, and appropriate action may be taken. Where the trigger signal is operative to provide an immediate call out message to a central police station or other manual security unit (hereinafter referred to as "police station" for simplicity) the operator may telephone the police station within the period of time allowed and by quoting (for example) the correct security code may cancel the call out.

Alternatively where the trigger signal operates to provide a call out message to the police station after the elapse of a brief period of time, the operator may within that time complete correctly the required operation before call out is initiated.

The alarm unit need not respond in this manner to all trigger signals generated by the alarm system. Thus some of the sensors of the alarm system may be input to primary inputs of the alarm unit: these may be designated for simplicity as primary hazard sensor inputs, and will be for use by sensors covering areas most unlikely to be triggered in error. Such primary hazard sensors may for example be located at windows, or doors not normally in use for entry and exit purposes when the alarm system is active.

Other sensors of the alarm system may be input to secondary inputs of the alarm unit: these may be designated false hazard sensor inputs and will be for use by sensors covering areas most likely to be triggered in error, such as the main doors of the building, and escape doors which open only outwardly and which are signed as being for use in an emergency only.

Thus activation of a sensor input to a primary hazard input will not generate the advisory message, and a call out signal will be transmitted to the police station directly.

Conversely, activation of a false hazard sensor input will generate the advisory message, allowing an alarm signal which has been triggered in error to be dealt with in the manner set out above.

Preferably the alarm unit comprises an output associated with each false hazard input, to enable the audio/visual advisory message to be transmitted to the vicinity of the sensor connected to said input. Conveniently the leads conducting the trigger signal from the sensor to the input of the alarm unit are also utilised for delivery of the advisory message.

The alarm unit may also provide a means for transmission of the warning message which is adjacent to a control panel for the alarm system. Thus, if on leaving a building an authorised user fails to check the system prior to activation (e.g. if a door or window is open or if a person remains in the building) he will be warned that a call out message is or will be delivered to the police station, enabling him to take the appropriate remedial action.

Preferably there is provided at each false hazard sensor a communication device such as a telephone enabling a person who erroneously activates the alarm to take the appropriate action as described above. Conveniently the leads conducting the trigger signal from the sensor to the input of the alarm unit are also utilised to provide recharging power for the purpose of trickle charging (for example) a cordless telephone.

The alarm unit may be operative in the manner described above at all times whenever the alarm system of which it forms part is armed. Alternatively the unit may be so operative only during specific periods of time (conveniently variable) such as those periods when the alarm system is most likely to be actuated in error.

Thus, if desired, the alarm unit may be operative to generate the advisory message (whether as a result of actuation of any of the sensors, or as a

result of the actuation of only the false hazard sensors) during a morning period, when the alarm is likely to be disarmed by an authorised user, and during an evening period when the alarm is likely to be armed by an authorised user.

Thus preferably the unit comprises switching means which when in an operative condition (e.g. during the specified period or periods) the advisory message will be generated, and when in an in-operative condition the advisory message will not be generated.

Preferably the switching means is manually variable, whereby the intervals during which the unit is operative as distinct from the time intervals during which the unit is inoperative may be selected by the user.

Preferably the unit is adapted to be operated in response to a primary trigger signal generated by the alarm system, i.e. that signal which initiates an alarm message to the police station or a security office.

According to this invention there is also provided an alarm system comprising a plurality of sensor units, and an alarm unit of the kind set out above.

Preferably the alarm system comprises a plurality of primary sensors, which in use are connected to primary inputs of the alarm unit, and a plurality of secondary sensors, which in use are connected to secondary inputs of the alarm unit, the alarm unit operating differently dependant upon whether or not a trigger signal is generated by a primary sensor or by a secondary sensor.

Preferably the alarm unit when triggered by a trigger signal from a primary unit initiates an alarm message to a police station, and when triggered by a trigger signal from a secondary input also delivers an audio/visual advisory message to the vicinity of the secondary sensor which has been activated.

According to this invention there is also provided an alarm unit according to any one of the preceding claims comprising an output associated with some at least of the inputs, to enable the advisory message to be transmitted to the vicinity of the sensor connected to said input.

There will now be given a detailed description, to be read with reference to the accompanying drawings, of two alarm units which have been

selected for the purpose of illustrating the invention by way of example, the alarm systems of which these units form part also being illustrative of certain aspects of the invention.

In the accompanying drawings:

Figure 1 is a schematic elevation of a first embodiment of this invention; and

Figure 2 is a schematic elevation of a second embodiment of this invention.

The unit which is the first embodiment of the invention comprises a housing 6 having an input socket 8, and an internal control mechanism (not shown) connected to a timer unit and to an audio display means, a loud speaker 10 of which is shown mounted in the housing. By manipulation of control switches 12, the timer unit may be caused to adopt a plurality of operative conditions during a twenty-four hour period, the remaining time being in inoperative condition. When an input signal is applied to the socket 8 with the timer unit in operative condition, a tape recording is caused to be played, with an advisory message such as "this alarm system has been activated. To prevent call-out the central control station must be telephoned immediately, and the identification code given". In this way, when the alarm is activated inadvertently by a bona fide user of the premises, an unnecessary call-out may be prevented.

Conversely, with the timer unit in its inoperative condition, the unit will not respond in this manner to an input signal at the socket 8.

The timer unit may be set to cover periods of time when the alarm system is most likely to be armed or disarmed. Thus, if the premises are normally entered at 8.00am, the timer unit may be operated to cause the unit to become operative during the period 7.45 to 8.15am, reducing the risk of inadvertent call-out being produced during de-actuation of the alarm system. Similarly if the premises are most usually vacated at 5.30pm, the timer unit may be set to generate a second operative period, e.g. between 5.15 and 5.45pm.

In this manner, a significant reduction in undesired call-outs may be obtained without any significant impairment of the efficacy of the alarm system, as would be produced if such a unit were to be retained operative in the manner described on a continuous basis.

Whilst additional periods may be programmed into the timer unit, e.g. when the premises may be vacated during the lunchtime period, or to cause no operative periods to be generated during the weekend, such complication may not be necessary, since the fact that the unit is not in an operative condition would not prevent the alarm from being operated in the normal manner.

Whilst in the first embodiment the input socket 8 is adapted to be connected to an output of the alarm system at which the primary trigger signal is present, whereby the unit is actuated only at the point of transmission of an alarm signal to the police station or security office, if desired an input signal may be applied to the socket 8 which is produced at a different stage in the alarm response procedure, e.g. the initial trigger signal which is produced on initial activation of the alarm system.

The alarm unit which is the second embodiment of this invention comprises a housing 20 comprising a plurality of primary inputs 22, and a plurality of secondary inputs 24. Each primary input is in use connected to a sensor 26 (hereinafter referred to as a primary sensor) located at a primary hazard area, such as adjacent to windows of the building, or entrances to the building which are least likely to be used authoritatively. The secondary inputs 24 are in use connected to secondary sensors 28 which in use are located at positions where false alarm signals are most likely to be generated. If desired, sensors such as those indicated 27a, 27b, 27c, 27d may be connected to the unit 20 by a single cable 27.

On activation of any one of the sensors 26, a trigger signal is generated which is conducted to the unit 20, which causes a call out message to be delivered to the police station through an output 30, which may be radio, or telephoned link line, as may be convenient. On activation of any one of the secondary sensors 28,

a trigger signal is generated which is fed to the unit 20, which causes an audio/visual advisory message to be delivered to the vicinity of the sensor 28 by a loud speaker 32, the audio/visual signal conveniently being fed to the speaker 32 using the wires by which the trigger signal has been delivered from the sensor 28 to the unit 20.

In this manner, as may be determined by the set up of the unit 20, an audio signal (for example) may be delivered to the speaker 32 advising the person actuating the sensor 28 that a trigger signal has been generated, and that appropriate action should be taken. If the unit is so set that a call out signal is automatically delivered to the police station, the person may be advised to utilise an adjacent telephone 34 to call the police station to cancel the call out, by referring to the password known only to authorised users. Alternatively if the call out message is one which is delayed, the appropriate corrective action may be taken. Conveniently the telephones 34 are cordless telephones, and are conveniently connected to the associated line 24a, 24b, 24c for the purpose of delivering low voltage thereto, for maintenance of the batteries of the telephones in fully charged condition.

Alternatively or in addition, the invention may be utilised in conjunction with a security bolt of the kind utilised to protect certain doors through which general passage is undesired, but which are required to be capable of being used in an emergency. Thus a security bolt of this kind may be connected (as sensor) to the unit 20, and if opened properly by using the correct operating procedure, a trigger signal is generated which produces an audio/visual advisory message to warn the user that the door in question is an alarmed door, and should not be used, other than in an emergency. Conversely, if such a bolt is opened other than by the use of the correct procedure, a call-out signal to the local police station may be generated.

If desired the unit which is the second embodiment of this invention may be provided with the timing control described above in relation to the first embodiment of the invention.

Whilst the invention, has been described above in relation to the provision of an alarm unit for connection to an existing alarm system, it will of course be appreciated that the invention may be put into practice by incorporating such a unit into an alarm system ab initio, either as a separately-identifiable operative mechanism, or integrally so that the functions of the unit are effected alongside other functions of the alarm system.

If desired the alarm unit may comprise internal means (not shown) which may be operative to test whether or not the system is operating correctly, and if a fault is detected during a period when the alarm system is armed, will treat this as an emergency, and transmit the emergency call out message to the police station.

Preferably the alarm unit is also operative under such circumstances to transmit the advisory message conveniently to the loud speaker 36, to advise that a fault has been located, to allow a person in authority who may be present to abort the call out, but to take remedial action to correct the fault.

Thus, the alarm unit, which is the second embodiment of this invention, and the alarm system of which the unit forms part, is capable of operating at four basic modes or levels, as follows:

- a) during normal working hours the alarm unit is disarmed and no alarms are on, but the alarm unit may, if desired, advise of a fault in the system through the loudspeaker 36 without call-out to the police station;
- b) during morning and evening periods, when the alarm system is armed and disarmed, and when the system is most likely to be triggered by a false alarm, the loudspeakers will advise by audio and/or visual means that the system has been triggered, and gives a period of time for remedial action to be taken, prior to the generation of a call-out signal to the police station. On exit, the unit will look for the system being "set" within a pre-set period of typically two minutes, and failure to set correctly during this period will generate the advisory message for the correct action to be taken, followed by the generation of a call-out signal

to the police station, if remedial action is not taken within a further (smaller) period of time;

- c) during other periods of time, for example during the night, the advisory message will be generated if anyone of the secondary sensors is triggered, allowing a person to telephone the police station during a period of typically 30 seconds, to abort the call-out by the utilisation of a correct code word;
- d) if any one of the primary sensors is activated, no advisory message will be given, and the signal to the police station will be generated.

Whilst the invention has been described as part of a system in which trigger signals are transmitted by conductive wires, the invention may of course be utilised in a system in which the trigger signal is transmitted (e.g.) by radio.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.



CLAIMS

1. An alarm unit for an alarm system of the kind which is responsive to a trigger signal produced in response to activation of sensing devices of the alarm system to generate an alarm signal, wherein the unit is adapted when activated to generate an audio and/or visual advisory message advising of activation of the alarm system.
2. An alarm unit according to Claim 1 wherein said advisory message is generated in addition to the alarm signal which may be an audio/visual alarm signal and/or a call-out signal delivered to a central receiving station.
3. An alarm unit according to Claim 1 or Claim 2 wherein the unit is so responsive to some only of the trigger signals generated by the alarm system, the unit comprising primary sensor inputs, and secondary sensor inputs, wherein activation of the unit by a signal applied to a primary input will not generate the advisory message, whilst activation of the unit by a signal applied to a secondary input will generate the advisory message.
4. An alarm unit according to any one of the preceding claims comprising an output associated with some at least of the inputs, to enable the advisory message to be transmitted to the vicinity of the sensor connected to said input.
5. An alarm unit according to Claim 4 comprising an advisory outlet adjacent to a control panel for the alarm system.
6. An alarm unit according to any one of the preceding claims wherein the transmission pathways conducting the trigger signal from the sensor to the input of the alarm unit are also utilised for transmission of a signal for the delivery of the advisory message.





7. An alarm unit according to any one of the preceding claims comprising a communication device associated with some at least of the sensors.
8. An alarm unit according to Claim 7 wherein the communication device is a cordless telephone, charging current for the telephone being conducted thereto using the transmission pathways or electric cables which conduct the trigger signal from the sensor to the input of the alarm unit.
9. An alarm unit according to any one of the preceding claims which is so operative to produce an advisory message at all times when the alarm system of which it forms part is armed.
10. An alarm unit according to any one of Claims 1 to 8 which is so operative to produce an advisory message during specific periods of time within the time span during which the alarm system of which the unit forms part is armed, the unit comprising switching means whereby the intervals during which the unit is so operative as distinct from the intervals during which the unit is so inoperative may be selected by the user.
11. An alarm system comprising a plurality of sensor units, and an alarm unit according to any one of Claims 1 to 10.
12. An alarm system according to Claim 11 comprising a plurality of primary sensors and a plurality of secondary sensors, the alarm unit operating differently dependent upon whether or not the trigger signal is generated by a primary sensor or by a secondary sensor.
13. An alarm system according to Claim 12 wherein the alarm unit when triggered by a trigger signal from a primary unit is operative to deliver a call-out signal to a central receiving station, and when triggered by a trigger signal from



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a secondary input also delivers an audio/visual advisory message to the vicinity of the secondary sensor which has been activated.

14. An alarm system comprising
- a) a control unit;
 - b) a plurality of sensors operative on activation to generate a trigger signal and apply the trigger signal to the control unit;
 - c) the control unit being operative on reception of a trigger signal to generate an alarm signal and/or to deliver a call-out signal to a central receiving station,

characterised in that the control unit comprises a means which is also operative on the reception of a trigger signal to generate an audible/visual advisory message advising that actuation of the alarm system has taken place, said advisory message being delivered to the vicinity of the sensor from which the trigger signal is produced.

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