means so that the duration of the recovery transmission is decreased.

In addition to the PIRD 128, the detector unit 124 comprises a number of sub-stations or slave units 158. In this embodiment, the slave units are a door switch 158*a* (which will indicate when a door in the zone being patrolled by the unit 124 is opened), a panic button 158*b* (which may be located on the unit 124 or at a position remote therefrom), a tamper switch 158*c* (which faults when an attempt is made to tamper with the unit 124), a window vibrator switch 158*d*, an isolate switch 158*e* (which is normally manually operable to isolate either the entire unit 124 or one or more of the slave units and/or the PIRD). Facilities for a spare slave unit 158*f* is also provided.

The slave units 158 are connected respectively to ICHLs 214*a* to 214*f* through preconditioners 236 that are used to shape and constrain the incoming signal. Two of these preconditioners will be described more fully below.

Reference is now made to FIG. 5 in which the circuit diagram of battery selector and cross switch (BSCS) circuit 136 is illustrated. Power from the main battery 132*a* flows through resistor R2 and tends to turn on transistor T2 which via resistor R1, turns on transistor T1. Thus the main battery power is fed via a transistor T_1 and diode DD_1 to the system at Point P, it being held at the appropriate voltage set by the ratio of the resistors R_3, R_5 and R_6. A capacitor C_1 is provided at this point to minimise oscillations. In use, the transistor T3 begins to turn on when the appropriate voltage is reached, shunting current away from transistors T_2 and thus T1. With a suitably high value for the resistor R_2, as little as two micro amps will be drawn from the main battery 132*a* by the regulator. The choice of the resistors R_3, R_4, R_5 and R_6 is such that the regulated voltage at P is for example about 5.1 volts. The regulator circuit for the second battery 132*b* is much the same as that for main battery 132*a* with a high value resistor R_7 connected to the collector of a shunt transistor T_6 that shunts current away from the transistors T_5 and thus T_4 when the regulated voltage at P_1 approaches the voltage set by the resistors R_3, R_4 and R12. This regulated voltage would be lower than the voltage present by extra divided resistors R_5 and R_6 and thus while the main regulator is regulating, the second regulator would be shut off and no current would be drawn by the system from the second battery 132*b*.

The second battery regulator is also connected upstream of the diode DD_2 to the base of transistor T_7 between resistors R9 and R11. The collector of the transistor T_7 is connected by line L_2 to the terminal D_2 of the convertor 204 which causes the transmitter 130 to send one of two signals. The first signal (which is in effect a default signal) is sent when the the second regulator is shut down, i.e. when power is being supplied by the first battery 132*a* and the second signal is sent when power is being supplied by the second battery 132*b*.

When the main battery 132*a* loses power, the voltage at point P/ will drop. When this is below the setting for the second regulator, then the second regulator will begin to supply power to become effective and the system from battery 132*b*. Thus there will an effective switch over to the second battery 132*b* which will now supplement or replace the main battery 132*a* depending upon how far the main battery has been drained.

A typical preconditioner 236 is shown in FIG. 6. This preconditioner 236 is connected to a normally closed external input 158. A capacitor C_3 is connected across the terminals of the input 158. The live terminal is connected through a high value resistor R_{13} to the power source and via another resistor R_{14} to the appropriate terminal D_n of the convertor 204 through the ICHL 214 (which is not shown in FIG. 6). Thus (a) only a very low amperage is drawn by the input 234 and (b) the signal from the input is shaped and constrained thereby protecting the convertor from spikes and other high voltages.

Because the signal from a window vibrator 158*d* would be extremely short, a preconditioner 236*d* as illustrated in FIG. 7 is used. This preconditioner is similar to that disclosed in FIG. 6 but further comprises a transistor T_8 the base of which is connected to the resistor R_{14} and to earth through an extra smoothing capacitor C_4 and a protective diode DD_3. This transistor T8 is connected to the terminal D_7 of the convertor 204. The transistor T_8 detects that there has been a signal from the vibrator 158*d* and increases the amplitude and period of the signal.

As mentioned above, the gate 222 arranges the operation of the transmitter 130 so that it emits data trains of varying amplitude and period. Reference is now made to FIG. 8 wherein is shown the timing diagram for such data trains. As can be seen, line DT1 indicates the data train which is emitted when the panic button and/or the tamper switch 234*b* and 234*c* detect a fault, line DT2 shows the data train emitted from the PIRD 128 and DT3 the data train emitted from a a door or window switches and DT4 the data train when both the PIRD and a door or window switch detects a fault. Line DT5 illustrates the data train for the half hourly signal and DT6 the data train for a recovery signal. It will be noted that the spacings between the pulses on the various lines differ. This is necessary not only to discriminate between the causes of the various signals but also to help prevent overlap between the signals that are emitted by different detector units. The likelihood of the signals from two detector units being emitted at the same time is small but in the unlikely event of this happening then, unless the identical inputs are faulting on both detector units, the signals will soon move out of phase and will be recognisable by the MCU.

In FIG. 9 there is shown an expansion of the status time slots. As can be seen from line TS2 the time slot comprises a start signal 250, a bit 252 and a stop bit 254. The space between the bits 252 and 254 being divided into two sections "D" and "C", the former dealing with the data signals (i.e. the signal to the appropriate terminal D_n of the convertor 204 and therefore the current status) and the latter with the code introduced by the code switches 206. Thus as an example as shown on line TS3 there can be seen pulses 264, 266 and 268 in section "D" indicating respectively that the second battery 132*b* is being used, the door is open and the PIRD and door have been isolated. Furthermore in section "C" there are pulses 270, 272 and 274 indicating a binary code 00010011101100 i.e. decimal code 1260.

It will be seen therefore that each data train within a time slot indentifies not only the detector unit sending the signal but also the particular slave or substation that is reporting a fault. The display device on the MCU is arranged to display both such sets of information so that a person examining the display device can identify not only the zone in which an untoward event has taken place but what event took place and the precise location thereof.

It will also be seen that the battery life enhancing device ("BLEM") will be constituted by the units **212**, **220**, **222**, **224** and **226**. Because of the attributes of these parts which are discussed above, and because of the use of the high value resistors discussed above, the drain on the battery will be very low so that the life of the main battery and of the second battery will be considerable.

It will be seen that as many zones as desired can be protected by the system thus described. There will be a detector unit **124** for each zone and the zones can be quite small e.g. a room. The signals from all the detector units can be received by a single MCU. The transmitter of the detector units and the receiver of the MCU will be such that the MCU may receive the signals anywhere within the space being protected. When the space is a building containing much structural steelwork which would shield the signals, e.g. a multi story building of reinforced concrete, repeaters may be provided at suitable locations e.g. at a lift shaft so that the signals may pass to the MCU without interference.

As mentioned above, the above are cordless systems. Thus the detector units can easily be installed by relatively unskilled staff. Furthermore, the location of the detector units can be chosen for optimum operation of the units and not be constrained by the requirements of running wires to the unit.

It will also be appreciated that normally only the detector will be drawing power, the transmitter being actuated only when one of the detectors gives a fault signal or the hourly signal is being emitted. Consequently only very little power is drawn from the batteries which therefore has a very long active life in practice. Furthermore as mentioned above, the person controlling the area will have two visual signals when a first battery is no longer operating (i.e. one at the unit housing and one at the MCU). Thus the possibility of the detector unit going out of operation due to exhaustion of both batteries will be small and can only occur due to gross negligence of the person in control. This is particularly so as the life of the batteries **132** is normally of the order of nine months.

Furthermore if desired when the light detector is used, the system will be operating only when the area controlled is unlikely to be patrolled or occupied, i.e. when the light is not sufficient in the area to enable work to take place therein.

Many of the parts as described herein will not be physically separate parts but will in fact be constituted by portions of integrated circuits.

The invention is not limited to the precise constructional details hereinbefore described or illustrated in the drawings. For example different numbers of code switches may be provided, the arrangement of the status time slots and the data trains may be different. Other that possible modifications will be apparent to those skilled in the art.

Instead of the detector being a passive infrared detector, it may be any other suitable detecting device, e.g. a smoke detector, a heat detector, a door switch, etc.

In a further modification of the invention, the detector units may be of the kind which detect signals from a small personell carried transmitter (SPCT). In this arrangement, all personell (including visitors) will be obliged to carry an SPCT in a surveyed area. The MCU may be a computer which will keep track of the movements of personell carrying SPCTS both during the employment period or at any particular moment so that their whereabouts can be monitored and they can easily be reached. Thus for example messages can be passed with ease. Access to security areas can also be prevented. The detector units may control doors or locks to security areas to open, lock or shut such doors depending upon the signal given off by the SPCT. This system could also be wired instead of being cordless.

I claim:

1. A detector unit comprising:

(a) a detector for developing a detector signal when actuated,

(b) signalling means in the form of a radio frequency transmitter that is connected to the detector and that transmits said detector signal when the detector is actuated,

(c) battery means for retaining a battery cell to power the detector and the transmitter, the battery means comprising

(c.1) two battery cells connected by means to prevent current from flowing from either battery cell to the other, a first only of said battery cells being normally connected to the detector and the transmitter,

(c.2) power control means actuable when the power of the said first cell drops below a certain minimum, and

(c.3) switch means operated by the power control means when it is actuated to connect the second cell to the detector and the transmitter,

(d) timing means for resetting a given time period in response to each successive detector signal, and

(e) means connected to said detector and to said timing means for preventing a said detector signal from being emitted by said transmitter after a first time until after said timing means has received no detector signal for said given time period.

2. A detector unit as claimed in claim **1** further comprising warning indicator means which is operated when the said second cell is connected to the detector and the transmitter.

3. A detector unit as claimed in claim **2** wherein the indicator means is a light.

4. A detector unit as claimed in claim **1** wherein the power control means includes signal emission means connected to the transmitter to operate the transmitter to give a signal that is receivable by a main control unit so that the latter can provide an indication that the power of the said first cell has dropped below the aforesaid minimum.

5. A detector unit as claimed in claim **1** further comprising a battery life enhancing means (hereinafter called a "BLEM") to limit the amount of time that the unit is operating.

6. A detector unit as claimed in claim **5** wherein the BLEM comprises a light sensitive means to deactivate the unit when it detects a certain amount of light.

7. A detector unit as claimed in claim **6** further comprising an override switch provided to override the action of the light sensitive means.

8. A detector unit as claimed in claim **6** wherein the BLEM comprises a timer to control the length (in time) of any detector signal emitted by the transmitter.

9. A detector unit as claimed in claim **1** wherein the detector is selected from the group consisting of passive infrared detectors, sonic detectors, micro-switches, vibrator window switches, smoke detectors, door switches, tamper switches, pressure pad switches, and remote key switches.

10. The combination of a main control unit (hereinafter called a "MCU") and a plurality of detector units each as claimed in claim **1**, the MCU comprising a receiver to receive a detector signal from a transmitter of any said detector unit and a signal emitter to emit a signal when a detector signal is received by the receiver.

11. The combination as in claim **10** wherein each detector unit includes signal emission means connected to the respective transmitter for transmitting a power drop signal indicating that the power of the respective first cell has dropped below said minimum and wherein the MCU includes means for detecting said power drop signal and providing an indication of its receipt.

12. The combination as in claim **11** wherein each detector unit has a warning indicator means which is operated when the respective second cell is connected to the respective detector and transmitter.

13. The combination of a main control unit (hereinafter called an "MCU") and a plurality of detector units, each detector unit comprising:

(a) a detector for developing a detector signal when actuated,

(b) signalling means in the form of a radio frequency transmitter that is connected to the detector and that transmits a detector signal when the detector is actuated, and

(c) battery means for retaining a battery cell to power the detector and the transmitter, the battery means comprising:

(c.1) two battery cells of which a first only is normally connected to the detector and the transmitter,

(c.2) power control means actuable when the power of the said first cell drops below a certain minimum, and

(c.3) switch means operated by the power control means when it is actuated to connect the second cell to the detector and the transmitter, and

(d) signal emission means connected to the transmitter for transmitting a power drop signal to said MCU to indicate that the power of the first cell has dropped below said minimum,

said MCU comprising:

(e) means for receiving a detector signal and a power drop signal from any of said detector units,

(f) means for indicating when a detector signal is received by the receiving means and from which of said detector units, and

(g) means for indicating when a power drop signal is received and from which of said detector units.

14. A detector unit comprising:

a detector for developing a detector signal when actuated,

signalling means including a radio frequency transmitter connected to the detector for transmitting said detector signal when the detector is actuated,

timing means for resetting a given time period in response to each successive detector signal received, and

means connected to said detector and to said timing means for preventing a said detector signal from being emitted by said transmitter after a first time until after said timing means has received no detector signal for said given time period.

15. A detector unit comprising:

a detector for developing a detector signal when actuated,

signalling means including a radio frequency transmitter connected to the detector for transmitting said detector signal when the detector is actuated, and

means connected to said detector for preventing said detector signal from being emitted by said transmitter after a first time for at least a given period of time regardless of the number of times the detector is actuated during that time period,

wherein said preventing means includes means for holding said detector signal after once passing said detector signal to said transmitter and means responsive to said detector signal for clearing said holding signal no sooner than said given period of time.

16. A detector unit as in claim **15** wherein said clearing means is reset to said given period of time for each of the times that said detector is actuated.

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