

This invention is directed to the problem of unauthorised use of utilities such as electricity, gas or water in vacant premises. Such use may occur when a house is sold or a tenant moves out of a flat. While applicable to most utilities, the invention will be described in terms of the electricity supply to a flat.

The vacating occupier should notify the supply authority which arranges to read the meter to prepare a final account. If use is made of the electricity supply after that time but before the new occupier moves in, the new occupier may be required to pay for electricity he did not use.

One method of overcoming this is to disconnect the supply when the flat is vacated and to reconnect it when the new occupant moves in. However, this is costly and inconvenient as it requires two visits by the linesman.

In our earlier Australian Patent Application No. 586716 we disclosed a utility management system in which a utility control centre is connected to the consumer's meters via the telephone network. The control centre is able to read the meters and send command signals to the consumer's premises, e.g. to perform off-peak switching. In a preferred embodiment the meter readings are stored in electronic memories under the control of a micro/processor.

This invention proposes a system which offers a simpler and more convenient solution to the problem of unauthorised use.

This specification discloses a system for monitoring use of a utility at a consumer's premises, the system comprising monitor means to detect use of the utility, a first register to store an indicator signal indicating whether or not use of the utility at the consumer's premises is authorised, an unauthorised use signal generating means responsive to the monitor output and the contents of the register to generate an unauthorised use signal which will be transmitted to a central control unit when the monitor output indicates use of the utility and the first register contains an indicator signal indicating that use is not authorised.

In a preferred embodiment there is disclosed a utility management system comprising a central control unit connected to the meters of each of a plurality of consumers via a communication network, wherein at each subscriber's premises there are transponder means responsive to a command received over the communication network to cause the meter reading to be transmitted to the central control unit. Wherein the system includes electronic storage means to store individual readings from each respective consumer's meter. The system further including means to store a signal indicative of whether or not the consumption is authorised, means to detect consumption on a consumer's meter (e.g. by comparing successive readings from each consumer's meter or by counting pulses from the meter), and alarm means responsive to the detection means to produce an alarm signal when unauthorised use occurs.

The invention is more fully described in relation to the accompanying drawing in which the central control unit (CCU)1 is shown connected to a communications network 2 through a suitable communications interface 3. A

plurality of utility management units (UMU)4, one at each consumer's premises, is connected to the communications network 2, e.g. by individual phone lines 5. Only one UMU 4 is shown.

In this system the utility provider can interrogate each UMU 4 from the CCU1 via the network 2, or the UMU can send a message to CCU1 via communications network 2, at any time. The UMU 4 provides data indicating the contents of one or more consumption registers, and the data from each UMU is stored in an associated store at the CCU. If the first occupier has notified the utility provider that he has vacated the premises, this information is fed into a corresponding store in the CCU via terminal 6 to indicate that further consumption from that UMU is unauthorised. The UMU continually monitors consumption via an external or internal meter and the CCU regularly monitors the UMU (e.g. one per day). If the consumption exceeds a known threshold, the CCU provides an alarm signal to drive alarm unit 7. The alarm signal may alternatively appear as part of a screen display or printout.

On receipt of the alarm indication the utility provider can initiate inquiries (e.g. via the phone) to alert the new occupier to his obligation to open an account or, failing a satisfactory response, can initiate a shutdown of the supply either via the CCU to cause a relay controlled by the UMU to disconnect the consumer, or by sending a linesman to disconnect the supply.

When a new tenant notifies the provider that he has moved in, the authorisation flag can be reset. Thus according to this method it is only necessary to disconnect and reconnect when illegal use is indicated.

In an alternative embodiment the authorisation flag and comparison may be incorporated in the UMU, with the authorisation flag set by instruction from the CCU, and the UMU processor sending the alarm signal to the CCU via network 2. This has the advantage of reducing communications traffic at the CCU, since many UMUs do not need the meter read on a daily basis, and reduces the time to detect theft, since the UMU can typically report an alarm in 5 minutes, while the CCU would only check at infrequent intervals e.g. daily.

In one embodiment, the alarm is raised when energy consumed exceeds a threshold. This embodiment may be implemented by clearing a counter when the alarm is first enabled. The counter is incremented for each unit of consumption and, when the threshold is exceeded, the alarm is raised. In a further embodiment, the alarm is raised when power consumption exceeds a threshold (e.g. the meter itself or the wiring may consume a small amount of power). In this embodiment the counter is cleared on a regular basis to prevent false alarms due to noise pulses etc.

The system is quite flexible and may be used to monitor supply on several circuits at a consumer's premises. A scheme of off-peak power is provided by certain electricity utilities, where thermal storage devices may be permitted power at certain times of the day, at a reduced cost. For instance, off-peak hot water may be registered in a first set of registers and the remaining circuits could be recorded in a second set of registers, provided there is a separate meter for each set of circuits. The consumer's circuits could be further subdivided at the cost of additional meters and registers so consumption from specific power outlets would be monitored.

In a further embodiment consumption at different times of day could be monitored by the use of time of day registers. Thus, by flagging time of day registers, it is possible to detect unauthorised use, e.g. while the occupier is absent, or while the off-peak supply should be off. This could then be used to trigger a burglar alarm.

CLAIMS

1. A system (4) for monitoring use of a utility at a consumer's premises, the system comprising monitor means to detect use of the utility, characterised in that a first register store an indicator signal indicating whether or not use of the utility at the consumer's premises is authorised, an unauthorised use signal generating means responsive to the monitor output and the contents of the register to generate an unauthorised use signal which will be transmitted to a central control unit (1) when the monitor output indicates use of the utility and the first register contains an indicator signal indicating that use is not authorised.
2. A system as claimed in claim 1 adapted to detect unauthorised use at any of a plurality of subscriber premises, wherein at each of the subscriber's premises a subscriber unit is located, each subscriber unit being connected to a central control unit via communications means, each subscriber unit including a said monitor means and a communication interface to permit the subscriber unit to transmit information to the central control unit.
3. A system as claimed in claim 2 wherein the subscriber unit transmits the output of its monitor means to the central control unit.



4. A system as claimed in claim 2 wherein a said first register and a said signal generating means are included in each subscriber unit and the subscriber unit transmits an unauthorised use signal to the central control unit when unauthorised use has occurred.

5. A system as claimed in claim 4 wherein the contents of the first register are controllable by the central control unit.

6. A system as claimed in any one of claims 2, 3, 4 or 5 including utility cut-off means at each subscriber's premises.

7. A system as claimed in claim 6 wherein each subscriber unit includes control means responsive to a cut-off command received from the central control to cause the cut-off means to cut off the supply of the utility to the consumer's premises.

8. A system as claimed in claim 7 wherein the control means are responsive to a reconnect signal from the central control unit to cause the cut-off means to reconnect the utility supply to the consumer's premises.

9. A system as claimed in claim 8 wherein the cut-off means are controlled by the central control unit to implement an off-peak supply control system.

10. A system as claimed in any one of claims 1 to 9 including memory means storing a signal representing a threshold consumption level and comparator means connected to the output of the monitor means and the memory means, whereby use of the utility is indicated when the use detected by the monitor means exceeds the threshold.



11. A method of monitoring use of one or a plurality of utilities, including the steps of monitoring consumption of the or each utility, characterised in that providing an authorisation signal which indicates whether or not consumption is authorised, and generating an unauthorised use signal which will be transmitted to a central control unit (1) when unauthorised consumption has occurred.

12. A method as claimed in claim 11, including the step of comparing the rate of consumption with a threshold value and generating an unauthorised use signal only if the unauthorised consumption exceeds the threshold value.

