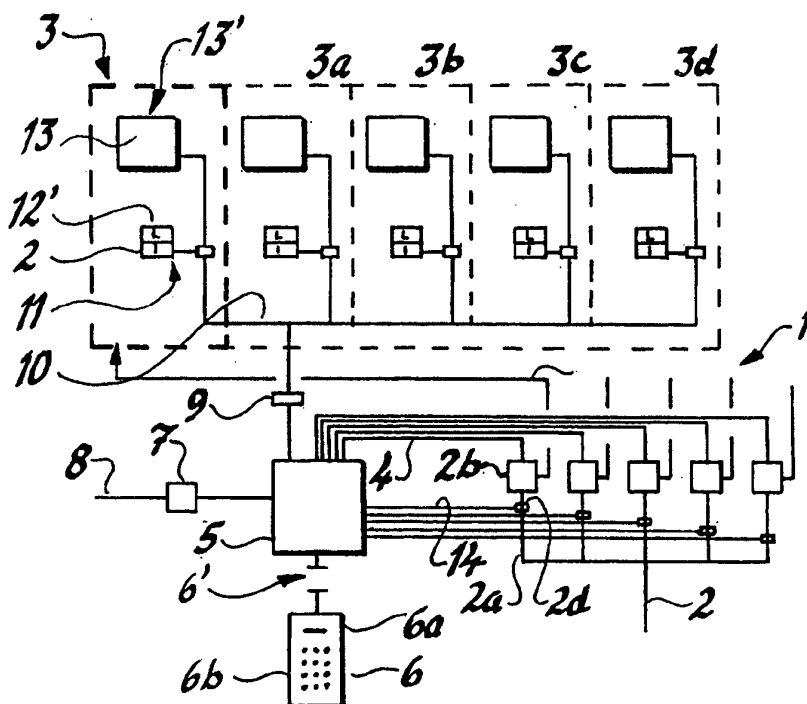




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(54) Title: ENERGY DISTRIBUTING SYSTEM



(57) Abstract

The present invention concerns an energy distribution system with one or more energy suppliers and several energy consumers (3), where each consumer is assigned energy measuring equipment (2). The instantaneous value of each system-related energy measuring equipment can be read by a computer. Each consumer (3) is provided with a terminal (11) connected to the computer (5), at which consumer (3) can activate the computer (5) via the terminal to show the relevant consumption during a selected period of time or equivalent.

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Title of Invention.

Energy Distributing System

Technical Field.

The present invention refers to an energy distribution system, and in particular a system of this type to which one or more energy suppliers are connected, as are also several energy consumers, some of whom may be connected and linked to one energy supplier, while others may be connected to another energy supplier, and so on.

The system is also based on each consumer being assigned equipment (meters) to measure his/her own energy consumption.

Even though the present invention can generally be regarded as covering an energy distribution system, the following description will exemplify the principles of the invention by covering an electrical energy (kWh) distribution system.

Description of the Prior Art.

Energy distribution systems, and in particular electrical energy distribution systems as mentioned in the introduction, are already known in several different forms.

In the case of systems such as this, the energy supplier demands payment from each consumer (or groups of consumers) for the energy which is supplied and consumed. This is normally done by taking a reading from the energy consumption measuring equipment (meter) belonging to each consumer, and then sending to each of these consumers a bill corresponding to the amount of energy consumed, stating the defined conditions of payment, and with a system of fixed charges – the whole or part of the charge.

A system of charging such as this means that the supplier has to wait a long time before receiving payment, and this in turn means that the energy supplier is burdened with the costs associated with reading off the energy consumption of each consumer, registering reported changes of address, shutting off and opening up the energy supply after failure of payment, or payment – a cost which the supplier has to spread among all consumers.

Measures have also been adopted to improve the required system of charging, and also to make it more effective, in order to comply on the one hand with a request from the suppliers to obtain payment for the energy supplied, such as electrical energy, to each of the consumers at the lowest possible cost, and on the other hand to be able to comply with a request from consumers to be able to match the charges to the relevant energy consumption in a more direct way.

One system of charging that has been put into use as regards distribution of electrical energy, and which can be regarded as a balanced compromise, involves allowing authorized personnel to read off the consumption of electrical energy from the metering equipment once a year, and feed the subscriber's annual consumption reading into a computerized charging system, which calculates a future annual consumption on the basis of the previous years' annual consumption. It will then be possible to make a charge based on a calculated (proportioned) energy consumption at pre-determined intervals, such as 2, 3 or 4 months.

Once a year, after reading off the consumption, a final bill is made out, taking into account the final and actual annual consumption.

A system of charging such as this, however, requires that every time a subscriber or an electrical energy consumer changes address, written notification must be sent to the energy supplier, who once again has to send personnel to read off the consumption from the energy consumption meter, or accept that the subscriber who has moved is allowed to read off the consumption from the meter himself/herself, and on the basis of this reading draw up a finally adjusted bill.

Practical experiences show that allowing subscribers to read off the consumption themselves may cause problems each time a subscriber who moves to a new address does not approve the reading made by the subscriber who lived at that address previously.

The present system also yields major disadvantages in as much as the ability of subscribers to pay is often not very good. The following procedure applies when there is failure of payment: A reminder is sent out seven days after the date when payment of the bill was due. After another 20 days, a debt collection demand is sent. If payment is not received ten days after the demand for debt collection is sent out, the electrical energy supply is shut off. In the case of bankruptcy, the electrical energy supplier loses the entire amount on the bill together with payment for an additional six weeks supply of electrical energy. The procedure for opening up a supply of energy also requires personnel resources.

As the consumption is read off only once a year, any faults in the meter will be detected only on this occasion.

Practical experiences from a system of charging such as this show that many consumers complain about the bills which they have received. Subscribers who have electrical heating of homes have well-founded reasons to complain often, as a proportioned calculated consumption and distribution over the various seasons of the year as described above cannot make the necessary consideration to the temperature variations during the year, and this means that some charges, which apply to the warmer periods of the year, will be regarded as being unrealistically high.

The need for a new system of charging, which can take the requests of suppliers into consideration to a greater extent, and the requests of consumers for better insight into the relevant consumption, is therefore great.

Furthermore, if you take into account some instructions, given in accordance with the present invention, you can establish that there has been previous knowledge of various advance purchase systems, where an electrical energy consumer can pay in advance, partly for the rental of a meter, and partly for the amount of electrical energy consumed.

Examples of the earlier technical standpoint in this particular field are in the form of coin telephones, and by coin slots and/or note feed equipment rendering vacuum cleaners, photocopiers and other similar equipment active.

There are also parking systems which are based on the principle of advance purchase.

Summary of the Present Invention.

TECHNICAL PROBLEMS

Taking into consideration the earlier technical standpoint, such as described above, it ought to be regarded as a technical problem in being able to offer a system that functions for charging for energy consumption, and which can suitably be based on the principle of advance purchase, and which would reduce considerably, and even eliminate, the losses which an energy supplier can suffer from in the case of bankruptcies, and also reduce and even eliminate the interest losses which are associated with the fact that each payment relating to a proportioned or actual energy consumption is made after supply.

It should be regarded as being a technical problem to be able to match the system of charging and have control over relevant consumption, so that it matches well with a price controlled and deregulated market, and thereby create the prerequisites for registering various amounts of energy supply during various periods without any manual reading, which will offer the possibility of being able to change and choose various electrical energy suppliers in a flexible way.

It must also be regarded as being a technical problem to be able to offer an energy distribution system which requires few personnel resources, and where the discontentment of consumers can be eliminated entirely by means of a calculated and proportioned system of charging.

It must also be regarded as being a technical problem to be able to create by simple means prerequisites which enable each energy consumer, and preferably each subscriber who consumes electrical energy within an electrical energy distribution system, to receive instantaneous information on each occasion about relevant consumption, and/or information about remaining energy output which is equivalent to an advance payment made earlier.

It must also be regarded as being a technical problem to be able to see the advantages of using such an energy distribution system to allow each consumer to be provided with a terminal connected to a computer, and also preferably a display screen from which the consumer can, via the terminal and possibly a personal code, activate the computer to get visual information about relevant consumption from the display screen or similar facility. Visual information such as this may include information about the amount of energy consumed, calculated time remaining, with the same energy consumption, before the advance purchase has been consumed or similar, as well as a catalogue showing the energy consumption of the subscriber, also including advice to the subscriber.

It ought also to be considered a technical problem to see the advantages of providing each consumer with the possibility of paying an amount of money to the supplier fixed by the consumer himself via an advance purchase system, and this amount will represent a certain fixed charge, such as a charge depending on a particular amount of energy output and/or a particular amount of energy consumption, and that the afore-mentioned display screen can show instantaneously the extent of the non-consumed deposit.

It is also a technical problem to be able to see the advantages which will be offered with a de-regulated electrical energy market, which will see the resulting competition making it necessary to have individual charges, which can be implemented easily in this system.

It is also a technical problem to see the importance of, and simplicity in, allowing each energy measuring equipment to be provided with or be subordinate to a contact connected to the current power supply circuit, which at a particular amount of energy consumed is activated by the computer to break the power supply. The amount of energy consumed need not be adapted directly to the latest amount of money paid, but offered here is the opportunity for the supplier to make use of the adapted credit levels.

It also ought to be considered a technical problem to be able to see the degree of simplification to be achieved by allowing a number of consumers to be coordinated with and connected to one and the same computer, which is linked to each of the energy measuring equipment assigned by the indicated consumers.

It also ought to be considered a technical problem to be able to see the importance of, and simplicity in, making use of a common link for all consumers, preferably a link in a home, such as a house, an apartment in a block of flats, a cable already installed, such as a telephone cable, or rather a television cable, matched to transmit individual information from each consumer to the afore-mentioned computer, and vice versa.

It must also be regarded as being a technical problem to be able to see the degree of simplification associated with being able to be connected with the afore-mentioned computer via a link, preferably a telephone cable, but also the energy supplier's own cables, such as electric cables, by using signal transmitting messages (overtones), or alternatively allowing each operator to be connected via terminal equipment assigned by the operator, in order to evaluate instantaneously the status in the computer, and to control the functions of the computer.

There is also a technical problem in being able to see the advantages of permitting information stored in the computer to be made use of by each supplier, and thereby via coding being able to evaluate each consumer's remaining amount of energy, permitted by the advance purchase, and, depending on a calculated energy output, being able to notify each consumer a calculated date when the energy output, based on the advance purchase, will be consumed, and that a new advance purchase should be considered.

The supplier can also notify the calculated date when the supply of energy can be expected to be concluded.

SOLUTION

In order to solve one or more of the afore-mentioned technical problems, the present solution assigns an energy distribution system with one or more energy suppliers and several energy consumers, and where each consumer is assigned his/her own energy measuring equipment (meter).

With a system such as this, the present invention assigns that the instantaneous value of each system related energy measuring equipment can be read off from a computer, that each consumer is provided with a terminal connected to the computer and preferably a display screen (such as a television set), at which each consumer is able via the terminal and preferably a code to activate the computer in order to show the relevant consumption during a selected period or equivalent via a display screen or in any other way.

As with the proposed forms of design, which are within the framework of the present invention, it is assigned that each consumer is to be able to pay a fixed charge via an advance purchase system, such as a certain power output etc. and/or a certain amount of energy consumption, and that the afore-mentioned display screen can show non-consumed deposit and equivalent.

Furthermore, it is assigned that each energy measuring meter is to be provided with a contact connected to the power supply circuit, which at the consumed amount of energy is activated by the computer to brake the power supply.

Furthermore, a number of consumers are assigned to be linked to one and the same computer, which is connected to each of the energy measuring meters assigned to the consumer.

Furthermore, a joint initial connection for all consumers is assigned, such as an aerial cable adapted to receive television signals, and adapted to be able to transmit individual information from each consumer to the mentioned computer, and vice versa. Via a second connection, such as a telephone cable, connected to the computer or the energy supplier's own electrical cables, by using overtones, to allow each supplier to be connected to the computer.

Furthermore, it is assigned that each consumer's remaining amount of energy, permitted by the advance purchase, is able to be established and readable, and that with a predetermined amount of residual energy be able to calculate the final date, which is notified to the consumer by the supplier.

ADVANTAGES

The principal advantages that can be regarded as being characteristic of an energy distribution system, especially an electrical energy distribution system, in accordance with the present invention, and especially if the system also utilizes an advance purchase system, are that it is possible to create the necessary prerequisites for the electrical energy supplier to reduce the losses associated with bankruptcy and equivalent situations, as well as interest loans, at the same time as the personnel resources can be reduced, and for each consumer the possibility of being able to adapt the payments is made better to the amount of electrical energy consumed.

The main characteristic of an energy distribution system, in accordance with the present invention, is given in the characteristic part of the subsequent patent demand 1.

BRIEF DESCRIPTION OF FIGURES

A currently proposed electrical energy distribution system, in accordance with the present invention, will now be described in more detail with reference to the enclosed drawing, where:

- figure 1 shows a structure of the system in principle in block diagram form
- figure 2 shows a schematic diagram of equipment for advance purchase, and
- figure 3 shows, greatly functionally simplified, computer equipment that can be used as per figure 1.

Description of a Preferred Embodiment.

With reference to figure 1, there is shown greatly simplified an electrical energy distribution system, in which an incoming electrical energy measuring conductor or cable 2 is distributed to a number of electrical

energy measuring meters, where the figure shows that an incoming and distributed cable or cable 2a is connected to an electrical energy measuring meter 2b, and then out on a supply cable or cable 2c to an electrical energy consumer 3.

In order to understand the present invention, it is not important what type of equipment the subscriber or consumer 3 has, and for this reason this is not even indicated.

As other electrical energy measuring equipment is connected to a specific electrical energy consumer 3a, 3b, 3c and 3d, in the same way as equipment 2b is connected to consumer 3, no description is required of the complete system in this respect.

It is sufficient to establish that the system can incorporate several electrical energy consumers, one of which is a signed reference design 3.

The present invention is based on the instantaneous value of each system-related electrical energy measuring equipment, such as the one assigned reference designation 2b, being able to be read via a cable 4.

A terminal 6 containing a card reader 6a and a keyset 6b, at the disposal of the service personnel or operator, can interact with the computer 5. The terminal is mobile and can be connected temporarily to the computer via an interface 6'.

Modem equipment 7 is connected to the computer 5 to enable each of the electrical energy suppliers to get in contact with and interact with computer 5 via a telephone cable 8, to evaluate the information fed into the computer, such as the supplementations and changes made from terminal 6, and the stated measuring values from the electric energy measuring equipment.

The information fed into computer 5, via a reader/scanner 12' belonging to a subscriber, will also be available to the supplier and/or service personnel or operator. This will be described in more detail with reference to figure 3.

Computer 5 is connected via an interface equipment 9 to a TV aerial cable 10. This aerial cable 10 is designed to coordinate all consumers 3, 3a-3d,

who are assigned to computer 5, through which each consumer can be connected to the mentioned computer.

For this reason, it is essential that each consumer is provided with a terminal 11, containing an interface and a reader.

For consumer 3, an interface 12 and a reader 12' are illustrated.

A display screen 13 is with advantage connected to cable 10, and this is considered to be part of a TV-set 13'.

Each consumer 3 is thereby provided with a terminal 11 and a display screen 13 connected to the computer 5, at which each consumer can activate the computer 5 via the terminal 11, and preferably and activated code, to enable his/her own display screen 13 to show the relevant consumption during a selected period of time or equivalent.

Each consumer 3 can, via an advance purchase system, which is described in schematic form in figure 2, pay a charge and at a date of payment decided upon by the consumer himself/herself.

Figure 2 aims to illustrate an advance purchase equipment, 20, provided with a note insertion intake 21 a keyset 22. If so required, note insertion can be coordinated with a code, at which a card 23 is provided with information equivalent to the paid amount, a number identification, and possibly an inserted identification code.

This card 23 should be used in the system, and should in each case be provided with a number identification, which can be read within the system.

The subscriber or consumer 3 can thus obtain and utilize a card 23, and this can be made available, depending on the selected payment in various amounts, such as 200, 500, 1000 and 2000 kronor.

It is possible for the system, via computer 5, to assign a consumer a certain discount in the event of advance purchase of higher amounts, which means that the energy output will be cheaper for subscribers or consumers who feed the system with a card of a high amount.

Via the terminal 11 and display screen 13, the subscriber or consumer 3 can obtain instantaneous information about the electrical energy consumption and the remaining electricity supply, and thus fix the date himself/herself when it is time to procure a new card.

Computer 5 is connected with a contact 2d via a cable 14, and the contact can be activated to break the supply of electric energy if no new card 23 is inserted into the system via the reader 12 or in any other way, such as that the supplier feeds the paid charges to the computer 5 via the telephone cable 8 and modem equipment 7.

The system offers the possibilities of fixing the proportion of the fixed costs which the supplier's charge contains through daily deduction. The backlog of fixed charges, which have been brought about, for example, by the subscriber not purchasing a new card, are not deducted until a new card is loaded into the reader.

Some electrical energy suppliers have distribution networks in areas which cannot cope with the transmission of maximum power, and in those cases the supplier can reinforce his electrical network in these areas by introducing time tariffs (low prices during certain hours or very high prices during other hours or periods). This enables the supplier to regulate the use of energy and avoid new investments. In the proposed system, tariffs such as this can be very easily introduced for each subscriber, district or region.

The system can be adapted to all existing approved electricity meters without any limitations.

In the dispenser 20, a receipt which shows the taxes such as VAT and energy tax is received.

Terminal 6 can, as shown in figure 1, be engaged and disengaged by an operator for temporary use via an interface 6', to a central computer 5, and can in the known way read off the value, which is entered on a card 23 inserted into the card reader 6b. The information is subsequently transmitted to the computer 5.

The terminal 6 and reader 12' are both designed so that they are able to destroy that part of the card 23 where the information is stored, thus

rendering the card unusable for renewed insertion without a previous advance purchase in the equipment, as shown in figure 2.

With reference to figure 3, the construction in principle of a computer 5 is shown.

When a card 23 is inserted into the terminal 6 card reader 6a, or in a corresponding card reader 12', or in any other system-related way, and if a system is chosen with the identification code activated on keyset 6b, a check is made to ensure that the activated code agrees with the code on card 23, and that the amount on the card with its number identification is introduced into computer 5.

This is followed by an evaluation of the amount of energy which corresponds to the amount fed into the system, taking into account a deduction for fixed charges, such as subscription fee, power requirement, or equivalent, and addition for possible discounts. The necessary consideration should therefore be taken as regards the power requirement.

The system also offers the possibility that it can fix the relevant proportion of the annual fixed charges, but also the charges that do not refer to the time between the latest payment and the present payment, and make a deduction for these and then evaluate the amount of energy represented by the remaining amount.

The percentage of the fixed charges in relation to the total costs can also be deducted.

The energy value thus produced is fed into a memory 3a for the consumer 3.

Via cable 4, the energy output is sensed continuously and this is stored as a sum in a memory 3b for consumer 3.

A calculation unit 30 incorporated in computer equipment 5 is adapted to calculate the information from reader 12' within a section 31 to a value corresponding to a fixed charge and a calculated number of kWh.

By activating the computer equipment 5 and its calculation unit 30, via equipment 11, cable 10, and circuit 9, each consumer, such as consumer 3, can obtain all information about the consumption on his/her display screen

or TV set, via a computer oriented and section 32 calculated for the relevant information, about the remaining paid amount, via a section 33 about the calculated time when the payment is consumed with an assumed average consumption, etc.

Messages fed from the electrical energy supplier via cable 8, a receiver 34, and a section 35, can also be displayed via the TV set 13, by using equipment 11 to engage this on a special channel, an energy channel, via section 36.

The design example illustrates five different electrical energy consumers 3, 3a-3d linked to one and the same computer 5 over an aerial cable 10, and are connected to each of energy measuring meters assigned to each of the indicated consumers.

The card 23, which can be utilized with advantage, is currently used in several different areas. Demands which with advantage can be placed on the card are:

- The card 23 should be of such quality that it can be used at least 15 times.
- Each card should have its own identification code and/or number identification.
- The programmable memory area, which is used on each occasion, should be destroyed so that the card cannot be used again except after being programmed once again.
- Programming should be performed only by the supplier and by equipment owned by the supplier.
- It should be possible for a so-called handshake between card 23, terminal 11, and computer 5, at each use.
- It should be very easy to use the card.

It should be possible to purchase such a programmable card 23 at various places.

In an equipment 20 or dispenser, there should be non-programmed cards. The consumer is able to choose between using a previously purchased card (which can be used 15 times in the dispenser) or purchasing a new card, with a deduction for the card cost.

The consumer 3 can choose the value which is programmed into the card by inserting notes, another magnetic card, credit card or equivalent into

dispenser 20. After the relevant insertion, the card 23 will be programmed with the amount that has been inserted.

It should also be possible to purchase ready-programmed cards with various amounts at various places.

It could also be possible to allow programming to be made at home, with the help of a reader and a telephone, if an approved payment card is used for the purpose. It is an absolute demand that programming can be made in a safe and reliable way without the possibility of unauthorized persons being able to communicate with the system.

All communication between a reader 12' and associated computer and TV set should be made via TV aerial cables, which are already installed in each apartment block. The system has been designed in a maintenance compatible way, so that any faults can be easily identified and rectified.

Computer 5 contains a control program within the section 37, which performs function control of communication, and reports any faults, either via TV sets or messages transmitted directly from computer 5 to the supplier over cable 8. The communication works both ways, that is, from the reader 12' to computer 5, and from the computer to the reader and TV set.

The computer 5 can also be automatically connected to the telecommunications network, via a section 38 and via cable 8, or the electric cable network, so that communication with electricity suppliers, for example, is possible. Communication is achieved with a frequency protocol with a safety code for various types of authority. Communication must be provided with a safety system that prevents unauthorized persons from entering into the computer 5. The safety system must also include an alarm system, within section 39, which warns the electricity supplier when an unauthorized person tries to break into or tamper with the system.

The use of cables already installed for TV aerials means that no additional costs are required for advanced running of cables indoors. In this way it is possible to have access to TV sets and transmit information to the customer. As computer 5 is connected to the telecommunication's network, the electricity supplier can transmit information to the customers or consumers both collectively and individually, via a section 40.

Furthermore, the electricity supplier can, via section 43, acquire all interesting information that is stored in the computer 5. Changing the relevant charge for each consumer, which is normally made annually, can now be made via the telecommunications network to all computers 5 which are included in the system, via a section 42.

Continuous information, via a section 43, about each consumption enables the electricity supplier to quickly identify any faults in meters or any tampering with the system.

The reader 12' and terminal 11 is a product which is owned by and supplied by the supplier and is connected to consumer. Reader 12' provides the possibilities of both reading off and entering information onto the card.

Demands which are placed on the reader include:

- It should be very easy to use.
- It should have a high standard of quality to withstand domestic environments, such as families with children.
- It should be easy to replace.
- It should be easy to identify faults.
- It should have an aesthetical design and match the domestic environment.

The interface 12 is an adaptation unit which converts codes from the reader 12' to a code which is adapted according to a selected communication protocol. Correspondingly, the information is converted from computer 5, which refers to reader 12', to a code which matches the reader 12'. The interface 12 also opens the communication channel to the TV set. Each interface 12 has an identification code which cannot be changed. This code is used as a filter when transmitting information relating to the apartment or consumer where it is installed.

The interface 12 should also include LEDs, which should warn the subscriber or consumer when it is time to purchase a new card, via a calculation circuit 44.

Those subscribers who do not have a TV set have in this way simple communication with the system. Other diodes should be used to notify that faults have occurred in the system. The reader 12' and interface 12 should

be placed in the same unit. The demands which are placed on the reader should also apply to the interface.

Equipment 11 should be designed in a way that provides complete electrical safety with negligible energy consumption. The reader 12' and interface 12 must function even if the supply of electricity to the consumer is disconnected.

The reader 12' and interface 12 are owned as are to be maintained by the electricity supplier. The consumer can pay a deposit to the landlord when he/she moves into the apartment. This deposit is repaid when the customer moves.

The following information should be included on card 23:

- Safety codes with individual identification.
- Sum of money paid in.

This information is transmitted to computer 5 when the card 23 is inserted into the reader 12' or the unit 6. If the computer 5 approves the transmission within a section 45, a signal is given to the reader to make the memory area which stores the information about the sum of money paid in unusable. It should then be possible to read this information later by means of a special control unit, within a section 46, when any control requirement is made. When the computer approves the transmission, a green LED lights up on the interface 12.

The computer 5 converts the paid amount into energy, where a proportion is allocated to the periodical fixed charge.

The consumer can obtain all available information on his/her TV screen if he selects a chosen channel number, one which is set at the same transmission frequency as information from the computer 5.

Each information message is transmitted with the reader 12' code, via a section 47, which means that the interface 12 opens the information channel only if it recognizes the code. The customer is able to see on his/her TV screen how many kWh remain to be consumed before the reader needs to be loaded once again.

The average daily consumption and information relating to an increase or reduction in consumption in relation to the previous period is also available within a section 48. Instantaneous consumption, consumption during the last hour, and a recommendation as to when a new card should be procured, are also displayed on the screen, via a section 49.

There will also be messages and tips concerning energy saving measures etc, via a section 50. This information can be supplemented by a lot of other information, which refers to the energy sector. The municipality can, for example, transmit some information via the same channel.

The proposal is that there should be a computer 5 in each apartment block. The computer should be matched to the applications required by the system. The computer 5 should be placed in a safe place, close to the electricity meters. The computer should be connected to each meter via digital inputs and outputs.

Consumption pulses from the meter are transferred to the computer via digital inputs. The computer should contain information about type of meter and number, within memory 3b. After each change of meter, this information should also be changed. The traditional type of meter with its integration unit is to remain. This makes it possible to have double checking of the amount of energy supplied.

When the computer 5 detects that the customer is close to final consumption according to the amount of energy paid for, a message will be transmitted to the customer with the help of a section 51. If no new payment is made, the computer will discontinue the supply of electrical energy, by activating a switch or contact 2d, fitted on the phase cable 2a, 2c, by means of digital outputs and a section 52. Customers who do not have access to a TV set can look at a red LED which is fitted on the interface 12 to see that a new card must be procured.

Programs for calculating the charge are developed individually from each electricity supplier.

The information program can also be developed individually.

Computer 5 is also connected to the telecommunications network 8 (or cable network 2 and associated matched equipment of a known type and

not shown), via a modem 7. The electricity supplier is able to contact computer 5 by telephone and also other certain parameters to acquire information about consumption. Some control of the feasibility of electricity consumption is made by the program, which then transmits the prepared material to the electricity supplier. The communication program for telecommunications is safe and prevents unauthorized persons from entering into the system. An alarm system is also provided which gives warning if any unauthorized person tries to communicate with the system. If the computer 5 ceases to function, the system will function as in the previous way. As soon as the computer starts to function once again, the necessary information will be acquired. The computer will have a reduced function when there is a power failure.

The calculation unit 30 should also be provided with a section 53, where the energy output from a predetermined date is stored, and a section 54 where the remaining energy is stored, as well as a section 55 indicating the final date of normal consumption.

A section 56 is adapted to be able to allow credit for some consumers.

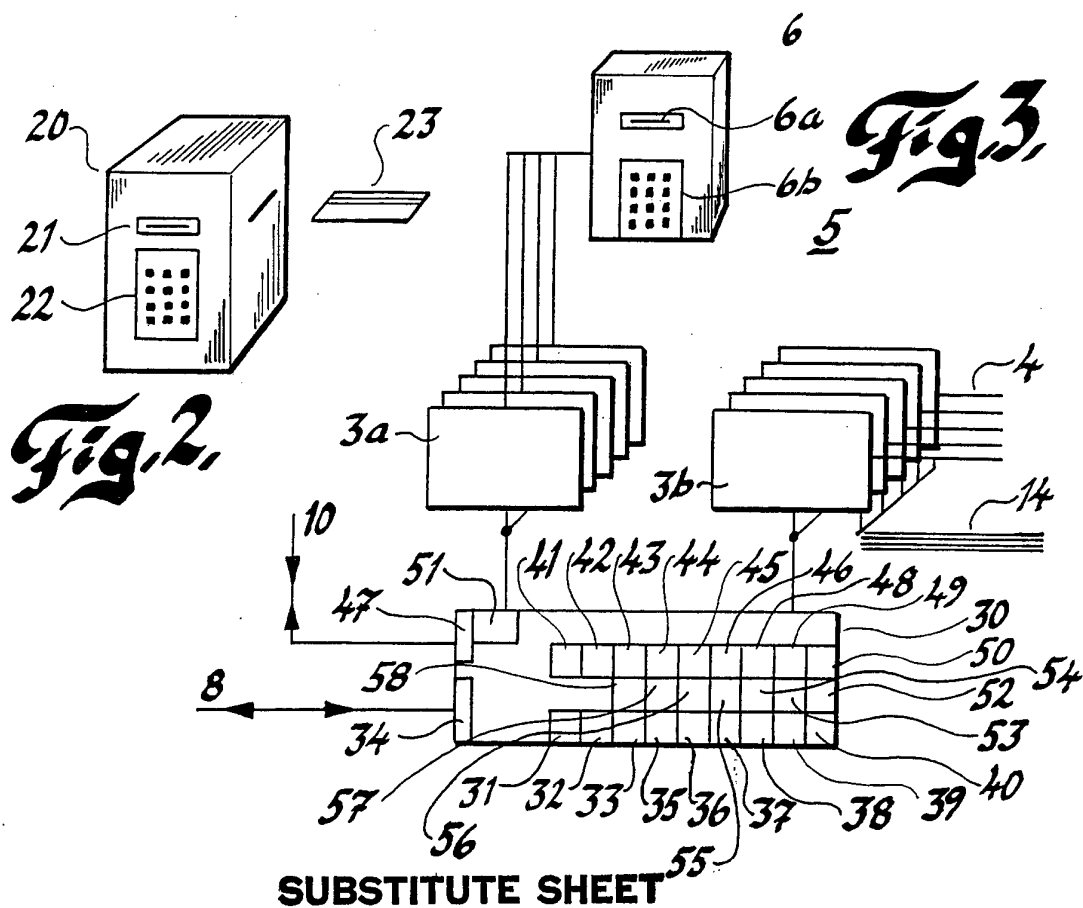
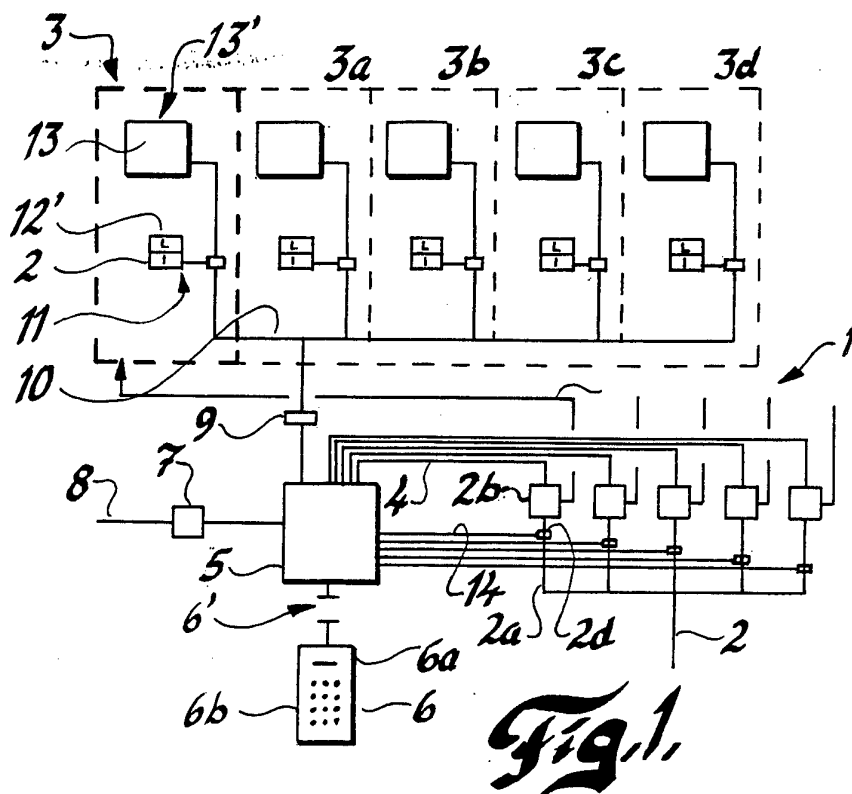
A section 58 aims to generate an optical warning and/or transmit a letter when a predetermined time remains for normal consumption.

The present invention is, of course, not limited to the type of design as described above, but can be modified within the framework of the concept of the invention as illustrated in the following patent demands.

Claims

- 1 An energy distribution system with one or more energy suppliers and several energy consumers, where each consumer is assigned energy measuring equipment (meters), *characterized* by the fact that the instantaneous value of each system-related energy measuring meter can be read by a computer, that each consumer (3) is provided with a terminal (11) connected to the computer, at which each consumer (3) can activate the computer via the terminal and a code to show the relevant consumption during a selected period of time or equivalent.
- 2 System in accordance with patent demand 1, *characterized* by the fact that each consumer has, via an advance purchase system, paid for a particular amount of power output and/or a particular energy consumption, and that a display screen is arranged to show the non-consumed deposit.
- 3 System in accordance with patent demand 1 or 2, *characterized* by the fact that each energy measuring meter is provided with a contact (2b) connected to the power supply circuit, which at a consumed amount of energy is actuated by the computer (5) to break the power supply.
- 4 System in accordance with patent demand 1, *characterized* by the fact that a number of consumers are linked to one and the same computer (5), which is connected to each of the energy measuring meters assigned to each of the indicated consumers.
- 5 System in accordance with patent demand 1, *characterized* by the fact that a connection (10) common to all consumers is adapted to transmit individual information from a consumer to the indicated computer, and vice versa.
- 6 System in accordance with patent demand 1, *characterized* by the fact that, via a connection (8), the supplier is connected to the computer (5).

- 7 System in accordance with patent demand 6, *characterized* by the fact that the remaining amount of energy permitted by the advance purchase for each consumer can be fixed and read, and that at a predetermined amount of remaining energy calculate the final time, and each consumer is notified of this information by the supplier.
- 8 System in accordance with patent demand 1, *characterized* by the fact that the indicated terminal (11) is set up in a location owned by the subscriber, such as an apartment.



SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 94/00906

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: G01R 21/133

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: G01R, G08C, H04B, H02J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

DIALOG: WPI, CLAIMS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 4513382 (JAMES V. FAULKNER, JR.), 23 April 1985 (23.04.85), see especially col. 1 line 7-12 and col. 2 line 26 - col. 3 line 11 --	1
X	US, A, 4218737 (DAVID J. BUSCHER ET AL.), 19 August 1980 (19.08.80), see especially abstract and col. 1 line 53 - col. 2 line 11 --	1
X	US, A, 5053766 (JAVIER RUIZ-DEL-PORTAL ET AL.), 1 October 1991 (01.10.91), see especially fig. 1 --	1

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

Date of the actual completion of the international search

12 December 1994

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Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Sven-Olof Wirlée

Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 94/00906

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US, A, 4989081 (MASAYUKI MIYAGAWA ET AL.), 29 January 1991 (29.01.91), see especially abstract --	1
X	Funkschau, no. 17, 1984, K.H. Knapp, "Immer mehr Mikroelektronik", page 50 - page 53, see especially fig. 4 at page 52 -- -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

26/11/94

International application No.

PCT/SE 94/00906

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US-A-	4513382	23/04/85	CA-A-	1201772	11/03/86
			DE-A-	3329507	23/02/84
			FR-A-	2532090	24/02/84
			GB-A-	2125595	07/03/84
			JP-A-	59053046	27/03/84

US-A-	4218737	19/08/80	NONE		

US-A-	5053766	01/10/91	FR-A-	2621395	07/04/89
			GB-A,B-	2203920	26/10/88

US-A-	4989081	29/01/91	CA-A-	2002718	14/05/90
			EP-A-	0369382	23/05/90
			JP-A-	3010596	18/01/91
			JP-A-	2132997	22/05/90
