EUROPEAN PATENT SPECIFICATION

Date of publication and mention of the grant of the patent: 20.03.2013 Bulletin 2013/12

Application number: 07018068.2

Date of filing: 14.09.2007

Integrated home information platform

Integrierte Hausinformationsplattform
Plate-forme d’informations domestiques intégrées

Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

Date of publication of application: 18.03.2009 Bulletin 2009/12

Divisional application:
12006161.9 / 2 544 160

Proprietor: Krauch, Michel
81679 München (DE)

Inventor: Krauch, Michel
81679 München (DE)

Representative: Jehle, Volker Armin et al
Bosch Jehle Patentanwaltsgesellschaft mbH
Flüggenstrasse 13
80639 München (DE)

References cited:
WO-A-03/044625
DE-A1- 10 336 462

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).
Description

[0001] The present invention relates to control systems, a controlling device, a controlled device and a corresponding method. In particular, it provides an integration platform with intuitive functionality to wirelessly control energy consumption (Convenience) and to create transparency on the sources of energy consumption (Efficiency).

[0002] Efficiency: According to the information of the Umweltbundesamt each year more than four billion euros are wasted by the inefficient use of electronic devices. That means 100€ per household on average. According to the Deutsche Energieagentur, a state owned body, 10% of the home heating budget can be saved through adapting the user behaviour. That equals 260€ per annum for an average one family home.

[0003] Although there is a clear need for ways to save energy and to create transparency on the sources of energy consumption users have no sufficient knowledge apart from the yearly energy bill that provides only lump sum information. For example the energy consumption of a standby personal computer workplace could be up to 200€ per year which is money that could be easily saved if there would be a means to make this waste of energy transparent to the consumer. The need to save energy is also expressed by consumers themselves. According to a web survey, the 2nd most important smart home applications in the future is "energy saving".

[0004] Convenience: Although consumers have become used to high-tech in most areas of modern living such as the automobile they still lack that same level of automation at home. Consequently, the missing equipment is gathered from multiple vendors and leaves the user with a multitude of electronic devices. Hence there is need for an integrated solution that helps to manage this complexity and that offers an intuitive functionality. According to the same web survey one of the top buying criteria for smart home solutions is the "ease of use" ranked even higher than the criteria "price".

[0005] The need for an integrated solution becomes visible when considering the current state of technology. Today there is no integrated solution to monitor and to influence energy consumption while enjoying the comfort of wireless home automation such as adapting room light and temperature to the users convenience from any place at home. There is no solution to meter and influence energy consumption of household devices on transactional level while enjoying the convenience of dimming the light, turning of all household appliances by "one touch", or changing room temperature from any place at home. Currently no solution exists that integrates this with a simple to use web user interface that contains up-to-date energy consumption information of the entire household that allows the user to recognize ways to reduce energy consumption even more effectively.

[0006] Currently there are two different types of home automation solutions: the high end solutions that include appliance control with broadband functionalities such as media broadcast. These complex high end solutions often involve substantial installation effort so that installation is restricted to newly build homes.

[0007] On the other hand, there are the low end solutions that focus on the automation of a specific appliance such as heating or lighting. These solutions usually are low cost and involve an easy installation procedure so that they can be installed into any home. However these solutions are manufacturer specific and can not be integrated with other home automation solutions.

[0008] Document DE 10336462 discloses a prior art remote control system in which a plurality of devices could be remotely controlled.

[0009] Therefore, there is e.g. a need for an integrated solution for controlling a plurality of appliances consuming energy and for monitoring an energy consumption of these appliances.

[0010] For this and other reasons, there is a need for the present invention.

[0011] In accordance with an aspect of the invention, there is provided a control system according to the subject-matter of claim 1.

[0012] Advantageously, one of the at least one controlled device is connected between an appliance and a electric power supply which provides the appliance with electric power.

[0013] Advantageously, the one of the at least one controlled device further comprises an electricity meter for measuring electrical energy consumption of the appliance connected to the one of the controlled devices.

[0014] Advantageously, the one of the at least one controlled device further comprises an on-off switch for powering up or cutting off the appliance connected to the at least one controlled device.

[0015] Advantageously, the one of the at least one controlled device further comprises a dimmer for reducing electric power supplied to the appliance connected to the at least one controlled device.

[0016] Advantageously, one of the at least one controlled device further comprises a short range transmitter and an actuator, the short range transmitter being adapted to transmit a device address of the respective controlled device when activated by a user operating the actuator.

[0017] Advantageously, one of the at least one controlled device further comprises a function ring defining a function of the respective controlled device.

[0018] Advantageously, the function ring is coloured, the colour indicating the user the function of the respective controlled device.

[0019] Advantageously, the controlling device further comprises a timer for initiating an operation at a user-defined time, for example powering up or cutting off the appliance connected to one of the at least one controlled device at a user-defined time.

[0020] Advantageously, one of the at least one controlled device is a remotely controllable thermostat, the
thermostat further comprising:

- a metering device for measuring heat energy consumption of the appliance connected to the thermostat;
- an actuator for controlling an heat energy output level.

In accordance with a further aspect of the invention, there is provided a method according to the subject-matter of claim 8.

Advantageously, the controlled device is a remotely controllable thermostat further comprising:

- a metering device for measuring heat energy consumption of the appliance connected to the thermostat;
- an actuator for controlling an heat energy output level.

In accordance with a further aspect of the invention, there is provided a controlled device according to the subject-matter of claim 6.

Advantageously, the appliances connected to the at least one controlled device are selected from a group containing household appliances, entertainment electronics devices, security devices, and electronic shutters.

In accordance with a further aspect of the invention, there is provided a method according to the subject-matter of claim 8.

Advantageously, the method further comprises:

- storing the measured energy consumption values of the controlled devices; and
- accessing and displaying a desired portion of the stored energy consumption values.

Brief description of the drawings

The accompanying drawings are included to provide a further understanding of the present invention and are incorporated and constitute a part of this specification. The drawings illustrate embodiments of the present invention and together with the description serve to explain the principles of the invention. Other embodiments of the present invention will be readily appreciated as they become better understood by reference to the following detailed description.

Figure 1 shows an exemplary and simplified schematic diagram of a control system according to an embodiment of the invention.

Figure 2 shows an exemplary and simplified illustration of a controlled device according to an embodiment of the invention.

Figure 3 shows two exemplary and simplified views of a controlling device.

Detailed description of the invention

Figure 1 shows an exemplary and simplified schematic diagram of a control system according to an embodiment of the invention.

Figure 3 shows two exemplary and simplified views of a controlling device.

The exemplary control system 10 of Figure 1 comprises respectively two multi-purpose controlled devices 12a, 12b, two dedicated controlled devices 14a, 14b, and four appliances 13a, 13b, 13c, 13d. However, the control system 10 may comprise any number of the latter apparatuses, may even comprise more than one controlling device 11.

The appliances 13a, 13b, 13c, 13d may be, for example, household appliances like, for example, a washing-machine, dryer, dish-washer, etc. or may also be a television set, a hi-fi system, or some other kind of entertainment electronics device as well as any other kind of electric appliance, like electric shutters or security devices.

The multi-purpose controlled devices 12a, 12b, hereinafter also referred to as controlled devices 12a, 12b, are in communication with the controlling device 11 and are connected to a respective appliance 13a, 13b, 13c, 13d and its power supply. Figure 2 shows one exemplary embodiment of a controlled device 22. It is a kind of adapter which can be plugged in a power socket and which comprises a power socket suitable for the power plug of the appliance to be plugged in.

The controlled device 22 further comprises a transmitter, and an actuator 23 which enable a user to register the respective controlled device 22 at the controlling device 11. To register the controlled device 22 at the controlling device, the user operates the actuator 23 which activates the transmitter, preferably a short range radio transmitter. The transmitter will then send the device address of the controlled device 22 to the controlling device 11 which will register the controlled device 22 using the transmitted unique device address of the controlled device 22.

Advantageously, the controlled device 22 com-
Hereafter, the user may specify certain attributes of the appliance connected to the controlled device 22. The function ring 24 may comprise a plurality of pins which are plugged in corresponding sockets of the controlled device 22, wherein the arrangement of the pins indicates the controlled device 22 the function of the appliance connected to the controlled device 22. The function rings 24 further indicate the user respective functions via assigned colours: "red" may represent "heating", "green" may represent "lighting", "blue" may represent "washing", etc. Accordingly, the user may select a function ring 24 according to the function of appliance connected to the controlled device 22. By attaching the function ring 24 to the controlled device 22, i.e. inserting the pins of the function ring 24 into the corresponding holes of the controlled device 22, the user assigns a particular function to the controlled device 22. Depending on the assigned function, the controlled device 22 can perform different operations: if the function is "washing" the operations include powering up and cutting off the appliance connected to the controlled device 22. If the function is "lighting" the operations further include reducing energy supplied to the appliance connected to the controlled device 22.

[0038] Hereafter, the user may specify certain attributes of the appliance connected to the controlled device 22, the attributes including the name of the appliance, such as ceiling lamp, washing-machine, etc., the location and room, respectively, to which the appliance is allocated, e.g. living-room, kitchen, etc., and other attributes.

[0039] The controlled device 22 further comprises a processor, a memory, and an electricity meter. The electricity meter measures the electrical energy consumption of the appliance connected to the controlled device 22 and the measured energy consumption data is stored in the memory. When requested by the controlling device 11, the transceiver transmits the stored energy consumption data to the controlling device 11. Alternatively, the transceiver may continuously transmit the stored energy consumption data to the controlling device 11. In both cases, instant feedback on energy savings can be provided.

[0040] The controlled device 22 further comprises an on-off switch or interruptor for powering up or cutting off the appliance connected to the controlled device 22. Advantageously, the controlled device 22 may comprise an electrical dimmer for reducing electric power supplied to the appliance connected to the controlled device 22.

[0041] The transceiver of the controlled device 22 transmits energy consumption data to the controlling device 11, as already noted above, and receives control data signals from the controlling device 11. These control signals may cause the controlled device 22 to send energy consumption data to the controlling device 11 or may cause the controlled device 22 to power up or cut off the appliance connected to the controlled device 22, for example.

[0042] As already noted above, the system 10 may further comprise at least one dedicated controlled device 14a, 14b. In contrast to the "multi-purpose" controlled device 22 illustrated above, a dedicated controlled device has a determined "dedicated" function and therefore, its function ring is non-detachable.

[0043] In the following, a remotely controllable thermostat for temperature control of a radiator or another kind of heating installation will be illustrated as an example for a dedicated controlled device. The remotely controllable thermostat comprises a metering device for measuring heat energy consumption, an actuator for controlling an heat energy output level electronically, a transceiver, a processor, memory for storing the measured heat energy consumption, and means for registering the thermostat at the controlling device 11.

[0044] The transceiver receives control data signals from the controlling device 11 and transmits heat energy consumption data to the controlling device 11. Further, the transceiver forwards received control data signals to the processor which causes appropriate actions according to the received control data signals: Causing the transceiver to send heat energy consumption data to the controlling device 11; or causing the actuator for controlling an heat energy output level to reduce or increase the heat energy output level of the heating installation to a user-defined value comprised in the received control data signals, for example.

[0045] The registration process may preferably be identical or similar to the one employed for registering the controlled device 22. Accordingly, the means for registering may comprise a transmitter for sending a unique device address of the thermostat to the controlling device 11, and an actuator for starting the registration process.

[0046] Figure 3 shows two exemplary and simplified views of a controlling device.

[0047] The controlling device 31 comprises a display 32, e.g. a liquid crystal display, a control element 33, a transceiver, and a processor having an associated memory.

[0048] The controlling device 31 is adapted to provide the user with information such as e.g. electric and heat energy consumption of connected appliances and to enable the user to remotely control controlled devices 12a, 12b, 14a, 14b, which are wirelessly connected to and registered at the controlling device 31.

[0049] As the controlling device 31 represents a mobile central information and control platform which the user should be able to handle like conventional remote controls, it is of a shape and size suitable to lie in one hand of the user so that the user can operate the device with his other hand.

[0050] Conveniently, the controlling device 31 is of a circular shape, e.g. cylinder-shaped, disc-shaped, hemispherical, or lentoid, the display is circular, and the control element 33 is ring-shaped.

[0051] Advantageously, the ring-shaped control ele-
ment 33 is turnable with respect to the remainder of the controlling device 31. Movements of the ring-shaped control element 33 are detected and monitored. The movement monitoring of the ring-shaped control element 33 may be implemented in different ways well-known in the art. Therefore, only one exemplary embodiment of the movement control will briefly be mentioned here: Similarly to a conventional mechanical computer mouse of a personal computer, movements of the ring-shaped control element 33 are transferred to a small rotating cylinder, which is comprised in the controlling device and touches the turnable ring-shaped control element 33. The movements of the small rotating cylinder are converted, e.g. by means of a helical potentiometer, into electrical signals.

[0052] Advantageously, the turnable ring-shaped control element 33 is pushable, i.e. it also includes an actuator.

[0053] A graphical user interface (GUI) implemented by the processor facilitates selecting between a plurality of functions featured by the controlling device 31. The graphical user interface depicts a ring-shaped menu having a plurality of options arranged circularly at the rim of the circular display 32. The remaining area within the ring-shaped menu serves as general information field and/or for displaying contents associated with a selected, and thus active, menu option. For example, status information about an actual controlled appliance and an energy consumption level of the actual controlled appliance may be displayed in the center of the GUI. In Figure 3, an exemplary picture of the main menu of the GUI is displayed.

[0054] The ring-shaped control element 33 acts as "mouse" for selecting a respective menu option. The user can switch from one menu option to the next by turning the ring-shaped control element 33 rightwards or leftwards (clockwise/anti-clockwise). The current menu option is highlighted and can be selected by the user by operating the actuator included in the turnable ring-shaped control element 33, i.e. by pressing the turnable ring-shaped control element 33 down.

[0055] By selecting a menu option of the main menu, the user can get to the respective submenu.

[0056] To ensure simple and intuitive operation of the controlling device 31, both the number of menu options, and the number of submenu levels (i.e. the maximal number of clicks necessary to select any function) have to be kept as small as possible. In a preferred embodiment, the GUI menu comprises six menu options (see Figure 3) and two submenu levels at most.

[0057] The controlling device 31 provides three main functionalities:

• Registering and specifying controlled devices 12a, 12b, 14a, 14b together with their associated appliances 13a, 13b, 13c, 13d;
• Displaying a plurality of diversified energy consumption information;
• Enabling a user to control a plurality of appliances in communication with the controlling device 31 remotely and wirelessly.

[0058] The registration process has already been described in context with the description of the controlled device 22.

After registering, the appliance connected to the just registered controlled device are specified by the user utilizing the GUI menu of the controlling device 31: The just registered appliance may appear as a menu option "new appliance" and, after selecting this option, characteristics of the "new appliance" may be specified in respective subordinate menu items, wherein the characteristics may include the name of the appliance, e.g. ceiling lamp, washing-machine, etc., the location and room, respectively, to which the appliance is allocated, e.g. living-room, kitchen, etc., and other specifications. For easier handling, the user may preferably choose between a plurality of default options to specify the "new appliance".

[0059] Advantageously the controlling device comprises a timer for powering up or cutting off an appliance connected to a corresponding controlled device at a user-defined time.

[0060] The controlling device 31 provides the user with a broad spectrum of diversified energy consumption information. In the main menu, the total energy consumption, as an absolute value and/or as a percentage of a maximum total energy consumption, is indicated in the central information field of the GUI. By selecting respective submenus, the user can get information about the energy consumption of a certain function group, such as lighting, heating, washing, etc., in a certain room, or of one specified appliance, wherein the respective energy consumption may be given as current energy consumption or as an energy consumption during a certain time period (e.g. day, week, month, year) and again, may be given as a total value or as a percentage of a respective maximum energy consumption.

[0061] The controlling device 31 further enables the user to wirelessly control a plurality of appliances which are in communication with the controlling device 31. To select a certain appliance or a group of appliances, the user can search in the GUI menu hierarchy and select the respective appliance or group. Then, depending on the selected appliance or group, the user can choose between several "standard" options:

• Switching on/off the respective appliance or all appliances of the group;
• Switching on/off the respective appliance or all appliances of the group at a certain user-defined time;
• Reducing or increasing the energy supplied to the respective appliance or to all appliances of the group.

Further "special" options may be provided for certain appliances, such as e.g. opening or closing electric shutters.
Furthermore, an additional option may be provided for switching off all appliances wirelessly connected to the controlling device 31.

It is noted that the handling of the GUI menu is intuitive: For switching from one option to another, and for increasing/decreasing a certain value (energy consumption, etc.), the user turns the turnable ring-shaped control element 33 clockwise or anti-clockwise. For selecting a certain currently highlighted option, the user presses the also pushable ring-shaped control element 33.

Again referring to Figure 1, the control system 10 advantageously further comprises a personal computer 15 wirelessly connected to the controlling device 11 and the Internet 16. In this preferred embodiment of the invention, the controlling device 11 stores received energy consumption data in the memory until it automatically links to the personal computer 15 for transferring the energy consumption data to the personal computer 15. Then, a user may transfer the energy consumption data to an internet platform, which enables the user to compare his energy consumption pattern with energy consumption patterns of other users. Privacy is protected by providing a common identification process for verifying a user identity.

Claims

1. A control system (10), comprising:

   a controlling device (11) comprising a transceiver, a processor, and a memory;
   at least one controlled device (12a, 12b, 14a, 14b) wirelessly connected to the controlling device (11) and comprising a transceiver, a processor, and a memory;
   wherein the controlling device (11) is configured to send control signals to at least one of the at least one controlled device (12a, 12b, 14a, 14b) and to receive data signals from at least one of the at least one controlled device (12a, 12b, 14a, 14b);
   and
   wherein each of the at least one controlled device (12a, 12b, 14a, 14b) is configured to receive the control signals from the controlling device (11) and to send the data signals to the controlling device (11) and is further configured to be connected to an appliance (13a, 13b, 13c, 13d);

characterized in that

one of the at least one controlled device further comprises a detachable function ring (24) which comprises a plurality of pins pluggable in corresponding sockets of the one controlled device (12a, 12b) and indicating the one controlled device (12a, 12b) the function of the appliance (13a, 13b) which is to be connected to the one controlled device (12a, 12b).

2. The control system (10) of claim 1, wherein the one controlled device (12a, 12b) is connected between the appliance (13a, 13b) and an electric power supply which provides the appliance (13a, 13b) with electric power.

3. The control system (10) of claim 2, wherein the one controlled device (12a, 12b) further comprises an electricity meter for measuring an electrical energy consumption of the appliance (13a, 13b) connected to the one controlled device (12a, 12b).

4. The control system (10) of claim 1, wherein the at least one controlled device (12a, 12b, 14a, 14b) further comprises a remotely controllable thermostat comprising:

   a metering device for measuring heat energy consumption of the appliance connected to the thermostat;
   an actuator for controlling an heat energy output level.

5. The control system (10) of one of the preceding claims, wherein the data signals sent from the one controlled device (12a, 12b, 14a, 14b) and/or the remotely controllable thermostat to the controlling device (11) comprise data of the measured energy consumption of the appliance connected to the one of the at least one controlled device (12a, 12b, 14a, 14b).

6. A controlled device (12a, 12b) for use in a system as defined by one of the claims 1 - 5, wherein the controlled device (12a, 12b) is wirelessly connected to a controlling device (11), comprises a transceiver, a processor, and a memory, and is configured to receive control signals from the controlling device, send data signals to the controlling device (11) and is further configured to be connected to an appliance (13a, 13b); characterized by

   further comprising a detachable function ring (24) which comprises a plurality of pins pluggable in corresponding sockets of the controlled device (12a, 12b) and indicating the controlled device (12a, 12b) the function of the appliance (13a, 13b) which is to be connected to the controlled device (12a, 12b).

7. The controlled device (12a, 12b) of claim 6, wherein the function ring (24) is coloured, the colour indicating the user the function of an appliance suitable to be connected to the controlled device (12a, 12b).

8. A method for use in a control system (10) comprising a controlling device (11) and at least one controlled device (12a, 12b, 14a, 14b) wirelessly connected to the controlling device (11), the method comprising:
transmitting, by the controlling device (11), control signals to the at least one controlled device (12a, 12b, 14a, 14b);
receiving, by the controlling device (11), control signals from the at least one controlled device (12a, 12b, 14a, 14b);
measuring, by the at least one controlled device (12a, 12b, 14a, 14b), an energy consumption of appliances (13a, 13b, 13c, 13d) connected to the at least one controlled device (12a, 12b, 14a, 14b);

wherein the control signals comprise commands for performing at least one of the following steps:

causing one of the at least one controlled device (12a, 12b, 14a, 14b) to send data signals to the controlling device (11), the data signals comprising the measured energy consumption values of an appliance (13a, 13b, 13c, 13d) connected to the one of the at least one controlled device (12a, 12b, 14a, 14b);
causing one of the at least one controlled device (12a, 12b, 14a, 14b) to power up or cut off an appliance (13a, 13b, 13c, 13d) connected to the one of the at least one controlled device (12a, 12b, 14a, 14b); causing one of the at least one controlled device (12a, 12b, 14a, 14b) to power up or cut off an appliance (13a, 13b, 13c, 13d) connected to the one of the at least one controlled device (12a, 12b, 14a, 14b) at a user-defined time;
causing one of the at least one controlled device (12a, 12b, 14a, 14b) to reduce energy supplied to an appliance (13a, 13b, 13c, 13d) connected to the one of the at least one controlled device (12a, 12b, 14a, 14b);

characterized by
attaching a detachable function ring (24) to a controlled device (12a, 12b) of the at least one controlled device which is to be connected to an appliance (13a, 13b), wherein the function ring (24) comprises a plurality of pins pluggable in corresponding sockets of the controlled device (12a, 12b) and indicating the controlled device (12a, 12b) the function of the appliance (13a, 13b) which is to be connected to the controlled device (12a, 12b).

Patentansprüche

1. Steuersystem (10) mit:
   - einer Steuervorrichtung (11), die einen Tran-
   - sceiver, einen Prozessor und einen Speicher aufweist;
   - wenigstens einer gesteuerten Vorrichtung (12a, 12b, 14a, 14b), die drahtlos mit der Steuervorrichtung (11) verbunden ist und einen Transceiver, einen Prozessor und einen Speicher aufweist;
   - wobei die Steuervorrichtung (11) so konfiguriert ist, dass sie Steuersignale an wenigstens eine der wenigstens einen gesteuerten Vorrichtung (12a, 12b, 14a, 14b) sendet und Datensignale von wenigstens einer der wenigstens einen gesteuerten Vorrichtung (12a, 12b, 14a, 14b) empfängt; und
   - wobei jede der wenigstens einen gesteuerten Vorrichtung (12a, 12b, 14a, 14b) so konfiguriert ist, das sie die Steuersignale von der Steuervorrichtung (11) empfängt und die Datensignale an die Steuervorrichtung (11) sendet, und des Weiteren so konfiguriert ist, dass sie mit einem Gerät (13a, 13b, 13c, 13d) verbunden wird;

dadurch gekennzeichnet, dass
   - eine der wenigstens einen gesteuerten Vorrichtung des Weiteren einen abnehmbaren Funktionsring (24) aufweist, der eine Vielzahl von Stiften enthält, die in entsprechende Sockel der einen gesteuerten Vorrichtung (12a, 12b) gesteckt werden können und der einen gesteuerten Vorrichtung (12a, 12b) die Funktion des Geräts (13a, 13b) anzeigen, das mit der einen gesteuerten Vorrichtung (12a, 12b) zu verbinden ist.

2. Steuersystem (10) nach Anspruch 1, wobei die einen gesteuerten Vorrichtung (12a, 12b) zwischen das Gerät (13a, 13b) und eine elektrische Stromversorgung geschaltet ist, die das Gerät (13a, 13b) mit elektrischem Strom versorgt.

3. Steuersystem (10) nach Anspruch 2, wobei die eine gesteuerte Vorrichtung (12a, 12b) zwischen das Gerät (13a, 13b) und eine elektrische Stromversorgung geschaltet ist, die das Gerät (13a, 13b) mit elektrischem Strom versorgt.

4. Steuersystem (10) nach Anspruch 1, wobei die wenigstens einer gesteuerten Vorrichtung (12a, 12b, 14a, 14b) des Weiteren einen fernsteuerbaren Thermostat aufweist, mit:
   - einer Messvorrichtung zum Messen des Wärmeenergieverbrauchs des Geräts, das mit dem Thermostat verbunden ist;
   - einem Aktor zum Steuern des Wärmeenergieausgangspegels.

5. Steuersystem (10) nach einem der vorhergehenden
Ansprüche, wobei die von der einen gesteuerten Vorrichtung (12a, 12b, 14a, 14) und/oder dem fernsteuerbaren Thermostat an die Steuervorrichtung (11) gesendeten Datensignale Daten des gemessenen Energieverbrauchs des Geräts aufweisen, das mit der einen der wenigstens einen gesteuerten Vorrichtung (12a, 12b, 14a, 14b) verbunden ist.

6. Gesteuerte Vorrichtung (12a, 12b) zur Verwendung in einem System nach einem der Ansprüche 1 bis 5, wobei
   die gesteuerte Vorrichtung (12a, 12b) drahtlos mit einer Steuervorrichtung (11) verbunden ist, einen Transceiver, einen Prozessor und einen Speicher aufweist, und
so konfiguriert ist, dass sie Steuersignale von der Steuervorrichtung empfängt, Datensignale an die Steuervorrichtung (11) sendet, und des Weiteren so konfiguriert ist, dass sie mit einem Gerät (13a, 13b) verbunden wird;
dadurch gekennzeichnet, dass
sie des Weiteren einen abnehmbaren Funktionsring (24) aufweist, der eine Vielzahl von Stiften enthält, die in entsprechende Sockel der gesteuerten Vorrichtung (12a, 12b) gesteckt werden können und der gesteuerten Vorrichtung (12a, 12b) die Funktion des Geräts (13a, 13b) anzeigen, das mit der gesteuerten Vorrichtung (12a, 12b) zu verbinden ist.

7. Gesteuerte Vorrichtung (12a, 12b) nach Anspruch 6, wobei der Funktionsring (24) farbig ist, wobei die Farbe dem Benutzer die Funktion eines Geräts anzeigt, das geeignet ist, mit der gesteuerten Vorrichtung (12a, 12b) verbunden zu werden.

8. Verfahren zur Verwendung bei einem Steuersystem (10), das eine Steuervorrichtung (11) und wenigstens eine gesteuerte Vorrichtung (12a, 12b, 14a, 14b) aufweist, die drahtlos mit der Steuervorrichtung (11) verbunden ist, wobei das Verfahren umfasst:

Senden, durch die Steuervorrichtung (11), von Steuersignalen an die wenigstens eine gesteuerte Vorrichtung (12a, 12, 14a, 14b);
Empfangen, durch die Steuervorrichtung (11), von Steuersignalen von der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b); Messen, durch die wenigstens eine gesteuerte Vorrichtung (12a, 12, 14a, 14b), des Energieverbrauchs von Geräten (13a, 13b, 13c, 13d), die mit der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) verbunden sind; wobei die Steuersignale Befehle zum Durchführen wenigstens eines der folgenden Schritte enthalten:

Veranlassen, dass eine der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) Daten signale an die Steuervorrichtung (11) sendet, wobei die Datensignale die gemessenen Energieverbrauchswerte eines Geräts (13a, 13b, 13c, 13d) enthalten, das mit der einen der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) verbunden ist;
Veranlassen, dass eine der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) ein Gerät (13a, 13b, 13c, 13d), das mit der einen der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) verbunden ist, einschaltet oder ausschaltet;
Veranlassen, dass eine der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) ein Gerät (13a, 13b, 13c, 13d), das mit der einen der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) verbunden ist, zu einem vom Benutzer definierten Zeitpunkt einschaltet oder ausschaltet;
Veranlassen, dass eine der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) ein Gerät (13a, 13b, 13c, 13d), das mit der einer der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) verbunden ist, die Energie reduziert, die an ein Gerät (13a, 13b, 13c, 13d) geliefert wird, das mit der einer der wenigstens einen gesteuerten Vorrichtung (12a, 12, 14a, 14b) verbunden ist;
Befestigen eines abnehmbaren Funktionsrings (24) an einer gesteuerten Vorrichtung (12a, 12b) der wenigstens einen gesteuerten Vorrichtung, die mit einem Gerät (13a, 13b) zu verbinden ist, wobei der Funktionsring (24) eine Vielzahl von Stiften enthält, die in entsprechende Sockel der gesteuerten Vorrichtung (12a, 12b) gesteckt werden können und der gesteuerten Vorrichtung (12a, 12b) die Funktion des Geräts (13a, 13b) anzeigen, das mit der gesteuerten Vorrichtung (12a, 12b) zu verbinden ist.

gekennzeichnet durch

Befestigen eines abnehmbaren Funktionsrings (24) an einer gesteuerten Vorrichtung (12a, 12b) der wenigstens einen gesteuerten Vorrichtung, die mit einem Gerät (13a, 13b) zu verbinden ist, wobei der Funktionsring (24) eine Vielzahl von Stiften enthält, die in entsprechende Sockel der gesteuerten Vorrichtung (12a, 12b) gesteckt werden können und der gesteuerten Vorrichtung (12a, 12b) die Function des Geräts (13a, 13b) anzeigen, das mit der gesteuerten Vorrichtung (12a, 12b) zu verbinden ist.

Revendications

1. Système de commande (10), comprenant :
un dispositif de commande (11) comprenant un émetteur-récepteur, un processeur, et une mémoire ;
au moins un dispositif commandé (12a, 12b, 14a, 14b) connecté sans fil au dispositif de commande (11) et comprenant un émetteur-récepteur, un processeur, et une mémoire ;
dans lequel le dispositif de commande (11) est configuré pour envoyer des signaux de commande à au moins un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) et pour recevoir des signaux de données d’au moins un
parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) ; et
dans lequel chacun parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) est configuré pour recevoir les signaux de commande du dispositif de commande (11) et pour envoyer les signaux de données au dispositif de commande (11) et est en outre configuré pour être connecté à un appareil (13a, 13b, 13c, 13d) ;
caractérisé en ce que
un parmi l’au moins un dispositif commandé comprend en outre une bague fonctionnelle (24) détachable qui comprend une pluralité de broches pouvant être branchées dans des prises correspondantes du dispositif commandé (12a, 12b) et indiquant au dispositif commandé (12a, 12b) la fonction de l’appareil (13a, 13b) qui doit être connecté au dispositif commandé (12a, 12b).

2. Système de commande (10) selon la revendication 1, dans lequel le dispositif commandé (12a, 12b) est connecté entre l’appareil (13a, 13b) et une alimentation en énergie électrique qui fournit à l’appareil (13a, 13b) une énergie électrique.

3. Système de commande (10) selon la revendication 2, dans lequel le dispositif commandé (12a, 12b) comprend en outre un compteur d’électricité pour mesurer une consommation d’énergie électrique de l’appareil (13a, 13b) connecté au dispositif commandé (12a, 12b).

4. Système de commande (10) selon la revendication 1, dans lequel l’au moins un dispositif commandé (12a, 12b, 14a, 14b) comprend en outre un thermostat à commande à distance comprenant :

un dispositif de mesure pour mesurer une consommation d’énergie thermique de l’appareil connecté au thermostat ;
un actionneur pour commander un niveau de sortie d’énergie thermique.

5. Système de commande (10) selon l’une des revendications précédentes, dans lequel les signaux de données envoyés du dispositif commandé (12a, 12b, 14a, 14b) et/ou du thermostat à commande à distance au dispositif de commande (11) comprennent des données de la consommation d’énergie mesurée de l’appareil connecté à l’un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b).

6. Dispositif commandé (12a, 12b) destiné à une utilisation dans un système selon l’une des revendications 1 à 5, dans lequel le dispositif commandé (12a, 12b) est connecté sans fil à un dispositif de commande (11), comprend un émetteur-récepteur, un processeur, et une mémoire, et est configuré pour recevoir des signaux de commande du dispositif de commande, envoyer des signaux de données au dispositif de commande (11), et est en outre configuré pour être connecté à un appareil (13a, 13b) ;
caractérisé en ce que
comprenant en outre une bague fonctionnelle (24) détachable qui comprend une pluralité de broches pouvant être branchées dans des prises correspondantes du dispositif commandé (12a, 12b) et indiquant au dispositif commandé (12a, 12b) la fonction de l’appareil (13a, 13b) qui doit être connecté au dispositif commandé (12a, 12b).

7. Dispositif commandé (12a, 12b) selon la revendication 6, dans lequel la bague fonctionnelle (24) est colorée, la couleur indiquant à l’utilisateur la fonction d’un appareil approprié à être connecté au dispositif commandé (12a, 12b).

8. Procédé destiné à une utilisation dans un système de commande (10) comprenant un dispositif de commande (11) et au moins un dispositif commandé (12a, 12b, 14a, 14b) connecté sans fil au dispositif de commande (11), le procédé comprenant :

la transmission, par le dispositif de commande (11), de signaux de commande à l’au moins un dispositif commandé (12a, 12b, 14a, 14b) ;
la réception, par le dispositif de commande (11), de signaux de commande de l’au moins un dispositif commandé (12a, 12b, 14a, 14b) ;
la mesure, par l’au moins un dispositif commandé (12a, 12b, 14a, 14b), d’une consommation d’énergie d’appareils (13a, 13b, 13c, 13d) connectés à l’au moins un dispositif commandé (12a, 12b, 14a, 14b) ;
dans lequel les signaux de commande comprennent des commandes pour exécuter au moins une parmi les étapes suivantes :

l’envoi par un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) de signaux de données au dispositif de commande (11), les signaux de données comprenant les valeurs de consommation d’énergie mesurées d’un appareil (13a, 13b, 13c, 13d) connecté à l’un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) ;
l’alimentation ou la coupure d’alimentation par un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) d’un appareil (13a, 13b, 13c, 13d) connecté à l’un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) ;
l’alimentation ou la coupure d’alimentation...
par un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) d’un appareil (13a, 13b, 13c, 13d) connecté à l’un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) à un moment défini par l’utilisateur ;
la réduction par un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) de l’énergie fournie à un appareil (13a, 13b, 13c, 13d) connecté à l’un parmi l’au moins un dispositif commandé (12a, 12b, 14a, 14b) ;

caractérisé par
la fixation d’une bague fonctionnelle (24) détachable à un dispositif commandé (12a, 12b) parmi l’au moins un dispositif commandé qui doit être connecté à un appareil (13a, 13b),
dans lequel la bague fonctionnelle (24) comprend une pluralité de broches pouvant être branchées dans des prises correspondantes du dispositif commandé (12a, 12b) et indiquant au dispositif commandé (12a, 12b) la fonction de l’appareil (13a, 13b) qui doit être connecté au dispositif commandé (12a, 12b).
REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader’s convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

• DE 10336462 [0008]