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(54) Title: SYSTEM FOR CONTROLLING ONE OR MORE ELECTRICAL OR ELECTRONIC APPLIANCES

(57) Abstract: System (1) for controlling one or more electrical or electronic appliances (120, 140, 150, 160, 170), the system (1) comprising an apparatus provided with a Wi-Fi router module (5) and a web-server module (6), the Wi-Fi router module (5) being configured to connect to one or more information devices through at least one connection selected from the group comprising Wi-Fi connections, wired connections, and remote Internet connections, the Wi-Fi router module (5) being connected to the web-server module (6) that is configured to make at least one web page available to said one or more information devices through the Wi-Fi router module (5) and to generate digital control signals for each one of said one or more electrical or electronic appliances (120, 140, 150, 160, 170), wherein each digital control signal corresponds to a command selected in said at least one web page by said one or more information devices, the system (1) further comprising a power driver module (7) configured to be connected to said one or more electrical or electronic appliances (120, 140, 150, 160, 170), wherein the power driver module (7) is configured to receive from the web-server module (6) said digital control signals and to generate corresponding power controls for said one or more electrical or electronic ap-
The present invention concerns a system for controlling one or more electrical or electronic appliances, in particular a universal system easy to install for managing electrical or electronic loads, e.g., for instance one or more electrical or electronic appliances installed in a house or in an office, optionally based on Ethernet protocol compatible with one or more portable information devices provided with Wi-Fi connection, such as smartphones and tablets, and optionally capable to connect to one or more information devices via cable. The system according to the invention is simple to install and use and it allows in an inexpensive, versatile, reliable and efficient way, to implement a domotic control of one or more even already existing electrical or electronic appliances, e.g. installed in a house or in an office.

In the last years, the use of domotic systems for controlling and/or automating electrical or electronic appliances inside offices and houses is continuous growing, thanks to the great benefits that these can bring both for environmental comfort and safety, and for energy saving and management. In fact, the technological equipments determining the functioning, enjoyment and proper living conditions within the spaces where one or more users live and/or work, when provided with suitable devices or systems for control, regulation and automation, are capable to ensure important technical and economic results in the context of houses and offices, e.g. in relation to lighting and/or heating and/or air conditioning and/or ventilation.

Several systems for remotely controlling electrical or electronic appliances have been proposed in the prior art.

Among these, document No. US 2013/346300 A1 discloses a network system through which commercial electric appliances are communicably connected to a specific control device to remotely control the commercial electric appliances. By way of example, an embodiment of such network system, disclosed in document No. US 2013/346300 A1 with reference to Figures 7-9 thereof, comprises a plurality of commercial electric appliances, installed in a commercial store, and a connection device (such as a personal computer or a mobile phone), wherein the commercial electric appliances and the connection device are communicably connected to a server through which they exchange information with each other; in particular, the connection device may be communicably connected to the server through an Internet or Wi-Fi connection. Each electrical appliance comprises a power driving unit (called driving unit) performing the
function of the same electrical appliance, a first communication unit for transmitting
information with respect to the operation and the state of the electric appliance to the outside
(in particular to the external connection device through the server) and for receiving
information from the outside, and a logic control electronics (called product input unit) capable
to give a predetermined command signal to the power driving unit corresponding to the
information received from the external connection device through the server. In other words,
when a user wishes to use one of the commercial electric appliances installed in the
commercial store, he controls the operation of such appliance with the connection device that
is connected, through the server, to the logic control electronics of the same appliance, which
quale logic control electronics transmits corresponding digital control signals to the power
driving unit that in turn generates power controls for the operation of the same appliance. In
this regard, this is evident also from the wording "communicably connected" that is constantly
used in document No. US 2013/346300 Al with reference to the exchange of data and logic
information; e.g., document No. US 2013/346300 Al specifies in paragraph [0078] that both
the commercial electric appliance and the connection device (e.g. a mobile phone) are
communicably connected to the server: a mobile phone communicably connecting to a server,
onoptionally via Wi-Fi_33, may exclusively transmit data and logic information, i.e. digital
signals (certainly not power controls), whereby the same applies to the data exchange
between the commercial electric appliance and the server which are also defined as
"communicably connected" to each other (the fact that the information exchanged between
the commercial electric appliance and the connection device through the server is data and
logic information, i.e. digital signals, is constantly mentioned in document No. US 2013/346300
Al, e.g. in paragraphs [0073] and [0083]-[0085] and in the description of the reservation
process of a commercial electric appliance given with reference to Fig. 9; the same applies to
the other embodiments of the network system of document No. US 2013/346300 Al, e.g. see
paragraphs [0039], [0041], [0044] and [0049]).

The network system of document No. US 2013/346300 Al requires that at least one
between the connection device (used by the user for controlling the commercial electric
appliances) and the server may process the digital command data input by the user through
the connection device so as to generate digital control signals complying with the various
specific logic communication protocols used by (the logic control electronics of) each single
commercial electric appliance. This entails that the network system of document No. US
2013/346300 Al is complex, expensive to make and to install (in fact, installers must have high
skills since they have to access the logic control electronics of the commercial electric
appliance that must be modified in order to be able to perform the complex information
communications of such network system), and expensive to maintain (since it must be capable
to add further logic communication protocols in the case where additional appliances are
installed and to follow the updates of the same protocols made by the companies
manufacturing commercial electric appliances).

In order to only partially solve such problem, also considering that many companies
manufacturing commercial electric appliances do not publicly disclose their proprietary logic
communication protocols, starting from the teaching of document No. US 2013/346300 Al the
person skilled in the art would have adapted the network system disclosed therein by using
only commercial electric appliances manufactured by a sole manufacturing company, the
proprietary protocol of which is publicly disclosed, arriving at a system that, however, would
still require a high skills of the installers, who should in any case access the logic control
electronics, and/or that would increase the manufacturing costs, thus obtaining a modified
network system that would be not at all versatile and flexible and that could not be generally
applied to any electrical appliance even already existing.

It is an object of the present invention to overcome the drawbacks described
hereinbefore, allowing in a simple, inexpensive, versatile, reliable and efficient way to control
the operation of one or more electrical or electronic appliances, optionally even already
existing, e.g. installed in a house or in an office.

It is specific subject matter of the present invention a system for controlling one or
more electrical or electronic appliances, the system comprising an apparatus provided with a
Wi-Fi router module and a web-server module, the Wi-Fi router module being configured to
connect to one or more information devices through at least one connection selected from the
group comprising Wi-Fi connections, wired connections, and remote Internet connections, the
Wi-Fi router module being connected to the web-server module that is configured to make at
least one web page available to said one or more information devices through the Wi-Fi router
module and to generate digital control signals for each one of said one or more electrical or
electronic appliances, wherein each digital control signal corresponds to a command selected
in said at least one web page by said one or more information devices, the system further
comprising a power driver module configured to be connected to said one or more electrical or
electronic appliances, wherein the power driver module is configured to receive from the web-server module said digital control signals and to generate corresponding power controls for said one or more electrical or electronic appliances.

According to another aspect of the invention, the Wi-Fi router module may be configured to be connected through a wired connection, optionally by means of a RJ45 network socket, to an information device, optionally a personal computer and/or a router.

According to a further aspect of the invention, the power driver module may be at least partially installed externally the apparatus.

According to an additional aspect of the invention, the power driver module may be provided with at least one backup battery.

According to another aspect of the invention, the power driver module may be connected to the web-server module through wired connection, optionally through copper connections and/or one or more UTP cables, and/or it is configured to be connected to the web-server module through Wi-Fi connection by means of the Wi-Fi router module.

According to a further aspect of the invention, the power driver module may comprise one or more relay modules configured to generate said power controls in function of said digital control signals, each relay module comprising one or more relays, the outputs of which are optionally provided with electrical protection fuses connected to respective electrical or electronic appliances.

According to an additional aspect of the invention, each one of said digital control signals may have a binary logic value selected between "0" and "1", wherein the two values "0" and "1" optionally correspond respectively to a power-off command and to a power-on command for an electrical or electronic appliance corresponding to the digital control signal.

According to another aspect of the invention, the web-server module may be configured to interact with the Wi-Fi router module through Ethernet protocol based on static IP address.

According to a further aspect of the invention, the Wi-Fi router module may be provided with two, optionally directional, antennas through which it is configured to spread a Wi-Fi signal, the system optionally further comprising one or more replicator apparatuses configured to extend an coverage area of said Wi-Fi signal.

According to an additional aspect of the invention, the system may further comprise a power supply stage, configured to be connected to the mains and to charge a battery that is
configured to supply the system in case of lack of power supply from the mains.

According to another aspect of the invention, the Wi-Fi router module may be configured to protect through a first password the access to the system on the part of said one or more information devices, and/or the web-server module may be configured to protect through a second password the access to said at least one web page.

According to a further aspect of the invention, said one or more information devices to which the Wi-Fi router module is configured to connect may be selected from the group comprising smartphones, tablets, personal computers.

According to an additional aspect of the invention, the system may be provided with a video surveillance equipment comprising a central unit and one or more cameras, that is directly controlled by the web-server module, wherein the video surveillance equipment is optionally provided with image storage on electronic and/or magnetic medium, and the images acquired by the cameras are more optionally accessible and visible by one or more information devices through a Local Wi-Fi connection and/or through remote Internet connection to the web-server module.

The present invention is based on a system comprising an apparatus provided with a web-server module configured to make at least one web page available wherein a user, through one or more information devices, selects one or more commands that the web-server module translates into corresponding digital control signals for the electrical or electronic appliances to control (installed in an area, e.g. a house or office). The system according to the invention also comprises a power driver module that is configured to receive the digital control signals generated by the web-server module and to generate corresponding power controls for the electrical or electronic appliances which are sent directly to the power devices (e.g., motors, compressors, pumps, ovens) internal to the electrical or electronic appliances to control. In other words, the power driver module of the system operates as power board of the electrical or electronic appliances to control, since it directly interacts with the power devices of such appliances. In particular, the power driver module may optionally comprise power actuators or switches, such as relays, and it may be at least partially installed within the same apparatus of the system (along with the web-server module) and/or at least partially externally to the same, in this case optionally in proximity of the electrical or electronic appliances (whereby the power driver module may be external to the apparatus of the system and distributed in the area, such as a house or office, in which the electrical or electronic
appliances to control are installed).

Consequently, differently from the prior art domotic systems as that disclosed in document No. US 2013/346300 Al, the system according to the invention does not communicate with the logic control electronics of the electrical or electronic appliances to control, which often use, as stated above, proprietary protocols which are not publicly disclosed by the manufacturing companies, but it sends power controls (generally low-voltage electrical type) directly to the power devices internal to the electrical or electronic appliances to control, whereby it is not necessary to install complex, expensive and scarcely versatile and flexible modules as in the prior art domotic systems. In other words, the system according to the invention controls the electrical or electronic appliances getting down to a basic command level (i.e. a power control level) that directly interacts with the power devices of the appliances to control, bypassing the logic control electronics of the latter. This allows the system to also control electrical or electronic appliances already existing and installed in the area, such as a house or office, to which the system is applied. Moreover, such power controls are known by most installers, whereby also the system installation is simpler and much less expensive with respect to the prior art domotic systems, which, on the contrary, impose an encoding of the digital control signals complying with the specific logic communication protocols used by the logic control electronics of each single electrical or electronic appliance, which encoding requires installers having a special education and specific skills for the mounting and putting into service, considering that each manufacturing company uses its own protocols.

The web-server module of the apparatus of the system according to the invention optionally comprises a microcontroller with an on-board processor, that is advantageously programmable through a software optionally adaptable to the needs of the specific user of the area (e.g. a house or office) in which the electrical or electronic appliances to control are installed. In this way, the system according to the invention is capable to perform multiple functions, such as for instance temperature management through heating and/or air conditioning, anti-theft function, electrical load management promoting an energy saving, management of particular lighting scenarios, electrical control timing, control of movement of shutters, control of refrigeration, functions of water switching and/or gas switching and/or electrical switching, control of gates. This allows to easily customise and supplement the functions of the system according to the invention which each specific user wishes on the basis of his own living habits, guaranteeing a higher living comfort, whereby the system according to
the invention is extremely flexible and versatile.

The system according to the invention is easy to install and allows to manage electrical and/or electronic loads of a house or office by means of portable devices, such as smartphones and tablets of whatever type, brand and model, which are provided with a Wi-Fi connection, or even by means of stationary devices, such as personal computers, which are provided with physical or Wi-Fi connection. For the installation of the system according to the invention no interventions of invasive type on walls, which often damage the appearance of the building (e.g. house or office), are necessary. The installation of the system according to the invention and the use thereof by the users is extremely simple, fast, reliable and efficient. The architecture of the system according to the invention and its operating modes make it applicable in any building equipment situation, relieving the end user of the costs of remaking the domestic electrical wiring. In particular, the system may be easily industrially produced in series.

Optionally, the system according to the invention may comprise a video surveillance equipment, provided with a central unit (possibly implemented into the same web-server module of the apparatus of the system) and one or more cameras, that is controlled as the other electrical or electronic appliances, which video surveillance equipment is provided with image storage on electronic and/or magnetic medium, wherein the images acquired by the cameras may be viewed both locally through Wi-Fi connection and remotely through telephone line or internet connection to the web-server module. The video surveillance equipments currently available on the market are purchasable separately introducing a problem related to the spaces of a house or office, and very often this entails work for hiding the equipment, since it is not pleasant to see; differently, the apparatus of the system according to the invention is placed in a sole point of the house or office, performing all the video surveillance functions, and each room of the house or office may house an information device, such as a commercial tablet, for controlling all the functions, including the video surveillance one, that the system according to the invention is capable to perform, without any need of a wired connection with the equipment to which it connects, through the web-server module, via radio (i.e. via Wi-Fi).

The system according to the invention allows the optimisation of the use of the energy drawn from the mains by creating an infrastructure controlling the electrical loads. In this case, the customer assumes an active and conscious role, participating to the system management
with beneficial effects on the "energy bill".

The present invention permits to obtain numerous advantages with respect to the prior art solutions.

First of all, the system may be installed by an electrical installer who must not necessarily have high skills in the domotic field, since it is an integrated system wherein the electronics within the apparatus (in particular the web-server module) is already electrically interconnected and programmed so as to reduce the installation time avoiding any difficulty for the installer.

THz connections inside and outside the apparatus with the several appliances may be optionally made through a conventional UTP (Unshielded Twisted Pair) cable, more optionally category 5, that optionally has four pairs which may be employed for sending the digital control signals from the web-server module to the components of the power driver module installed externally to the apparatus (e.g. towards power actuators or switches, such as relays, installed in proximity of the electrical or electronic appliances), and/or signals to the devices of the possible video surveillance equipment, such as cameras, sensors, alarms. This connection technique favours the application of the system according to the invention to even not recent electrical wirings, whereby the system is even more compatible with most existing electrical wirings.

The apparatus of the system according to the invention, that internally integrates the devices (implemented through software and hardware) necessary to the user for the electrical and/or alarm and/or video surveillance and/or energy saving management, is advantageous because it does not entail any design nor customisation expense in relation to the area (e.g. a house or office) wherein the system is installed.

In order to guarantee compatibility and ease of connection of the apparatus (in particular of the web-server module thereof) to the components of the power driver module installed externally (e.g. in proximity of the electrical or electronic appliances), the power driver module may advantageously comprise relays already available on the market which have reduced size such that they can be housed in a junction box space (of the electrical wiring of the house or office), or in a switch box space (of the light control switches of the house or office). This allows an installation of the system according to the invention (in particular of the relays of the related power driver module) that is simpler, neater, faster and more inexpensive with respect to the prior art domotic systems, for which it is necessary to modify or insert new
wall boxes for inserting actuator devices.

The present invention will be now described, by way of illustration and not by way of limitation, according to its preferred embodiments, by particularly referring to the Figures of the annexed drawings, in which:

Figure 1 schematically shows a first perspective view of a first embodiment of the system according to the invention wherein the container of the apparatus is open and a second perspective view wherein the container of the apparatus is closed; and

Figure 2 schematically shows a second embodiment of the system according to the invention.

In the Figures identical reference numerals will be used for alike elements.

Making reference to Figure 1, it may be observed that a first embodiment of the system according to the invention (applied to an area, such as a house or office, in which one or more electrical or electronic appliances to control are installed) comprises an apparatus 1, having a container provided with a power supply socket 2 of IEC type with protection fuse, by means of which the apparatus 1 may be connected to the mains and supplied through a power supply cable of IEC type. The apparatus 1 is provided with a conventional power supply stage 3, with smart battery charger function, supplying the various components of the apparatus 1, favouring the smart charging of a battery 4 that ensures its safety and lifetime. In particular, the purpose of the battery 4 is to allow a full autonomy of the power supply of the apparatus 1, optionally for eight hours, even in case of lack of power supply from the mains. This allows the apparatus 1 to avoid that, upon return of the power supply from the mains, commands previously given for controlling the electrical or electronic appliances reset albeit stored, hence allowing to continue to normally use the system according to the invention.

The apparatus 1 also comprises a Wi-Fi router module 5, optionally operating as Wi-Fi Ethernet controller and converter module, that allows communication of the various components of the apparatus 1, and permits to remotely access the apparatus 1 on the part of the installers and end users.

The apparatus 1 also comprises a web-server module 6, configured to interact with the Wi-Fi router module 5 and with a power driver module 7, wherein the web-server module 6 is connected to both the Wi-Fi router module 5 and the power driver module 7. In particular, the interaction of the web-server module 6 with the Wi-Fi router module 5 optionally occurs through Ethernet protocol based on static IP address, while the interaction of the web-server
module 6 with the power driver module 7 optionally occurs by sending digital control signals, having binary logic value selected between "0" and "1" for each single digital control signal, from the former to the latter. The power driver module 7, comprising one or more power actuators or switches, optionally relays, is configured to acquire from the web-server module 6 the binary logic value of the digital control signals and to generate corresponding power controls to send to one or more electrical or electronic appliances to control (not shown in the Figure).

Although in the first embodiment of the system according to the invention shown in Figure 1 it is mounted internally to the apparatus 1, nevertheless it must be noted that in other embodiments of the system according to the invention the power driver module 7 may be also mounted at least partially externally to the apparatus 1, optionally in proximity of at least one part of the electrical or electronic appliances to control, in order to avoid invasive interventions for the user. In this case, the single components of the power driver module 7 (e.g. relays) which are mounted externally to the apparatus 1 communicate with the latter through electrical connection, optionally by using UTP cables, and/or through Wi-Fi connection, where in this case the component is provided with an integrated Wi-Fi communication device and optionally with a small backup battery.

In particular, the apparatus 1 comprises a reset button 10, that implements an antipanic function allowing to avoid critical situations for the system according to the invention, giving to the end user the possibility to restore the same system, by allowing to reset the commands in off position, if the user leaves the house or office and there is no power supply from the mains, also avoiding that the user, getting back to the house or office, finds one or more of the controlled electrical or electronic appliances that is activated, for instance the lighting that is on. In particular, such antipanic function is assisted by the presence of backup batteries in the components of the power driver module 7 which are mounted externally to the apparatus 1.

The apparatus 1 further comprises a first led 8 that, optionally when on, indicates that the apparatus 1 is supplied by the mains and a second led 9 that, optionally when on, indicates that the apparatus 1, in case of lack of power supply from the mains, will continue to operate with the auxiliary power supply provided by the internal battery 4 (and by the possible backup batteries within the components of the power driver module 7 which are mounted externally to the apparatus 1).
The apparatus 1 also comprises a RJ45 network socket 11 that allows, for instance an installer or a user, to program the components of the apparatus 1 (in particular of the web-server module 6) and that allows the apparatus 1 to be connected on a device router for being capable to have the remote control of the apparatus 1 (in particular of the web-server module 6). The methods of accessing the apparatus 1 do not change and remain the same when either the access occurs through one or more local information devices (e.g. smartphones, tablets, personal computers) through Wi-Fi connection, or via cable, or remotely through a telephone provider (e.g. through the network socket 11), optionally by means of Internet connection.

The local connection, made through information devices (e.g. smartphones, tablets, personal computers) present in the various rooms of the house or office to which the system according to the invention is applied is at no cost. If the connection is made from the outside regardless of the distance of the information devices from the house or office, the cost is that charged to the Internet traffic. From tests carried out by the inventor, traffic consumption is rather low, since the system according to the invention (i.e. the web-server module 6 through the Wi-Fi router module 5) only limits to receive and update the essential information, capable to transmit to the remote user the events related to the possible power-on of electrical or electronic appliances of the house or office. In this way, the remote user may decide to execute the same commands which he normally executes when inside the house.

In particular, the system according to the invention may control building doors and garage up-and-over doors, thus operating as door opener at no cost by using Wi-Fi, being advantageous for people with physical disabilities, since with an information device, e.g. a smartphone or tablet, they are capable to activate electrical and/or electronic events of electrical or electronic appliances.

The apparatus 1 further comprises two, optionally directional, antennas 13 connected to the Wi-Fi router module 5, which complete the Wi-Fi section of the apparatus 1.

Access to the apparatus 1 is optionally protected by two safety codes (although the number of the safety codes is not an essential feature of the system according to the invention) settable by the end user for privacy purposes. The first safety code protects the access to the Wi-Fi section of the apparatus 1 (i.e. including Wi-Fi router module 5 and antennas 13), while the second safety code protects the access to a web page (made available by the web-server module 6) optionally provided with a synoptic panel, wherein commands for commandable events (of the operation) of the electrical or electronic appliances are present,
which commands have been selected by the user during programming of the system according to the invention (and of the apparatus 1, with particular reference to the web-server module 6) and which he can hence control by accessing the web page. This makes the system according to the invention highly flexible and versatile in terms of installation, and most of all usable in a wide application field within a house or office.

Another advantage of the present invention is given by the reduction of the time for making a building electrical wiring, since all the commands which are normally activated (e.g. the switch for turning a lamp on) are eliminated because they are virtualised on a display of an information device downloading the web page made available by the web-server module 6, hence avoiding interventions on the walls, also improving the aesthetic appearance, and minimising the final cost of the electrical wiring. Another advantage of the present invention is the possibility to control electrical or electronic appliances with low energy consumption. It is evident that the examples of application are very broad and they may not be all described in herein; consequently, there are no limitations to the system.

The various components of the apparatus 1 are advantageously mounted on a stainless steel plate by means of insulated supports allowing to space apart the electronic components, also favouring a greater ventilation. Moreover, such plate is optionally connected to the same earth potential, thus guaranteeing safety and protection to the apparatus 1, shielding the latter from possible phenomena of electrical interferences induced on the same. The various electronic components of the apparatus 1 are connected through copper connections; advantageously, for a better differentiation, the cable bundles are separated on the basis of their function and marked with a name so as to make the installer or maintenance technician immediately understand which connection is made with the various electronic components inside the apparatus 1, in order to optimise the time of intervention on the part of the maintenance staff. Internal wiring are optionally insulated with fireproof braided sheath, guaranteeing electrical safety to the apparatus 1; all the connection nodes on the various terminal blocks of the electronic parts are made with the aid of end leads, in order to guarantee an optimal electrical connection. The apparatus 1 may be internally provided with leds (not shown in Figure 1) which allow to display in real time a diagnosis (i.e. the state) of the digital control signals generated by the web-server module 6 and of the power controls generated by the power driver module 7.

The apparatus 1 does not need particular maintenance, apart from the battery 4 that
must be periodically replaced, in particular with batteries available nowadays on the market which are replaceable every two years.

The Wi-Fi router module 5 permits the connection to the telephone network (e.g. through the socket 11); it is possible to set therein the first-level password for the access from the outside or through Wi-Fi network. The same Wi-Fi router module 5 allows to spread the Wi-Fi signal by means of two small, optionally directional, antennas 13; optionally, the signal emitted by the antennas 13 may be replicated and hence it is possible to extend its coverage area on the basis of the size of the house with conventional replicator apparatuses.

The web-server module 6 performs a web-server function, making a web page available to the Wi-Fi router module 5 through Ethernet protocol at a defined IP address set by the user. Access is allowed only to the users having the access codes (i.e. the password), who may access the internal functions and hence have the possibility to make graphic changes to the web page, allowing the user to customise such web page on the basis of the needs of the house or office. Finally, it is possible to replace the password in case of need, or replace the IP address of the web page of the apparatus 1 for rendering the same compatible with other network-connected information devices through Wi-Fi connection. Moreover, the web-server module 6 is capable to generate the logic pulses corresponding to the commands given by the user through the web page, i.e. digital control signals for each one of said one or more electrical or electronic appliances. Such digital control signals are logic because they are binary and they assume alternatively level (i.e. value) "0" and "1"; by way of example, and not by way of limitation, the level "0" may correspond to the power-off command of the related appliance, while the level "1" may correspond to the power-on command.

The web-server module 6 is capable to generate a logic digital signal for each single command that is not capable to drive an electrical or electronic load of an appliance due to the power required by such loads; for this reason, the power driver module 7 interprets the logic digital signal coming from the web-server module 6, implementing the power controls, i.e. generating the corresponding power controls of the electrical or electronic appliances, optionally through relay modules capable to drive an electrical/electronic load. In this regard, the web-server module 6 may be provided with a relay for each single command selectable by a user for controlling the electrical or electronic appliances installed in the house or office; by way of example, a relay module may contain eight relays and relay modules may be added and delocalised (i.e. mounted externally to the apparatus 1) in several points of the house or office,
depending on the user's needs and the number of electrical or electronic appliances to command through the already existing electrical wiring. Each single output of the web-server module 6 is provided with fuse in order to guarantee electrical protection to the appliance to command.

The power driver module 7 is optionally provided with input terminals for the digital control signals coming from the web-server module 6 and with output terminals for its connection to the electrical/electronic loads of the appliances to command. The same outputs may be advantageously free contacts, hence it is easy to understand that the apparatus 1 may control whatever electrical or electronic appliance that can be controllable (e.g. a lighting system, a boiler that can be turned on or off, an anti-theft system that can be switched on or off, a motor for moving a garage up-and-over door that may be open or closed, an electromechanical device for opening and closing a water or gas system).

The apparatus 1 of Figure 1 further comprises a hole 12 allowing an easy passage of the cables coming from the power driver module 7 mounted internally to the container of the apparatus 1 and connected to the electrical or electronic appliances to control or of the cables for the digital control signals coming from the web-server module 6 and getting to the components of the power driver module 7 which are mounted externally to the container of the apparatus 1. Advantageously, the container of the apparatus 1 is made of fireproof plastic material, with front leaf that can be opened for an easy access to the internal components of the same apparatus 1.

Figure 2 shows a second embodiment of the system according to the invention, wherein the power driver module 7 mounted externally to the container of the apparatus 1 in several points of a house 100 in proximity of electrical or electronic appliances to control. In particular, it may be observed that the web-server module 6 of the apparatus 1 is connected to:

- a first relay 71, that is capable to generate power controls for controlling a lamp 120;
- a second relay 72, that is capable to generate power controls for an electric meter 140 for switching the power supply from the mains on or off;
- a third relay 73, that is capable to generate power controls for controlling a boiler 150 for heating the house 100;
- a fourth relay 74, that is capable to generate power controls for operating at least one electromechanical device 160 for opening and closing a water system; and
a fifth relay 75, that is capable to generate power controls for operating at least one
electromechanical device 170 for opening and closing a gas system.

Moreover, the system of Figure 2 is provided with a video surveillance equipment
comprising a central unit 110 and one or more cameras 130, that is directly controlled by the
web-server module 6 of the apparatus 1; in particular, the central unit 110 may be at least
partially integrated within the same apparatus 1 and/or at least part of its functionalities may
be implemented in the web-server module 6. Advantageously, the video surveillance
equipment is provided with image storage on electronic and/or magnetic medium, wherein the
images acquired by the cameras may be viewed both locally through Wi-Fi connection and
remotely through telephone line or Internet connection to the web-server module.

In other words, the system according to the invention, in particular in its preferred
embodiments, comprises electronic elements interconnected to each other, capable to
manage electrical and/or electronic loads for houses and for offices.

The system according to the invention is innovative, since it offers to the user of the
house or office the possibility to locally and remotely manage his own electrical wiring through
the use of whatever information device such as smartphones, tablets, personal computers
provided with a network connection of Wi-Fi type or via cable.

The system according to the invention is provided with a module 5 performing the
function of Wi-Fi router, that permits the connection to the system on the part of information
devices of the user.

The system according to the invention is provided with a module 6 performing the
function of web-server and encoder of the commands given by the user.

The system according to the invention is provided with a module 7, performing the
function of power board activating the commands of the electrical and/or electronic loads
given by the module 6.

The system according to the invention is provided with components 3 and 4, which
guarantee an adequate power supply and continuity of service of the system, also in case of
lack of power supply from the mains providing the service.

The system according to the invention complies with the regulations related to
electrical hazards, it is easily industrially produced in series, it is easy to install and simple to
use by the end user.

The preferred embodiments of this invention have been described and a number of
variations have been suggested hereinbefore, but it should be understood that those skilled in
the art can make other variations and changes without so departing from the scope of
protection thereof, as defined by the attached claims.
CLAIMS

1. System (1) for controlling one or more electrical or electronic appliances (120, 140, 150, 160, 170), the system (1) comprising an apparatus provided with a Wi-Fi router module (5) and a web-server module (6), the Wi-Fi router module (5) being configured to connect to one or more information devices through at least one connection selected from the group comprising Wi-Fi connections, wired connections, and remote Internet connections, the Wi-Fi router module (5) being connected to the web-server module (6) that is configured to make at least one web page available to said one or more information devices through the Wi-Fi router module (5) and to generate digital control signals for each one of said one or more electrical or electronic appliances (120, 140, 150, 160, 170), wherein each digital control signal corresponds to a command selected in said at least one web page by said one or more information devices, the system (1) further comprising a power driver module (7) configured to be connected to said one or more electrical or electronic appliances (120, 140, 150, 160, 170), wherein the power driver module (7) is configured to receive from the web-server module (6) said digital control signals and to generate corresponding power controls for said one or more electrical or electronic appliances (120, 140, 150, 160, 170).

2. System (1) according to claim 1, characterised in that the Wi-Fi router module (5) is configured to be connected through a wired connection, optionally by means of a RJ45 network socket (11), to an information device, optionally a personal computer and/or a router.

3. System (1) according to claim 1 or 2, characterised in that the power driver module (7) is at least partially installed externally the apparatus (1).

4. System (1) according to claim 3, characterised in that the power driver module (7) is provided with at least one backup battery.

5. System (1) according to any one of the preceding claims, characterised in that the power driver module (7) is connected to the web-server module (6) through wired connection, optionally through copper connections and/or one or more UTP cables, and/or it is configured to be connected to the web-server module (6) through Wi-Fi connection by means of the Wi-Fi router module (5).

6. System (1) according to any one of the preceding claims, characterised in that the power driver module (7) comprises one or more relay modules configured to generate said power controls in function of said digital control signals, each relay module comprising one or more relays (71, 72, 73, 74, 75), the outputs of which are optionally provided with electrical
protection fuses connected to respective electrical or electronic appliances (120, 140, 150, 160, 170).

7. System (1) according to any one of the preceding claims, characterised in that each one of said digital control signals has a binary logic value selected between "0" and "1", wherein the two values "0" and "1" optionally correspond respectively to a power-off command and to a power-on command for an electrical or electronic appliance (120, 140, 150, 160, 170) corresponding to the digital control signal.

8. System (1) according to any one of the preceding claims, characterised in that the web-server module (6) is configured to interact with the Wi-Fi router module (5) through Ethernet protocol based on static IP address.

9. System (1) according to any one of the preceding claims, characterised in that the Wi-Fi router module (5) is provided with two, optionally directional, antennas (13) through which it is configured to spread a Wi-Fi signal, the system (1) optionally further comprising one or more replicator apparatuses configured to extend an coverage area of said Wi-Fi signal.

10. System (1) according to any one of the preceding claims, characterised in that it further comprises a power supply stage (3), configured to be connected to the mains and to charge a battery (4) that is configured to supply the system (1) in case of lack of power supply from the mains.

11. System (1) according to any one of the preceding claims, characterised in that the Wi-Fi router module (5) is configured to protect through a first password the access to the system (1) on the part of said one or more information devices, and/or the web-server module (6) is configured to protect through a second password the access to said at least one web page.

12. System (1) according to any one of the preceding claims, characterised in that said one or more information devices to which the Wi-Fi router module (5) is configured to connect are selected from the group comprising smartphones, tablets, personal computers.

13. System (1) according to any one of the preceding claims, characterised in that it is provided with a video surveillance equipment comprising a central unit (110) and one or more cameras (130), that is directly controlled by the web-server module (6), wherein the video surveillance equipment is optionally provided with image storage on electronic and/or magnetic medium, and the images acquired by the cameras are more optionally accessible and visible by one or more information devices through a Local Wi-Fi connection and/or through
remote Internet connection to the web-server module (6).
Fig. 2
A. CLASSIFICATION OF SUBJECT MATTER

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)
H04L

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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See patent family annex.

Date of the actual completion of the international search
4 February 2016

Date of mailing of the international search report
15/02/2016

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016

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Sager, Bernard
<table>
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