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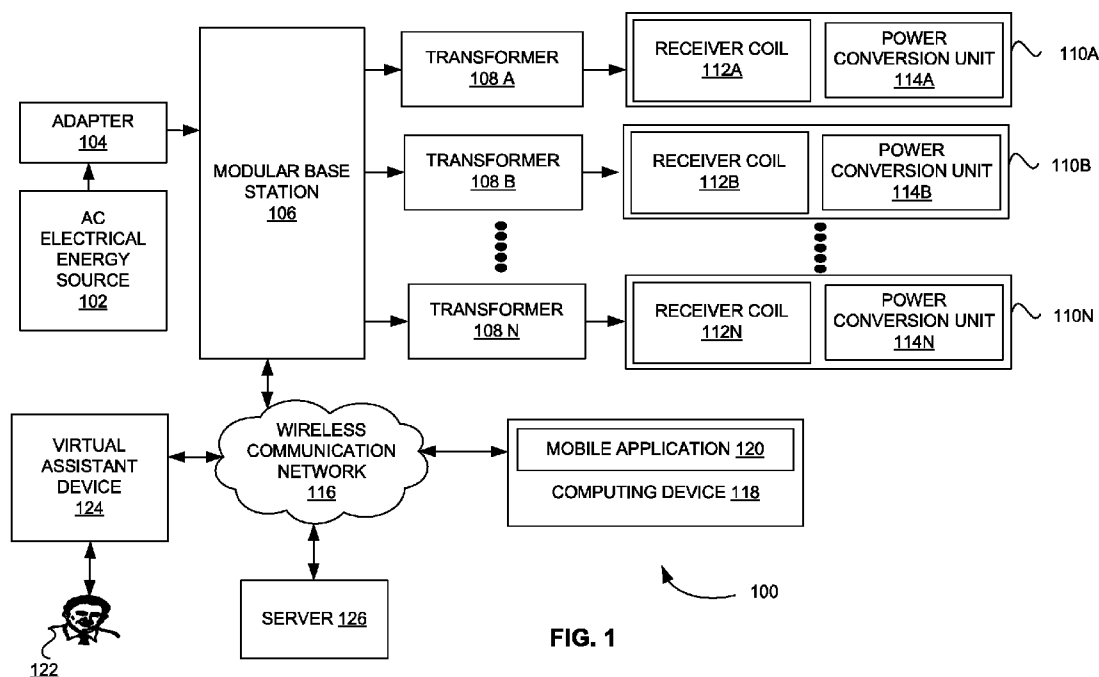


FIG. 1

(57) Abstract: A system for wirelessly managing the functional units (110A-N) using a computing device that includes a modular base station (106), a first functional unit (110A), a second functional unit (110B) and a computing device (118). The modular base station (106) includes a first induction coil (402), a second induction coil (404), a signal receiver (406) and a signal transmitter (408). The first induction coil (402) and second induction coil (404) generates a first and second set of electromagnetic waves respectively. The first functional unit (110A) includes a first receiver coil (112A), and a first power conversion unit (114A). The second functional unit (110B) includes a second receiver coil (112B) and a second power conversion unit (114B). The first power conversion unit (114A) converts first set of electromagnetic waves into a first control signal. The second power conversion unit (114B) converts second set of electromagnetic waves into a second control signal.

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SYSTEM AND METHOD FOR WIRELESSLY MANAGING A PLURALITY OF FUNCTIONAL UNITS USING A COMPUTING DEVICE

BACKGROUND

Technical Field

[0001] Embodiments herein generally relate to a wireless assembly of functional units, and more particularly, to a system and method for wirelessly managing a plurality of functional units using a computing device.

Description of the Related Art

[0002] Conventionally, electricity is transmitted via a wired power supply device to electric equipment that performs functions such as lighting, image capture etc. When the electric equipment, such as lamps, fans, temperature control devices, cameras, sensors speakers, and screens require multi-directional rotation for operation, wires of the power supply device may get twisted or even broken due to the rotation. As a result, application of the external electric equipment (e.g., functional units) is limited to the extent of rotation allowed by the wires of the power supply device, thus limiting an angle of operation of the external electric equipment. Most common electrical equipment typically has complicated wire connections when there are a large number of outputs. Further, there is a limit to the flexibility in configuring combinations of such functional units due to the wiring.

[0003] Conventional technologies increase the complexity of deploying such functional units (e.g., lights, fans, temperature controllers, smoke alarms, cameras, speakers etc.), when there is a need for different applications in homes, at party halls, restaurants, event venues, etc. Also, a technician working with the equipment faces inconvenience while moving the entire assembly from one place to another. The wires need to be changed frequently, else the wires may get damaged and that may lead to accidents. Due to this, maintenance costs of conventional assemblies are high. Further, different combinations of electrical or electronic equipment with different functionalities may be required at different times. Planning, configuring, and assembling such multi-functional systems is a major challenge, particularly in existing wired systems.

[0004] Accordingly there remains a need for a less cumbersome approach for assembling and configuring combinations of electrical functional units.

SUMMARY

[0005] In view of the foregoing, an embodiment herein provides a system for wirelessly managing one or more functional units using a computing device. The system includes a modular base station, a first functional unit, a second functional unit and a computing device. The modular base station includes a first induction coil, and a second induction coil, a signal receiver, and a signal transmitter. The first induction coil generates a first set of electromagnetic waves when a first signal is wirelessly communicated from the computing device to a first functional unit. The second induction coil generates a second set of electromagnetic waves when a second signal is wirelessly communicated from the computing device to a second functional unit. The signal receiver receives the first signal and the second signal. The signal transmitter wirelessly transmits the first signal and the second signal. The first functional unit includes a first receiver coil and a first power conversion unit. The first receiver coil receives the first set of electromagnetic waves wirelessly from the signal transmitter of the modular base station. The first set of electromagnetic waves enables or disables one or more functionalities of the first functional unit. The first power conversion unit converts the first set of electromagnetic waves into a first control signal to control the first functional unit. The power conversion unit receives the first set of electromagnetic waves from the first receiver coil. The second functional unit includes a second receiver coil and a second power conversion unit. The second receiver coil receives the second set of electromagnetic waves wirelessly from the signal transmitter of the modular base station. The second set of electromagnetic waves enables or disables one or more functionalities of the second functional unit. The second power conversion unit converts the second set of electromagnetic waves into a second control signal to control the second functional unit. The second power conversion unit receives the second set of electromagnetic waves from the second receiver coil. The computing device (i) receives input from a user and (ii) processes the input of the user. The computing device wirelessly transmits the first signal and the second signal to the signal receiver. The computing device includes (a) a memory unit that stores a set of modules and (b) a processor that executes the

set of modules. The set of modules includes (i) configuration planning module, (ii) a remote controlling module. The configuration planning module implemented by the processor. The configuration planning module configures functionalities of the one or more functional units wirelessly to obtain a configuration, and communicates the configuration to the modular base station. The remote controlling module implemented by the processor. The remote controlling module controls the functionalities of the one or more functional units wirelessly by communicating with the modular base station.

[0006] In an embodiment, a remote monitoring module monitors the functionalities of the one or more functional units wirelessly based on input from at least one sensor coupled to at least one of the one or more functional units by communicating with the modular base station.

[0007] In another embodiment, a server includes a configuration database includes one or more pre-determined functionality configuration templates that specify a configuration of the one or more functional units.

[0008] In yet another embodiment, the first functional unit wirelessly communicates a first feedback signal to the modular base station. The first feedback signal includes a reading or an indication from a sensor associated with the first functional unit. The configuration planning module updates the configuration based on the feedback signal.

[0009] In yet another embodiment, the first functional unit is associated with a first category and the second functional unit is associated with a second category that is different from the first category. The first category and the second category are selected from (i) sound, (ii) light, (iii) ventilation, (iv) environment, (v) alarm, and (vi) image or video capture.

[0010] In yet another embodiment, a virtual assistant device processes a voice command from the user and (iii) communicates the voice command of the user to the server. The server matches the voice command of the user with metadata associated with the one or more pre-determined functionality configuration templates to find a matching pre-determined functionality configuration template that corresponds to the voice command of the user. The server communicates instructions that is associated with the matching pre-determined functionality configuration template to the modular base station.

[0011] In yet another embodiment, the server generates a new functionality configuration template based on the voice command of the user if the voice command of the

user does not match with metadata of any of the one or more pre-determined functionality configuration templates.

[0012] In yet another embodiment, each of the first functional unit and the second functional unit includes one or more sub-units that can be independently configured by the configuration planning module.

[0013] In one aspect, a method of wirelessly managing one or more of functional units is provided. The method includes the following steps: (a) receiving, using a computing device or a virtual assistant device, an input from a user; (b) processing, using the computing device or the virtual assistant device, the input of the user, wherein the computing device includes the mobile application; (c) configuring functionalities of the one or more functional units wirelessly based on the input to obtain a configuration; (d) communicating the configuration to the modular base station; (e) generating, using a first induction coil, a first set of electromagnetic waves when a first signal is received from the computing device or the virtual assistant device based on the configuration. (f) generating, using a second induction coil, a second set of electromagnetic waves when a second signal is received from the computing device or the virtual assistant device based on the configuration; (g) receiving, using a first receiver coil of a first functional unit, the first set of electromagnetic waves; (h) receiving, using a second receiver coil of a second functional unit, the second set of electromagnetic waves; (i) converting, using a first power conversion unit, the first set of electromagnetic waves into a first control signal to enable or disable one or more functionalities the first functional unit; and (j) converting, using a second power conversion unit, the second set of electromagnetic waves into a second control signal to enable or disable one or more functionalities the second power conversion unit.

[0014] In one embodiment, the method further includes the following steps: (i) receiving a voice command from the user at the virtual assistant device; (ii) communicating instructions that is associated with a matching predetermined functionality template out of the one or more pre-determined functionality configuration templates to the modular base station if the voice command of the user matches with one of the one or more pre-determined functionality configuration templates; and (iii) generating, a new functionality configuration template based on the voice command of the user if the voice command of the user does not

match with metadata of any of the one or more pre-determined functionality configuration templates.

[0015] These and other aspects of the embodiments herein will be better appreciated and understood when considered in conjunction with the following description and the accompanying drawings. It should be understood, however, that the following descriptions, while indicating preferred embodiments and numerous specific details thereof, are given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the embodiments herein without departing from the spirit thereof, and the embodiments herein include all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The embodiments herein will be better understood from the following detailed descriptions with reference to the drawings, in which:

[0017] FIG. 1 illustrates a system view of a wireless assembly of functional units that includes a modular base station connected to a plurality of transformers that are connected to a plurality of functional units, which are controlled using a computing device according to an embodiment herein;

[0018] FIG. 2 illustrates an exploded view of the computing device of FIG.1 according to an embodiment herein;

[0019] FIG. 3 is a flow diagram illustrating a process of configuring, monitoring, and controlling the plurality of functional units using a mobile application in the computing device of FIG. 1 according to an embodiment herein;

[0020] FIG. 4 illustrates a functional block diagram of the modular base station of FIG. 1 according to embodiment herein;

[0021] FIG. 5 illustrates a perspective view of the wireless assembly of functional units of FIG.1 connected to a ceiling according to an embodiment herein;

[0022] FIG. 6 illustrates a perspective view of the wireless assembly of functional units of FIG.1 connected to a floor according to an embodiment herein;

[0023] FIG. 7 illustrates a perspective view of the wireless assembly of functional units of FIG.1 connected to a wall according to an embodiment herein;

[0024] FIGS. 8A and 8B illustrate assembly of functional units of one category connected to a modular base station, according to an embodiment herein;

[0025] FIG. 9 illustrates a flow diagram illustrating a process of selecting a pre-determined configuration template from the plurality of pre-determined configuration templates using the server according to an embodiment herein; and

[0026] FIGS. 10A and 10B are flow diagrams illustrating a process for implementing the wireless assembly of functional units of FIG. 1 according to an embodiment herein.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0027] The embodiments herein and the various features and advantageous details thereof are explained more fully with reference to the non-limiting embodiments that are illustrated in the accompanying drawings and detailed in the following description. Descriptions of well-known components and processing techniques are omitted so as to not unnecessarily obscure the embodiments herein. The examples used herein are intended merely to facilitate an understanding of ways in which the embodiments herein may be practiced and to further enable those of skill in the art to practice the embodiments herein. Accordingly, the examples should not be construed as limiting the scope of the embodiments herein.

[0028] As mentioned, there remains a need for a less cumbersome approach for assembling and configuring combinations of electrical functional units. Referring now to the drawings, and more particularly to FIGS. 1 through 10, where similar reference characters denote corresponding features consistently throughout the figures, there are shown preferred embodiments.

[0029] FIG. 1 illustrates a system view of a wireless assembly of functional units 100 that includes a modular base station 106 connected to a plurality of transformers 108A-N that are connected to a plurality of functional units 110A-N, which are controlled using a computing device 118 according to an embodiment herein. The wireless assembly of functional units 100 includes an AC electrical energy source 102, an adapter 104, a modular base station 106, a plurality of transformers 108A-N, a plurality of functional units 110A-N, a wireless communication network 116, a computing device 118, a mobile application 120, a

user 122, a virtual assistant device 124 and a server 126. The modular base station 106 includes a first induction coil, a second induction coil, a signal receiver and a signal transmitter. The modular base station 106 receives power from the AC electrical energy source 102. The first induction coil generates a first set of electromagnetic waves when a first signal is wirelessly communicated from the computing device 118 to a first functional unit 110A. The second induction coil generates a second set of electromagnetic waves when a second signal is wirelessly communicated from the computing device 118 to a second functional unit 110B. The modular base station 106 receives the first signal and the second signal from the computing device 118. The modular base station 106 wirelessly transmits the first signal and the second signal to the plurality of functional units 110A-N. In one embodiment, the modular base station 106 wirelessly transmits the first signal and the second signal to the first receiver coil 112A and the second receiver coil 112B respectively.

[0030] The plurality of functional units 110A-N include a plurality of receiver coil (112A-N) and a plurality of power conversion units (114A-N). The plurality of receiver coil includes a first receiver coil 112A, a second receiver coil 112B. The plurality of power conversion units (114A-N) includes a first power conversion unit 114A and a second power conversion unit 114B. The first power conversion unit 114A may convert a first set of electromagnetic waves into a first control signal to enable or disable one or more functionalities the first functional unit 110A, and the second power conversion unit 114B may convert a second set of electromagnetic waves into a second control signal to enable or disable one or more functionalities the second functional unit 110B.

[0031] The AC electrical energy source 102 provides AC electrical energy to the wireless assembly of functional units 100. In one embodiment, the AC electrical energy source 102 receives power from a solar power source (DC) or public power distribution line (AC). If the AC electrical energy source 102 receives a DC electrical energy from the solar power source, the wireless assembly of functional units 100 may include an inverter for converting DC electrical energy to AC. The adapter 104 receives AC electrical energy from the AC electrical energy source 102. The adapter 104 is wirelessly connected to the modular base station 106.

[0032] The AC electrical energy may be transferred from the adapter 104 to the modular base station 106 using the principle of electro-magnetic induction. In one

embodiment, the AC electrical energy is transferred from the adapter 104 to the modular base station 106 using radio waves. In another embodiment, the AC electrical energy is transferred from the adapter 104 to the modular base station 106 using a resonance phenomenon of magnetic fields. The plurality of transformers 108A-N receives a standard line voltage AC electrical energy from the modular base station 106. In one embodiment, the transformer may be a step-up transformer. In another embodiment, the transformer may be a step-down transformer.

[0033] The plurality of transformers 108A-N reduces or increases the standard line voltage, depending on system requirements, and transmits the reduced/increased inputs to the plurality of functional units 110A-N. In one embodiment, the plurality of functional units 110A-N may be a chandelier unit or LED unit or any electronic or electrical device (e.g., fans, smoke alarms, temperature control devices, cameras, speakers, and air purifiers), of only one type or functionality (e.g., only lights, only sound, only fans, only air purifiers, only cameras, only color changing lights etc.).

[0034] The computing device 118 includes the mobile application 120. The computing device 118 receives input from the user 122. The computing device 118 processes the input of the user 122. The computing device 118 wirelessly transmits the first signal and the second signal to the signal receiver. The first induction coil generates the first set of electromagnetic waves when a first signal is wirelessly received from the computing device 118. The second induction coil generates the second set of electromagnetic waves when a second signal is wirelessly received from the computing device 118.

[0035] The first functional unit 110A includes the first receiver coil 112A and the first power conversion unit 114A. The second functional unit 110B includes the second receiver coil 112B and the second power conversion unit 114B. The first receiver coil 112A receives the first set of electromagnetic waves wirelessly from a signal transmitter (not shown in FIG. 1) of the modular base station 106. The first set of electromagnetic waves enables or disables one or more functionalities of the first functional unit 110A. The first power conversion unit 114A receives the first set of electromagnetic waves from the first receiver coil 112A and converts the first set of electromagnetic waves into the first control signal to control the first functional unit 110A. The first functional unit 110A wirelessly communicates a first feedback signal to the modular base station 106. The first feedback

signal includes a reading or an indication from a sensor associated with the first functional unit 110A. The mobile application 120 of the computing device 118 updates the configuration based on the feedback signal.

[0036] The second receiver coil 112B receives the second set of electromagnetic waves wirelessly from the signal transmitter (not shown in FIG. 1) of the modular base station 106. The second set of electromagnetic waves enables or disables one or more functionalities of the second functional unit 110B. The second power conversion unit 114B receives the second set of electromagnetic waves from the second receiver coil 112B and converts the second set of electromagnetic waves into a second control signal to control the second functional unit 110B. .

[0037] In another embodiment, the wireless functional units 100 may combine functional units of different types to assemble a multi-functional assembly of different types and/or functionalities (e.g., a combination of lights with fans, alarms, cameras, speakers, alarms, temperature control devices etc.). In one embodiment, the modular base station 106 may be connected with a combination of many lights and fans in a home or a commercial establishment. In another embodiment, the modular base station 106 connects with the cameras, sensors and alarms for security purposes. In yet another embodiment, the base station 106 connects with temperature controls devices, speakers etc.

[0038] The modular base station 106 receives signals from the plurality of functional units 110A-N and passes the received signals to the mobile device 118 through the wireless communication network 116. In one embodiment, the wireless communication network 116 may be an internet, or a mobile communication network. The computing device 118 monitors the activities of the plurality of functional units 110A-N using the received signal. The computing device 118 has the capability to control the activities (e.g., dimming lights, speed control on fans, cameras focus change, speakers sound level control etc.) of the plurality of functional units 110A-N. The modular base station 106 receives the control signals from the computing device 118 via the wireless communication network 116.

[0039] The modular base station 106 can be mounted in any environment, whether indoor or outdoor. Once the modular base station 106 is fixed, the plurality of functional units 110A-N can be placed or replaced based on choice, preferences, and the need of the hour. In one embodiment, a get together (e.g., a party or an event) in a particular space (e.g.,

outdoors) may require the modular base station 106 to control many lights and a few fans. In another embodiment, when the user 122 is travelling, the modular base station 106 may be assembled at home and can be mounted with cameras, sensors and/or alarms as functional units. In yet another embodiment, during a hot day, a set of fans can be mounted on the same modular base station 106 as functional units. The computing device 114 may control the plurality of functional units 110A-N based on the requirements of the user 122 by sending control signals to the plurality of functional units 110A-N via the wireless communication network 116 and/or the modular base station 106.

[0040] The server 126 includes a configuration database (e.g. not shown) that includes a plurality of predefined functionality configuration templates that can correspond to different scenarios (e.g., dinner, party, workout, romantic, cool, warm, etc). The plurality of predefined functionality configuration templates may include metadata such as a template identifier that enables the user 122 to retrieve an appropriate predefined functionality configuration template using the computing device 118 or the virtual assistant device 124.

[0041] In one embodiment, the computing device may be a virtual assistant device 124. In one embodiment, the virtual assistant device 124 is a wearable device. The user 122 may directly communicate to the virtual assistant device 124 with a wake word (E.g., Siri[®], Alexa[®]). The virtual assistant device 124 includes one or more microphones (not shown in the figure). The user 122 may provide a voice comment to the virtual assistant device 124. The virtual assistant device 124 receives and processes the voice command from the user 122. The virtual assistant device 124 matches the voice command of the user 122 with metadata associated with the plurality of pre-determined functionality configuration templates to find a matching pre-determined functionality configuration template that corresponds to the voice command of the user 122. The virtual assistant device 124 generates and sends/communicates a control signal (e.g. instructions that are associated with the matching pre-determined functionality configuration template) to the modular base station 106. The modular base station 106 receives the control signal of the virtual assistant device 124 from the server 126 via the wireless communication network 116. The virtual assistant device 124 may control the plurality of functional units 110A-N based on the user 122 requirements by sending control signals to the plurality of functional units 110A-N via the wireless communication network 116 and/or the modular base station 106. The server

122 generates a new functionality configuration template based on the voice command of the user 122 if the voice command of the user 122 does not match with metadata of any of the plurality of pre-determined functionality configuration templates.

[0042] In one embodiment, the first functional unit 110A is associated with a first category the second functional unit 110B is associated with a second category that is different from the first category. The first category and the second category are selected from (i) sound, (ii) light, (iii) ventilation, (iv) environment, (v) alarm, and (vi) image or video capture.

[0043] FIG. 2 illustrates an exploded view of a computing device 118 of FIG.1 according to an embodiment herein. The computing device 118 includes the mobile application 120. The mobile application 120 includes a configuration planning module 202, a remote monitoring module 204, and a remote controlling module 206. The configuration planning module 202 configures functionalities of the plurality of functional units (110A-N) wirelessly to obtain a configuration, and communicates the configuration to the modular base station 106.

[0044] The remote monitoring module 204 monitors the functionalities of the plurality of functional units 110A-N wirelessly based on input from at least one sensor coupled to at least one of the plurality of functional units 110A-N by communicating with the modular base station 106. The modular base station receives and passes the signals from the plurality of functional units 110A-N to the computing device 118 through the wireless communication network 116. The remote controlling module 206 controls the functionalities of the plurality of functional units 110A-N wirelessly by communicating with the modular base station 106 (e.g., dimming lights, speed control on fans, cameras focus change, speaker sound level control).

[0045] FIG. 3 is a flow diagram illustrating a process of configuring, monitoring, and controlling the plurality of functional units 110A-N using a mobile application 120 in the computing device 118 of FIG. 1 according to an embodiment herein. At step 302, functionalities of the plurality of functional units 110A-N is wirelessly configured to obtain a configuration, and communicates the configuration to the modular base station 106. At 304, the functionalities of the plurality of functional units 110A-N are wirelessly monitored based on input from at least one sensor coupled to at least one of the plurality of functional units

110A-N by communicating with the modular base station 106. At step 306, the functionalities of the plurality of functional units 110A-N are wirelessly controlled by communicating with the modular base station 106.

[0046] FIG. 4 illustrates a functional block diagram of the modular base station 106 of FIG. 1 according to embodiment herein. The modular base station 106 includes a first induction coil 402, a second induction coil 404, a signal receiver 406 and a signal transmitter 408. The modular base station 106 receives power from the electric power supply (e.g. AC electrical energy source 102). The first induction coil 402 generates a first set of electromagnetic waves when a first signal is wirelessly communicated from the computing device 118 to a first functional unit (110A). The second induction coil 404 generates a second set of electromagnetic waves when a second signal is wirelessly communicated from the computing device 118 to the first functional unit (110A). The signal receiver 406 receives the first signal and the second signal from the computing device 118. The signal transmitter 408 transmits the first signal and the second signal to the plurality of functional units 110A-N.

[0047] FIG. 5 illustrates a perspective view of the wireless assembly of functional units 500 of FIG.1 connected to a ceiling according to an embodiment herein. In the ceiling version of the wireless functional units 500, the AC electrical energy source 102 receives the AC electrical energy from public power distribution lines or solar power source. The AC electrical energy source 102 may be mounted on the ceiling. The adapter 104 (e.g., not shown) receives AC electrical energy from the AC electrical energy source 102. The adapter 104 is wirelessly connected to the modular base station 106. The AC electrical energy is transferred from the adapter 104 to the modular base station 106 by using electromagnetic induction, according to one embodiment. In one embodiment, the AC electrical energy is transferred from the adapter 104 to the modular base station 106 using radio waves. In another embodiment, the AC electrical energy is transferred from the adapter 104 to the modular base station 106 using the resonance phenomenon of magnetic fields. The plurality of transformers 108A-N (e.g., not shown) receives standard line voltage AC electrical energy from the modular base station 106. The plurality of transformers 108A-N reduces or increases the line voltage range, which depends on system requirements, and transmits the voltage to the plurality of functional units 110A-N.

[0048] The plurality of functional units 110A-N receive AC electrical energy, and get switched on. In one embodiment, the plurality of functional units 110A-N may be a chandelier unit or LED unit or any electronic or electrical device (e.g., fans, smoke alarms, temperature control devices, cameras, speakers), of only one category (e.g., only lights, only sound, only fans etc.). The category may include sound, light, ventilation, environment, alarm, image or video capture, etc. In another embodiment, the wireless plurality of functional units 110A-N may combine functional units of different types to assemble a multi-functional assembly of different categories (e.g., a combination of one or more of lights, fans, alarms, cameras, speakers, alarms, temperature control devices etc.). Each of the first functional unit 110A and the second functional unit 110B includes a plurality of sub-units that can be independently configured by the configuration planning module 202.

[0049] FIG. 6 illustrates a perspective view of the wireless assembly of functional units 600 of FIG.1 connected to a floor according to an embodiment herein. In the floor version of the wireless functional units 600, the AC electrical energy source 102 receives the AC electrical energy from public power distribution lines or solar power source. The AC electrical energy source 102 is mounted on the floor. The adapter 104 (e.g., not shown) receives AC electrical energy from the AC electrical energy source 102. The adapter 104 is wirelessly connected to the modular base station 106. Each of the first functional unit 110A and the second functional unit 110B includes a plurality of sub-units that can be independently configured by the configuration planning module 202.

[0050] FIG. 7 illustrates a perspective view of the wireless assembly of functional units 700 of FIG.1 connected to a wall according to an embodiment herein. In the wall version of the wireless functional units 700, the AC electrical energy source 102 receives the AC electrical energy from public power distribution lines or solar power source. The AC electrical energy source 102 is mounted on the wall. The adapter 104 (e.g., not shown) receives AC electrical energy from the AC electrical energy source 102. The adapter 104 is wirelessly connected to the modular base station 106. Each of the first functional unit 110A and the second functional unit 110B includes a plurality of sub-units that can be independently configured by the configuration planning module 202.

[0051] FIGS. 8A and 8B illustrate assembly of functional units of one category connected to a modular base station, according to an embodiment herein. The perspective view includes the modular base station 106 and the plurality of functional units (110A-N).

[0052] FIG. 9 illustrates a flow diagram illustrating a process of selecting a pre-determined configuration template from the plurality of pre-determined configuration templates using the server 126 according to an embodiment herein. At step 902, a voice command is processed from the user 122. At step 904, the voice command of the user 122 is communicated to the server 126. At step 906, the voice command of the user is checked with a list of one or more pre-determined functionality configuration templates using the server 126, if yes step 908 will perform else step 914 will perform. At step 908, the instructions associated with the matching pre-determined functionality configuration templates are communicated to the modular base station 106 from the server 126. At step 910, a new functionality configuration template is created based on the voice command of the user 122.

[0053] FIGS. 10A and 10B are flow diagrams illustrating a process for implementing the wireless assembly of functional units 1000 of FIG. 1 according to an embodiment herein. At step 1002, an input is received from a user 122 using the computing device 118 or a virtual assistant device 124. At step 1004, the input of the user 122 is processed using the computing device 118 the virtual assistant device 124. At step 1006, functionalities of the plurality of functional units 110A-N are wirelessly configured based on the input to obtain a configuration. At step 1008, the configuration is communicated to the modular base station 106.

[0054] At step 1010, the first set of electromagnetic waves are generated when a first signal is received from the computing device 118 or the virtual assistant device 124 based on the configuration. At step 1012, a second set of electromagnetic waves are generated when a second signal is received from the computing device 118 or the virtual assistant device 124 based on the configuration. At step 1014, the first set of electromagnetic waves is received using a first receiver coil of the first functional unit 110A. At step 1016, the second set of electromagnetic waves is received using a second receiver coil of the second functional unit 110A. At step 1018, the first set of electromagnetic waves is converted into a first control signal to enable or disable one or more functionalities of the first functional unit using a first power conversion unit. At step 1020, the second set of electromagnetic waves are converted

into a second control signal to enable or disable one or more functionalities of the second functional unit using a second power conversion unit.

[0055] The wireless assembly of functional units 100 addresses a wide range of functionalities using a single system, which can be configured and controlled depending on changing user requirements. The functionalities may include lighting, alarms, environment control (e.g., fans), audio speakers, air purifier, color changing lights, cameras etc. Various such combination may include a fan with lights, light with a smoke alarm, speakers with lights and fans etc). The wireless assembly of functional units 100 makes it easy to reconfigure functionalities by simplistically placing or replacing a functional unit with another. It also minimizes space used for multiple units being used, and creates a flexible system for the user to plan, monitor, and control any configuration directly from the computing device 114, in one embodiment. The computing device 114 may control variances on each functional unit such as by dimming lights, control the speed on fans, changing a focus of a camera, sound level control of speakers, etc.

[0056] The foregoing description of the specific embodiments will so fully reveal the general nature of the embodiments herein that others can, by applying current knowledge, readily modify and/or adapt for various applications such specific embodiments without departing from the generic concept, and, therefore, such adaptations and modifications should and are intended to be comprehended within the meaning and range of equivalents of employed herein is for the purpose of description and not of limitation. Therefore, while the embodiments herein have been described in terms of preferred embodiments, those skilled in the art will recognize that the embodiments herein can be practiced with modification within the spirit and scope of the appended claims.

CLAIMS

I/We claim:

1. A system for wirelessly managing a plurality of functional units (110A-N) using a computing device (118), comprising:

a modular base station (106) that (i) receives power from an electric power supply, said modular base station (106) comprising:

a first induction coil that generates a first set of electromagnetic waves when a first signal is wirelessly communicated from the computing device to a first functional unit (110A);

a second induction coil that generates a second set of electromagnetic waves when a second signal is wirelessly communicated from the computing device to a second functional unit (110B);

a signal receiver that receives said first signal and said second signal; and

a signal transmitter that wirelessly transmits said first signal and said second signal;

a first functional unit (110A) that comprises:

a first receiver coil (112A) that receives said first set of electromagnetic waves wirelessly from said signal transmitter of said modular base station (106), wherein said first set of electromagnetic waves enables or disables one or more functionalities of said first functional unit (110A); and

a first power conversion unit (114A) that converts said first set of electromagnetic waves into a first control signal to control said first functional unit (110A), wherein said power conversion unit receives said first set of electromagnetic waves from said first receiver coil (112A);

a second functional unit (110B) that comprises:

a second receiver coil (112B) that receives said second set of electromagnetic waves wirelessly from said signal transmitter of said modular base station (106), wherein said second set of electromagnetic waves enables or disables one or more functionalities of said second functional unit (110B); and

28 a second power conversion unit (114B) that converts said second set of
29 electromagnetic waves into a second control signal to control said second functional
30 unit (110B), wherein said second power conversion unit (114B) receives said second
31 set of electromagnetic waves from said second receiver coil (112B); and
32 said computing device (118) that (i) receives input from a user (122) and (ii)
33 processes said input of said user (122), wherein said computing device (118) wirelessly
34 transmits said first signal and said second signal to said signal receiver, wherein said
35 computing device (118) comprises:
36 (a) a memory unit that stores a set of modules; and
37 (b) a processor that executes said set of modules, wherein said set of modules
38 comprises:
39 a configuration planning module (202) implemented by the processor
40 that configures functionalities of said plurality of functional units (110A-N)
41 wirelessly to obtain a configuration, and communicates said configuration to
42 said modular base station (106); and
43 a remote controlling module (206) implemented by the processor that
44 controls said functionalities of said plurality of functional units (110A-N)
45 wirelessly by communicating with said modular base station (106).

1
1 2. The system for wirelessly managing a plurality of functional units (110A-N) as
2 claimed in claim 1, comprising a remote monitoring module (204) that monitors said
3 functionalities of said plurality of functional units (110A-N) wirelessly based on input from
4 at least one sensor coupled to at least one of said plurality of functional units (110A-N) by
5 communicating with said modular base station (106);

1
1 3. The system for wirelessly managing a plurality of functional units (110A-N) as
2 claimed in claim 1, comprising a server (122) that comprises a configuration database
3 comprising a plurality of pre-determined functionality configuration templates that specify a
4 configuration of said plurality of functional units (110A-N).

1 4. The system for wirelessly managing a plurality of functional units (110A-N) as
2 claimed in claim 1, wherein said first functional unit (110A) wirelessly communicates a first
3 feedback signal to said modular base station (106), wherein said first feedback signal
4 comprises a reading or an indication from a sensor associated with said first functional unit
5 (110A) wherein said configuration planning module (202) updates said configuration based
6 on said feedback signal.

1
1 5. The system for wirelessly managing a plurality of functional units (110A-N) as
2 claimed in claim 1, wherein said first functional unit is associated with a first category and
3 said second functional unit is associated with a second category that is different from said
4 first category, wherein said first category and said second category are selected from (i)
5 sound, (ii) light, (iii) ventilation, (iv) environment, (v) alarm, and (vi) image or video capture.

1
1
1
1 6. The system for wirelessly managing a plurality of functional units (110A-N) as
2 claimed in claim 3, comprising a virtual assistant device (124) that processes a voice
3 command from said user (122) and (iii) communicates said voice command of said user
4 (122) to said server (126), wherein said server (126) matches said voice command of said
5 user (122) with metadata associated with said plurality of pre-determined functionality
6 configuration templates to find a matching pre-determined functionality configuration
7 template that corresponds to said voice command of said user (122), wherein said server
8 (126) communicates instructions that is associated with said matching pre-determined
9 functionality configuration template to said modular base station (106).

10
11 7. The system for wirelessly managing a plurality of functional units (110A-N) as
12 claimed in claim 6, wherein said server (122) generates a new functionality configuration
13 template based on said voice command of said user (122) if said voice command of said user
14 (122) does not match with metadata of any of said plurality of pre-determined functionality
15 configuration templates.

1 8. The system for wirelessly managing a plurality of functional units (110A-N) as
2 claimed in claim 1, wherein each of said first functional unit (110A) and said second
3 functional unit (110B) comprises a plurality of sub-units that can be independently
4 configured by said configuration planning module (202).

1 9. A method of wirelessly managing a plurality of functional units (110A-N),
2 comprising:

3 receiving, using a computing device (118) or a virtual assistant device (124), an input
4 from a user (122);

5 processing, using said computing device (118) or said virtual assistant device (124),
6 said input of said user (122), wherein said computing device (118) comprises said mobile
7 application (120);

8 configuring functionalities of said plurality of functional units (110A-N) wirelessly
9 based on said input to obtain a configuration;

10 communicating said configuration to said modular base station (106);

11 generating, using a first induction coil, a first set of electromagnetic waves when a
12 first signal is received from said computing device (114) or said virtual assistant device (124)
13 based on said configuration;

14 generating, using a second induction coil, a second set of electromagnetic waves
15 when a second signal is received from said computing device (114) or said virtual assistant
16 device (124) based on said configuration;

17 receiving, using a first receiver coil (112A) of a first functional unit (110A), said first
18 set of electromagnetic waves;

19 receiving, using a second receiver coil (112B) of a second functional unit (110B),
20 said second set of electromagnetic waves;

21 converting, using a first power conversion unit (114A), said first set of
22 electromagnetic waves into a first control signal to enable or disable one or more
23 functionalities said first functional unit (110A);

24 converting, using a second power conversion unit (114B), said second set of
25 electromagnetic waves into a second control signal to enable or disable one or more
26 functionalities said second power conversion unit (114B).

1 10. The method as claimed in claim 9, comprising receiving a voice command from said
2 user (122) at said virtual assistant device (124);
3 communicating instructions that is associated with a matching predetermined
4 functionality template out of said plurality of pre-determined functionality configuration
5 templates to said modular base station (106) if said voice command of said user (122)
6 matches with one of said plurality of pre-determined functionality configuration templates;
7 and
8 generating, a new functionality configuration template based on said voice command
9 of said user (122) if said voice command of said user (122) does not match with metadata of
10 any of said plurality of pre-determined functionality configuration templates.

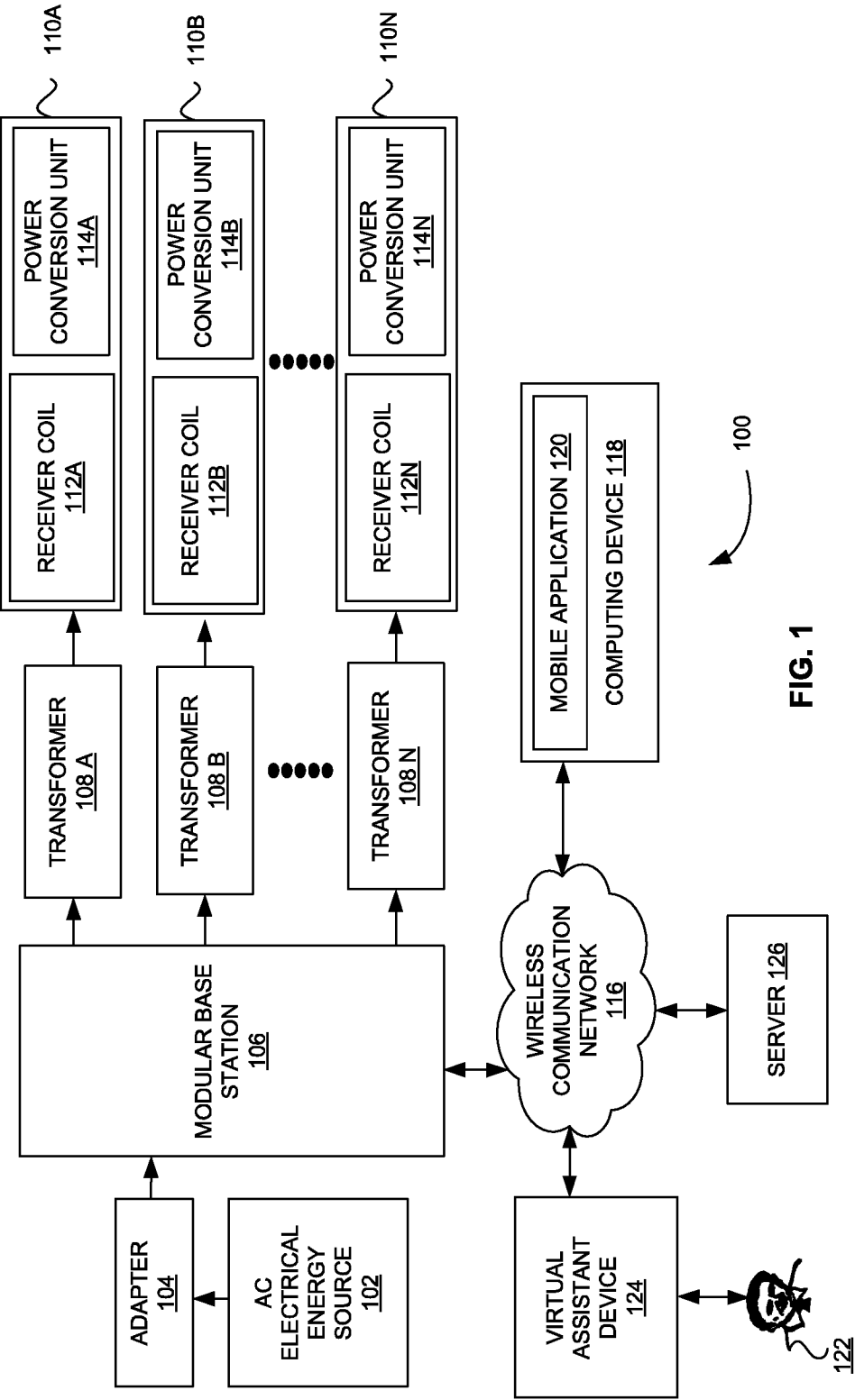


FIG. 1

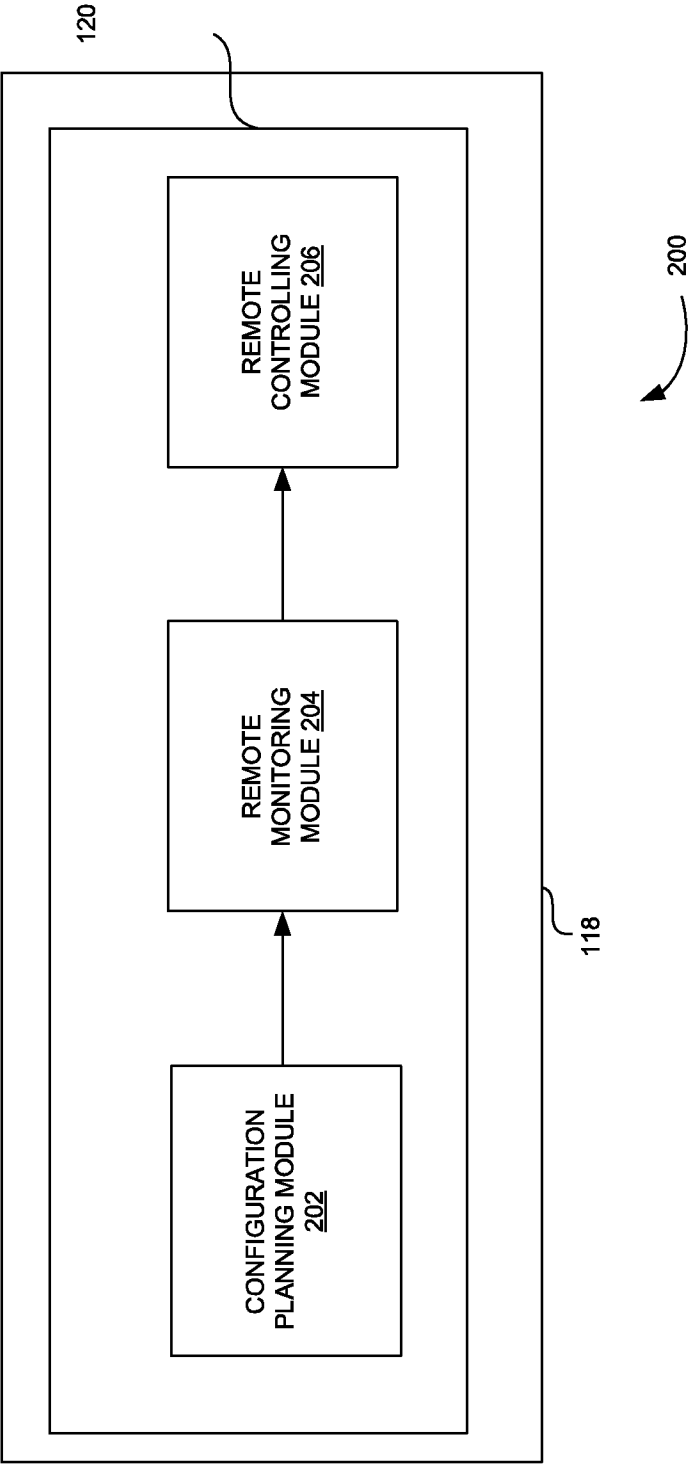


FIG. 2

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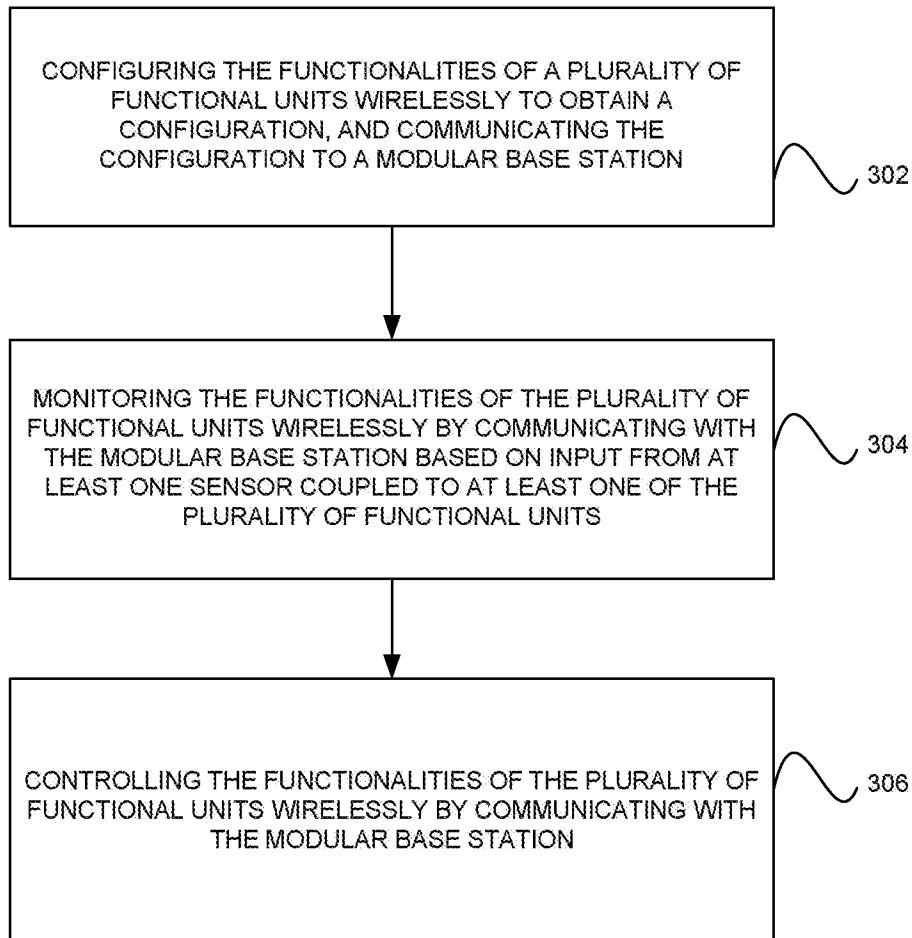


FIG. 3

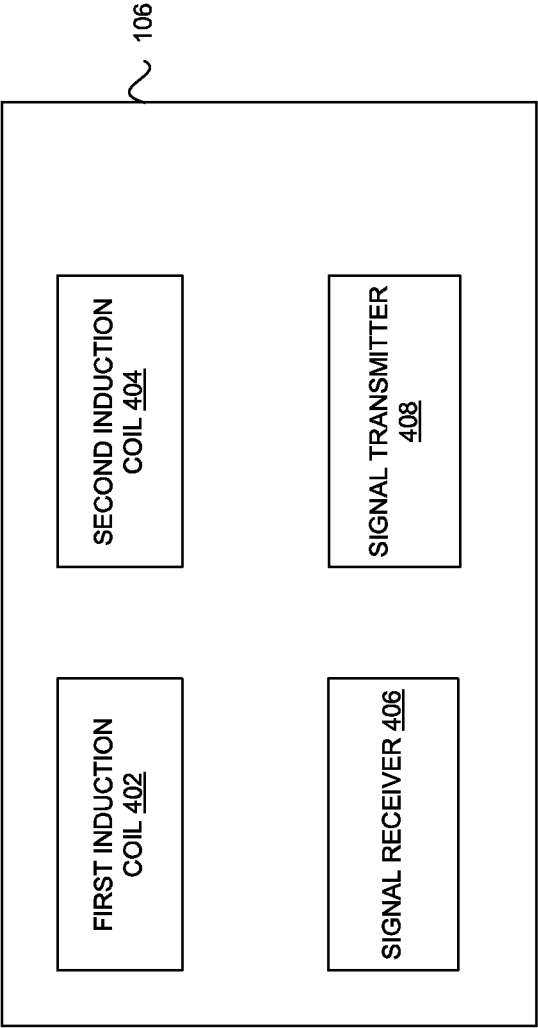


FIG. 4

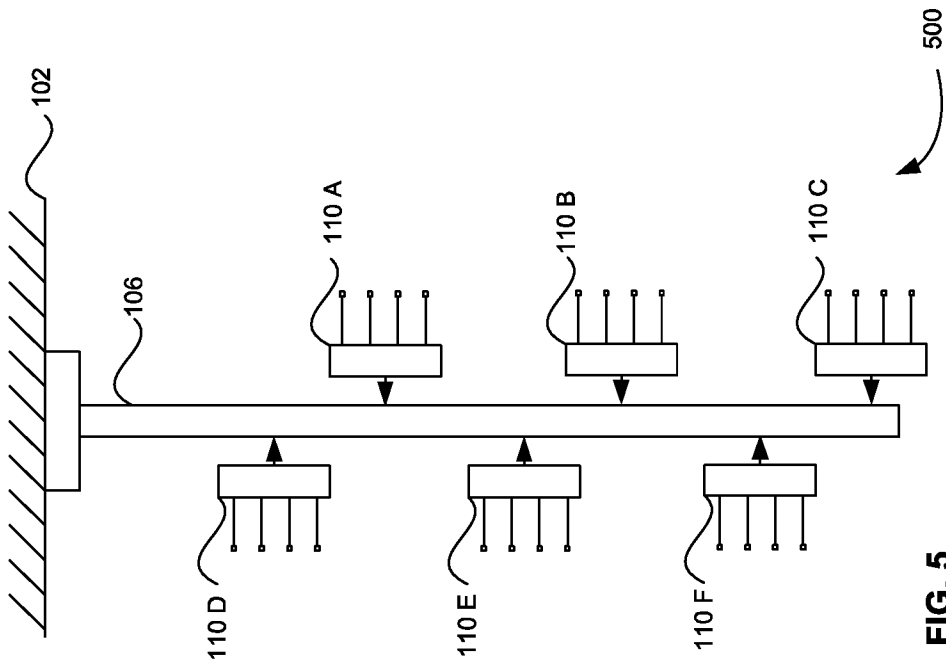


FIG. 5

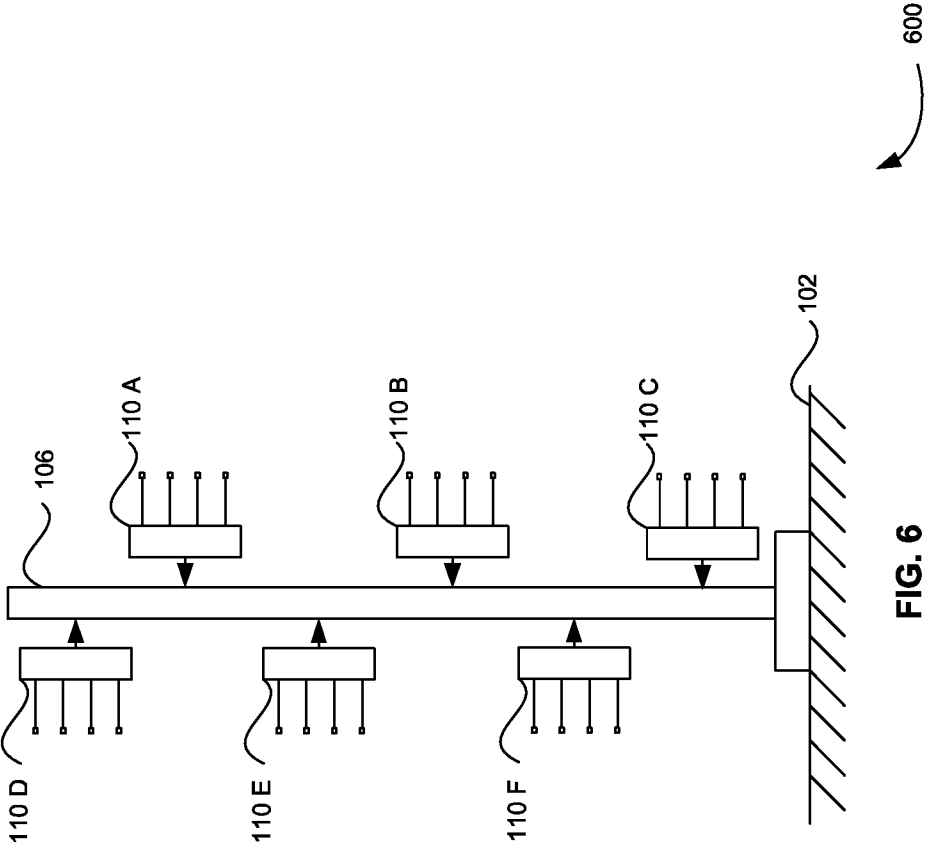


FIG. 6

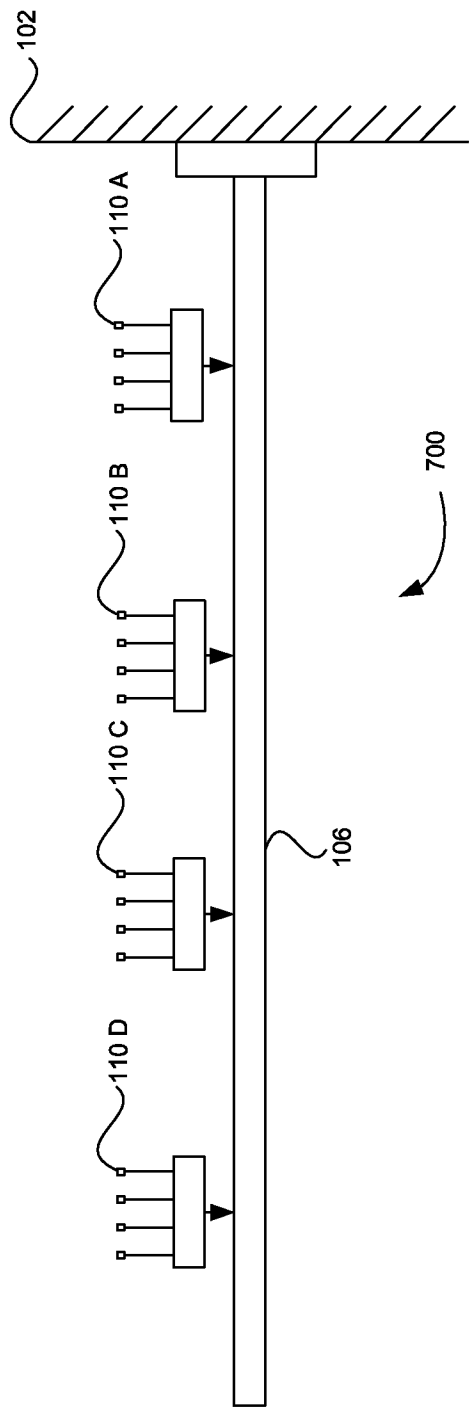


FIG. 7

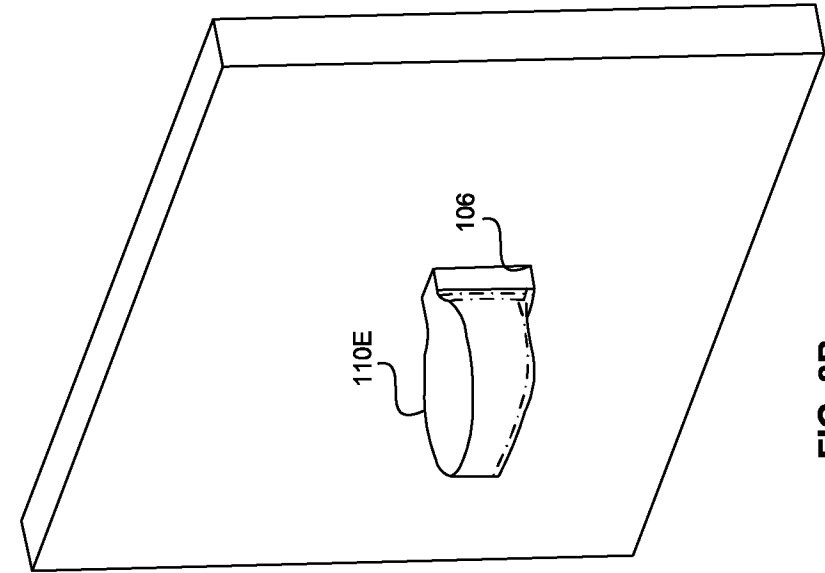


FIG. 8B

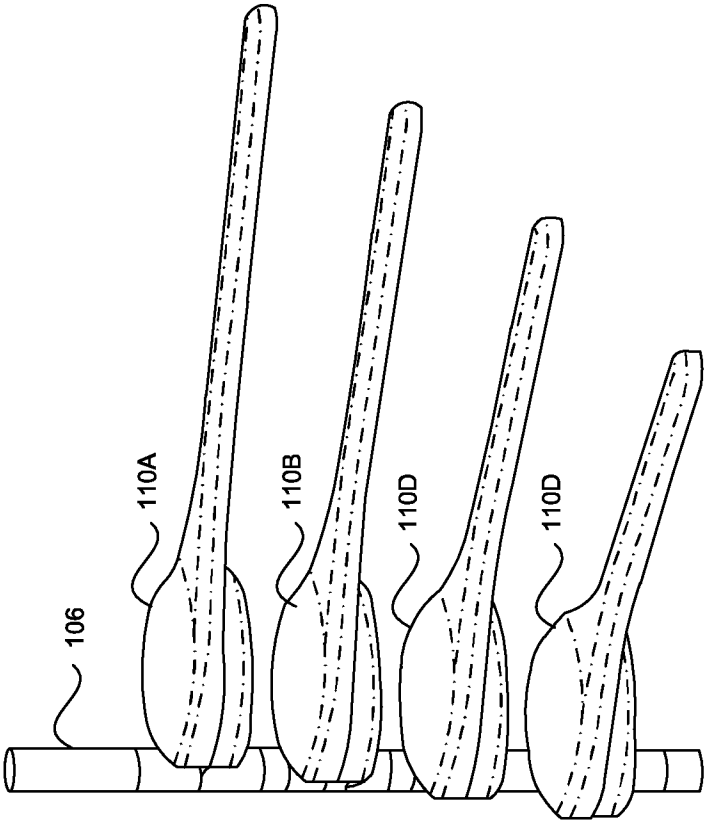


FIG. 8A

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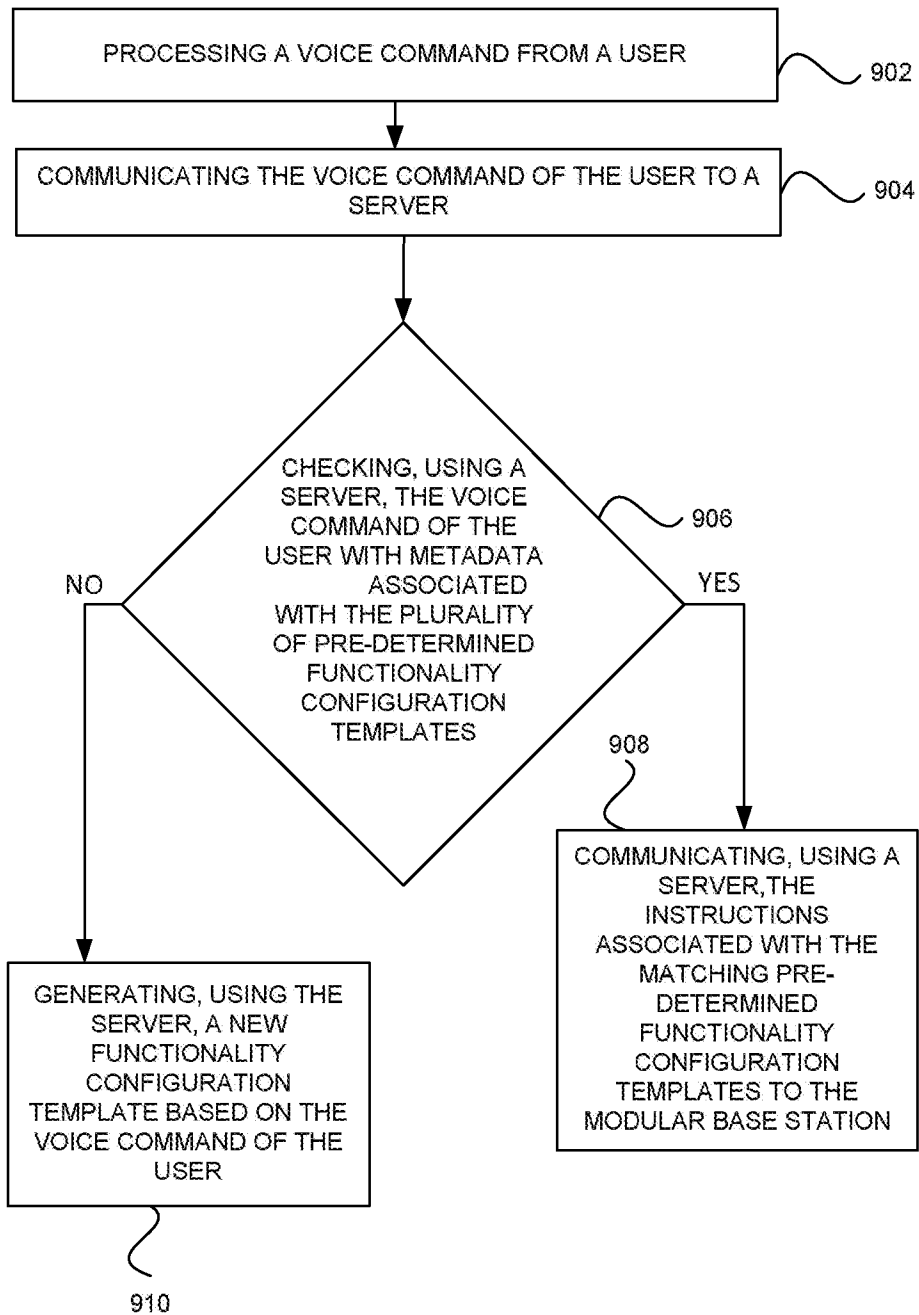


FIG. 9

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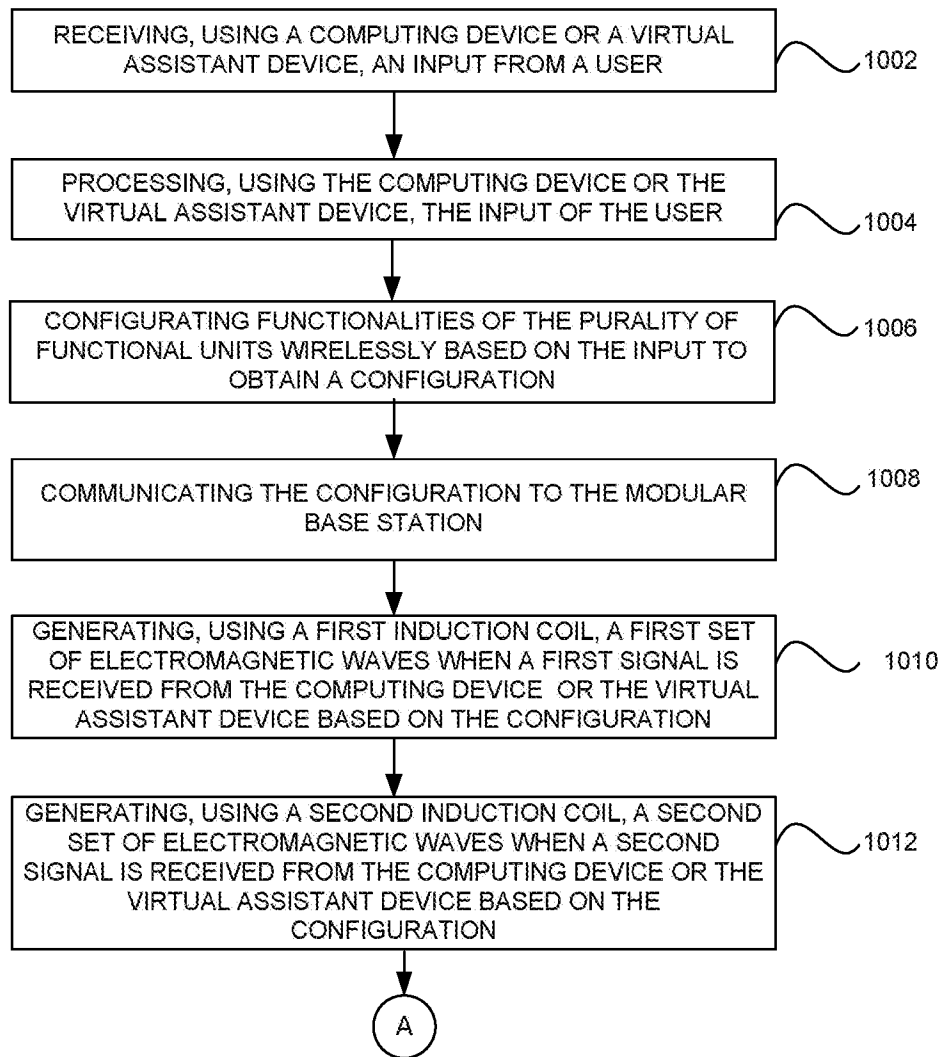


FIG. 10A

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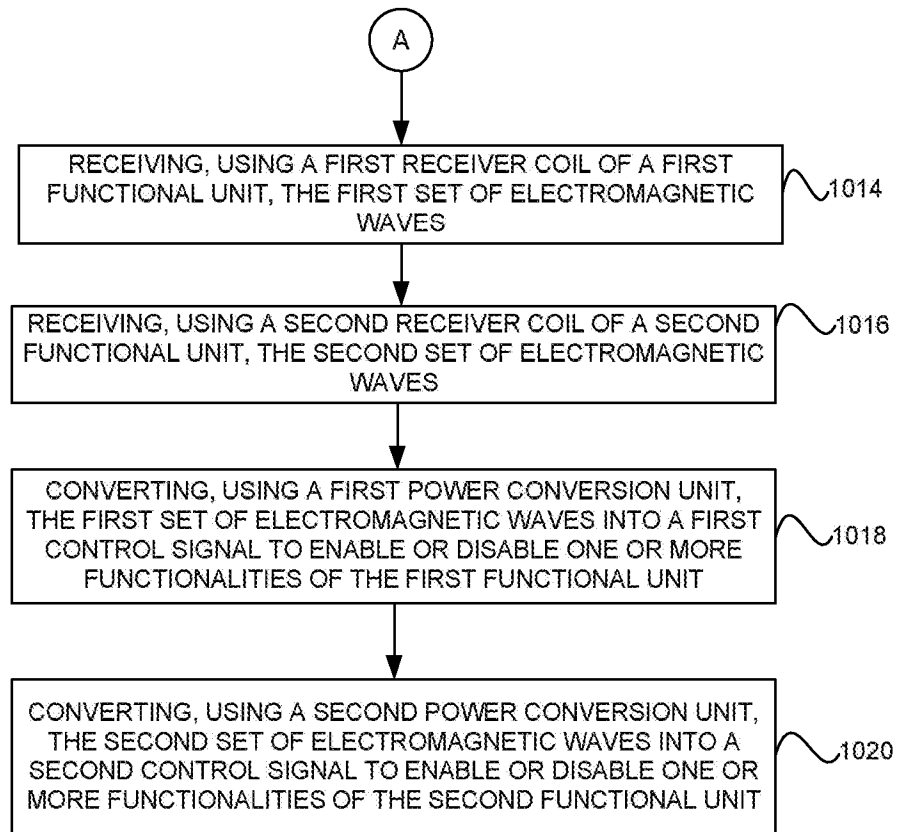


FIG. 10B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IN2017/050219

A. CLASSIFICATION OF SUBJECT MATTER
G08C17/02, G05B15/02 Version=2017.01

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)

G08C, G05B

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)

Databases - Patseer, IPO Internal Database.

Search Terms - Remote Control, device, RF or electromagnetic, command

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP0923060 A2 (DEPAUW, Frank) ,16-06-1999 (16 June,1999). Whole Document	1-10
Y	US 2012/0086563 A1 (UNIVERSAL ELECTRONICS INC.),12-04-2012 (12 April, 2012). Whole Document	1-10
A	WO 2013/008252 A2 (SHETTY, Ravindra, K. et. al),17-01-2013(17 January, 2013). Page 3, line 5- Page 6 line 14	1-10
A	US 6856236 B2 (Ensys A/S), 15-02-2005(15 february,2005). Abstract; Claims 1,13	1-10
A	US 5382947 A (Feller AG), 17-01-1995(17 January, 1995). Abstract; Column 4 line 11- Column 7 line 15, Figure 1	1-10

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

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"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	

Date of the actual completion of the international search

08-08-2017

Date of mailing of the international search report

08-08-2017

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/IN2017/050219

Citation	Pub.Date	Family	Pub.Date
US 2012/0086563 A1	12-04-2012	WO 2012134681 A1	04-10-2012
		EP 2689574 B1	21-10-2015
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		EP 1290506 A2	12-03-2003
US 5382947 A	17-01-1995	CH 683570 A5	31-03-1994
		EP 0541741 A1	19-05-1993
		JP H06500449 A	13-01-1994
		WO 9222047 A1	10-12-1992