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(54) **DEVICE FOR AUTOMATIC SYSTEMS SERVING BUILDINGS, PARTICULARLY FOR FIRE PREVENTION**

(57) A device (10) for automatic systems serving buildings, which is adapted for detection and/or execution and/or signaling, which comprises an active tag (11) of the NFC and/or technically equivalent type, with which it is adapted for connection with an external apparatus (12) for control and/or adjustment and/or diagnostics.

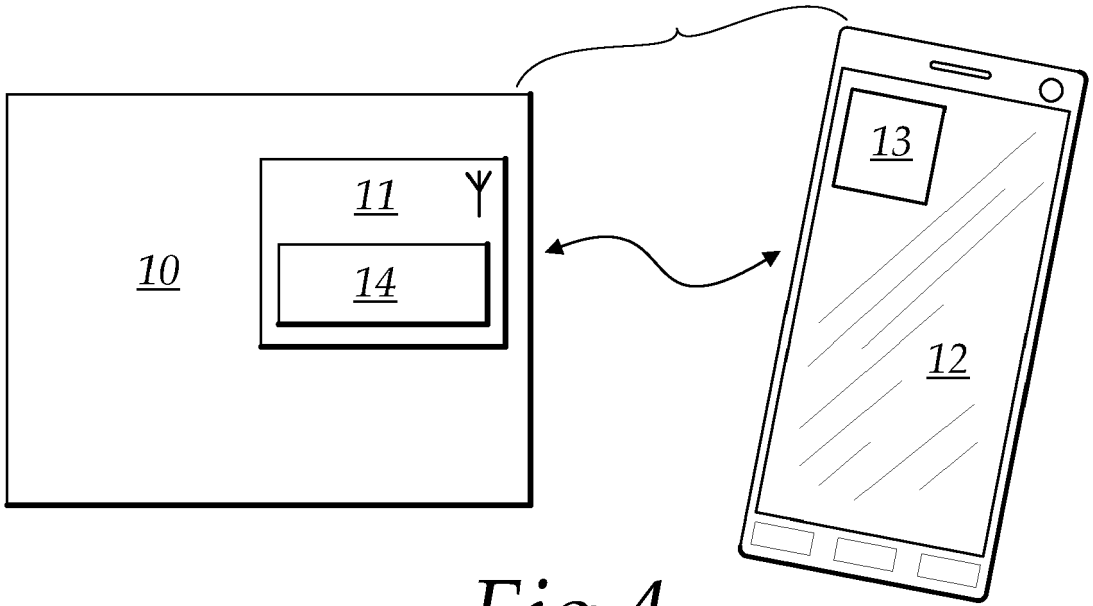

Fig.4

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Description

[0001] The present invention relates to a device for automatic systems serving buildings.

[0002] The field to which the device relates is the sector of management of electronic systems serving buildings and, in particular, of electronic systems for fire detection.

[0003] However, the device according to the invention can also be used in other sectors such as, for example, home automation systems or building automation systems, or anti-theft systems.

[0004] Such systems are typically made up of:

- detection devices, for example smoke sensors, which can be defined as input devices,
- execution and signaling devices, such as for example optical/acoustic signs and sirens, which can be defined as output devices,
- optional centralized control devices for controlling the above mentioned devices, for example a fire prevention station.

[0005] The input devices and output devices are generally programmed in two ways, i.e. locally, on the device itself, for example by way of small mechanical or magnetic switches or using a handheld programming device, or remotely, selectively:

- by the centralized control device,
- by a PC, going through the centralized control device.

[0006] In such programming, the following are defined:

- the address of the device, for the dialog with the centralized control device,
- the normal operation parameters,
- the alarm and malfunction parameters.

[0007] The centralized control device also needs to be programmed. In such case the programming is carried out directly, by way of an adapted user interface, on the device itself, or via PC, by way of adapted software.

[0008] With reference to the accompanying tables of drawings, Figures 1 and 2 show a schematic diagram of the device in the state of the art in two embodiments, generally indicated respectively with A and A'. The memory C can be internal or external to the processing unit B which can be a microprocessor, a microcontroller, a system-on-a-chip, or a programmable logic controller.

[0009] In addition the device A, A' comprises a part of the user interface D for programming the device A, A', for example by way of small mechanical or magnetic switches and other accessory elements E, for example electrical contacts to cabling, sensors or signaling components.

[0010] In the example shown in Figures 1 and 2 the device A, A' is programmed locally by way of a programmer F: this is the only available method of programming if the interface D is not present; or it can be used as a secondary method, if the interface D is present.

[0011] The programmer F is not always necessary.

[0012] At present, the programming can be carried out with electrical contact and/or without electrical contact.

[0013] Programming without electrical contact of the input devices and output devices typically occurs by communicating using infrared rays and needs to have the device powered while being programmed.

[0014] Other contactless and wireless communication technologies, more common in other environments, are the wireless LAN technology and the Bluetooth technology. However, these are not easily applied to input devices and output devices because of:

- high energy consumption, especially with wireless LAN,
- cost, which is disproportionally high with respect to the cost of the devices themselves,
- possible encumbrance, owing to the wireless LAN or Bluetooth module.

[0015] In addition, the presence of a wireless LAN or Bluetooth module would increase the complexity of the device and, especially, the communication of data would require the device to be powered on, which is not always possible and practical.

[0016] Nowadays, therefore, the need is still felt to simplify the programming of input devices, output devices and control devices in the above mentioned electronic systems, by way of leading-edge technologies with a simple architecture and without additional cost.

[0017] Furthermore, the need is felt at the same time to ensure the control, maintenance and programming of the devices even in situations in which electric power is not available from the local mains.

[0018] The aim of the present invention is to provide a device for controlling automatic electronic systems in buildings which is capable of improving the known art in one or more of the above mentioned aspects.

[0019] Within this aim, an object of the invention is to provide a device with which to control and adjust the operation of automatic systems serving buildings, such as fire prevention systems, home automation systems and/or building automation and anti-theft systems, simply and rapidly by using leading-edge contactless and wireless technologies.

[0020] Another object of the invention is to provide a device that is structurally simple and uses leading-edge technologies, but without additional costs over and above the technologies presently in use in the same sector.

[0021] Another object of the invention is to provide a device for automatic systems serving buildings, particularly for fire prevention, which has reduced energy consumption.

[0022] Another object of the invention is to provide a device that is highly reliable, easy to implement and man-

age, and of low cost.

[0023] This aim and these and other objects which will become better apparent hereinafter are achieved by a device for automatic systems serving buildings, which is designed for detection and/or execution and/or signaling, characterized in that it comprises an active tag of the NFC and/or technically equivalent type, with which it is adapted for connection to an external apparatus for control and/or adjustment.

[0024] Further characteristics and advantages of the invention will become better apparent from the description of a preferred, but not exclusive, embodiment of the device according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings wherein:

- Figures 1 and 2 are schematic diagrams of two embodiments of a conventional device,
- Figure 3 is a schematic diagram of the device according to the invention,
- Figure 4 is a schematic diagram of the device in Figure 3 in a mode of use,
- Figure 5 is a schematic diagram of the device in Figure 3 in a different mode of use.

[0025] With reference to the figures, the device according to the invention is generally designated by the reference numeral 10.

[0026] The device 10 is adapted for the detection and/or execution and/or signaling in automatic systems serving buildings, particularly, but not exclusively, in fire prevention systems.

[0027] The device 10 comprises an active tag 11, with an internal memory 14 with which it is adapted for connection with an external control and/or adjustment apparatus 12.

[0028] In particular, the memory 14 is integrated in the active tag 11.

[0029] The external apparatus 12 comprises a tag reader 13.

[0030] The active tag 11, which is known per se, is known in the electronics sector as a component and/or device that uses the induction of an electromagnetic field to exchange energy: the tag reader 13 generates an electromagnetic field in order to supply power to the active tag 11.

[0031] As is known, the tag is constituted by a chip with internal circuits (with the non-volatile rewritable memory) and by an antenna which can be inside or outside the chip.

[0032] The device 10 is an input device, an output device or a control device in a system serving a building.

[0033] In a fire prevention system, it can be constituted, for example, by a smoke sensor.

[0034] In an anti-theft system, the device 10 can be constituted, for example, by a motion sensor; in a home automation system it can be constituted by a roller blind command module.

[0035] The external apparatus 12 is preferably, but not exclusively, constituted by an apparatus selected from among a smartphone, a tablet computer, a laptop computer, and a handheld computer. Alternatively, it can be constituted by another apparatus with processing capacity, memory and connection.

[0036] Figure 3 shows the complete device 10.

[0037] The active tag 11 is of the NFC (Near Field Communication) and/or technically equivalent type, with rewritable memory 14, and it can be accessed from outside by way of one or more electrical communication lines. The tag reader 13 of the external apparatus 12 is also of the active NFC and/or technically equivalent type, for communication with the active tag 11.

[0038] The memory 14 is of the non-volatile rewritable type.

[0039] The external apparatus 12 is advantageously provided with an application for managing the tag 11.

[0040] The device 10 comprises a processing unit 15.

[0041] Such processing unit 15 in the device 10 is conventional per se and is selected from among: a microcontroller, a microprocessor, a system-on-a-chip (SoC), or a programmable logic controller.

[0042] The processing unit 15 is provided with a memory, internal or optionally external, which is non-volatile.

[0043] The device 10 can comprise other accessory elements 16, of a known type per se which does not constitute a peculiarity of the invention, for example sensors and/or components for signaling.

[0044] The memory 14 of the active tag 11 can be read and written in two ways:

- through the active tag 11 with adapted commands sent by the tag reader 13, in this case the electricity for its operation can be supplied by the tag reader 13 or drawn from a local source of electricity that powers the device 10;
- through one or more electrical communication lines toward the processing unit 15, when the device 10 is powered.

[0045] The NFC and/or technically equivalent technology enables the use of an active tag 11, with an internal non-volatile rewritable memory 14, which can also be shared externally by the data processing unit 15.

[0046] In this manner it is possible to share data for operation, malfunctions and alarms, diagnostics, and other data besides.

[0047] Such memory 14 is accessible both by the tag reader 13, by way of a smartphone or a tablet computer, and also by the processing unit 15 internal to the device 10.

[0048] The memory 14 is, therefore, accessible in the two following ways.

[0049] In a first case, shown in Figure 3, the device 10, and therefore the active tag 11, is powered by a local source of electricity and the memory 14 is in communication with the processing unit 15 for an exchange of

data.

[0050] In the second case, shown in Figure 4, the device 10 is not powered locally: for example it is in a warehouse before its installation or the electrical system is not yet connected. In this case the processing unit 15 is switched off, but the memory 14 is accessible by the tag reader 13 for the execution of a diagnostic program and/or the programming of the operating parameters and/or more besides, by way of the external apparatus 12.

[0051] Figures 3 to 5 show three active configurations.

[0052] Figure 3 shows a configuration with the external apparatus 12 switched off, or not in the vicinity. The device 10 is switched on and electrically powered locally and all the internal stages are switched on. The stream of data in this case is only between the processing unit 15 and the memory 14. Substantially the device 10 is in normal operation and there is no interaction with the tag reader 13 and it is therefore not possible to carry out reading, programming and diagnostics or the like. The tag reader 13 is not in communication with the device 10.

[0053] Figure 4 shows a configuration with the device 10 switched off. The active tag 11 is powered by the tag reader 13, when necessary, and the stream of data occurs between the external apparatus 12, by way of the tag reader 13, and the memory 14, which therefore is still accessible. This allows reading the device 10 even before its installation in the building, optionally even for programming and testing at the factory, or during transport. In this case the device 10 for automatic systems serving buildings is not powered locally, but the external apparatus 12 is in communication with it.

[0054] Figure 5 shows a configuration of the device 10, switched on and operational, electrically powered autonomously by a local source; all the internal stages are switched on. The stream of data occurs between the external apparatus 12, by way of the tag reader 13, and the memory 14, and between the processing unit 15 and the memory 14.

[0055] It should be noted that it is possible to read and program the parameters of the device 10 even when it is operating, for an interaction in real time.

[0056] The NFC tag and/or technically equivalent technology therefore enables the execution of a series of operations before or at the same time as the installation, i. e. when the device 10 is not locally powered, possibly still being at the factory or in a warehouse, when it is still boxed: programming, testing and quality control while still at the factory or in a warehouse; identification, verification and programming of the device during installation in the absence of power supply and/or of the centralized control device; verification, testing and programming during normal operation or during maintenance operations or, also, during special checks (for example for anomalies in the system); verification of the device during the steps of repair both in the field and in the laboratory and during its disposal.

[0057] Operation of the device according to the invention is evident from the foregoing description and explanation and, in particular, it is evident that it allows a simple and rapid management of the product at all stages of its life cycle, enabling easy access even in the absence of power and without needing to interrupt its normal operation.

[0058] Furthermore, the device can be used in a simple and intuitive manner, using technologies that are known today and contactless, with reduced costs owing to the absence of specific programming devices and using devices in everyday use for reading, such as a smartphone, a laptop computer, a tablet computer, or a handheld computer, which are now standard issue to technical personnel.

[0059] In practice it has been found that the invention fully achieves the intended aim and objects by providing a device with which to control and adjust the operation of automatic systems serving buildings in a simple and rapid manner, using contactless and wireless technologies and without additional costs over and above the technologies presently in use in the same sector.

[0060] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0061] In practice the materials employed, provided they are compatible with the specific use, and the contingent dimensions and shapes, may be any according to requirements and to the state of the art.

[0062] The disclosures in Italian Patent Application No. 102018000011092 from which this application claims priority are incorporated herein by reference.

[0063] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for automatic systems serving buildings, which is designed for detection and/or execution and/or signaling, **characterized in that** it comprises an active tag (11) of the NFC and/or technically equivalent type, with which it is adapted for connection to an external apparatus (12) for control and/or adjustment.

2. The device according to claim 1, **characterized in that** said external apparatus (12) is provided with a tag reader (13) of the NFC and/or technically equivalent type.

3. The device according to one or more of the preceding

claims, **characterized in that** said active tag (11) comprises a non-volatile rewritable memory (14).

4. The device according to one or more of the preceding claims, **characterized in that** it comprises a processing unit (15).

5. The device according to claim 3, **characterized in that** said processing unit (15) is chosen from among: a microcontroller, a microprocessor, a system-on-a-chip (SoC), or a programmable logic controller.

6. The device according to one or more of the preceding claims, **characterized in that** said processing unit (15) has a non-volatile memory.

7. The device according to one or more of the preceding claims, **characterized in that** said external apparatus (12) is provided with an application for managing said tag (11).

8. The device according to one or more of the preceding claims, **characterized in that** said external apparatus (12) is constituted by an apparatus chosen from among a smartphone, a tablet computer, a laptop computer, a handheld computer.

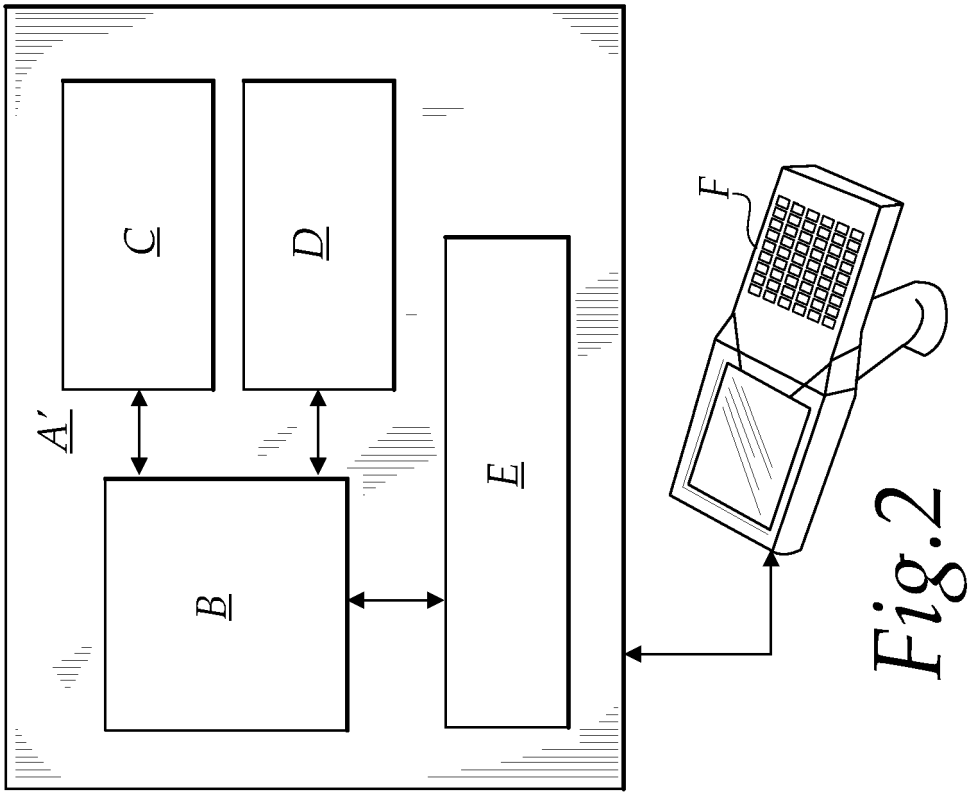

Fig.2

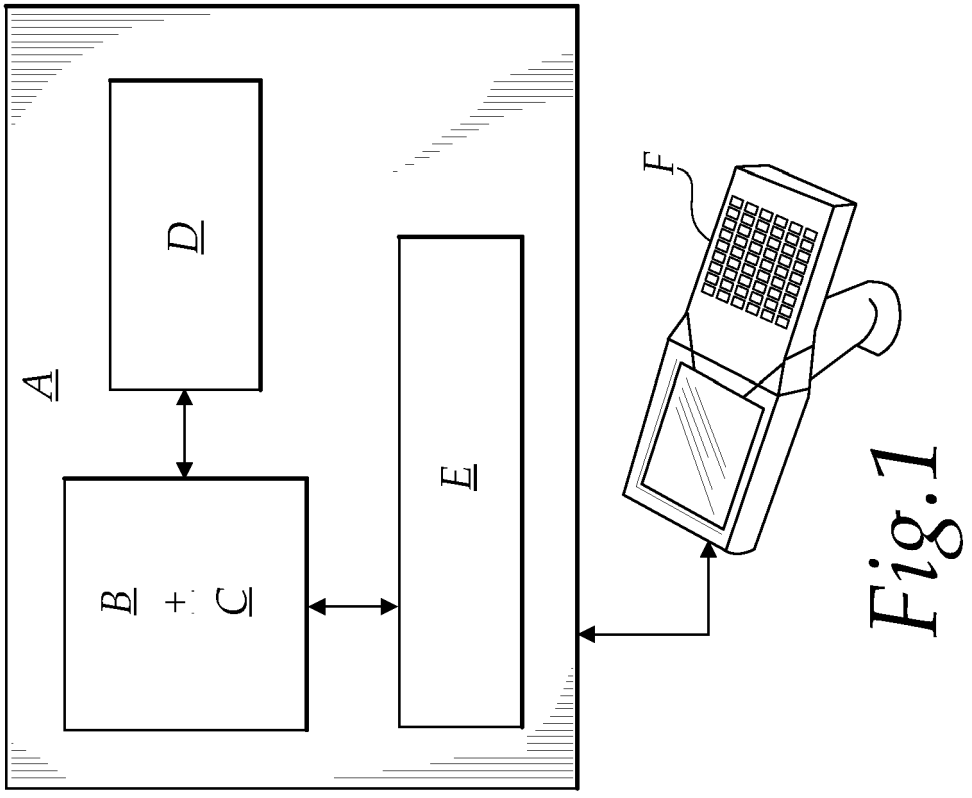

Fig.1

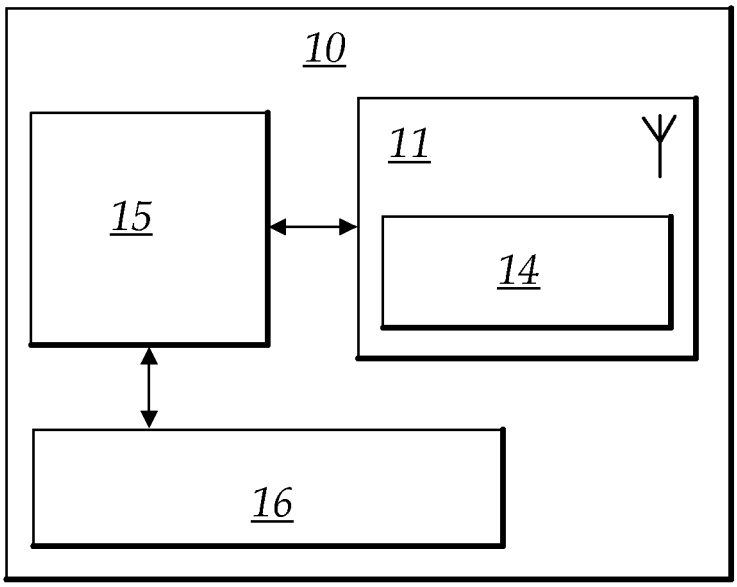

Fig.3

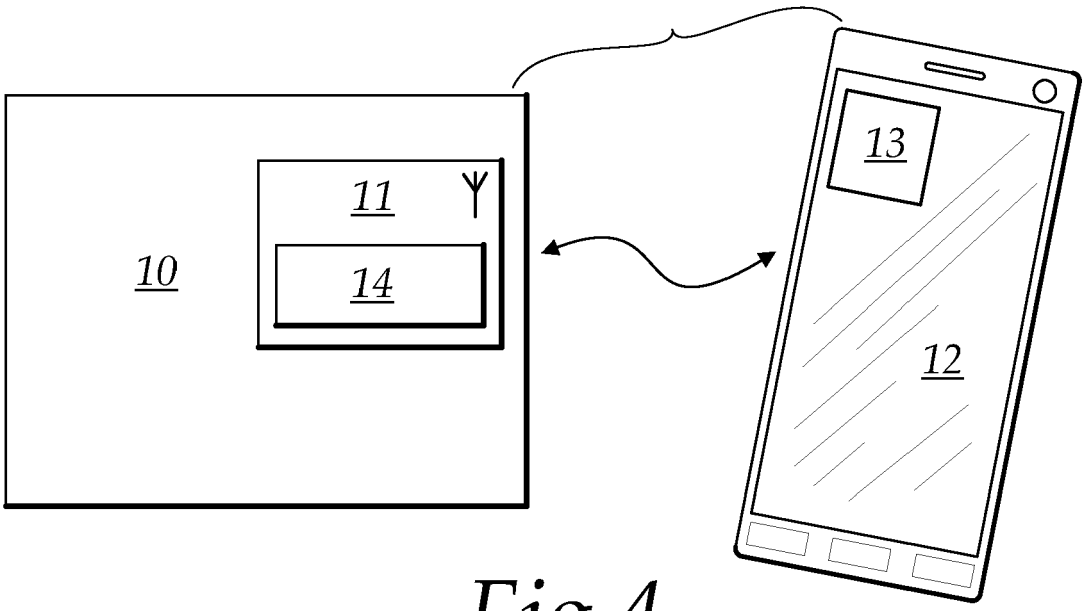

Fig.4

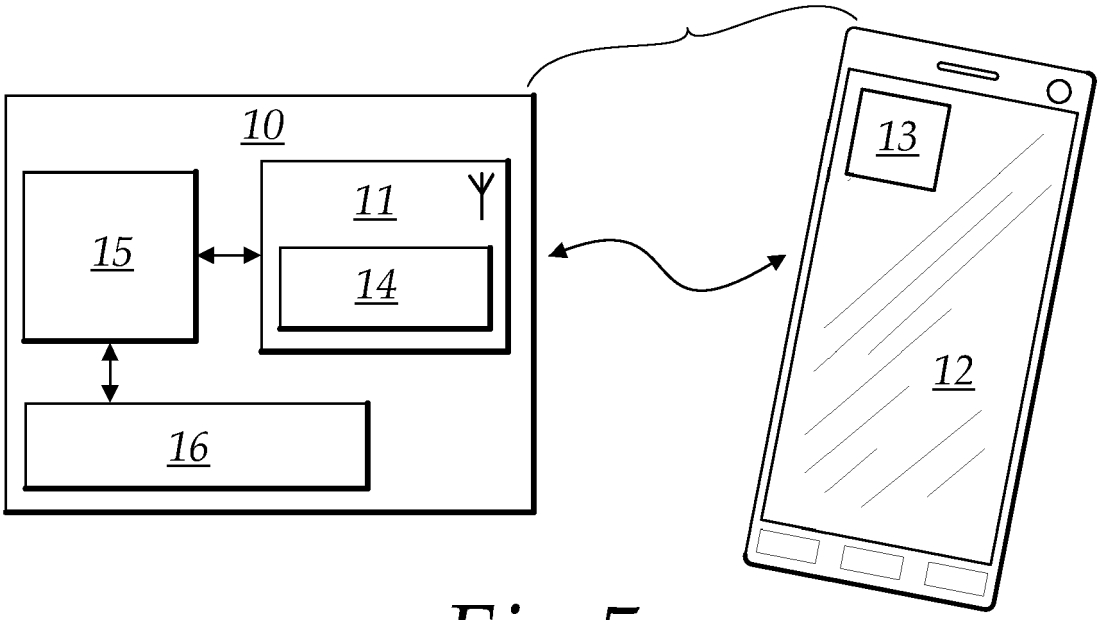

Fig.5

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EUROPEAN SEARCH REPORT

Application Number
EP 19 21 5927

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 204 406 597 U (SHANGHAI INTERNAT TECHNOLOGY TRADE JOINT SERVICE CO LTD) 17 June 2015 (2015-06-17) * abstract; figure 1 *	1-8	INV. G08B29/14
X	WO 2017/125911 A1 (BUBLIL DAVID [IL]) 27 July 2017 (2017-07-27) * abstract * * "Background art"; page 1 * * Description of figure 1; page 1 * * "The invention"; page 2 - page 4, line 2 *	1,6-8	
X	WO 2012/006296 A2 (HONEYWELL INT INC [US]; WORTHINGTON STEPHEN D [US] ET AL.) 12 January 2012 (2012-01-12) * abstract; figure 1 * * paragraph [0008] - paragraph [0012] *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)

G08B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 April 2020	Wagner, Ulrich

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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15-04-2020

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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WO 2017125911 A1	27-07-2017	US 2019043332 A1	07-02-2019
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT 102018000011092 **[0062]**