



- (51) **International Patent Classification:**
G05B 15/02 (2006.01)
- (21) **International Application Number:**
PCT/EP20 19/069975
- (22) **International Filing Date:**
24 July 2019 (24.07.2019)
- (25) **Filing Language:** English
- (26) **Publication Language:** English
- (30) **Priority Data:**
18185528.9 25 July 2018 (25.07.2018) EP
- (71) **Applicant: EBS SPOLKA Z OGRANICZONA ODPOWIEDZIALNOSCIA 3E PRODUCTION SP.K.**
[PL/PL]; ul. Okrezna IB, 19-300 ELk (PL).
- (72) **Inventor: STALEWSKI, Krzysztof;** EBS Spolka z ograniczona odpowiedzialnoscia 3E Production Sp. k., ul. Okrezna IB, 19-300 Elk (PL).
- (74) **Agent: MARKIETA, Jaroslaw;** Kancelaria Rzecznikow Patentowych, J. Markieta, M. Zielinska-Lazarowicz Sp. p., Bukowinska 2 lok 160, 02-703 Warszawa (PL).
- (81) **Designated States** (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,

(54) **Title: REAL ESTATE MONITORING SYSTEM**

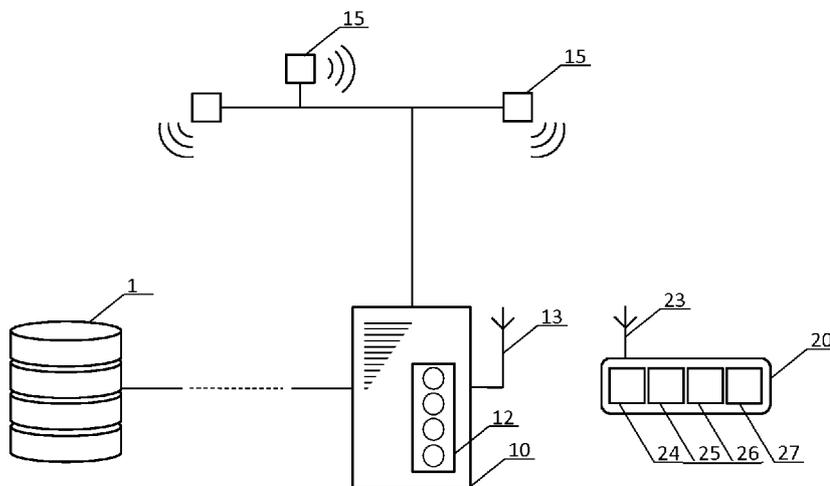


Fig. 1

(57) **Abstract:** The real estate monitoring system, comprising a monitoring module (10), which is adapted to the real estate monitoring capacities and contains at least one sensor (15), which is installed within the real estate, with a monitoring module (10) configured to respond to changes in physical parameters that are recorded by the sensor (15); furthermore, the monitoring module (10), which is equipped with a receiver (13) for a wireless communication system, and a keyboard (12) for selecting the operating mode of the real estate monitoring system communicatively linked to the monitoring module (10), and the identification tag (20) with memory (25), microprocessor (27) and transmitter (23) of the wireless communication system, and a battery (26), with a unique identification tag number (20) stored in the memory (25) of the identification tag. In addition, the monitoring module (10) is communicatively linked to the database (1), in which data representing the unique tag identification number (20) and its assigned authority to change the operating mode of the monitoring system are stored; characterized in that the identification tag (20) is fitted with an accelerometer (24) suitable for measuring accelerations, and that the tag (20) is adapted so as to switch off the transmitter (23) of the wireless communication system when the accelerometer signal (24) corresponds to the acceleration signals occurring when the tag is at rest (20), and turns on



SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to the identity of the inventor (Rule 4.17(i))*
- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(H))*

Published:

- *with international search report (Art. 21(3))*
- *in black and white; the international application as filed contained color or greyscale and is available for download from PATENTSCOPE*

the transmitter (23) of the wireless communication system when the accelerometer signal (24) corresponds to the acceleration signals occurring when the tag is (20) in motion, in addition, the tag (20) is adapted for the cyclical transmission of a signal representing the unique tag identification number (20) when the transmitter (23) and the receiver (13) of the wireless communication system are switched on, and the monitoring module (10) is adapted to verify the correctness of the unique identification number received, to check in the database (1) the authorisations assigned to the unique identification number and to generate a signal to change the mode of operation of the real estate monitoring system in response to the receipt of a signal representing the unique identification number of the tag (20), to which the required authorisation to change the mode of operation of the monitoring system have been assigned and to press the button on the keyboard (12) to select the mode of operation of the real estate monitoring system.

Real estate monitoring system

The subject of the invention is the real estate monitoring system.

This solution belongs to the area of intelligent home management systems and intelligent alarm systems.

Smart home management systems are systems that use information from multiple interconnected sensors,
5 detectors or household appliances to manage them in order to improve the quality of life and safety of users.

There are known the state of the art solutions for intelligent home management systems based on a wide range of devices and detectors. The descriptions of finished systems and peripherals cooperating within one system are known from the publications CN 106707786 A and CN 106936673 A. They present a wide range of applications, including devices, such as washing machines, refrigerators, ovens, alarm sensors,
10 thermostats, solenoids and others with the base station, allowing their wireless two-way communication with the use of popular smartphones. With the right configuration, users have an influence on individual aspects of everyday life, such as savings (automatic light switches, thermostats), comfort of life (remote start of household appliances, air conditioning, irrigation systems) or safety (wireless cameras, motion detectors, smoke detectors). Various configurations and operating methods of intelligent house systems designed to
15 secure and protect property and users are known from publications CN 105976559 A, CN 103794015 A and CN 106406116 A. Thanks to the interaction of the base station with safety sensors, such as reed sensors, motion detectors, smoke detectors, wireless cameras and flood detectors, home security systems based on an individual level of protection of users have been developed at a low cost, while maintaining full integrity and wireless availability. Simple construction and configuration allows you to monitor the status of your
20 property through your smartphone or web browser, as well as to program specific actions in case of an attempted burglary. Intelligent real estate monitoring systems, like any security system, are exposed to an attempt to take over control by unauthorised persons. Publications CN 105259771 A and CN 102932215 A are used to verify and authorise users in intelligent monitoring systems. Thanks to wireless communication (Wi-Fi, Bluetooth, NFC) between the system and verification device, e.g. smartphone, NFC card,
25 smartphone, key ring, user within the communication range of the intelligent monitoring system can be authenticated actively (entering code, bringing the card closer to the reader, clicking in the application) or passively (the device is located in the same Wi-Fi or Bluetooth network). After positive authentication, the

system performs the user's authorisation based on the obtained data. This option allows you to restrict access to specific devices, functions or areas of your property.

The essence of the invention is a real estate monitoring system, containing a monitoring module, which is adapted to real estate monitoring and contains at least one sensor, which is installed within the real estate, the monitoring module is configured to respond to changes in physical parameters, which are recorded by
5 the sensor. Furthermore, the monitoring module is equipped with a receiver of wireless communication system and a keyboard for selecting the mode of operation of the real estate monitoring system connected by communication with the monitoring module. The system contains a memory-based identification tag, a microprocessor and a transmitter for the wireless communication system, as well as a battery, with the
10 unique identification tag number stored in the memory of the identification tag. In addition, the monitoring module shall be communicatively linked to the database, in which data representing the unique tag identification number and its assigned powers to change the operating mode of the monitoring system are stored. It has an accelerometer fitted to the identification tag for measuring accelerations and is adapted so
15 as to turn off the transmitter of the wireless communication system when the accelerometer signal corresponds to the acceleration signals, occurring while the tag is at rest, and activates the transmitter of the wireless communication system when the accelerometer signal corresponds to the acceleration signals, occurring while the tag is in motion. The tag is designed to periodically transmit a signal representing the
20 unique tag identification number when the transmitter and receiver of the wireless communication system are turned on; however, the monitoring module is designed to validate the received unique tag identification number, check the authorisation assigned to the unique tag identification number in the database, and generate a change of mode signal to the real estate monitoring system in response to the receipt of a signal representing the unique tag identification number to which the required authorisation to change the operating
mode of the monitoring system is assigned, and press a button on the keyboard to select the operating mode of the real estate monitoring system.

25 In addition, according to the invention, the system is provided with the identification tag is equipped with an accelerometer to measure accelerations. Furthermore, the tag is adapted to turn off the transmitter of the wireless communication system when the accelerometer signal corresponds to the acceleration signals occurring while the tag is at rest, and a wireless communication system transmitter when the accelerometer
30 signal corresponds to the acceleration signals occurring while the tag is in motion. The tag is also adapted to cyclical transmission of a signal representing the unique identification tag number when the transmitter and receiver of the wireless communication system are in operation.

System according to the invention is provided with the monitoring module that is adapted to verify the correctness of the unique identification number received, to check in the database the authorisations assigned to the unique identification number and to generate a signal to change the operating mode of the
35 real estate monitoring system in response to the receipt of a signal representing the unique identification number of the tag, to which the required authorisations to change the operating mode of the monitoring system have been assigned and in response to signal representing pressing the button on the keyboard to select the operating mode of the real estate monitoring system.

40 Real estate monitoring system according to the invention is characterized in that the receiver of the monitoring module and the transmitter of the tag are bidirectional wireless communication system modules.

Real estate monitoring system according to the invention are characterized in that the keyboard of the monitoring module contains a sensor which is a motion detector.

Further an object of the invention is the identification tag that is equipped with the accelerometer suitable for measuring accelerations; furthermore, the tag is adapted to switch off the transmitter of the wireless communication system when the accelerometer signal corresponds to the acceleration signals occurring while the tag is at rest, and to switch on the transmitter of the wireless communication system when the accelerometer signal corresponds to the acceleration signals occurring while the tag is in motion; further the tag is adapted to send a cyclic signal transmission representing the unique tag identification number when the transmitter and the receiver of a wireless communication system are switched on.

According to the invention, the advantage of the system is quick and precise identification of the user's authorisation within the operation of one or more real estate monitoring systems. This advantage has been achieved by using a battery-powered identification tag equipped with an accelerometer and a monitoring module connected to the database. Moreover, the advantage of using an identification tag is the possibility of assigning different rights to the user registered in several real estate monitoring systems.

The subject of the invention is presented in more detail in a favourable example in the drawing, in which:

Fig. 1 presents a diagram of the real estate monitoring system according to the invention.

In fig. 1, the diagram of the real estate monitoring system according to the invention was presented. The monitoring system includes a monitoring module (10) equipped with a wireless keyboard (12) and a wireless communication system receiver (13) (e.g. Wi-Fi, Bluetooth, NFC), adapted to the real estate monitoring capacities, containing at least one sensor (15) installed within the property and connected to the system's database (1). When the user is detected within the range of the real estate monitoring system, or an attempt is made to change the operating mode of the system (disarmament, day mode, night mode, full arming), by pressing the button on wireless keyboard (12), the monitoring module (10) activates the wireless receiver (13), pending the receipt of the unique user identification number. The keyboard (12) of the monitoring module (10) is also equipped with a sensor (15), which is e.g. a motion detector (passive PIR sensor). The use of the motion sensor (15) on the keyboard (12) of the monitoring module (10) allows to detect the user near the monitoring module, which significantly affects the speed of system operation by prior activation of the wireless communication receiver (13). Furthermore, the use of the motion sensor on the keyboard (12) of the monitoring module can improve the comfort of using the system at night by e.g. illuminating the keyboard (12) at the moment of detecting the user. A user who is within the scope of the real estate monitoring system can be identified by having an identification tag (20). Before using it for the first time, the tag (20) must be paired with the monitoring system to register its unique identification number in the system's database (1). Adding and removing tags (20) (for new users and in case of loss or theft) to the property monitoring system can be done by means of a dedicated computer application to configure the system or the user's mobile application with appropriate permissions. The identification tag (20) may take the form of, inter alia, a key ring, wristband or smartwatch and is adapted to the cyclical assignment of a unique identification number stored in the memory (25) of the tag (20).

In the favourable example of the implementation, the wireless communication modules (13) and (23) of the monitoring modules (10) and (20) are the modules of two-way wireless communication system. Application of the two-way communication allows mutual waking up of the monitoring module (10) and the tag (20), which significantly affects the safety and speed of the system operation.

5 Tag (20) can also be equipped with an accelerometer (24), based on which the transmitter (23) is activated. The use of the accelerometer (24) has a positive impact on the system safety by combining data from accelerometer (24) with a unique identification number to avoid the possibility of retransmission of the signal by unauthorised persons. In addition, activating and deactivating the transmitter (23) with the accelerometer (24) has a significant impact on the battery (26) life and the battery performance. The activated receiver (13)
10 of wireless transmission receives the unique identification number from the wireless transmitter (23) of the identification tag (20). In order to increase security, microprocessor (27) randomly changes the transmission frequency of the wireless transmission (23) identification number. For this purpose, an in-house data transmission standard will be developed operating in unlicensed ISM bands (e.g. 868 MHz, 915 MHz). Verification of the unique identification number received by receiver (13) of the monitoring module (10) is
15 performed by comparing it with the data of the registered identification numbers stored in the database (1). Then, the set of authorisations assigned to the unique identification number is read. To shorten the verification time of the unique identification number, an updated copy of the database (1) can be found in the monitoring module (10) or in the wireless keyboard (12). Correct verification of the user's authorisations allows to change the mode of operation of the real estate monitoring system. In case of repeated incorrect
20 verification or lack of authorisations, the monitoring module 10 temporarily blocks access to the wireless keyboard (12).

Table of contents:

	1 - database
	10 - monitoring module
25	12 - keyboard
	13 - receiver of wireless communication system
	15 -sensors
	20 - smart tag
	23 - wireless communication transmitter
30	24 - accelerometer
	25 - memory
	26 - battery
	27 - microprocessor

Patent claims

1. Real estate monitoring system, comprising:

a monitoring module (10), which is adapted to the real estate monitoring capacities and includes at least one sensor (15), which is installed within the premises; wherein, the monitoring module (10), is configured to respond to changes in physical parameters that are recorded by the sensor (15); furthermore, the monitoring module (10) is equipped with a receiver (13) for the wireless communication system and a keyboard (12) for selecting the operating mode of the real estate monitoring system, communicatively linked with a monitoring module (10);

an identification tag (20) with a memory (25), a microprocessor (27) and a transmitter (23) for the wireless communication system, and a battery (26), whereby the unique identification tag number (20) is stored in the memory (25) of the identification tag; and

the monitoring module (10) is communicatively linked to the database (1) in which data representing the unique tag identification number (20) and its associated authority to change the operating mode of the monitoring system are stored;

the identification tag (20) is fitted with an accelerometer (24) suitable for measuring accelerations; the tag (20) is adapted to switch off the transmitter (23) of the wireless communication system when the accelerometer signal (24) corresponds to the acceleration signals occurring while the tag is at rest (20), and to switch on the transmitter (23) of the wireless communication system when the accelerometer signal (24) corresponds to the acceleration signals occurring when the tag (20) is in motion; and

characterized in that

the tag (20) is adapted to send a cyclic signal transmission representing the unique tag identification number (20) when the transmitter (23) and the receiver (13) of the wireless communication system are switched on; and

the monitoring module (10) is adapted to verify the correctness of the unique identification number received, to check in the database (1) the authorisations assigned to the unique identification number and to generate a signal to change the operating mode of the real estate monitoring system in response to the receipt of a signal representing the unique identification number of the tag (20), to which the required authorisations to change the operating mode of the monitoring system have been assigned and in response to signal representing pressing the button on the keyboard (12) to select the operating mode of the real estate monitoring system.

2. Real estate monitoring system as in claim 1, characterized in that the receiver (13) of the monitoring module and the transmitter (23) of the tag (20) are bidirectional wireless communication system modules.
3. Real estate monitoring system as in claim 1, characterized in that the keyboard (12) of the monitoring module (10) contains a sensor (15) which is a motion detector.
4. The identification tag (20) is equipped with the accelerometer (24) suitable for measuring accelerations; furthermore, the tag is adapted to switch off the transmitter (23) of the wireless communication system

when the accelerometer (24) signal corresponds to the acceleration signals occurring while the tag is at rest (20), and to switch on the transmitter (23) of the wireless communication system when the accelerometer (24) signal corresponds to the acceleration signals occurring while the tag (20) is in motion; further the tag (20) is adapted to send a cyclic signal transmission representing the unique tag identification number (20) when the transmitter (23) and the receiver (13) of a wireless communication system are switched on.

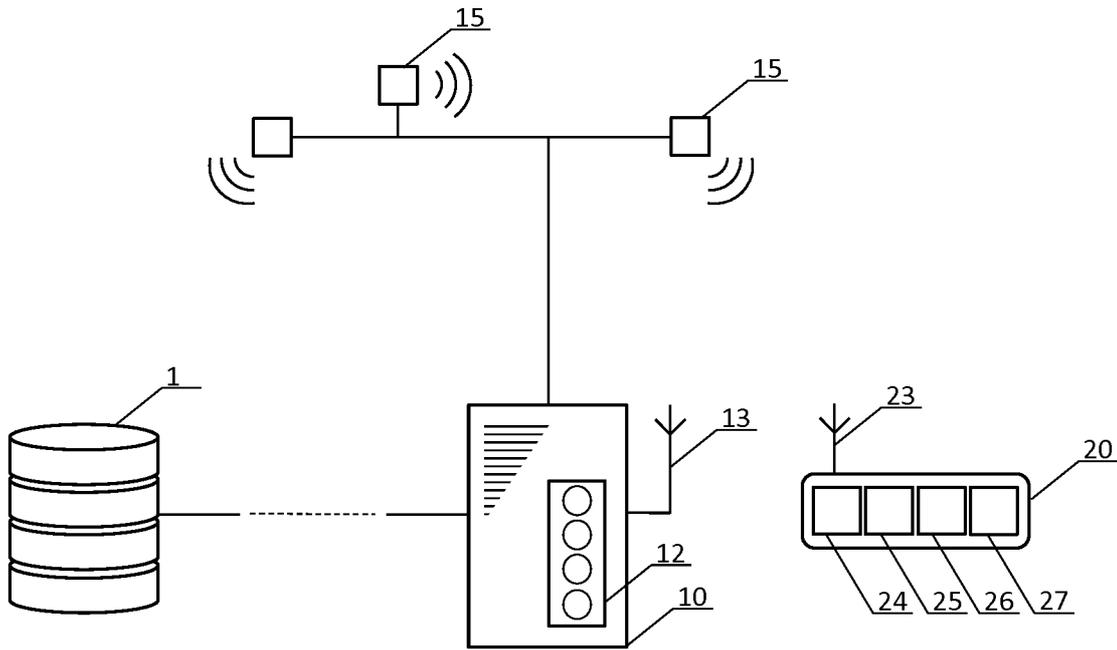


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP20 19/069975

A. CLASSIFICATION OF SUBJECT MATTER
INV. G05B 15/02
 ADD.
 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)
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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2011/087377 A1 (NABESHIMA HIDEO [JP] ET AL) 14 April 2011 (2011-04-14) paragraph [0040] - paragraph [0050] paragraph [0077] paragraph [0081] - paragraph [0086] paragraph [0090] - paragraph [0097] paragraph [0115] - paragraph [0122] figures 2A, 3A, 5B, 8A	1-4
A	----- US 2016/353381 A1 (HSU CHI-HUI [TW] ET AL) 1 December 2016 (2016-12-01) paragraph [0030] figure 5	1-4
A	----- US 2011/254760 A1 (LLOYD STEPHEN [US] ET AL) 20 October 2011 (2011-10-20) the whole document ----- -/--	1-4

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier application or patent but published on or after the international filing date
- "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)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "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
- "&" document member of the same patent family

Date of the actual completion of the international search 25 October 2019	Date of mailing of the international search report 05/11/2019
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	Authorized officer Falconi, Riccardo

INTERNATIONAL SEARCH REPORT

International application No
PCT/ EP20 19/069975

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 492 427 A2 (DIEHL GMBH & CO [DE]) 1 July 1992 (1992-07-01) the whole document	1-4
A	----- ROY WANT ET AL: "The active badge location system", ACM TRANSACTIONS ON INFORMATION SYSTEMS, ASSOCIATION FOR COMPUTING MACHINERY, 2 PENN PLAZA, SUITE 701 NEW YORK NY 10121-0701 USA, vol. 10, no. 1, 2 January 1992 (1992-01-02), pages 91-102, XP058233190, ISSN: 1046-8188, DOI: 10.1145/128756.128759 the whole document -----	1-4

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2019/069975

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011087377 A1	14-04-2011	CA 2717597 A1	13-04-2011
		CN 102043400 A	04-05-2011
		JP 2011087016 A	28-04-2011
		KR 20110040731 A	20-04-2011
		TW 201135617 A	16-10-2011
		US 2011087377 A1	14-04-2011

US 2016353381 A1	01-12-2016	CN 106200863 A	07-12-2016
		TW 201642685 A	01-12-2016
		US 2016353381 A1	01-12-2016

US 2011254760 A1	20-10-2011	NONE	

EP 0492427 A2	01-07-1992	DE 4041825 C1	16-07-1992
		EP 0492427 A2	01-07-1992
