(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 187 509 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
31.05.2023 Bulletin 2023/22

(21) Application number: **22209846.9**

(22) Date of filing: **28.11.2022**

(51) International Patent Classification (IPC):
G07C 9/00 *(2020.01)* ***G07C 9/21*** *(2020.01)*

(52) Cooperative Patent Classification (CPC):
G07C 9/00658; G07C 9/21

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(30) Priority: **29.11.2021 SE 2151447**

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(54) A METHOD TO ACTIVATE A DEVICE, A DEVICE AND A SYSTEM COMPRISING A DEVICE

(57) The present disclosure relates to a method to activate a device (1) connected to a reader (3) with a processing unit (5) and a decoder (7), wherein the reader (3) is arranged to read an information-message comprising coded instructions to activate the device (1) and the device (1) is arranged to receive decoded instructions provided by the decoder (7) to activate the device (1), The method comprises:
- creating a list of coded instructions to activate the device (1),
- saving the list in the processing unit (5) before delivering of the device (1) and the reader (3) to the place of intended operation of the device (1) by an operator and of intended use of the device (1) by a user,
- creating an information-message comprising coded instructions to activate the device (1), wherein the information-message is provided with a certificate specific for the operator of the device (1),
- providing the information-message to the user,
- reading the information-message by the reader (3),
- verifying the certificate in the information-message,
- decoding the instructions in the information-message if the verification step is positive,
- providing decoded instructions to the device (1) and
- activating the device (1) based on the provided decoded instructions. The present disclosure relates also to a device and to a system comprising the device.

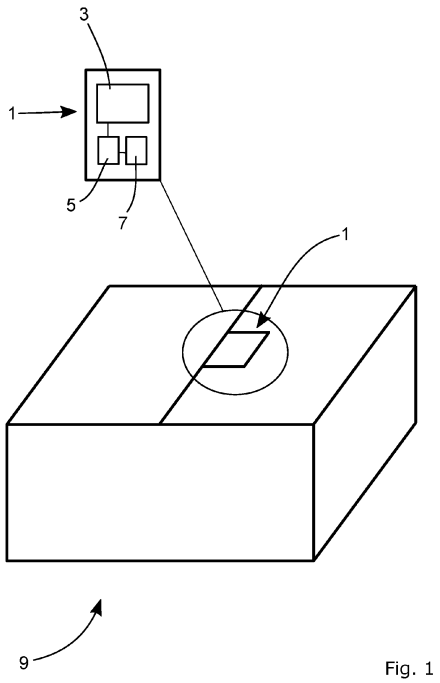

Fig. 1

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Description

BACKGROUND OF THE INVENTION AND PRIOR ART

[0001] The present disclosure relates to the technical area of control of a device, such as for example control of a door lock. Historically, doors like hotel rooms doors have been opened with either metal keys or with programmed plastic cards. In the recent years, different alternatives to the metal keys and to the cards have been developed. Today there are systems using QR-codes displayed on a handheld device, like a mobile phone that enable opening of a door lock.

[0002] US9514586B2 describes a system and method for opening door locks like the locks on hotel room doors using a handheld mobile device and a QR-code. KR1020210055977A is another example of a system where a QR-code is used for authenticating of a digital door lock.

[0003] Although the known systems work well there are some safety aspects that need to be improved. Therefore, it is desirable to provide an improved method and a system to control a device, such as for example a door lock, in an improved and safe way.

SUMMARY OF THE INVENTION

[0004] The object of the present disclosure is to provide an improved method to activate a device, an improved device and an improved system regarding inter alia the safety aspects during usage.

[0005] The above mentioned object is achieved by the method, the device and the system defined in the independent claims.

[0006] Thus, the object is achieved by a method to activate a device connected to a reader with a processing unit and a decoder. The reader is arranged to read an information-message comprising coded instructions to activate the device and the device is arranged to receive decoded instructions provided by the decoder to activate the device.

[0007] The method further comprises:

- creating a list of coded instructions to activate the device,
- saving the list in the processing unit before delivering of the device and the reader to the place of intended operation of the device by an operator and of intended use of the device by a user,
- creating an information-message comprising coded instructions to activate the device, wherein the information-message is provided with a certificate specific for the operator of the device,
- providing the information-message to the user,
- reading the information-message by the reader,
- verifying the certificate in the information-message,
- decoding the instructions in the information-message if the verification step is positive,
- providing decoded instructions to the device and
- activating the device based on the provided decoded instructions.

[0008] Because the created list of coded instructions to activate the device is saved in the processing unit before delivering of the device and the reader to the place of intended operation of the device by an operator and of intended use of the device by a user, there is no need of communication of the device with an external provider of information when the device is to be activated. Thus, the place of intended operation of the device can be a remote place without access to internet and the device can be activated on the place without need of a communication with an external provider of information.

[0009] The operator of the device may be a company that has bought the device and has intention to make business using the device and the method. The user may be a client to the company, which user has an intention to, for example, pay for a thing or a service or bay a thing that can be made available by activating the device. Another examples of activating the device by the user can be: activating an electric system with lamps, opening a lock in a cabinet or similar.

[0010] Further, because the information-message is provided with the certificate specific for the operator of the device and the method comprises the step of verifying the certificate in the information-message, the device can only be activated by an information-message comprising the certificate. Thus, the device can only be activated when the right information-message, i.e. the information-message from the correct operator of the device is used to activate the device. Thereby, an improved method to activate a device regarding safety during usage is provided. Consequently, the above mention object is achieved.

[0011] Optionally, the information-message comprises information about the duration of the information-message and the method comprises to verify the duration of the information-message. Thus, the information-message can be used during a predefined period of time. When creating the information-message, it can be decided, either by the operator or by the user, for how long period of time the information-message is valid and can be used to activate the device. The information about the duration of the information-message improves the safety during use of the method because when the decided period of time has expired, the information-message cannot be used. Thereby, a yet improved method to activate the device is provided

[0012] Optionally, the method comprises:

- memorizing the read information-message in order to prevent reuse of once used information-message. Once used information-message is recognized by the reader and cannot be reused. This preferably by an index function included in the information-message and by memorizing used index from the index

function by the reader. Thereby, a yet improved method to activate the device is provided regarding the safety during usage of the method.

[0013] Optionally, the information-message is a QR-code.

[0014] Optionally, the device is a locking arrangement arranged to lock a unit.

[0015] Optionally, the unit is a refrigerator.

[0016] Optionally, the method comprises providing the information-message with instructions to affect the functionality of the device, such as to update the device. Thus, the device can be updated at the same time when the information-message is used to activate the device.

[0017] Further, the above mentioned object is achieved by a device connected to a reader with a processing unit and a decoder, wherein the reader is arranged to read an information-message comprising coded instructions to activate the device and the device is arranged to receive decoded instructions provided by the decoder to activate the device. The information-message is provided with a certificate specific for the operator of the device, wherein the processing unit of the device is arranged to verify the certificate in the information-message.

[0018] The operator of the device may be a company that has bought the device and has intention to make business using the device, while the user may be a client to the company, which user has an intention to, for example, pay for a thing or a service or bay a thing that can be made available by activating the device. Another examples of activating the device by the user can be: activating an electric system with lamps, opening a lock in a cabinet or similar.

[0019] Because the information-message is provided with the certificate specific for the operator of the device and the processing unit is arranged to verify the certificate in the information-message, the device can only be activated by an information-message comprising the certificate. Thus, the device can only be activated when the right information-message, i.e. the information-message from the correct operator of the device is used to activate the device. Thereby, an improved device regarding the safety is provided and thereby the above mentioned object is achieved.

[0020] Optionally, the reader is arranged to memorize the read information-message in order to prevent reuse of once used information-message. Once used information-message is recognized by the reader and cannot be reused, which improves the safety during usage of the device. This preferably by an index function included in the information-message and by memorizing used index from the index function by the reader. Thereby, a yet improved device is provided.

[0021] Optionally, the information-message is a QR-code.

[0022] Optionally, the information-message comprises information about the duration of the information-message and the reader is arranged to verify the information about the duration of the information-message. Thus, the information-message can be used during a predefined period of time. When creating the information-message, it can be decided, either by the operator or by the user, for how long period of time the information-message is valid and can be used to activate the device. The information about the duration of the information-message improves the safety during use of the device because when the decided period of time has expired, the information-message cannot be used. Thereby, a yet improved device is provided.

[0023] Optionally, the device is a locking arrangement arranged to lock a unit.

[0024] Optionally, the unit is a refrigerator.

[0025] Optionally, the information-message is provided with instructions to affect the functionality of the device, such as to update the device. Thus, the device can be updated at the same time when the information-message is used to activate the device.

[0026] Optionally, the processing unit is arranged to enable saving of a created list of coded instructions to activate the device before delivering of the device and the reader to the place of intended operation of the device by an operator and of intended use of the device by a user. Thus, there is no need of communication of the device with an external provider of information when the device is to be activated. Thus, the place of intended operation of the device can be a remote place without access to internet and the device can be activated on the place without need of a communication with an external provider of information.

[0027] Yet further, the above mentioned object is achieved by a system comprising an information-message creator and a device connected to a reader with a processing unit and a decoder. The information-message creator is arranged to create an information-message comprising coded instructions to activate the device and the reader is arranged to read the information-message. The device is arranged to receive decoded instructions provided by the decoder to activate the device. The information-message creator is configured to create the information-message provided with a certificate specific for the operator of the system and the processing unit of the device is arranged to verify the certificate.

[0028] The operator of the system may be a company that has bought the system and has intention to make business using the system, while the user may be a client to the company, which user has an intention to, for example, bay a thing that can be made available by activating the device. Another examples of activating the device by the user can be: activating an electric system with lamps, opening a lock in a cabinet or similar.

[0029] Because the information-message is provided with the certificate specific for the operator of the system and the processing unit of the device is arranged to verify the certificate in the information-message, the device can only be activated by an information-message comprising

the certificate. Thus, the device can only be activated when the right information-message, i.e. the information-message from the correct operator of the system and the device is used to activate the device. Thereby, an improved system is provided regarding the safety during usage of the system. Consequently, the above mentioned object is achieved.

[0030] Optionally, the information-message comprises information about the duration of the information-message and the reader is arranged to verify the information about the duration of the information-message. Thus, the information-message can be used during a predefined period of time. When creating the information-message, it can be decided, either by the operator or by the user, for how long period of time the information-message is valid and can be used to activate the device. The information about the duration of the information-message improves the safety during use of the system because when the decided period of time has expired, the information-message cannot be used. Thereby, a yet improved system is provided.

[0031] Optionally, the reader is arranged to memorize the read information-message in order to prevent reuse of once used information-message. Once used information-message is recognized by the reader and cannot be reused, which improves the safety during usage of the system and of the device. This preferably by an index function included in the information-message and by memorizing used index from the index function by the reader. Thereby, a yet improved system is provided.

[0032] Optionally, the information-message is a QR-code.

[0033] Optionally, the device is a locking arrangement arranged to lock a unit.

[0034] Optionally, the unit is a refrigerator.

[0035] Optionally, the information-message is provided with instructions to affect the functionality of the device, such as to update the device. Thus, the device can be updated at the same time when the information-message is used to activate the device.

[0036] Optionally, the processing unit of the device is arranged to enable saving of a created list of coded instructions to activate the device before delivering of the device and the reader to the place of intended operation of the device by an operator and of intended use of the device by a user. Thus, there is no need of communication of the device with an external provider of information when the device is to be activated. Thus, the place of intended operation of the device can be a remote place without access to internet and the device can be activated on the place without need of a communication with an external provider of information.

BRIEF DESCRIPTION OF THE DRAWINGS

[0037] In the following preferred embodiments of the invention are described with reference to the attached drawings, on which:

Fig. 1 is a schematic illustration of a unit, such as a refrigerator, comprising a device, which is a locking arrangement connected to a reader with a processing unit and a decoder and

Fig. 2 is a schematic illustration of a system comprising an information-message creator and the device illustrated in Fig. 1.

DETAILLED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

[0038] Fig. 1 is a schematic illustration of a unit 9, such as a refrigerator, comprising a device 1, which, according to the embodiments in Fig. 1, is a locking arrangement to lock the refrigerator. The locking arrangement 1 is connected to a reader 3 with a processing unit 5 and a decoder 7. According to the embodiments illustrated in Fig. 1, the reader 3, the processing unit 5 and the decoder 7 are integrated in the locking arrangement 1. The locking arrangement 1 comprises a locking mechanism, which locking mechanism is common knowledge in the art and therefore not described in details herein. As an option, the reader 3, the processing unit 5 and the decoder 7 can be arranged at a distance from the device 1 and can be arranged to communicate with the device, for example in a wireless manner.

[0039] Before delivering of the refrigerator 9 with the locking arrangement 1 to the place of intended operation of the refrigerator by an operator and of intended use of the refrigerator 9 by a user a list of coded instructions to activate the locking arrangement lis created and is saved in the processing unit 5 of the locking arrangement 1. Thus, the list of coded instructions may be saved in the processing unit 5 at the factory manufacturing the locking arrangement1.

[0040] Thus, the place of intended operation of the refrigerator can be a remote place without access to internet and the locking arrangement 1 can be activated on the place without need of a communication with an external provider of information.

[0041] The reader 3 is arranged to read an information-message comprising coded instructions to activate the refrigerator 1. The locking arrangement 1 is arranged to receive decoded instructions provided by the decoder 7 to activate the locking arrangement 1 and particularly to activate the locking mechanism within the locking arrangement 1 to unlock the refrigerator 1.

[0042] Preferably, the information-message is a QR-code. The reader 3 is arranged to read the QR-code and can be arranged to memorize the QR-code in order to prevent reuse of once used QR-code. This preferably by an index function included in the QR-code and by memorizing used index from the index function by the reader 3.

[0043] The QR-code can be provided with a certificate specific for the operator of the locking arrangement 1, wherein the processing unit 5 of the locking arrangement 1 is then arranged to verify the certificate in the QR-code. The operator of the locking arrangement 1 may be a com-

pany that has bought the locking arrangement 1 and has intention to make business using the locking arrangement 1. Alternatively, the operator may be a company owning the refrigerator 9 with the locking arrangement 1.

[0044] The user may be a client to the company, which user has an intention to, for example, bay a thing that can be made available by activating the locking arrangement 1 of the refrigerator 9 to unlock the refrigerator 9.

[0045] Because the QR-code can be provided with the certificate specific for the operator of the locking arrangement 1 and the processing unit 5 is then arranged to verify the certificate in the QR-code, the locking arrangement 1 can only be activated by a QR-code comprising the certificate. Thus, the locking arrangement 1 can only be activated when the right QR-code, i.e. the QR-code from the correct operator of the locking arrangement 1 is used to activate the locking arrangement 1 to unlock the refrigerator 9.

[0046] Fig. 2 is a schematic illustration of a system 11 comprising an information-message creator 13 and the locking arrangement 1 illustrated in Fig. 1.

[0047] The information-message creator 13 is configured to create the information-message, which information-message may be a QR-code provided with a certificate specific for the operator of the system 11.

[0048] The operator of the system 11 may be a company that has bought the system and has intention to make business using the system 11, while a user may be a client to the company, which user has an intention to, for example, bay a thing that can be made available by activating the refrigerator described in Fig. 1.

[0049] According to some embodiments, the information-message creator 13 is a server with program to create the information-message. The server can be reached by a computer or by a mobile phone of a user to create a QR-code that can be provided to the computer or mobile phone of the user.

[0050] Below the general information about the innovation in this application is provided. The creation of a QR-code is done through a Hash-based message authentication codes (HMAC). There is a cryptographically strong key and a weaker key that together with a encoded instructions is used to create a SHA-256 hash. This hash is converted into a QR-code that a user can display for the reader 3. The reader 3, the processing unit 5 and the decoder 7 are arranged to read the QR-code, to decode the information in the QR-code and to process the information to achieve an activation of the device 1 based on the information in the QR-code.

Claims

1. A method to activate a device (1) connected to a reader (3) with a processing unit (5) and a decoder (7), wherein the reader (3) is arranged to read an information-message comprising coded instructions to activate the device (1) and the device (1) is arranged to receive decoded instructions provided by the decoder (7) to activate the device (1),
characterized in that the method comprises:

   - creating a list of coded instructions to activate the device (1),
   - saving the list in the processing unit (5) before delivering of the device (1) and the reader (3) to the place of intended operation of the device (1) by an operator and of intended use of the device (1) by a user,
   - creating an information-message comprising coded instructions to activate the device (1), wherein the information-message is provided with a certificate specific for the operator of the device (1),
   - providing the information-message to the user,
   - reading the information-message by the reader (3),
   - verifying the certificate in the information-message,
   - decoding the instructions in the information-message if the verification step is positive,
   - providing decoded instructions to the device (1) and
   - activating the device (1) based on the provided decoded instructions.

2. The method according to claim 1, wherein the information-message comprises information about the duration of the information-message, wherein the method comprises to verify the duration of the information-message and/or the information-massage is provided with instructions to affect the functionality of the device (1), such as to update the device (1).

3. The method according to claim 1 or 2, comprising:

   - memorizing the read information-message in order to prevent reuse of once used information-message.

4. The method according to any of claims 1 to 3, wherein said information-message is a QR-code.

5. The method according to any of claims 1 to 4, wherein the device (1) is a locking arrangement arranged to lock a unit (9), such as a refrigerator.

6. A device (1) connected to a reader (3) with a processing unit (5) and a decoder (7), wherein the reader (3) is arranged to read an information-message, such as a QR-code, comprising coded instructions to activate the device (1) and the device (1) is arranged to receive decoded instructions provided by the decoder (7) to activate the device (1),
characterized in that, the information-message is provided with a certificate specific for the operator

of the device (1), wherein the processing unit (5) of the device (1) is arranged to verify the certificate in the information-message.

7. The device (1) according to claim 8, wherein the reader (3) is arranged to memorize the read information-message in order to prevent reuse of once used information-message.

8. The device (1) according to any of claims 8 to 10, wherein the information-message comprises information about the duration of the information-message and the reader (3) is arranged to verify the information about the duration of the information-message and/or the information-message is provided with instructions to affect the functionality of the device (1), such as to update the device (1).

9. The device (1) according to any of claims 8 to 11, wherein the device (1) is a locking arrangement arranged to lock a unit (9), such as a refrigerator.

10. The device (1) according to any of claims 8 to 14, wherein the processing unit (5) is arranged to enable saving of a created list of coded instructions to activate the device (1) before delivering of the device (1) and the reader (3) to the place of intended operation of the device (1) by an operator and of intended use of the device (1) by a user.

11. A system (11) comprising an information-message creator (13) and a device (1) connected to a reader (3) with a processing unit (5) and a decoder (7), wherein the information-message creator (13) is arranged to create an information-message, such as a QR-code, comprising coded instructions to activate the device (1) and the reader (3) is arranged to read the information-message, wherein the device (1) is arranged to receive decoded instructions provided by the decoder (7) to activate the device (1), **characterized in that**
the information-message creator (13) is configured to create the information-message provided with a certificate specific for the operator of the system (11) and the processing unit (5) of the device (1) is arranged to verify the certificate.

12. The system (11) according to claim 16, wherein the information-message comprises information about the duration of the information-message and the reader (3) is arranged to verify the information about the duration of the information-message and/or the information-message is provided with instructions to affect the functionality of the device (1), such as to update the device (1).

13. The system (11) according to claim 16 or 17, wherein the reader (3) is arranged to memorize the read information-message in order to prevent reuse of once used information-message.

14. The system (11) according to any of claims 16 to 19, wherein the device (1) is a locking arrangement arranged to lock a unit (9), such as a refrigerator.

15. The system (11) according to any of claims 16 to 22, wherein the processing unit (5) of the device (1) is arranged to enable saving of a created list of coded instructions to activate the device (1) before delivering of the device (1) and the reader (3) to the place of intended operation of the device (1) by an operator and of intended use of the device (1) by a user.

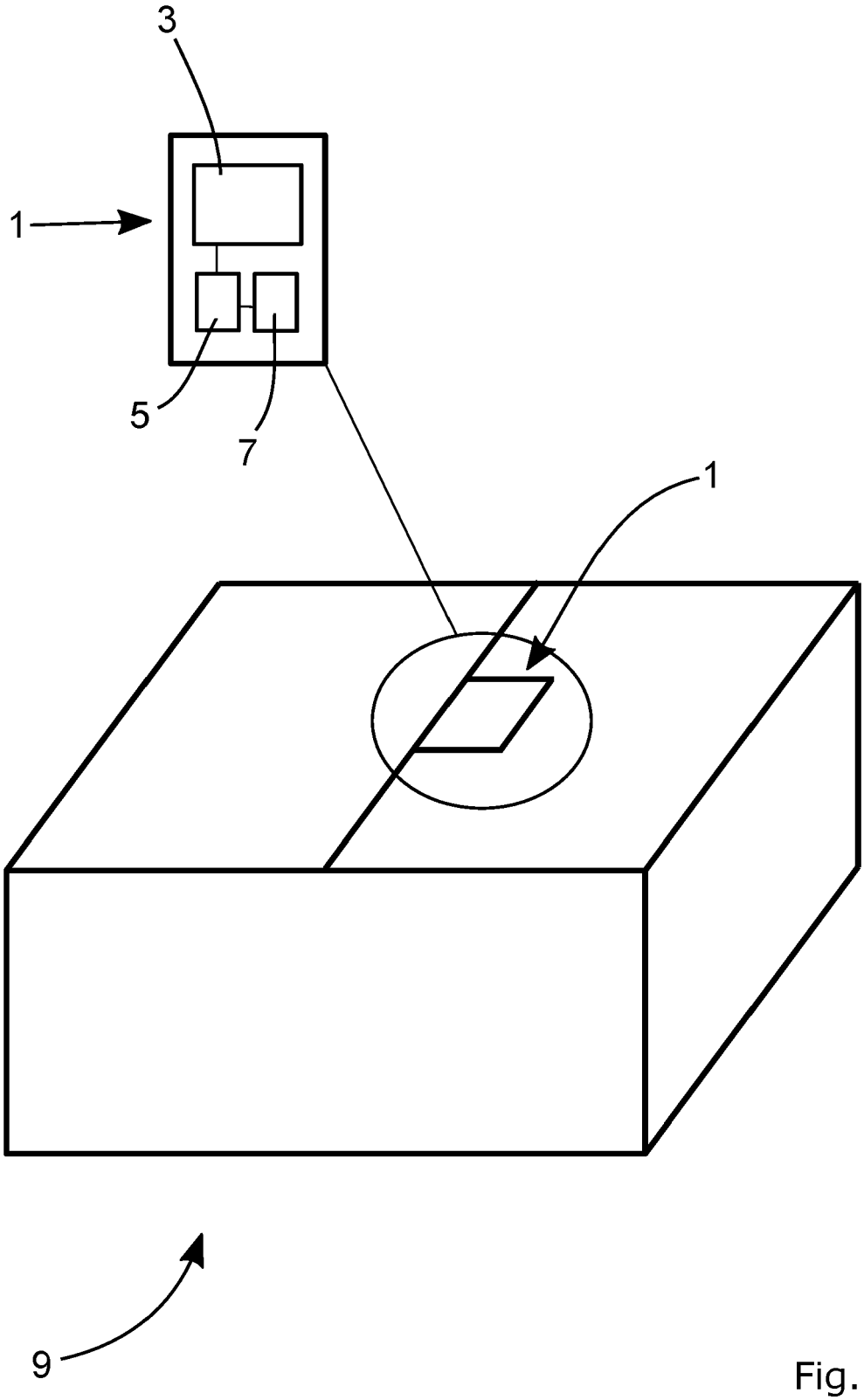

Fig. 1

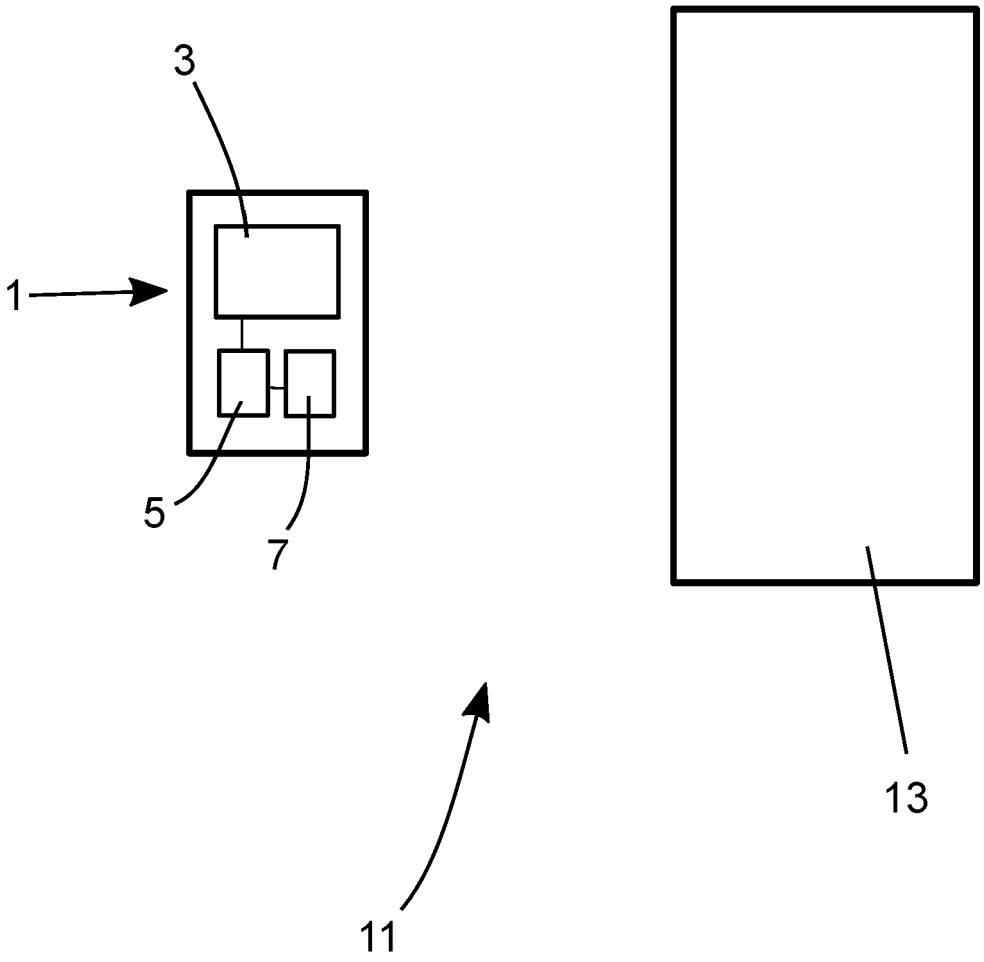

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 22 20 9846

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Y	* paragraph [0002] - paragraph [0009] * * paragraph [0023] - paragraph [0065] * * figures 1-8 *	4	G07C9/21
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Y	* paragraph [0002] * * paragraph [0008] - paragraph [0014] * * paragraph [0037] - paragraph [0053] * * figures 1-21 *	4	
Y	US 8 844 811 B1 (ROGERS APRIL ELIZABETH [US] ET AL) 30 September 2014 (2014-09-30) * column 1, line 20 - column 2, line 23; figures 1-2 *	4	
Y	US 2017/001598 A1 (POPHALE SACHIN [IN] ET AL) 5 January 2017 (2017-01-05) * paragraph [0003] - paragraph [0004] * * paragraph [0012] - paragraph [0049] * * figures 1-4 *	4	

TECHNICAL FIELDS SEARCHED (IPC)

G07C
G07F
G06Q

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	14 April 2023	Neumann, Christoph

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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14-04-2023

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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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