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(54) **A METHOD FOR GRANTING ACCESS TO ONE OR MORE COMPARTMENTS USING A TAG**

(57) A method (100) comprising steps of
- receiving (400), at a parcel locker (10), an identifier linking a personal token to one or more compartments of the parcel locker (10) transmitted to the parcel locker (10) by a backend system,
- receiving (400), at a parcel locker (10), via near field communication the personal token (90) stored on a personal Tag (20) for access to the one or more compartments (12),
- granting (500) access to the one or more compartments (12) as a function of the personal token (90) and the identifier ().

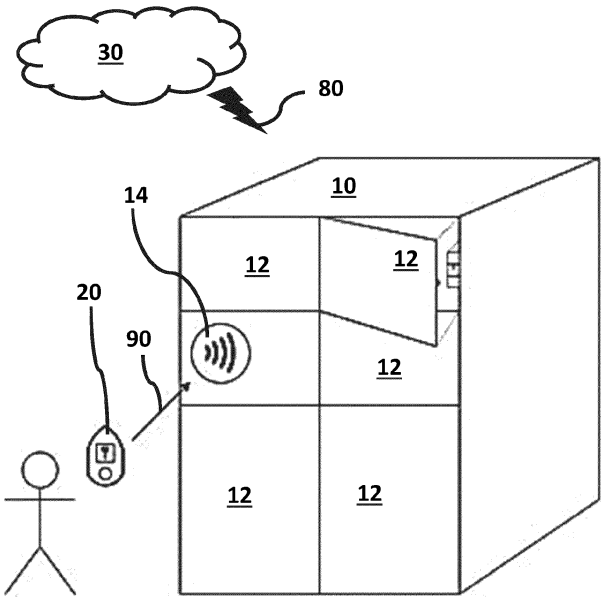

Fig. 1

EP 4 576 028 A1

Description

Field of the Invention

[0001] The present invention relates to methods for granting access to one or more compartments using a tag.

Background of the Invention

[0002] Today, the parcel lockers are mainly operated using pin pads or touch screens or apps on smart devices such as smartphones or tablets. Some people do not want to use apps, and some people with disabilities cannot use the touch screens or pin pads. Other people just want the convenience of operating a parcel locker quickly without the need for manual inputs.

[0003] This problem is present for on-grid parcel lockers and off-grid parcel lockers, such as autonomous parcel lockers which are battery powered and only communicates with a backend system via third-party devices. The autonomous parcel lockers may use piggybacking as described in WO2019161872.

[0004] Hence, there is a need for one solution allowing fast transfer of instructions without the use of apps or other manual inputs thereby allowing a larger number of people with disabilities to use parcel lockers.

Object of the Invention

[0005] One objective of the present disclosure is to achieve a method for granting access to a parcel locker without the need for pressing buttons or using an app on a portable device.

Description of the Invention

[0006] An objective of the invention is achieved by a method comprising steps of

- receiving, at a parcel locker, an identifier linking a personal token to one or more compartments of the parcel locker transmitted to the parcel locker by a backend system,
- receiving, at a parcel locker, via near field communication the personal token stored on a personal tag for access to the one or more compartments,
- granting access to the one or more compartments as a function of the personal token and the identifier.

[0007] The identifier can be received by the parcel locker via a third-party device using piggybacking or via a wired connection to the internet or via GSM or LTE or NB-IoT or any other communication protocol. The identifier enables that the parcel locker can link the personal token stored on a tag to one or more compartments, thereby the correct compartments will open. The owner of the tag can then collect one or more parcels from the one or more compartments and/or place one or more parcels to the one or more compartments.

[0008] The step of granting access will typically be performed by unlocking a hatch.

[0009] The communication is preferably encrypted to prevent misuse of the personal token.

[0010] An objective of the invention is achieved by a method comprising steps of

- receiving, at a backend system, a request to access one or more compartments of a parcel locker using a personal token stored on a personal tag,
- determining, at a backend system, the one or more compartments from a plurality of compartments of the parcel locker;
- transmitting an identifier from the backend system to the parcel locker, which identifier links the personal token to one or more compartments of the parcel locker.

[0011] The owner of the personal token stored on the tag will, when ordering a parcel, request to be able to use the personal token for the pick-up or when ordering delivery of a parcel request to be able to use the personal token for the drop-off. The backend system has information related to the personal token, which enables the backend system to determine the one or more compartments and to transmit the identifier linking the personal token to one or more compartments.

[0012] The information may be data on the personal token and a personal identifier of the owner which can be a telephone number, e-mail address or Visa Card or other means of identification.

[0013] An objective of the invention is achieved by a method comprising steps of - transmitting a personal token from a personal tag to a parcel locker, wherein the personal token is linked to one or more compartments of the parcel locker by an identifier transmitted to the parcel locker by a backend system, wherein the personal token and the identifier cause the parcel locker to perform a step of granting access to the one or more compartments.

[0014] Thereby, almost any person will be able to open one or more compartments by simply placing the tag at a tag reader of the parcel locker, which can be performed quickly and without providing an input.

[0015] In an aspect, the step of transmitting an identifier from the backend system to the parcel locker may be performed via a third-party device. Alternatively or in addition the step of receiving, at a parcel locker, an identifier may be performed via a third-party device. Thereby, off-grid parcel lockers which are not in direct contact with the backend system can still perform the method as long as the off-grid parcel lockers have a tag reader.

[0016] The third-party device may be a courier device transferring the identifier during delivery of parcels.

[0017] The third-party device may be a user device

transferring the identifier during pick-up or drop-off of a parcel to the parcel locker using piggybacking technology.

[0018] In an aspect, the step of transmitting an identifier from the backend system to the parcel locker, is performed by a courier device, when delivering or collecting one or more parcels from the parcel locker.

[0019] The communication (transmitting and receiving) between the parcel locker and the backend system can be via third-party devices i.e. indirect communication or via NB-IoT or GSM or LTE i.e. direct communication.

[0020] However, the communication (transmitting and receiving) between the tag and the tag reader is preferable direct without any devices in between.

[0021] In an aspect, the method may perform further steps of

- transmitting a challenge from the tag to the parcel locker;
- receiving, at the tag, a challenge response from the parcel locker, wherein the tag only performs the step of transmitting the personal token to the parcel locker upon receiving the correct challenge response. Thereby, a man-in-the-middle attack is prevented or at least the risk of such an attack is lowered significantly.

[0022] In an aspect, the personal token is used two, three or more times at one, two or more parcel lockers. The owner of the personal token stored on the tag can, in principle, use the same tag forever, as long as the tag is not lost.

[0023] The tag may be an NFC tag or Bluetooth tag or similar tag with a suitable near field communication protocol. The corresponding tag reader may be NFC reader or a Bluetooth reader or similar reader.

[0024] An objective of the invention is achieved by a parcel locker comprising compartments, a tag reader and means to perform the steps of the method according to any of claims 1 to 6.

[0025] An objective of the invention is achieved by a backend system having means to perform the steps of the method according to any of claims 1 to 6.

[0026] An objective of the invention is achieved by a tag having stored thereon a personal token and means to perform the steps of the method according to any of claims 1 to 6.

[0027] An objective of the invention is achieved by computer program product comprising instructions to cause the parcel locker of claim 7, or the backend system of claim 8, or the tag of claim 9 to execute the steps of the method according to any of claims 1 to 6.

[0028] An objective of the invention is achieved by a computer-readable medium such as a non-transient storage medium having stored thereon the computer program product of claim 10.

Description of the Drawing

[0029] Various examples are described hereinafter with reference to the figures. The reference numerals refer to the elements throughout. The elements will, thus, not be described in detail with respect to the description of each figure. It should also be noted that the figures are only intended to facilitate the description of the examples. They are not intended as an exhaustive description of the claimed invention or as a limitation of the scope of the claimed invention. In addition, an illustrated example does not have all the aspects or advantages shown. An aspect or an advantage described in conjunction with a particular example is not necessarily limited to that example and can be practiced in any other examples even if not illustrated, or if not explicitly described.

[0030] Exemplary embodiments of the invention are described in the figures, whereon:

Fig. 1 illustrates a parcel locker operationally using a tag;
Fig. 2 illustrates a method for granting access to the one or more compartments; and
Fig. 3 illustrates a challenge sent from the tag to the parcel locker.

Item	Reference
Parcel locker	10
Compartments	12
Tag reader	14
Tag	20
Backend system	30
Challenge	60
Challenge response	62
Identifier	80
Personal token	90
Method	100, 200, 300
Receiving	400
Granting	500
Determining	600
Transmitting	700

Detailed Description of the Invention

[0031] Exemplary examples will now be described in more detail hereinafter with reference to the accompanying drawings. In this regard, the present examples may have different forms and should not be construed as being limited to the descriptions set forth herein. Accordingly, the examples are merely described below, by re-

ferring to the figures, to explain aspects.

[0032] The terminology used herein is for the purpose of describing particular examples only and is not intended to be limiting. As used herein, the terms "comprises" "comprising" "includes" and/or "including" when used in this specification specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0033] Unless otherwise defined, all terms used herein (including technical and scientific terms) have the same meaning as commonly understood by those skilled in the art to which this invention pertains. It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined in the present specification.

[0034] Fig. 1 illustrates a parcel locker 10 operationally using a tag 20. The parcel locker 10 has prior to operating the parcel locker 10 received from a backend system 30 an identifier 80 linking a personal token 90 to one or more compartments 12 of the parcel locker 10.

[0035] The transmitting of the identifier 80 can be via GSM, or NB-loT or LTE or other long range communication protocols and/or via a third-party device such as a courier device during delivering or collecting one or more parcels wherein the transmitting may be performed using piggybacking technology. The transmitting of the identifier 80 can be performed via a third-party device such as a recipient device during delivering or collecting one or more parcels wherein the transmitting may be performed using piggybacking technology.

[0036] In the shown embodiment, the person with the tag 20 having stored thereon the personal token 90 ensures that a tag reader 14 of the parcel locker 10 can receive the personal token either by placing the tag at the tag reader 14 or by otherwise activating the tag 20 or tag reader 14. A Bluetooth tag would not be required to be a few cm from the tag reader 14 in order for transfer while an NFC tag 20 would be required to be very close to the tag reader 14. There may be sent a challenge from the tag 20 to the parcel locker 10 as described in figure 3.

[0037] The parcel locker 10 will upon receiving the personal identifier 80 grant access to the one or more compartments 12 as a function of the personal token 90 and the identifier 80. In the shown embodiment, the compartment 12 access is granted to the compartment 12 in the top right corner.

[0038] Fig. 2 illustrates a method 100, 200, 300 for granting access to the one or more compartments.

[0039] A parcel locker 10 performs a method 100 comprising steps of

- receiving 400, at the parcel locker 10, an identifier 80 linking a personal token 90 to one or more compartments of the parcel locker 10 transmitted to the parcel locker 10 by a backend system 30,
- receiving 400, at a parcel locker 10, via near field communication the personal token 90 stored on a personal tag 20 for access to the one or more compartments 12,
- granting 500 access to the one or more compartments 12 as a function of the personal token 90 and the identifier 80.

[0040] A backend system 30 performs a method 200 comprising steps of

- receiving 400, at the backend system 30, a request to access one or more compartments 12 of a parcel locker using a personal token 90 stored on a personal tag 20,
- determining 600, at a backend system 30, the one or more compartments 12 from a plurality of compartments of the parcel locker 10;
- transmitting 700 an identifier from the backend system 30 to the parcel locker 10, which identifier links the personal token 90 to one or more compartments 12 of the parcel locker 10.

[0041] A personal tag 20 performs a method 300 comprising steps of

- transmitting 700 a personal token 90 from the personal tag 20 to a parcel locker 10, wherein the personal token 90 is linked to one or more compartments of the parcel locker 10 by an identifier 80 transmitted to the parcel locker 10 by a backend system 30, wherein the personal token 90 and the identifier 80 cause the parcel locker 10 to perform a step of granting 500 access to the one or more compartments 12.

[0042] Fig. 3 illustrates a challenge 60 sent from a tag 20 to a parcel locker 10. The parcel locker 10 comprises a tag reader 14 and one or more not shown compartments 12. An example of compartments 12 is shown in figure 1.

[0043] The tag 20 performs a step of transmitting 700 a challenge 60 from the tag 20 to the parcel locker 10. The parcel locker 10 performs a step of receiving the challenge 60. The challenge 60 may be encrypted with a key, which the true parcel locker 10 can decrypt and compute the challenge response 62.

[0044] The parcel locker 20 then performs a step of transmitting 700 a challenge response 62 from the parcel locker 10 to the tag 20. The tag 20 performs a step of receiving 40 the challenge response 62 and only if the received challenge response is the correct challenge response, then the tag 20 only performs the step of transmitting 700 the personal token 90 to the parcel locker 10 upon receiving the correct challenge response. This is shown in figure 3A.

[0045] Figure 3B shows the same interaction, but where the actual receiver of the challenge 60 is not the true parcel locker 10, i.e. it may be the wrong parcel locker 10 or a man-in-the-middle, then the challenge response will not be the correct challenge response and the tag 20 will forward the personal token 90.

Claims

1. A method (100) comprising steps of

- receiving (400), at a parcel locker (10), an identifier (80) linking a personal token (90) to one or more compartments of the parcel locker (10) transmitted to the parcel locker (10) by a backend system (30),
- receiving (400), at a parcel locker (10), via near field communication the personal token (90) stored on a personal tag (20) for access to the one or more compartments (12),
- granting (500) access to the one or more compartments (12) as a function of the personal token (90) and the identifier (80).

2. A method (200) comprising steps of

- receiving (400), at a backend system (30), a request to access one or more compartments (12) of a parcel locker using a personal token (90) stored on a personal tag (20),
- determining (600), at a backend system (30), the one or more compartments (12) from a plurality of compartments of the parcel locker (10);
- transmitting (700) an identifier from the backend system (30) to the parcel locker (10), which identifier links the personal token (90) to one or more compartments (12) of the parcel locker (10).

3. A method (300) comprising steps of

- transmitting (700) a personal token (90) from a personal tag (20) to a parcel locker (10), wherein the personal token (90) is linked to one or more compartments of the parcel locker (10) by an identifier (80) transmitted to the parcel locker (10) by a backend system (30), wherein the personal token (90) and the identifier (80) cause the parcel locker (10) to perform a step of granting (500) access to the one or more compartments (12).

4. A method (100, 200, 300) according to any of claims 1 to 3, wherein the step of transmitting (700) an identifier (80) from the backend system (30) to the parcel locker (10) and/or the step of receiving (400), at a parcel locker (10), an identifier (80) is performed via a third-party device (80).

5. A method (100, 200, 300) according to any of claims 1 to 4, wherein the method (100, 200, 300) performs steps of

- transmitting (700) a challenge from the tag (20) to the parcel locker (10);
- receiving (400), at the tag (20), a challenge response from the parcel locker (10), wherein the tag (20) only performs the step of transmitting (700) the personal token (90) to the parcel locker (10) upon receiving the correct challenge response.

6. A method (100, 200, 300) according to any of claims 1 to 5, wherein the personal token (90) is used two, three or more times at one, two or more parcel lockers (10)

7. A parcel locker (10) comprising compartments (12), an tag reader (14) and means to perform the steps of the method according to any of claims 1 to 6.

8. A backend system (30) having means to perform the steps of the method according to any of claims 1 to 6.

9. A tag (20) having stored thereon a personal token (90) and means to perform the steps of the method according to any of claims 1 to 6.

10. A computer program product comprising instructions to cause the parcel locker of claim 7, or the backend system (70) of claim 8, or the tag (20) of claim 9 to execute the steps of the method according to any of claims 1 to 6.

11. A computer-readable medium such as a non-transient storage medium having stored thereon the computer program product of claim 10.

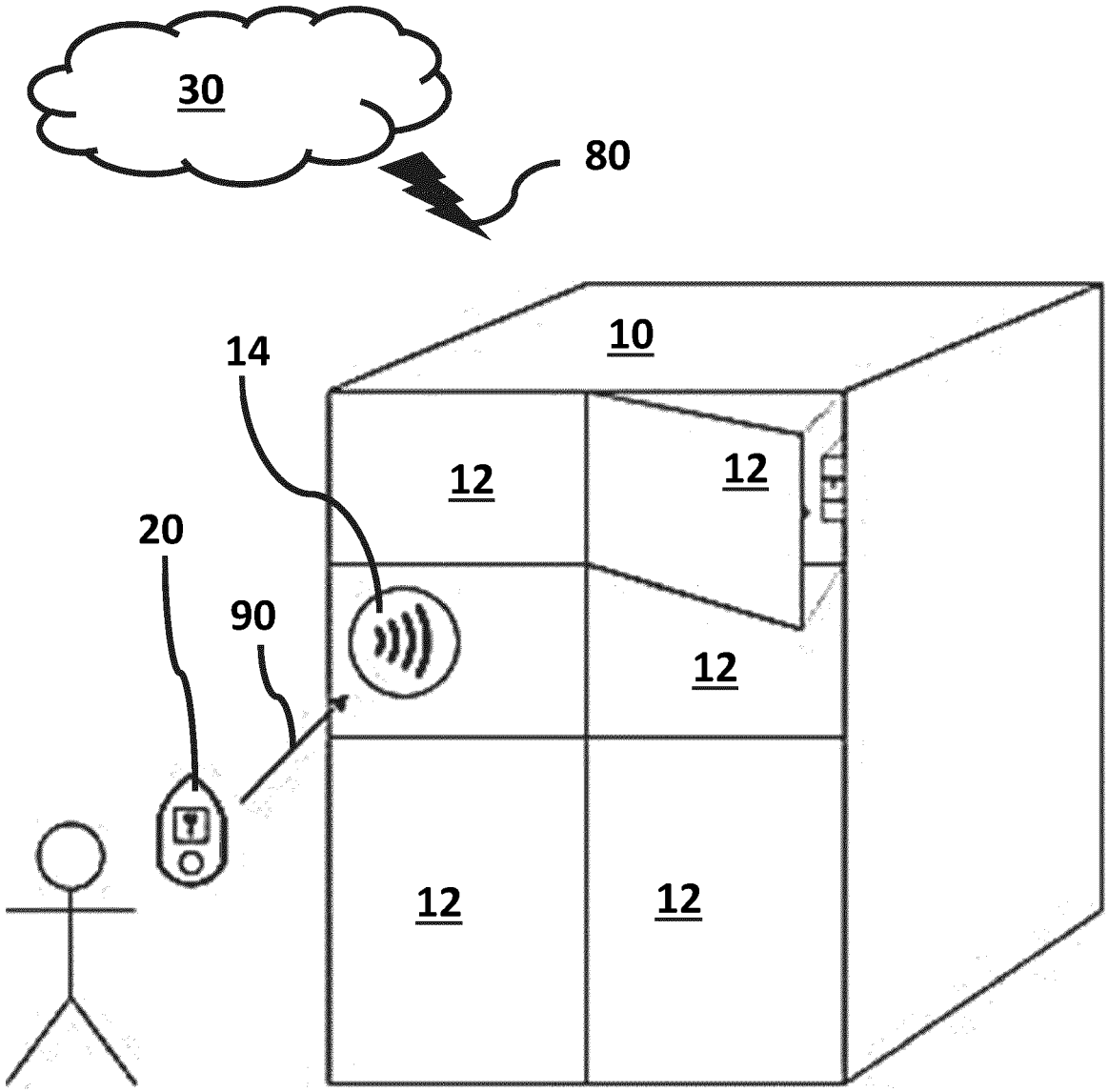

Fig. 1

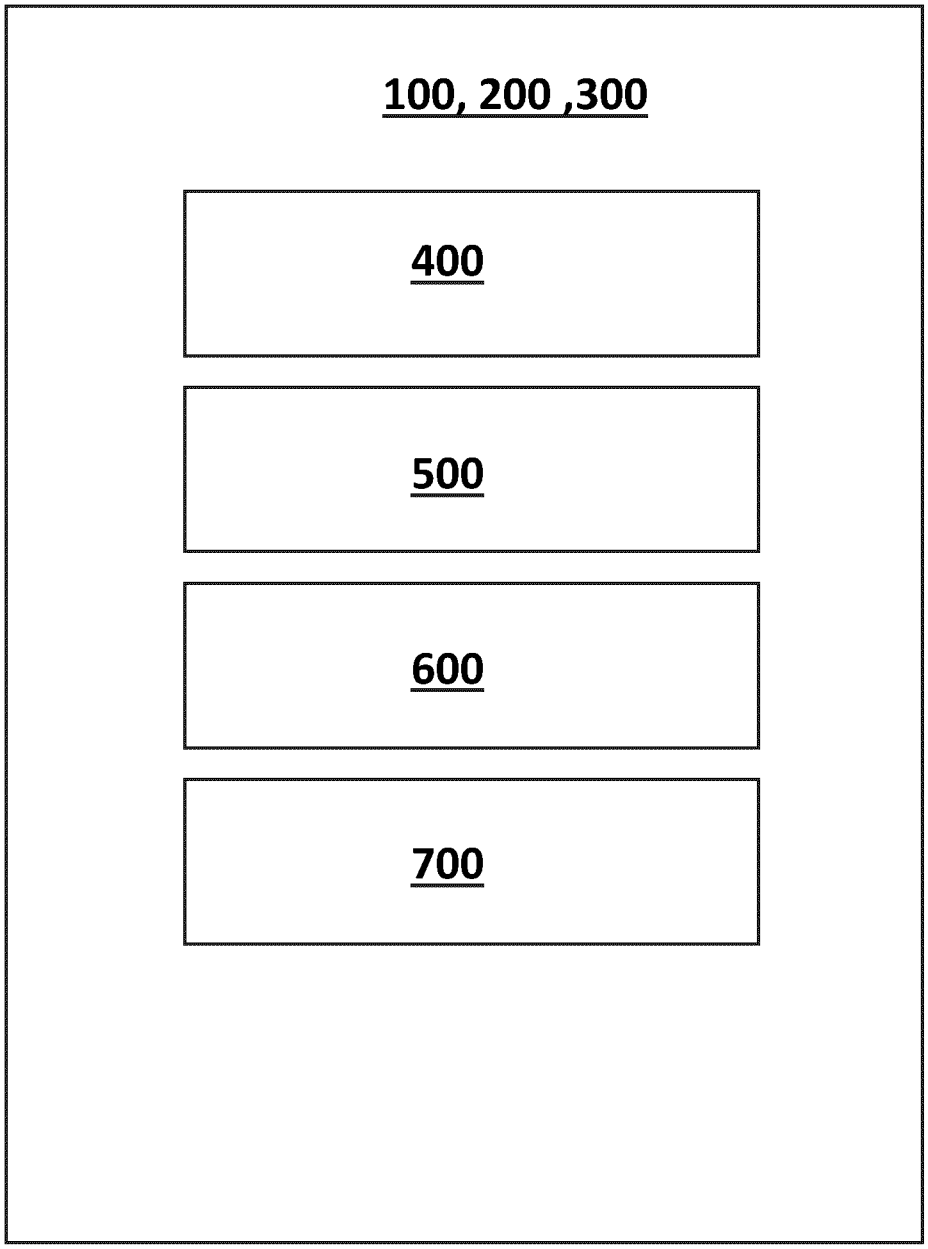

Fig. 2

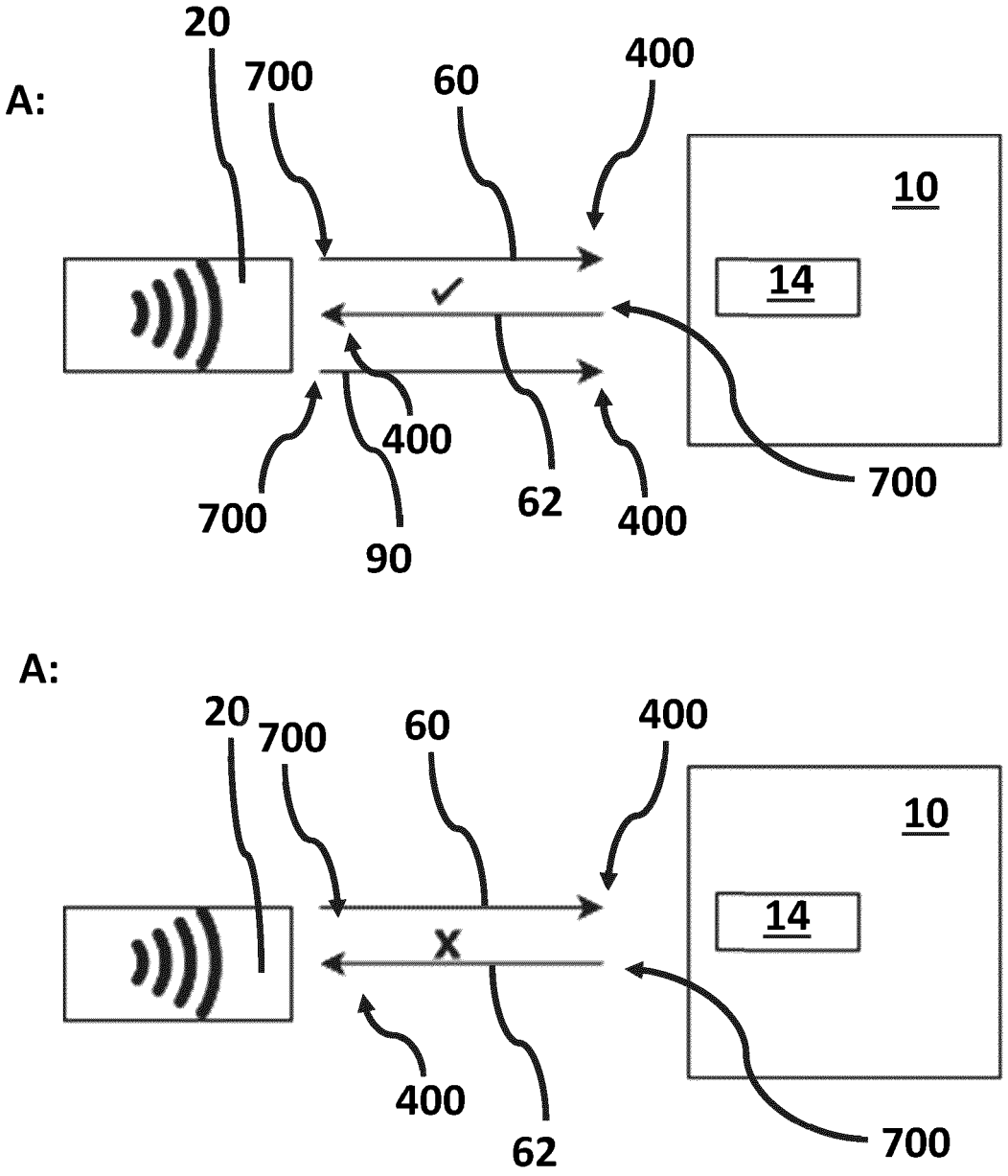
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Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 23 21 9738

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	EP 4 191 547 A1 (QUADIENT TECH FRANCE [FR]) 7 June 2023 (2023-06-07) * abstract * * * figures 1-8 * * paragraph [0006] - paragraph [0058] * * claims 1-14 *	1-11	INV. G07C9/00
A	US 2022/335760 A1 (LOW MUN WEI [US] ET AL) 20 October 2022 (2022-10-20) * the whole document * *	1-11	

TECHNICAL FIELDS SEARCHED (IPC)

G07C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	6 June 2024	Pañeda Fernández, J

CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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06-06-2024

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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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