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(54) **ELECTRONIC COMMUNICATION UNIT FOR A DOOR**

(57) A system is provided which comprises a door leaf (1) and an electronic communication unit (10) configured to be in communication with an electronic door lock (5). The communication unit (10) is configured to be inserted into a cavity (2) of the door leaf (1), and the communication unit (10) comprises a communication device (14) and a transmitter device (16). The electronic door lock (5) is configured to lock or unlock the door (1) based on a signal transmitted by the transmitter device. The communication unit (10) is configured to be inserted into the door leaf (1) from a lateral edge portion (3) of the door leaf (1), such that the communication device (14) is arranged flush with or inside an outer surface (4) of the door leaf (1) and such that the communication device (14) is covered by the outer surface (4) or by an additional layer of the door leaf (1).

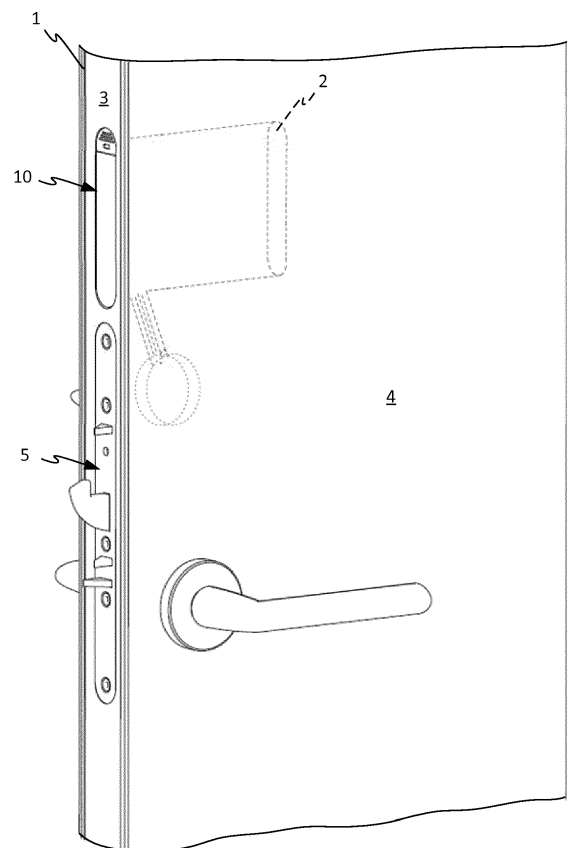


Fig. 2

Description

TECHNICAL FIELD

[0001] The present invention relates to an electronic communication unit for an electronic door lock and more specifically an electronic communication unit configured to lock and unlock an electronic door lock.

BACKGROUND

[0002] It has become more and more common to instead of using pure mechanical locks on doors arranged in building doorways, to provide electronic door locks, and many entrance doors are nowadays installed with such locks. It is also common to instead of using a mechanical key, to use some sort of electronic key to lock and unlock the electronic door lock. Tags or entering codes are common knowledge. However, in order to use such system, a device which is able to for example read or receive signals is mounted onto the door or onto an area next to the door. A disadvantage with this, is that the appearance of the door or the surroundings of the door is affected and for a buyer wanting to buy an entrance door based on the appearance of the door would prefer to make as little impact as possible on it. Another challenge that users face today is the complexity of the installation of such a device and the maintenance of it. There is therefore room for improvements regarding the installation, the maintenance and the handling of an electronic device connected to an electronic door lock.

SUMMARY

[0003] An object of the present invention is to provide an improved communication unit. This object is achieved by the technique defined in the appended independent claims; certain embodiments being set forth in the related dependent claims.

[0004] In a first aspect, there is provided a system comprising a door leaf and an electronic communication unit for an electronic door lock configured to be inserted into a cavity of the door leaf. The communication unit comprises a communication device configured to communicate with and/or identify a person and/or an object by receiving information from said person/object and/or collecting information from said person/object, and a transmitter device connected to said communication device and said electronic door lock, said transmitter device being configured to transmit a signal, based on the received or gathered information, to said electronic door lock. The electronic door lock is configured to lock or unlock said door based on the transmitted signal. The communication unit is configured to be inserted into said door leaf from a lateral edge portion of said door leaf, such that the communication device is arranged flush with or inside an outer surface of said door leaf such that the communication device is covered by said outer surface or by an

additional layer of the door leaf. The outer surface or layer is made from a material which allows the communication device to be visible through the surface/layer when enlightened.

[0005] The above described communication unit at least mitigates the above mentioned problems of units known today. The installation of the unit in the door leaf provides a solution which makes it easy for a user or operator to access the unit if maintenance work needs to be done. Its location and the design of it also means that no additional part needs to be mounted to the outside of the door leaf and prominently changing the appearance of the door. Yet further, the unit may be compatible with many different ways of identifying a person or an object. Also, the unit may be compatible with many different types of power sources.

[0006] The door leaf is preferably arrangable in a doorway of a building. The building may be a residential property, office building, office space or the like.

[0007] The insertion of the unit into the door leaf from a lateral edge portion of the door leaf is advantageous since the lateral edge portion of the door leaf is easily accessible.

[0008] The communication unit covered by the outer surface, or by an additional layer of the door leaf is an advantage since the communication device then can be hidden from the outside of the door.

[0009] In another embodiment, the communication device is configured to receive information in one or several of the following manners: from an output signal of the object, provided by a person and by reading a readable item. The object may be a mobile terminal which is configured to send the output signal with the information to the communication device. The output signal may be sent by an application of the mobile terminal. The readable item may be a tag, a QR-code, a barcode or similar.

[0010] In one embodiment, the communication device is configured to read a fingerprint of a person. Further, the communication device may be a touch screen, at least one button or a key pad. Once again, many different ways of identifying a person or an object can be implemented in the unit.

[0011] Further, the unit may comprise a power source unit arranged to provide the communication device and the transmitter device with power.

[0012] Yet further, the unit may comprise a power indicating device configured to visually and/or by sound indicate the status of the power source. This is an advantage to make users aware of the power situation.

[0013] In an embodiment, the communication device is arranged inside the outer surface of the door leaf.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] Embodiments of the invention will be described in the following, reference being made to the appended drawings, which illustrate non-limiting examples of how the inventive concept can be reduced into practice.

Fig. 1 is a perspective view of a section of a door leaf with a cavity of receiving an electronic communication unit,

Fig. 2 is a perspective view of a section of a door leaf with an electronic communication unit according to an embodiment,

Fig. 3a is a perspective back view of the unit in Fig. 2 in a disassembled state,

Fig. 3b is a perspective back view of the unit in Fig. 2 in an assembled state,

Fig. 4a is a perspective front view of the unit in Fig. 2 in a disassembled state,

Fig. 4b is a perspective front view of the unit in Fig. 2 in an assembled state,

Fig. 5 is a perspective view of the door with a unit according to another embodiment, and

Fig. 6 is a perspective view of the door with a unit according to yet another embodiment.

DETAILED DESCRIPTION OF EMBODIMENTS

[0015] With reference to the accompanying drawings, a new electronic communication unit 10 is shown. The communication unit 10 is configured to assist an electronic door lock 5 or lock case, arranged on a door leaf 1, preferably a door leaf of a residential property, office building, office space or the like, to be locked and unlocked. In the door leaf 1, there is a cavity 2 in which the communication unit 10 is received in a mounted position. The cavity 2 extends from a lateral side 3 into the interior of the door leaf 1 preferably without effecting the outer surfaces 4 of the door leaf 1. In other embodiments it is possible for the cavity to, at least to some extent, extend out to one or both outer surfaces, but in the shown embodiment the cavity 2 ends just before reaching the outer surfaces 4. This is an advantage when a user wishes not to change the outside appearance of the door leaf.

[0016] The communication unit 10 is designed to fit in the cavity 2 and to be inserted into the cavity 2 from the lateral side 3 of the door leaf 1. In a mounted state, where the communication unit 10 is mounted in the door leaf 1, the unit 10 is arranged in line with or inside the outer surface of the lateral side 3, i.e. no part of the unit 10 protrude from the lateral side 3 of the leaf 1. The lateral side 3 shown in the Figs is the same lateral side as the door lock 5 is installed in, however, the communication unit 10 may be arranged in any suitable lateral side.

[0017] As shown in Figs 3-4, included in the communication unit 10 is a frame 11 with a first portion 11a having a substantially oblong rectangular shape with round edges, and a second portion 11b, from now on called a support portion 11b. The first portion 11a has an opening 12 along its extension. The shape of the opening 12 is formed such that it can receive a removable power source holder 22 of a power source unit 20, explained in more detail below. Around the opening 12, extending in a direction into the door leaf 3, the support portion 11b protrudes perpendicular from the surface of the first portion

11a. The support portion 11b is configured to support the power source holder 22 in an assembled state, and it is also configured to support and connect a circuit board 13 of the unit 10 to a power source 21 of the power source unit 20. The circuit board 13 has at least one communication device 14 which is configured to communicate with and/or identify a person P and/or an object O wanting to open the door. The communication device 14 is arranged substantially flush with or inside the outer surface 4 of the door leaf 1.

[0018] In one embodiment, shown in Fig. 6, the communication device 14 is arranged behind the outer surface 4 of the door leaf, i.e. the outer surface 4 is intact and has not been affected by the installation of the communication unit 10. Preferably, the communication device 14 is covered by the outer surface 4 or an additional outer layer (not shown) of the door leaf 1 which means that the cavity 2 is not physically reachable from the outside 4 of the door leaf 1.

[0019] In an embodiment, the outer surface 4 or layer covering the communication device 14 has a thickness which allow the communication device 14 to fulfill its purpose even if it is reading a readable item or visually displaying information. The outer surface 4 or layer can be made from any suitable material, which allows the communication device 14 to for example be visible through the surface/layer when enlightened. In this way the communication device 14 may be hidden when not in use and only visible when a user wants to open the door 1. The surface/layer can be a separate layer or an integrated part of the door leaf 1.

[0020] The communication device 14, 14a, 14b is configured to communicate with and/or identify a person P and/or an object O by receiving information from this person P/object O and/or collecting information from the person P/object O. Preferably, the communication device 14 is configured to receive information from an output signal of the object O, receive information provided by a person P and/or collect information by reading a readable item.

[0021] If information is received by an output signal of an object, the object may for example be a mobile terminal O, shown in Fig. 6. The mobile terminal may be a mobile phone, such as a touch phone or a non-touch phone, a tablet, a touch pad or similar smart devices. It may also be another suitable portable electronic device such as a tablet computer, a game device, a media device, a navigation device or other touch device. The object O can be configured to send the output signal with the information to the communication device 14. The output signal may then preferably be sent by an application of the smart device.

[0022] If the information is provided by a person P, i.e. a user or an operator, the person can provide it by maneuvering a touch screen, at least one button or a key pad 14a, as shown in Fig. 5. Another alternative is to identify a person by means of fingerprints.

[0023] Further, if the information is gathered by reading

a readable item, such an item can be a tag, a QR-code, a barcode or similar.

[0024] As shown e.g. in Fig. 3a, the communication unit 10 further includes a transmitter device 16 connected to the communication device 14 and to the electronic door lock 5. The transmitter device 16 is configured to transmit a signal, based on the received or gathered information, to the electronic door lock 5 communicating instructions to lock or unlock the door 1.

[0025] As mentioned above, the communication unit 10 includes a power source unit 20 arranged to provide the communication device 14 and the transmitter device 16 with power. The power source unit 20 includes a power source 21 and a power source holder 22. The power source 21 is, in the shown embodiment, a replaceable battery pack 21a-d which is contained in the displaceable power source holder 22, mentioned above. The power source holder 22 can in the shown embodiment be referred to as a battery holder. The battery holder 22 has a front portion 26 facing outwards from the lateral side 3 of the door leaf 1. In an assembled state, it is mounted to the first portion 11a of the frame 11 by means of screws. The front portion 26 has an oblong shape and is arranged to cover the opening into the cavity 2, the opening 12 of the frame 11 and at least parts of the first portion 11a of the frame 11. It is also arranged in line with the outer surface of the lateral side 3 such that it does not affect the function or appearance of the lateral side 3 of the door 1.

[0026] The battery holder 22 further has a number of battery compartments 22a-d, each formed and configured to receive a battery 21a-d. On an end portion 27 of the battery power source holder 22 and on the circuit board 13 there are provided power means 28a, 28b respectively, for providing electricity from the batteries 21a-d to the circuit board 13 and transmitter device 16.

[0027] In other embodiments, different types of power sources can be used, for example cables or similar (not shown). The power source can be stationary and does not have to be detachable as the shown battery pack.

[0028] The first portion 11 of the frame 10 is connected at its top end 11a to a power indicating device 24. The power indicating device 24 visually indicates the status of the power of the power source 21 to a user. Preferably, the outer surface 24a of the power indicating unit 24 which displays the status of the batteries is arranged in line with the surface of the lateral side 3 of the door leaf 1 and in line with the front portion 26 of the battery holder 22.

[0029] According to a further aspect, there is provided a door leaf 1 comprising an electronic communication unit 10 as described above and an electronic door lock 5, where the door leaf 1 has a cavity 2 for receiving the electronic communication unit 10.

[0030] All through this application, the communication between the communication device 14, 14a, 14b and the person P/object O is made by short-range or long-range wireless data communication. The communication be-

tween the device and the person P/object O is preferably made by wireless short-range communication. Short-range wireless data communication standards such as Bluetooth®, WiFi (e.g. IEEE 802.11, wireless LAN), Near Field Communication (NFC), RF-ID (Radio Frequency Identification) or Infrared Data Association (IrDA) may for example be used.

[0031] Finally, although the inventive concept has been described above with reference to specific embodiments, it is not intended to be limited to the specific form set forth herein. Rather, the invention is limited only by the accompanying claims and other embodiments that the specific above are equally possible within the scope of these appended claims.

Claims

1. A system comprising a door leaf (1) and an electronic communication unit (10) configured to be in communication with an electronic door lock (5), the communication unit (10) being configured to be inserted into a cavity (2) of said door leaf (1), said communication unit (10) comprising:

a communication device (14) configured to communicate with and/or identify a person (P) and/or an object (O) by receiving information from said person (P)/object (O) and/or collecting information from said person (P)/object (O), and a transmitter device (16) connected to said communication device (14) and said electronic door lock (5), said transmitter device (16) being configured to transmit a signal, based on the received or gathered information, to said electronic door lock (5), wherein said electronic door lock (5) is configured to lock or unlock said door (1) based on the transmitted signal, wherein said communication unit (10) is configured to be inserted into said door leaf (1) from a lateral edge portion (3) of said door leaf (1), such that said communication device (14) is arranged flush with or inside an outer surface (4) of said door leaf (1) such that said communication device (14) is covered by said outer surface (4) or by an additional layer of the door leaf (1), and wherein the outer surface (4) or layer is made from a material which allows the communication device (14) to be visible through the surface/layer when enlightened.

2. The system according to claim 1, wherein the door leaf (1) is arrangeable in a doorway of a building.
3. The system according to claim 1 or 2, wherein said communication device (14) is configured to receive information in one or several of the following man-

ners: from an output signal of said object (O), provided by a person (P) and by reading a readable item.

4. The system according to claim 3, wherein said object (O) is a mobile terminal which is configured to send the output signal with said information to said communication device (14). 5
5. The system according to claim 4, wherein said output signal is sent by an application of said mobile terminal. 10
6. The system according to claim 3, wherein said readable item is a tag, a QR-code, a barcode or similar. 15
7. The system according to any one of the preceding claims, wherein said communication device (14) is a touch screen, at least one button or a key pad (14a).
8. The system according to any one of the preceding claims, wherein said communication device (14) is configured to read a fingerprint of a person (P). 20
9. The system according to any one of the preceding claims, further comprising a power source (21) arranged to provide said communication device (14) and said transmitter device (16) with power. 25
10. The system according to claim 9 or 10, further comprising a power indicating device (24) configured to visually and/or by sound indicate the status of said power source (21). 30
11. The system according to any one of the preceding claims, wherein said communication device (14) is arranged inside said outer surface (4) of said door leaf (1). 35
12. The system according to any one of the preceding claims, wherein the outer surface (4)/additional layer is a separate layer or an integrated part of the door leaf (1). 40

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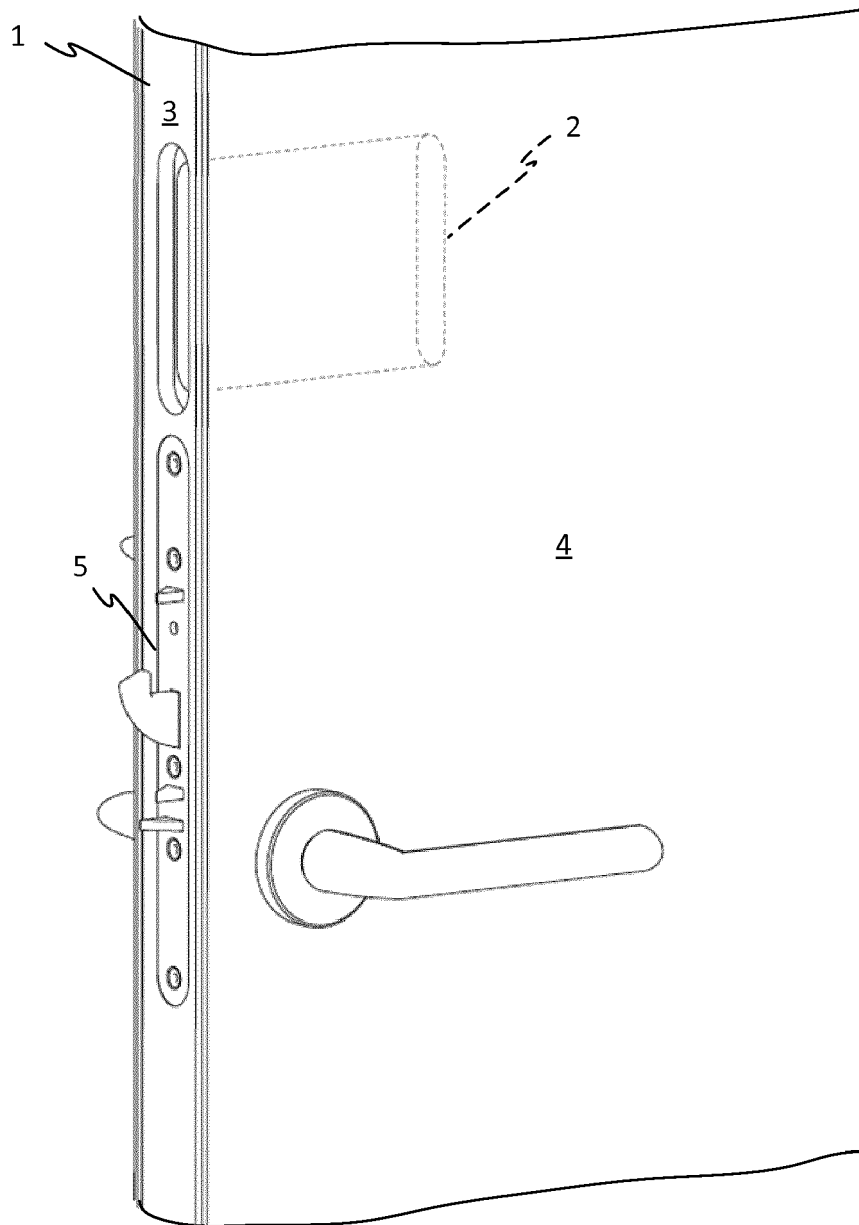


Fig. 1

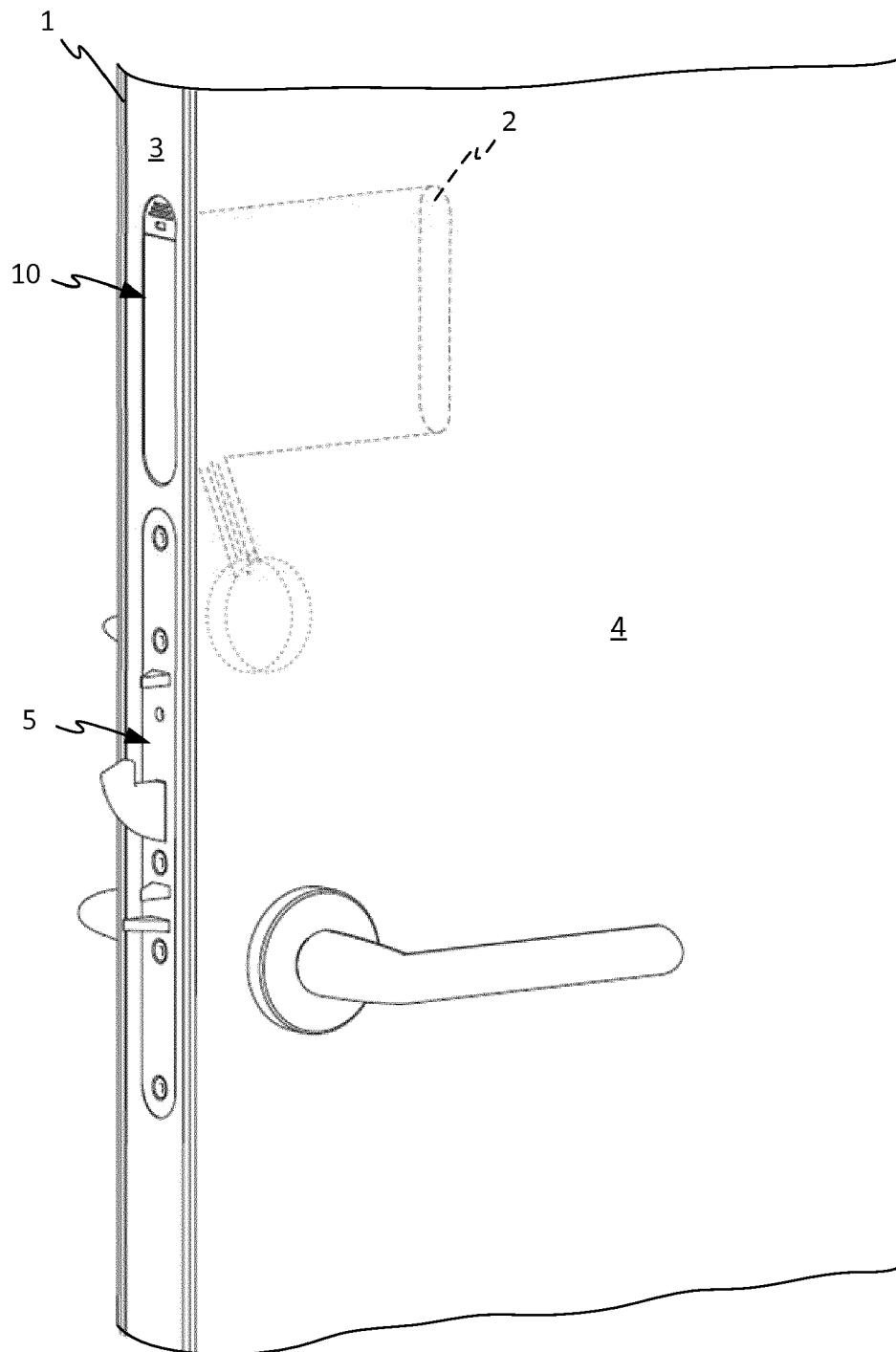


Fig. 2

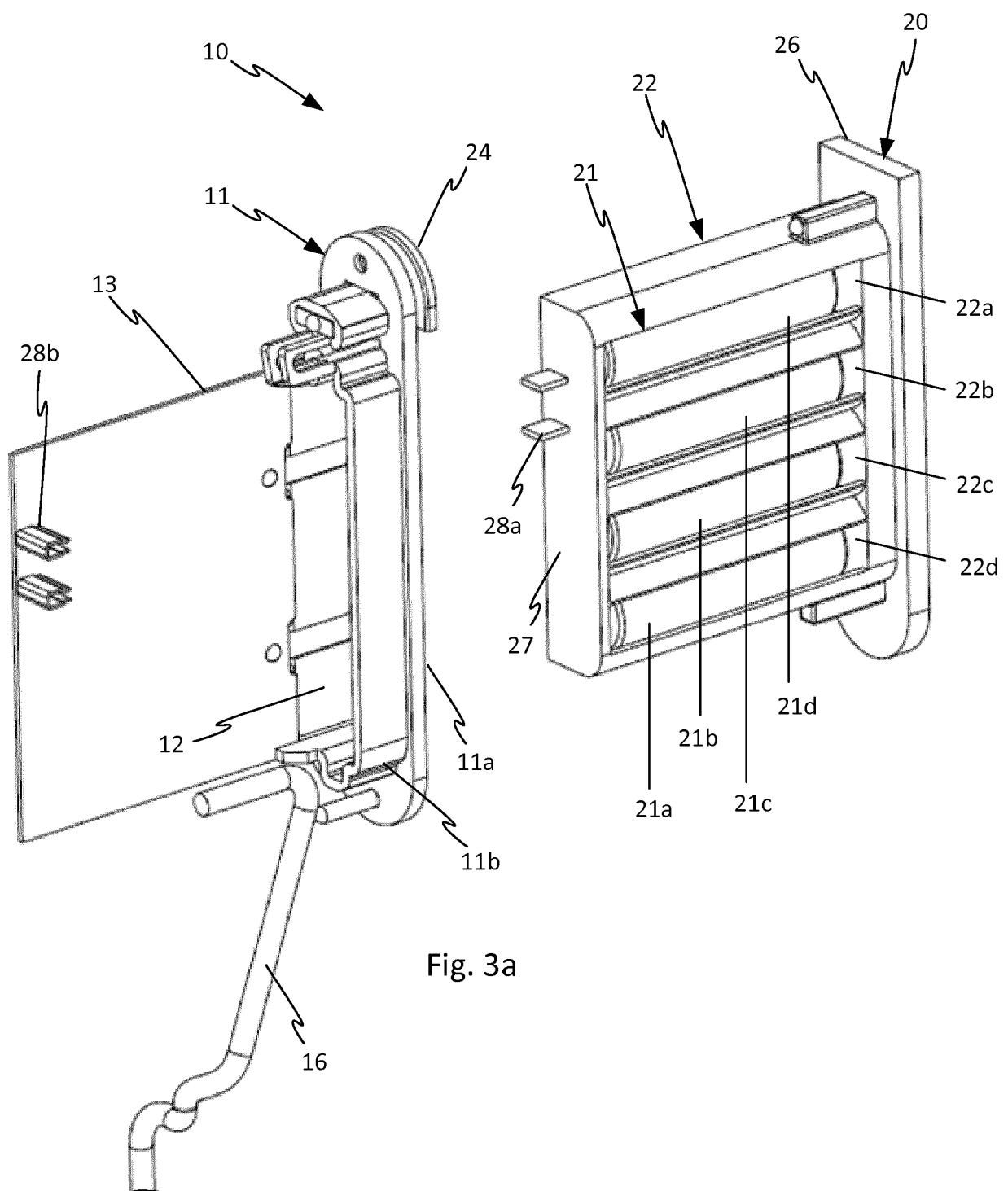
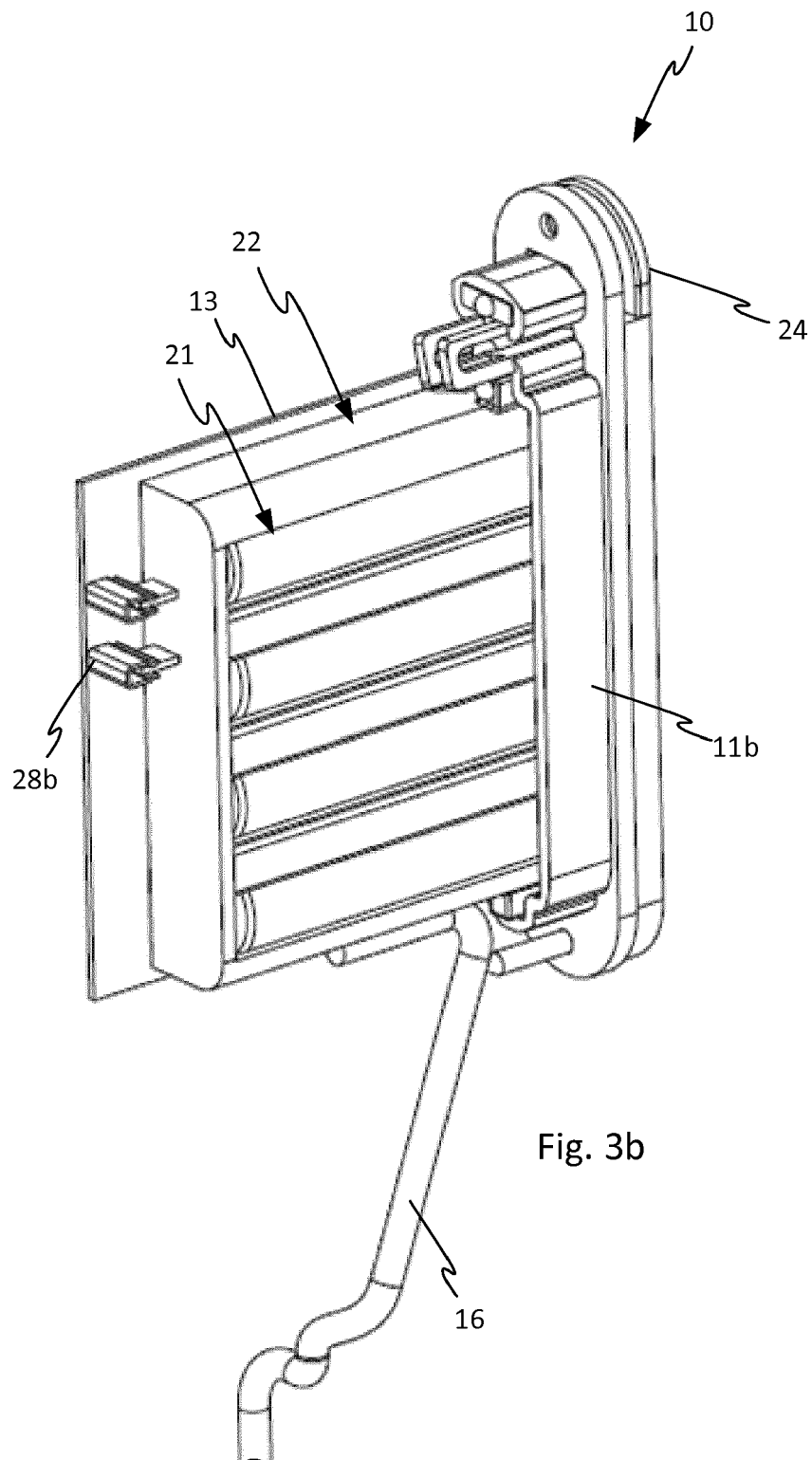


Fig. 3a



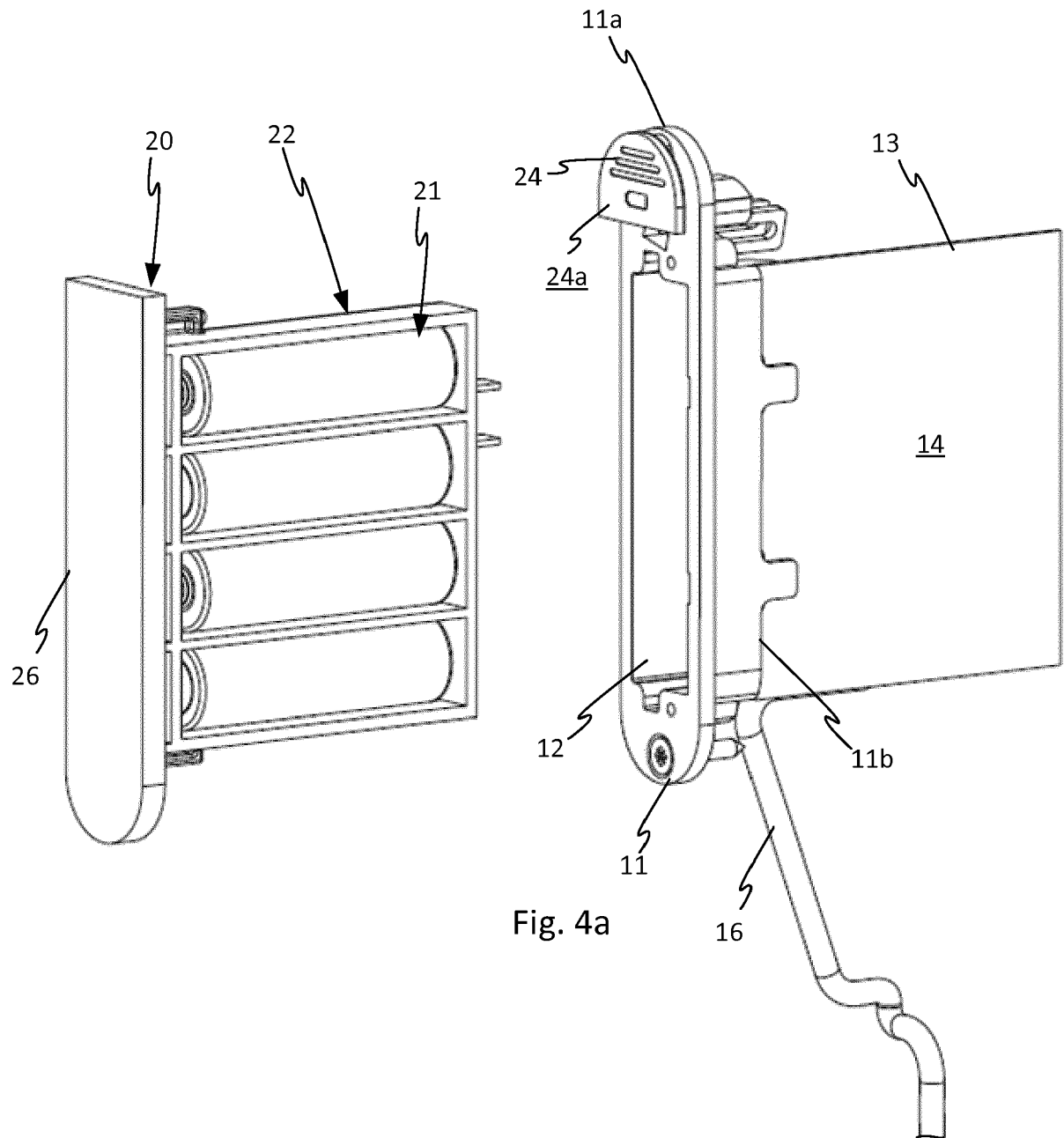
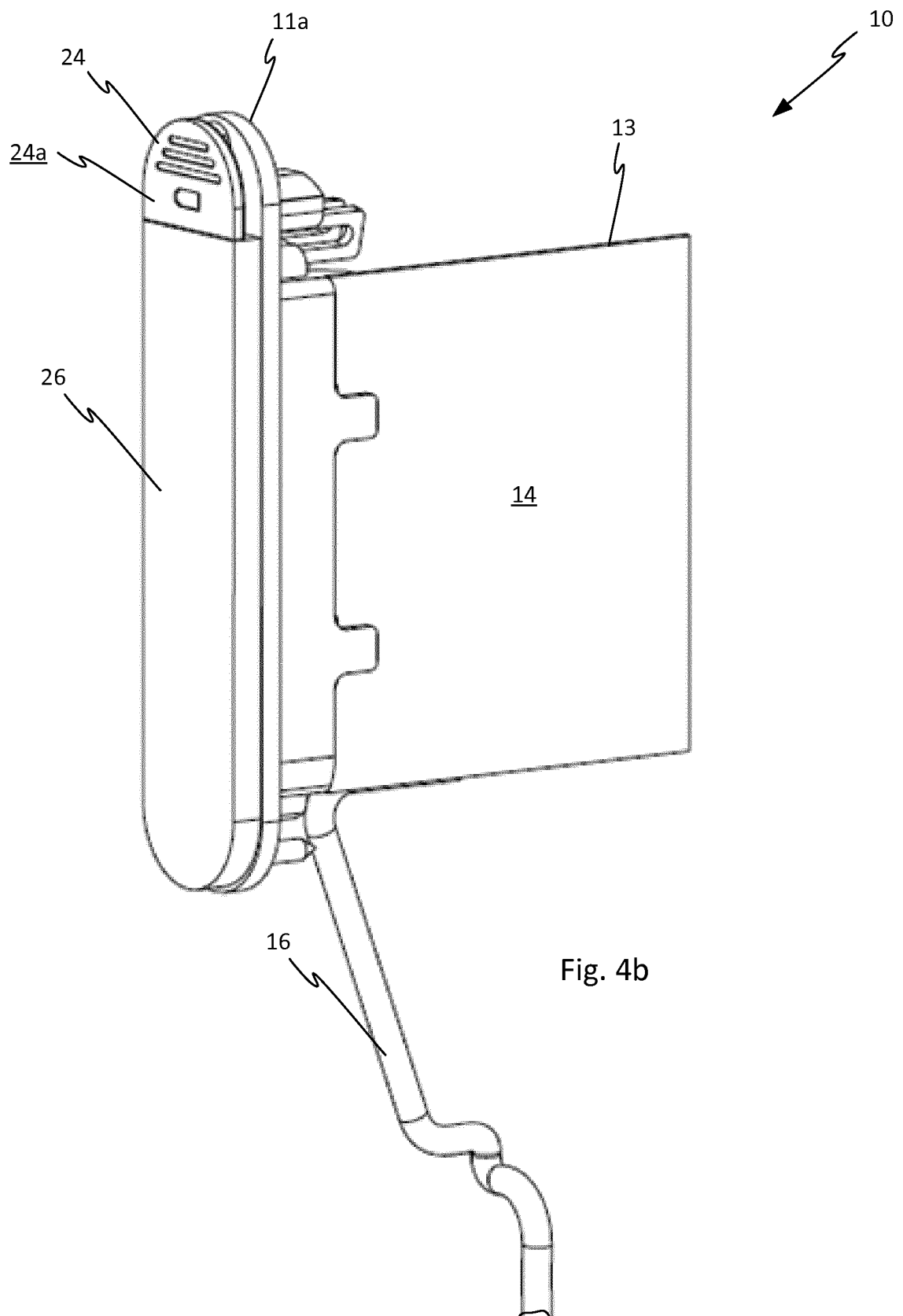


Fig. 4a



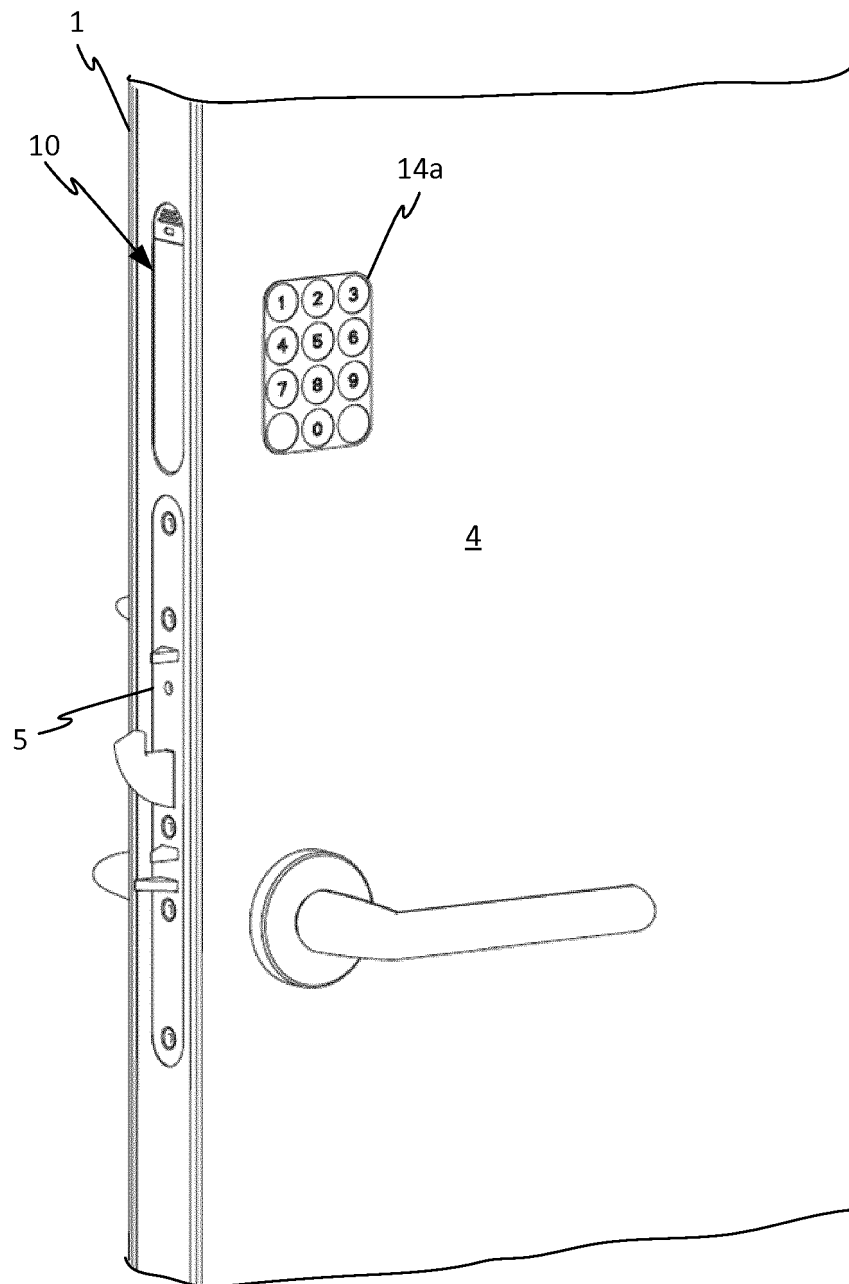


Fig. 5

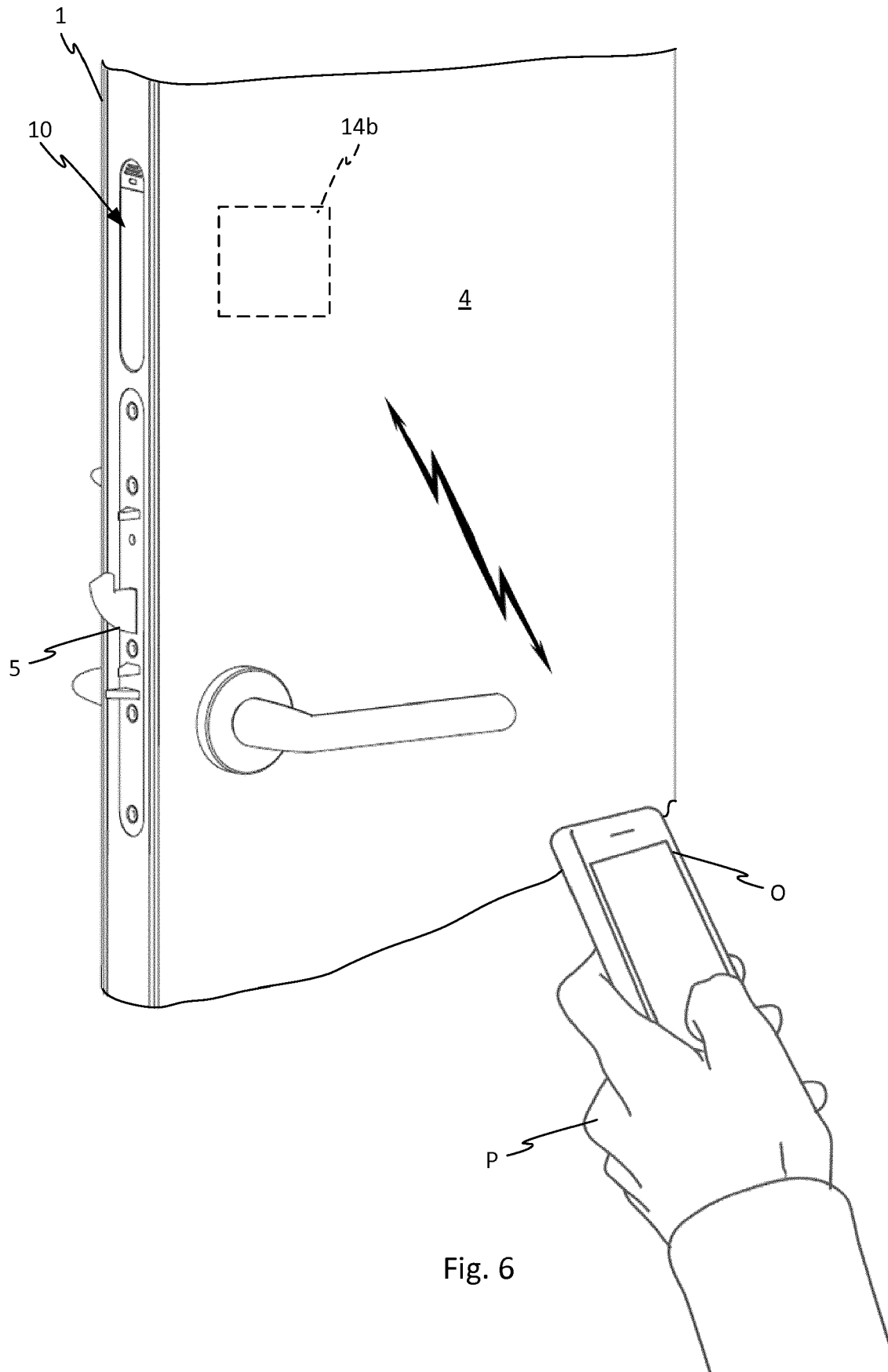


Fig. 6



EUROPEAN SEARCH REPORT

Application Number
EP 18 18 0442

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The present search report has been drawn up for all claims			
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CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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