



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.04.2023 Bulletin 2023/14

(51) International Patent Classification (IPC):
E05B 47/02 ^(2006.01) **E05B 47/06** ^(2006.01)
E05B 47/00 ^(2006.01)

(21) Application number: **21213017.3**

(52) Cooperative Patent Classification (CPC):
E05B 47/02; E05B 47/0012; E05B 47/0611;
E05B 2047/002; E05B 2047/0058; E05B 2047/0091

(22) Date of filing: **08.12.2021**

(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 MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

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(30) Priority: **30.09.2021 CN 202122409766 U**
30.09.2021 CN 202122411671 U
30.09.2021 CN 202122411673 U

(54) **DRIVING MECHANISM AND SMALL-SIZED UNIVERSAL ELECTRONIC LOCK ADOPTING THE SAME**

(57) The present invention belongs to the field of door locks, in particular relates to a driving mechanism and a small-sized universal electronic lock adopting the same. The electronic lock includes the driving mechanism and a power supply assembly; the driving mechanism is electrically connected with the power supply assembly; the driving mechanism includes a driving member used to be connected with an external lock cylinder and a motor assembly used for driving the driving member to move so as to drive the external lock cylinder to rotate; and the power supply assembly, the motor assembly and the driving member are sequentially arranged, the power supply assembly is electrically connected with the motor assembly,

and the motor assembly is connected with the driving member in a transmission manner. In the present invention, the electronic lock is small in size, convenient to transport and mount, and lower in cost. Moreover, based on the arrangement that the motor assembly is directly disposed on a side of the power supply assembly, when the motor assembly is electrically connected with the power supply assembly, the phenomenon that a conducting wire between the motor assembly and the power supply assembly is overlong due to an overlong distance therebetween can be avoided, and the position of the conducting wire can be more conveniently set, so that the electronic lock is more convenient to mount.

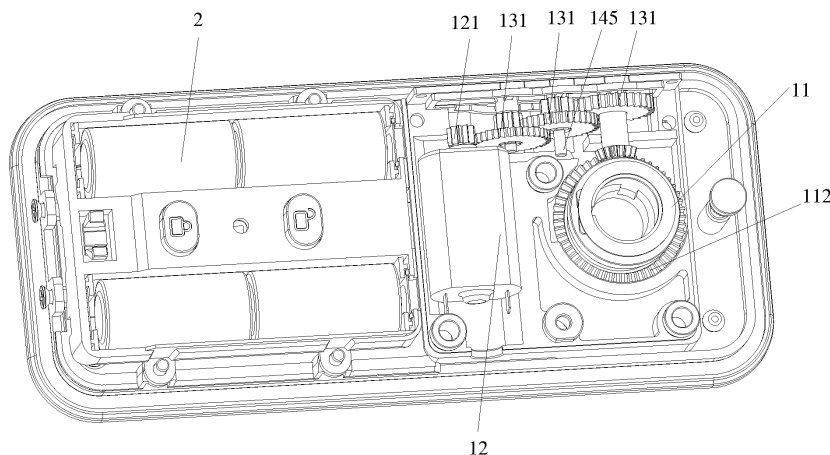


FIG. 5

Description

Technical Field

[0001] The present invention belongs to the field of door locks, in particular relates to a driving mechanism and an electronic lock adopting the same.

Background Art

[0002] As the name suggests, a door lock is a device for locking a door to prevent other people from opening the door. At present, with the improvement of people's requirements for security and convenience, an electronic lock serving as one of door locks has wide market prospects. However, an existing electronic lock is large in size, high in cost, inconvenience to transport and mount, and larger in spatial size.

[0003] In the prior art, disclosed is a waterproof and dustproof electronic door lock (with the patent application No. CN202022848445.9) including an electronic door lock body, wherein a groove is formed in the front surface wall of the electronic door lock body, sliding chutes are fixedly disposed in two opposite inner side walls of the groove, a dustproof plate is slidably mounted between the two sliding chutes, the top end of the dustproof plate penetrates through the top wall of the groove to extend to the upside of the electronic door lock body, and a sealing plate is fixedly mounted on the top end of the dustproof plate. The above-mentioned defects exist in the prior art.

Summary of the Invention

[0004] In order to overcome the above-mentioned defects, the first purpose of the present invention is to provide a driving mechanism. By reasonably setting a positional relationship among a motor assembly, a gear assembly, and a driving member, the driving mechanism is smaller in occupied spatial size and lower in cost.

[0005] The second purpose of the present invention is to provide a small-sized universal electronic lock. By reasonably setting positions of a power supply assembly, a motor assembly, and a driving member, the electronic lock is small in size, convenient to transport and mount, and lower in cost.

[0006] In order to achieve the above-mentioned purposes, technical solutions of the present invention are described as follows.

[0007] Provided is a driving mechanism, wherein the driving mechanism includes a driving member used to be connected with an external lock cylinder and a motor assembly used for driving the driving member to move so as to drive the external lock cylinder to rotate; the motor assembly includes a motor and a gear assembly, and the motor is disposed on a side of the driving member; and the gear assembly is located on front ends of the motor and the driving member, and the motor is connected with the driving member by the gear assembly in

a transmission manner. In the driving mechanism, based on the arrangement that the motor and the driving member are disposed side by side and the gear assembly is located on the front ends of the motor and the driving member and by reasonably setting positions of the motor, the gear assembly and the driving member, the driving mechanism is smaller in occupied spatial size; and based on the reduction of the size, the corresponding material loss and the cost are lower. Therefore, an electronic lock adopting the driving mechanism is small in size, convenient to transport and mount, and lower in cost. Moreover, the electronic lock is wider in application scope in addition to smaller size so as to become a universal electronic lock.

[0008] Further, the driving mechanism further includes a driving housing, and both the driving member and the motor assembly are disposed in the driving housing.

[0009] Further, a motor groove for mounting the motor is formed in the driving housing, the motor is fixedly disposed in the motor groove, a driving member groove for mounting the driving member is formed in a side of the motor groove, the driving member is movably disposed in the driving member groove in which a driving through hole penetrating through the driving housing is further formed, and one end of the driving member is exposed out of the driving housing after penetrating through the driving through hole so as to form a driving connecting part connected with the external lock cylinder. Due to the arrangement of the motor groove and the driving member groove, the motor and the driving member are mounted more conveniently and stably.

[0010] Further, a gear part connected with the gear assembly in a transmission manner is disposed on the upper end of the driving member, and the driving connecting part is located on the lower end of the driving member.

[0011] Further, the gear assembly includes three transmission gears, a driving gear is fixedly disposed on an output shaft of the motor, the three transmission gears are sequentially meshed, the first transmission gear is meshed with the driving gear, and the third transmission gear is meshed with the gear part. Each of the three transmission gears is formed by fixing a large gear and a small gear together, wherein the small gear of the third transmission gear is a bevel gear, and the third transmission gear is meshed with the gear part by the bevel gear.

[0012] Provided is a small-sized universal electronic lock, wherein the electronic lock includes the driving mechanism and a power supply assembly used for supplying electric energy to the driving mechanism and controlling the driving mechanism to work, the power supply assembly is electrically connected with the motor, and the power supply assembly, the motor and the driving member are sequentially arranged from left to right. In the electronic lock, by reasonably setting positions of the power supply assembly, the motor and the driving member in the sequential arrangement of the power supply assembly, the motor and the driving member, the elec-

tronic lock is small in size and convenient to transport and mount; and based on the reduction of the size, the corresponding material loss and the cost are lower. Moreover, based on the arrangement that the motor is directly disposed on a side of the power supply assembly, when the motor is electrically connected with the power supply assembly, the phenomenon that a conducting wire between the motor and the power supply assembly is overlong due to an overlong distance therebetween can be avoided, and the position of the conducting wire can be more conveniently set, so that the electronic lock is more convenient to mount and lower in cost. Moreover, the electronic lock is smaller in size and wider in application range so as to become a universal electronic lock.

[0013] Further, the power supply assembly includes a battery housing, batteries, and a PCB, the batteries are connected with the PCB, keys for controlling the motor are disposed on the PCB, and the PCB is connected with the motor;

[0014] battery grooves for mounting the batteries are formed in the upper side of the battery housing, and a PCB groove for mounting the PCB is formed in the lower side of the battery housing; and the battery grooves and the PCB grooves are respectively located on upper and lower sides of the battery housing to ensure that the internal space of the battery housing can be more reasonably utilized, so that the overall structure of the power supply assembly is smaller.

[0015] The two battery grooves are formed in the upper side of the battery housing, an isolating bulge is formed between the two battery grooves, two PCB fixing bulges are formed on positions, corresponding to the two battery grooves, on the lower side of the battery housing, the PCB groove is formed between the two PCB fixing bulges, and the position of the PCB groove corresponds to the position of the isolating bulge. That is, the PCB fixing bulges are formed on the lower side of the battery housing while the battery grooves are recessed downwards, and the isolating bulge is formed while the PCB groove is recessed upwards. By disposing the structures of the battery grooves and the PCB groove, the internal space of the battery housing can be more reasonably utilized, so that the overall structure of the power supply assembly is smaller.

[0016] Further, the keys on the PCB are exposed out of the battery housing after penetrating through the isolating bulge. Due to the arrangement that the keys are exposed out of the battery housing after penetrating through the isolating bulge, the internal space of the battery housing can be more reasonably utilized, so that the overall structure of the power supply assembly is smaller.

[0017] A battery surface cover for shielding the battery grooves is detachably disposed on the upper side of the battery housing. The battery surface cover is capable of playing a role in fixing the batteries, thereby playing a role in protecting the batteries.

[0018] The battery surface cover is detachably connected with the upper side of the battery housing by a

buckling structure, key avoiding through holes corresponding to the keys are further formed in the battery surface cover, and the keys are exposed out of the battery surface cover after penetrating through the key avoiding through holes. Due to the arrangement that the battery surface cover is detachably connected with the upper side of the battery housing by the buckling structure, the batteries can be replaced by removing the battery surface cover when being damaged.

[0019] Further, a battery base is further fixedly disposed below the battery housing, a side of the battery base extends to form a mounting bulge, a mounting groove is formed in a side of the driving housing, and the mounting bulge is fixedly disposed in the mounting groove. Specifically, the right side of the battery base extends to form the mounting bulge.

[0020] Further, the electronic lock further includes a mounting housing, and the power supply assembly, the motor assembly and the driving member are all disposed in the mounting housing and are sequentially arranged in the mounting housing from left to right; and

a surface cover through hole penetrating through the mounting housing is formed in a position, corresponding to the battery surface cover, on the upper side of the mounting housing, the battery surface cover is exposed outside after penetrating through the surface cover through hole, and the driving through hole penetrates through the lower side of the mounting housing, so that the driving connecting part is exposed out of the mounting housing after penetrating through the driving through hole; and

a silica gel pad is fixedly disposed on the lower side of the mounting housing, and the driving through hole penetrates through the silica gel pad, so that the driving connecting part is exposed out of the silica gel pad after penetrating through the driving through hole. By using the silica gel pad, a door can be prevented from being scratched when the electronic lock is mounted on the door.

[0021] The present invention has the beneficial effects that in the electronic lock, by reasonably setting positions of the power supply assembly, the motor assembly and the driving member in the sequential arrangement of the power supply assembly, the motor assembly and the driving member, the electronic lock is small in size and convenient to transport and mount, and lower in cost. Moreover, based on the arrangement that the motor assembly is directly disposed on a side of the power supply assembly, when the motor assembly is electrically connected with the power supply assembly, the phenomenon that a conducting wire between the motor assembly and the power supply assembly is overlong due to an overlong distance therebetween can be avoided, and the position of the conducting wire can be more conveniently set, so that the electronic lock is more convenient to mount.

Brief Description of the Drawings

[0022]

Fig. 1 is a schematic diagram showing a structure when an electronic lock is used;

Fig. 2 is a schematic diagram showing a structure viewed from a first viewing angle of the electronic lock;

Fig. 3 is a schematic diagram showing a structure viewed from a second viewing angle of the electronic lock;

Fig. 4 is a schematic diagram showing a structure with a part of a mounting housing being hidden;

Fig. 5 is a schematic diagram showing a structure with a part of a mounting housing, a part of a driving housing and a battery surface cover being hidden;

Fig. 6 is a schematic diagram showing a structure with a part of a mounting housing, a silica gel pad, a part of a driving mechanism and a battery surface cover being hidden;

Fig. 7 is schematic diagram showing a structure viewed from the other viewing angle of Fig. 6; and

Fig. 8 is a schematic diagram showing a structure of a power supply assembly with a battery surface cover is hidden.

Detailed Description of the Invention

[0023] In order to make objectives, technical solutions and advantages of the present invention clearer and more understandable, the present invention will be further described in detail below in conjunction with the accompanying drawings and embodiments. It should be understood that the specific embodiments described herein are merely intended to explain the present invention, rather than to limit the present invention.

[0024] Reference is made to Fig. 1 to Fig. 8, provided is a small-sized universal electronic lock. The electronic lock includes the driving mechanism 1 and a power supply assembly 2 used for supplying electric energy to the driving mechanism 1 and controlling the driving mechanism 1 to work, and the driving mechanism 1 is electrically connected with the power supply assembly 2. The driving mechanism 1 includes a driving member 11 used to be connected with an external lock cylinder 3 and a motor assembly used for driving the driving member 11 to move so as to drive the external lock cylinder to rotate; and the power supply assembly 2, the motor assembly and the driving member 11 are sequentially arranged, the power supply assembly 2 is electrically connected with the mo-

tor assembly, and the motor assembly is connected with the driving member 11 in a transmission manner. Specifically, the electronic lock is a rear lock part in a complete automatic lock system. Specifically, the electronic lock is mounted on the rear side of a door 4, wherein two ends of the lock cylinder 3 respectively penetrate through the front and rear sides of the door, and a lock body 5 is located on the left/right side of the door and is connected with the lock cylinder so as to achieve a door locking effect; and a front lock 6 is further disposed on the front side of the door and is connected with a front locking end. Herein, structures of the lock cylinder 3, the lock body 5 and the front lock 6 and a connection relationship among them fall within the prior art.

[0025] Further, the motor assembly includes a motor 12 and a gear assembly 13, and the motor 12 is disposed on a side of the driving member 11, and the power supply assembly 2, the motor 12 and the driving member 11 are sequentially arranged from left to right; and the gear assembly 13 is located on front ends of the motor 12 and the driving member 11, and the motor 12 is connected with the driving member 11 by the gear assembly 13 in a transmission manner.

[0026] Further, the driving mechanism 1 further includes a driving housing 14, and both the driving member 11 and the motor assembly are disposed in the driving housing 14; and one side of the driving housing 14 is connected with the power supply assembly 2.

[0027] Further, a motor groove 141 for mounting the motor 12 is formed in the driving housing 14, the motor 12 is fixedly disposed in the motor groove 141, a driving member groove 142 for mounting the driving member 11 is formed in a side of the motor groove 141, the driving member 11 is movably disposed in the driving member groove 142 in which a driving through hole 143 penetrating through the driving housing 14 is further formed, and one end of the driving member 11 is exposed out of the driving housing 14 after penetrating through the driving through hole 143 so as to form a driving connecting part 111 connected with the external lock cylinder 3. Specifically, the driving connecting part 111 is further sleeved with a bearing 114 and is movably connected with the driving through hole by a bearing 114.

[0028] Further, a gear part 112 connected with the gear assembly 13 in a transmission manner is disposed on the upper end of the driving member 11, and the driving connecting part 111 is located on the lower end of the driving member 11.

[0029] Further, a lock cylinder groove 113 for mounting the external lock cylinder 3 is disposed in the driving connecting part 111.

[0030] Further, a gear mounting groove 144 is further formed in the driving housing 14, and the gear assembly 13 is disposed in the gear mounting groove 144.

[0031] Further, the gear assembly 13 includes three transmission gears 131, a driving gear 121 is fixedly disposed on an output shaft of the motor 12, the three transmission gears 131 are sequentially meshed, the first

transmission gear 131 is meshed with the driving gear 121, and the third transmission gear 131 is meshed with the gear part 112.

[0032] Further, three fixing columns 145 are respectively and fixedly disposed on positions, corresponding to the three transmission gears 131, in the driving housing 14, and the three transmission gears 131 respectively and movably sleeve the three fixing columns 145.

[0033] Further, the power supply assembly 2 includes a battery housing 21, batteries 22, and a PCB 23, the batteries 22 are electrically connected with the PCB 23, keys 231 for controlling the motor 12 are disposed on the PCB 23, and the PCB 23 is electrically connected with the motor 12.

[0034] Further, battery grooves 211 for mounting the batteries 22 are formed in the upper side of the battery housing 21, and a PCB groove 212 for mounting the PCB 23 is formed in the lower side of the battery housing 21.

[0035] Further, the two battery grooves 211 are formed in the upper side of the battery housing 21, an isolating bulge 213 is formed between the two battery grooves 211, two PCB fixing bulges 214 are formed on positions, corresponding to the two battery grooves 211, on the lower side of the battery housing 21, the PCB groove 212 is formed between the two PCB fixing bulges 214, and the position of the PCB groove 212 corresponds to the position of the isolating bulge 213.

[0036] Further, the keys 231 on the PCB 23 are exposed on the upper side of the battery housing 21 after penetrating through the isolating bulge 213.

[0037] Further, a battery surface cover 24 for shielding the battery grooves 211 is detachably disposed on the upper side of the battery housing 21.

[0038] Further, the battery surface cover 24 is detachably connected with the upper side of the battery housing 21 by a buckling structure, key avoiding through holes 241 corresponding to the keys 231 are further formed in the battery surface cover 24, and the keys 231 are exposed out of the battery surface cover 24 after penetrating through the key avoiding through holes 241.

[0039] Further, a battery base 25 is further fixedly disposed below the battery housing 21, a side of the battery base 25 extends to form a mounting bulge 251, a mounting groove 146 is formed in a side of the driving housing 14, and the mounting bulge 251 is fixedly disposed in the mounting groove 146. Specifically, the right side of the battery base 25 extends to form the mounting bulge 251.

[0040] Isolating columns 252 are fixedly disposed on the battery base 25, the battery housing 24 is fixedly disposed on the isolating columns 252, and an isolating gap 253 is formed between the lower side of the battery housing 21 and the upper side of the battery base 25.

[0041] Further, four isolating columns 252 are provided, each of the front and rear sides of the battery housing 21 is fixed together with two of the isolating columns 252.

[0042] Further, the left side of the battery base 25 extends upwards to form a battery fixing part 253, and the battery fixing part 253 is fixed together with the left side

of the battery housing 21.

[0043] Further, the electronic lock further includes a mounting housing 7, and the power supply assembly 2, the motor assembly and the driving member 11 are all disposed in the mounting housing 7 and are sequentially arranged in the mounting housing 7 from left to right.

[0044] Further, a surface cover through hole 71 penetrating through the mounting housing 7 is formed in a position, corresponding to the battery surface cover 24, on the upper side of the mounting housing 7, the battery surface cover 24 is exposed outside after penetrating through the surface cover through hole 71, and the driving through hole 143 penetrates through the lower side of the mounting housing 7, so that the driving connecting part 111 is exposed out of the mounting housing 7 after penetrating through the driving through hole 143.

[0045] Further, a silica gel pad 8 is fixedly disposed on the lower side of the mounting housing 7, and the driving through hole 143 penetrates through the silica gel pad 8, so that the driving connecting part 111 is exposed out of the silica gel pad 8 after penetrating through the driving through hole 143.

[0046] The above descriptions are merely preferred embodiments of the present invention, but are not intended to limit the present invention. Any modifications, equivalent replacements, improvements and the like made within the spirit and principle of the present invention shall fall within the protection scope of the present invention.

Claims

1. A driving mechanism, wherein the driving mechanism comprises a driving member used to be connected with an external lock cylinder and a motor assembly used for driving the driving member to move so as to drive the external lock cylinder to rotate; the motor assembly comprises a motor and a gear assembly, and the motor is disposed on a side of the driving member; and the gear assembly is located on front ends of the motor and the driving member, and the motor is connected with the driving member by the gear assembly in a transmission manner.
2. The driving mechanism of claim 1, wherein the driving mechanism further comprises a driving housing, and both the driving member and the motor assembly are disposed in the driving housing.
3. The driving mechanism of claim 2, wherein a motor groove for mounting the motor is formed in the driving housing, the motor is fixedly disposed in the motor groove, a driving member groove for mounting the driving member is formed in a side of the motor groove, the driving member is movably disposed in the driving member groove in which a driving through hole penetrating through the driving housing is fur-

ther formed, and one end of the driving member is exposed out of the driving housing after penetrating through the driving through hole so as to form a driving connecting part connected with the external lock cylinder.

4. The driving mechanism of claim 3, wherein a gear part connected with the gear assembly in a transmission manner is disposed on the upper end of the driving member, and the driving connecting part is located on the lower end of the driving member.

5. The driving mechanism of claim 4, wherein the gear assembly comprises three transmission gears, a driving gear is fixedly disposed on an output shaft of the motor, the three transmission gears are sequentially meshed, the first transmission gear is meshed with the driving gear, and the third transmission gear is meshed with the gear part.

6. A small-sized universal electronic lock adopting the driving mechanism of any one of claims 2 to 5, wherein the electronic lock comprises the driving mechanism and a power supply assembly used for supplying electric energy to the driving mechanism and controlling the driving mechanism to work, the power supply assembly is electrically connected with the motor, and the power supply assembly, the motor and the driving member are sequentially arranged from left to right.

7. The small-sized universal electronic lock of claim 6, wherein the power supply assembly comprises a battery housing, batteries, and a PCB, the batteries are connected with the PCB, keys for controlling the motor are disposed on the PCB, and the PCB is connected with the motor;

battery grooves for mounting the batteries are formed in the upper side of the battery housing, and a PCB groove for mounting the PCB is formed in the lower side of the battery housing; and

the two battery grooves are formed in the upper side of the battery housing, an isolating bulge is formed between the two battery grooves, two PCB fixing bulges are formed on positions, corresponding to the two battery grooves, on the lower side of the battery housing, the PCB groove is formed between the two PCB fixing bulges, and the position of the PCB groove corresponds to the position of the isolating bulge.

8. The small-sized universal electronic lock of claim 7, wherein the keys on the PCB are exposed out of the battery housing after penetrating through the isolating bulge;

a battery surface cover for shielding the battery grooves is detachably disposed on the upper side of the battery housing; and the battery surface cover is detachably connected with the upper side of the battery housing by a buckling structure, key avoiding through holes corresponding to the keys are further formed in the battery surface cover, and the keys are exposed out of the battery surface cover after penetrating through the key avoiding through holes.

9. The small-sized universal electronic lock of claim 8, wherein a battery base is further fixedly disposed below the battery housing, a side of the battery base extends to form a mounting bulge, a mounting groove is formed in a side of the driving housing, and the mounting bulge is fixedly disposed in the mounting groove.

10. The small-sized universal electronic lock of claim 8, wherein the electronic lock further comprises a mounting housing, and the power supply assembly, the motor assembly and the driving member are all disposed in the mounting housing and are sequentially arranged in the mounting housing from left to right; and a surface cover through hole penetrating through the mounting housing is formed in a position, corresponding to the battery surface cover, on the upper side of the mounting housing, and the battery surface cover is exposed outside after penetrating through the surface cover through hole.

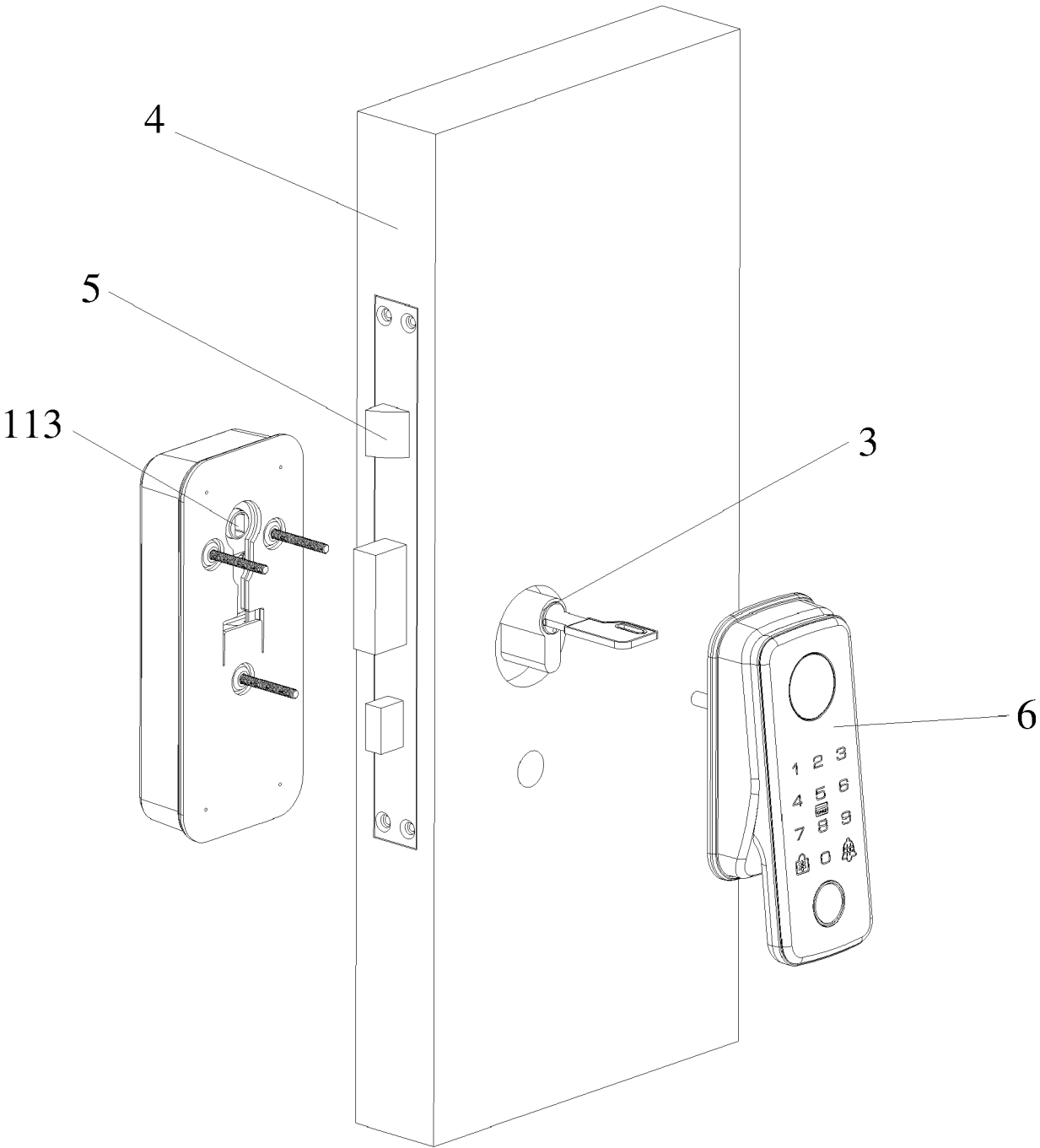


FIG. 1

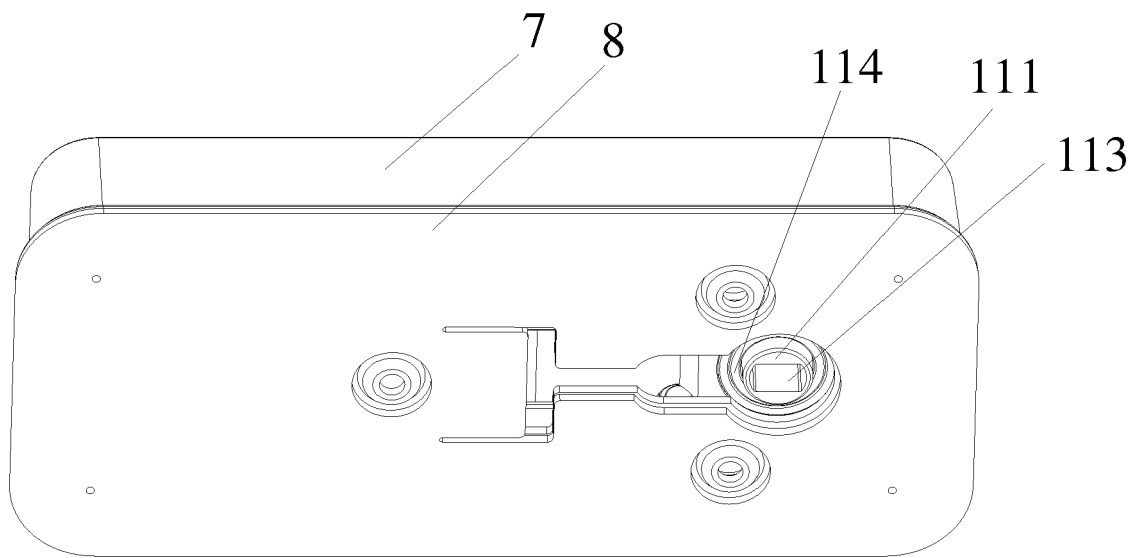


FIG. 2

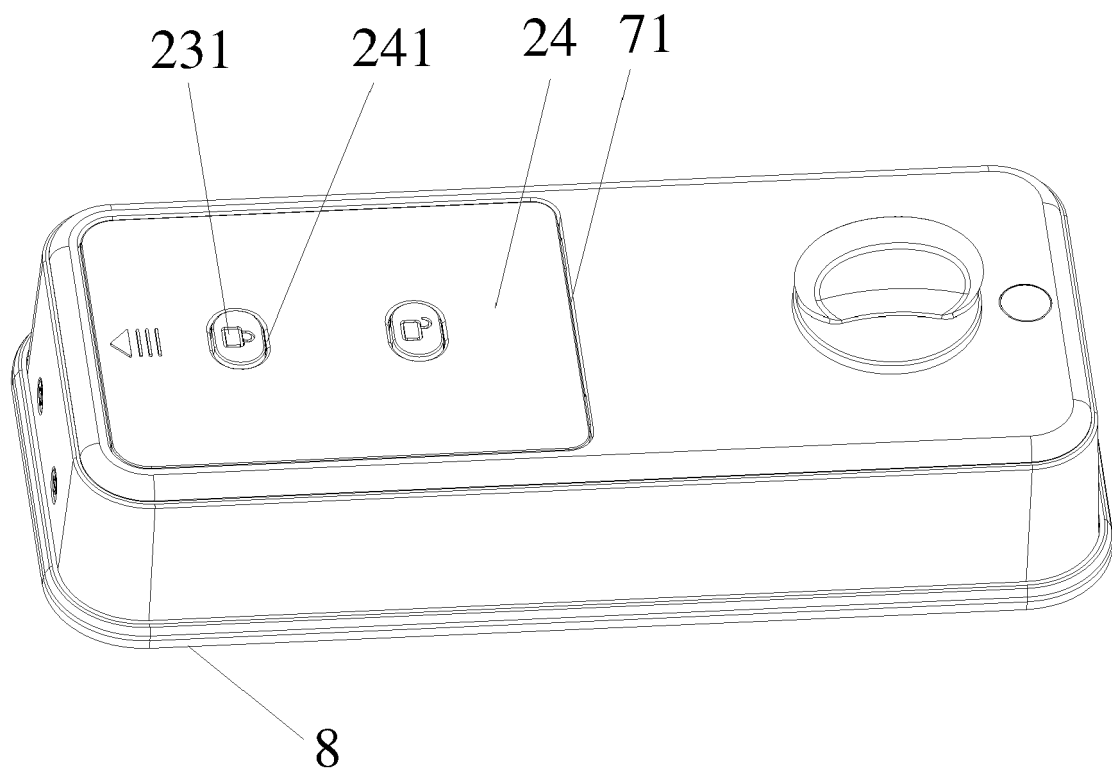


FIG. 3

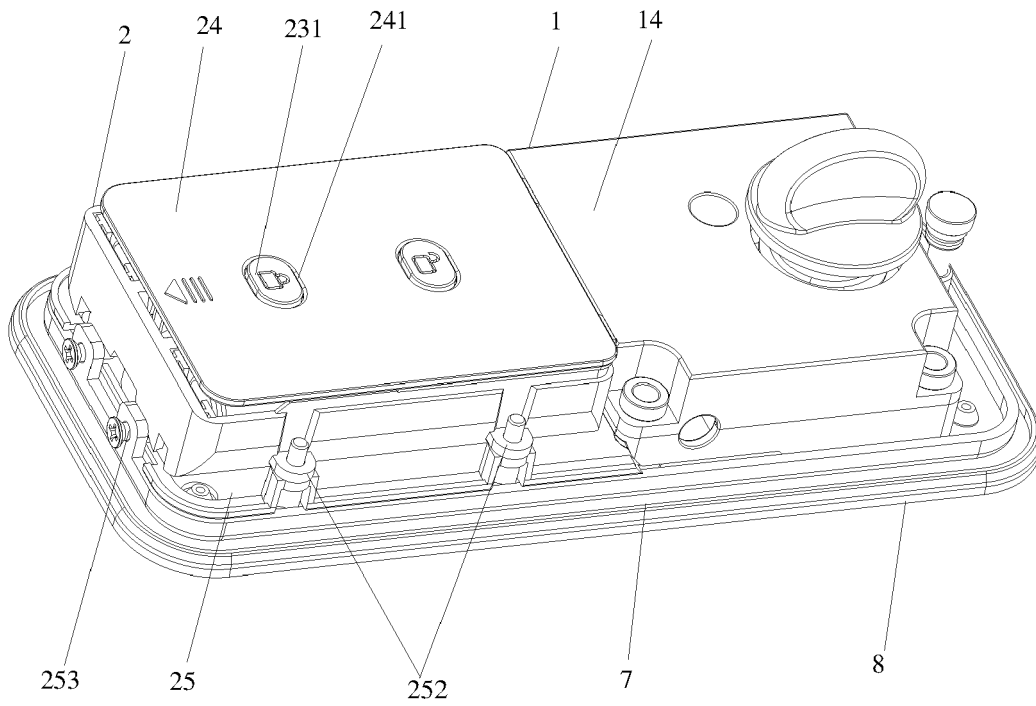


FIG. 4

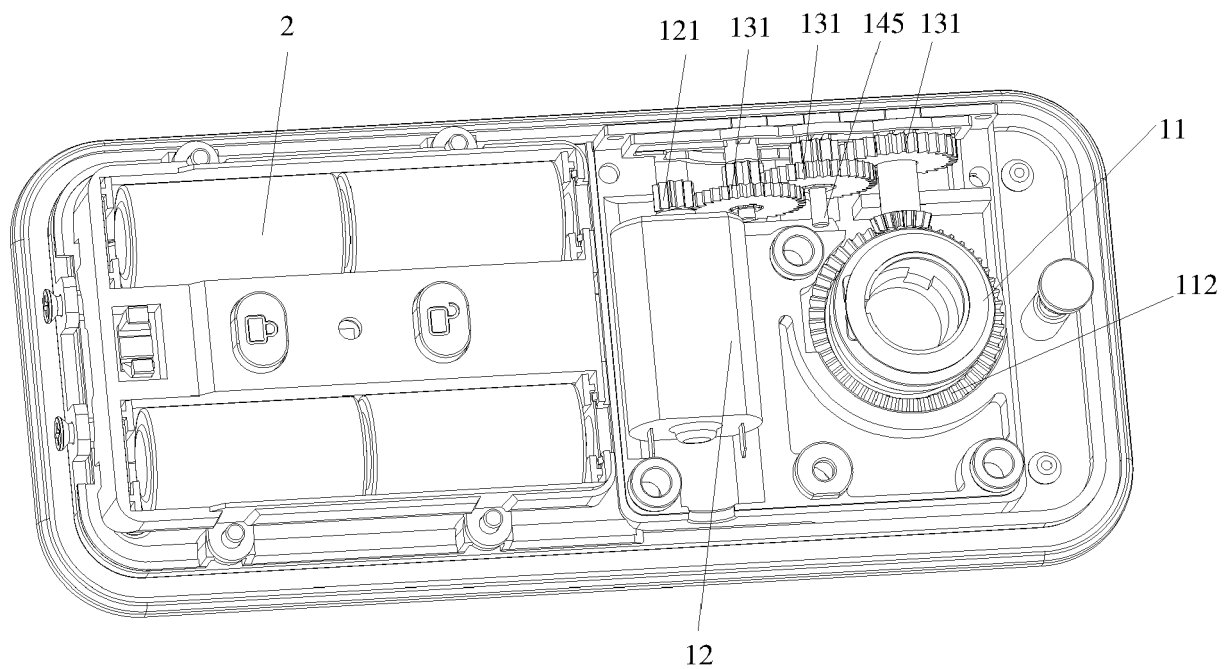


FIG. 5

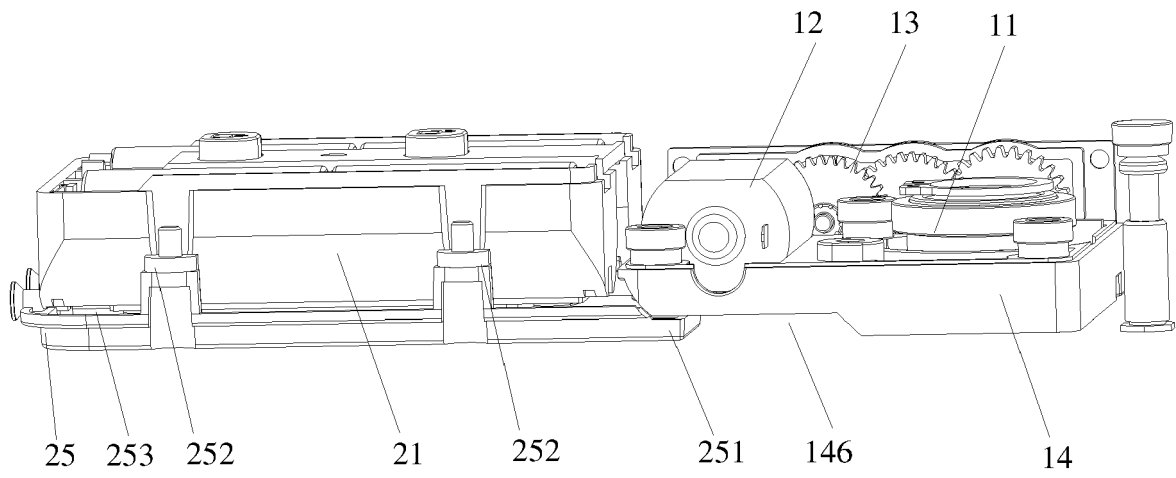


FIG. 6

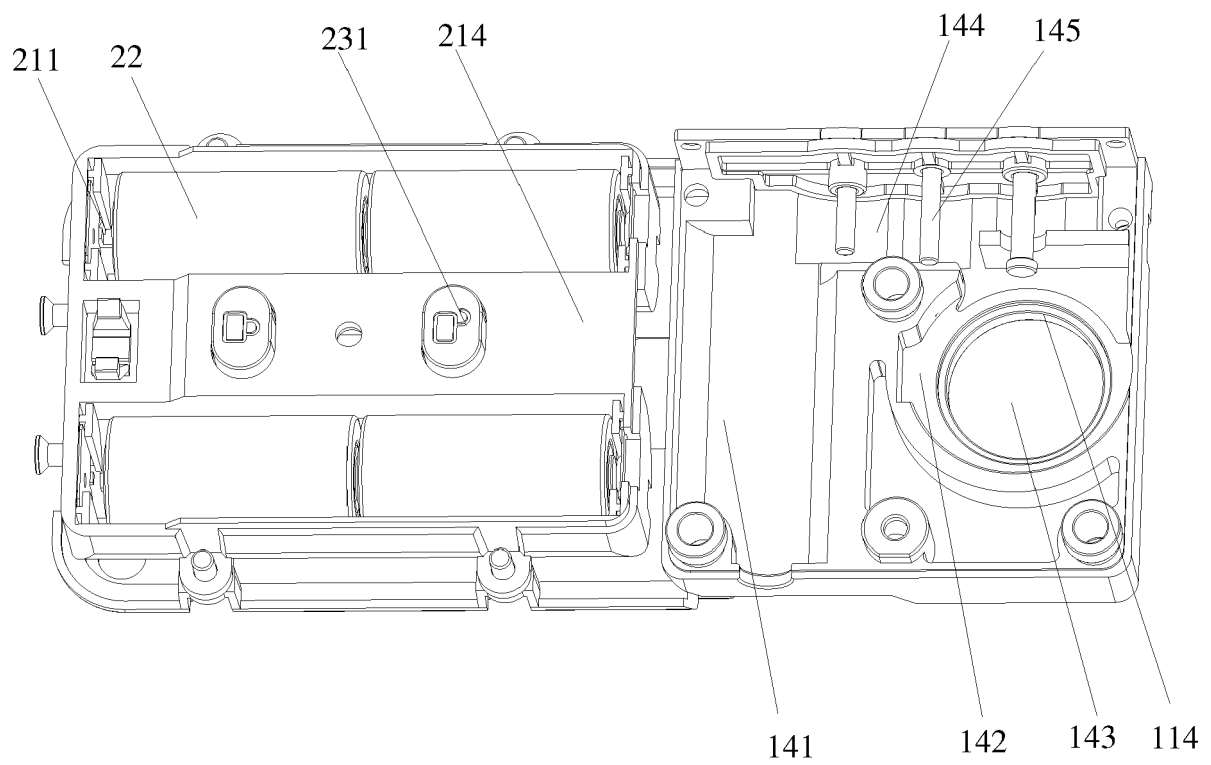


FIG. 7

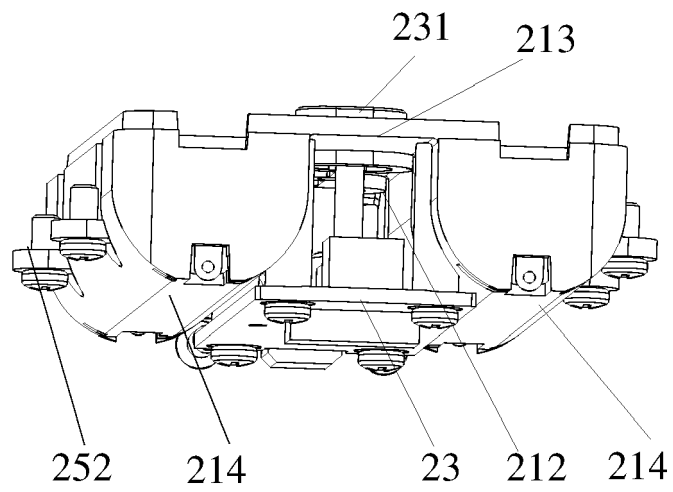


FIG. 8



EUROPEAN SEARCH REPORT

Application Number

EP 21 21 3017

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EPO FORM 1503 03.82 (P04C01)

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 May 2022	Examiner Geerts, Arnold
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EP 21 21 3017

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