



(11)

EP 4 357 565 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
24.04.2024 Bulletin 2024/17

(21) Application number: **22202867.2**

(22) Date of filing: **20.10.2022**

(51) International Patent Classification (IPC):
E05B 13/00 (2006.01) **E05B 47/06** (2006.01)
E05C 3/24 (2006.01) **E05B 5/00** (2006.01)
E05B 7/00 (2006.01)

(52) Cooperative Patent Classification (CPC):
E05B 13/002; E05B 5/00; E05B 7/00;
E05B 47/0661; E05C 3/24; E05B 2047/0069;
E05B 2047/0086

(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

(71) Applicant: **Mesan Kilit Anonim Sirketi**
34570 Istanbul (TR)

(72) Inventors:
• **DASDEMIR, Buse**
Istanbul (TR)
• **KEKLIK, Emre**
Istanbul (TR)
• **KANBUROGLU, Kaan**
Istanbul (TR)

(74) Representative: **Sevinç, Erkan**
Istanbul Patent A.S.
Plaza-33, Büyükdere Cad. No: 33/16
Sisli
34381 Istanbul (TR)

(54) AN IMPROVED LATCH ASSEMBLY HAVING A HANDLE

(57) The invention relates to a latch assembly (10) comprising a main body (20); a handle (30) pivotable mounted on the main body (20) for movement between a normally closed position and open position; a pivotably mounted locking hook (22) in communication with a spring biased triggering member (24) for locking and unlocking the latch assembly (10); a locking lever (50) having two spaced apart arms (52a, 52b) attached to opposite sides of the main body (20); an attachment pin (28) guided in the main body (20) and mechanically connected to the handle (30) and the locking lever (50); an electronic circuit (29) for triggering a motor unit (25) wherein the motor unit (25) is operatively connected to a locking tongue (40) being movable between unlocked and locked positions; wherein the locking tongue (40) is arranged to operatively engage a locking slot (51) formed on one of the arms (52a) of the locking lever (50) when the locking tongue (40) is brought to the locked position.

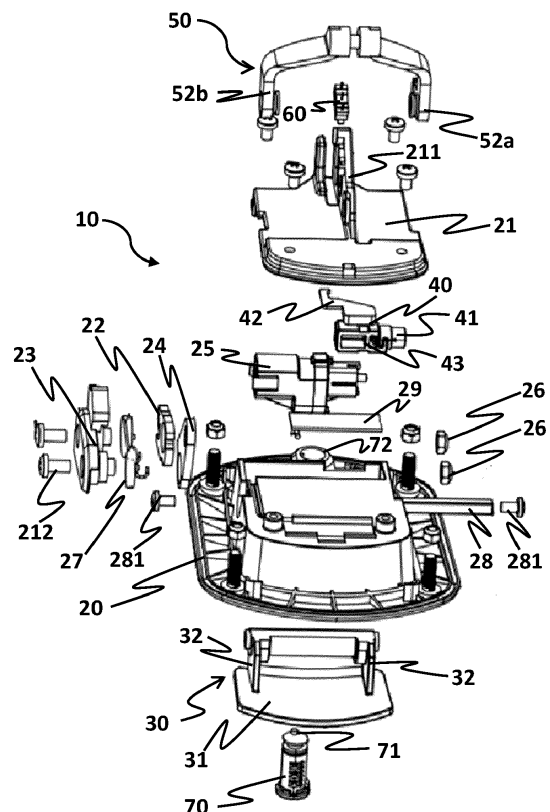


FIG. 1

Description

Technical Field of the Invention

[0001] The present invention relates to a latch assembly according to the preamble of the claim 1.

Background of the Invention

[0002] The latch assemblies with handles are known in the art. Such latch assemblies are used in panels, industrial machines, or cabinet doors.

[0003] The latch assemblies in the art are mostly available in the market as mechanical cabinet locks. When only the mechanical lock is used, it is not possible to get information on whether the door is open or closed. There is a need of a latch assembly in which electronic and mechanical opening options work together. Moreover, such latch assemblies are generally formed of a single locking component. Frequently a need exists for added locking features such as the use of a padlock or the like.

[0004] A prior art publication in the technical field of the invention may be referred to as US2002112511 (A1), which discloses a double lock T-handle having a tray which includes an inwardly dished handle receiving area, a second recessed handle receiving region, and a recessed padlock receiving depression.

Objects of the Invention

[0005] The primary object of the invention is to provide a latch assembly that allows both mechanical and electronic locking operations with increased security.

[0006] Another object of the invention is to provide a latch assembly having an electronic unit that informs whether the door of the cabinet or the like is open or closed.

[0007] Another object of the present invention is to provide a system in which the handle can be easily blocked so that the latch assembly cannot be unlocked.

[0008] Another object of the present invention is to include a lock plug suitable to be used with a key that also allows mechanical use.

[0009] Another object of the invention is to provide a latch assembly in which if the door is not opened for a certain period of time when it is triggered to unlock, the lock can lock itself within a certain period of time.

[0010] Another object of the invention is to provide a latch assembly that allows the lock to be opened with a key from the front of the door and by pressing the back side of the door.

[0011] Another object of the invention is to provide a latch assembly that includes a remote control to enable remote locking.

Summary of the Invention

[0012] The present invention relates to a latch assembly

bly comprising a main body; a handle pivotable mounted on the main body for movement between a normally closed position and open position; a pivotably mounted locking hook in communication with a spring-biased triggering member for locking and unlocking the latch assembly; a locking lever having two spaced apart arms attached to opposite sides of the main body; an attachment pin guided in the main body and mechanically connected to the handle and at least one of the arms of the locking lever; an electronic circuit for triggering a motor unit wherein the motor unit is operatively connected to a locking tongue being movable between unlocked and locked positions. Advantageously, the proposed locking tongue is arranged to operatively engage a locking slot formed on one of the arms of the locking lever when the locking tongue is brought to the locked position.

Brief Description of the Drawings

[0013] The latch assembly which is the subject of the present invention is illustrated in the accompanying drawings for better understanding thereof, which drawings are only attached for better explaining the present invention and are not limiting the invention.

Figure 1 is an exploded view of a latch assembly according to the present invention.

Figure 2a is a top view of the latch assembly in a closed state according to the present invention.

Figure 2b is a rear view of the latch assembly in a closed state according to the present invention.

Figure 3 is a side view of the latch assembly in a closed state according to the present invention.

Fig. 4a is a sectioned perspective view showing the locking mechanism in an open state, according to the present invention.

Fig. 4b is a sectioned perspective view showing the locking mechanism in a locked state, according to the present invention.

Fig. 5a is a cross-sectional view of the latch assembly in a locked state, according to the present invention.

Fig. 5b is a cross-sectional view of the latch assembly in an open state, according to the present invention.

Fig. 6a is a perspective view showing the position where a lock tongue mates with a protrusion of a plug of the latch assembly, according to the present invention.

Fig. 6b is an exploded view of the lock tongue and the motor unit shown in Fig. 6a.

Fig. 7 is a perspective view of the locking hook, a triggering member, and a triggering spring of the latch assembly, according to the present invention.

Fig. 8, is a back perspective view of the main body of the latch assembly in which an electronic circuit is removed, according to the present invention.

Detailed Description of the Invention

[0014] The invention will now be explained in detail in this section with reference to the accompanying drawings and the list of reference numerals used in the appended drawings is as follows;

- 10. Latch assembly
- 20. Main body
 - 21. Back cover
 - 211. Support portion
 - 212. Fastening member
 - 22. Locking hook
 - 23. Bearing cover
 - 24. Triggering member
 - 25. Motor unit
 - 251. Operating rod
 - 252. Spring protrusion
 - 26. Nut
 - 27. Triggering spring unit
 - 28. Attachment pin
 - 281. Fixing nut
 - 29. Electronic circuit
- 30. Handle
 - 31. Holding portion
 - 32. Guiding leg
- 40. Locking tongue
 - 41. Locking head
 - 411. Engagement groove
- 42. Plug leg
- 43. Carrier
 - 431. Engagement protrusion
- 50. Locking lever
 - 51. Locking slot
 - 52a. Arm
 - 52b. Arm
 - 53. Extended portion
- 60. Switch
 - 61. Switch arm
- 70. Plug
 - 71. Protrusion
 - 72. Plug housing
- Y. horizontal direction

[0015] The present invention proposes a latch assembly (10) comprising a main body (20); a handle (30) pivotally mounted on the main body (20) for movement be-

tween a normally closed position and an open position; a pivotally mounted locking hook (22) in communication with a spring biased triggering member (24) for locking and unlocking the latch assembly (10); a locking lever (50) having two spaced apart arms (52a, 52b) attached to opposite sides of the main body (20); an attachment pin (28) guided in the main body (20) and mechanically connected to the handle (30) and at least one of the arms (52) of the locking lever (50); an electronic circuit (29) for triggering a motor unit (25) wherein the motor unit (25) is operatively connected to a locking tongue (40) being movable between unlocked and locked positions. Advantageously, the locking tongue (40) is arranged to operatively engage a locking slot (51) formed on one of the arms (52a) of the locking lever (50) when the locking tongue (40) is brought to the locked position. Both arms (52a, 52b) are in contact with the attachment pin (28) and one of the arms (52a) has an extended portion (53). This extended portion (53) preferably extends parallel to the longitudinal axis of the latch assembly (10) and includes said locking slot (51) at its end. The locking lever (50), which is normally connected with the attachment pin (28) and suitable for pivotal movement, does not pivot when the locking tongue (40) at least partly enters the locking slot (51). This extended portion (53) is preferably provided only one of the arms (52a).

[0016] Referring to Fig. 1, a substantially U-shaped locking lever (50) is mounted to the handle (30) with the cylindrically shaped attachment pin (28) which ensures main parts of the latch assembly (10) move together as a one-piece system. In order to turn the latch assembly (10) on or off electronically, the motor unit (25) allows the electronic tongue mechanism to move in a horizontal direction (Y) which is perpendicular to the longitudinal axis of the latch assembly (10). Two opposite ends of the attachment pin (28) are provided with fixing nuts (281).

[0017] Referring to Fig. 4a and 4b, the motor unit (25) having a motor with a plurality of gears is arranged to push or retract the locking tongue (40). Accordingly, when the locking tongue (40) is in the locked position the motor unit (25) slides the locking tongue (40) to engage the locking slot (51) such that the movement of the handle (30) is blocked, and when the locking tongue (40) is in the unlocked position the motor unit (25) retract the locking tongue (40) from the locking slot (51) to allow the pivotal movement of the handle (30). When the motor unit (25) is energized, the locking tongue (40) is pushed to move along the horizontal direction (Y) and the locking head (41) of the locking tongue (40) engages with the locking slot (51) formed on the locking lever (50). When the locking head (41) engages with the locking slot (51), the movement of the handle (30) and locking lever (50) are blocked and kept in the locked state. As the opening signal comes to the electronic circuit (29), the electronic circuit (29) transmits it to the motor unit (25) to retract the locking tongue (40) in the opposite direction and releases the locking lever (50) by bringing to the open state. Referring to Fig. 8, the electronic circuit (29) is placed within

the main body (20) of the latch assembly (10).

[0018] The handle (30) has a holding portion (31) arranged to be held by the user and has two oppositely arranged guiding legs (32) extending from the holding portion (31). So, the handle (30) is arranged to pivotably release the locking hook (22); and when the locking tongue (40) is in the locked position whereby movement of the motor unit (25) to the open position slides the locking tongue (40) to engage the locking slot (51) such that the movement of the handle (30) is blocked.

[0019] Referring to Fig. 6b, the locking tongue (40) has a snap-fitted attachable locking head (41) and a carrier (43) operatively connected to the motor unit (25). This cylindrically shaped locking head (41) has a U-shaped engagement groove (411) arranged to engage with an engagement protrusion (431) formed on the carrier (43). The locking head (41) is shaped and dimensioned with respect to the cylindrically shaped locking slot (51) and perfectly fits in the locking slot (51) when the locking tongue (40) is pushed horizontally.

[0020] The main body (20) has a substantially rectangular cross-section and has a raised embossed housing portion to house the handle (30) and the locking mechanism. The main body (20) is, preferably, equipped with bolts and nuts at each corner and also includes a back cover (21) covering the raised embossed housing portion of the main body (20).

[0021] Referring to Fig. 1, the back cover (21) has an elevated support portion (211) in the middle of this back cover (21). This support portion (211) can have a triangle cross-section with at least two guiding holes for pivotably attaching the locking hook (22) and the triggering member (24) wherein two fastening members (212) pass through the guiding holes and corresponding nuts (26) are used to fasten therein. Moreover, a bearing cover (23) is attached to one of the main lateral sides of the support portion (211) in which the locking hook (22) and the triggering member (24) are guided with a corresponding triggering spring unit (27). Said bearing cover (23) has also suitable holes and engaging cylindrical tips for inserting into the corresponding holes of the support portion (211). The triggering member (24) has two holes one of which is guided within the bearing cover (23) and the other hole of the triggering member (24) is used to attach between the arms (52) of the locking lever (50). In this way, the position of the locking hook (22) can be adjusted by bringing the position of the triggering member (24) to the desired position.

[0022] The proposed motor unit (25) has an outer body arranged to place within the embossed housing portion of the main body (20) and has a rotating operating rod (251) on which a spring (not shown) is placed and guided (25) to push the carrier (43) of the locking tongue (40). The spring on the operating rod (251) is guided by a vertically arranged spring protrusion (252) formed on the operating rod (251). One end of the spring abuts an inner wall of the carrier (43) and when the operating rod (251) is rotated, the spring is squeezed by the spring protrusion

(252) which results in the carrier (43) being pushed. In a possible embodiment different engagement and triggering, methods can be used, for example, the operating rod (251) can move along the horizontal direction (Y).

[0023] The locking hook (22) and the triggering member (24) together mechanically lock or unlock the latch assembly (10). The handles (30), the attachment pin (28), and the locking lever (50) formed as one piece are connected to the triggering member (24) which is placed substantially in the middle of the latch assembly (10). When the locking arm (40) moves axially, the triggering member (24) enables the locking hook (22) to be opened. Thanks to the triggering spring unit (27), the triggering member (24) always tries to stay in the neutral position. After it turns on, it returns to its original position. In order to bring the latch assembly (10) to the locked position, the locking hook (22) must be closed physically. This occurs when the door of a cabinet is physically closed. Referring to Fig. 5a and 5b, the locking hook (22) has a U-shaped portion locking portion and a sloped groove opposite to the U-shaped portion for engaging with a tip of the triggering member (24). Referring to Fig. 7, the triggering spring unit (27) has, preferably, two similarly shaped integral springs attached to the locking hook (22) and the triggering member (24), respectively.

[0024] Referring to Fig. 5a and 5b, the triggering member (24) is guided in between two arms (52a, 52b) of the locking lever (50) and the triggering member (24) is movable between a supporting position in which it supports the locking hook (22) to keep it in the locked position when the locking hook (22) is in the locked position and a tensioning position in which the triggering member (24) is not in contact with the locking hook (22). In order to know the current status of the latch assembly (10), the latch assembly (10) comprises a switch (60) which is electrically connected to the electronic circuit and has a switch arm (61) arranged to be triggered by the locking hook (22). Referring to Fig. 5a, the switch arm (61) of the switch (60) is movable between a closed position in which the locking hook (22) presses the switch arm (61) when the locking hook (22) is in the locked position and an opened position in which the locking hook (22) does not contact the switch arm (61) when the locking hook (22) is in the released position. Referring to Fig. 4a and 4b, the switch (60) is provided on the support portion (211) of the main body (20). In a possible embodiment, the location of the switch (60) can vary.

[0025] As additional security, a plug (70) is provided for the mechanical opening/closing option. The main body (20) has a plug housing (72) for receiving the plug (70) in mechanical communication with the locking tongue (40) for moving in between the unlocked and locked positions. When the user inserts the suitable key into the plug (70) and rotates, an eccentrically arranged integral protrusion (71) of the plug (70) pulls a plug leg (42) of the carrier (43). Referring to Fig. 6b, the carrier (43) of the locking tongue (40) has an outwardly extending pulling leg (42) arranged to be in contact with an ec-

centrically arranged protrusion (71) of the plug (70) for triggering the locking tongue (40). Moreover, the plug leg (42) has an L-shaped extended tip to attach the cylindrically shaped protrusion (71). Thus, it is also possible to unlock the latch assembly (10) mechanically without the need for an electronic trigger. The plug (70) has a straight-shaped slot known as the keyway at one end to allow the key to enter the plug (70) and pins of varying lengths to prevent the plug (70) from opening without the correct key.

[0026] The motor unit (25) is arranged to automatically trigger the locking tongue (40) in the unlocked position within a pre-defined period of time if the handle (30) is not pulled out within a specified time. In a possible embodiment, the pre-defined period of time can be arranged in the electronic circuit (29). Thus, as an extra security feature, if the door of a cabinet where the latch assembly (10) is attached is not opened within a certain time, the latch assembly (10) is locked back.

[0027] The latch assembly (10) further comprises a remote controller arranged to send wireless data to the electronic circuit (29) for triggering the motor unit (25) remotely. Thus, the user can remotely open the latch assembly (10) with remote control.

Claims

1. A latch assembly (10) comprising:

a main body (20);
 a handle (30) pivotable mounted on the main body (20) for movement between a normally closed position and an open position;
 a pivotably mounted locking hook (22) in communication with a spring-biased triggering member (24) for locking and unlocking the latch assembly (10);
 a locking lever (50) having two spaced apart arms (52a, 52b) attached to the main body (20);
 an attachment pin (28) guided in the main body (20) and mechanically connected to the handle (30) and the locking lever (50); and
 an electronic circuit (29) for triggering a motor unit (25) wherein the motor unit (25) is operatively connected to a locking tongue (40) being movable between unlocked and locked positions; and wherein the locking tongue (40) is arranged to operatively engage a locking slot (51) formed on one of the arms (52a) of the locking lever (50) when the locking tongue (40) is brought to the locked position.

2. The latch assembly (10) according to claim 1, wherein the motor unit (25) is arranged to push or retract the locking tongue (40) when the locking tongue (40) is in the locked position the motor unit (25) slides the locking tongue (40) to engage the locking slot (51)

such that the movement of the handle (30) is blocked and when the locking tongue (40) is in the unlocked position the motor unit (25) retract the locking tongue (40) from the locking slot (51) to allow movement of the handle (30).

3. The latch assembly (10) according to claim 1 or 2, wherein the locking tongue (40) has an attachable locking head (41) and a carrier (43) operatively connected to the motor unit (25).

4. The latch assembly (10) according to claim 3, wherein the cylindrically shaped locking head (41) has a U-shaped engagement groove (411) for attaching a corresponding engagement protrusion (431) formed on the carrier (43).

5. The latch assembly (10) according to any one of the preceding claims, wherein the motor unit (25) has an operating rod (251) movable along the longitudinal axis of the motor unit (25) to push a carrier (43) of the locking tongue (40).

6. The latch assembly (10) according to any one of the preceding claims, wherein the triggering member (24) is guided in between two arms (52a, 52b) of the locking lever (50).

7. The latch assembly (10) according to claim 6, wherein the triggering member (24) is movable between a supporting position in which it supports the locking hook (22) to keep it in the locked position when the locking hook (22) is in the locked position and a tensioning position in which the triggering member (24) is not in contact with the locking hook (22).

8. The latch assembly (10) according to any one of the preceding claims, wherein the latch assembly (10) comprises a switch (60) which is electrically coupled with the electronic circuit and has a switch arm (61) arranged to be triggered by the locking hook (22), wherein the switch arm (61) is movable between a closed position in which the locking hook (22) presses the switch arm (61) when the locking hook (22) is in the locked position and an opened position in which the locking hook (22) does not contact the switch arm (61) when the locking hook (22) is in the released position.

9. The latch assembly (10) according to any one of the preceding claims, wherein the main body (20) has a plug (70) in mechanical communication with the locking tongue (40) for moving in between the unlocked and locked positions.

10. The latch assembly (10) according to claim 9, wherein the carrier (43) of the locking tongue (40) has an outwardly extending plug leg (42) arranged to be in

contact with an eccentrically arranged protrusion (71) of the plug (70) for triggering the locking tongue (40).

11. The latch assembly (10) according to any one of the preceding claims, wherein the motor unit (25) is arranged to automatically trigger the locking tongue (40) in the unlocked position within a pre-defined period of time if the handle (30) is not pulled out within a specified time. 5 10
12. The latch assembly (10) according to claim 11, wherein the pre-defined period of time can be arranged in the electronic circuit (29). 15
13. The latch assembly (10) according to any one of the preceding claims, wherein the latch assembly (10) further comprises a remote controller arranged to send wireless data to the electronic circuit (29) for triggering the motor unit (25) remotely. 20
14. The latch assembly (10) according to any one of the preceding claims, wherein the handle (30) has a holding portion (31) arranged to be held by the user, and has two oppositely arranged guiding legs (32) extending from the holding portion (31). 25
15. The latch assembly (10) according to any one of the preceding claims, wherein one of the arms (52a) of the locking lever (50) has an extended portion (53) in which said locking slot (51) is formed at its end wherein the extended portion (53) extends from the region where the arm (52a) is connected to the attachment pin (28). 30 35

40

45

50

55

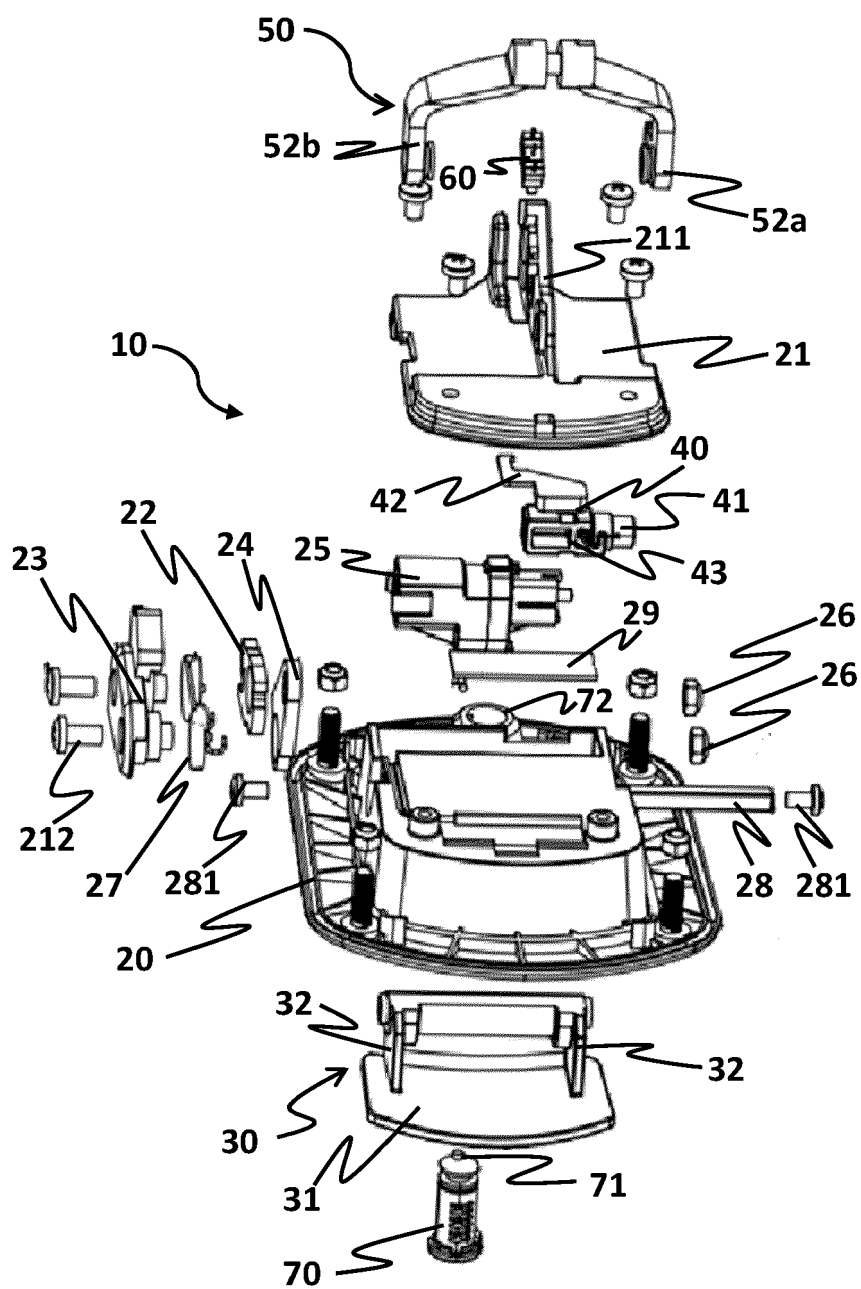


FIG. 1

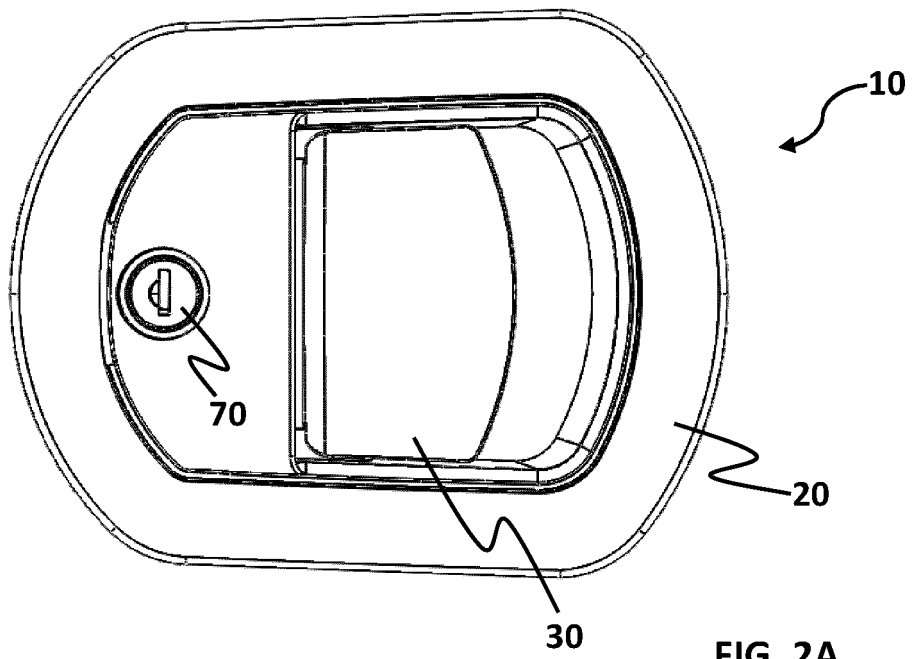


FIG. 2A

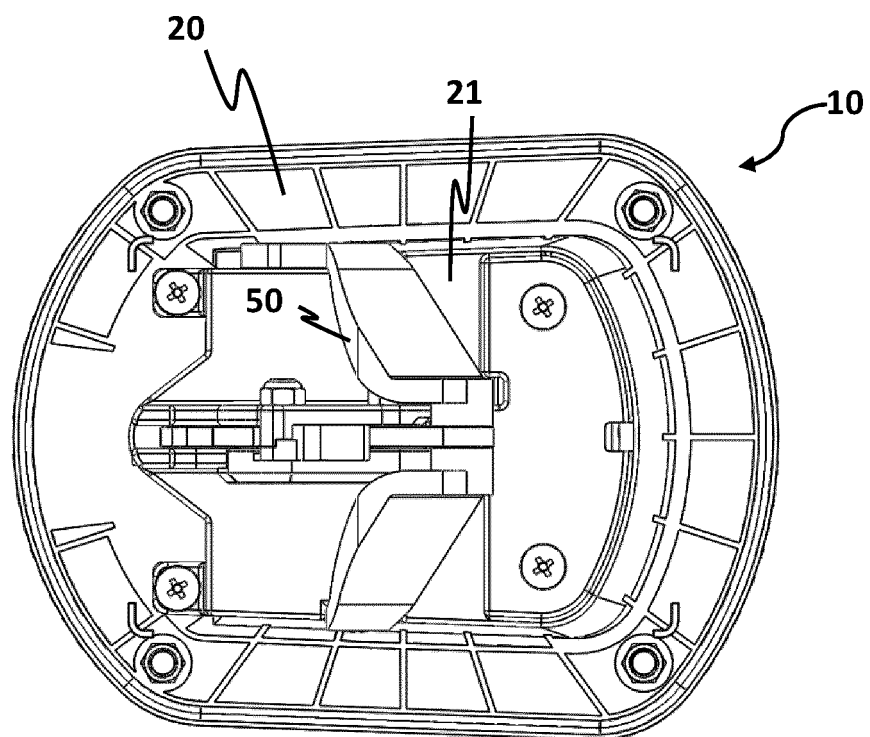


FIG. 2B

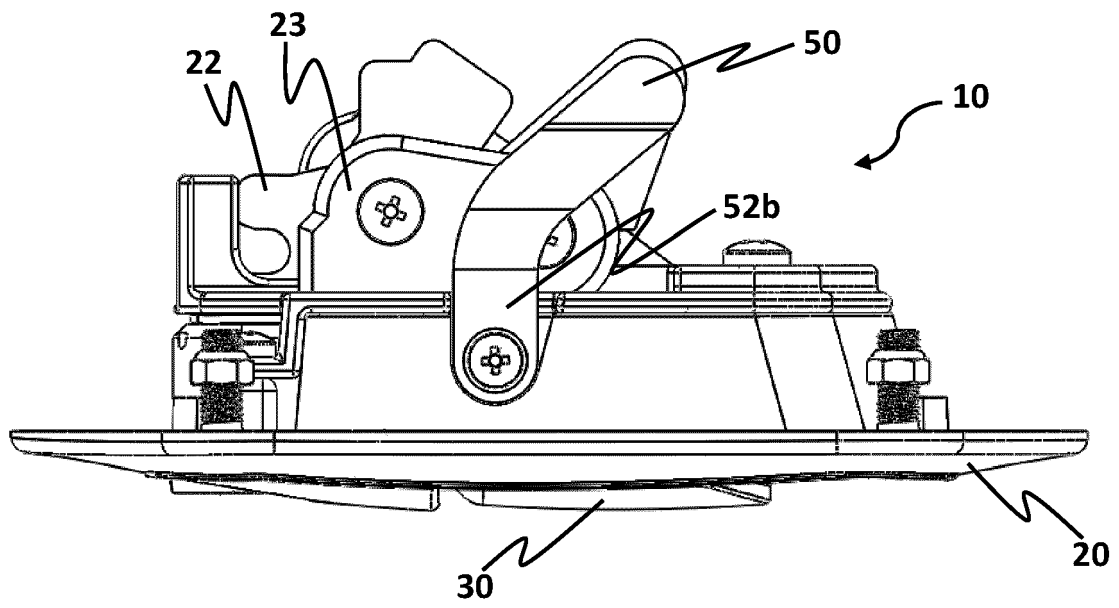


FIG. 3

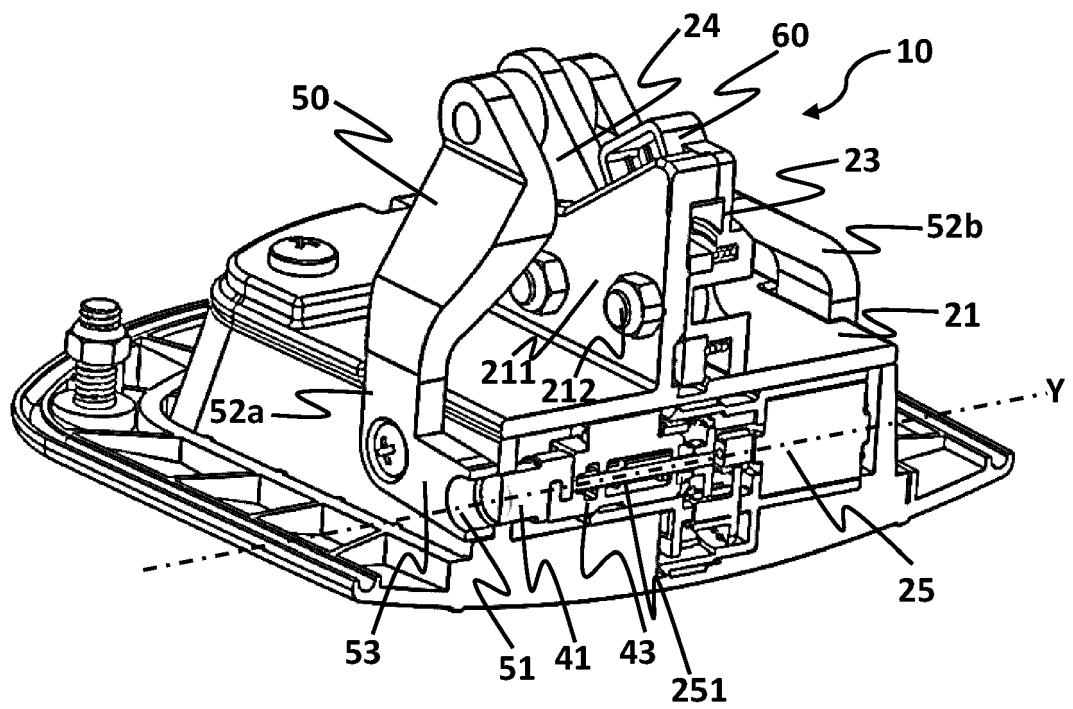


FIG. 4A

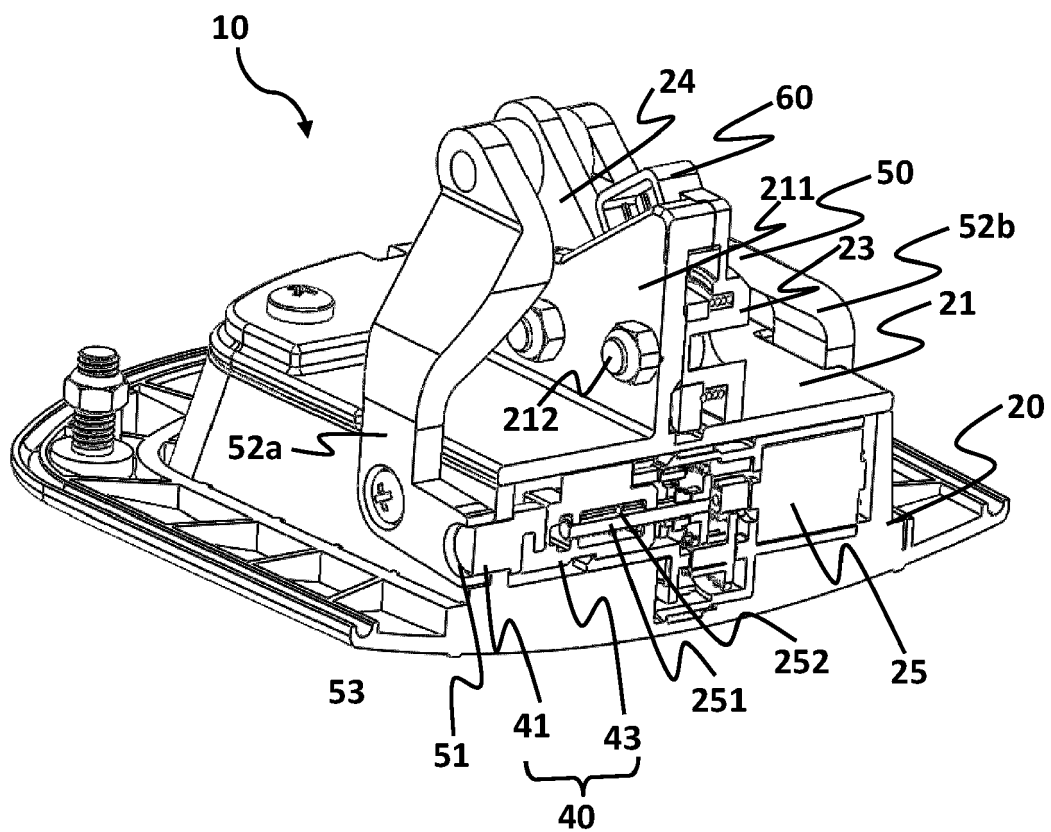


FIG. 4B

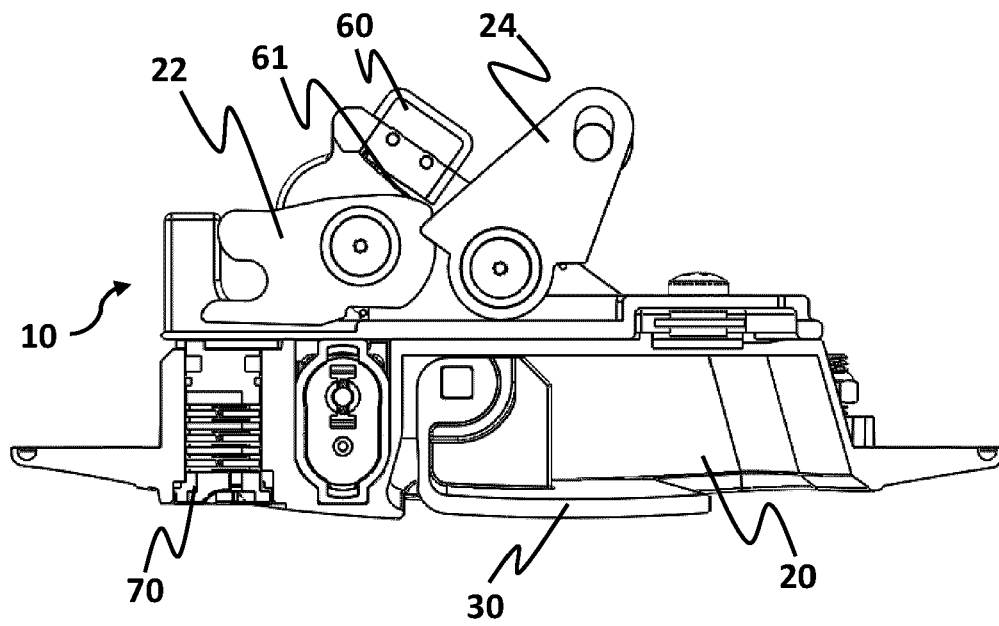


FIG. 5A

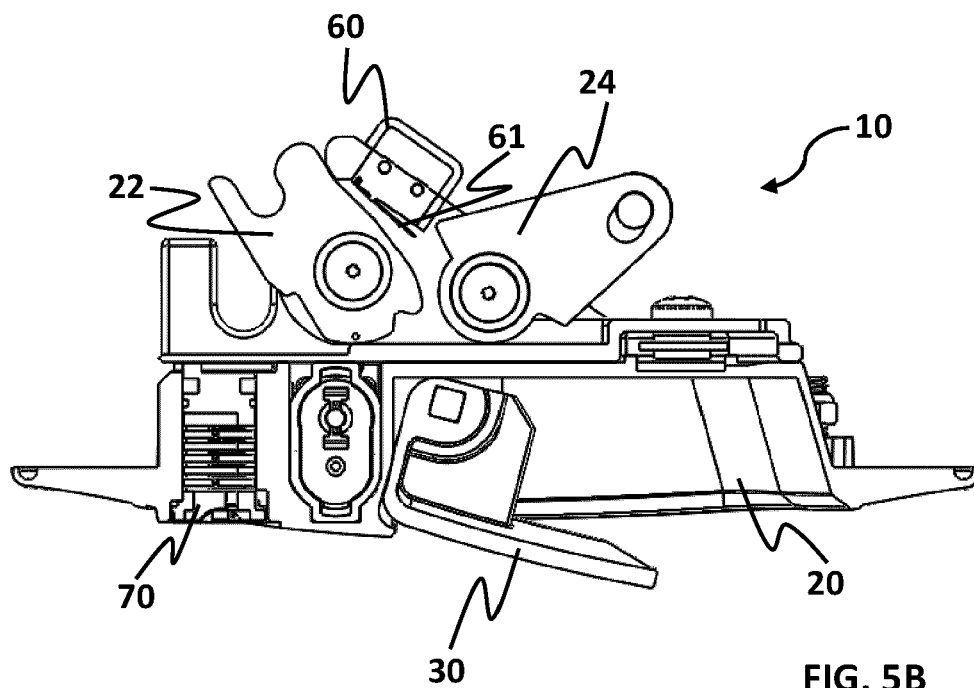


FIG. 5B

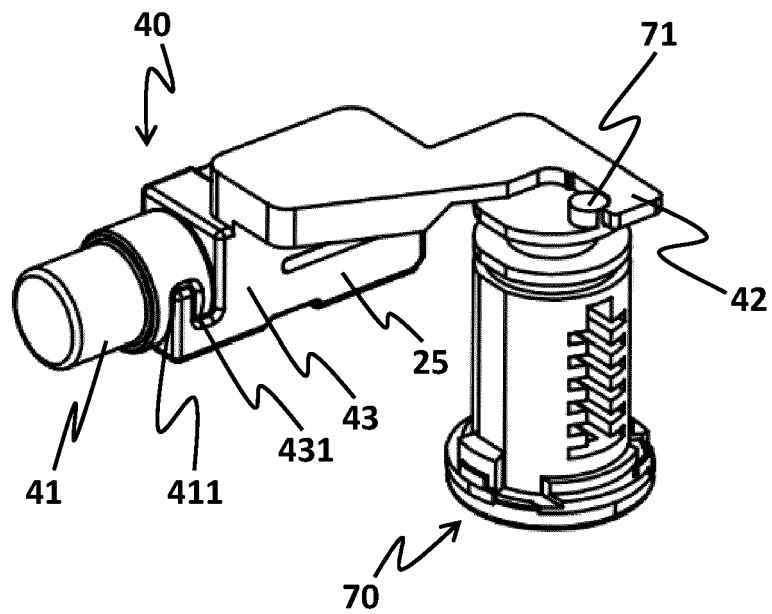


FIG. 6A

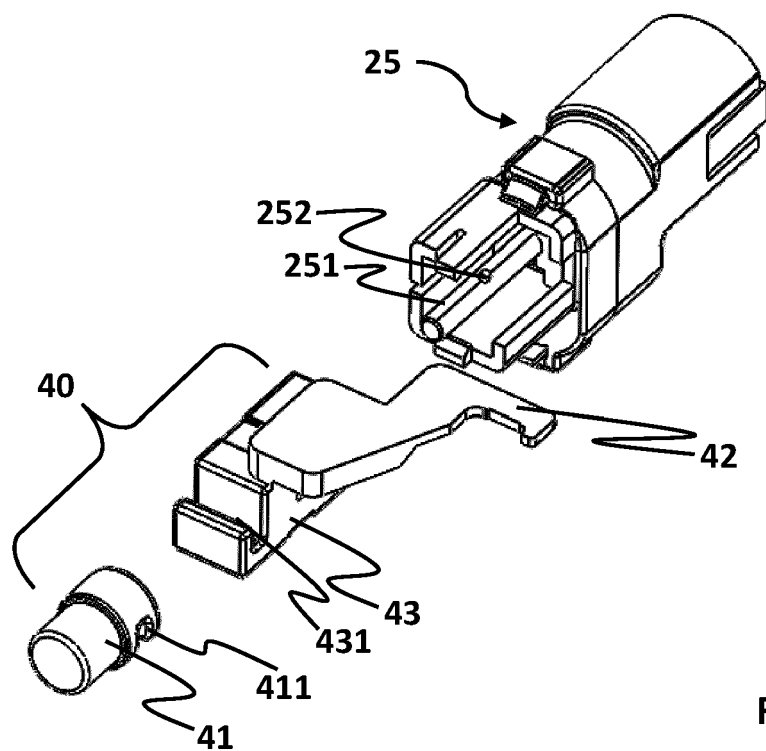


FIG. 6B

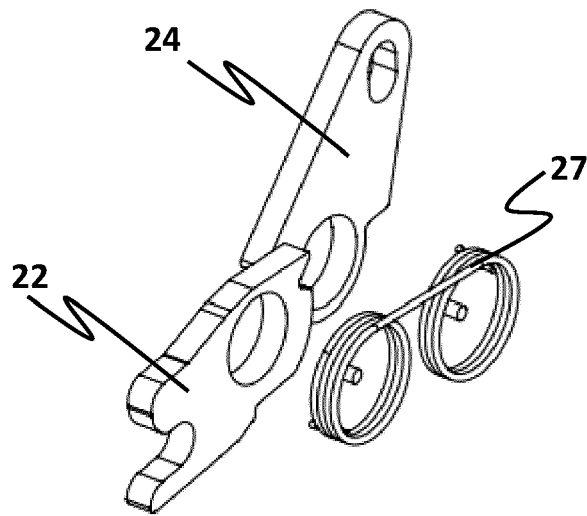


FIG. 7

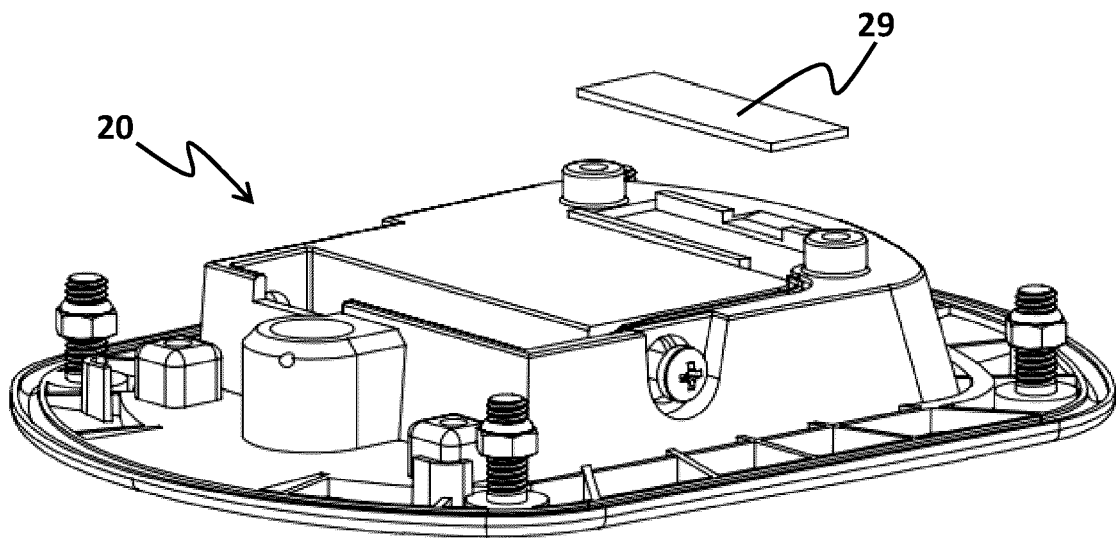


FIG. 8



EUROPEAN SEARCH REPORT

Application Number

EP 22 20 2867

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 10 815 697 B1 (WEINERMAN LEE S [US] ET AL) 27 October 2020 (2020-10-27) * column 10, line 49 - column 12; figures 20-31 *	1-15	INV. E05B13/00 E05B47/06 E05C3/24 E05B5/00 E05B7/00
A	US 2003/141724 A1 (RAMSAUER DIETER [DE]) 31 July 2003 (2003-07-31) * the whole document *	1	
A	JP 4 711357 B2 (TAKIGEN MFG CO) 29 June 2011 (2011-06-29) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B E05C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 3 March 2023	Examiner Ansel, Yannick
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	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 22 20 2867

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

03-03-2023

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 10815697	B1	27-10-2020	NONE
US 2003141724	A1	31-07-2003	AT 267937 T 15-06-2004
		AU 3925901 A 23-10-2001	
		CN 1422358 A 04-06-2003	
		DE 20006373 U1 09-08-2001	
		EP 1268961 A2 02-01-2003	
		US 2003141724 A1 31-07-2003	
		WO 0177465 A2 18-10-2001	
JP 4711357	B2	29-06-2011	JP 4711357 B2 29-06-2011
		JP 2010133120 A 17-06-2010	

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 2002112511 A1 [0004]