



(11) **EP 1 436 477 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
19.03.2008 Bulletin 2008/12

(51) Int Cl.:
E05B 47/00 (2006.01) E05B 9/02 (2006.01)

(21) Application number: **02778149.1**

(86) International application number:
PCT/SE2002/001873

(22) Date of filing: **15.10.2002**

(87) International publication number:
WO 2003/033845 (24.04.2003 Gazette 2003/17)

(54) **A MOTOR UNIT FOR PLACEMENT IN A LOCK ARRANGEMENT**

MOTOREINHEIT ZUR ANORDNUNG IN EINER VERRIEGELUNGSANORDNUNG

BLOC MOTEUR DESTINE A ETRE PLACE DANS UN SYSTEME DE VERROUILLAGE

(84) Designated Contracting States:
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR
IE IT LI LU MC NL PT SE SK TR**
Designated Extension States:
LT LV

(72) Inventor: **HIRVI, Jorma**
S-640 43 Eskilstuna (SE)

(30) Priority: **16.10.2001 SE 0103443**

(74) Representative: **Estreen, Lars J.F. et al**
Kransell & Wennborg KB
P.O. Box 27834
115 93 Stockholm (SE)

(43) Date of publication of application:
14.07.2004 Bulletin 2004/29

(56) References cited:
DE-A1- 19 710 834 US-A- 5 394 718
US-A- 5 531 086 US-A- 6 109 674

(73) Proprietor: **ASSA AB**
S-631 05 Eskilstuna (SE)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 436 477 B1

Description

FIELD OF INVENTION

[0001] The present invention relates to a motor unit which is intended to be mounted in a lock arrangement and more specifically to a motor lock arrangement that includes a motor for driving the mechanical components of the lock arrangement.

DESCRIPTION OF THE BACKGROUND ART

[0002] Some known locks include a lock post and a lock box that can be connected detachably to the lock post and that houses the lock mechanism. This makes possible relatively rational handling of specific products. An example of one such solution is found, for instance, in Swedish Patent Specification SE7601429-9 in the name of GKN-Stenman AB.

[0003] However, the present-day manufacturing industry places increasingly higher demands on automation and modularization, in order to minimise storage costs and to simplify fitting of the lock. This demand is particularly apparent in the lock industry, which produces many different lock variants. For example, the industry must be capable of supplying locks of different dimensions, different bolt configurations, functions, etc.

[0004] One problem thus resides in producing lock arrangements that are suited for large-scale manufacture with retained flexibility, while keeping storage costs down to a minimum. One particular problem in this regard resides in providing motor locks that can be manufactured and fitted rationally. The components of a motor lock, such as an electric motor or some other motor, door position sensors and other types of sensor, cabling, mechanical coupling to followers, etc., have been tailor-made in accordance with requirements and the space available in the lock housing. This results in a large number of different components that can contribute towards high costs and also to impaired mechanical and electrical reliability.

SUMMARY OF THE INVENTION

[0005] One object of the present invention is to provide a lock arrangement of the kind mentioned in the introduction that is suited for automated manufacture with simplified storage and that also fulfils high reliability demands.

[0006] The invention is based on the insight that a motor lock can be manufactured from modules, of which one consists of a motor unit having mechanical and electrical coupling to other lock units.

[0007] According to a first aspect of the invention, there is provided a motor unit as defined in the accompanying Claim 1.

[0008] According to a second aspect of the invention, there is provided a lock arrangement as defined by the

accompanying Claim 9.

[0009] Other preferred embodiments of the invention are defined in the dependent Claims.

[0010] The motor unit and the lock arrangement according to the invention avoid the aforesaid drawbacks of known techniques. The inventive lock arrangement includes a motor unit as an independent unit. This enables the lock arrangement to be modularised, thereby requiring fewer parts to be stored and/or a greater variation of lock arrangements to be offered.

[0011] In one particularly preferred embodiment of the invention, a motor unit includes a printed circuit board or card which carries control electronics, sensors, etc., wherein a sensor is mounted on a part of the circuit board that is intended to be separated from the remainder of the board, preferably with the aid of a fracture indication. A cable arrangement connects the sensor and remaining electronic devices. This has the advantage of simpler manufacture, i.e. the sensor part can be produced integrally with the remainder of the circuit board. Because the sensor part can be allowed to remain on the board up to the time of assembly, the handling procedure is made simpler without the risk of a separate sensor part being torn loose or damaged in some other way.

[0012] Adaptation to different lock configurations can also be achieved with the aid of fracture indications. Such adaptation may include adaptation to different back sets or different sensor positions. This provides the advantage of needing to store only one single type of module.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The invention will now be described in more detail by way of example and with reference to the accompanying drawings, in which

Fig. 1 is a perspective, exploded overview of an inventive lock arrangement;

Figs. 2a-c are perspective and plan views of a first embodiment of a motor unit intended to be mounted in the inventive lock arrangement;

Fig. 2d illustrates the motor unit of Figs. 2a-c mounted in position in said lock arrangement;

Fig. 2e is a perspective view of a mounting element for mounting a sensor included in the motor unit shown in Figs. 2a-c;

Fig. 2f shows the mounting element together with the sensor; and

Figs. 3a and 3b are respective perspective and plan views of a second embodiment of a motor unit intended to be mounted in the inventive lock arrangement.

DESCRIPTION OF EMBODIMENTS

[0014] Preferred embodiments of a lock arrangement and a motor unit according to the present invention will now be described initially with reference to Fig. 1. Fig. 1 shows the lock arrangement in perspective with the box and covering lid removed. The lock arrangement includes a post unit 10, which includes a lock post 11 and a bar or beam 12 of U-shaped cross-section welded to the lock post. The U-bar surrounds all lock functions close to the front of the lock, such as the function of controlling and driving a falling latch 13 and a holding bolt 14. The lock post 11 includes a through-penetrating upper sensor opening 11a. This opening is intended to accommodate a door position sensor in a first embodiment of a motor module according to the invention, as described hereinafter with reference to Figs. 2e and 2f. The lock post also includes a lower sensor opening 11a which is intended to accommodate a door position sensor in a second embodiment of a motor module, which is described below with reference to Figs. 3a and 3b.

[0015] The lock arrangement also includes a housing that comprises a box 21 and a covering lid - 22. These parts are a mirror image of each other, although they are identical in other respects. These parts are fitted to the U-bar 12 by means of fastener elements which in the illustrated case have the form of screws and nut sleeves 24a, 24b that extend through holes 23a-d in the covering lid and through corresponding holes in the box. The holes 23a and 23b register with through penetrating holes 12a, 12b in the post unit. The box and the covering lid also include respective ledges 21a-c and 22a-c that extend at right angles to the bottom and the lid and that function as side surfaces in the assembled state of the lock arrangement.

[0016] Finally, the lock arrangement includes follower units or follower modules, in the illustrated embodiment a cylinder follower unit 30 and a handle follower unit 40. The follower units are mounted between the box 21 and the covering lid 22 and are provided, to this end, with through-penetrating holes that register with the holes 23c and 23d in the covering lid 22 and corresponding pins in the box.

[0017] The cylinder follower unit 30 is essentially square and includes the drive arrangement typically found in cylinder followers. Thus, the unit 30 includes a through penetrating opening 31 adapted to receive a dogging element (not shown) in a lock cylinder or a lock knob/handle.

[0018] The cylinder follower unit 30 is adapted to communicate with the holding bolt 14 via a pin 32 and a link arrangement 14a. The pin 32 is moved either upwards or downwards depending on the rotational direction of the follower, and movement of the pin therewith rotates the bolt 14 between its extended position shown in the figures and a retracted position (not shown).

[0019] The handle follower unit 40 is adapted to communicate with an arm (not shown) that controls move-

ment of the falling latch 13 between an outwardly extended and inwardly withdrawn position. There is used in this regard a pressure rod 42 of appropriate length. The handle follower is caused to rotate by means of a handle (not shown) that has a square pin or peg inserted in a square opening 41 in the handle follower. The handle follower unit 40 includes an arrangement, which urges the pressure rod 42 to the left in the figure as the handle follower is rotated clockwise as seen in the figure. This causes the arm (not shown) to rotate and forcibly guide the falling latch to its inwardly withdrawn position (not shown). When the spring-loaded handle follower is caused to return to its starting position, the falling latch, which is also spring-loaded, returns to its outwardly extended position.

[0020] A first embodiment of an inventive motor unit adapted to be mounted in the inventive lock arrangement will now be described with reference to Figs. 2a-d. The motor unit, generally referenced 50, includes a box 51 that has an electric motor 52 disposed therein; see the perspective view of Fig. 2a. The box also houses a printed circuit board or card 53. The printed circuit board includes an electronic circuit arrangement 54 having control and drive electronics for the motor 52.

[0021] A gearwheel arrangement 55 which includes gearwheels driven by the motor 52 is adapted to move a connecting part 56 up and down in the lock housing. The connecting part 56 is provided with two pinholes and can thereby be connected to a co-acting part of the cylinder follower unit 30; see Fig. 2d. The holding bolt 14 can be manoeuvred in this way by means of the motor 52, which is a characteristic feature of a so-called motor lock.

[0022] An alternative placement of the connecting part is shown in dotted lines in Figs. 2a and 2c and is referenced 56'. This placement may be used, for instance, when the motor unit is used in lock arrangements that have a very small back set.

[0023] The motor unit shown in Figs. 2a-d includes a sensor 57 which functions as a door position sensor in a known manner. The sensor is placed on an outwardly projecting part or tongue 53a on the circuit board 53. As will be seen from Fig. 2c, this tongue includes a fracture indication 53b that enables the outward part 53a of said tongue to be separated from the remainder of the circuit board. The motor module 50 also includes a cable arrangement 58 adapted to connect the sensor 57 to the control electronics 54, as apparent from the perspective view of Fig. 2b. This is necessary, since that part on which the sensor 57 is arranged is removed from the remainder of the circuit board 53. Prior to fitting the motor module, the cable arrangement 58 is disposed in a cable depot in the unit and a required amount of cable is withdrawn from the depot when mounting the motor module. That part of the cable arrangement 58 placed in the depot is shown in broken lines in Fig. 2b.

[0024] Fig. 2c is a plan view of the motor unit prior to mounting said unit, while Fig. 2d is a plan view of the motor unit fitted in a lock housing.

[0025] Fig. 2e shows a mounting element 60 for mounting the sensor 57 in the upper sensor opening 11a in the lock post, as shown in Fig. 1. The mounting element is made of a plastic material and has a flat end surface 61 and a barrel surface 62 whose shape harmonises with the shape of the upper opening 11a in the lock-post 11; see Fig. 1. The mounting element also includes two barbed spring arms 63 which are adapted to retain the mounting element in the opening 11a subsequent to having inserted said element.

[0026] When mounting the sensor, the sensor-equipped part 53a is broken off from the remainder of the circuit board and the desired amount of cable is withdrawn from the cable depot. The sensor carrying part 53a is then inserted through the opening 11a in the lock post from the inside and then placed in the mounting element 60. This is then inserted into the opening 11a from the outside until the barbed arms 63 engage the inner surface of the lock post, therewith holding the mounting element in place. The mounting element can then only be released by actuation of the arms 63 from inside the lock housing.

[0027] In the mounted position of the mounting element 60, the sensor-provided part 53a is held in place in said element, and hence the sensor 57 obtains a predetermined position in the opening 11a. The motor unit 50 can thus be used with lock housings of different designs, since the sensor can be placed in a desired position in said housing. This provides a flexible solution with regard to positioning of the sensor, such as a door position sensor, as different applications may require different sensor placements. This advantage is afforded by the fact that part of the circuit board included in the motor unit can be removed.

[0028] The flexibility afforded partly by several drive positions for the part connecting follower units included in the lock and partly by a part of the electronic circuit board that can be broken off enables the arrangement of a separate motor unit in a modular motor lock. This motor unit affords savings in costs with regard to both storage and assembly. Moreover, a separate motor unit in which controlling and driving of the motor is arranged affords greater electrical and mechanical reliability; it is not necessary to spread out the various lock components, with the risk of cable breakages, poor soldering, mechanical mismatching, etc.

[0029] Placement of the sensor on one and the same circuit board, or card, as the remaining electronic elements facilitates manufacture, i.e. only one circuit board need be loaded. The sensor carrying part 53a of the circuit board is attached to the remainder of said board upon delivery, which affords rational handling and also reduces the risk of damage to the sensor. In assembly, the sensor carrying part is removed from the remainder of the circuit board and a desired length of cable is withdrawn from the depot. This cable storage also contributes towards the rational and safe handling of the motor unit.

[0030] A second embodiment of an inventive motor

unit will now be described with reference to Figs. 3a and 3b, which illustrate the motor unit in perspective and in plan respectively.

[0031] The motor unit illustrated in Figs. 3a and 3b is, to a large extent, similar to the motor unit described above with reference to Figs. 2a-d. Thus, the unit includes a box 151 in which there is arranged an electric motor 152. A circuit board 153 is mounted in the box. This circuit board includes an electronic circuit arrangement 154 comprising motor control and motor drive electronics.

[0032] A gearwheel arrangement 155 includes gearwheels, which are driven by the motor 152 and arranged in the same way as in the aforescribed embodiment.

[0033] The circuit board 153 includes an outwardly protruding part 153a having parallel-coupled magnet sensors 157, 157' coupled to the circuit arrangement 154 disposed on the circuit board. The magnet sensor situated nearest the post 11, i.e. the sensor situated at the tip of the part 153a, functions as a door position sensor in a known manner and is designed to fit into the lower opening 111a in the lock post 11 shown in Fig. 1. In order to enable the motor unit 150 to be used in lock housings that have different back sets, the outwardly protruding part 153a of the circuit board is provided with a number of fracture indications, of which one 153b has been shown in broken lines in Figs. 3a and 3b. The fracture indications are adapted to different standard back-set measurements and the motor unit is adapted to the back set concerned by simply breaking off the circuit board at an appropriate fracture indication. Because the circuit board is provided with several magnet sensors 157, 157' - one at each fracture indication - a functioning magnet sensor will always be present at the tip of the circuit board part 153a.

[0034] Because the sensor is placed on the same circuit board as the remaining electronic elements, similar to the first embodiment, the advantages afforded by said first embodiment are also obtained with the second embodiment.

[0035] Although the invention has been described with reference to preferred embodiments of an inventive lock arrangement and the motor unit included therein, the person skilled in this particular field will understand that these embodiments can be varied within the scope of the accompanying Claims. For instance, mounting of the sensor shown in Fig. 2f can be effected in a way other than with the aid of the illustrated mounting element. For example, the sensor part 53a (and 153a) can be attached in a desired position with the aid of glue or some other adhesive, for example. Alternatively, the sensor may be placed on the circuit board 53a in a manner which enables the sensor, similar to the second embodiment, also to be used without removing the sensor carrying part 53a from the remainder of the circuit board.

Claims

1. A motor unit (50,150) which is intended to be mounted in a lock arrangement, wherein the motor unit (50; 150) comprises

- an electric motor (52; 152);
- a printed circuit board (53; 153) that includes an electronic circuit arrangement (54; 154) for controlling said motor (50, 150);
- a sensor (57; 157) mounted on said printed circuit board (53, 153) and connected electrically to said electronic circuit arrangement (54,154);
- a mechanical follower coupling (55, 56, 57'; 155, 156); and
- a housing (51; 151) which houses said motor (50,150), said printed circuit board (53,153), said sensor (57,157) and said mechanical follower coupling (55, 56, 57' 155, 156);

characterised in that

- said motor unit (50,150) constitutes a separate unit, wherein said mechanical follower coupling (55, 56, 57' 155, 156) has at least two alternative placements,
- wherein said mechanical follower coupling (55, 56, 57', 155, 156) includes a gearwheel arrangement (55) driven by said motor (52), and a connecting part (56) for connection with a follower unit (30) and coupled to the gearwheel arrangement (55), and
- wherein said connecting part (56) can be coupled to the gearwheel arrangement at two alternative locations (56, 56').

2. The motor unit according to Claim 1, comprising a cable arrangement (58) which connects said electronic circuit arrangement (54) and said sensor (57), wherein the sensor (57) is mounted on a part (53a) of the printed circuit board (53) that is intended to be removed from the remainder of said board.

3. The motor unit according to Claim 2, in which said cable arrangement (58) is accommodated in a depot in said motor unit (50) prior to fitting said unit.

4. The motor unit according to Claim 1, comprising:

- a further sensor (157') which is mounted on said printed circuit board (153) and parallel-coupled electrically to said sensor (157) and adapted for mounting said motor unit (150) to a second back set that exceeds a first back set;
- wherein said circuit board (153) is adapted for removal of a part (153a) that includes said further sensor (157') when adapting to said first

back set.

5. The motor unit according to any one of Claims 2-4, in which said printed circuit board (53) is provided with a fracture indication for removal of a part (53a; 153a) of said circuit board (53) on which a sensor (57; 157) is arranged.

6. The motor unit according to Claim 5 as dependent on Claim 4, wherein said fracture indication is adapted to a standard back-set measurement.

7. The motor unit according to any one of Claims 2 and 3, comprising a mounting element (60) which is adapted to fasten said part (53a) of said printed circuit board (53) that is intended to be removed from the remainder of said printed circuit board (53) in an opening (11a) in a lock post (11).

8. The motor unit according to any one of Claims 1-7, in which said sensor (57; 157, 157') is a magnetic sensor.

9. A lock arrangement that includes a motor unit (50, 150) according to Claims 1-8.

Patentansprüche

1. Motoreinheit (50; 150), welche dazu vorgesehen ist, in eine Schlossanordnung eingebaut zu werden, wobei die Motoreinheit (50; 150) beinhaltet

- einen elektrischen Motor (52; 152);
- eine gedruckte Schaltungsplatte (53; 153), welche eine elektronische Schaltkreisordnung (54; 154) zum Steuern des Motors (50; 150) beinhaltet;
- einen Sensor (57; 157), der auf der gedruckten Schaltungsplatte (53; 153) montiert ist und elektrisch mit der elektronischen Schaltkreisordnung (54; 154) verbunden ist,
- ein mechanisches Mitlaufkoppellement (55, 56, 57'; 155, 156); und
- ein Gehäuse (51; 151), welches den Motor (50; 150), die gedruckte Schaltungsplatte (53; 153), den Sensor (57; 157) und das mechanische Mitlaufkoppellement (55; 56, 57'; 155, 156) aufnimmt;

dadurch gekennzeichnet, dass

- die Motoreinheit (50, 150) aus einer separaten Einheit besteht, wobei das mechanische Mitlaufkoppellement (55, 56, 57'; 155, 156) wenigstens zwei alternative Einstellungen hat,
- wobei das mechanische Mitlaufkoppellement (55, 56, 57'; 155, 156) eine Getrieberadanord-

- nung (55) einschließt, die von dem Motor (52) angetrieben ist, und ein Verbindungsteil (56) zur Verbindung mit einer Mitlaufeinheit (30) und wobei das Verbindungsteil an die Getriebeanordnung (55) gekoppelt ist, und
- wobei das Verbindungsteil (56) an die Getriebeanordnung an zwei alternative Einbaustellen (56, 56') gekoppelt werden kann.
2. Motoreinheit nach Anspruch 1, enthaltend eine Kabelanordnung (58), welche die elektronische Schaltungsanordnung (54) und den Sensor (57) verbindet, wobei der Sensor (57) auf einem Teil (53a) auf der gedruckten Schaltungsplatte (53) montiert ist, wobei es vorgesehen ist, dass es vom restlichen Teil der Schaltungsplatte gelöst werden kann. 10
3. Motoreinheit nach Anspruch 2, in welcher die Kabelanordnung (58) in einem Depot in der Motoreinheit (50) aufgenommen wird, bevor sie an der Einheit befestigt wird. 15
4. Motoreinheit nach Anspruch 1, aufweisend:
- einen weiteren Sensor (157'), welcher auf der gedruckten Schaltungsplatte (153) montiert ist und elektrisch parallel zu dem Sensor (157) geschaltet ist und zum Befestigen an der Motoreinheit (150) zu einem zweiten hinteren Geräteteil angepasst ist, das ein erstes hinteres Geräteteil überragt; 25
- wobei die Schaltungsplatte (153) für das Entfernen eines Teils (153a) ausgelegt ist, welches den weiteren Sensor (157') beinhaltet, wenn eine Anpassung zum ersten hinteren Geräteteil erfolgt. 30
5. Motoreinheit nach irgendeinem der Ansprüche 2 bis 4, in welcher die gedruckte Schaltungsplatte (53) mit einer Bruchanzeige für die Entfernung eines Teils (53a; 153a) der gedruckten Schaltungsplatte (53) ausgerüstet ist, auf welcher ein Sensor (57; 157) angeordnet ist. 35
6. Motoreinheit nach Anspruch 5 soweit abhängig von Anspruch 4, wobei die Bruchanzeige für eine Standard-Messung für ein hinteres Geräteteil angepasst ist. 40
7. Motoreinheit nach irgend einem der Ansprüche 2 und 3, beinhaltend ein Befestigungselement (60), welches angepasst ist, das Teil (53a) auf der gedruckten Schaltungsplatte (53) zu befestigen, für welches beabsichtigt ist von dem übrigen Teil der gedruckten Schaltungsplatte (53) in einer Öffnung (11a) in einer Befestigungssäule (11) entfernt zu werden. 45

8. Motoreinheit nach irgendeinem der Ansprüche 1 bis 7, in welcher der Sensor (57; 157; 157') ein magnetischer Sensor ist.
- 5 9. Schlossanordnung, die eine Motoreinheit (50; 150) nach den Ansprüchen 1 bis 8 beinhaltet.

Revendications

1. Bloc moteur (50 ; 150) qui est destiné à être monté dans un dispositif de verrou, où le bloc moteur (50 ; 150) comprend:
- un moteur électrique (52 ; 152) ;
 - une carte à circuits imprimés (53 ; 153) qui comprend un agencement de circuits électroniques (54 ; 154) pour commander ledit moteur (50 ; 150) ;
 - un capteur (57 ; 157) monté sur ladite carte à circuits imprimés (53 ; 153) et connecté électriquement audit agencement de circuits électroniques (54 ; 154) ;
 - un accouplement de fouillot mécanique (55, 56, 57' ; 155, 156) ; et
 - un boîtier (51 ; 151) qui loge ledit moteur (50 ; 150), ladite carte à circuits imprimés (53 ; 153), ledit capteur (57 ; 157) et ledit accouplement de fouillot mécanique (55, 56, 57' ; 155, 156) ;

caractérisé en ce que

- ledit bloc moteur (50 ; 150) est un bloc distinct, dans lequel ledit accouplement de fouillot mécanique (55, 56, 57' ; 155, 156) a au moins deux emplacements possibles,
 - dans lequel ledit accouplement de fouillot mécanique (55, 56, 57' ; 155, 156) comprend un agencement de roues dentées (55) entraîné par ledit moteur (52), et une partie de liaison (56) destinée à être reliée à un bloc fouillot (30) et accouplée à l'agencement de roues dentées (55), et
 - dans lequel ladite partie de liaison (56) peut être accouplée à l'agencement de roues dentées en deux endroits possibles (56, 56').
2. Bloc moteur selon la revendication 1, comprenant un agencement de câble (58) qui relie ledit agencement de circuits électroniques (54) et ledit capteur (57), dans lequel ledit capteur (57) est monté sur une partie (53a) de la carte à circuits imprimés (53) qui est destinée à être retirée du reste de ladite carte.
3. Bloc moteur selon la revendication 2, dans lequel ledit agencement de câble (58) est logé dans un espace à l'intérieur dudit bloc moteur (50) avant le montage dudit bloc.

4. Bloc moteur selon la revendication 1, comprenant :

- un autre capteur (157') monté sur ladite carte à circuits imprimés (153), couplé électriquement en parallèle audit capteur (157), et conçu pour le montage dudit bloc moteur (150) à une deuxième distance fouillot-tête qui est supérieure à une première distance fouillot-tête ;
- dans lequel ladite carte à circuits (153) est conçue pour permettre le retrait d'une partie (153a) qui contient ledit autre capteur (157') lors de l'adaptation à ladite première distance fouillot-tête.

5

10

5. Bloc moteur selon l'une quelconque des revendications 2 à 4, dans lequel ladite carte à circuits imprimés (53) est pourvue d'une indication de fracture pour le retrait d'une partie (53a ; 153a) de ladite carte à circuits (53) sur laquelle est disposé un capteur (57 ; 157).

15

20

6. Bloc moteur selon la revendication 5, quand il dépend de la revendication 4, dans lequel ladite indication de fracture est prévue pour une distance fouillot-tête standard.

25

7. Bloc moteur selon l'une quelconque des revendications 2 et 3, comprenant un élément de montage (60) qui est conçu pour fixer, dans une ouverture (11a) formée dans une tête (11), ladite partie (53a) de ladite carte à circuits imprimés (53) qui est destinée à être retirée du reste de ladite carte à circuits imprimés (53).

30

8. Bloc moteur selon l'une quelconque des revendications 1 à 7, dans lequel ledit capteur (57 ; 157, 157') est un capteur magnétique.

35

9. Dispositif de verrou qui comprend un bloc moteur (50, 150) selon les revendications 1 à 8.

40

45

50

55

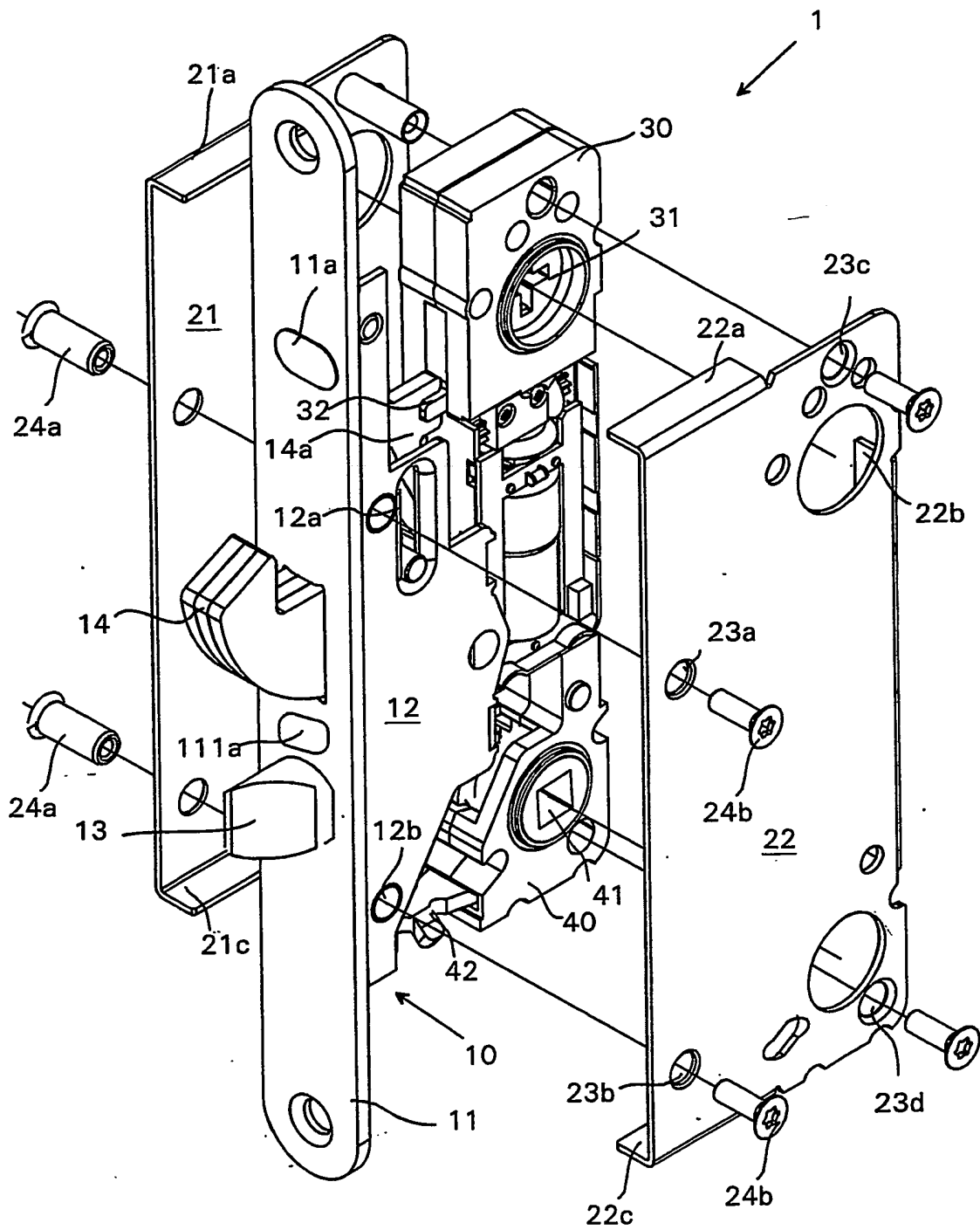


Fig. 1

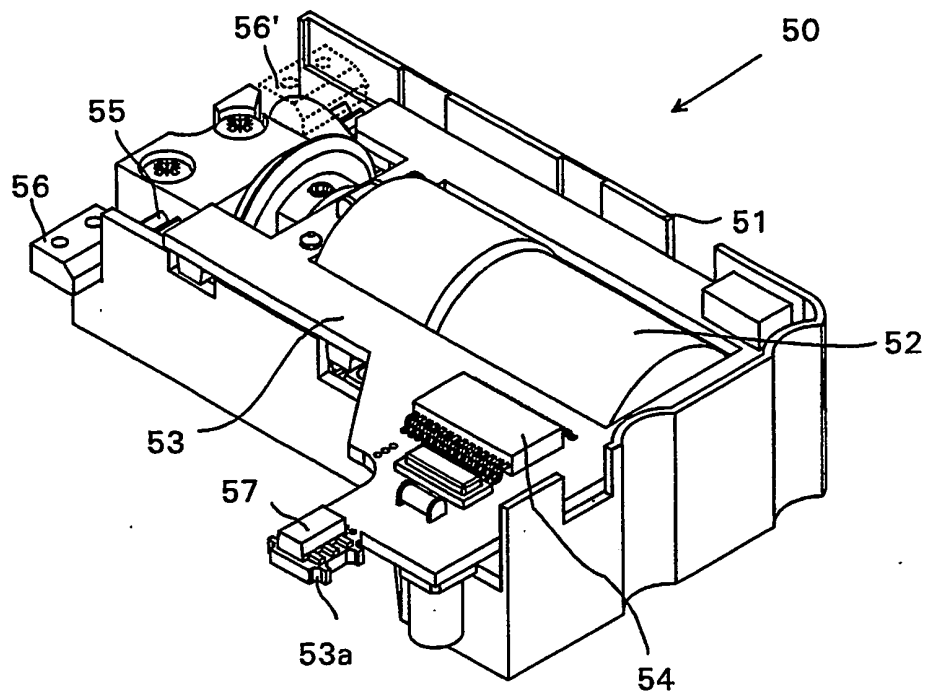


Fig. 2a

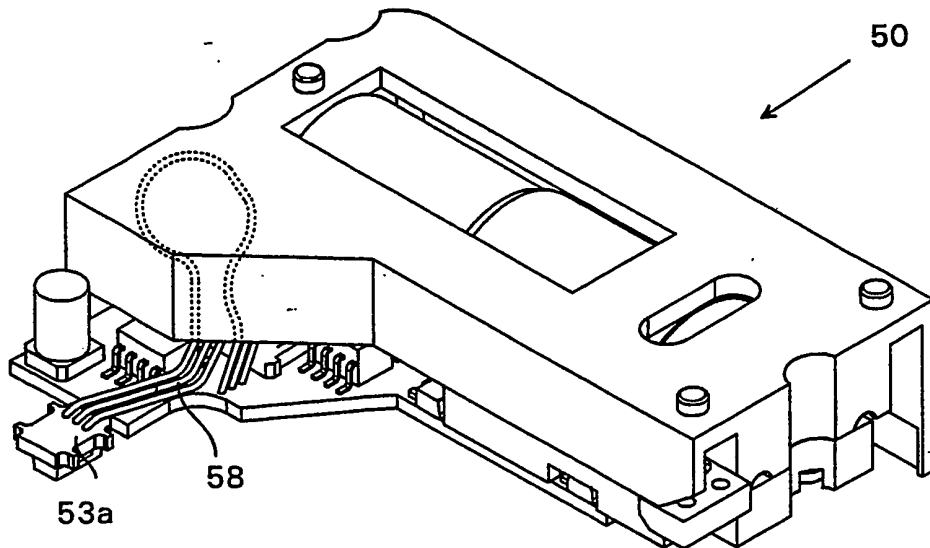


Fig. 2b

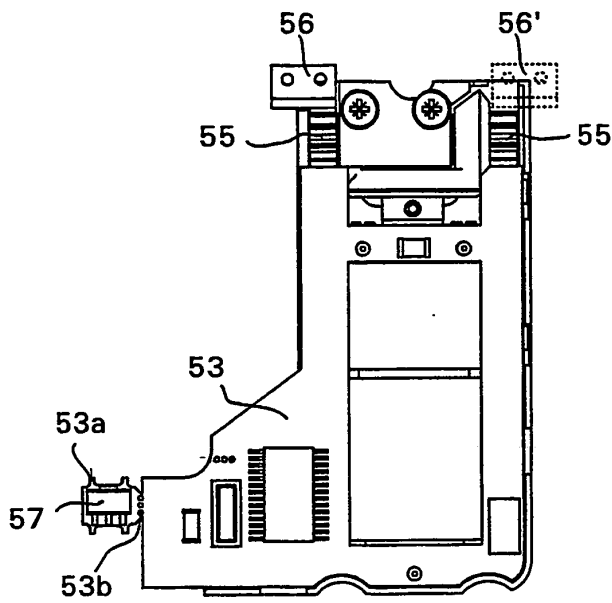


Fig. 2c

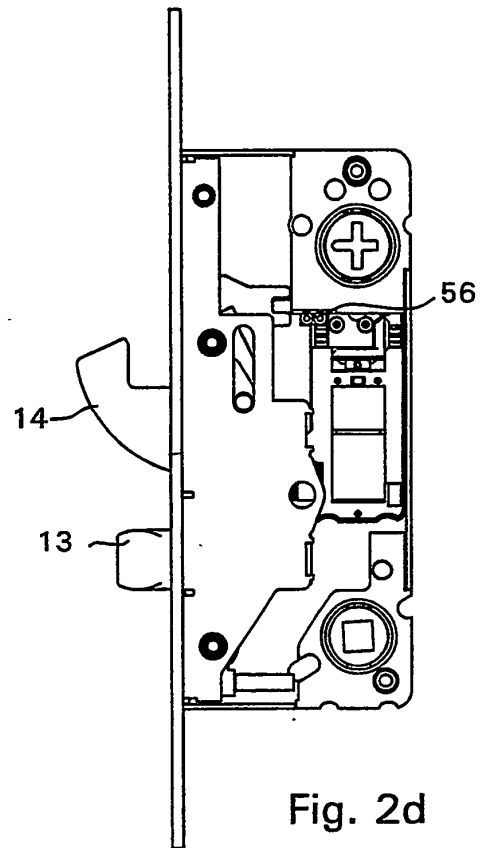


Fig. 2d

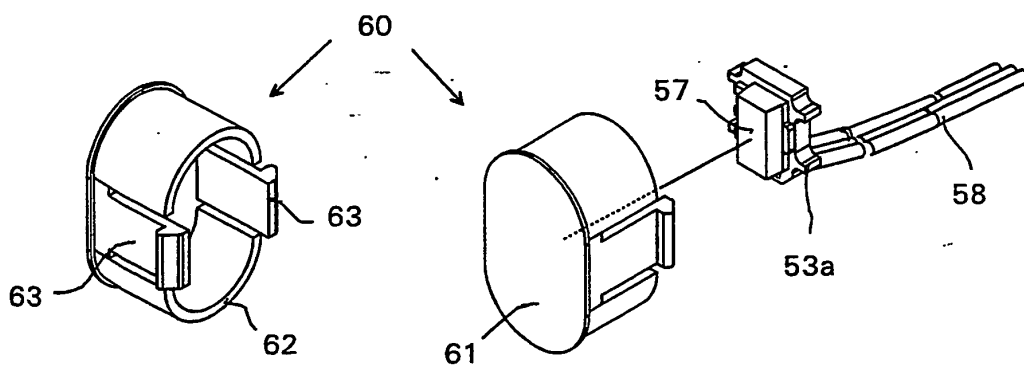


Fig. 2e

Fig. 2f

Fig. 3a

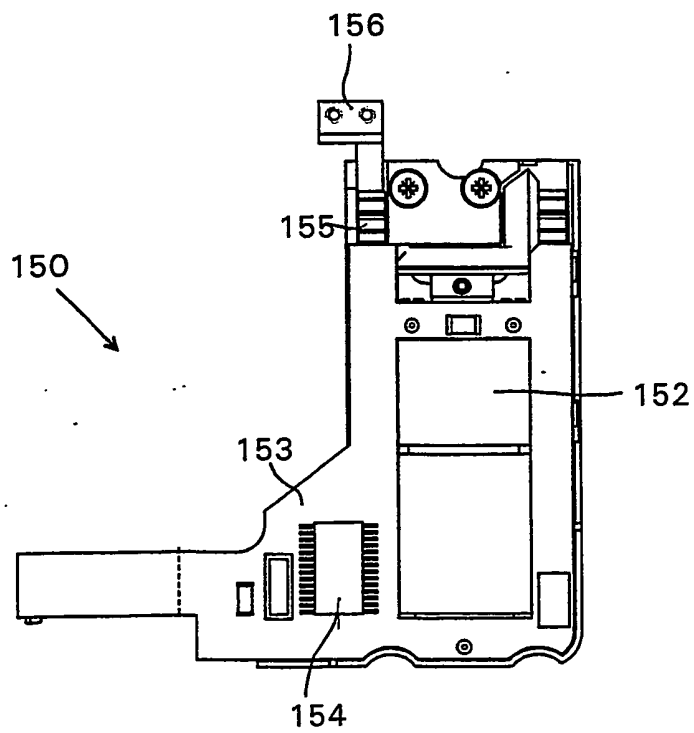
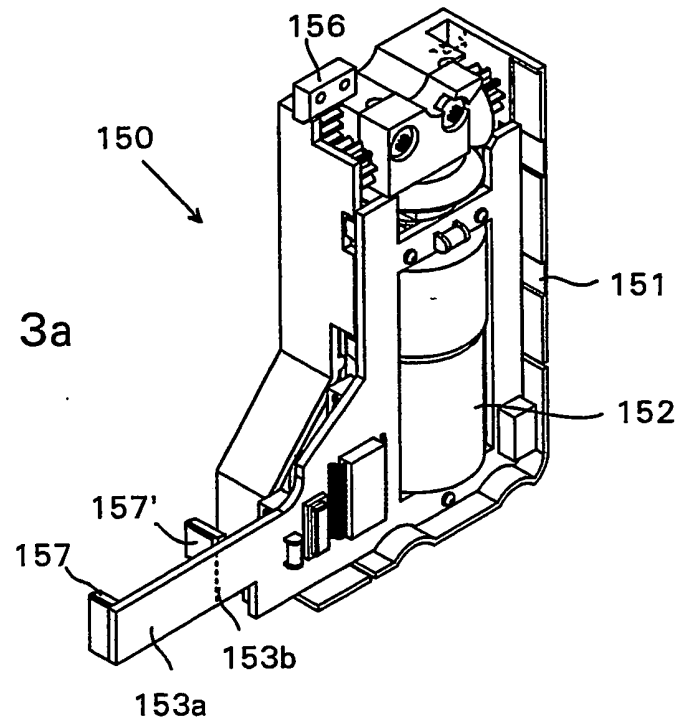


Fig. 3b

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

- SE 76014299 [0002]