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(54) **A DEVICE FOR MECHANICAL GUIDING, A LOCK MODULE AND A LOCK DEVICE COMPRISING SUCH A DEVICE**

VORRICHTUNG ZUR MECHANISCHEN FÜHRUNG, VERRIEGELUNGSMODUL UND SOLCH EINE VORRICHTUNG UMFASSENDE VERRIEGELUNGSVORRICHTUNG

DISPOSITIF DE GUIDAGE MECANIQUE, MODULE DE VERROUILLAGE ET DISPOSITIF DE VERROUILLAGE COMPRENANT UN TEL DISPOSITIF

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Description

Technical Field

[0001] The present invention relates generally to lock arrangements and more particularly to a device for guiding mechanically components of a lock arrangement. The invention also relates to a lock module and to a lock arrangement that includes such a component guiding device.

Background of the invention

[0002] Known to the art are lock arrangements of the type with which it is desired to manoeuvre lock components mechanically by means of an electrically actuable manoeuvring element, such as an electric motor or a solenoid. A so-called electric lever handle lock is an example of such an arrangement, with which it is possible to engage and disengage a lever handle function on one or both sides of a door fitted with such an arrangement, see for example EP 0 315 056 A1.

[0003] Known lock arrangements of this type have been found to be encumbered with several drawbacks. One problem is that the electrical manoeuvring facility of such locks requires the provision of space demanding components. Another problem with such lock arrangements is that it is preferred to include only one electrically actuable manoeuvring device for economic and space reasons. In those instances when it is desired to guide several components, such as engagement and disengagement components of an electrical lever handle lock that comprises a follower unit having a divided spindle, it has either been necessary to use several manoeuvring devices or to include highly complicated mechanical arrangements for guiding several lock components with a single motor or solenoid. A further drawback with known solutions is that the use of a solenoid as a manoeuvring device requires the presence of an electricity supply source, resulting in a relatively high current consumption. In turn, this has made the supply of electricity from a supply source located internally in the door, such as a battery, difficult or even impossible to achieve.

[0004] The international patent publications WO02/059440 and WO02/059441 describe a lock arrangement adapted for engagement and disengagement by a thumb turn function. The hub of the lock arrangement includes an outer part which is connected to a spindle and a centrally positioned follower. The arrangement includes means for connecting the outer part of the hub and the follower. This connecting means is mounted rotatably about an axis which is parallel with the centre axis of the hub and can be moved between an engagement position and a disengagement position by means of an electrically powered solenoid. This enables selective coupling of the spindle function. The illustrated lock arrangement, however, is both energy and space consuming and is not suitable for modular construction of the lock arrangement.

SUMMARY OF THE INVENTION

[0005] An object of the present invention is to provide a device for mechanically guiding lock components which is more flexible and less space consuming than present day solutions.

[0006] The invention is based on the insight that a compact and, at the same, a flexible component guiding facility can be achieved with the use of one or more pivotal arms whose rotation is controlled by means of a linearly movable engagement element that engages in grooves provided in the arms.

[0007] According to a first aspect of the invention, a device for mechanically guiding lock components is provided according to claim 1.

[0008] According to a second aspect of the invention there is provided a lock module which includes such a component guiding device.

[0009] According to a third aspect of the invention there is provided a lock arrangement which includes such a component guiding device.

[0010] The guiding device, the lock arrangement and the lock module according to the present invention avoid, or at least reduce, the above drawbacks associated with known techniques.

[0011] The inventive component guiding device enables a compact construction to be achieved with only a few parts and also enables the achievement of a modular construction. Because linear movement of the first engagement means is converted to rotary movement of an arm as a result of the design of the second engagement means there can be obtained a highly flexible construction with which an exchange of one arm for another arm that has a different groove configuration provides a new function.

[0012] In one preferred embodiment of the invention, the component guiding device includes two grooved arms which enable independent guiding of two components with the aid of one single manoeuvring element.

[0013] Further preferred embodiments are defined in the appendent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The invention will now be described in more detail by way of example with reference to the accompanying drawings, in which

Fig. 1 is an exploded view of a lock device according to the present invention;

Fig. 2 is a diagrammatic view of an inventive lock module that includes a device for mechanically guiding a lock component in accordance with the invention;

Fig. 3 is a diagrammatic exploded view of the lock module shown in figure 2;

Fig. 4 illustrates diagrammatically the mechanical guiding device shown in figures 2 and 3;

Fig. 5 is a diagrammatic exploded view of the device shown in figure 4; and

Fig. 6a-c are plan views of the device shown in figures 4 and 5 in different operational positions.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0015] There will now be described, initially with reference to figure 1, a preferred embodiment of a lock arrangement that includes a device for mechanically guiding a lock component.

[0016] Figure 1 is a general overview of a lock device generally referenced 1. The lock device includes a forend 2 that has a lock mechanism mounted thereon. The lock mechanism includes conventional components, such as a latch bolt 3, a hook bolt, a cylinder follower, etc.. The lock mechanism is protected by a box (not shown) and a cover plate 4.

[0017] The lock mechanism also includes a lock module in the form of a lever handle follower unit 10. This unit is intended to communicate with an arm that guides movement of the latch bolt 3 between an extended and a retracted position. The lever handle follower unit, which is shown in more detail in figures 2 and 3, includes a lever handle follower hub 30 which is caused to rotate by means of a lever handle (not shown) that has a square peg inserted in a square opening in the hub. The unit 10 includes a mechanical guiding device, generally referenced 20, which guides or controls the function of the hub 30. The hub 30 is mounted between an upper box 31 and a lower box 32 which together with the component guiding device form a module that functions as an independent part in the lock arrangement 1.

[0018] The component guiding device 20 will now be described in detail with reference also to figures 3, 4, 5a and 5b. The device includes an electric motor 21 which is powered by an electric energy source (not shown). This power source may be a battery connected to the lock arrangement or may be an externally located source. The motor includes a threaded output shaft 22 that has screwed thereon a drive nut 23 which includes a through-passing internally threaded hole. The drive nut is caused to move linearly between an inner and an outer end position along the shaft 22 as the motor rotates. As will be seen particularly from figure 5b, the drive nut 23 also includes a T-shaped stud carrying element 24 that includes a first stud 24a and a second stud 24b, the modus operandi of which will be explained hereinafter.

[0019] The component guiding device also includes a respective upper and lower arm 25 and 26 which are mounted for rotation on a shaft A. The arms 25, 26 are disposed so that when rotated they influence the direction of a respective wing 33, 34 on the hub 30 for selective engagement and disengagement of its lever handle function. To this end, the upper arm 25 includes a two-part groove 27, wherein a first part 27a situated nearest the motor 21 extends parallel with the shaft 22 in the position shown in figure 4, and the second part 27b of which extends out of parallel with the shaft 22.

[0020] A first peg or pin 24a on the T-shaped peg carrying part 24 engages the groove in the upper arm whereas a second peg or pin 24b of said peg carrying part engages correspondingly in the groove 28 of the lower arm. As a result, when the drive nut 23 moves linearly along the shaft 22, and therewith also the pegs 24a, 24b, one of the arms 25, 26 is caused to rotate when the engagement part runs in that part of the groove which is non-parallel with the shaft. This will be described in detail hereinafter, with reference to figures 6a-c.

[0021] Figure 6a shows the mechanical guiding device in a starting position. The drive nut 23 is here located in an inner end position, i.e. a position nearest or primal to the motor 21. The first peg 24a is located in a first end position in the groove 27, i.e. at the end of the first part 27a of the groove. As the shaft rotates and therewith causes the drive nut to move in the arrowed direction from the inner end position, the first peg will move in the first groove part 27a. Because this part of the groove extends parallel with the shaft 22, i.e. with the movement axis of the drive nut, the first arm 25 will not rotate whilst the first peg is located in the first part of the groove.

[0022] On the other hand, the lower arm 26 is caused to rotate anticlockwise, as will be seen from figure 6b. This is because the first part 28a of the groove 28 in the lower arm is non-parallel with movement axis of the drive nut and because the second peg 24b causes the lower arm to move anticlockwise from the nut position in figure 6a to the nut position in figure 6b. In the position shown in figure 6b, the lower arm has been rotated so that the second part 28b of the groove 28, i.e. the part located at a distance from the motor 21, extends generally parallel with the movement axis of the drive nut. In this position, the lower arm exerts pressure on the lower wing 32 of the hub 30, resulting in engagement of the lever handle function with respect to one side of the hub.

[0023] Thus, further movement of the drive nut from the position shown in figure 6b to the position shown in figure 6c will not result in further rotation of lower arm 26. On the other hand, this movement of the drive nut will cause the upper arm to rotate anticlockwise. This is because the first peg runs in the non-parallel second part 27b of the groove 27, i.e. in that part of the groove distanced from the motor 21. Subsequent to the movement of the drive nut to its outer end position, shown in figure 6c, the upper arm will have been caused to rotate so that this arm also exerts pressure on its respect wing 33 of the hub 30, i.e. on the upper wing. With both wings 33, 34 pressed inwardly, the lever handle function is engaged on both sides of the hub.

[0024] The above lock component mechanical guiding device affords several advantages over known techniques. Because the drive nut is moved by rotation of the shaft 22, it is possible to achieve precise movement of the nut, where this movement will be more precise the lower the pitch of the shaft threads. Another advantage afforded by the use of a threaded motor output shaft is that the position of the drive nut can be kept generally constant as a result of friction and the thread drive, even when the motor is not powered. This results in lower energy consumption, by virtue of the fact that the supply of power to the motor can be disconnected when the drive nut is not moved.

[0025] Another benefit afforded by the described device is that several arms can be guided with the use of only one single drive nut. This results in a simple and inexpensive construction.

[0026] In the case of the preferred embodiment of the invention, the mechanical component guiding device includes two grooved arms. It will be understood, however, that the device may included solely one arm or more than two arms.

[0027] Each groove includes two parts that extend in mutually different directions. It will be understood that the grooves can be appropriately configured to provide the desired guiding function, provided that at least part of each groove is non-parallel with the movement axis of the drive nut.

[0028] In the case of the illustrated embodiment, the arms are intended to influence the function of a lever handle follower. As will be understood, a mechanical component guiding device according to the invention can also be used to guide or control other functions in a lock arrangement, such as a latch mechanism, etc.

[0029] There has been described above a device with which a peg-carrying drive nut engages with grooves in rotatable arms. It will be understood, however, that the device can be constructed with a reverse function without deviating from the concept of the invention, as expressed in the accompanying claims. For example, a device is conceivable in which a linearly movable drive nut is provided with grooves in which pegs on peg-carrying rotatable arms engage.

[0030] Although the invention has been described with reference to an electric motor having a threaded output shaft as the electrically actuable manoeuvring element that also includes the drive nut, it will be understood that the motor and the drive nut can be replaced with a solenoid provided with an engagement element.

Claims

1. A device for mechanically guiding lock components, wherein the guiding device includes

- an electrically actuable manoeuvring device (21),
- a first engagement element (23,24) connected mechanically to the manoeuvring device for linear movement along a movement axis between a first and a second end position,
- a first arm (25) rotatably mounted on a pivot shaft (A),

wherein the first arm includes a second engagement element (27) that is in mechanical engagement with the first engagement element, and wherein the guiding device is **characterized in that**

- either of the first and second engagement elements (23,24,and 27) includes a groove (27), which has a first part (27a) which extends parallel with the movement axis of the first engagement element, and a second part (27b) which extends non-parallel with the movement axis of the first engagement element..

2. A device according to claim 1, wherein the electrically actuable manoeuvring device (21) includes an electric motor that has a threaded output shaft (22), and wherein the first engagement element (23,24) includes an internally threaded hole by means of which the engagement element is screwed onto threaded output shaft.

3. A device according to claim 1 or 2, wherein the first engagement element includes a peg-carrying element (24a) and wherein the second engagement includes a groove (27).

4. A device according to any one of claims 1-3, wherein the device includes a second arm (26) which is rotatably mounted on the shaft (A), and wherein the second arm includes a third engagement element (28) which is in mechanical engagement with the first engagement element (23,24).

5. A device according to claim 4, wherein the first engagement element (23,24) includes a peg-carrying element (24) that includes a first peg (24a) in engagement with a groove (27) in the first arm (25) and a second peg (24b) in engagement with a groove (28) in the second arm (26).

6. A lock module (10) comprising a guiding device according to any one of claims 1-5.

7. A lock module according to claim 6, comprising a follower unit (30), preferably a lever handle follower unit, with which the first arm (25) is brought into engagement for selective guidance of the function of the follower unit.

8. A lock device that includes a mechanical guiding device according to any one of claims 1-5.

Patentansprüche

1. Vorrichtungzum mechanischen Führen von Schliesskomponenten, worin eine Führungsvorrichtung beinhaltet

   - eine elektrisch bedienbare Betätigungsvorrichtung (21),
   - ein erstes Eingreifelement (23, 24), welches mechanisch mit der Betätigungsvorrichtung zur linearen Verschiebung entlang einer Verschiebungsachse zwischen einer ersten und zweiten Endposition verbunden ist,
   - einen ersten Arm (25), welcher drehbar auf einem Schwenkschaft (A) befestigt ist,

   wobei der erste Arm ein zweites Eingreifelement (27) umfasst, welches mechanisch mit dem ersten Eingreifelement eingreift, und wobei die Führungsvorrichtung
   dadurch gekennzeichnet ist, dass

   - eines der ersten und zweiten Eingreifelemente (23, 24 und 27) eine Nut (27) umfasst, welche einen ersten Teil (27a) aufweist, welcher sich parallel zur Verschiebungsachse des ersten Eingreifelements erstreckt, und einen zweiten Teil (27b), welcher sich nicht parallel zu der Verschiebungsachse des ersten Eingreifelements erstreckt.

2. Eine Vorrichtung nach Anspruch 1, wobei die elektrisch bedienbare Betätigungsvorrichtung (21) einen elektrischen Motor umfasst, welcher einen Ausgabeschaft (22) mit Gewinde aufweist, und wobei das erste Eingreifelement (23, 24) ein Loch mit innerem Gewinde umfasst, durch welches das Eingreifelement auf den Ausgabeschaft mit Gewinde gedreht wird.

3. Eine Vorrichtung nach Anspruch 1 oder 2, wobei das erste Eingreifelement ein Stift-tragendes Element (24a) umfasst, wobei das zweite Eingreifelement eine Nut (27) umfasst.

4. Vorrichtung nach einem der Ansprüche 1 bis 3, wobei die Vorrichtung einen zweiten Arm (26) umfasst, welcher drehbar auf dem Schaft (A) befestigt ist und wobei der zweite Arm ein drittes Eingreifelement (28) umfasst, welches mechanisch mit dem ersten Eingreifelement (23, 24) eingreift.

5. Vorrichtung nach Anspruch 4, wobei das erste Eingreifelement (23, 24) ein Stift-tragendes Element (24) umfasst, welches einen ersten Stift (24a) im Eingriff mit einer Nut (27) in dem ersten Arm (25), einen zweiten Stift (24b) in Eingriff mit einer Nut (28) in dem zweiten Arm (26) umfasst.

6. Schließmodul (10), welches eine Führungsvorrichtung nach einem der Ansprüche 1 bis 5 umfasst.

7. Schließmodul nach Anspruch 6, welches eine Mitnehmereinheit (30), vorzugsweise eine Griffmitnehmereinheit, umfasst, mit welcher der erste Arm (25) in Eingriff zum selektiven Führen der Funktion der Mitnehmereinheit gebracht wird.

8. Schließvorrichtung, welche eine mechanische Führungsvorrichtung nach einem der Ansprüche 1 bis 5 umfasst.

Revendications

1. Dispositif pour des composants de guidage mécanique d'une serrure, dans lequel le dispositif de guidage inclut

   - un dispositif manoeuvrant (21) électriquement actionnable,
   - un premier élément embrayant (23, 24) et mécaniquement connecté au dispositif manoeuvrant, pour mouvement linéaire le long d'une axe de mouvement entre une première et une deuxième position finale,
   - un premier bras (25), fixé rotativement sur un arbre de rotation (A),

   dans lequel le premier bras inclut un deuxième élément embrayant (27) qui est mécaniquement embrayé avec le premier élément embrayant et dans lequel le dispositif de guidage
   est caractérisé par le fait que

   - et le premier et le deuxième élément embrayant (23, 24 et 27) incluent une rainure (27) qui a une première partie (27a) qui s'étend parallèlement avec l'axe de mouvement du premier élément embrayant et qui a une deuxième partie (27b), qui s'étend non-parallèlement avec l'axe de mouvement d'un premier élément embrayant.

2. Dispositif selon la revendication 1, dans lequel le dispositif manoeuvrant (21) électriquement actionnable inclut un moteur électrique qui a un arbre de sortie fileté (22) et dans lequel le premier élément embrayant (23, 24) inclut un trou internement fileté, par lequel l'élément embrayant est vissé sur l'arbre de sortie fileté.

3. Dispositif selon la revendication 1 ou 2, dans lequel le premier élément embrayant inclut un élément qui porte une goupille (24a) et dans lequel le deuxième élément embrayant inclut une rainure (27).

4. Dispositif selon une des revendications 1 à 3, dans lequel le dispositif inclut un deuxième bras 26 qui est fixé rotativement sur l'arbre (A) et dans lequel le deuxième bras inclut un troisième élément embrayant (28), qui embraye mécaniquement avec le premier élément embrayant (23, 24).

5. Dispositif selon la revendication 4, dans lequel le premier élément embrayant (23, 24) inclut un élément qui porte une goupille (24), qui inclut une première goupille (24a) qui embraye avec la rainure (27) dans le premier bras (25) et une deuxième goupille (24b), qui embraye avec une rainure (28) dans le deuxième bras (26).

6. Module de serrure (10), qui comprend un dispositif de guidage selon une des revendications 1 à 5.

7. Module de serrure selon la revendication 6, qui comprend une unité entraînante (30), préférablement une unité entraînante de poignée, avec laquelle le premier bras (25) est amené dans une position embrayante pour un guidage sélectif de la fonction de l'unité entraînante.

8. Dispositif de serrure qui inclut un dispositif de guidage mécanique selon une des revendications 1 à 5.

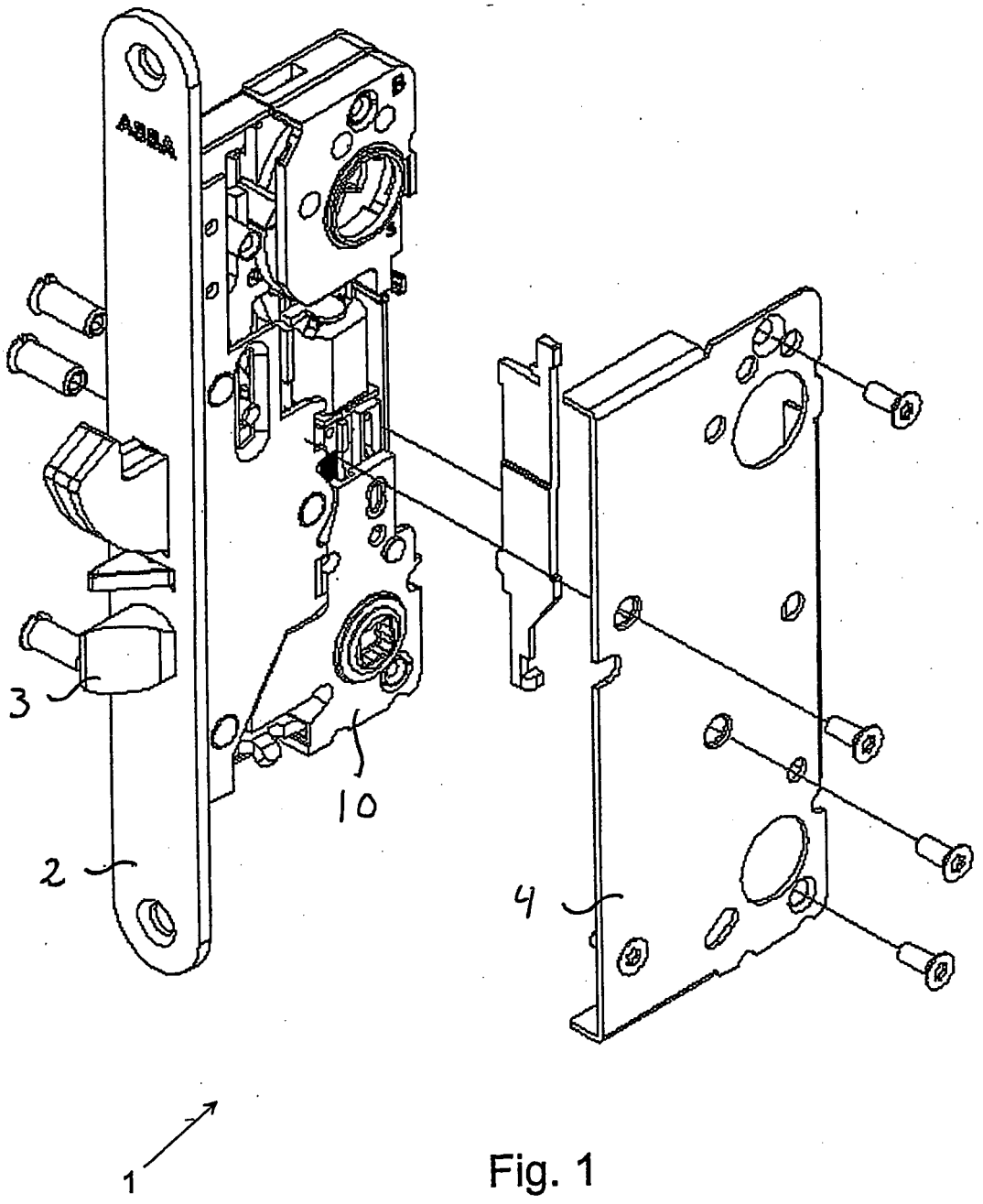


Fig. 1

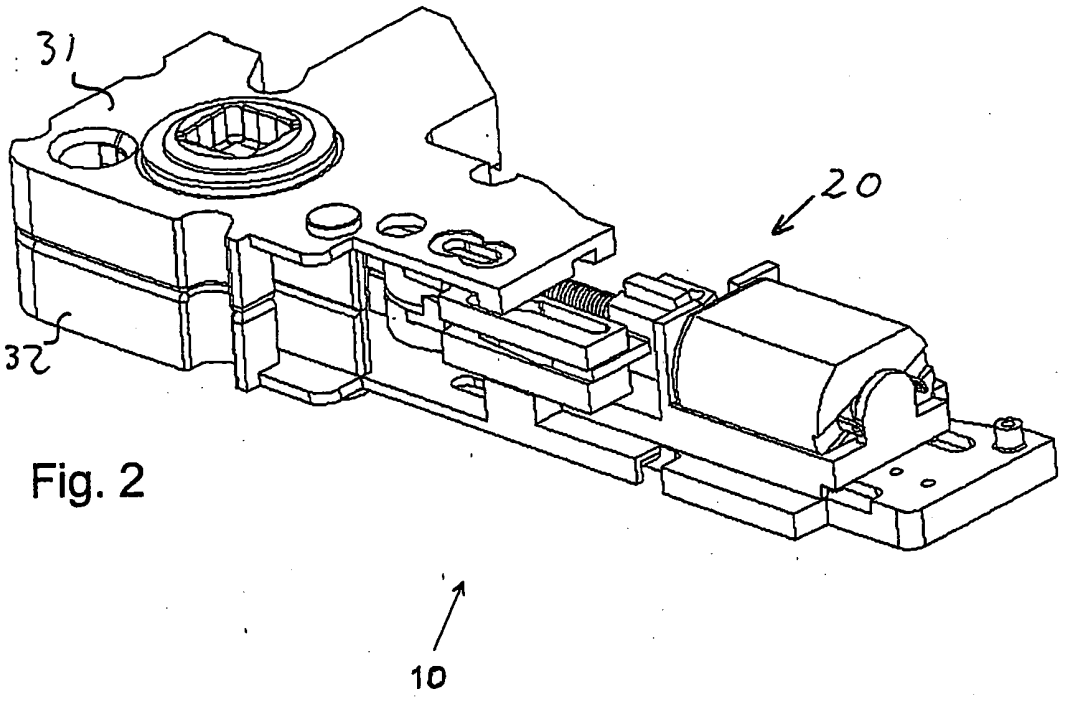


Fig. 2

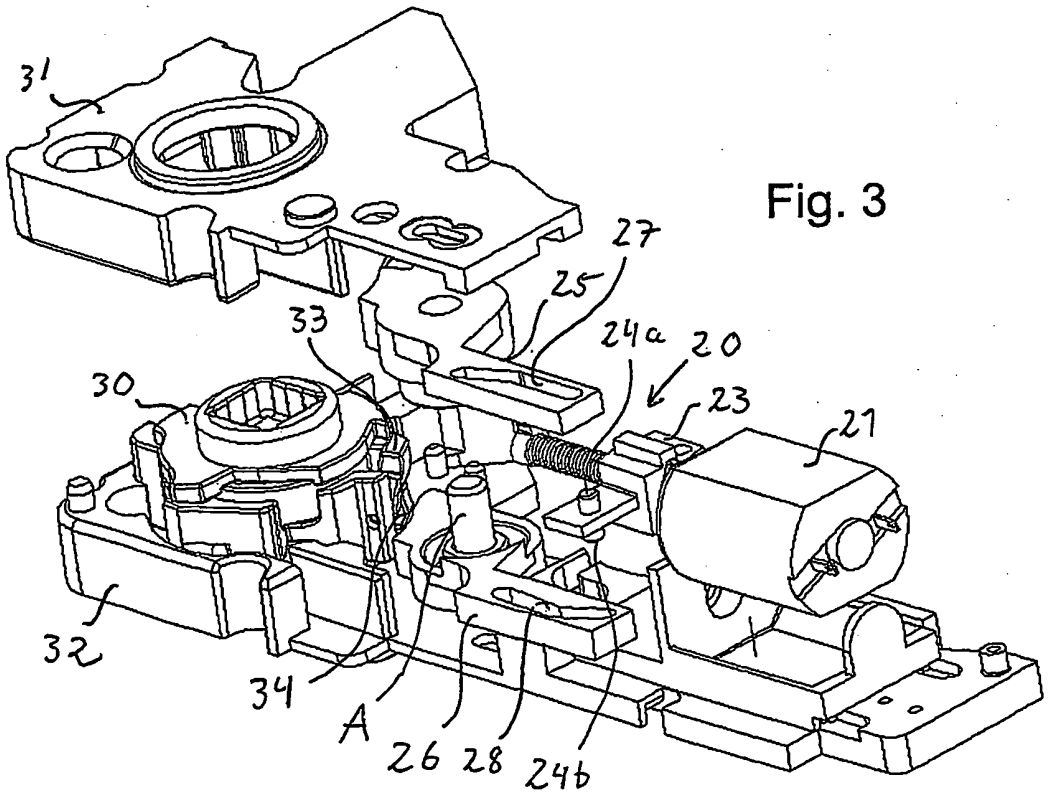


Fig. 3

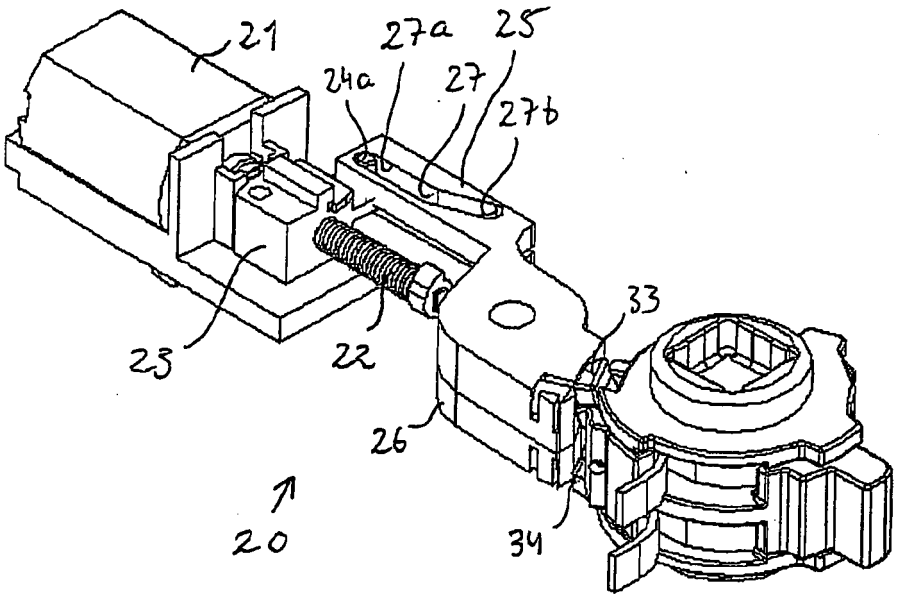


Fig. 4

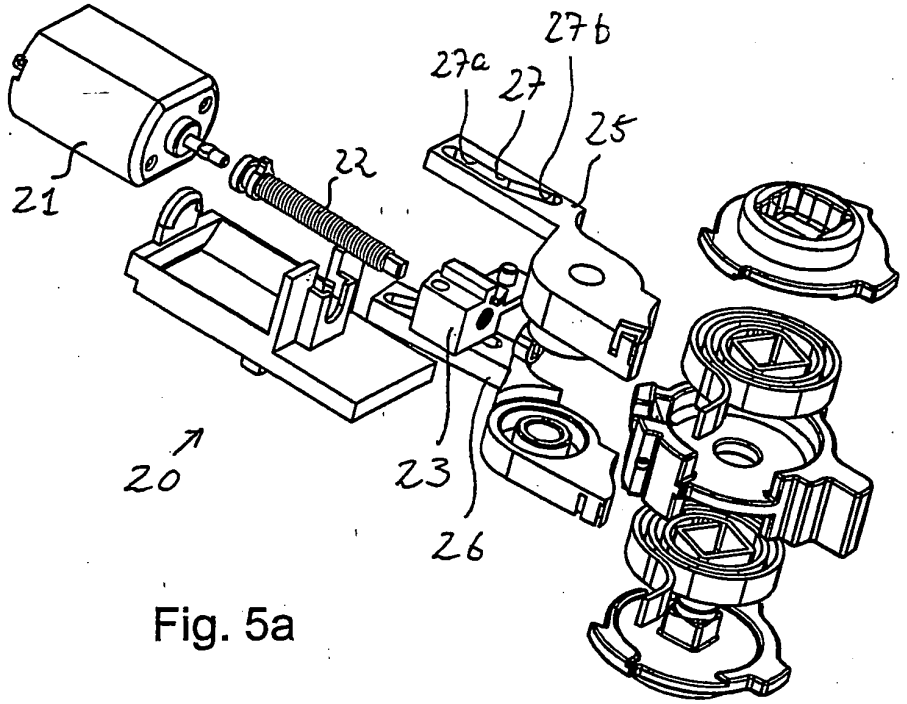


Fig. 5a

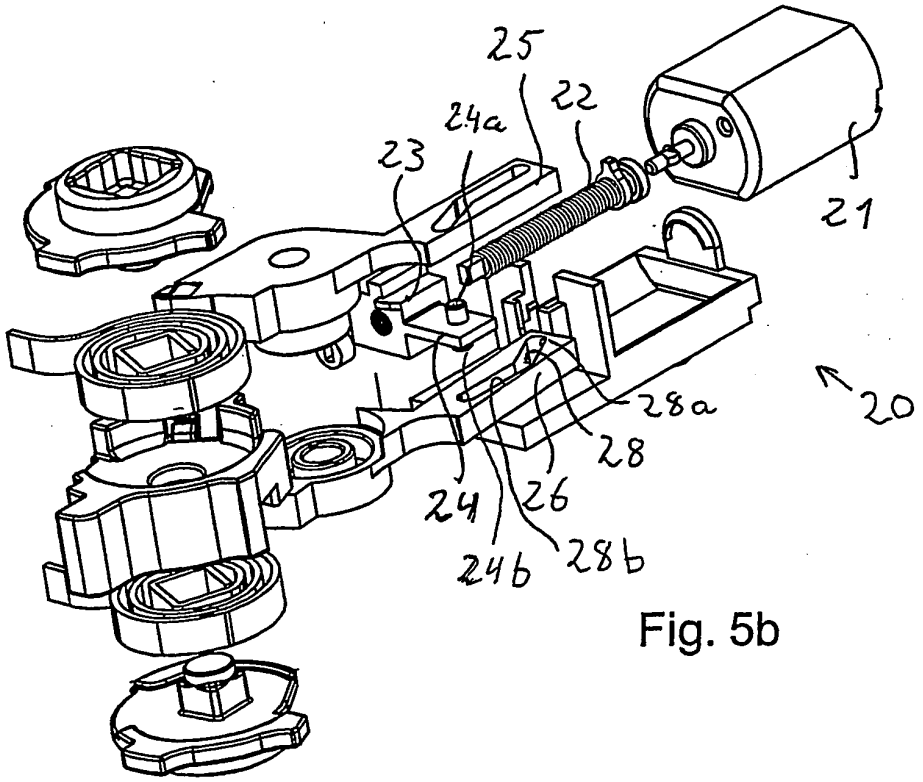


Fig. 5b

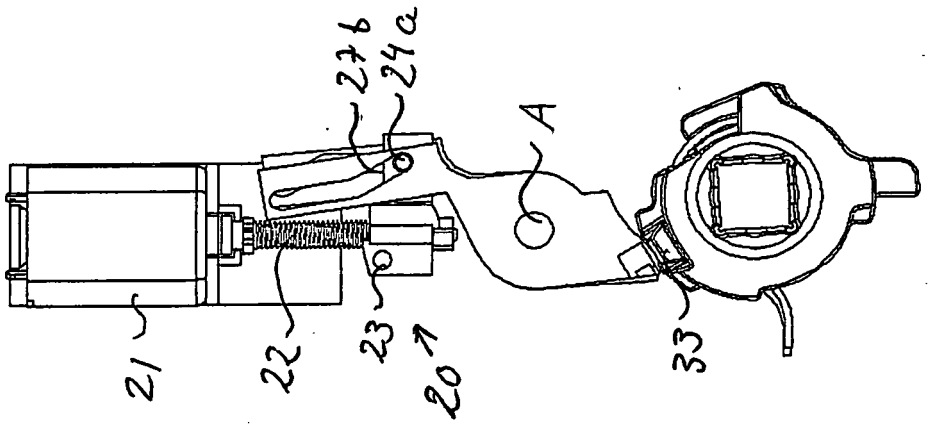


Fig. 6c

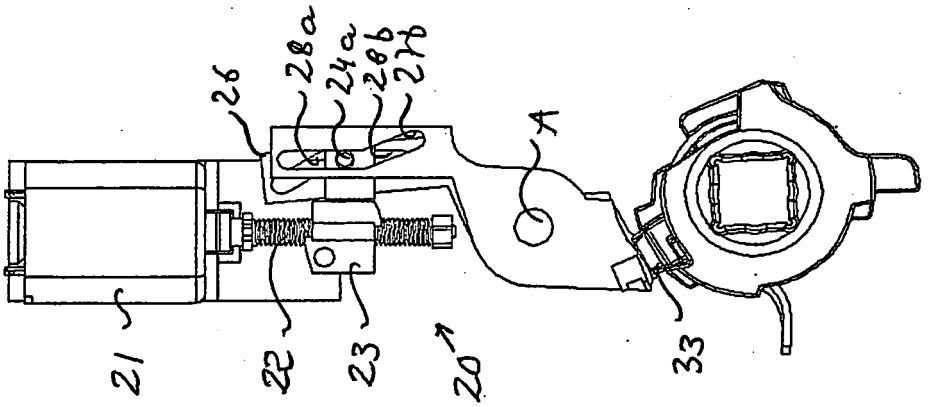


Fig. 6b

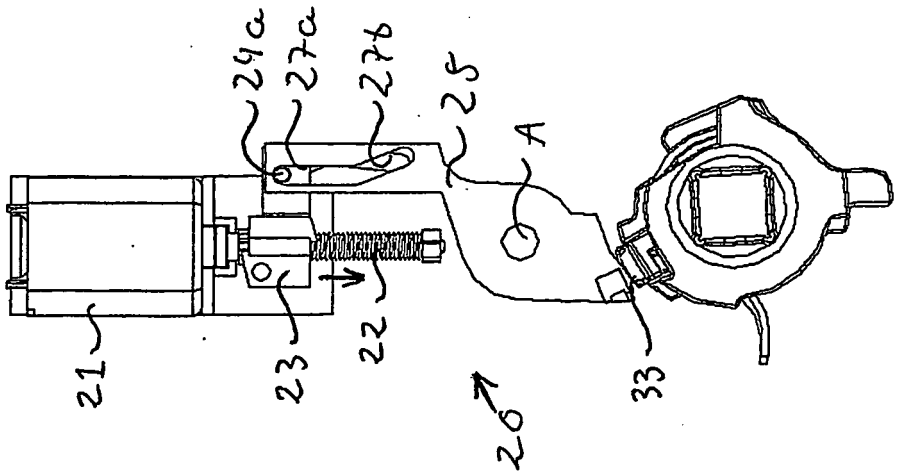


Fig. 6a

REFERENCES CITED IN THE DESCRIPTION

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