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(54)

Electromechanical lock adapted to doors

(57)

Electromechanical lock adapted to doors comprising a latch operable by a first handle or a second handle, transmission means (100) for the movement associated to the corresponding handle towards the latch or a lever (6), and clutch means (90) comprising an endless screw (93), an actuator (94) that includes a contact member (94b) adapted to come into contact with the endless screw (93) and a clutch (95) operable by the actuator

(94).

The transmission means (100) comprise a first pusher rotatable by the first handle, a second pusher (21) rotatable by the second handle, and an intermediate member fixed to one of the pushers. The pusher not fixed to the intermediate member includes stoppers that delimit a housing. The actuator (94) comprises a contact surface (94c) adapted to keep the clutch (95) in the intermediate member in a declutched position or partially housed in the housing in a clutched position.

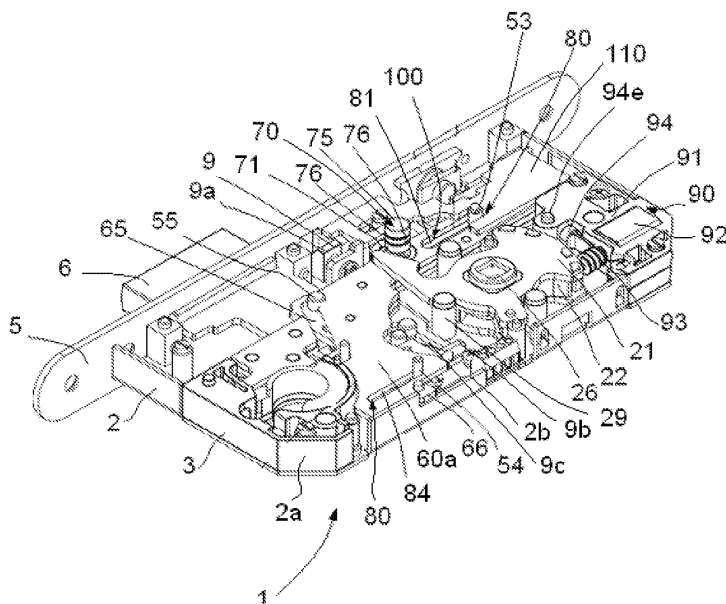


FIG. 3

## Description

### TECHNICAL FIELD

**[0001]** This invention relates to electromechanical locks adapted to doors, in particular to electromechanical locks that comprise means for engaging the handles that operate said electromechanical locks.

### PRIOR ART

**[0002]** Known electromechanical locks adapted to doors comprise a lever by means of which the door is locked, the lever being capable of being operated by means of a cylinder, and a latch that may be operated by means of an external handle or by means of the cylinder. The electromechanical lock also comprises attachment means that convert the rotational movement of the handle into a movement of the latch.

**[0003]** In addition, there are known electromechanical locks that comprise clutch means that enable, or otherwise, the rotation movement to be transmitted from one of the handles to the other handle. Document ES2323201A1 thus describes a clutch device that comprises a first clutch member connected to the outer handle that includes a projection that includes a hole into which is introduced a pin assisted by a spring that moves in order to be introduced into a groove of a second clutch member. The clutch device comprises a motor, an endless screw linked to a spring, and a rocker/pusher that is moved by the spring and which comes into contact with the pin. These clutch devices are attached in the manner of a cover to the lock.

### DISCLOSURE OF THE INVENTION

**[0004]** The object of the invention is to provide an electromechanical lock adapted to doors as described in the claims.

**[0005]** The electromechanical lock adapted to doors of the invention comprises at least one lever that may be operated by means of a cylinder, a latch that may be operated by means of a first handle arranged on one side of the door or by means of a second handle arranged on the opposite side of the door, means for transmitting the movement associated to the cylinder or to the corresponding handle towards the latch or towards the lever, and clutch means of both handles which comprise a motor, an endless screw, an actuator that includes a contact member adapted to come into contact with the endless screw and a clutch adapted to be operated by the actuator.

**[0006]** The transmission means comprise a first pusher adapted to rotate operated by the first handle, a second pusher adapted to rotate operated by the second handle, and an intermediate member that is arranged fixed to one of the pushers, said intermediate member housing in its interior, at least partially, the clutch.

**[0007]** The pusher that is arranged fixed to the intermediate member comprises stoppers, which delimit a housing between them.

**[0008]** In addition, the actuator comprises a contact surface adapted in order to keep the clutch in a retracted position, housed in the intermediate member, in a position in which the handles are disengaged, or to keep the clutch in an extended position projecting out in relation to the intermediate member, said clutch being housed partially in the housing defined by the stoppers of the intermediate member, in a position in which the handles are engaged.

**[0009]** As a result an electromechanical lock is obtained and which integrates the clutch means in a simple and optimal manner.

**[0010]** These and other advantages and characteristics of the invention will be made evident in the light of the drawings and the detailed description thereof.

### DESCRIPTION OF THE DRAWINGS

#### [0011]

Figure 1 shows a view in perspective of an electromechanical lock that comprises clutch means according to the invention, in a position in which the door is closed or locked.

Figure 2 is a ground view of the electromechanical lock shown in Figure 1, without a cover.

Figure 3 is a view in perspective of the electromechanical lock shown in Figure 1, without a cover.

Figure 4 is a partial view in perspective of transmission means comprised in the electromechanical lock shown in Figure 1.

Figure 5 is a partial view in perspective of the transmission means shown in Figure 4, without a first pusher.

Figure 6 is a view in perspective of an intermediate plate of the transmission means shown in Figure 4.

Figure 7 is a view in perspective of a second pusher of the transmission means shown in Figure 4.

Figure 8 is a view of a unit of followers comprised in the electromechanical lock shown in Figure 1.

Figure 9 is a view of an actuator of the clutch means of the electromechanical lock shown in Figure 1.

Figure 10 is a partial ground view of the lock shown in Figure 1, which shows transmission means in cooperation with clutch means of the lock, in a position in which the handles are declutched.

Figure 11 is another partial ground view of the lock shown in Figure 1, which shows transmission means in cooperation with clutch means of the lock, in a position in which the handles are declutched.

Figure 12 is a partial ground view of the lock shown in Figure 1, which shows transmission means in cooperation with clutch means of the lock, in a position in which the handles are clutched.

Figure 13 is another partial ground view of the lock shown in Figure 1, which shows transmission means in cooperation with clutch means of the lock, in a position in which the handles are clutched.

Figure 14 is a partial cross-sectional view of the electromechanical lock shown in

Figure 1, in particular of the anti-panic release means in a first position in cooperation with the transmission means.

Figure 15 is a partial cross-sectional view of the electromechanical lock shown in

Figure 1, in particular of the anti-panic release means in a second position in cooperation with the transmission means.

#### DETAILED DISCLOSURE OF THE INVENTION

**[0012]** The electromechanical lock 1 adapted to doors according to the invention, shown in Figures 1 to 3, comprises a case 2 delimited by a base 3, a cover 4, shown in Figure 1, the base 3 and the cover 4 being arranged substantially parallel to each other, side walls 2a and a front 5 arranged substantially orthogonal to the base 3 and the cover 4, a lever 6 that may be operated by means of a cylinder not shown in the figures, a latch 7 that may be operated by means of a first handle or a second handle not shown in the figures or the cylinder not shown in the figures, and a trigger element 9, arranged between the lever 6 and the latch 7.

**[0013]** The trigger element 9, shown in Figures 2 and 3, comprises a first part 9a that, in an initial open door position not shown in the figures, projects out in relation to the front 5 towards the outside of the electromechanical lock 1, and a second part 9b that is arranged housed inside the case 2, the second part 9b including a groove 9c that cooperates with a projection 57 fixed to the base 3 to guide the movement of the trigger element 9.

**[0014]** The electromechanical lock 1 comprises means 100 for transmitting the movement associated to the cylinder or the corresponding handle towards the latch 7 or towards the lever 6, the transmission means 100 comprising a first pusher 20 adapted to be operated by the first handle, a second pusher 21 adapted to be operated by the second handle, and at least one slide member 110

adapted so that it may be moved, operated by the first pusher 20 or by the second pusher 21.

**[0015]** The slide member 110 is arranged coupled to the lever 6, the slide member 110 including a groove 65a along which moves a connector member 55 inserted in the lever 6, shown in Figures 2 and 3.

**[0016]** In addition, the electromechanical lock 1 includes a traction spring, not shown in the figures, one of the ends of which is arranged fixed to the base 3 of the case 2 and the other end is arranged fixed to one end of the slide member 110.

**[0017]** In an initial position, in which the electromechanical lock 1 has not been operated, the trigger element 9 keeps the slide member 110 locked. At the moment at which the door is closed, the trigger element 9 moves towards the inside of the case 2, with the result that the first part 9a retracts and is housed in said case 2, and the second part 9b comes into contact with a switch 10, shown in Figure 2, generating an electrical signal that indicates that the door is closed against the frame of the door and, at the same time, releases the slide member 110. When the slide member 110 is released, the traction spring to which is arranged fixed one end of the slide member 110 attracts the slide member 110, with the result that the movement of said slide member 110 causes the operation of the lever 6, which moves and projects out in relation to the case 2 of the electromechanical lock 1, thereby locking the door.

**[0018]** In addition, the slide member 110 includes guide means 80 that include a first groove 81 that collaborates with a substantially cylindrical guide member 53, shown in Figures 2 and 3, fixed to the base 3 of the case 2 of the electromechanical lock 1, to guide the movement of the slide member 110 in relation to said base 3. In addition, the guide means 80 comprise in the slide member 110 a second groove 84 substantially parallel to the first groove 81 that collaborates with a substantially cylindrical guide member 54, fixed to the case 2, which also acts as a support for the slide member 110, and a projection 66, shown in Figures 1 to 3, that collaborates with a groove 2b arranged on one of the walls 2a of the case 2 for the movement of the slide member 110 inside the case 2.

**[0019]** The slide member 110 also comprises a projection 45, shown in Figure 2, that acts as a stopper when the lock is in the locked position, preventing said latch 7 from moving towards the inside of the case 2. Additionally, the slide member 110 is arranged attached to the latch 7, with the result that the movement of the slide member 110 brings about the movement of the latch 7.

**[0020]** In addition, the first pusher 20, shown in detail in Figures 4, 5 and 7 comprises a plate 20a that also includes an arm 20b adapted to move the slide member 110 when the first handle is operated and an opening 20c with a rectangular cross-section, in which a follower 26 is attached.

**[0021]** In addition, the second pusher 21, shown in detail in Figure 4, comprises a second plate 21a that in-

cludes a second arm 21 b adapted to move the slide member 110 when the second handle is operated and an opening 21 c with a rectangular cross-section, in which a follower 26 is attached. The followers 26, shown in detail in Figure 8, each comprise a central part 26b with a substantially rectangular cross-section that is arranged inserted in the opening 20c, 21 c of the corresponding pusher 20,21, and a longitudinal housing 26a in which is attached a shaft of the corresponding handle, with the result that the followers 26, and, therefore, the respective pushers 20,21 rotate independently of each other.

**[0022]** The electromechanical lock 1 comprises stoppers 29, shown in Figures 2, 3 and 10-13, fixed to the base 3 which cooperate with respective recesses 20f,21f in the respective pusher 20,21 to delimit the rotation of the pushers 20,21.

**[0023]** The transmission means 100 also comprise an intermediate plate 22, shown in Figures 4 to 6, which is arranged, in the embodiment described in the figures, fixed to the first pusher 20 by means of coupling pins 28, and a return spring 25 that is arranged housed inside the intermediate plate 22. For this purpose, the intermediate plate 22 includes a substantially concentric housing 22a in which is housed the return spring 25, preferably a torque spring, and a side opening 23 through which a first branch 25a, and a second branch 25b of the spring 25 project out, the ends 23a,23b of the opening 23 defining the limits of rotation of the handles. The intermediate plate 22 also has a central hole 22b in which the respective followers 26 attached to the first pusher 20 and the second pusher 21 are partially attached. The intermediate plate 22 also has a central hole 22b in which the respective followers 26 attached to the first pusher 20 and the second pusher 21 are partially attached.

**[0024]** The electromechanical lock 1 comprises a stopper 56 that is arranged inserted in the base 3 of the case 2 against which the first branch 25a acts permanently as a stopper. In addition, the first pusher 20 comprises a projection 20d, which extends towards the base 3, against which both branches 25a, 25b of the spring 25 act as stoppers in a position in which the handles are not operated, and against which only the second branch 25b acts as a stopper when the first handle has been operated. Additionally, the second pusher 21 also comprises a projection 21 d fixed to the second plate 21 a, which extends towards the cover 4, against which both branches 25a,25b of the spring 25 act as stoppers in a position in which the handles are not operated, and against which only the second branch 25b acts as a stopper when the second handle has been operated. Thus, in a position in which the handles are not operated, the projection 20d of the first pusher 20 and the projection 21 d of the second pusher 21 are arranged substantially aligned.

**[0025]** In addition, the electromechanical lock 1 of the invention comprises clutch means 90 that attach both pushers 20,21 for the simultaneous rotation of both handles regardless of which handle is operated by the user. The clutch means 90 are fully inserted in the case 2 of

the electromechanical lock 1, with the result that an optimal electromechanical lock in terms of dimensions and assembly is obtained.

**[0026]** The clutch means 90, shown in Figures 2, 3 and 10-13, comprise a support 91 fixed to the base 3, a motor 92 supported by the support 91, an endless screw 93 attached to the motor 92, an actuator 94 fixed at one end in a pivoting manner to the support 91 and which includes a contact member 94b that is in contact with the endless screw 93, and a clutch 95 that attaches the pushers 20,21 when operated by the actuator 94. The actuator 94 is made of flexible material.

**[0027]** The contact member 94b has a substantially orthogonal cross-section, its width being smaller than the distance between two consecutive threads of the endless screw 93.

**[0028]** The actuator 94, shown in detail in Figure 9, comprises a base 94d that includes the contact surface 94 and which is arranged supported on the base 3 of the case 2, a first projection 94e, shown in Figures 2,3 and 10-13, that is fixed substantially orthogonal to the base 94d of the actuator 94, it being inserted in a hole 94a of said base 94, by means of which the actuator 94 is fixed in a pivoting manner to the support 91, and a second projection 94f from which the contact member 94b is arranged substantially orthogonal to the endless screw 93.

**[0029]** The clutch 95 is housed in the intermediate plate 22 of the transmission means 100, comprising a substantially rectangular first part 95a and a second part 95b with a substantially rectangular cross-section, and a greater width than the first part 95a. Additionally, the intermediate plate 22 includes a cavity 24 that has a first part 24a inside which is housed the second part 95b of the clutch 95, and a second part 24b connected to the first part 24a and the exterior, with a smaller width than the first part 24a, inside which is housed the first part 95a of the clutch 95. The clutch 95 includes in the second part 95b a housing 95c in which is housed a compression spring 97.

**[0030]** Furthermore, the first pusher 21 includes, on the end opposite the arm 21 b, grooves 21 e, shown in Figure 4, where stoppers 27, shown in Figures 4 and 5, are arranged inserted, arranged facing the second pusher 20 and which delimit a housing 27b between them.

**[0031]** Thus, in an initial position of the electromechanical lock 1, shown partially in Figures 10 and 11, both pushers 20,21 are declutched, the motor 91 is not operating, and the actuator 94 acts on the clutch 95, in particular on the first part 95a, with the result that the clutch 95 compresses the spring 96, being housed entirely in the cavity 24 of the intermediate plate 22, each pusher 20,21 being capable of rotating independently in relation to the other pusher 21,20, given that the respective projection 27 of the first pusher 21 acts as a stopper, preventing the clutch 95 from expanding outside the cavity 24. Subsequently, the respective pusher 20,21 returns to the initial position by means of the return spring 25.

**[0032]** When the motor 91 receives a certain electrical

impulse the endless screw 93 rotates in an anti-clockwise direction, with the result that the contact member 94b of the actuator 94 is moved by the endless screw 93 in a direction towards the motor 91, with the result that both pushers 20,21 are attached to each other, rotating jointly when either of the two handles are operated. In this position, shown partially in Figures 12 and 13, the second part 95b of the clutch 95 acts as a stopper against the first part 24a of the cavity 24 of the intermediate plate 22, with the result that the first part 95a is partially housed in the housing 27b delimited by the stoppers 27, with the result that both pushers 20,21 are engaged together.

**[0033]** From this position, when the motor 91 receives an electrical impulse contrary to the initial one, the endless screw 93 rotates in a clockwise direction, with the result that the end 94b of the actuator 94 is moved by the endless screw 93 in a direction towards the clutch 95, with the result that the actuator 94 once more keeps the clutch 95 pressed down inside the cavity 24, thus keeping the pushers 20,21 declutched.

**[0034]** In addition, the anti-panic release means 70, shown in detail in Figures 14 and 15, comprise a sleeve 71 that is arranged inserted in the slide member 110, for which purpose respective cams comprised in the slide member 110 respectively include a hole in which the sleeve 71 is inserted fixed. The anti-panic release means 70 also comprise a substantially cylindrical positioning member 75, inserted in a movable manner in the sleeve 71. In particular, the sleeve 71 includes an inner ring-shaped groove 772 in which is housed an elastic means 77, and the positioning member 75 also comprises a first outer groove 76a and a second outer groove 76b, both of them ring-shaped grooves, separated from each other by a certain distance. The elastic means 77 preferably includes an elastic seal. In other embodiments the elastic means 77 may include elastic washers, a spring, ring seals, etc.

**[0035]** When the anti-panic release means 70 are arranged in a first position, shown in Figure 14, the positioning member 75 is arranged inserted in the sleeve 71 with the result that the elastic seal 77 inserted in the inner groove 72 of the sleeve 71 is housed in the first outer groove 76a of said positioning member 75, the positioning member 75 projecting out in relation to the slide member 110, and in particular in relation to a first free surface 60a of said slide member 110, being supported on the base 3 of the case 2 of the electromechanical lock 1. As a result, starting from a position in which the door is closed and locked by means of the lever 6, the pushers 20,21 declutched, only the user operating the second handle can unlock the electromechanical lock 1 quickly, as when said second handle is operated, the second pusher 21 rotates and, facing the surface 60a of the first surface 60, acts as a stopper against the part of the positioning member 75 that projects out, thereby moving the slide member 110. The movement of the slide member 110 causes the movement of the lever 6 and the latch 7 towards the inside of the case 2, enabling the opening of

the door. If the user operates the first handle, the rotation of the first pusher 20 does not move the slide member 110, and the lever 6 therefore continues to lock the door.

**[0036]** In contrast, when the anti-panic release means 70 are arranged in a second position, shown in Figure 15, the positioning member 75 is arranged inserted in the sleeve 71, with the result that the elastic seal 77, inserted in the inner groove 72 of the sleeve 71 is housed tightly in the second outer groove 76b of the positioning member 75, the positioning member 75 projecting out in relation to the slide member 110, in particular in relation to a second free surface 60b of the slide member 110, it being supported on the cover 4 of the case 2 of the electromechanical lock 1. As a result, starting from a position in which the door is closed and locked by means of the lever 6 and the pushers 20,21 declutched, only the user operating the first handle can unlock the electromechanical lock 1 quickly, as when said first handle is operated, the first pusher 20 rotates and, facing the second surface 30a, acts as a stopper against the part of the positioning member 75 that projects out, thereby moving the slide member 110. The movement of the slide member 110 causes the movement of the lever 6 and the latch 7 towards the inside of the case 2, enabling the opening of the door.

**[0037]** Finally, both the cover 4 and the base 3 of the case 2 respectively comprise a hole 96, arranged concentric to each other and to the positioning member 75, with the result that by introducing a suitable tool through the corresponding hole 96, the positioning member 75 may be moved from one position to another, thereby allowing the user to change, quickly and easily from the outside of the electromechanical lock 1, the configuration of said electromechanical lock 1 in order to obtain an electromechanical lock 1 that is unlocked when the first handle is operated or is unlocked when the second handle is operated.

## Claims

1. Electromechanical lock adapted to doors that comprises at least one lever (6) that may be operated by a cylinder, a latch (7) that may be operated by a first handle arranged on one side of the door or by means of a second handle arranged on the opposite side of the door, transmission means (100) for the movement associated to the cylinder or the corresponding handle towards the latch (7) or towards the lever (6), and clutch means (90) of both handles, the clutch means (90) comprising a motor (92), an endless screw (93), an actuator (94) that includes a contact member (94b) adapted to come into contact with the endless screw (93) and a clutch (95) adapted to be operated by the actuator (94), **characterised in that** the transmission means (100) comprise a first pusher (20) adapted to rotate operated by the first handle, a second pusher (21) adapted to rotate operated by

the second handle, and an intermediate member (22) that is arranged fixed to one of the pushers (20,21), said intermediate member (22) housing in its interior, at least partially, the clutch (95), the pusher (20,21) not fixed to the intermediate member (22) including stoppers (27) that delimit a housing (27b) between them, and the actuator (94) comprising a contact surface (94c) adapted to keep the clutch (95) in a retracted position, housed in the intermediate member (22), in a position in which the handles are declutched or to keep the clutch (95) in an extended position projecting out in relation to the intermediate member (22), said clutch (95) partially being housed in the housing (27d) defined by the stoppers (27) of the intermediate member (22), in a position in which the handles are clutched.

2. Electromechanical lock according to the preceding claim, wherein the intermediate plate (22) includes a cavity (24) that includes a substantially rectangular first part (24a) and a second part (24b) with a smaller width than the first part (24a), and the clutch (95) comprises a first part (95a) that is housed in the second part (24b) of the cavity (24) and a second part (95b) with a substantially rectangular cross-section and a width greater than the first part (95a) that is housed, at least partially, in the first part (24a) of the cavity (24).
3. Electromechanical lock according to any of the preceding claims, wherein the clutch (95) comprises a compression spring (97) housed in a housing (95c) arranged in the second part (95b) of the clutch (95).
4. Electromechanical lock according to any of the preceding claims, wherein the actuator (94) comprises a base (94d) that is arranged supported on the base (3) of the electromechanical lock (1), a first projection (94e) arranged substantially orthogonal to the base (94d) by means of which it is fixed in a pivoting manner to the support (91), and a second projection (94f) arranged substantially orthogonal to the base (94d), from which extends the contact member (94b) arranged substantially orthogonal to the endless screw (93).
5. Electromechanical lock according to the preceding claim, wherein the base (94d) includes a contact surface (94c).
6. Electromechanical lock according to any of the preceding claims, wherein the contact member (94b) has a substantially orthogonal cross-section, its width being smaller than the distance between two consecutive threads of the endless screw (93).
7. Electromechanical lock according to any of the preceding claims, wherein the actuator (94) is made of

flexible material.

8. Electromechanical lock according to any of the preceding claims, wherein the clutch means (90) are arranged completely housed in a case (2) of the electromechanical lock (1).

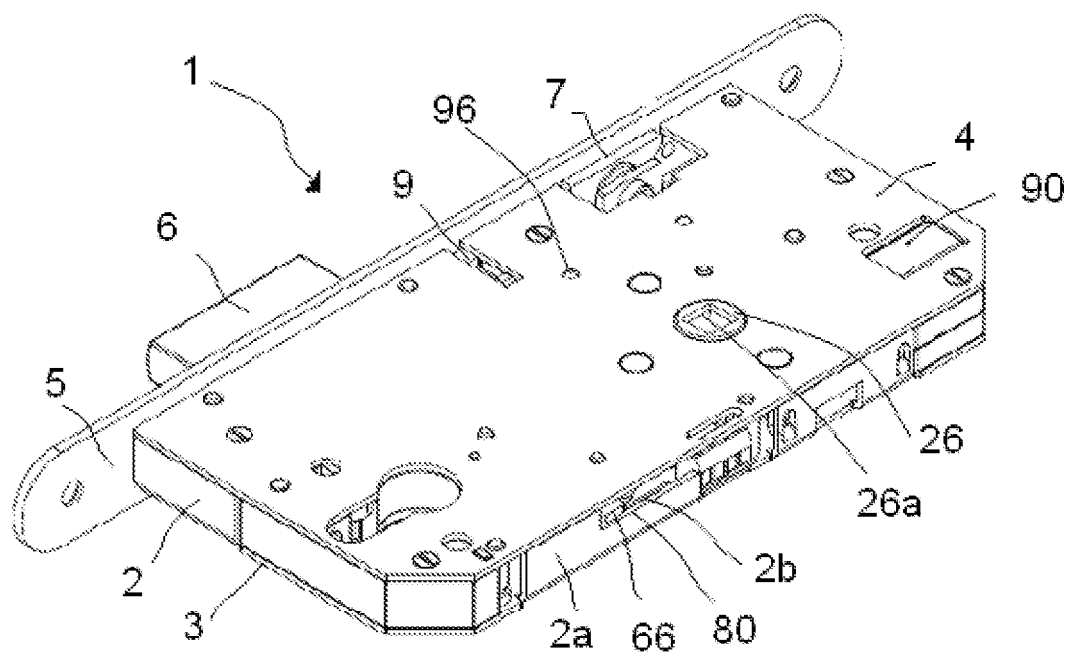


FIG. 1

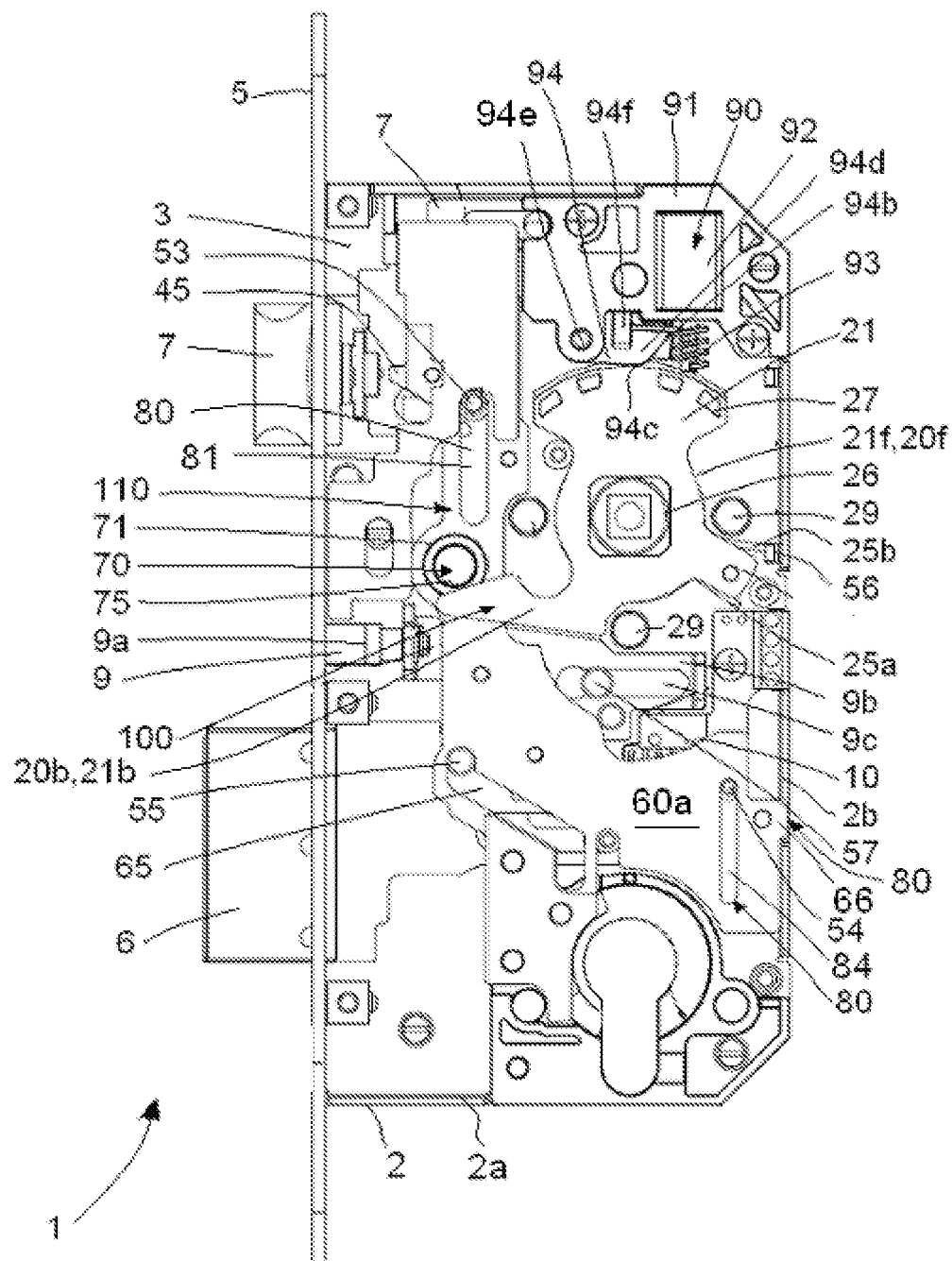


FIG. 2

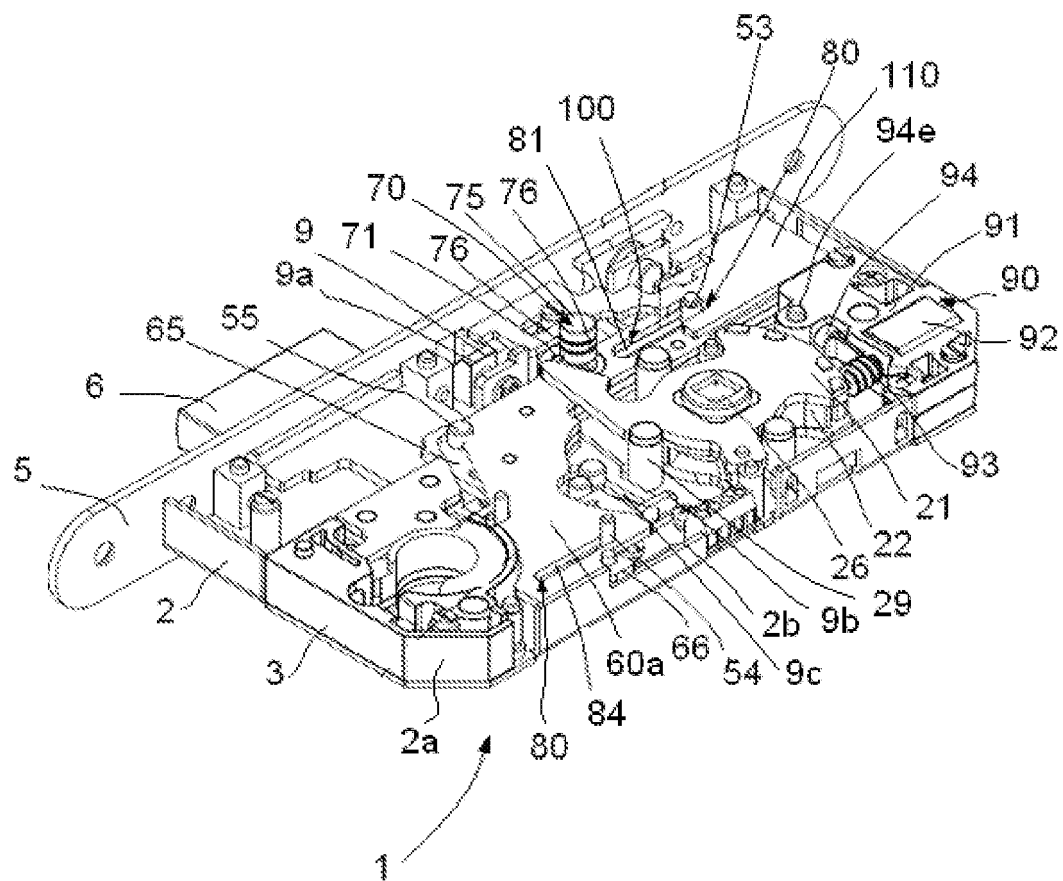


FIG. 3

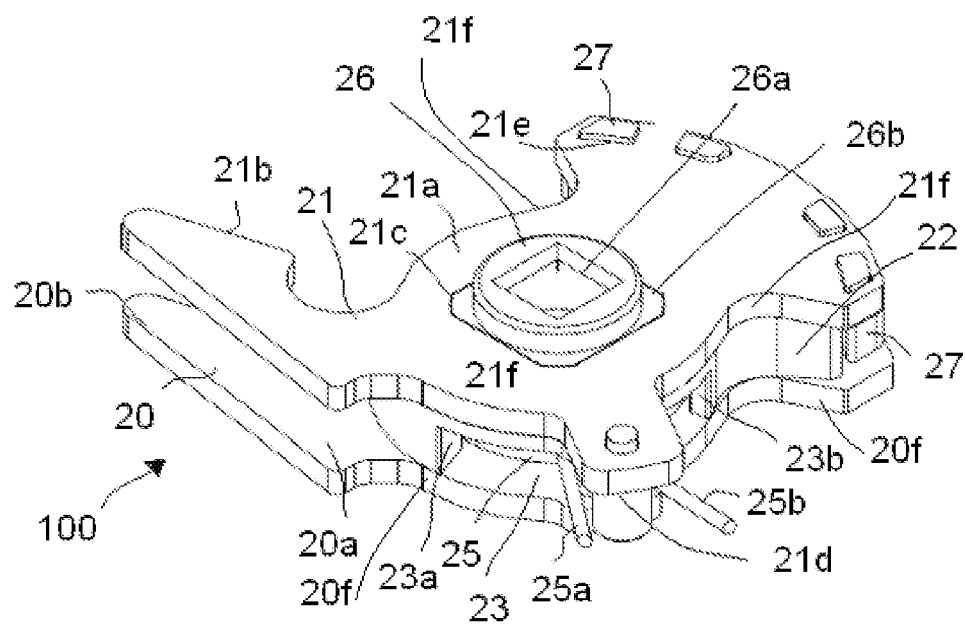


FIG. 4

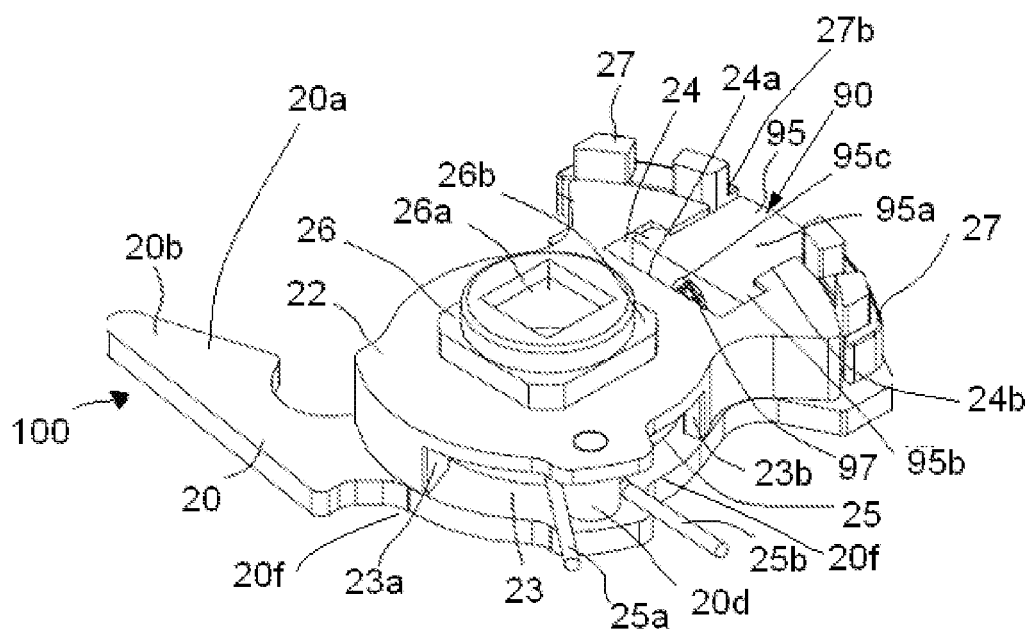


FIG. 5

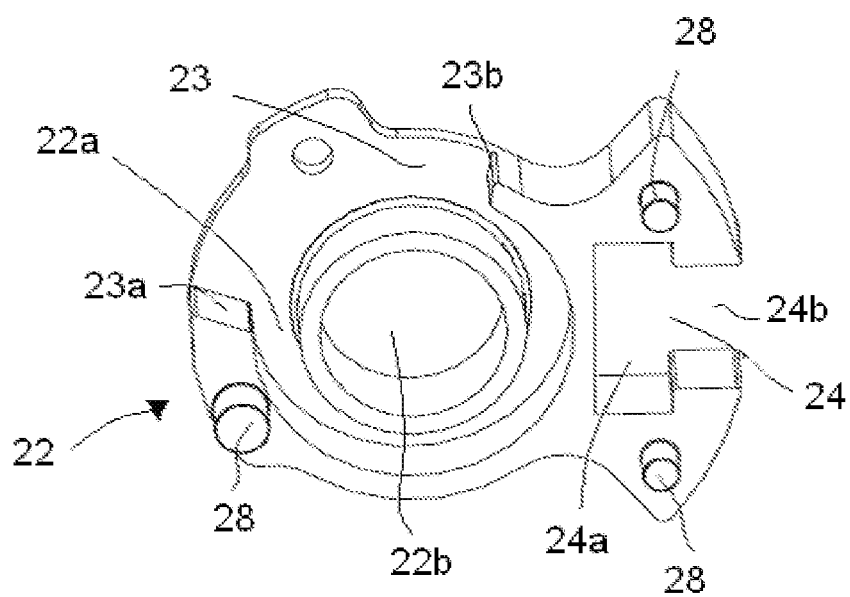


FIG. 6

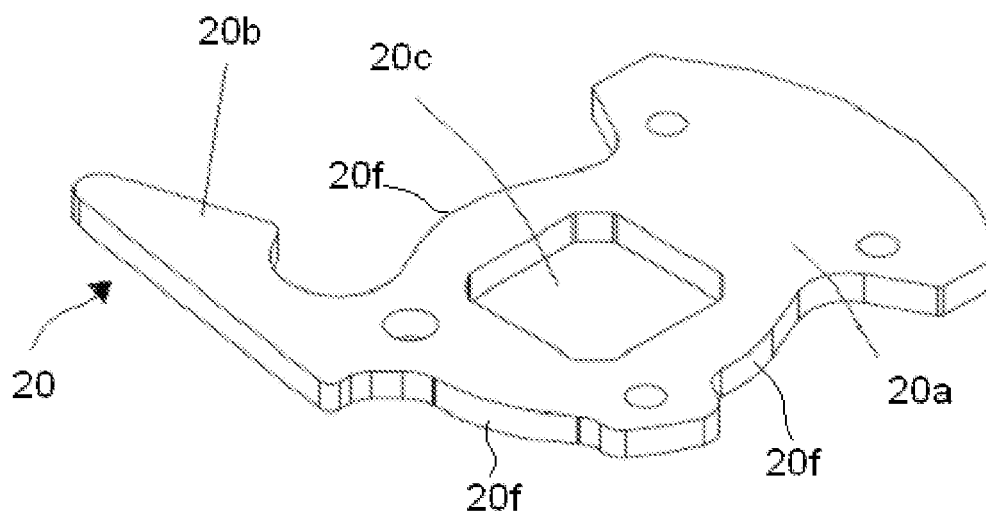


FIG. 7

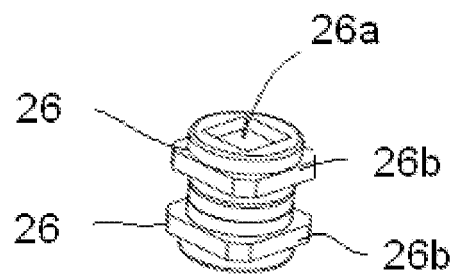


FIG. 8

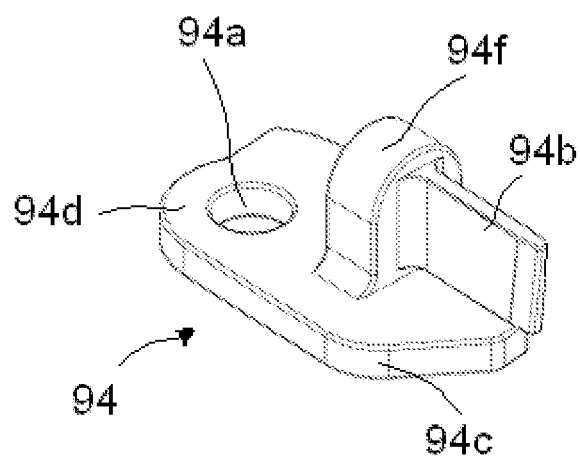


FIG. 9

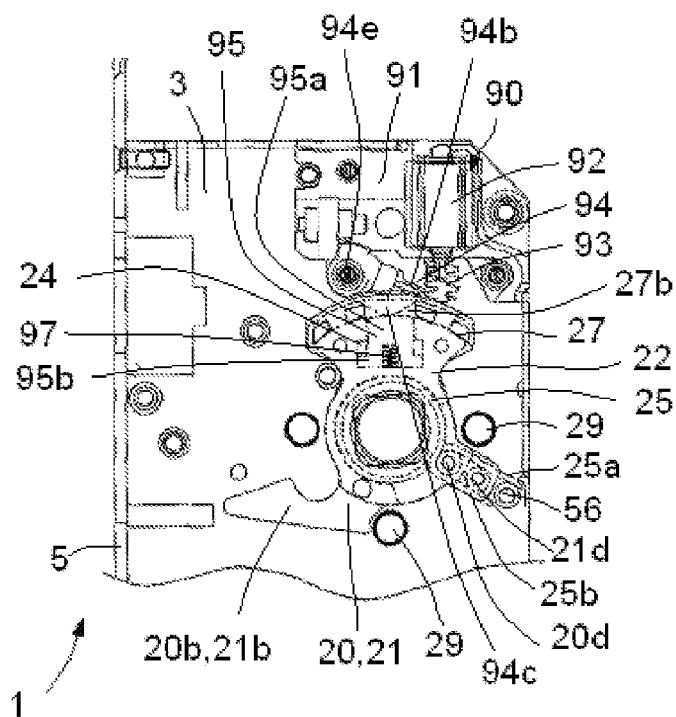


FIG. 10

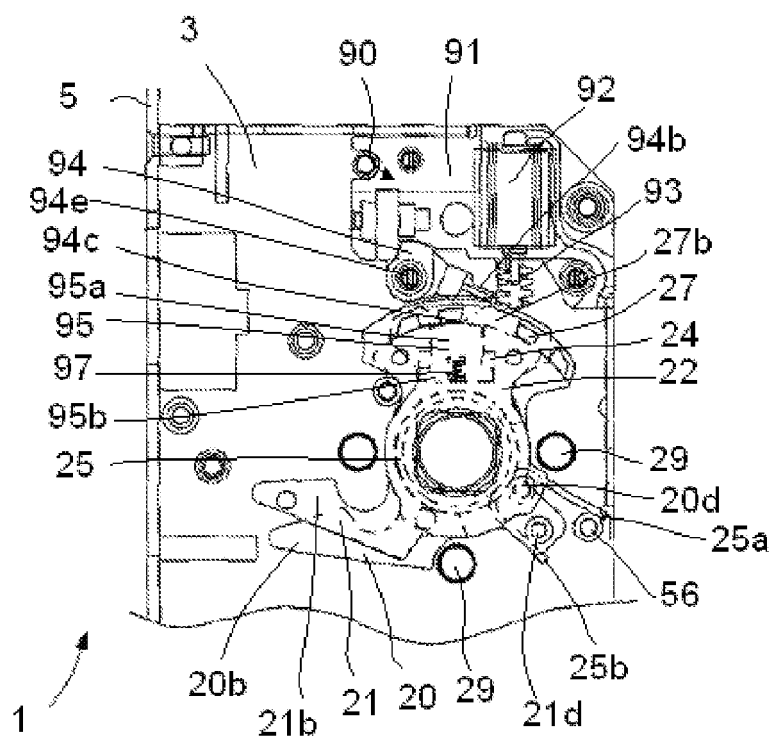


FIG. 11

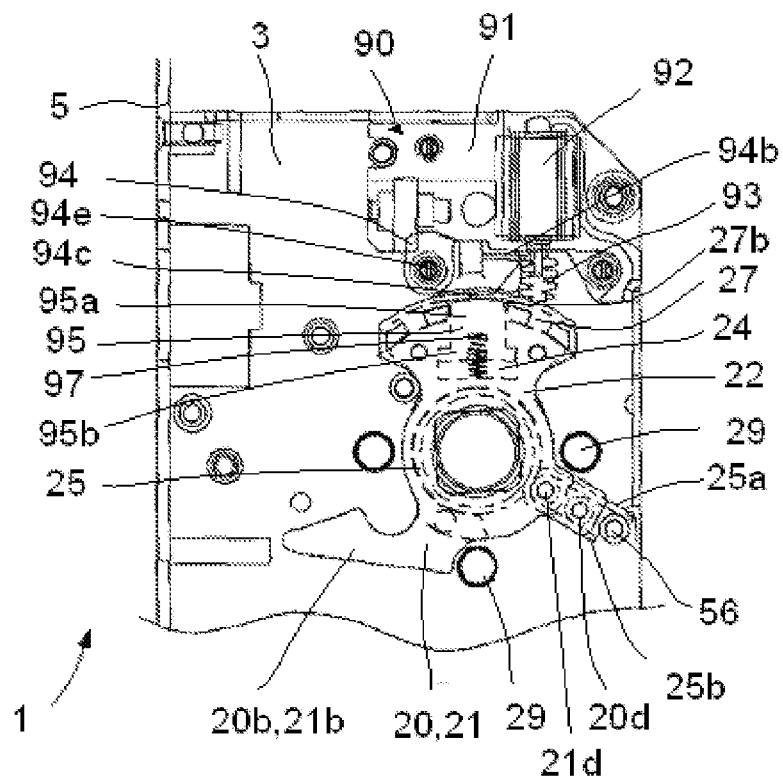


FIG. 12

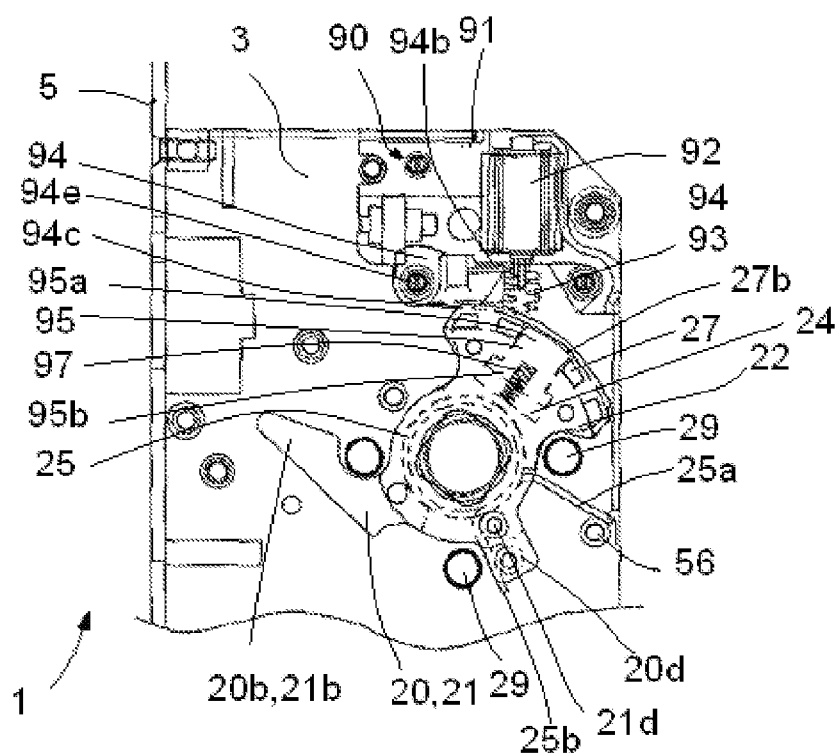


FIG. 13

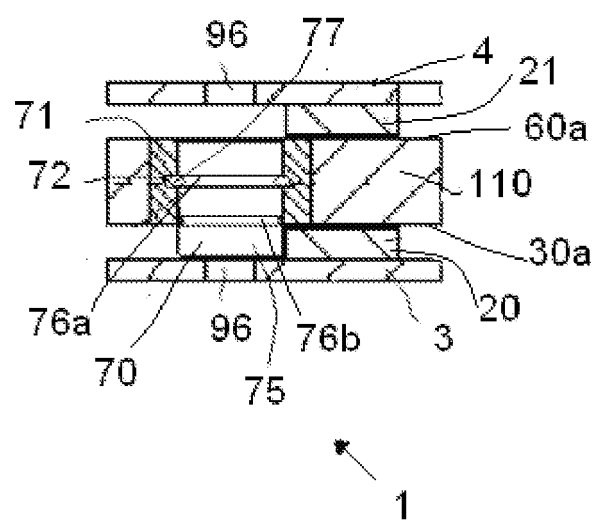


FIG. 14

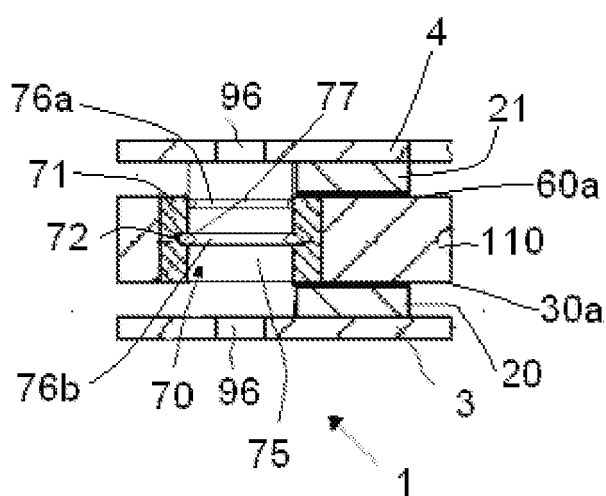


FIG. 15

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- ES 2323201 A1 [0003]