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(54) **DOOR OPENER WITH A MONITORING SYSTEM**

(57) The invention relates to a door opener with a monitoring system, comprising a bolt (2) provided with a height adjustable front part (3) and comprising a groove (33) defined on the front face and a stop (31) of said front part; an Internal mechanism for locking and unlocking the bolt (2) and a drive cam (51) of a monitoring system (5) for monitoring the state of the door, said cam being moved by the catch (C) of a door in the closed position. The cam (51) and the front part (3) are sized such that with the front part in a lower position, the end of the cam (51) is arranged inside the groove (33) of the stop (31), and with the front part in an upper position, the end of the cam (51) is arranged considerably flush with the lower plane (32) of the stop (31) or inside the groove (33) of said stop (31).

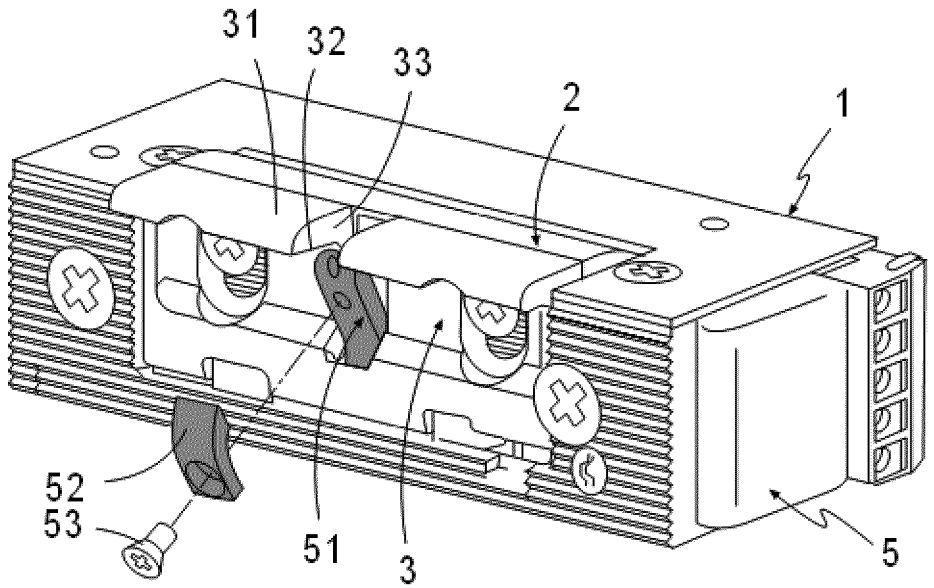

Fig. 8

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Description

Technical field.

[0001] The present invention relates to a door opener with a monitoring system, suitable for locking and unlocking a door and providing a signal indicating the state of the door. This invention falls within the sector of closing devices with access control for doors, windows and closures in general.

Prior state of the art

[0002] Electric and electronic door openers are access control devices which allow locking/unlocking a door. Said door openers are assembled in the frame of the door and have a retaining bolt for the catch of the lock of the door in the closed position.

[0003] Said door openers have an internal mechanism that is locked or unlocked by means of the activation or deactivation of a solenoid. In an unlocked position, the internal mechanism allows a rotational movement of the bolt, and it allows the catch of the door to slide over said bolt when opening the door.

[0004] The bolt of the door opener generally has a height adjustable front part and is provided with a closing stop in charge of preventing the movement of the catch and the rotation of the door towards the open position when the internal mechanism keeps the bolt of the door opener locked.

[0005] Electric or electronic door openers having a monitored function are able to send a signal to an access control system, indicating the open or closed state of the door at all times.

[0006] Monitored door openers today have a drive cam assembled with the possibility of rotation in the casing of the door opener and arranged in front of the front part of the bolt. Said cam is operated by the latch of the door and when said door reaches the closed position, the drive cam acts by means of an arm on a microswitch of the monitoring system, providing a signal indicating that the door is closed.

[0007] Door openers on the market in which the bolt has a height adjustable front part and in which a monitoring system is included have operating problems.

[0008] When the adjustable front part of the bolt is moved to an upper adjustment position, a space remains between the drive cam and the adjustable front part of the bolt. This causes the handleset of the door to be able to fit into this space and not activate the monitoring system. It may also cause the cam to break or deform.

[0009] Another important problem is that the drive cam of the monitoring system takes away useful space for engagement of the handleset of the door with the bolt of the door opener.

[0010] The applicant of the invention is unaware of the existence of monitored door openers having the features of this invention and allowing the aforementioned problems to be resolved.

Description of the invention.

[0011] The monitored door opener object of the invention is of the type described in the preamble of the main claim, comprising: a bolt assembled on a rotating shaft; a height adjustable front part with respect to the bolt and provided with a stop defining a lower plane for retaining a catch of a door in a closed position; an internal mechanism for locking and unlocking the bolt, activating a solenoid, and a drive cam of a monitoring system for monitoring the state of the door, facing the front part of the bolt, and said cam being moved by the catch of the door from an inoperative position to an operative position in which said cam drives the monitoring system by providing a signal about the closed state of the door.

[0012] This door opener has certain technical features which ensure the effective contact of the catch of the door with the drive cam of the monitoring system for monitoring the state of the door, in all the height regulation positions of the front part of the bolt and without reducing the useful space for engagement of the catch with the bolt of the door opener.

[0013] According to the invention, the adjustable front part of the door opener comprises a receiving groove of the cam, said groove being defined on the front face and in the stop of said adjustable front part.

[0014] The cam and the front part are sized such that said front part is movable between a lower position in which the end of the cam is arranged inside the groove of the stop of the adjustable front part, and an upper position away from the rotating shaft of the bolt, in which the end of the cam is arranged considerably flush with the lower plane of the stop of the bolt or inside the groove of said stop.

[0015] This feature allows, in the upper and most unfavourable position of the adjustable front part, no empty space to be left between the cam activating the microswitch and the stop of the adjustable front part locking the catch of the door, whereby ensuring that no errors occur in the activation of the monitoring system and that the catch of the door is not engaged with the cam, causing it to deform or break.

[0016] Said groove has on the front face of the adjustable front part a depth equal to or greater than the thickness of the cam, such that when said cam is operated by the catch of the door, it is housed in the groove of the front part and does not reduce the length defined in the lower plane of the stop of the front part for engaging and locking the catch of the door; which entails an advantage with respect to door openers existing today, in which the cam activating the microswitch is kept in a projecting position with respect to the surface of the adjustable front part when it is operated by the catch of the door, said cam reducing the useful space defined in the adjustable front part for locking the catch of the door.

[0017] According to the invention, the cam can be

formed by a one-piece body having a length sufficient for the end thereof to be housed in the groove of the stop of the adjustable front part when said front part is in the upper, most unfavourable position; or it may comprise fixing means for fixing a supplement, which increases its length and forms the end of the cam intended for being housed in the groove of the stop of the adjustable front part, preventing a free space from being left between the stop of the adjustable front part and the end of the cam.

Brief description of the content of the drawings.

[0018] To complement the description that is being made and for the purpose of helping to facilitate the understanding of the features of the invention, a set of drawings accompanies this specification in which, with an illustrative and nonlimiting character, the following is represented:

- Figure 1 shows a perspective view of an exemplary embodiment of the door opener with a monitoring system according to the invention, and in which the drive cam of the monitoring system has been represented in the operative position.
- Figure 2 shows a front elevational view of the door opener of Figure 1 with the adjustable front part in a lower position.
- Figures 3 and 4 show respective profile views of the door opener of Figure 2, partially sectioned by plane A-A' and with the adjustable front part in lower position. Figure 3 represents the drive cam of the monitoring system in the inoperative position, and Figure 4 represents said cam in the operative position, operated by the catch of a door in the closed position.
- Figure 5 shows a front elevational view of the door opener of Figure 1 with the adjustable front part in an upper position.
- Figures 6 and 7 show respective profile views of the door opener of Figure 5 partially sectioned by plane B-B' and with the adjustable front part in the same upper position. Figure 6 represents the drive cam of the monitoring system in the inoperative position, and Figure 7 represents said cam in the operative position, operated by the catch of a door in the closed position.
- Figure 8 shows a perspective view of an embodiment variant of the door opener with a monitoring system according to the invention, in which the cam comprises a base body provided with fixing means for fixing a supplement forming the end of the cam, and it has been represented in an exploded view.
- Figure 9 shows a profile view of the door opener of Figure 8 partially sectioned by a transverse plane, with the adjustable front part of the bolt in a lower position and with the drive cam of the monitoring system in the inoperative position.
- Figure 10 shows a profile view of the door opener of Figure 8 partially sectioned by a transverse plane, with the adjustable front part of the bolt in an upper position and with the drive cam of the monitoring system in the inoperative position.

Detailed explanation of embodiments of the invention.

[0019] Figures 1 to 7 represent a door opener (1) provided with a bolt (2) with a rotating shaft (21) and having a height adjustable front part (3) between a lower position represented in Figures 1 to 4 and an upper position represented in Figures 5 to 7, and fixed to the bolt (2) by means of screws (4).

[0020] The mentioned front part (3) has in its front-upper area a stop (31) defining a lower plane (32) for retaining the catch (C) of the lock of a door when said door reaches a closed position, as shown in Figures 4 and 7.

[0021] The door opener (1) has an internal mechanism (not represented) for locking and unlocking the bolt (2), which can be driven by means of a solenoid, and a drive cam (51) of a monitoring system (5) for monitoring the state of the door, facing the front part (3) of the bolt (2).

[0022] The cam (51), formed in this exemplary embodiment by a one-piece body, is moved by the catch (C) of the door from an inoperative position represented in Figures 3 and 6, to an operative position represented in Figures 4 and 7 when said door reaches the closed position.

[0023] As can be seen in the mentioned Figures 1 to 7, the adjustable front part (3) of the bolt has a groove 33 affecting both the front face and the stop (31) of said adjustable front part (3).

[0024] Both the cam (51) and the front part (3) are sized such that said front part (3) is movable between: a lower position, shown in Figures 3 and 4, in which the end of the cam (51) is arranged inside the groove (33) of the stop (31), and an upper position in which the end of the cam is kept inside the groove (33) of the stop (31) or considerably flush with the lower plane (32) of the mentioned stop (31), as shown in Figures 6 and 7.

[0025] Regardless of the position in height of the front part (3) of the bolt, the sizing of the cam (51) and of the front part (3) of the bolt (2) prevent a space from being defined between the lower plane (32) of the stop (31) of the bolt and the end of the cam (51), in which the end of the catch (C) can be introduced without moving the cam (51) towards the operative position, causing a failure in the monitoring system for monitoring the state of the door.

[0026] As can be seen in Figures 3, 4, 6 and 7, the groove (33) has on the front face of the front part (3) a depth equal to or greater than the thickness of the cam (51), such that in the operative position the cam (51) is arranged inside the mentioned groove (33) as shown in Figures 4 and 7. The cam (51) therefore does not project from the front surface of the front part (3) and does not reduce the length (L) defined in the lower plane (32) of the adjustable stop (31) for supporting and retaining the catch (C) in the closed position of the door.

[0027] In the embodiment variant shown in Figures 8 a 10, the cam (51) comprises a supplement (52) fixed to the body of the cam (51) by fixing means (53) represented by a screw, said supplement (52) forming the end of the cam (51) intended for being housed in the groove (33) of the front part (3) of the bolt (2).

[0028] Having sufficiently described the nature of the invention as well as a preferred exemplary embodiment, it is hereby stated for all relevant purposes that the materials, shape, size and arrangement of the described elements may be modified, provided that this does not entail an alteration of the essential features of the invention which are claimed below.

Claims

1. A door opener with a monitoring system, comprising:

- a bolt (2) assembled on a rotating shaft (21);
- a height adjustable front part (3) with respect to the bolt (2) and provided with a stop (31) defining a lower plane (32) for retaining a catch (C) of a door in a closed position;
- a internal mechanism for locking and unlocking the bolt (2) activating a solenoid and,
- a drive cam (51) of a monitoring system (5) for monitoring the state of the door, facing the front part (3) of the bolt, and said cam being moved by the catch (C) of the door from an inoperative position to an operative position in which said cam (51) drives the monitoring system (5) by providing a signal about the closed state of the door; **characterised in that**:

  - the adjustable front part (3) of the bolt (2) comprises a receiving groove (33) of the cam (51), being defined on the front face and in the stop (31) of said front part (3) and;
  - said adjustable front part (3) is movable between: a lower position in which the end of the cam (51) is arranged inside the groove (33) of the stop (31) of the front part (3), and an upper position in which the end of the cam (51) is arranged considerably flush with the lower plane (32) of the stop (31) or inside the groove (33) of said stop (31).

2. The door opener according to claim 1, **characterised in that** the groove (33) has on the front face of the front part (3) a depth equal to or greater than the thickness of the cam (51), and **in that** said cam (51) is arranged, in its operative position, inside the mentioned groove (33).

3. The door opener according to any of claims 1 and 2, **characterised in that** the cam (51) is formed by a one-piece body.

4. The door opener according to any of claims 1 and 2, **characterised in that** the cam (51) comprises a supplement (52) fixed to the body of the cam by fixing means (53) and forming the end of the cam (51) intended for being housed in the groove (33) of the stop (31) of the front part.

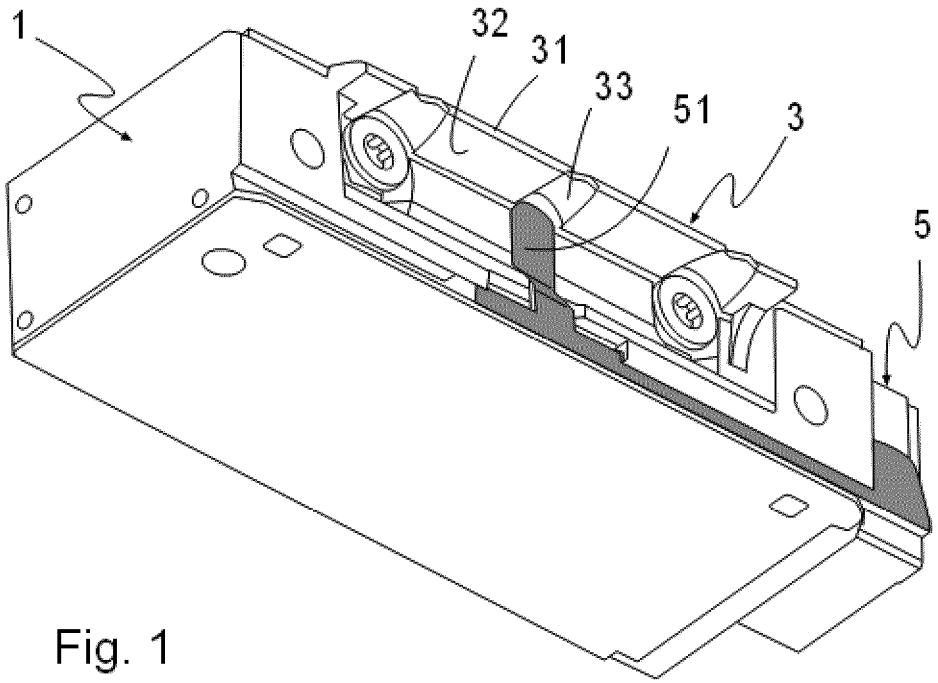

Fig. 1

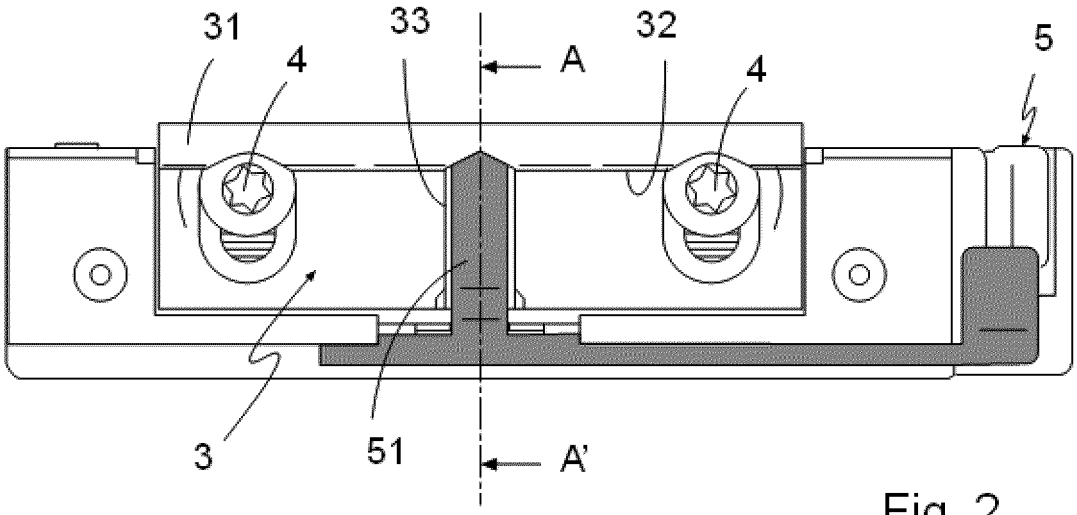

Fig. 2

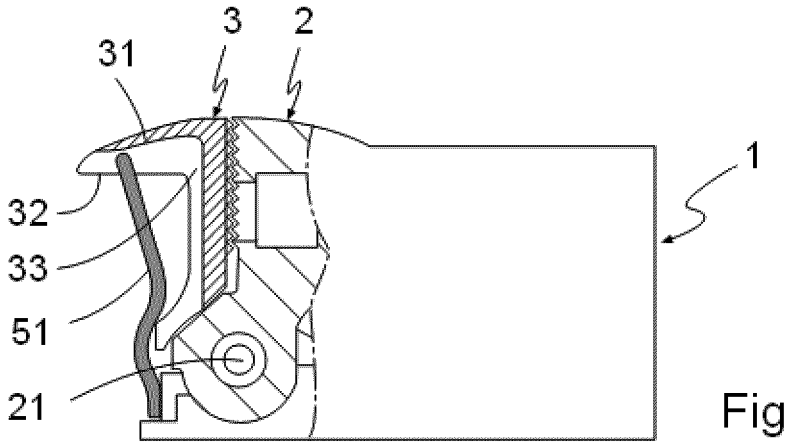

Fig. 3

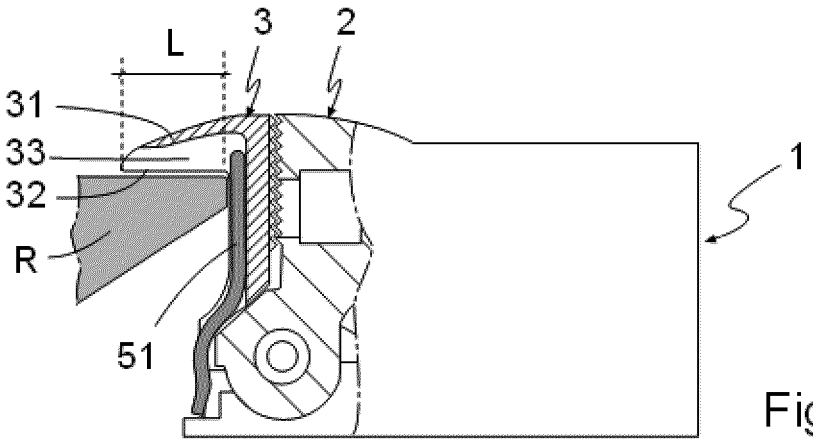

Fig. 4

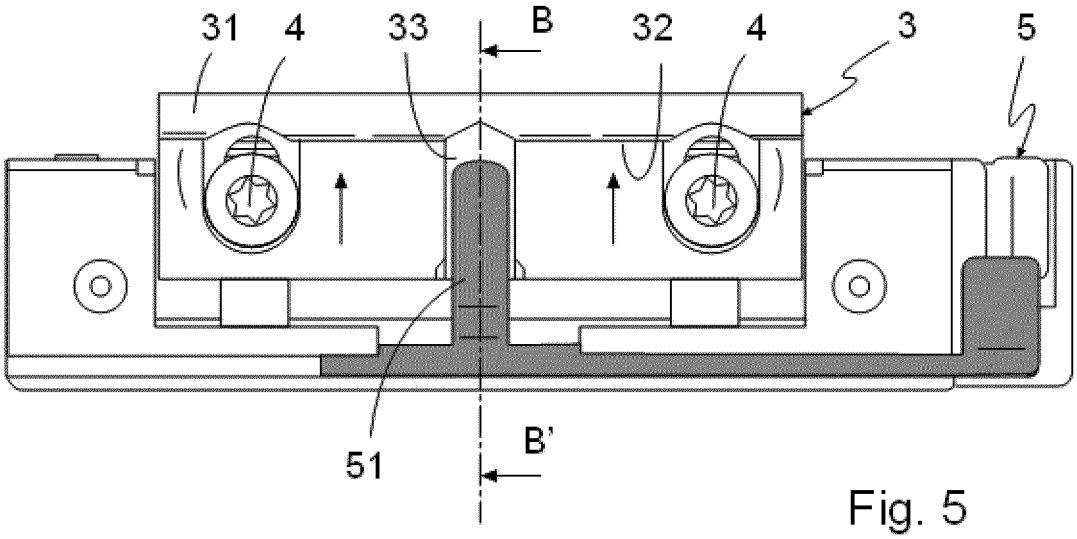

Fig. 5

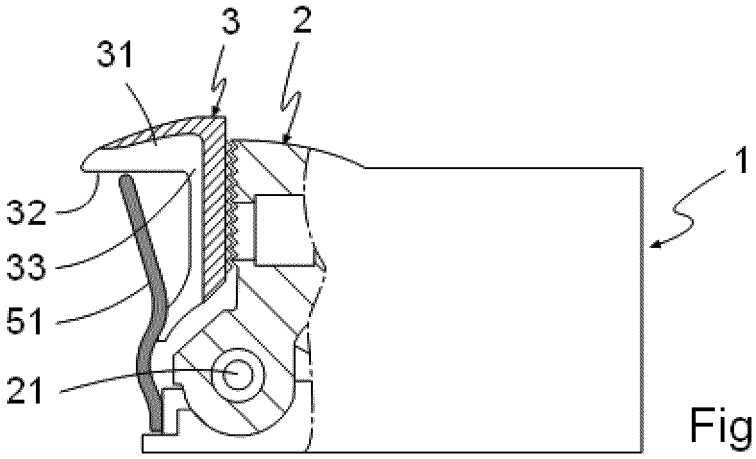

Fig. 6

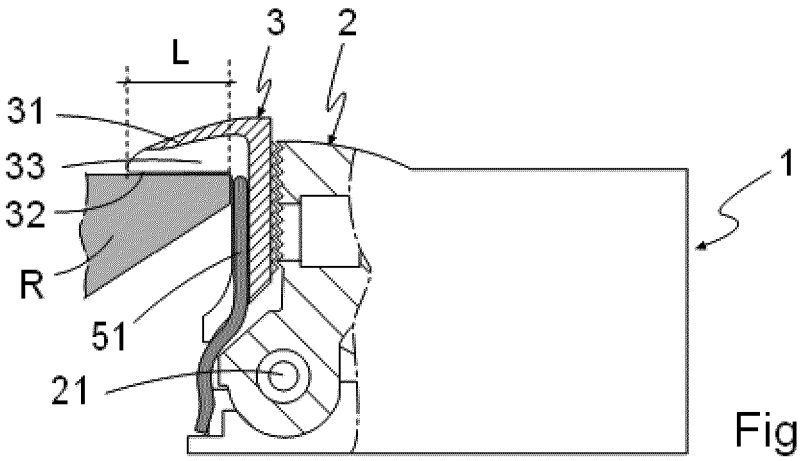

Fig. 7

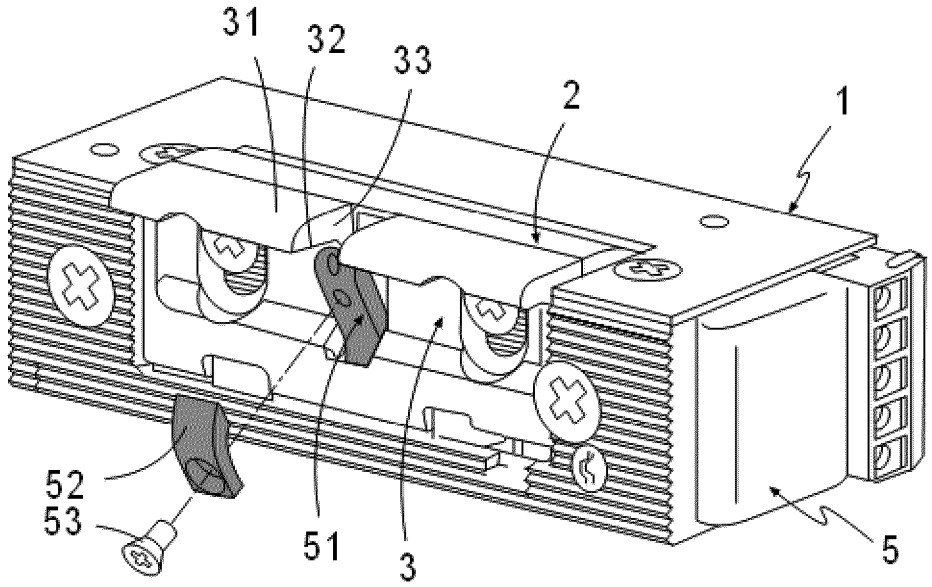

Fig. 8

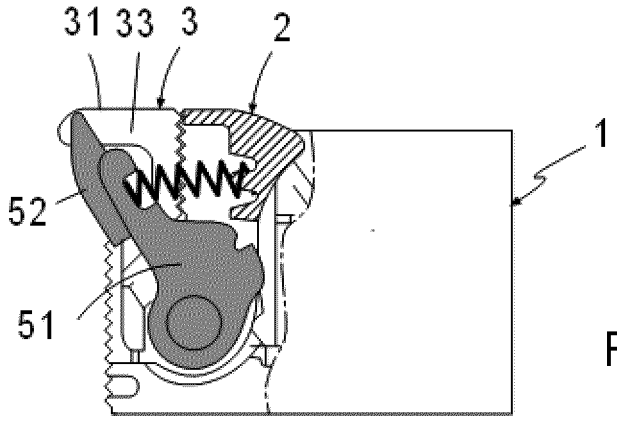

Fig. 9

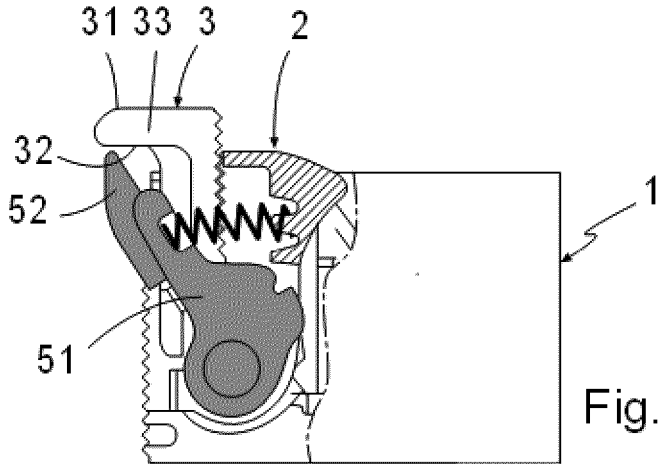

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 22 38 2337

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 10 2004 037827 A1 (ASSA ABLOY SICHERHEITSTECHNIK [DE]) 23 February 2006 (2006-02-23) * paragraph [0039] - paragraph [0052] * * figures 1-14 *	1-4	INV. E05B15/02 E05B47/00
X	ES 1 070 806 U (OPENERS & CLOSERS SL [ES]) 30 October 2009 (2009-10-30) * column 1, line 11 - line 21 * * column 2, line 48 - column 4, line 7 * * figures 1-5 *	1-4	
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X	EP 3 599 328 A1 (OPENERS & CLOSERS SL [ES]) 29 January 2020 (2020-01-29) * paragraph [0019] - paragraph [0027] * * figures 1-5 *	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 October 2022	Antonov, Ventseslav

CATEGORY OF CITED DOCUMENTS

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