

(19)



(11)

EP 4 560 094 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

28.05.2025 Bulletin 2025/22

(51) International Patent Classification (IPC):

E05B 47/02^(2006.01) E05B 65/10^(2006.01)

(21) Application number: **24212036.8**

(52) Cooperative Patent Classification (CPC):

E05B 65/1053; E05B 47/0012; E05B 47/023; E05B 65/108; E05B 2047/002; E05B 2047/0069; E05B 2047/0091; E05B 2047/0094

(22) Date of filing: **11.11.2024**

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR

Designated Extension States:

BA

Designated Validation States:

GE KH MA MD TN

(71) Applicant: **Iseo Serrature S.p.A.**

25055 Pisogne (Brescia) (IT)

(72) Inventor: **CONFORTI, Marco**

25055 Pisogne (Brescia) (IT)

(74) Representative: **Rapisardi, Mariacristina**

Ufficio Brevetti Rapisardi S.r.l.

Via Serbelloni, 12

20122 Milano (IT)

(30) Priority: **23.11.2023 IT 202300024900**

(54) **PANIC BAR**

(57) The panic bar (1) includes a support base (3), a manual push bar (2), a latch (5), and a control rod (6) for the latch (5) positioned in a longitudinal cavity (7) defined between the support base (3) and the manual push bar (2), within this cavity an elastic element (8) for the automatic reset of the manual push bar (2), a first rotatable element (9) to move the control rod (6), a second translatable element (10) to move the control rod (6) indepen-

dently of the first rotatable element (9), magnetic position sensors means (15, 19, 20) for the control rod (6), and a motorized module (11) to drive the second translatable element (10) are present, the motorized module (11) including a motorized reducer (12, 13) and a shell (14) for housing the motorized reducer (12, 13) and the magnetic sensors means (15, 19, 20), fixed to the support base (3).

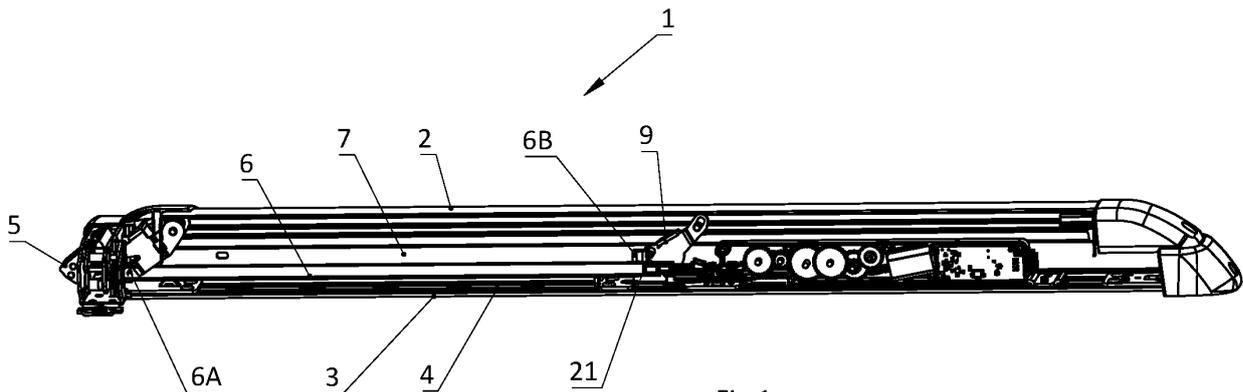


Fig.1

EP 4 560 094 A1

Description

[0001] The present invention pertains to a panic bar that includes a manually operated push bar placed along a longitudinal support base and movable in a direction transverse to its longitudinal axis to operate a latch control rod.

[0002] Electromechanical versions of panic bars are available on the market, in which the latch can be operated independently by the push bar or a geared motor. In these versions, sensor systems sometimes detect the starting and ending positions of the latch control rod to stop the geared motor and reverse its rotation.

[0003] Detecting the starting and ending positions of the latch control rod can also be used to track the number of times the panic bar is activated.

[0004] One of the common issues in these versions of panic bars is that the sensors positioned on the support base require long and complex electrical wiring for power supply and signal transmission.

[0005] Over time, the wiring may settle and interfere with moving parts, jeopardizing the integrity and/or functionality of the sensor system.

[0006] Additionally, the sensors are exposed to environmental contamination, and dirt accumulation can further degrade their performance.

[0007] Patent US2012/261928 A1 discloses a panic bar according to the preamble of claim 1, while EP 3 271 531 B1 shows a panic bar with a motorized module.

[0008] The technical objective of the present invention is, therefore, to develop an electromechanical panic bar that overcomes the technical drawbacks of known designs.

[0009] Within this technical objective, an aim of the invention is to create an electromechanical panic bar that maintains high performance over time.

[0010] Another aim of the invention is to provide an electromechanical panic bar that is easy to assemble. Additionally, the invention aims to supply an electromechanical panic bar with high operational flexibility, allowing tracking of activations caused by both the manual push bar and the geared motor.

[0011] The technical objective, as well as these and other aims, are achieved in the present invention by a panic bar that includes a longitudinal support base, a manually operated push bar arranged along this support base, a latch, a latch control rod positioned in a longitudinal cavity delimited between the support base and the manual push bar, and having a proximal end near to the latch and a distal end away from the latch, in that cavity an automatic reset elastic element for the manual push bar, a first rotatable element for actuating the control rod, a second actuating element for the control rod that operates independently of the first rotatable element, magnetic position sensors means for the control rod, and a motorized module for actuating the second element are present, wherein the motorized module comprises a gearmotor and a shell for housing both the

gearmotor and the magnetic sensors means, which is fixed to the support base.

[0012] In a preferred embodiment of the invention, the magnetic sensor means include a magnetic field-generating element supported by an extension on the distal end of the control rod, extending into the housing, and at least a first magnetic field-sensitive element fixed within the housing.

[0013] In a preferred embodiment of the invention, the second movement element engages the control rod in a disengageable manner.

[0014] In a preferred embodiment of the invention, the second movement element is translatable.

[0015] In a preferred embodiment of the invention, the magnetic sensor means include a second magnetic field-sensitive element fixed within the housing, where the magnetic field-generating element can align with the first magnetic field-sensitive element to indicate the position of the control rod corresponding to an open state of the latch, and with the second magnetic field-sensitive element to indicate the position of the control rod corresponding to a closed state of the latch.

[0016] In a preferred embodiment of the invention, the first rotatable movement element is configured to transform movement from the manual push bar into movement of the control rod, is rotatable against and by action of the elastic reset element and includes a cam that captures movement from the manual push bar and a cam that transfers movement to the latch control rod.

[0017] In a preferred embodiment of the invention, this movement-transferring cam is configured to impart to the latch control rod a motion that includes both a translational and a rotational component.

[0018] In a preferred embodiment of the invention, the extension is formed by a series of elements, including a proximal terminal element close to the control rod, a distal terminal element away from the control rod, and an intermediate articulated connection element between the proximal terminal element close to the control rod and the distal terminal element.

[0019] In a preferred embodiment of the invention, the proximal terminal element close to the control rod is rigidly fixed to the control rod.

[0020] In a preferred embodiment of the invention, the magnetic field-generating element is supported by the distal terminal element.

[0021] In a preferred embodiment of the invention, the distal terminal element is slidable along a linear guide supported by the translatable element.

[0022] In a preferred embodiment of the invention, the distal terminal element and the translatable element are movable parallel to one another.

[0023] Additional features and advantages of the invention will become more evident from the description of a preferred but non-exclusive embodiment of the panic bar, provided illustratively and not restrictively in the accompanying drawings, in which:

Figure 1 shows an axonometric view of the panic bar without the motorized module and the manual push bar for viewing convenience;

Figure 2 shows an axonometric view of a detail of the panic bar corresponding to the extension of the control bar;

Figure 3 shows an exploded view of the extension of the control bar and the electronic board where the second and third magnetic elements are mounted;

Figure 4A shows a top view of the panic bar with the manual push bar (sectioned along a horizontal longitudinal plane) at rest;

Figure 4B shows a top view of the panic bar with the control rod actuated by the manual push bar (sectioned along a horizontal longitudinal plane), manually pressed;

Figure 4C shows a top view of the panic bar with the control rod actuated by the motorized module.

[0024] Referring to the cited figures, a panic bar is shown, designated overall by reference number 1. The panic bar 1 includes a manual push bar 2 arranged along a longitudinal support base 3. More precisely, the support base 3 is made of a "U" profile that houses the push bar 2, which is also made of a "U" profile, with its concave side facing that of the base 3.

[0025] The top wall of the push bar 2 faces the bottom wall 4 of the support base 3, while the side walls of the push bar 2 are positioned further inside than the side walls of the base 3. The bottom wall 4 of the support base 3 is flat for attachment to the wall of a door frame. The push bar 2 is supported by the support base 3 in a way that allows reversible sliding movement perpendicular to the flat bottom wall 4 of the support base 3.

[0026] The panic bar also includes a latch 5 and a control rod 6 for the latch 5, positioned in the longitudinal cavity 7, which is enclosed between the support base 3 and the push bar 2. The control rod 6 has a proximal end 6a near the latch 5 and a distal end 6b away from the latch 5.

[0027] In the longitudinal cavity 7, there is also an elastic element 8 for the automatic reset of the push bar 2, a first rotatable movement element 9 for operating the control rod 6, a second movement element 10 for the control rod 6, and a motorized module 11 to drive the second translatable movement element 10. The motorized module 11 includes a motorized reducer 12, 13, and a housing 14 for the motorized reducer 12, 13, fixed to the support base 3.

[0028] The housing 14 also contains specialized magnetic position sensors 15, 19, 20, configured and arranged to detect the position of the control rod 6. The control rod 6 can be operated independently via the first movement element 9 and the second movement element 10. To this end, the second movement element 10 can engage the control rod 6 in a disengageable manner, and it is translatable.

[0029] The first movement element 9 of the control rod

6 is configured to transform the movement of the manual push bar 2 into movement of the control rod 6 and is rotatable against and by the action of the reset elastic element 8. The sensor means 15, 19, 20 include a magnetic field-generating element 15 supported by an extension 16, 17, 18 on the distal end 6b of the control rod 6. The magnetic field-generating element 15 is specifically a permanent magnet. The extension 16, 17, 18 on the distal end 6b of the control rod 6 extends inside the housing 14.

[0030] The magnetic sensors 15, 19, 20 include at least one first magnetic field-sensitive element 19 fixed within the housing 14, and preferably a second magnetic field-sensitive element 20 also fixed within the housing 14. The first magnetic field-sensitive element 19 and the second magnetic field-sensitive element 20 are arranged offset along the translation path of the magnetic field-generating element 15 and are mounted on an electronic board 26, also housed in a fixed position inside the housing 14.

[0031] The magnetic field-generating element 15 can align with the first magnetic field-sensitive element 19 to signal the position of the control rod 6 corresponding to an open state of the latch 5, in which the latch is retracted within the cavity 7, and with the second magnetic field-sensitive element 20 to signal the position of the control rod 6 corresponding to a closed state of the latch 5, in which the latch protrudes outside the cavity 7.

[0032] The first movement element 9 of the control rod 6 is positioned within the longitudinal cavity 7, enclosed between the support base 3 and the push bar 2. Specifically, the first movement element 9 of the control rod 6 is pivoted to the support base 3 with a rotation axis 21 perpendicular to the movement axis of the push bar 2 and the longitudinal axis of the support base 3. More precisely, the movement axis of the push bar 2 is horizontal, while the rotation axis 21 of the first movement element 9 is vertical. The first movement element 9 of the control rod 6 includes a cam 22 to receive movement from the push bar 2 and a cam 23 to transmit movement to the control rod 6. The movement-receiving cam 22 from the push bar 2 consists of two opposing pins that slide along corresponding, mirror-image longitudinal slots 27 on the inner side walls of the push bar 2. The movement-transmitting cam 23 is specifically configured to transmit to the control rod 6 a motion that has a primary component of longitudinal translational movement and a secondary component of rotational movement.

[0033] The movement-transmitting cam 23 is formed by two open, curvilinear, mirror-image slots located on the two sides of the first movement element 9 of the control rod 6, in which corresponding pins 24 slide, extending symmetrically from both sides of the distal end 6b of the control rod 6. The reset elastic element 8 is specifically a torsional spring wound around the rotation axis 21 of the first movement element 9 of the control rod 6, with one fixed end and one end that can be rotated by the first movement element 9 of the control rod 6.

[0034] In the illustrated solution, the latch 5 is opera-

tively connected to the control rod 6 and is supported by the support base 3 with a rotation axis parallel to the rotation axis 21 of the first movement element 9 of the control rod 6. The operative connection between the control rod 6 and the latch 5 can be achieved through an actuating pin of the latch 5 fixed to the control rod 6, which slides within a slot on the latch 5, or vice versa. When the push bar 2 is pressed, the first movement element 9 rotates and moves the control rod 6 in a direction that corresponds to the latch 5 retracting inward into the cavity 7, allowing the door to open, and, as a result of this movement of the first movement element 9, the torsional spring 8 is loaded.

[0035] When the push bar 2 is released, the torsional spring 8 unloads, rotating the first movement element 9 in the opposite direction, pulling the control rod 6 in a direction that causes the latch 5 to extend outward from the cavity 7, thus closing the door.

[0036] The extension 16, 17, 18 consists of a series of elements, including a proximal terminal element 16 near the control rod 6 and a distal terminal element 18 away from the control rod 6. This series of elements also includes an intermediate articulated connection element 17 between the proximal terminal element 16 near the control rod 6 and the distal terminal element 18.

[0037] The proximal terminal element 16 is rigidly attached to the control rod 6. The magnetic field-generating element 15 is supported by the distal terminal element 18 of the extension 16, 17, 18 on the distal end 6b of the control rod 6. The distal terminal element 18 of the distal end 6b of the control rod 6 slides along a linear guide 25 supported by the second translatable element 10. The distal terminal element 18 and the second movement element 10 move parallel to each other, particularly in the longitudinal direction of the support base 3.

[0038] The second movement element 10 of the control rod 6 is configured and arranged to engage the distal end 6b of the control rod 6, specifically a stop feature designed on the distal end 6b of the control rod 6, thereby pushing the control rod 6. The second movement element 10 includes a rack 28, which meshes with a terminal gear 30 of a gear assembly with various diameters 30 that forms the reducer 13. The first gear 30 of the assembly meshes with the thread of a threaded rod 31, which can rotate on its axis, driven by the motor 12.

[0039] The gears 30 have an axis of rotation parallel to the rotation axis 21 of the first movement element 9 of the control rod 6. The threaded rod 31 has an axis inclined relative to the longitudinal direction of the support base 3.

[0040] The operation of the panic bar 1 is briefly as follows:

The first mode of operation is manual activation of the panic bar 1 via the push bar 2. Initially, when the push bar 2 is at rest, the control rod 6 is in a position where the latch 5 is extended, keeping the door closed. When the push bar 2 is pressed, it rotates the first movement element 9, which in turn pushes the control rod 6 in a direction that corresponds to the retraction of the latch 5, opening the

door. The control rod 6 then also rotates the first movement element 9, loading the torsional spring 8. The door remains in the open state as long as manual pressure is applied to the push bar 2.

[0041] When manual pressure on the push bar 2 is released, the reset spring 8 automatically returns the control rod 6 to its initial position. When the push bar 2 is at rest, the magnetic field-generating element 15 aligns with the second magnetic field-sensitive element 20, which detects this alignment and signals it to the electronic board 26, identifying this alignment condition as the closed state of the latch 5.

[0042] When the push bar 2 is pressed, the magnetic field-generating element 15 aligns with the first magnetic field-sensitive element 19, which detects this alignment and signals it to the electronic board 26, identifying this alignment condition as the open state of the latch 5.

[0043] The second mode of operation is when the panic bar 1 is activated via the motorized module 12, 13, which can be controlled remotely. Initially, as in the previous example, the control rod 6 is in a position where the latch 5 is extended to close the door. When the motor 12 is activated in one direction due to a remote command for opening, the motorized reducer 12, 13 moves the second movement element 10, which in turn moves the control rod 6 in a direction corresponding to the retraction of the latch 5, opening the door. The control rod 6, in turn, rotates the first movement element 9, loading the torsional spring 8.

[0044] The stroke of the control rod 6 occurs between an initial position, where the magnetic field-generating element 15 aligns with the second magnetic field-sensitive element 20, and a final position, where the magnetic field-generating element 15 aligns with the first magnetic field-sensitive element 19. Specifically, the first magnetic field-sensitive element detects this alignment of the magnetic field-generating element 15 and signals it to the electronic board 26, which then stops the motorized reducer 12, 13.

[0045] When the motor 12 is activated in the opposite direction following a remote command to close the door, the motorized reducer 12, 13 returns to the initial configuration where the magnetic field-generating element 15 aligns with the second magnetic field-sensitive element 20. The second magnetic field-sensitive element 20 detects this alignment and signals it to the electronic board 26, which stops the motorized reducer 12, 13.

[0046] In this case, the second movement element 10 returns to its initial position thanks to the force exerted on it by the distal end 6b of the control rod 6, which is moved by the reset spring 8. Essentially, the first and second magnetic field-sensitive elements (19 and 20) detect two positions of the magnetic field-generating element 15, which correspond to stopping the motor 12 of the motorized reducer 12, 13. Advantageously, the electronic board 26 can count and record the number of door openings triggered by both the push bar 2 and the motorized module 11. Additionally, the motorized module 11 is

compatible for retrofit installation, allowing upgrades to products already on the market without requiring replacement of other components of the panic lock 1. Finally, the protected placement of the position sensors within the housing 14 of the motorized module 11 eliminates many issues encountered in known technologies, as it does not require complex electrical wiring exposed to environmental contamination.

[0047] The panic bar, as conceived, is open to numerous modifications and variations, all falling within the inventive concept; furthermore, all details can be replaced with technically equivalent elements. Practically, the materials used, as well as the dimensions, can be adapted according to requirements and the state of the art.

Claims

1. Panic bar (1) comprising a longitudinal support base (3), a manual push bar (2) arranged along said support base (3), a latch (5), a control rod (6) for the latch (5) positioned in a longitudinal cavity (7) delimited between said support base (3) and said manual push bar (2) and having a proximal end (6a) near the latch (5) and a distal end (6b) away from the latch (5), in that said cavity (7) an elastic element (8) for automatic reset of the manual push bar (2), a first rotatable element (9) for actuating said control rod (6), a second actuating element (10) for the control rod (6) independently of said first rotatable element (9), magnetic position sensor means (15, 19, 20) for said control rod (6), and a motorized module (11) for actuating said second element (10) are present, **characterized in that** said motorized module (11) comprises a gearmotor (12, 13) and a shell (14) for housing said gearmotor (12, 13) and said magnetic sensor means (15, 19, 20) fixed to said support base (3).
2. Panic bar (1) according to claim 1, **characterized in that** said magnetic sensor means (15, 19, 20) comprise a magnetic field generating element (15) supported by an appendage (16, 17, 18) of the distal end (6b) of said control rod (6) extending into said shell (14) and at least one first magnetic field sensitive element (19) fixed inside said shell (14).
3. Panic bar (1) according to any preceding claim, **characterized in that** said second actuating element (10) engages said control rod (6) in a disengageable manner.
4. Panic bar (1) according to any preceding claim, **characterized in that** said second actuating element (10) is translatable.
5. Panic bar (1) according to any one of claims 2 to 4, **characterized in that** said magnetic sensor means (15, 19, 20) comprise a second magnetic field sensitive element (20) fixed inside said shell (14), wherein said magnetic field generating element (15) is alignable with said first magnetic field sensitive element (19) to indicate the position of said control rod (6) corresponding to an open state of the latch (5), and with said second magnetic field sensitive element (20) to indicate the position of said control rod (6) corresponding to a closed state of the latch (5).
6. Panic bar (1) according to any preceding claim, **characterized in that** said first rotatable element (9) is configured to transform a movement of the manual push bar (2) into a movement of said control rod (6), is rotatable against the action of the elastic reset element (8), and comprises a cam (22) for receiving movement from the manual push bar (2) and a cam (23) for transferring movement to the control rod (6) of the latch (5).
7. Panic bar (1) according to the preceding claim, **characterized in that** said movement transfer cam (23) is configured to transfer to the control rod (6) of the latch (5) a movement having both translational and rotational components.
8. Panic bar (1) according to the preceding claim, **characterized in that** said appendage (16, 17, 18) is formed by a series of elements comprising a proximal end element (16) attached rigidly to the control rod (6), a distal end element (18) away from the control rod (6), and an intermediate connecting element (17) pivotally connecting said proximal end element (16) to said distal end element (18) of the control rod (6).
9. Panic bar (1) according to the preceding claim, **characterized in that** said proximal end element (16) is rigidly attached to said control rod (6).
10. Panic bar (1) according to any one of claims 7 to 9, **characterized in that** said magnetic field generating element (15) is supported by said distal end element (18).
11. Panic bar (1) according to any one of claims 7 to 10, **characterized in that** said distal end element (18) is slidable along a linear guide (25) supported by said translatable element (10).
12. Panic bar (1) according to the preceding claim, **characterized in that** said distal end element (18) and said translatable element (10) are movable parallel to each other.

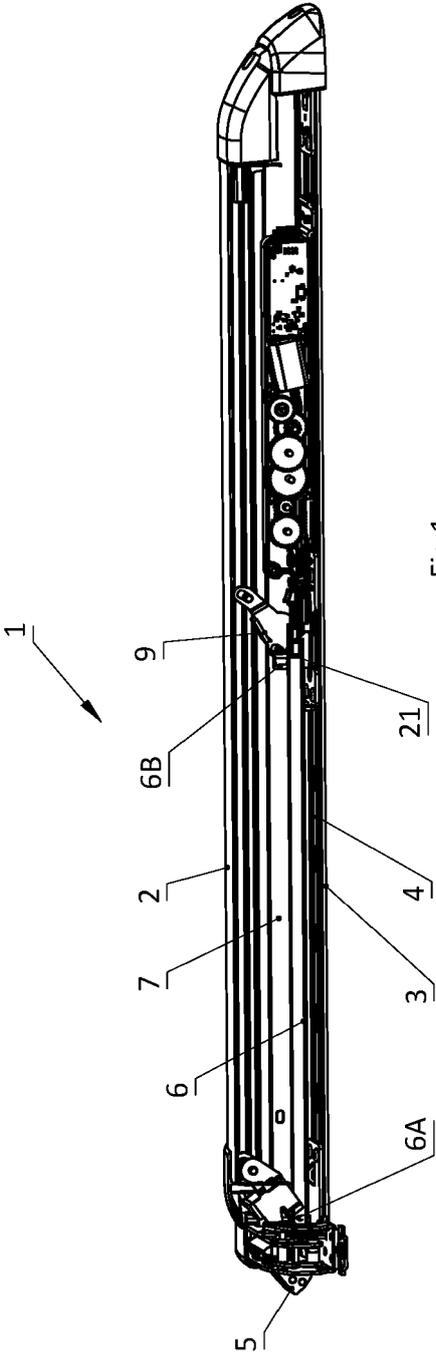


Fig.1

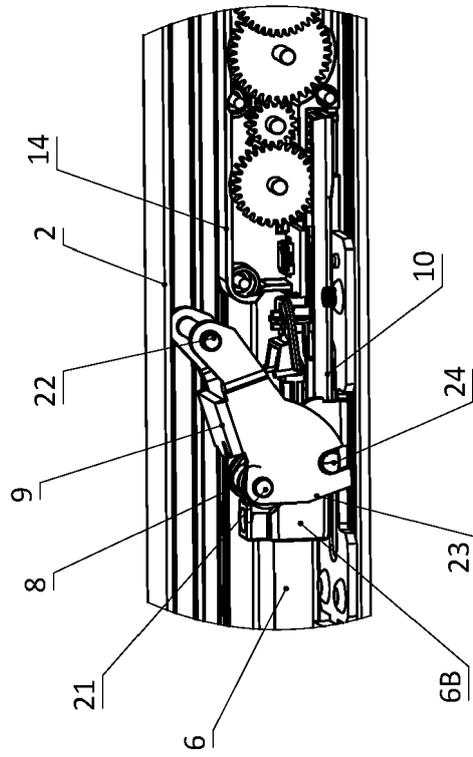


Fig.2

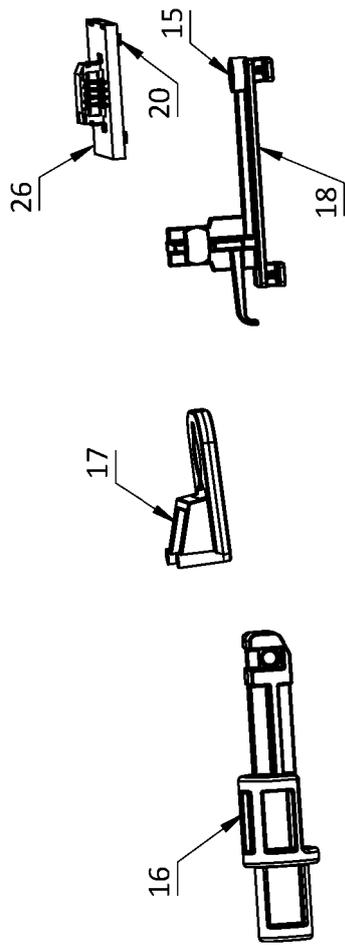


Fig. 3

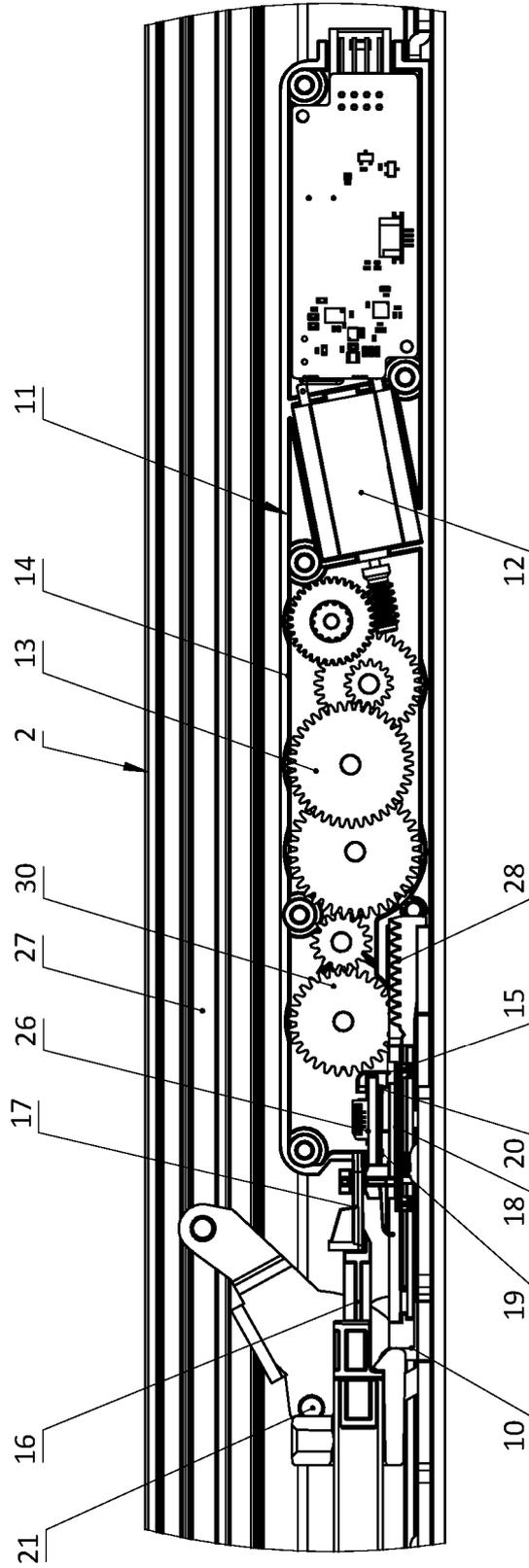


Fig. 4A

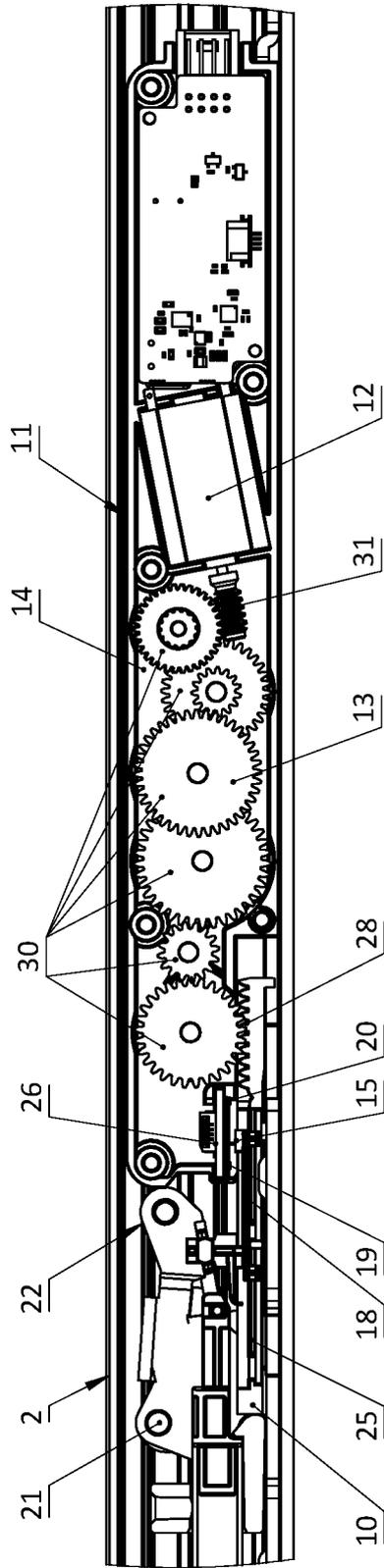


Fig.4B

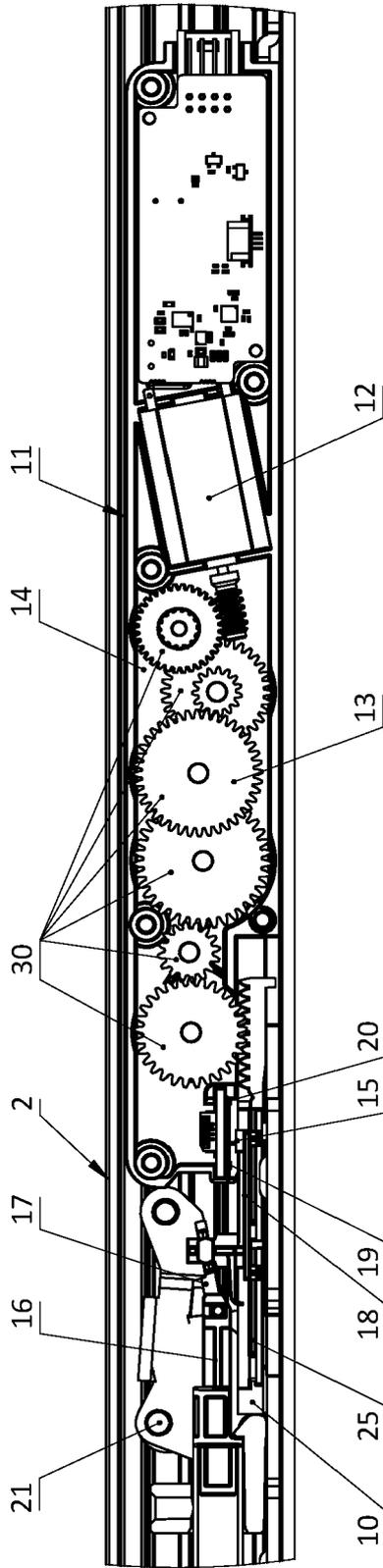


Fig.4C



EUROPEAN SEARCH REPORT

Application Number

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			E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 March 2025	Examiner Goddar, Claudia
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