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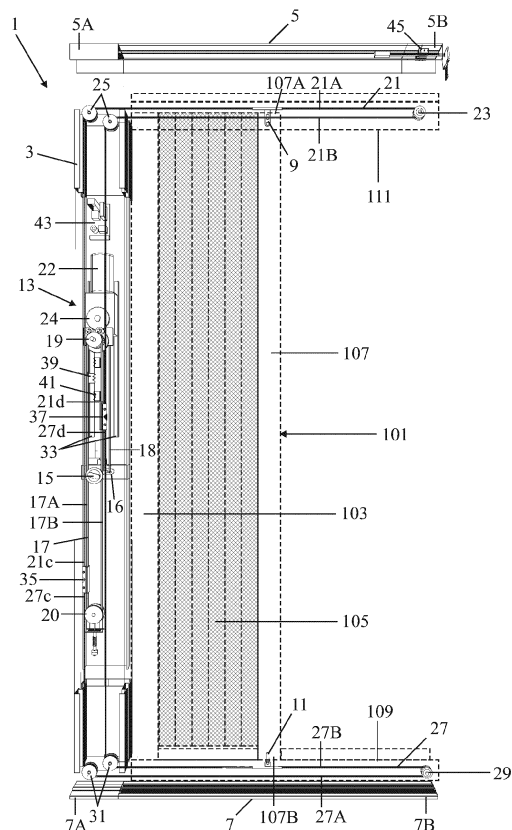
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(54) **SCREEN DOOR CONTROL DEVICE FOR AUTOMATIC OPENING AND CLOSING OF A SCREEN DOOR**

(57) A screen door operating device 1 has a vertical tube 3, an upper guide profile 5 and a lower guide profile 7 which can be coupled to a screen door 101. The screen door has a cassette 103 which can be coupled to the tube 3. An insect screen 105 is folded in the cassette, which is attached to a vertical closing strip 107 which is movable in the upper and in the lower guide profile 5, 7 and thereby pulls the insect screen 105 out of the cassette 103 or pushes it into the cassette. Two drivers 9, 11 are movable in the upper and lower guide profiles 5, 7, and can be coupled to the vertical closing strip 107. In the tube 3 and in the lower and upper guide profiles 5, 7 a drive 13 is present for moving these drivers 9, 11. This drive 13 is operated by a switch 15 present on the tube 3.



**FIG. 1**

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## Description

### Technical field of the invention

[0001] The invention relates to a screen door operating device for automatically opening and closing a screen door, the screen door comprising an elongate insect screen holder for a rolled or concertina folded insect screen that with an edged is attached to an elongate, movable and in operation vertically oriented closing strip which is parallel to the elongate insect screen holder and is movable between an open position in which the insect screen is rolled up or folded and a closed position in which the insect screen is unrolled or unfolded.

### Background of the invention

[0002] From EP3382135A1 an automatic screen door is known in which a drive motor is present in the cassette, which via a mechanism shifts the vertical post over the bottom sill and thus pushes the insect screen into the cassette or pulls it out of the cassette. Such an automatic screen door is relatively expensive because the existing production process has to be radically adapted or an entirely new production process has to be set up.

### Summary of the invention

[0003] An object of the invention is to provide a screen door operating device which is relatively inexpensive. To this end, the screen door operating device according to the invention is characterized in that it comprises:

- an upper guide profile, for guiding the upper end of the movable vertical closing strip, which upper guide profile can be connected with a first end to the insect screen holder, as well as
- a lower guide profile, for guiding the lower end of the movable vertical closing strip, which lower guide profile can be connected with a first end to the insect screen holder,
- an upper driver which is movable in the upper guide profile and which can be coupled to the upper end of the vertical closing strip,
- a lower driver which is movable in the lower guide profile and which can be coupled to the lower end of the vertical closing strip,
- a drive for moving the drivers and thus also the closing strip, for automatically opening and closing the screen door, which drive is mounted against the insect screen holder and is present in the lower and upper guide profile, and
- at least one switch for operating the drive.

[0004] The screen door operating device according to the invention can be applied to existing screen doors. This means that existing production processes for screen doors do not have to be adapted. Only an operating de-

vice has to be produced that has to be fitted around an already existing screen door.

[0005] An embodiment of the screen door operating device according to the invention is characterized in that the drive comprises:

- an elongate, flexible, upper drive element, to which the upper driver is attached, as well as
- an elongated, flexible, lower drive element to which the lower driver is attached, and
- a drive motor mounted against the insect screen holder,

which drive elements are connected to the drive motor in such a way that they move the two drivers simultaneously in the guide profiles during opening and closing of the screen door.

[0006] This construction is simple and effective. An elongated, flexible, upper drive element can be a cord or string. By using cord or belt drives, protection against overload is obtained by limiting the maximum force due to the rope or belt slipping over a wheel.

[0007] An embodiment of the screen door operating device according to the invention, in which the lower and upper drive elements can be moved well, is characterized in that the drive further comprises a central drive element which is wrapped around a drive wheel connected to the drive motor, from which drive wheel two parallel branches of the middle drive element extend, wherein the upper and lower drive elements with their ends are attached to both branches of the middle drive element.

[0008] Preferably:

- the lower drive element has a first end connected to the middle drive element at a first branch of the two parallel branches of the middle drive element and a second end of the lower drive element is connected to the middle drive element at a second branch of the two parallel branches of the middle drive element, and
- the upper drive element has a first end connected to the middle drive element at a first branch of the two parallel branches of the middle drive element and a second end of the upper drive element is connected to the middle drive element at a second branch of the two parallel branches of the middle drive element.

[0009] An embodiment of the screen door operating device according to the invention, in which the drivers can be moved simultaneously, is characterized in that:

- the upper drive element is wrapped around an upper guide wheel which is present near a second end of the upper guide profile and is guided by two upper guides located at the top against the insect screen holder from vertical to horizontal direction and vice versa, wherein two parallel branches of the upper

drive element being present between the middle drive element and the upper guide wheel, of which a first branch is connected to the first branch of the middle driving element and a second branch is connected to the second branch of the middle driving element,

- the lower drive element is wrapped around a lower guide wheel which is present near a second end of the lower guide profile and is guided by two lower guides located at the bottom against the insect screen holder from vertical to horizontal direction and vice versa, wherein two parallel branches of the lower drive element are present being present between the middle drive element and the lower guide wheel, of which a first branch is connected to the first branch of the middle drive element and a second branch is connected to the second branch of the middle drive element, and
- the lower driver is connected to the lower drive element at the location of the second branch of the lower drive element and the upper driver is connected to the upper drive element at the location of the first branch of the upper drive element.

**[0010]** In a practical embodiment, the middle drive element is endless and, in addition to said drive wheel, is wrapped around a further wheel which is located at a vertical distance from the drive wheel.

**[0011]** In another practical embodiment:

- the middle drive element has two ends,
- the end of the first branch of the lower drive element is attached to the end of the first branch of the middle drive element and the end of the second branch of the lower drive element is attached to the end of the second branch of the middle drive element, and
- the end of the first branch of the upper drive element is attached to the first branch of the middle drive element and the end of the second branch of the upper drive element is attached to the second branch of the middle drive element.

**[0012]** In order to have the closing strip stop automatically and to be able to set the extreme position of the closing strip, a further embodiment of the screen door operating device according to the invention is characterized in that next to each branch of the middle drive element there is a further switch which is operated by a coupling piece by which the drive elements are attached to the middle drive element for switching off the drive motor in the extreme positions of the vertical closing strip in which the screen door is fully open or closed.

**[0013]** Another embodiment for stopping the closing strip automatically and being able to set the extreme position of the closing strip, is characterized in that a sensor for switching off the drive motor is present next to each branch of the third drive element in the extreme positions of the vertical closing strip in which the screen door is

fully open or closed.

**[0014]** A further embodiment of the screen door operating device according to the invention is characterized in that the drive motor is movable along a vertical guide and the switch is designed as a push button and when pressed activates the drive motor to move the drivers, which push button can also be turned and when turned moves the drive motor along the vertical guide thereby disengaging the drive motor from the driven drive wheel. Because the drive motor can be easily disconnected, the screen door can be easily operated manually. By integrating many functions into the rotary knob, few switches are required to control the drive.

**[0015]** Another embodiment in which the drive motor can be easily disconnected is characterized in that the switch when turned moves an operating rod which displaces the drive motor and thereby disengages a gear wheel present on an output shaft of the drive motor from engagement with a further gear of the transmission coupled to the drive wheel, so that the drive motor can be disengaged from the drive wheel and the drive wheel can rotate freely.

**[0016]** In order to prevent problems from occurring if the closing strip is blocked during closing of the screen door, a further embodiment of the screen door operating device according to the invention is characterized in that the drive motor is provided on a carriage which can be moved downwards against a spring force and that a safety switch is provided below and spaced from the carriage, which switch, when activated, causes the drive motor to rotate in the direction for opening the screen door, so that when the closing strip is blocked during closing of the screen door, the drive motor pulls itself and the associated carriage downwards and activates the safety switch.

**[0017]** Yet another embodiment of the screen door operating device according to the invention is characterized in that it comprises a control unit which, after displacing the drivers for opening the screen door, after a preset time, moves the drivers back to the position where the screen door is closed.

**[0018]** Yet another embodiment of the screen door operating device according to the invention is characterized in that the switch is incorporated in the closing strip, such that the switch is actuated by tapping the closing strip.

**[0019]** The invention also relates to an automatic screen door device comprising a screen door that includes:

- a vertical insect screen holder, as well as
- a coiled or concertina folded insect screen parallel to and connected to the insect screen holder, and
- an elongate, movable vertical closing strip which is parallel to the insect screen holder wherein the insect screen is attached with an edge to the vertical closing strip,

which automatic screen door device further comprises a screen door operating device according to the invention.

### Brief description of the drawings

**[0020]** The invention will be further elucidated below on the basis of an exemplary embodiment shown in the drawings of the screen door operating device and an automatic screen door device according to the invention. Hereby is:

Figure 1 an exploded view of the screen door operating device for cooperation with an existing screen door;

Figure 2 the drive of the screen door operating device shown in Figure 1 in detail;

Figure 3 an enlarged view of the main part of the drive shown in Figure 2;

Figure 4 an exploded view of the automatic screen door device;

Figure 5 the drive of the automatic screen door device shown in Figure 4 in detail; and

Figure 6 an enlarged part of the main part of the drive shown in figure 5.

### Detailed description of the drawings

**[0021]** Figures 1-3 show an embodiment of the screen door operating device according to the invention. The screen door operating device 1 has a vertical tube 3, an upper guide profile 5 which, at a first end 5A, is connected with the vertical tube 3, and a lower guide profile 7 which, at a first end 7A, is coupled with the vertical tube 3. The vertical tube 3 and the lower and upper guide profiles 5 and 7 can be coupled to a screen door 101 which is indicated in broken lines in figure 1. The screen door has an elongate insect screen holder which is designed as a cassette 103 which can be coupled to the vertical tube 3. In the cassette, an insect screen 105 is folded in concertina shape, which is attached with one edge to a vertical closing strip 107 which is parallel to the elongate cassette 103 and which is displaceable with an upper end 107A in the upper guide profile 5 and with a lower end 107B in the lower guide profile 7 while pulling the insect screen 105 out of the cassette 103 or pushing it into the cassette.

**[0022]** Two drivers 9 and 11 can be moved in the upper and lower guide profile 5 and 7, which drivers can be coupled to the vertical closing strip 107 of the screen door. A drive 13 is present in the vertical tube 3 and in the lower and upper guide profiles 5 and 7 for displacing the drivers 9 and 11. This drive 13 is operated by a switch 15 present on the vertical tube 3. The screen door 101 has also a lower guide 109 over which the vertical closing strip 107 runs and an upper guide 111 in which the vertical closing strip 107 is movable. These guides must be omitted when coupling the screen door 101 with the screen door operating device 1 and should be replaced by the lower and upper guide profiles 5 and 7 of the screen door operating device 1.

**[0023]** The drive 13 has a drive motor 22 which is

present in the vertical tube 3 and which drives a belt drive wheel 19 via a gear transmission (of which gear 24 is part, among other things). An endless central drive element, in the form of a drive belt 17, is wrapped around this belt drive wheel 19 and a further belt wheel 20. The two belt wheels 19 and 20 are located in the vertical tube 3 at a vertical distance from each other. Two parallel branches 17A and 17B of the drive belt 17 extend between the belt wheels 19 and 20.

**[0024]** The drive 13 furthermore has an upper drive element, designed as a drive cord 21, which is connected at both ends to the drive belt 17 and which is wrapped via two upper guide rollers 25 present in the top of the vertical tube 3 around an upper cord guide wheel 23 which is located near a second end 5B of the lintel. This upper drive cord 21 is connected to the drive belt 17 with a first end 21c at the location of the first branch 17A and is connected to the drive belt 17 with a second end 21d at the location of the second branch 17B. The upper guide rollers 25 guide the upper drive cord 90 degrees from vertical to horizontal direction and vice versa. Between the drive belt 17 and the upper cord guide wheel 23, there are two parallel branches 21A, 21B of the upper drive cord 21, of which a first branch 21A is connected to the first branch 17A of the drive belt and a second branch 21B is connected to the second branch 17B of the drive belt.

**[0025]** Furthermore, the drive 13 is provided with a lower drive element, also designed as a drive cord 27, which is also connected to the drive belt at both ends, a first end 27c of the lower drive cord being connected to the drive belt 17 at the location of the first branch 17A and a second end 27d of the lower drive cord is connected to the drive belt 17 at the second branch 17B. The lower drive cord 27 is wrapped around a lower cord guide wheel 29 which is present near a second end 7B of the lower guide profile and is guided by two lower guide rollers 31 present in the bottom of the vertical tube 3 from vertical to horizontal direction and vice versa.

**[0026]** Between the drive belt 17 and the lower cord guide wheel 29 there are two parallel branches 27A, 27B of the lower drive cord 27, of which a first branch 27A is connected to the first branch 17A of the drive belt and a second branch 27B is connected to the second branch 17B of the drive belt.

**[0027]** The lower driver 11 is connected to the first branch 27A of the lower drive cord 27 and the upper driver 9 is connected to the second branch 21B of the upper drive cord 21. Due to this construction, when the drive belt 17 is driven, the two drivers 9 and 11 move simultaneously and in the same direction (away from or towards the vertical tube).

**[0028]** The drive motor 22 in the vertical tube 3 can be moved along a vertical guide 33 in the vertical tube 3. The switch 15 is designed as a rotary knob which can also be pressed. Depressing the rotary knob activates the drive motor 22 which moves the drivers 9 and 11 towards the vertical tube 3, thereby opening the screen

door. After some time, a control unit 43 activates the drive motor 22 to move the drivers 9 and 11 back to the position in which the screen door 101 is closed.

**[0029]** When the rotary knob is turned, the drive motor 22 is pressed upwards over the guide 33 via an arm 16 attached to the rotary knob and a connecting rod 18 present between the end of this arm and the drive motor, whereby a gear 24 connected to the drive motor 22 is released of a sprocket connected to the upper belt guide wheel 19, so that the drive belt 17 can no longer be driven by the drive motor 22. When the rotary knob is turned, the power supply to the drive motor 22 is also interrupted.

**[0030]** Adjacent to each branch 17A and 17B of the drive belt 17 is a switch 35 and 37, respectively, for turning off the drive motor 22. These switches are depressed by coupling pieces 39 and 41, connecting the lower and upper drive cords 21 and 27 to the drive belt 17, when they come into contact with the switches during drive of the drive belt 17. The positions of the switches 35 and 37 along the drive belt determine the extreme positions of the drivers and thus the extreme positions of the vertical closing strip 107 (fully open against the vertical tube 3 or completely closed at the location of the second ends 5B and 7B of the upper and lower guide profiles.

**[0031]** Figure 4 shows an embodiment of the automatic screen door device according to the invention. The screen door has a vertical insect screen holder 103 which is to be placed vertically in a passage against a wall bounding the passage. A concertina-shaped folded insect screen 105 is attached with a vertical edge to the vertical insect screen holder 103 (not visible in the figure). Above and below, a horizontally extending upper guide profile 5 and lower guide profile 7, respectively, are connected to the vertical insect screen holder 103. The insect screen 105 is attached to an elongate, movable vertical closing strip 107 with an opposite vertical edge. The vertical closing strip 107 is movable along the guide profiles 5 and 7 and thereby unfolds or folds the insect screen.

**[0032]** Located against the vertical insect screen holder 103 is an operating device 1 for moving the vertical closing strip 107 along the guide profiles. In figure 5 the operating device 1 is shown enlarged. This operating device 1 consists of a drive 13 and a switch 15 for operating the drive. The vertical closing strip 107 is connected to an upper driver 9, which is displaceable along the upper guide profile 5, and a lower driver 11, which is displaceable along the lower guide profile 7. During operation of the screen door, the drive 13 will move the drivers 9 and 11 and thereby open and close the screen door.

**[0033]** The drive 13 has an elongate, flexible, central drive element 17, which is formed by a ball chain which is wrapped through 180 degrees around a drive wheel 19 present in the vertical insect screen holder 103. Two parallel branches 17A and 17B of the middle drive element 17 extend from the drive wheel 19. A drive motor 22 which is coupled to the drive wheel 19 is further provided against the vertical insect screen holder 103.

**[0034]** The drive 13 further has an elongate, flexible,

lower drive element 27, which is formed by a cord connected at both ends to the ends of the middle drive element 17. A first end 27c of the lower drive element is connected via a first coupling piece 39 with a first branch 17A of the middle drive element 17 and a second end 27d of the lower drive element is connected via a second coupling piece 41 to a second branch 17B of the middle drive element 17. Near one end 7B of the lower guide profile 7, the lower drive element 27 is wrapped around a guide wheel 23 and is guided from vertical to horizontal direction by two lower guide elements 25 present against the vertical insect screen holder 103.

**[0035]** Furthermore, the drive has an elongated, flexible upper drive element 21, which is also formed by a cord and which is connected at both ends to the middle drive element. The two ends 21c and 21d of the upper drive element 21 are connected via the coupling pieces 39 and 41 to both ends of the first drive element 17. Close to an end 5B of the upper guide profile 5, the upper drive element 21 is wrapped around a further guide wheel 29 and is moved from vertical to horizontal direction by two upper guide elements 31 located against the vertical insect screen holder 103.

**[0036]** The lower driver 11 is connected to a first branch 27A of the lower drive cord 27 and the upper driver 9 is connected to a second branch 21B of the upper drive cord 21. Due to this construction, when the middle drive element 17 is driven, the two drivers 9 and 11 can be moved simultaneously and in the same direction (away from or towards the vertical insect screen holder 103).

**[0037]** The drive motor 22 located against the vertical insect screen holder 103 is rotatable about a pivot point 33. The switch 15 is designed as a rotary knob which can also be pressed. Depressing the rotary knob activates the drive motor 22 which moves the drivers 9 and 11 towards the vertical insect screen holder 103, thereby opening the screen door. After some time, a control unit 43 activates the drive motor 22 to move the drivers 9 and 11 back to the position in which the screen door 101 is closed.

**[0038]** When the rotary knob 15 is turned, the drive motor 22 is uncoupled from the drive wheel 19. For this purpose, a gear wheel 14 is attached to the rotary knob, which gear wheel cooperates with a gear rack 16. Close to the drive wheel 19, a further gear wheel 18 cooperates with the gear rack 16. The gear wheel 18 is attached to a cam 20 which rotates the drive motor 22 about the pivot point 33. This can be seen in Figure 6 in which the drive 13 is shown enlarged. Rotation of the drive motor 22 also displaces a worm wheel 24 connected to the drive motor 22, which worm wheel 24 is thereby released from a gear wheel connected to the drive wheel 19. As a result, the central drive element 17 can no longer be driven by the drive motor 22. When the rotary knob is turned, the power supply to the drive motor 22 is also interrupted.

**[0039]** Adjacent to each branch 17A and 17B of the central drive element 17 is a sensor 35 and 37, respectively, for switching off the drive motor 22. These sensors

can be designed as switches which are activated by tubes arranged on the ball chain. By adjusting the position of these tubes on the ball chain, the extreme positions are set. However, the sensors can also be designed as counters which count the passing balls and calculate the position of the drivers 9 and 11 on the basis thereof. The extreme positions can then be entered using software.

**[0040]** The drive motor 22 is provided on a carriage 47 which can be moved downwards against a spring force. Remotely below the carriage 47, a safety switch 49 is mounted on the vertical tube 103. When activated, this safety switch 49 causes the drive motor 22 to rotate in the opposite direction, so that during the closing of the screen door, when the closing frame 107 is blocked, the drive motor 22 pulls the carriage 47 downwards and activates the safety switch 49 so that the screen door opens again.

**[0041]** Although the invention has been elucidated in the foregoing with reference to the drawings, it should be noted that the invention is by no means limited to the embodiment shown in the drawings. The invention also extends to all embodiments deviating from the embodiment shown in the drawings within the framework defined by the claims. For example, the switch 15 can also be designed as a motion sensor which activates the drive already when approaching the screen door. A motion sensor 45 can also be present in the upper guide profile 5 near the second end 5B, which motion sensor can be activated, for example, by striking the vertical closing strip 107. In both situations, the screen door can be opened without using the hands.

## Claims

1. A screen door operating device (1) for automatically opening and closing a screen door (101), the screen door comprising an elongate insect screen holder (103) for a rolled or concertina folded insect screen (105) that with an edged is attached to an elongate, movable and in operation vertically oriented closing strip (107) which is parallel to the elongate insect screen holder (103) and is movable between an open position in which the insect screen (105) is rolled up or folded and a closed position in which the insect screen (105) is unrolled or unfolded, which screen door operating device (1) comprising:

- an upper guide profile (5), for guiding the upper end (107A) of the movable vertical closing strip (107), which upper guide profile (5) can be connected with a first end (5A) to the insect screen holder (103), as well as
- a lower guide profile (7), for guiding the lower end (107B) of the movable vertical closing strip (107), which lower guide profile (7) can be connected with a first end (7A) to the insect screen holder (103),

- an upper driver (9) which is movable in the upper guide profile (5) and which can be coupled to the upper end (107A) of the vertical closing strip (107),

- a lower driver (11) which is movable in the lower guide profile (7) and which can be coupled to the lower end (107B) of the vertical closing strip (107),

- a drive (13) for moving the drivers (9, 11) and thus also the closing strip, for automatically opening and closing the screen door, which drive (13) is mounted against the insect screen holder (103) and is present in the lower and upper guide profile (5, 7), and

- at least one switch (15) for operating the drive (13).

2. Screen door operating device according to claim 1, **characterized in that** the drive (13) comprises:

- an elongate, flexible, upper drive element (21), to which the upper driver (9) is attached, as well as

- an elongated, flexible, lower drive element (27) to which the lower driver (11) is attached, and

- a drive motor (22) mounted against the insect screen holder (103),

which drive elements (21, 27) are connected to the drive motor (22) in such a way that they move the two drivers (9, 11) simultaneously in the guide profiles (5, 7) during opening and closing of the screen door.

3. Screen door operating device according to claim 2, **characterized in that** the drive (13) further comprises a central drive element (17) which is wrapped around a drive wheel (19) connected to the drive motor (22), from which drive wheel (19) two parallel branches (17A, 17B) of the middle drive element (17) extend, wherein the upper and lower drive elements (21, 27) with their ends are attached to both branches (17A, 17B) of the middle drive element (17).

4. Screen door operating device according to claim 3, **characterized in that:**

- the lower drive element (27) has a first end (27c) connected to the middle drive element (17) at a first branch (17A) of the two parallel branches of the middle drive element (17) and a second end (27d) of the lower drive element (27) is connected to the middle drive element (17) at a second branch (17B) of the two parallel branches of the middle drive element (17), and
- the upper drive element (21) has a first end (21c) connected to the middle drive element (17) at a first branch (17A) of the two parallel branch-

es of the middle drive element (17) and a second end (21d) of the upper drive element (21) is connected to the middle drive element (17) at a second branch (17B) of the two parallel branches of the middle drive element (17).

5. Screen door operating device according to claim 4, **characterized in that:**

- the upper drive element (21) is wrapped around an upper guide wheel (23) which is present near a second end (5B) of the upper guide profile and is guided by two upper guides (25) located at the top against the insect screen holder (103) from vertical to horizontal direction and vice versa, wherein two parallel branches (21A, 21B) of the upper drive element (21) being present between the middle drive element (17) and the upper guide wheel (23), of which a first branch (21A) is connected to the first branch (17A) of the middle driving element (17) and a second branch (21B) is connected to the second branch (17B) of the middle driving element (17),

- the lower drive element (27) is wrapped around a lower guide wheel (29) which is present near a second end (7B) of the lower guide profile and is guided by two lower guides (31) located at the bottom against the insect screen holder (103) from vertical to horizontal direction and vice versa, wherein two parallel branches (27A, 27B) of the lower drive element (27) are present being present between the middle drive element (17) and the lower guide wheel (29), of which a first branch (27A) is connected to the first branch (17A) of the middle drive element (17) and a second branch (27B) is connected to the second branch (17B) of the middle drive element (17), and

- the lower driver (11) is connected to the lower drive element (27) at the location of the second branch (27A) of the lower drive element (17) and the upper driver (9) is connected to the upper drive element (21) at the location of the first branch (21B) of the upper drive element (21).

6. Screen door operating device according to claim 3, 4 or 5, **characterized in that** the middle drive element (17) is endless and, in addition to said drive wheel (19), is wrapped around a further wheel (20) which is vertically spaced from the drive wheel (19).

7. Screen door operating device according to claim 3, 4 or 5, **characterized in that:**

- the middle drive element (17) has two ends (17c, 17d),

- the end (27c) of the first branch (27A) of the lower drive element (27) is attached to the end

(17c) of the first branch (17A) of the middle drive element (17) and the end (27d) of the second branch (27B) of the lower drive element (27) is attached to the end (17d) of the second branch (17B) of the middle drive element (17), and  
- the end (21c) of the first branch (21A) of the upper drive element (21) is attached to the first branch (17A) of the middle drive element (17) and the end (21d) of the second branch (21B) of the upper drive element (21) is attached to the second branch (17B) of the middle drive element (17).

8. Screen door operating device according to one of the preceding claims 3-7, **characterized in that** next to each branch (17A, 17B) of the middle drive element (17) there is a further switch (35, 37) which is operated by a coupling piece (39, 41) by which the drive elements (21, 27) are attached to the middle drive element (17) for switching off the drive motor (22) in the extreme positions of the vertical closing strip (107) in which the screen door (101) is fully open or closed.

9. Screen door operating device according to one of the preceding claims 3-7, **characterized in that** a sensor (35, 37) for switching off the drive motor (22) is present next to each branch (17A, 17B) of the third drive element (17) in the extreme positions of the vertical closing strip (107) in which the screen door (101) is fully open or closed.

10. Screen door operating device according to any one of the preceding claims 3-9, **characterized in that** the drive motor (22) is movable along a vertical guide (33) and the switch (15) is designed as a push button and when pressed activates the drive motor (22) to move the drivers, which push button can also be turned and when turned moves the drive motor (22) along the vertical guide (33) thereby disengaging the drive motor (22) from the driven drive wheel (19).

11. Screen door operating device according to any one of the preceding claims 3-9, **characterized in that** the switch (15) when turned moves an operating rod which displaces the drive motor (22) and thereby disengages a gear wheel present on an output shaft of the drive motor from engagement with a further gear of the transmission coupled to the drive wheel, so that the drive motor can be disengaged from the drive wheel and the drive wheel can rotate freely.

12. Screen door operating device according to any one of the preceding claims 3-11, **characterized in that** the drive motor (22) is provided on a carriage (47) which can be moved downwards against a spring force and that a safety switch (49) is provided below and spaced from the carriage (47), which switch,

when activated, causes the drive motor (22) to rotate in the direction for opening the screen door, so that when the closing strip (107) is blocked during closing of the screen door, the drive motor (22) pulls itself and the associated carriage (47) downwards and activates the safety switch (49). 5

13. Screen door operating device according to any one of the preceding claims, **characterized in that** it comprises a control unit (43) which, after displacing the drivers (9, 11) for opening the screen door (101), after a preset time, moves the drivers (9, 11) back to the position where the screen door (101) is closed. 10

14. Screen door operating device according to any one of the preceding claims, **characterized in that** the switch is incorporated in the closing strip (107), such that the switch is actuated by tapping the closing strip (107). 15

15. Automatic screen door device comprising a screen door that includes: 20

- a vertical insect screen holder (103), as well as
- a coiled or concertina folded insect screen (105) parallel to and connected to the insect screen holder (103), and 25
- an elongate, movable vertical closing strip (107) which is parallel to the insect screen holder (103) wherein the insect screen (105) is attached with an edge to the vertical closing strip (107), 30

which automatic screen door device further comprises a screen door operating device (1) according to any one of the preceding claims. 35

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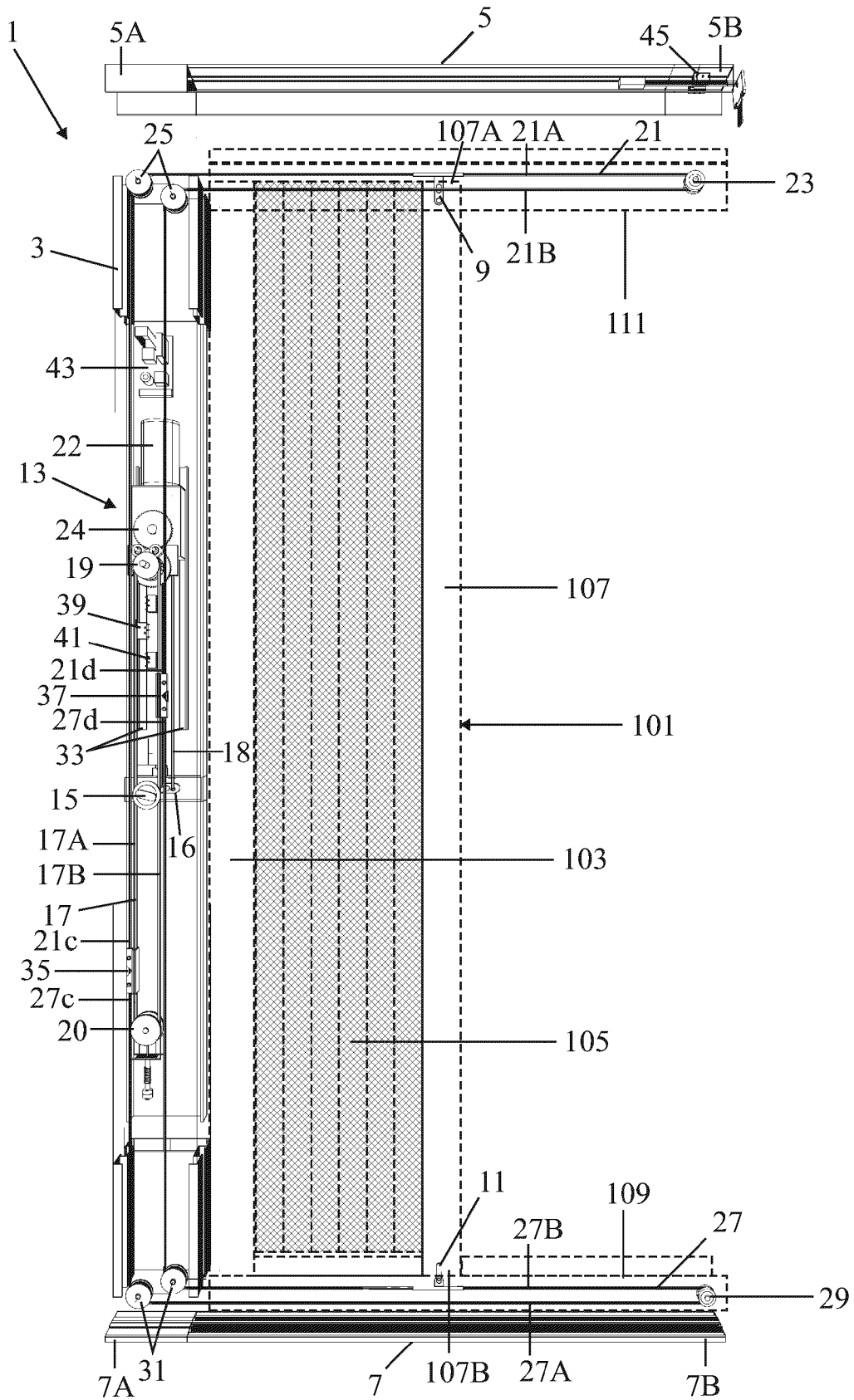


FIG. 1

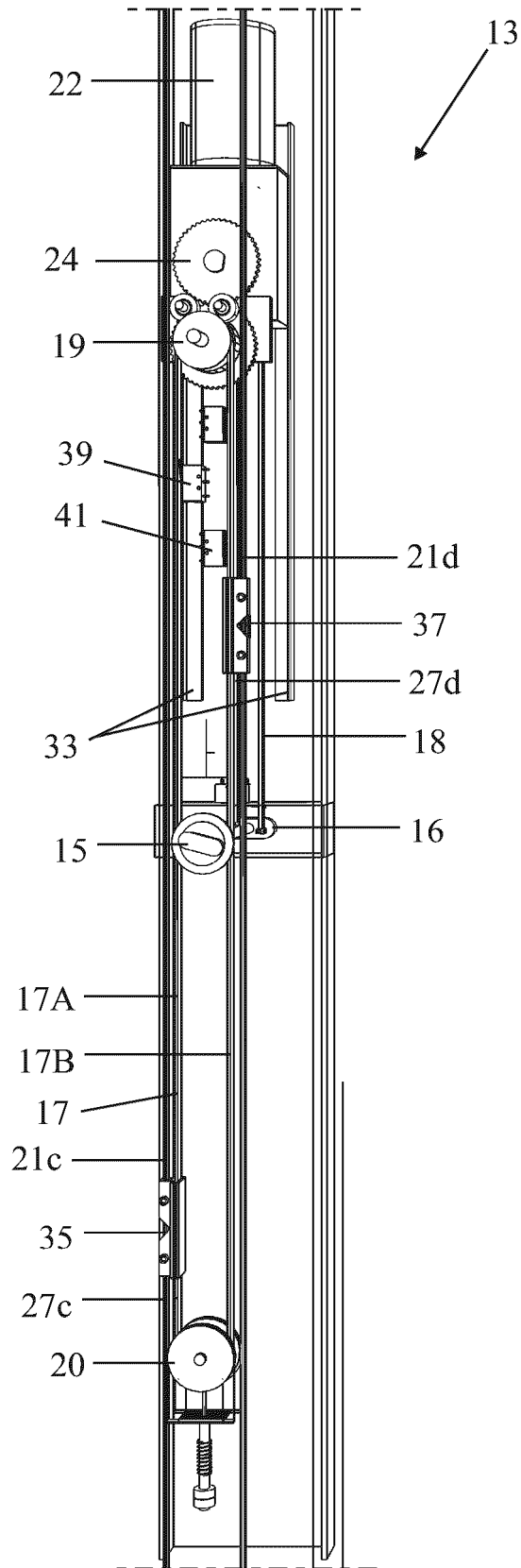


FIG. 2

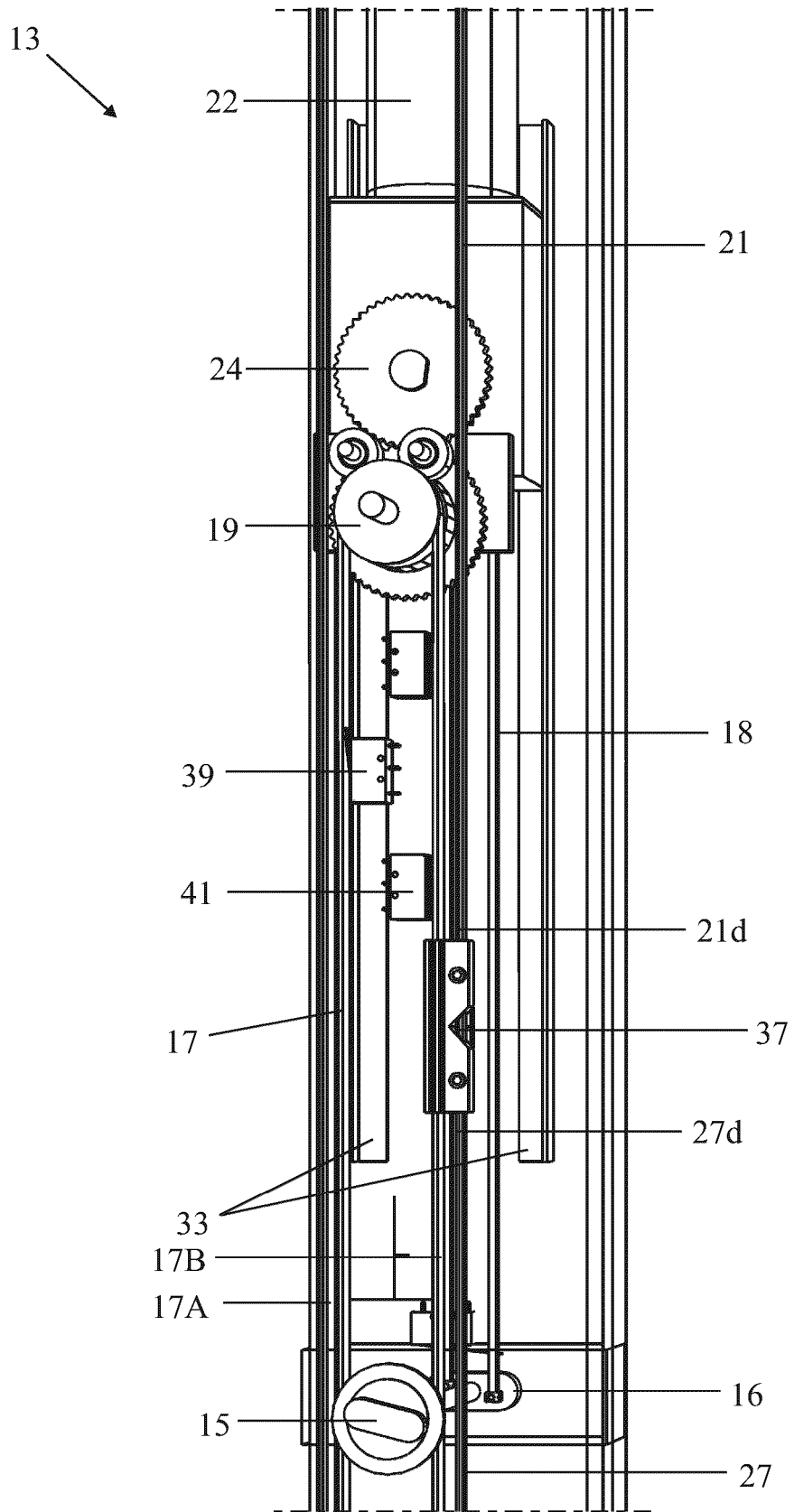


FIG. 3

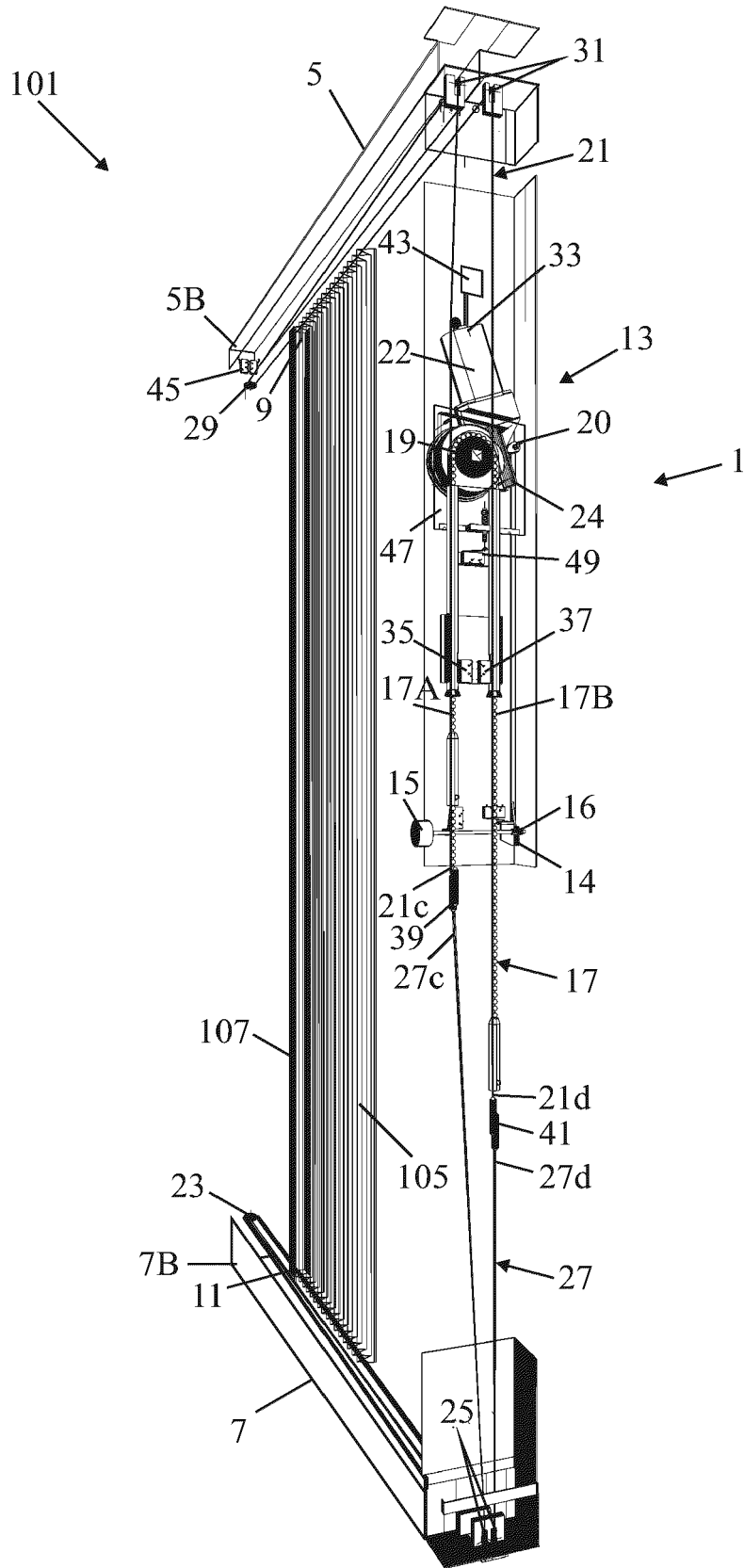


FIG. 4

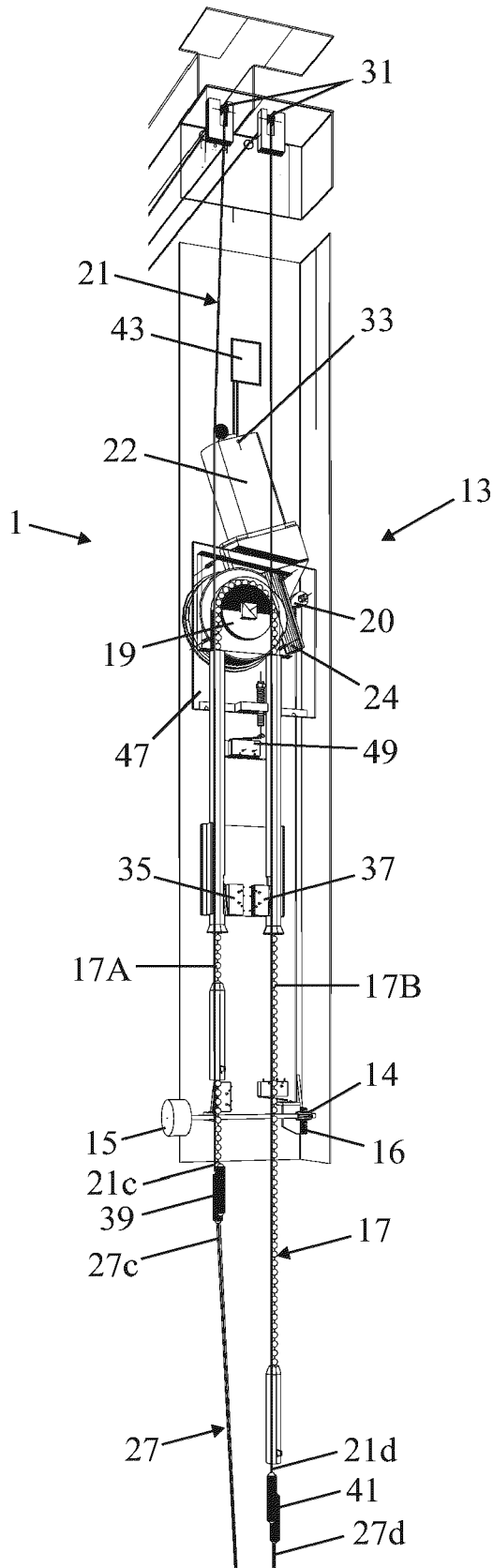


FIG. 5

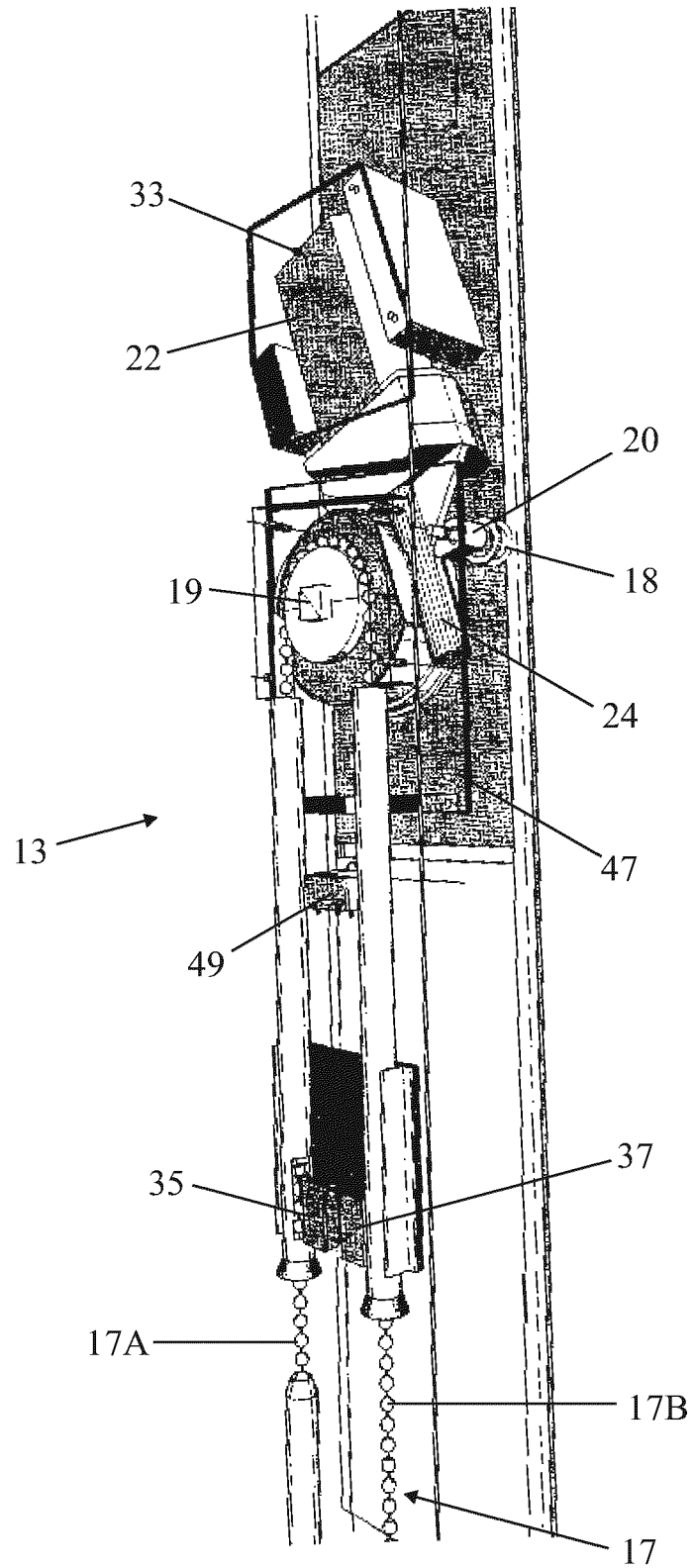


FIG. 6



EUROPEAN SEARCH REPORT

Application Number  
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			E06B
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