(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 886 784 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
19.10.2016 Bulletin 2016/42

(21) Application number: **14196204.3**

(22) Date of filing: **04.12.2014**

(51) Int Cl.:
E06B 9/68 *(2006.01)* ***E06B 9/88*** *(2006.01)*
E06B 9/90 *(2006.01)*

(54) **A screening device for a window and related method**

Verschattungsvorrichtung für ein Fenster und zugehöriges Verfahren

Dispositif de blindage pour fenêtre et procédé associé

(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 MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **17.12.2013 EP 13197805**

(43) Date of publication of application:
24.06.2015 Bulletin 2015/26

(73) Proprietor: **VKR Holding A/S**
2970 Hørsholm (DK)

(72) Inventors:
- **Birkkjær, Martin**
  DK-6731 Tjæreborg (DK)
- **Kold, Ove**
  DK-6900 Skjern (DK)
- **Thomsen, Jan**
  DK-6950 Ringkøbing (DK)

(74) Representative: **Nordic Patent Service A/S**
Bredgade 30
1260 Copenhagen K (DK)

(56) References cited:
WO-A1-2010/076820
DE-A1- 19 605 273
DE-A1-102006 015 507
DE-U1- 9 319 657

EP 2 886 784 B1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to screening devices for screening a window, and more particularly to a screening device with a screen with an adjustable length in which the position of the free end of the screen can be controlled with an electric drive. The disclosure also relates to a method for controlling the position of the free end of a screen of a screening device for screening a window.

BACKGROUND

[0002] EP 0 845 572 A1 discloses a device for controlling and actuating a venetian blind in a double-glazing unit of the type constituted by a rectangular frame which supports at least two panes which are mutually parallel and spaced so as to form a chamber isolated from the outside and inside which chamber the venetian blind is accommodated and moved. The venetian blind is moved by means of an electric motor. The device comprises at least one permanent magnet which is arranged on a bottom element of the venetian blind and at least one sensor which is fixed to the frame of the double-glazing unit in a specific position in order to signal that the venetian blind has passed and/or has reached the position of the sensor. This device has the drawback that only a very limited number of positions for the venetian blind may be obtained since for each position in which it may be desired to position the venetian blind a sensor must be provided. Thus, in case a high degree of freedom in choice of positions for the screening arrangement is desired a correspondingly high number of sensors would be needed. This of leads to high energy consumption as a signal would inevitably be sent to the motor each time a sensor is passed by the magnet arranged on the bottom element. Further, the construction with a large number of magnets would be rather complicated and expensive. Another drawback lies in the arrangement of the fixed sensors on the frame of the double-glazing unit which may cause the sensors to form an obstruction or even be subjected to damage e.g. when cleaning the window, and is furthermore, this solution aesthetically unappealing.

[0003] DE 19605273 discloses roller blind raised and lowered by electric motor. A roller blind material is wound on a spindle rotated by an electric drive motor. The power supply for the electric drive motor is controlled by sensors positioned at each end of the required blind movement. The blind material is wound on a shaft, contained in a housing and driven by the electric drive motor. A rod forms the lower edge of the blind. Rotation of the shaft in one direction lowers the blind to a point and rotation in the other direction raises it to a point. Magnets in one end of the rod activate reed switches at the end positions of the blind to switch off the electric drive motor.

SUMMARY

[0004] Therefore, it is an object of the to provide a method for positioning a screen of a screening device as well as a screening device, which is simple in construction, inexpensive and power saving in use, whilst providing a high degree of freedom in choice of positions for the screening arrangement, with which no elements are be subjected to damage during e.g. cleaning of the window, and which is furthermore aesthetically appealing. Further it is an object to provide a screening device which may easily be assembled, fitted and operated by an end user.

[0005] The foregoing and other objects are achieved by the features of the independent claims. Further implementation forms are apparent from the dependent claims, the description and the figures.

[0006] According to a first aspect the object above is achieved by providing a screening device for screening a window, the screening device comprising a screen with a variable length, a fixed width between two edges of the screen and with a positionable free end, the longitudinal position of the free end determining the length of the screen, an electric drive is operably connected to the screen for adjusting the longitudinal position the free end, an elongated guide member parallel with the two edges and arranged adjacent to one of the two esges, a position indicator for manually indicting a desired longitudinal position of the free end, the longitudinal position of the position indicator being freely manually adjustable by an operator to any longitudinal position along the elongated guide element, a sensor arrangement configured for detecting a difference between the actual longitudinal position of the free end and the actual longitudinal position of the position indicator, a circuit or processor connected to the sensor arrangement, the circuit or processor being configured to operate the electric drive with the aim to reduce the detected difference between the actual longitudinal position of the free end and the actual longitudinal position of the position indicator.

[0007] Thereby, a window screening device is provided that has an inexpensive, simple and robust user interface for manually adjusting the position of the free end of the screen, thereby adjusting the length of the screen and the area of the window covered by the screen. The provision of a manually freely adjustable position indicating element and arrangement that ensures that the free end of the screen follows the position of the position indicating element in a slave like manner provides for an intuitive user interface. This new user interface can be used in addition to a remote control that is configured to adjust the position of the screen. The device allows for free positioning the free end of the screen anywhere between the completely retracted and completely extended position of the screen

[0008] In a first possible implementation of the first aspect the circuit or processor is configured to control the longitudinal position of the free end as a slave of the

longitudinal position of the position indicator.

[0009] In a second possible implementation of the first aspect the sensor arrangement is configured to detect the direction of the detected difference in longitudinal position between the actual longitudinal position of the free end and the actual longitudinal position of the position indicator. Thereby, the process or control circuit is able to determine in which direction to move the free end of the screen by means of the electric drive.

[0010] In a third possible implementation of the first aspect the sensor arrangement and the circuit or processor are arranged to form a closed loop to control the longitudinal position of the free end with the aim to minimize the detected difference in longitudinal position between the actual longitudinal position of the free end and the actual longitudinal position of the position indicator. By implementing the sensor arrangement and circuit or processor in a closed loop the position of the free edge of the screen can the control to match the position of the position indicator very accurately.

[0011] In a fourth possible implementation of the first aspect the position indicator is disposed on the elongated guide member.

[0012] In a fifth possible implementation of the first aspect the position indicator is slidably positionable along the elongated guide member.

[0013] In a sixth possible implementation of the first aspect the screening device further comprises two parallel spaced rails for guiding the two edges of the screen. The provisional guide rails that guide the size of the screen allows the screen to be used in non-vertical applications.

[0014] In a seventh possible implementation of the first aspect the elongated guide member is formed by one of the parallel spaced rails.

[0015] In an eighth possible implementation of the first aspect the sensor arrangement comprises a sensor component at the free end and/or a sensor component at the position indicator.

[0016] In a ninth possible implementation of the first aspect the position indicator comprises a magnet or a magnetic component.

[0017] In a tenth possible implementation of the first aspect the at least one sensor element is any one of: a position sensor, an inductive sensor, a Reed sensor and a Hall sensor.

[0018] In a eleventh possible implementation of the first aspect the position indicator is arranged detachably on one of the two side rails.

[0019] In a twelfth possible implementation of the first aspect the position indicator is releasably coupled to the free edge so that the position indicator moves in unison with the free edge when the free end moves longitudinally.

[0020] In a thirteenth possible implementation of the first aspect the position indicator is magnetically coupled to the free end or mechanically coupled to the free end with a certain degree of flexibility that allows minor displacement in the longitudinal direction.

[0021] The object above is also achieved by providing a method for controlling the position of a free end of a screen of a screening device for screening a window, the screen having a variable length, a fixed width between two edges of the screen and a positionable free end, the longitudinal position of the free end determining the length of the screen and an electric drive operably connected to the screen for adjusting the position of the free end, the method comprising detecting the difference between the actual longitudinal position of a manually positionable position indicator and the actual longitudinal position of the free end, and activating the electric drive to move the free edge in a direction that reduces the detected difference in in longitudinal position.

[0022] This method provides for an intuitive way for a user or operator to adjust the position of the screening device.

[0023] In a first possible implementation of the second aspect the method further comprises deactivating the electric drive when the detected difference is zero or below a predetermined threshold.

[0024] In a second possible implementation of the second aspect the method further comprises manually positioning the position indicator for indicating a desired longitudinal position of the free end.

[0025] In a second possible implementation of the second aspect the method further comprises adjusting the position of the free edge by activating the electric drive means using another form of user interface than the position indicator.

[0026] These and other aspects will be apparent from and the embodiment(s) described below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] In the following detailed portion of the present disclosure, the invention will be explained in more detail with reference to the example embodiments shown in the drawings, in which:

Fig. 1 shows a screening device mounted on the frame of a window.

Fig. 2A shows a perspective view of a screening device of mounted on the frame of a window and positioned in a first position.

Fig. 2B shows a perspective view of the screening device according to Fig. 2A mounted on the frame of a window and positioned in a second, desired position.

Fig. 3 shows a perspective view of another screening device.

Fig. 4 shows a side view of the screening device according to Fig. 3.

Figs. 5A to 5C show side views of three different screening devices.

DETAILED DESCRIPTION

[0028] Fig. 1 shows a window, in this case a roof window, such as a roof window with a pivot or top hung sash. The window has a frame 20. The frame 20 has a top piece 21, a bottom piece 22 and two side pieces 23 and 24 surrounding an aperture, which is covered by a suitable panel element such as a glazing in the form of an insulating pane. The shown screening device 100 comprises a top element 3 positioned at the top piece 21, a screen 5 and a bottom element in the form of a free end 4. It is noted that the screen device can be applied to other type of windows, such as facade windows or skylights.

[0029] The screen 5 has a variable length L, a fixed width W between two edges of the screen 5 and with a positionable free end 4. The longitudinal position of the free end 4 determining the length L of the screen 5 (the longitudinal direction being parallel with the edges of the screen 5). The longitudinal position of the free edge 4 can be adjusted between a completely retracted position of the screen 5 where the screen 5 does substantially not cover the window pane and a completely extended position of the screen 5 where the substantially completely covers the window pane.

[0030] At its upper end edge, the screen 5 is accommodated in the top element 3 and at its opposed, free end 4 a bottom element is provided. The positon of the free end 4 can be adjusted by electric drive means connected to the screen to e.g. when moving the free edge 4 and hence the screen 5 between the non-screening position shown in Fig. 1 and a screening position, in which the screen 5 covers the frame aperture partly or fully shown in Figs. 2A and 2B. To this end the bottom element comprises an electric drive. The electric drive may in principle and arranged anywhere on the screening device, such as particularly in either the bottom element 4 or the top element 3. The electric drive may e.g. include an electric drive motor and gear arranged inside a tube on which the screen 5 can rolled up and configured to rotate the tube for winding or unwinding of the screen or e.g. an electric drive motor and gear arranged inside the bottom element and acting with drive wheels on the window frame or side rails of side rails 1,2.

[0031] Furthermore, and as shown in Fig. 2A and 2A, the screening device 100 comprises two side rails 1 and 2 adapted to be connected to a respective side piece 23 and 24 of the frame 20 by means of fastening elements, such as screws, and to the top element 3, e.g. by means of a snap or click connection or a plug and socket connection. In the mounted position of the screening device 100, opposite ends of the bottom element 4 and opposite edges of the screening body 5 are guided in these side rails 1 and 2. The shown screening device has a roller blind with a cloth or fabric screen 5. The top element 3 includes a spring-biased winding shaft. However, other screening arrangements having other kinds of screening bodies and other configurations of the top element are conceivable as well. Hence, it is noted that as used herein the term "screen" is intended to encompass all feasible types of screens, examples being blinds, pleated blinds, venetian blinds, curtains, insect screens, awnings, roller shutters and shades.

[0032] The screening device 100 further includes a position indicator 6. The position indicator 6 is arranged on an elongated guide member that extends close to and parallel with one of the two edges of the screen 5. The elongated guide member can be one of the side rails 1, 2. Alternatively, (not shown) the elongated guide member can be formed by a rod or string that extends close to and parallel with one of the edges of the screen 5. The position indicator 6 is disposed on the elongated guide member such as to be displaceable in the longitudinal direction thereof, i.e. in a direction between the top element 3 and the end of the maximum longitudinal extension of the screen 5, e.g. the end of the side rail 1, 2 opposite to the top element 3. In the shown screening device 100 the position indicator 6 is arranged on side rail 2. The position indicator 6 may be continuously or stepwise displaceable in the longitudinal direction of the side rail 2 by a user or operator. The position indicator 6 is disposed such on the elongated guide member that is will stay in the position selected by a user or operated, i. e. the position indicator 6 will not slide down under the influence of gravity.

[0033] The position indicator 6 is displaceable along the substantially entire possible longitudinal extend of the screen 5 in order to define a position anywhere substantially 0 and 100% of the possible longitudinal extend of the screen 5. The position indicator 6 is manually displaceable to manually define any arbitrary position of the screen 5.

[0034] The screening device 100 further comprises a sensor arrangement for determining any difference d between the longitudinal position of the free edge 4 and the position indictor element 6. Fig. 2A shows a situation where a user has move the position indicator 6 downwards from a higher position where the position indicator 6 is shown in uninterrupted lines to a lower position where the position indicator 6 is shown in interrupted lines. The sensor arrangement detects the difference d in longitudinal position of the free end 4 and the position indicator 6. The sensor arrangement senses at least the direction of the difference in longitudinal position and the fact that there is a difference in longitudinal position. The sensor arrangement is connected to a circuit for or processor that controls the action of the electric drive. The circuit for or processor is in receipt of a signal form the sensor arrangement indicative of a difference in longitudinal position and the direction thereof. Upon detection of a difference in position and the direction thereof the circuit or processor instructs the electronic drive to adjust the position of the free edge in the detected direction of the difference in longitudinal position, thereby reducing the difference in longitudinal position. The circuit or processor continues to move the free edge until the sensor ar-

rangement indicated that there is no difference in position, or until the difference in longitudinal positon has dropped below a predetermined threshold. When this happens the free end 4 and the position indicator 4 are located in a substantially the same longitudinal position, there is longitudinal overlap.

[0035] By substantially the same longitudinal position is understood that the position indicator 6 and the bottom element or free edge 4 have the same longitudinal position. There is no physical overlap required and the position indicator 6 may merely be aligned with the bottom element 4. Thus, the position indicator 6 acts as a guide and sets a target destination for the bottom element and the free end or bottom element 4 is a slave to the position indicator 6.

[0036] The bottom element positioning device will be described in detail further below.

[0037] When operating the screening device 100, an operator or user displaces or slides the position indicator 6 from its current or initial position to a desired position illustrated on Fig. 2A by showing the position indicator 6 in interrupted lines. Thereupon the bottom element is moved, particularly by activating the electrical drive, in direction of the arrow shown in Fig. 2A to the desired position in which the position indicator 6 and the bottom element 4 are in the same longitudinal position again. The bottom element 4 is stopped when the position indicator 6 reaches the longitudinal position of the bottom element 4, as shown on Fig. 2B. The screen 5 has thus arrived at the desired position.

[0038] Turning now to Fig. 3 and 4 another of a screening device 101 is shown in a perspective view and a side view, respectively. The electric drive of the screening device 101 is arranged in the bottom element 4.

[0039] The sensor arrangement includes two sensor elements; a free end component 8 and a position indicator component 10. The free end component includes a magmatic element 8, such as a plate of magnetic material and the position indicator component is a permanent magnet 10. The sensor elements 7, 9 are Reed or Hall sensors. Since the sensor elements 7 and 9 are spaced longitudinally, the difference in signal between the two sensor elements 7 and 9 indicates the direction of the difference in longitudinal position between the free and 4 and the position indicator 6. Assuming that the window and the covering device are arranged vertically, a stronger signal from the higher placed sensor 7 than from the lower placed sensor 9 is an indication that the position indicator 6 has a longitudinal position that is higher than the free end 4 and thus the free end 4 should move upwards in order to reduce the difference in longitudinal position between the free end 4 and the position indicator 6. A stronger signal from the lower placed sensor 9 than from the higher placed sensor 7 is an indication that the position indicator 6 has a longitudinal position that is lower than the free end 4 and thus the free end 4 should move downwards in order to reduce the difference in longitudinal position between the free end 4 and the position indicator 6.

[0040] When the magnetic element 8 and the permanent magnet 10 are sufficiently close to each other, which will be the case the position indicator 6 and the bottom element 4 are substantially in the same longitudinal position, the permanent magnet 10 will attract the magnetic element 8 such as to form a magnetic connection. Thus, the metallic element 8 and the permanent magnet 10 are adapted to interact, and particularly to take up a position in alignment with each other, when the bottom element 4 and the position indicator 6 are located in substantially the same longitudinal position. The result is that in any further movement of the bottom element 4 the position indicator 6 will follow the bottom element 4 due to the magnetic force between the metallic element 8 and the permanent magnet 10. So when the screening device is operated by e.g. a remote control, or an automated system operating on timing opening or sensor the position indicator 6 will follow the bottom element 4 and remain aligned. Thus, the magnetic connection between the bottom element 4 and the position indicator 6 will cause the position indicator to follow the longitudinal position of the bottom element as a slave. The user may also manually control the position of the screen 5 and release the position indicator 6 from the bottom element 4 by manually sliding the position indicator and the manual force thereby overcoming the magnetic force and disengaging the magnetic connection.

[0041] When the permanent magnet 10 is moved past the sensor elements 7, 9 a signal is triggered and sent from the sensor element 7, 9 to the electric drive or to a control device of the electric drive means. The signal from the sensor elements 7, 9 may cause the electrical drive to reverse its direction of operation to move the bottom element 4 in a direction opposite to the initial direction of movement in case the bottom element 4 has been moved too far, or it may cause the electric drive to stop when the desired positon has been reached, i.e. When the bottom element 4 and the position indicator 6 have substantially the same longitudinal position.

[0042] Generally, in disclosed screening devices the at least one sensor element is configured to register the direction of movement that ended the longitudinal alignment of the position indicator 6 and bottom element 4. So the at least one sensor element can register if the position indicator is moved above the bottom element or below the bottom element. This may for example be done by plural sensors or by employing a first signal when the position indicator is moved above the bottom element and a second signal when the position indicator is moved below the bottom element. For example some sensors may be direction sensitive.

[0043] It is noted that the screening device without the two sensor elements 7, 9 as well as the screen device in which the free end component and/or the position indicator component has been omitted are also feasible. In the latter case the two sensor elements 7, 9 may be used to detect whether the desired position has been reached.

In the screening device where both the bottom element component and the position detector component have been omitted by sensing the presence of the position detector 6, and in another embodiment where only the bottom element component has been omitted by sensing the presence of the position detector component.

[0044] In the former case, i.e. where no sensor element is present, the free end component and the position detector component may be used for stopping the movement of the free end 4 by means of the physical interaction or connection between the free end component and the position detector component.

[0045] It is furthermore noted, that embodiments in which the bottom element positioning device comprises no sensor or detector are particularly suitable for manually operated screening arrangements, whether in case of the electric drive being turned off or malfunctioning.

[0046] Still referring to Fig. 3, the side rail 2 comprises a magnetic material strip 11 and the position detector 6 is provided with a permanent magnet so that the position detector 6 may be mounted on the side rail 2 by a magnetic attractive force between the magnetic material strip 11 and the permanent magnet. Alternatively, a magnetic material insert provided in the side rail 2 may be used. In another alternative a magnetic material strip part or insert may be provided in the position indicator 6 while the side rail 2 is be provided with a permanently magnetic strip. In yet another alternative the position indicator 6 may be secured to the side rail by means of a snap connection or by means of a guide rail connection, a guide rail being provided on the side rail. In any case, in is advantageous if the position indicator 6 can slide along the side rail 2. Thus, it is advantageous if the side rail provides longitudinal guidance to the position indicator 6. Further, it is advantageous if the position indicator 6 can be placed substantially anywhere along the length of the side rail 2.

[0047] Turning now to Fig. 5A a third a screening device 102 is shown in a side view. The electric drive of the screening device 102 is arranged in the bottom element 4.The bottom element positioning device of the screening device 102 comprises a bottom element component and a position indicator component. In this screen device the bottom element component is a switching element, here in the form of three mechanical switches 13a, 13b, 13c, and the position indicator component is a contact element 14 or alternatively a switch. In this screen device a connection is formed between the switches 13a, 13b, 13c and the contact element 14 as the bottom element 4 moves into the position in which it is longitudinally aligned with the position indicator 6. The connection formed between the switches 13a, 13b, 13c and the contact element 14 causes the electric drive to stop, for instance by simply interrupting the electrical power supply to the electric drive or by forming a suitable electrical connection to the electric drive or to a control device associated with or part of the electric drive.

[0048] Turning now to Fig. 5B a screening device 103 according is shown in a side view. This screen device is particularly suitable for screening arrangements in which the electric drive is arranged in another part of the screening arrangement 103 than the bottom element 4, for instance as shown inside the tubular shaft in the top element 3. The bottom element positioning device of the screening arrangement 103 comprises a sensor element 16 in the form of a position sensor arranged in the position indicator 6. The sensor element 16 measures the position of the position indicator 6 and transmits a signal 18 indicative of the position of the position indicator 6 measured to a control device 15 of the electric drive. The control device 15 the controls the electric drive and stops the bottom element 4 in response to the signal 18 received, particularly at the position of the position indicator 6 indicated by the signal 18. The signal 18 may be transmitted over a wired connection or wirelessly.

[0049] Finally, with reference to Fig. 5C a fifth embodiment of a screening arrangement 104 according to the invention is shown in a side view. This embodiment is particularly suitable for screening arrangements in which the electric drive is arranged in another part of the screening arrangement 104 than the bottom element 4, for instance in the top element 3.

[0050] The bottom element positioning device of the screening device 103 comprises at least one sensor element 17 in the form of a Reed or Hall sensor arranged in the bottom element 4 and a position indicator component in the form of a permanent magnet 10. When the permanent magnet 10 and the sensor element 17 are brought sufficiently close to each other during movement of the bottom element 4, the permanent magnet 10 triggers the sensor element 17 to transmit a signal 18 indicating that a position in which the bottom element 4 and the position indicator 6 are longitudinally aligned has been reached to a control device 15 of the electric drive. The control device 15 then stops the electric drive and thus the bottom element 4 in response to the signal 18 received. The signal 18 may be transmitted over a wired connection or wirelessly. Furthermore, when operating any of the screening devices described herein by remote control it is well known to encode a predefined or user-defined preferred screening position, e.g. "screening device 55 % closed", in the remote control. In this case it would be feasible to encode the preferred predefined position in terms of a particular position of the position indicator 6 on the side rail. So the controller stores the last manually defined position by means of the position indicator 6 and may stop the screening at this stored position when operated by remote control or a program.

[0051] The description above should not be regarded as being limited to the disclosed screening devices and methods. Several modifications and combinations of the different screening devices and methods will be apparent to the person skilled in the art. For example the magnetic coupling between the position indicator 6 and the bottom element 4 may alternatively be provided by means of a latch or a spring which snaps into a recess. For example

the position indicator 6 may be connected to a cord and hereby the position indicator 6 sensors may be placed remote. For example the disclosed screening operation may be combined with further screening limit detection at the top or bottom. For example the position indicator 6 may control the position of multiple screenings so a zone with multiple screenings is linked. Generally in all embodiments the electric drive may be provided in the bottom element 4 so the electronics are located in the bottom element and enable a reliable and user friendly operation.

[0052] In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. A single processor or other unit may fulfill the functions of several items recited in the claims. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measured cannot be used to advantage.

[0053] The reference signs used in the claims shall not be construed as limiting the scope.

Claims

1. A screening device (100,101,102,103,104) for screening a window (1), said screening device (101) comprising:

a screen (5) with a variable length (L), a fixed width (W) between two edges of said screen (5) and with a positionable free end (4), the longitudinal position of said free end (4) determining the length (L) of said screen (5),
an electric drive operably connected to said screen (5) for adjusting the longitudinal position said free end (4),
an elongated guide member parallel with said two edges and arranged adjacent to one of said two edges,
a position indicator (6) for manually indicting a desired longitudinal position of said free end,
the longitudinal position of said position indicator (6) being freely manually adjustable by an operator to any longitudinal position along said elongated guide element,
a sensor arrangement configured for detecting a difference between the actual longitudinal position of said free end (4) and the actual longitudinal position of said position indicator (6),
a circuit or processor connected to said sensor arrangement,
said circuit or processor being configured to activate said electric drive to move said free edge (4) in a direction that reduces the detected difference between the actual longitudinal position of said free end (4) and the actual longitudinal position of said position indicator (6).

2. A screening device (101) according to claim 1, wherein said circuit or processor is configured to control the longitudinal position of said free end (4) as a slave of the longitudinal position of said position indicator (6).

3. A screening device (101) according to claim 1 or 2, wherein said sensor arrangement is configured to detect the direction of the detected difference in longitudinal position between the actual longitudinal position of said free end (4) and the actual longitudinal position of said position indicator (6).

4. A screening device (101) according to any one of claims 1 to 3, wherein said sensor arrangement and said circuit or processor are arranged to form a closed loop to control the longitudinal position of said free end (4) with the aim to minimize the detected difference in longitudinal position between the actual longitudinal position of said free end (4) and the actual longitudinal position of said position indicator (6).

5. A screening device (101) according to any one of claims 1 to 4, wherein said position indicator (6) is disposed on said elongated guide member.

6. A screening device (101) according to any one of claims 1 to 5, wherein said position indicator (6) is slidably positionable along said elongated guide member.

7. A screening device (101) according to any one of claims 1 to 6, further comprising two parallel spaced rails (1,2) for guiding said two edges of said screen (5).

8. A screening device (101) according to claim 7, wherein said elongated guide member is formed by one of said parallel spaced rails (1,2).

9. A screening device (101) according to any one of claims 1 to 8, wherein said sensor arrangement comprises a sensor component at said free end (4) and/or a sensor component at said position indicator (6).

10. A screening device (101) according to any one of claims 1 to 9, wherein said position indicator (6) comprises a magnet or a magnetic component.

11. A screening device (101) according to any one of claims 1 to 10, wherein the at least one sensor element (7, 9) is any one of: a position sensor, an inductive sensor, a Reed sensor and a Hall sensor.

12. A screening device (101) according to any one of claims 1 to 11, wherein the position indicator (6) is arranged detachably on one of the two side rails (1, 2).

13. A screening device (101) according to any one of claims 1 to 12, wherein said position indicator (6) is releasably coupled to said free edge (4) so that said position indicator (6) moves in unison with said free edge (4) when said free end (4) moves longitudinally.

14. A screening device (101) according to claim 13, wherein said position indicator (6) is magnetically coupled to said free end (4) or mechanically coupled to said free end (4) with a certain degree of flexibility that allows minor displacement in the longitudinal direction.

15. A method for controlling the position of a free end (4) of a screen of a screening device (101) for screening a window, said screen (5) having a variable length (L), a fixed width (W) between two edges of said screen (5) and a positionable free end (4), the longitudinal position of said free end (4) determining the length (L) of said screen and an electric drive operably connected to said screen for adjusting the position of said free end,
said method comprising:

detecting the difference between the actual longitudinal position of a manually positionable position indicator and the actual longitudinal position of said free end (4), and
activating said electric drive to move said free edge (4) in a direction that reduces said detected difference in in longitudinal position.

16. A method according to claim 15, further comprising deactivating said electric drive when the said detected difference is zero or below a predetermined threshold.

17. A method according to claim 15 or 16, further comprising manually positioning said position indicator (6) for indicating a desired longitudinal position of said free end (4).

18. A method according to any one of claims 15 to 17, further comprising adjusting the position of said free edge (4) by activating said electric drive means using another form of user interface than said position indicator (6).

Patentansprüche

1. Abschirmvorrichtung (100, 101, 102, 103, 104) zum Abschirmen eines Fensters (1), wobei die Abschirmvorrichtung (101) umfasst:

eine Abschirmung (5) mit einer veränderlichen Länge (L), einer festen Breite (W) zwischen zwei Rändern der Abschirmung (5) und mit einem positionierbaren freien Ende (4), wobei die Längsposition des freien Endes (4) die Länge (L) der Abschirmung (5) bestimmt,
einen elektrischen Antrieb, der betriebsfähig mit der Abschirmung (5) zum Einstellen der Längsposition des freien Endes (4) verbunden ist,
ein längliches Führungselement, das zu den zwei Rändern parallel ist und zu einem der zwei Ränder benachbart angeordnet ist,
einen Positionsanzeiger (6) zum manuellen Anzeigen einer gewünschten Längsposition des freien Endes,
wobei die Längsposition des Positionsanzeigers (6) manuell durch einen Bediener frei auf eine beliebige Längsposition entlang des länglichen Führungselements einstellbar ist,
eine Sensoranordnung, die zum Erfassen eines Unterschieds zwischen der tatsächlichen Längsposition des freien Endes (4) und der tatsächlichen Längsposition des Positionsanzeigers (6) ausgelegt ist,
eine Schaltung oder einen Prozessor, die/der mit der Sensoranordnung verbunden ist,
wobei die Schaltung oder der Prozessor derart ausgelegt ist, dass sie/er den elektrischen Antrieb aktiviert, um den freien Rand (4) in eine Richtung zu bewegen, die den erfassten Unterschied zwischen der tatsächlichen Längsposition des freien Endes (4) und der tatsächlichen Längsposition des Positionsanzeigers (6) reduziert.

2. Abschirmvorrichtung (101) nach Anspruch 1, wobei die Schaltung oder der Prozessor derart ausgelegt ist, dass sie/er die Längsposition des freien Endes (4) als ein Slave der Längsposition des Positionsanzeigers (6) steuert.

3. Abschirmvorrichtung (101) nach Anspruch 1 oder 2, wobei die Sensoranordnung derart ausgelegt ist, dass sie die Richtung des erfassten Längspositionsunterschieds zwischen der tatsächlichen Längsposition des freien Endes (4) und der tatsächlichen Längsposition des Positionsanzeigers (6) erfasst.

4. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 3, wobei die Sensoranordnung und die Schaltung oder der Prozessor derart angeordnet sind, dass sie einen geschlossenen Kreis bilden, um die Längsposition des freien Endes (4) mit dem Ziel zu steuern, den erfassten Längspositionsunterschied zwischen der tatsächlichen Längsposition des freien Endes (4) und der tatsächlichen Längsposition des Positionsanzeigers (6) zu minimieren.

5. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 4, wobei der Positionsanzeiger (6) auf dem länglichen Führungselement angeordnet ist.

6. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 5, wobei der Positionsanzeiger (6) verschiebbar entlang des länglichen Führungselements positionierbar ist.

7. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 6, die ferner zwei parallele beabstandete Schienen (1, 2) zum Führen der zwei Ränder der Abschirmung (5) umfasst.

8. Abschirmvorrichtung (101) nach Anspruch 7, wobei das längliche Führungselement durch eine der parallelen beabstandeten Schienen (1, 2) ausgebildet ist.

9. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 8, wobei die Sensoranordnung eine Sensorkomponente an dem freien Ende (4) und/oder eine Sensorkomponente an dem Positionsanzeiger (6) umfasst.

10. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 9, wobei der Positionsanzeiger (6) einen Magnet oder eine magnetische Komponente umfasst.

11. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 10, wobei das mindestens eine Sensorelement (7, 9) ein Beliebiges von einem Positionssensor, einem induktiven Sensor, einem Reed-Sensor und einem Hall-Sensor ist.

12. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 11, wobei der Positionsanzeiger (6) abnehmbar auf einer der zwei Seitenschienen (1, 2) angeordnet ist.

13. Abschirmvorrichtung (101) nach einem der Ansprüche 1 bis 12, wobei der Positionsanzeiger (6) lösbar mit dem freien Rand (4) gekoppelt ist, so dass sich der Positionsanzeiger (6) gemeinsam mit dem freien Rand (4) bewegt, wenn sich das freie Ende (4) in Längsrichtung bewegt.

14. Abschirmvorrichtung (101) nach Anspruch 13, wobei der Positionsanzeiger (6) magnetisch mit dem freien Ende (4) gekoppelt ist oder mechanisch mit dem freien Ende (4) gekoppelt ist, und zwar mit einem gewissen Grad an Flexibilität, der eine geringfügige Verschiebung in Längsrichtung zulässt.

15. Verfahren zum Steuern der Position eines freien Endes (4) einer Abschirmung einer Abschirmvorrichtung (101) zum Abschirmen eines Fensters, wobei die Abschirmung (5) eine veränderbare Länge (L), eine feste Breite (W) zwischen zwei Rändern der Abschirmung (5) und ein positionierbares freies Ende (4), wobei die Längsposition des freien Endes (4) die Länge (L) der Abschirmung bestimmt, und einen elektrischen Antrieb aufweist, der betriebsfähig mit der Abschirmung verbunden ist, um die Position des freien Endes einzustellen, wobei das Verfahren umfasst:

Erfassen des Unterschieds zwischen der tatsächlichen Längsposition eines manuell positionierbaren Positionsanzeigers und der tatsächlichen Längsposition des freien Endes (4), und Aktivieren des elektrischen Antriebs, um den freien Rand (4) in eine Richtung zu bewegen, die den erfassten Längspositionsunterschied reduziert.

16. Verfahren nach Anspruch 15, das ferner ein Deaktivieren des elektrischen Antriebs, wenn der erfasste Unterschied null beträgt oder unter einem vorgegebenen Schwellenwert liegt, umfasst.

17. Verfahren nach Anspruch 15 oder 16, das ferner ein manuelles Positionieren des Positionsanzeigers (6) zum Anzeigen einer gewünschten Längsposition des freien Endes (4) umfasst.

18. Verfahren nach einem der Ansprüche 15 bis 17, das ferner ein Einstellen der Position des freien Randes (4) durch Aktivieren der elektrischen Antriebseinrichtung unter Verwendung einer anderen Form von Benutzerschnittstelle als des Positionsanzeigers (6) umfasst.

Revendications

1. Dispositif d'écran (100, 101, 102, 103, 104) destiné à protéger une fenêtre (1), ledit dispositif d'écran (101) comprenant :

un écran (5) d'une longueur modifiable (L), une largeur fixe (W) entre deux bords dudit écran (5) et une extrémité libre positionnable (4), la position longitudinale de ladite extrémité libre (4) déterminant la longueur (L) dudit écran (5),
une commande électrique fonctionnellement reliée audit écran (5) pour le réglage de la position longitudinale de ladite extrémité libre (4),
un élément de guidage allongé, parallèle auxdits deux bords et disposé à côté de l'un desdits deux bords,
un indicateur de position (6) permettant d'indiquer manuellement une position longitudinale souhaitée de ladite extrémité libre, la position longitudinale dudit indicateur de position (6) pouvant être réglée librement manuellement le long dudit élément de guidage allongé,
un système de détection configuré pour détecter une différence entre la position longitudinale

réelle de ladite extrémité libre (4) et la position longitudinale réelle dudit indicateur de position (6),
un circuit ou processeur relié audit système de détection,
ledit circuit ou processeur étant configuré pour activer ladite commande électrique afin de déplacer ladite extrémité libre (4) dans une direction réduisant la différence détectée entre la position longitudinale réelle de ladite extrémité libre (4) et la position longitudinale dudit indicateur de position (6).

2. Dispositif d'écran (101) selon la revendication 1, dans lequel ledit circuit ou processeur est configuré pour contrôler la position longitudinale de ladite extrémité libre (4) en fonction de la position longitudinale dudit indicateur de position (6).

3. Dispositif d'écran (101) selon la revendication 1 ou 2, dans lequel ledit système de détection est configuré pour détecter la direction de la différence détectée dans la position longitudinale entre la position longitudinale réelle de ladite extrémité libre (4) et la position longitudinale réelle dudit indicateur de position (6).

4. Dispositif d'écran (101) selon l'une quelconque des revendications 1 à 3, dans lequel ledit système de détection et ledit circuit ou processeur sont agencés de manière à former une boucle fermée pour commander la position longitudinale de ladite extrémité libre (4) dans le but de réduire la différence détectée dans la position longitudinale entre la position longitudinale réelle de ladite extrémité libre (4) et la position longitudinale réelle dudit indicateur de position (6).

5. Dispositif d'écran (101) selon l'une quelconque des revendications 1 à 4, dans lequel ledit indicateur de position (6) est disposé sur ledit élément de guidage allongé.

6. Dispositif d'écran (101) selon l'une quelconque des revendications 1 à 5, dans lequel ledit indicateur de position (6) peut être positionné de façon coulissante le long dudit élément de guidage allongé.

7. Dispositif d'écran (101) selon l'une quelconque des revendications 1 à 6, comprenant en outre deux rails espacés parallèles (1, 2) destinés à guider lesdits deux bords dudit écran (5).

8. Dispositif d'écran (101) selon la revendication 7, dans lequel ledit élément de guidage allongé est formé par l'un desdits rails espacés parallèles (1, 2).

9. Dispositif d'écran (101) selon l'une quelconque des revendications 1 à 8, dans lequel ledit système de détection comprend un composant de détection à ladite extrémité libre (4) et/ou un composant de détection sur ledit indicateur de position (6).

10. Dispositif d'écran (101) selon l'une quelconque des revendications 1 à 9, dans lequel ledit indicateur de position (6) comprend un aimant ou un composant magnétique.

11. Dispositif d'écran (101) selon l'invention l'une quelconque des revendications 1 à 10, dans lequel l'au moins un élément de détection (7, 9) est l'un quelconque parmi : un capteur de position, un capteur inductif, un capteur Reed et un capteur Hall.

12. Dispositif d'écran (101) selon l'une quelconque des revendications 1 à 11, dans lequel l'indicateur de position (6) est agencé de façon détachable sur l'un des deux rails latéraux (1, 2).

13. Dispositif d'écran (101) selon l'une quelconque des revendications 1 à 12, dans lequel ledit indicateur de position (6) est accouplé de façon amovible à ladite extrémité libre (4), de telle façon que ledit indicateur de position (6) se déplace conjointement avec ledit bord libre (4) lorsque ladite extrémité libre (4) se déplace longitudinalement.

14. Dispositif d'écran (101) selon la revendication 13, dans lequel ledit indicateur de position (6) est accouplé magnétiquement à ladite extrémité libre (4) ou accouplé mécaniquement à ladite extrémité libre (4), avec un certain degré de flexibilité permettant un déplacement mineur dans la direction longitudinale.

15. Procédé destiné à commander la position d'une extrémité libre (4) d'un écran d'un dispositif d'écran (101) destiné à protéger une fenêtre, ledit écran (5) présentant une longueur modifiable (L), une largeur fixe (W) entre deux bords dudit écran (5) et une extrémité libre positionnable (4), la position longitudinale de ladite extrémité libre (4) déterminant la longueur (L) dudit écran, et une commande électrique fonctionnellement reliée audit écran pour régler la position de ladite extrémité libre,
ledit procédé comprenant :

la détection de la différence entre la position longitudinale réelle d'un indicateur de position positionnable manuellement et la position longitudinale réelle de ladite extrémité libre (4), et
l'activation de ladite commande électrique pour déplacer ladite extrémité libre (4) dans une direction réduisant ladite différence détectée dans la position longitudinale.

16. Procédé selon la revendication 15, comprenant en

outre la désactivation de ladite commande électrique lorsque ladite différence détectée est nulle ou inférieure à un seuil prédéterminé.

17. Procédé selon la revendication 15 ou 16, comprenant en outre le positionnement manuel dudit indicateur de position (6) afin d'indiquer une position longitudinale souhaitée de ladite extrémité libre (4).

18. Procédé selon l'invention l'une quelconque des revendications 15 à 17, comprenant en outre le réglage de la position de ladite extrémité libre (4) par activation dudit moyen de commande électrique à l'aide d'une autre forme d'interface d'utilisateur que ledit indicateur de position (6).

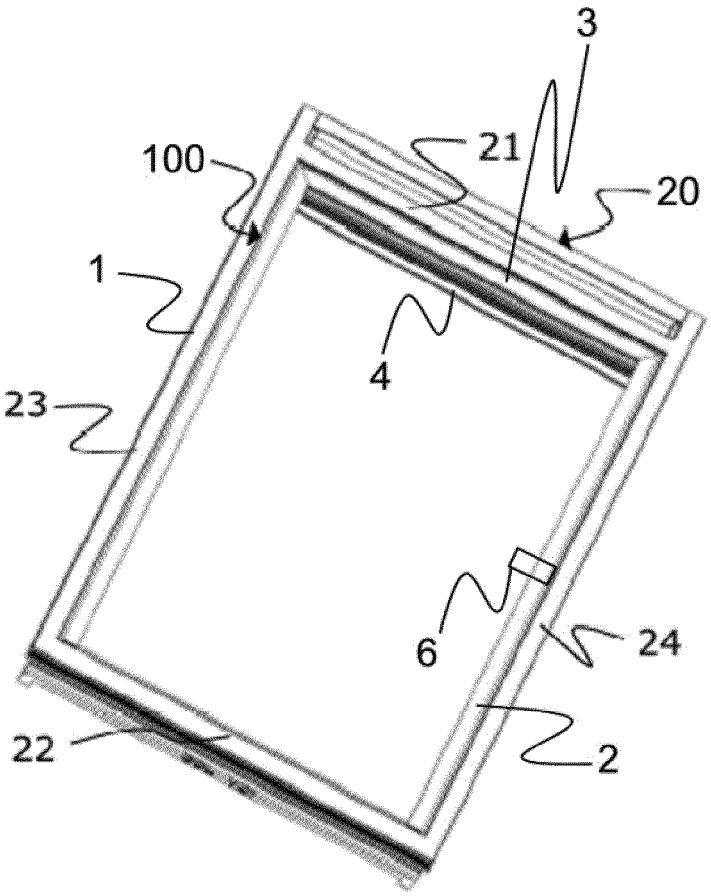

Fig. 1

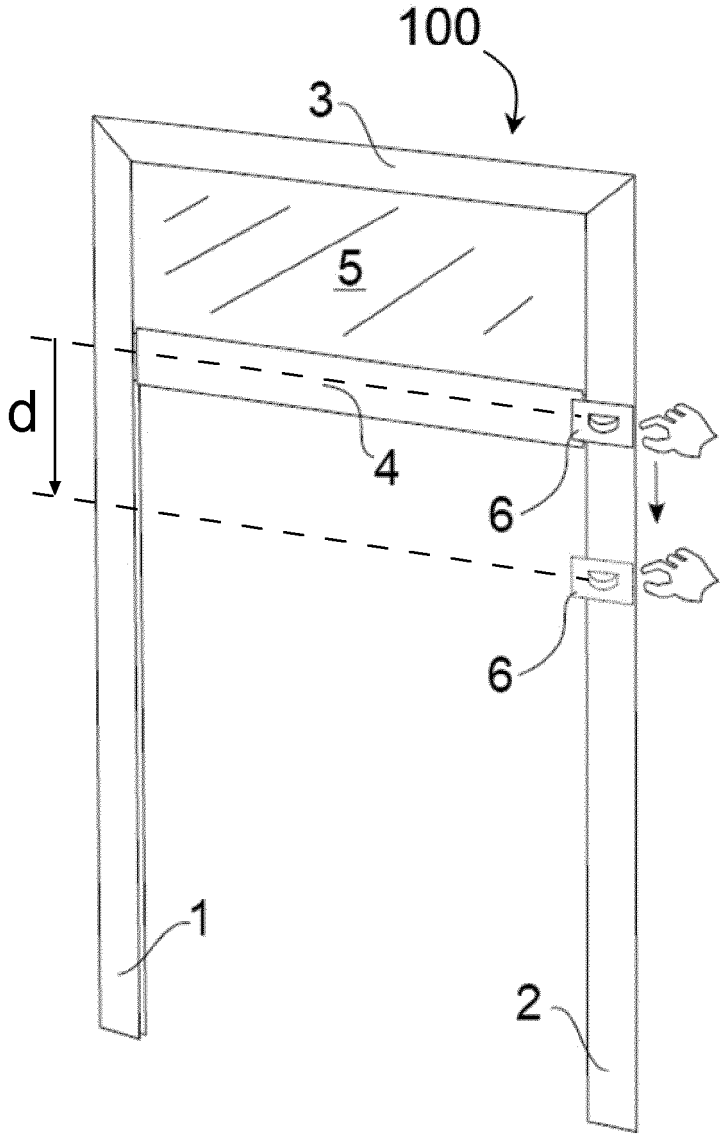

Fig. 2A

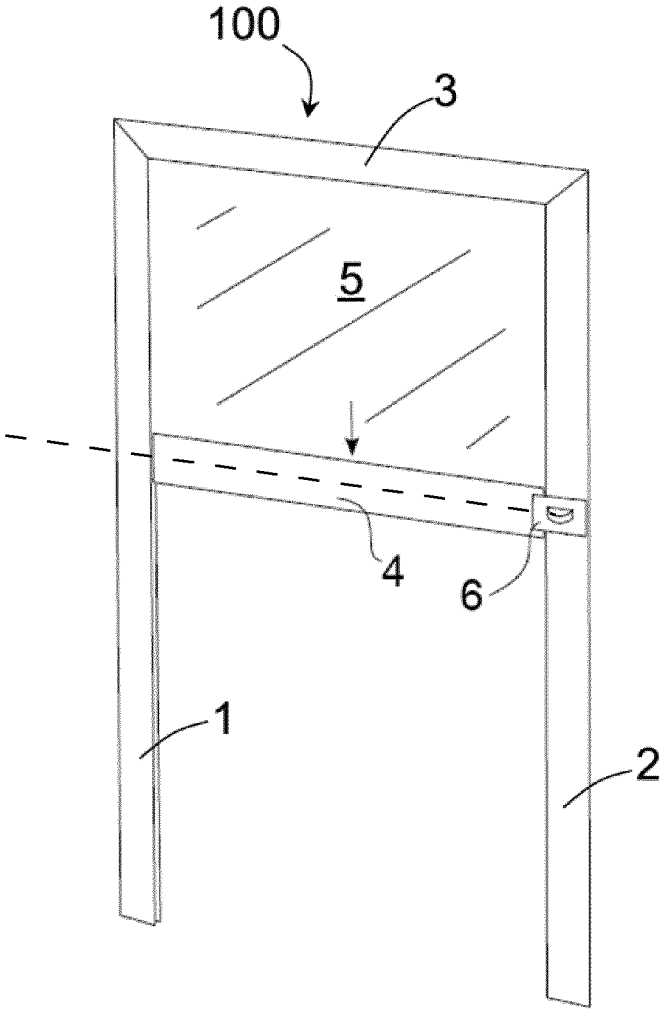

Fig. 2B

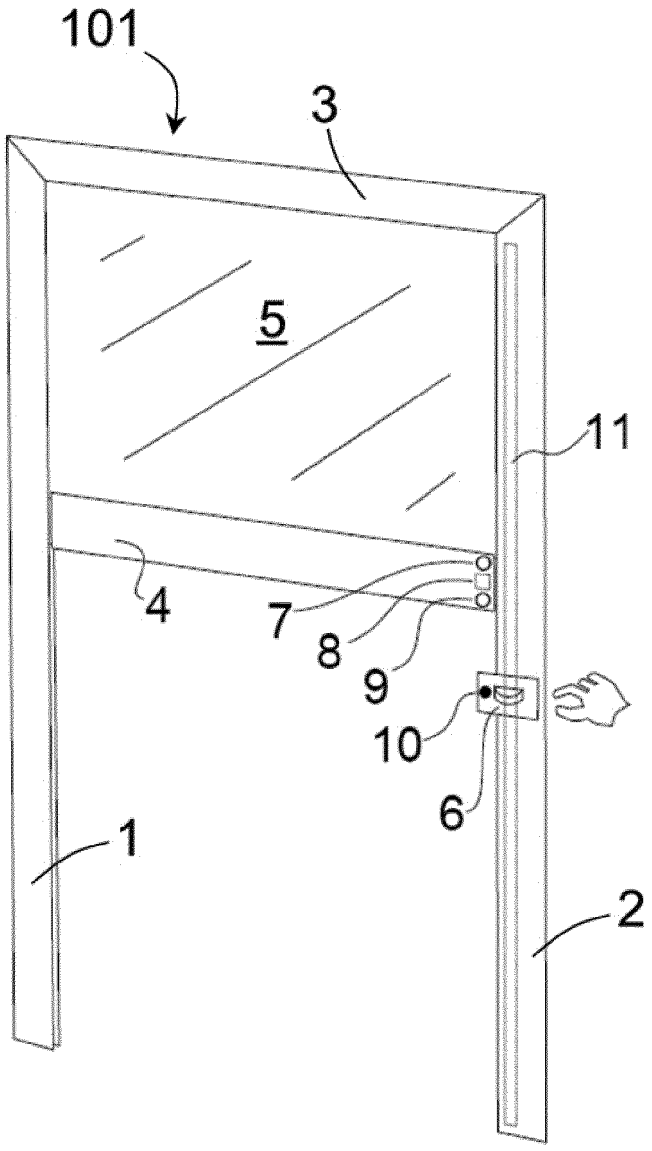

Fig. 3

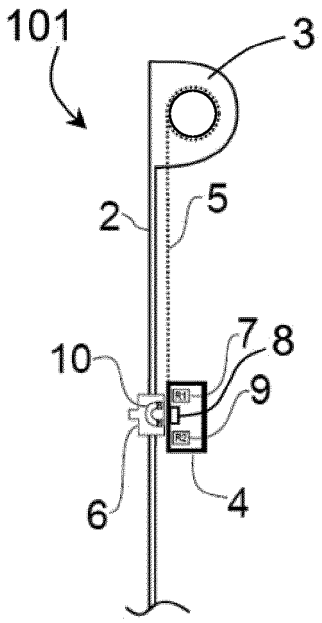

Fig. 4

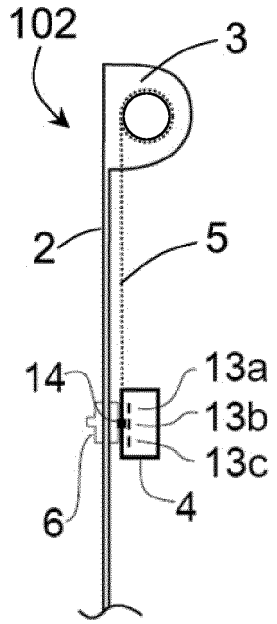

Fig. 5A

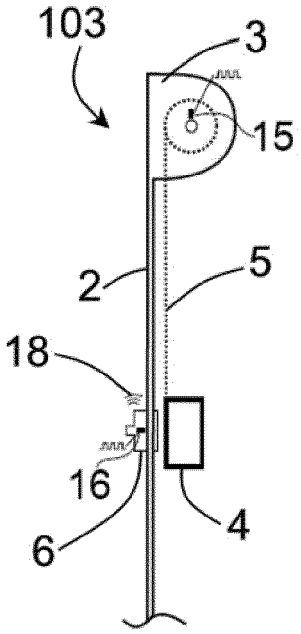

Fig. 5B

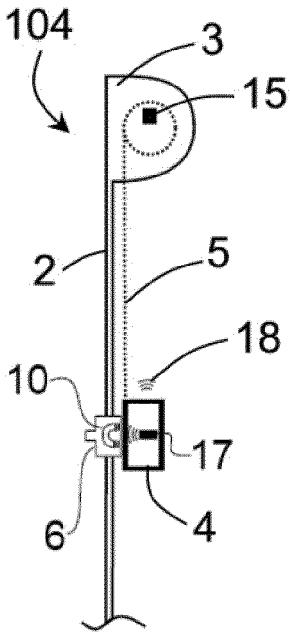

Fig. 5C

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0845572 A1 **[0002]**
- DE 19605273 **[0003]**