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(54) ROLLER BLIND THAT FREELY OPENS/CLOSES UP AND DOWN

(57) A roller blind that freely opens and closes up and down, which comprises a roller shaft, a drawing cord and a drawing device. An end part of the roller shaft is provided with a movable pulley (1), and the drawing cord comprises a lifting section (31) and a pull-down section (32) which are drawn by the drawing device to move synchronously; the lifting section (31) and the pull-down section (32) bypass the movable pulley (1) and then tension upward and downward respectively so as to keep the movable pulley (1) stable, such that the movable pulley (1) may rotate while lifting, thus achieving the free up and down opening and closing of the roller blind.

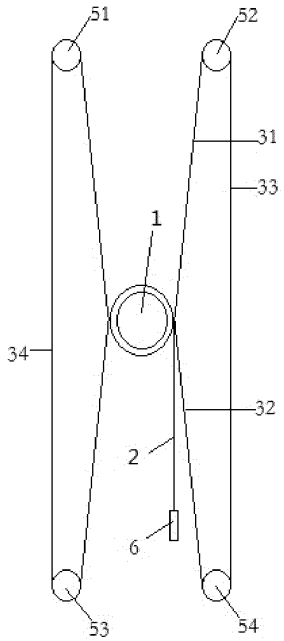

FIG. 2

EP 3 825 507 A1

Description

Technical field

[0001] The invention relates to a roller blind, in particular to an upper F free opening and closing coil with more reliable operation curtain.

Background

[0002] Roll-up curtains are easy to use, beautiful and generous, and are widely used in home life and office places. The commonly used method of existing roller blinds is to fix and install the roller on the upper end of the window, rotate the roller, and wind or release the curtain. This kind of curtain is first opened from the lower part of the window, so that the upper part of the window is shaded, and the lower part is lighted. When opened, the lower part of the window cannot block the line of sight, and the upper part cannot light.

[0003] In real life, private spaces such as rooms, reception rooms, bathrooms, school classrooms, and some office spaces often require the lower part of the window to block the line of sight, while the upper part of the window is used for daylighting. This requires a top-opening roller blind. In order to block the line of sight or direct light in different parts, sometimes it is necessary to block the middle or upper part of the window. The ideal function of the roller blind is to open any size at any position.

[0004] For example, Chinese patent ZL201320482322.5 discloses an upper-opening roller blind. This patent connects a movable pulley mechanism at both ends of the reel, so that the traction rope drives the movable pulley and the reel to lift together while driving the reel to rotate in white, so that the speed of the reel is raised and lowered. It is similar to the speed at which the curtain is released or wound on the reel, keeping the lower end of the roller blind basically still, thus realizing the dynamic upper-opening roller blind effect. In this patent, a clutch mechanism is arranged between the movable pulley and the reel, which can be shielded at any position of the window.

[0005] In order to further improve the design of this patent, Chinese patent ZL201620022532.X discloses a roller blind of any size that can be unfolded at any position, including a reel, a commercial cloth, a movable pulley and a traction rope at both ends of the reel. The two ends of the traction rope are respectively Connecting two motor-driven winders, by controlling the movement of the two motors, the curtain can be opened from top to bottom, or the unfolding size of the curtain can be adjusted at any position, so that the curtain can be covered in the lower, middle or upper part of the window position.

[0006] The roller blinds disclosed in the above patents rely on the gravity of the reel and the pulling force of the traction rope to drive the reel to rotate. If the gravity of the reel is not enough, the reel will be difficult to rotate when it is raised and lowered, thereby destroying the upper opening effect. In addition, the roller blinds disclosed in the above patents all rely on a winder to wind or loosen the traction rope to drive the reel. When the traction rope is loosened, the descent of the reel also relies on gravity, which makes the roller blind not suitable for certain tilting or It is used in horizontal installation. At the same time, the setting of the winder occupies the design space, which is not conducive to the optimization of the entire system.

Summary of Invention

[0007] The invention provides a roller blind that can be opened and closed freely up and down, so that the movement of the reel does not depend on its own gravity, so that the operation is more reliable, and it can be used in occasions that require inclined or horizontal installation.

[0008] Up and down freely opening and closing roller blinds, including a reel, a traction rope and a traction device, the end of the reel is provided with a movable pulley, the traction rope includes an upward section and a downward section that are pulled by the traction device to move synchronously, the upward section After bypassing the movable pulley, the pull-down section is tensioned upward and downward respectively to keep the movable pulley stable.

[0009] The lift-up section and the pull-down section can be split structures. In this case, the traction device is a winder arranged at one or both ends of the lift-up section and the pull-down section. The winder has a simple structure and can be driven by a motor or Manually driven, the upper and lower sections can only be connected to the winder at one end, or both ends can be connected to the winder. When the winders at both ends of the upper lift section take up the wire and the winders at both ends of the pull-down section are set at the same speed When threading, the movable pulley only moves up and down, and does not rotate: when the winder at one end of the upper lifting section takes up the wire and the winder at the other end pays off at the same speed, and the winders at both ends of the pull-down section move in the opposite direction, The movable pulley only rotates without lifting action; and when the winder at one end of the lifting section is stationary and the winder at the other end is paying off or taking up and the winder of the pull-down section is moving in the opposite direction, the moving pulley is lifting Rotate at the same time to realize the opening or closing of the roller blind.

[0010] Preferably, the traction rope has a closed loop structure, and the upper and lower freely opening and closing roller blinds include a plurality of tension wheels for tensioning the traction rope, and at least one of the tension wheels is a traction wheel constituting the traction device. Compared with the split structure, the closed-loop structure adds a tensioning device, but omits the winder for retracting the traction rope, and can ensure the synchronous movement of the upper lifting section

and the lowering section.

[0011] More preferably, two traction wheels are included, and the two traction wheels respectively tow different ends of the upper lifting section and the lowering section. When the two traction wheels tow the ends of the upper lifting section or the lowering section at the same speed, the movable pulley can be prevented from rotating, but only lifting motion, so that the height of the roller blind can be adjusted.

[0012] Further preferably, the two traction wheels are respectively driven by two different motors.

[0013] The two traction wheels can also be provided with only one drive motor, which drives one of the traction wheels and the other traction wheel is driven by it. In order to realize the above function, a clutch device is arranged between the two traction wheels. The clutch device may be a gear set, which includes an intermediate gear. When the intermediate gear meshes with the other gears, the two traction wheels are linked, and when the intermediate gear is withdrawn, the two traction wheels are disconnected.

[0014] Further preferably, the two traction wheels are respectively driven by two sets of bead chain-sprocket wheels. The two traction wheels are each driven by a set of bead chain-sprockets, and the combination of movement modes between the two traction wheels is realized by selecting different combinations of bead chains, so that the curtain can switch between different modes of movement.

[0015] Preferably, the traction rope is a bead chain or a timing belt.

[0016] Preferably, guide grooves are provided on both sides of the up and down freely opening and closing roller blind, and the traction device, traction rope and movable pulley are arranged on the guide grooves. The guide groove can limit the lateral swing of the movable pulley, so that the roller blind has the function of wind resistance, and can realize the modularization of the device and facilitate assembly.

[0017] Preferably, the traction rope and the traction device are arranged symmetrically, and the traction devices on both sides are connected coaxially, and the coaxial connection can transmit the driving force of one side to the other side, ensuring the synchronous movement of the traction ropes on both sides.

[0018] In the present invention, the traction rope is provided with an upper lifting section and a lowering section. The upper lifting section and the lowering section tension the movable pulley in two opposite directions to maintain balance. When the upper lifting section and the pull-down section move synchronously by traction, the movable pulley is Rotation can be generated while lifting, so that the reel can open or retract the curtain while lifting without relying on gravity, so that the curtain can be opened and closed freely up and down.

Brief description of the drawings

[0019]

Fig. 1 is a schematic structural diagram of Embodiment 1 of the roller blind of the present invention.

Fig. 2 is a schematic structural diagram of embodiment 2 of the roller blind of the present invention.

Fig. 3 is a schematic structural diagram of the shutter clutch device shown in Fig. 2 in a disconnected state.

Fig. 4 is a schematic structural diagram of the combined state of the roller shutter clutch device shown in Fig. 2.

Fig. 5 is a schematic structural diagram of another driving mode of the roller blind shown in Fig. 2.

Figure 6 is a schematic diagram of the overall installation structure of the roller blind of the present invention;

Fig. 7 is a schematic structural diagram of Embodiment 5 of the roller blind of the present invention;
Among them, 1 is a movable pulley, 2 is a curtain, 31 is a lifting section, 32 is a pull-down section, 33 and 34 are connecting sections, 41, 42, 43, 44 are winders, and 51, 52, 53, 54 are tensioners Wheel, 6 is the counterweight, 7 is the intermediate gear, 8 is the guide groove, 91 and 92 are the motors, 10 is the controller, 11 is the drive shaft, 12 is the fixed gear seat, 61, 62, 63, 64 are the bead chains.

Embodiments

Embodiment 1

[0020] As shown in Figure 1, a vertical free opening and closing roller blind, including a reel (not shown in the figure), a movable pulley 1, a traction rope and a curtain cloth 2. The upper end of the curtain cloth 2 is fixed on the reel, and the lower end is a free end, which is provided with a Heavy 6.

[0021] The traction rope of the present invention includes an upper lifting section 31 and a pull-down section 32. The two ends of the upper lifting section 31 are connected to the winder 41 and the winder 42, and the two ends of the pull-down section are connected to the winder 43 and the winder 44. The lifting section 31 is stretched upwards after bypassing the movable pulley 1, and the pull-down section 32 tensions the movable pulley downwards, so that the movable pulley 1 remains stable at all times.

[0022] When the bobbin 42 and the bobbin 44 are stationary, the bobbin 41 is released and the bobbin 43 is wound, the winding shaft moves downward while winding

up the curtain, achieving the effect of opening the curtain up. When the bobbin 42 and the bobbin 44 are stationary, the bobbin 41 is wound and the bobbin 43 is released, the winding shaft moves upward while releasing the curtain, achieving the effect of closing the curtain upward.

[0023] When the bobbin 41 and the bobbin 42 are wound at the same time and the bobbin 43 and the bobbin 44 are released at the same time, the reel and the cord as a whole rise; when the bobbin 41 and the bobbin 42 are released at the same time, the bobbin 43 When winding with 44 at the same time, the reel and the curtain are lowered as a whole, so that it can be covered at any position of the window.

Embodiment 2

[0024] As shown in Figure 2, a freely opening and closing roller blind includes a reel (not shown in the figure), a movable pulley 1 and a curtain 2. The traction rope includes an upper lifting section 31 and a lowering section 32, which are connected by connecting sections 33 and 34 It becomes a closed-loop structure, and the tensioning is arranged on four tensioning wheels. The tensioning wheel 51 and the tensioning wheel 52 are traction wheels. They can be driven manually or by a motor. The traction rope can be a variety of wires with small elongation, or a bead chain, or a timing belt can be selected. Of course, the tensioner and the movable pulley also need to choose a structure that matches the traction rope. When the traction rope is a bead chain, the tensioner and the movable pulley are sprockets; when the traction rope is a timing belt, the tensioner and the movable pulley are the timing pulleys.

[0025] The lifting section 31 of the traction rope bypasses the movable pulley 1 and is tensioned upward, and the pull-down section 32 bypasses the movable pulley 2 and is tensioned downward to keep the movable pulley 1 stable. The upper end of the curtain fabric 2 is fixed on the reel, and the lower end is provided with a counterweight 6.

[0026] As shown in FIG. 3, the movable pulley 1, the traction rope and the tensioning wheel are provided with a guide groove 8, the tensioning wheel 52 is provided with an intermediate gear 7, and the guide groove 8 is provided with a fixed gear seat 12 that can mesh with the intermediate gear 7. The tension wheel 51 and the tension wheel 52 are provided with a coaxial ring gear, and the intermediate gear 7 always meshes with the ring gear on the tension wheel 52. When the tensioning wheel 52 needs to be rotated, as shown in Figure 4, the intermediate gear 7 is rotated around the axis of the tensioning wheel 52 so that it meshes with the ring gear on the tensioning wheel 51, and the tensioning wheel 51 drives the tensioning wheel. The pinch wheel 52 rotates.

[0027] As shown in Figures 3 and 4, the way the upper pull section 31 is wound around the tensioning wheel 52 is different from the way used in Figure 2. This connection mode can be linked to the tensioning wheel 51 and the tensioning wheel 52 through the intermediary gear 7 to achieve traction. The two ends of the rope lifting section 31 move upward or downward simultaneously.

[0028] By driving the tensioning wheel 51 manually or by a motor, and engaging or disengaging the intermediate gear 7, the combined actions of the two traction wheels of rotation, stationary and different rotation directions can be realized as follows:

When the tensioning wheel 51 rotates clockwise, the intermediate gear 7 remains disengaged from the ring gear on the tensioning wheel 51, and meshes with the fixed gear seat 12, so that the tensioning wheel 52 is stationary. Due to the traction of the tensioning wheel 51, the lifting The section 31 is gradually extended, and the pull-down section 32 is gradually shortened. The traction rope drives the pulley 1 to descend and rotates counterclockwise at the same time. The curtain is rolled up, and the roller blind is opened from top to bottom to achieve the top-opening effect.

[0029] When the tensioning wheel 51 rotates counterclockwise, the intermediate gear 7 remains disengaged from the ring gear on the tensioning wheel 51, and meshes with the fixed gear seat 12, so that the tensioning wheel 52 is stationary. Due to the traction of the tensioning wheel 51, the lifting The section 31 is gradually shortened, and the pull-down section 32 is gradually extended. The traction rope drives the pulley 1 to rise and rotate clockwise at the same time, and the curtain is released, thereby achieving the effect of closing the roller blind from bottom to top.

[0030] When the tension wheel 51 rotates counterclockwise, the intermediate gear 7 disengages from the fixed gear seat 12 and meshes with the ring gear on the tension wheel 51, and the tension wheel 52 also rotates counterclockwise, as shown in FIG. 4. Since the traction rope is wound on the tension pulley 52 in the reverse direction, both ends of the upper lifting section 31 of the traction rope are shortened at the same time. Otherwise, the curtain will be lowered as a whole, so as to achieve the effect of sheltering at any position of the window.

Embodiment 3

[0031] As shown in Figure 5, the arrangement of the reel (not shown in the figure), the guide groove 8, the movable pulley 1, the curtain 2, the traction rope and the fixed pulley is the same as that of the second embodiment, without the intermediate gear and the fixed gear seat. The tensioner 51 and the tensioner 52 are respectively driven by the motor 91 and the motor 92, the motor 91 and the motor 92 are controlled by the controller 10, through the controller 10, various programs can be set to control the rotation and the stationary of the motor 91 and the motor 92 respectively. And different rotation directions, so that the two traction wheels can achieve the combined action as described in Embodiment 2, so that the curtain can achieve the effect of opening or closing or covering any position of the window.

[0032] By making the diameter of the movable pulley and the reel the same or similar, it can be ensured that when the curtain is opened or retracted, the bottom end of the curtain always keeps up and down or does not move up and down obviously.

Embodiment 4

[0033] As shown in FIG. 6, guide grooves 8 are provided on both sides of the roller blind, and the traction rope, the movable pulley 1 and the tensioning wheel are all installed on the guide groove 8. The traction ropes, tensioning wheels, and movable pulleys on both sides of the roller blind are arranged symmetrically, and the reel is arranged between the two movable pulleys 1, and a curtain cloth is wound on it. In order to realize the synchronous movement, the traction wheels on both sides are coaxially connected by the drive shaft 11, so that the synchronous movement of the movable pulleys on both sides can be realized only by driving the traction wheels on one side.

[0034] Connecting the two ends of the counterweight 6 at the lower end of the curtain fabric 2 to the corresponding positions of the pull-down section of the traction rope will not affect the retracting and overall lifting of the curtain fabric. Therefore, the up and down freely opening and closing roller blind of the present invention can be applied to inclined or horizontal installation.

Embodiment 5

[0035] As shown in Fig. 7, the tension wheel 51 and the tension wheel 52 are independently manually driven by a set of bead chain-sprocket wheels. The closed loop bead chain that drives the tensioning wheel 52 freely sags into two sections 61 and 62, and the closed loop bead chain that drives the tensioning wheel 51 freely sags into two sections, 63 and 64.

[0036] Pull down 61, the tension wheel 51 rotates counterclockwise, the tension wheel 52 is stationary, the traction rope drives the pulley 1 to rise and rotate clockwise at the same time, the curtain is released, thereby achieving the effect of closing the roller blind from bottom to top. On the contrary, if 62 is pulled downwards, the traction rope drives the pulley 1 to descend and rotates counterclockwise at the same time, and the curtain is rolled up, thereby realizing the effect of opening the roller blind from top to bottom.

[0037] Pulling 61 and 64 downwards at the same time, the traction rope drives the movable pulley 1 to rise and no rotation occurs, and the curtain as a whole rises. On the contrary, if 62 and 63 are pulled downwards, the traction rope drives the pulley 1 to descend without rotating, and the curtain as a whole descends.

[0038] Pulling 61 and 63 downwards at the same time, the traction rope drives the pulley 1 to stop lifting and rotate counterclockwise at the same time, the reel can stay at any position and the curtain is released downward. On the contrary, if 62 and 64 are pulled downwards, the traction rope drives the pulley 1 to stop lifting and rotate clockwise at the same time, the reel can stay at any position and the curtain is rolled up.

[0039] In this embodiment, two sets of manually-driven bead chain-sprocket wheels are set, and the movement of the two traction wheels is clutched by selecting the combination of the bead chain, so that the curtain can be switched in different movement modes.

Claims

1. The up and down freely opening and closing roller blind including a reel, a traction rope and a traction device, the end of the reel is provided with a movable pulley, the traction rope is **characterized in that** the traction rope includes an upward section and a pull-down section that move synchronously by the traction device, after the above-mentioned lifting section and pull-down section bypass the movable pulley, they are tensioned upward and downward respectively to keep the movable pulley stable.

2. The up and down freely opening and closing roller blind according to claim 1, **characterized in that** the traction device is a winder arranged at one or both ends of the upper lifting section and the lowering section.

3. The up and down freely opening and closing roller blind of claim 1, wherein the traction rope is a closed loop structure, and the roller blind includes a plurality of tension wheels for tensioning the traction rope, and at least one of the tension wheels is configured to The traction wheel of the traction device.

4. The up and down freely opening and closing roller blind according to claim 3, **characterized in that** it comprises two traction wheels, and the two traction wheels respectively traction different ends of the upper lifting section and the lowering section.

5. The up and down freely opening and closing roller blind according to claim 4, **characterized in that** the two traction wheels are driven by two different motors respectively.

6. The up and down freely opening and closing roller blind according to claim 4, **characterized in that** a clutch device is provided between the two traction wheels.

7. The up and down freely opening and closing roller blind of claim 1, wherein the traction rope is a bead chain or a timing belt.

8. The roller blind of up and down freely opening and

closing according to claim 1, **characterized in that** guide grooves are provided on both sides of the roller blind, and the traction device, the traction rope and the movable pulley are arranged on the guide grooves.

9. The up and down freely opening and closing roller blind according to claim 1, wherein the traction rope and the traction device are arranged symmetrically, and the traction devices on both sides are connected coaxially.

10. The up and down freely opening and closing roller blind according to claim 4, wherein the two traction wheels are respectively driven by two sets of bead chain-sprocket wheels.

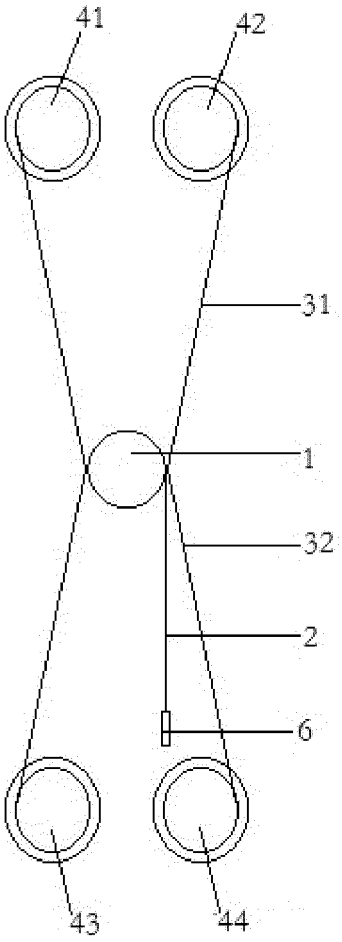

FIG. 1

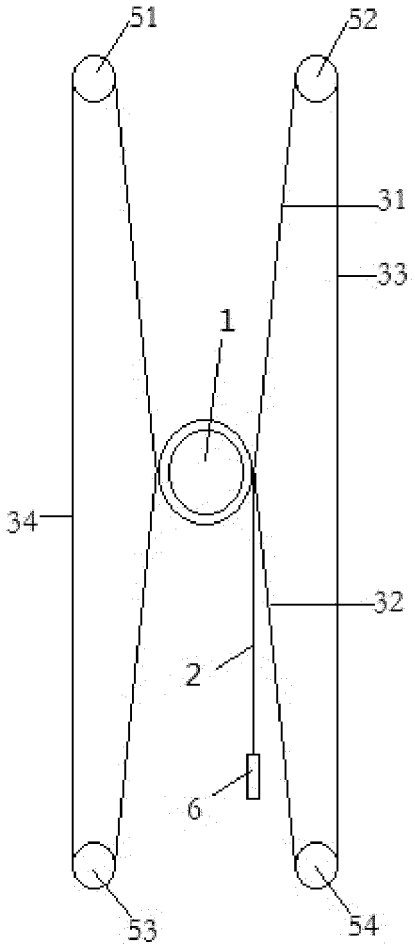

FIG. 2

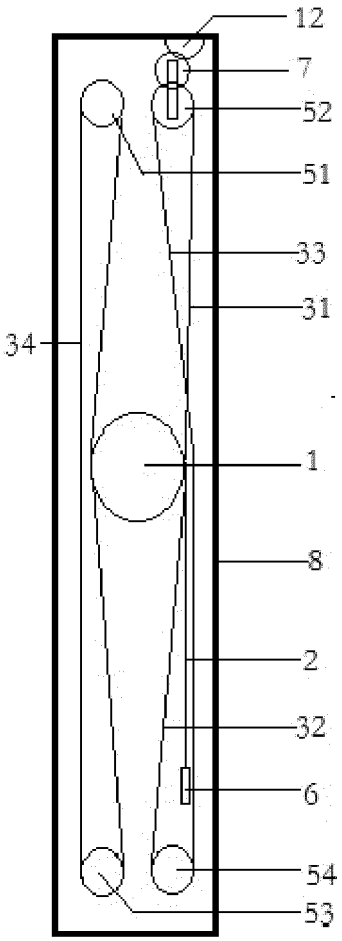

FIG. 3

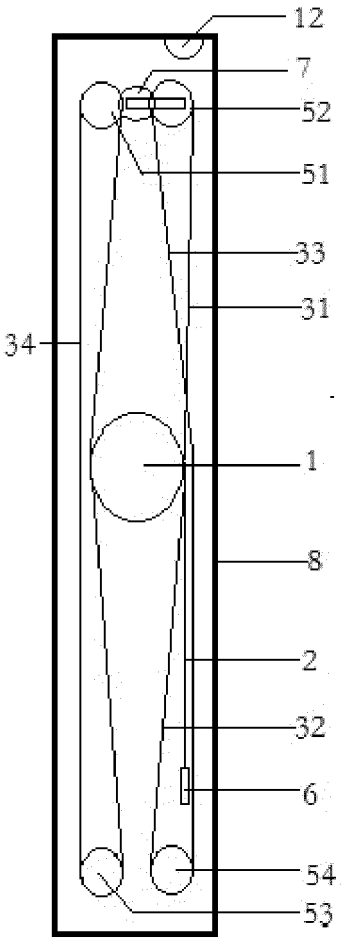

FIG. 4

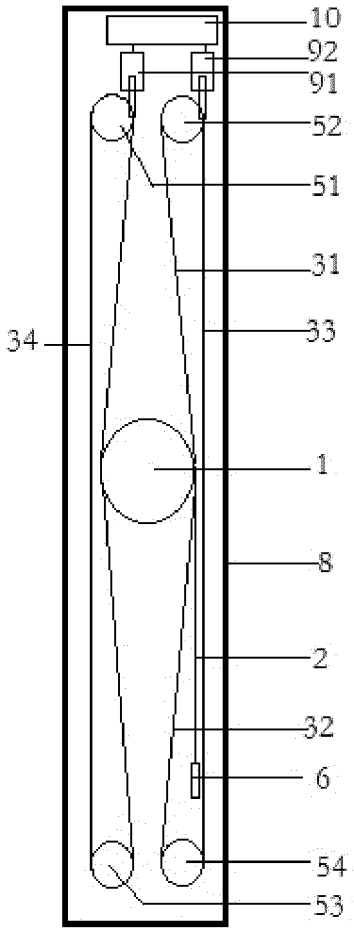

FIG. 5

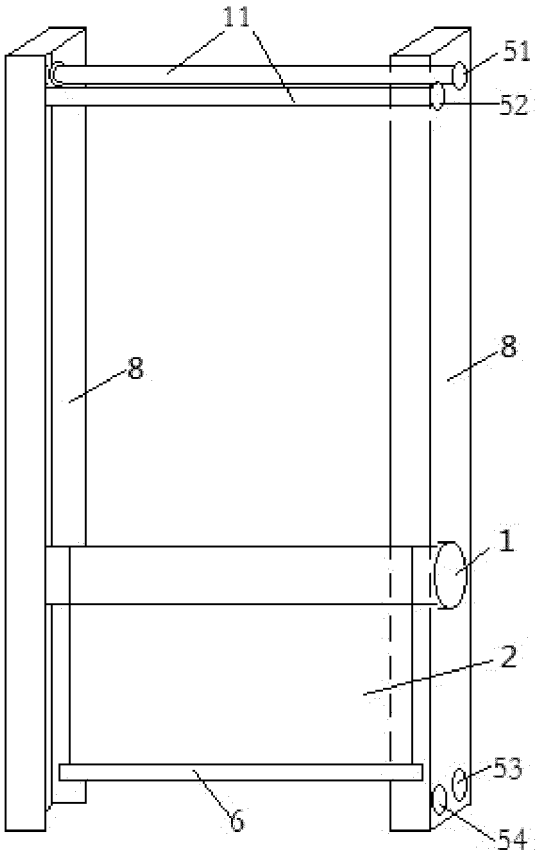

FIG. 6

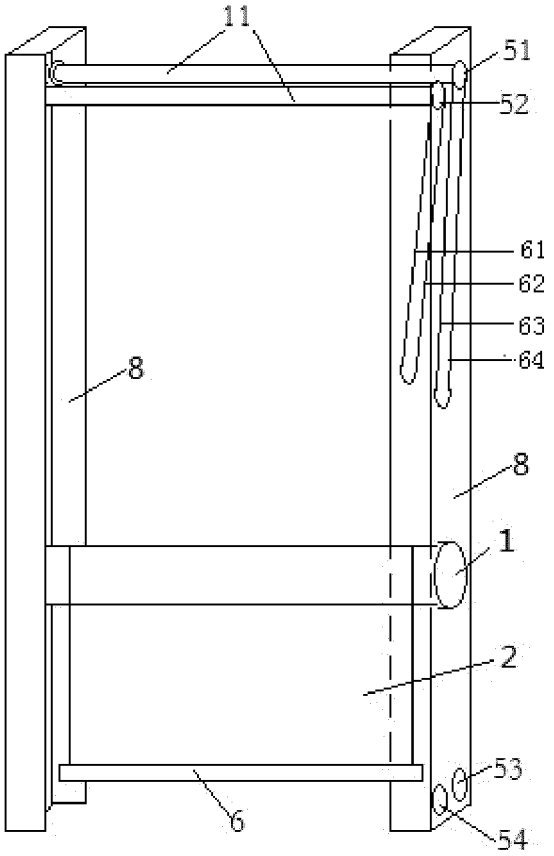

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/087906

A. CLASSIFICATION OF SUBJECT MATTER

E06B 9/40(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

E06B 9, A47H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNKI, CNABS, VEN: 窗, 轮, 同步, 上拉, 向上, 上提, 上升, 下拉, 向下, 下降, 张紧, 拉紧, 稳定, 轴, 绳, 线, window, wheel, pulley, synchronization, in-phase, up, upward, upside, upper, top, ascend, climb, raise, rise, below, down, lower, descend, under, drop, fall, decline, rope, thread, stay, cable, guyrope, shaft, axes, strain, tense, tension, stable, stably, steadily, stabilization, steady

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 104234608 A (ZHANG, JIWEN) 24 December 2014 (2014-12-24) description, paragraphs 0032-0049, and figures 1-4	1-10
A	CN 202467609 U (LAI, HAIMING ET AL.) 03 October 2012 (2012-10-03) entire document	1-10
A	CN 106958413 A (ZHANG, JIWEN) 18 July 2017 (2017-07-18) entire document	1-10
A	CN 2580081 Y (HUAZHONG AGRICULTURAL UNIVERSITY) 15 October 2003 (2003-10-15) entire document	1-10
A	CN 106193975 A (ZHANG, JIWEN) 07 December 2016 (2016-12-07) entire document	1-10
A	EP 0295223 A1 (LUCI-N LUCIANO SRL) 14 December 1988 (1988-12-14) entire document	1-10
A	JP 2000017975 A (KOID-N KOIDE YG) 18 January 2000 (2000-01-18) entire document	1-10

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
16 August 2019	**22 August 2019**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration** **No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088** **China**	Authorized officer
Facsimile No. **(86-10)62019451**	Telephone No.

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2019/087906

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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PX	CN 208534379 U (ZHANG, JIWEN) 22 February 2019 (2019-02-22) claims 1-9	1-10

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2019/087906

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REFERENCES CITED IN THE DESCRIPTION

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- CN ZL201620022532X **[0005]**