

Description

Title of Invention VERTICAL BLIND, HANGER RAIL, AND METHOD FOR MANUFACTURING HANGER RAIL

TECHNICAL FIELD

5 [0001]

The present invention relates to a vertical blind where a hanger rail includes a steady rest for suppressing the vibration of a slat drive shaft.

BACKGROUND ART

[0002]

10 In a vertical blind, slats are suspended from and supported by many runners which are movably supported in a hanger rail, and an angle adjustment shaft which is rotatably supported in the hanger rail is passed through the runners. By operating an operation apparatus, the angle adjustment shaft is rotated and thus the slats are rotated in phase.

15 Further, by operating an operation apparatus, the runners are transferred within the hanger rail and thus the slats are drawn out or folded up along the hanger rail.

[0003]

[0004]

20 In the vertical blind thus configured, when the slats are folded up, the angle adjustment shaft is supported only at both ends of the hanger rail. The angle adjustment shaft is deformed by self-weight on the lengthwise middle portion of the hanger rail. Thus, in drawing out the slats subsequently, a larger operation force is required to transfer the runners, or the rotation of the angle adjustment
25 shaft causes noise.

[0005]

For this reason, there has been proposed a vertical blind including a steady rest configured to, when slats are folded up, support the middle portion of an angle adjustment shaft.

[0006]

Patent Document 1 discloses a vertical blind including a rotational shaft configured to rotate slats and an interval keeping member configured to support a screw rod for transferring the slats, on the middle portion of a guide rail at equal intervals.

Prior Art Documents

Patent Documents

[0007]

Patent Document 1: Japanese Examined Utility Model Registration Application
Publication No. 57-55917

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0008]

In the vertical blind disclosed in Patent Document 1, when the slats are folded up, the interval keeping member is transferred to a predetermined position and then held. For this purpose, pins serving as stoppers protrude on predetermined positions in an inner side surface opposite to the guide rail, and the pairs of pins hold the interval keeping member in the predetermined positions.

[0009]

However, in order to mount these stoppers to the guide rail, it is necessary to make many holes for driving the pins in the front and back side surfaces of the guide rail and then to drive the pins into the holes.

[0010]

As seen above, the stopper mounting work is troublesome, and the number of parts is increased, thereby increasing cost. Further, since the heads of the pins are exposed to a side surface of the guide rail, the appearance of the guide rail is unfavorably degraded.

[0011]

Further, in order to drive the pins, which are spaced in the length direction of the guide rail, in such a manner that the heights of the pins are uniform, there is formed an alignment groove extending horizontally in an outer surface of the guide rail. Thus, the design limitation to the guide rail is unfavorably increased.

5 [0012]

An object of the present invention is to provide a vertical blind which can reduce the number of parts of stoppers for holding steady rests in predetermined positions on a hanger rail and improve the appearance of the hanger rail.

MEANS FOR SOLVING THE PROBLEMS

10 [0013]

The present invention provides a vertical blind including: a shaft having both ends rotatably supported by both ends of a hanger rail; a steady rest movably supported by the hanger rail, the shaft being passed through the steady rest, the steady rest being transferred along with a leading runner in a
15 slat-folding-up direction during folding up of slats; and a stopper configured to hold the steady rest in a support position where deformation of the shaft is prevented. The stopper is disposed in a position other than a lateral side of the hanger rail.

[0014]

20 In one aspect of the present invention, the steady rest preferably has a locking portion configured to become engaged with the single stopper and to hold the steady rest in the shaft support position.

[0015]

In one aspect of the present invention, the stopper is preferably disposed on
25 an upper side of the hanger rail.

[0016]

In one aspect of the present invention, the stopper is preferably disposed on a shoulder formed over a lateral side of the hanger rail.

[0017]

In one aspect of the present invention, the stopper is preferably disposed on a lower side of the hanger rail.

[0018]

5 In one aspect of the present invention, the stopper preferably protrudes from the upper side of the hanger rail diagonally along a length direction of the hanger rail, and the locking portion preferably has elasticity that allows the locking portion to, when contacting a slope of the stopper, become deformed and get over the stopper.

[0019]

10 In one aspect of the present invention, the stopper is preferably formed by lancing the hanger rail.

[0020]

In one aspect of the present invention, the stopper preferably includes multiple stoppers disposed in a length direction of the hanger rail and having at least two different protruding heights, the protruding heights being heights from an inner surface of the hanger rail, multiple steady rests are preferably movably supported by the hanger rail, and each of the steady rests preferably has a locking portion configured to become engaged with one of the stoppers and to stop the steady rest in multiple different support positions.

20 [0021]

In one aspect of the present invention, the stoppers are preferably formed by lancing in such a manner to have different lengths so that the stoppers have multiple protruding heights, and the steady rests each preferably have a locking portion configured to become engaged with one of the stoppers having the different protruding heights.

[0022]

In one aspect of the present invention, the stoppers are preferably formed by lancing in such a manner to have different angles so that the stoppers have multiple protruding heights, and the steady rests each preferably have a locking

portion configured to become engaged with one of the stoppers having the different protruding heights.

[0023]

5 In one aspect of the present invention, the stoppers are preferably formed by lancing in such a manner to have different lengths and different angles so that the stoppers have multiple protruding heights, and the steady rests each preferably have a locking portion configured to become engaged with one of the stoppers having the different protruding heights.

[0024]

10 In one aspect of the present invention, the stopper preferably includes multiple columns disposed in a front-back direction of the hanger rail and the columns each include multiple stoppers having different protruding heights.

[0025]

15 In one aspect of the present invention, the stopper is preferably disposed in a position obtained by dividing the shaft into equal parts in a length direction of the shaft.

[0026]

20 In one aspect of the present invention, the steady rest preferably includes multiple steady rests, and the stopper engaged with each of the steady rests is preferably located within a range corresponding to a diameter of the shaft directly above the shaft.

[0027]

25 The present invention also provides a hanger rail including a stopper configured to, when slats are folded up, hold a steady rest in a shaft support position. The stopper is disposed in a position other than a lateral side of the hanger rail.

[0028]

In one aspect of the present invention, the stopper is formed by lancing.

[0029]

In one aspect of the present invention, the stopper preferably includes multiple stoppers disposed in a length direction of the hanger rail and having at least two different protruding heights, the protruding heights being heights from an inner surface of the hanger rail.

5 [0030]

In one aspect of the present invention, the stoppers are preferably formed by lancing in such a manner to have different lengths so that the stoppers have multiple protruding heights.

[0031]

10 In one aspect of the present invention, the stoppers are preferably formed by lancing in such a manner to have different angles so that the stoppers have multiple protruding heights.

[0032]

In one aspect of the present invention, the stoppers are preferably formed by
15 lancing in such a manner to have different lengths and different angles so that the stoppers have multiple protruding heights.

[0033]

In one aspect of the present invention, the stopper preferably includes multiple columns disposed in a front-back direction of the hanger rail and the
20 columns each include multiple stoppers having different protruding heights.

[0034]

The present invention also provides a method for manufacturing a hanger rail for a vertical blind. The manufacturing method includes lancing a position other than a lateral side of a hanger rail to form a stopper for a steady rest.

25 **EFFECT OF THE INVENTION**

[0035]

According to the present invention, it is possible to reduce the number of stoppers for holding steady rests in predetermined positions on a hanger rail and to improve the appearance of the hanger rail.

BRIEF DESCRIPTION OF THE DRAWINGS

[0036]

FIG. 1 is a front view showing a vertical blind of a first embodiment.

FIG. 2 is a perspective view showing a hanger rail of the first embodiment.

5 FIG. 3 is a sectional view showing the hanger rail of the first embodiment.

FIG. 4 is a perspective view showing a second steady rest of the first embodiment.

FIG. 5 is a perspective view showing a first steady rest of the first embodiment.

10 FIG. 6 is a sectional view showing the second steady rest and stoppers of the first embodiment.

FIG. 7 is a sectional view showing the first steady rest and the stoppers of the first embodiment.

15 FIG. 8 is a sectional view showing the operation of the second steady rest of the first embodiment.

FIG. 9 is a sectional view showing the operation of the hanger rail of the first embodiment.

FIG. 10 is a sectional view showing the operation of the hanger rail of the first embodiment.

20 FIG. 11 is a sectional view showing a hanger rail of a second embodiment.

FIG. 12 is a sectional view showing a hanger rail of a third embodiment.

FIG. 13 is a sectional view showing a steady rest and stoppers of a fourth embodiment.

25 FIG. 14 is a sectional view showing a steady rest and stoppers of a fifth embodiment.

FIG. 15 is a sectional view showing a steady rest and a stopper of a sixth embodiment.

FIG. 16 is a sectional view showing a steady rest and stoppers of a seventh embodiment.

FIG. 17 is a sectional view showing a hanger rail of an eighth embodiment.

FIGS. 18(a) to 18(e) are sectional views showing the hanger rail of the eighth embodiment.

FIG. 19 is a sectional view showing another example of the hanger rail of the eighth embodiment.

FIG. 20 is a sectional view showing another example of the hanger rail of the eighth embodiment.

FIG. 21 is a sectional view showing a hanger rail of a ninth embodiment.

FIG. 22 is a side view showing a steady rest and stoppers of a tenth embodiment.

FIG. 23 is an exploded perspective view showing the steady rest of the tenth embodiment.

FIG. 24 is a side view showing the operation of the steady rest and the stoppers of the tenth embodiment.

FIG. 25 is a side view showing the operation of the steady rest and the stoppers of the tenth embodiment.

FIG. 26 is an exploded perspective view showing another example of the steady rest of the tenth embodiment.

FIG. 27 is a side view showing the operation of a steady rest and a stopper of another example the tenth embodiment.

FIG. 28 is a side view showing the operation of the steady rest and a stopper of the other example the tenth embodiment.

FIG. 29 is a plan view showing a steady rest of an eleventh embodiment.

FIG. 30 is a plan view showing a steady rest of a twelfth embodiment.

FIG. 31 is a side view showing a steady rest of a thirteenth embodiment.

FIG. 32 is a side view showing a steady rest and a stopper of a fourteenth embodiment.

FIG. 33 is a side view showing another example of the steady rest and the stopper of the fourteenth embodiment.

FIG. 34 is a side view showing yet another example of the steady rest and stopper of the fourteenth embodiment.

EMBODIMENTS

[0037]

5 First Embodiment

Now, a first embodiment of the present invention will be described with reference to the drawings. In a vertical blind shown in FIG. 1, many runners 2 and a leading runner 2a are movably supported by a hanger rail 1, and slats 3 are rotatably suspended from and supported by the runners 2 and 2a. In FIG. 1,
10 the leading runner 2a is located closer to the right end of the hanger rail 1 than the runners 2.

[0038]

Both ends of an angle adjustment shaft 4 disposed in the hanger rail 1 are rotatably supported by both ends of the hanger rail 1. The angle adjustment
15 shaft 4 is passed through the runners 2a and 2a.

[0039]

Mounted on the left end of the hanger rail 1 is an operation apparatus 5. Suspended from and supported by the operation apparatus 5 is an operation baton 6. By operating the operation baton 6, the angle adjustment shaft 4 is
20 rotated. The rotation of the angle adjustment shaft 4 rotates the slats 3 in phase through worm mechanisms in the runners 2 and 2a.

[0040]

Hanging from the operation apparatus 5 is an endless operation cord 7 which is round-movably routed in the hanger rail 1. One end of the operation
25 cord 7, routed in the hanger rail 1, is attached to the leading runner 2a.

[0041]

According to the above configuration, by operating the operation cord 7 hanging from the operation apparatus 5, the leading runner 2a moves along the hanger rail 1. If the leading runner 2a moves in the direction of arrow A, the

following runners 2 are sequentially drawn out at equal intervals. In contrast, if the leading runner 2a moves in the direction of arrow B, the following runners 2 are sequentially pushed back by the leading runner 2aa and thus the slats 3 are folded up at the left end of the hanger rail.

5 [0042]

As seen above, the vertical blind of the present embodiment is of a single-sided type in which the slats 3 are drawn out from the left end toward the right end of the hanger rail 1 in the direction of arrow A or folded up from the right end toward the left end of the hanger rail 1 in the direction of arrow B.

10 [0043]

When the leading runner 2a moves to the right end of the hanger rail 1, first and second steady rests 8 and 9 are held on the front surface of the leading runner 2a. In this state, the leading runner 2a and the first and second steady rests 8 and 9 attract each other through magnets (to be described later).

15 [0044]

The first and second steady rests 8 and 9 form a steady rest apparatus for preventing deformation of the angle adjustment shaft 4. When the slats 3 are folded up, these steady rests are held in positions obtained by dividing the entire length of the angle adjustment shaft 4a into three equal parts and prevent deformation of the angle adjustment shaft 4.

[0045]

Note that if the length of the angle adjustment shaft 4 is short and if deformation of the angle adjustment shaft 4 can be sufficiently prevented by a single steady rest, a stopper is formed only at one position in the central area of the hanger rail 1 by lancing. If the length of the angle adjustment shaft 4 is long and if the angle adjustment shaft 4 is supported by three or more steady rests at equal intervals, the same number of stoppers as the number of the steady rests are disposed on the hanger rail 1 at equal intervals and in different positions in the front-back direction. Each steady rest only has to have a locking portion

configured to become engaged with one of the stoppers.

[0046]

Next, the specific configuration of the steady rest apparatus will be described. The hanger rail 1 is formed of an aluminum extrusion mold material
5 and, as shown in FIGS. 2 and 3, has two stoppers, first and second stoppers 10 and 11, on the upper side of the hanger rail 1. The first and second stoppers 10 and 11 are formed by narrowly lancing two positions of the hanger rail 1 lengthwise by a press machine.

[0047]

10 The first and second stoppers 10 and 11 are each a lanced piece having a front end which diagonally protrudes toward the right end of the hanger rail 1, that is, in the direction in which the slats 3 are drawn out. The lengthwise position of the first stopper 10 is a position which is distant from the left end of the hanger rail 1 by about one-third the entire length of the hanger rail 1; the
15 lengthwise position of the second stopper 11 is a position which is distant from the right end thereof by about one-third the entire length thereof.

[0048]

Further, the first and second stoppers 10 and 11 are formed in different positions in the front-back direction of the hanger rail 1, that is, in the horizontal
20 direction of FIG. 6. The first stopper 10 is formed adjacent to the rear lateral side of the hanger rail 1. Furthermore, the first and second stoppers 10 and 11 are formed within a range corresponding to the diameter of the angle adjustment shaft 4 over the angle adjustment shaft 4.

[0049]

25 As shown in FIGS. 5 and 7, a case 12 of the first steady rest 8 is formed of an elastic synthetic resin and has a rectangular parallelepiped shape which is thinner than the cases of the runners 2. The case 12 has, on the front and rear sides thereof, guide protrusions 14 which are supported between a pair of ribs 13 formed on both inner side surfaces of the hanger rail 1. The case 12 also has,

on the lower surface thereof, a step 16 which is engaged with ribs 15 on both sides of an aperture of the hanger rail 1.

[0050]

The first steady rest 8 can move within the hanger rail 1 along the ribs 13
5 and ribs 15.

[0051]

A magnet 17 is fitted to, in an exposed manner, the central areas of the left and right side surfaces of the case 12, that is, to the central areas of both side surfaces of the case 12 in the moving direction of the steady rest. By the
10 attractive force of the magnet 17, the first steady rest 8 can attract the second steady rest 9 and the leading runner 2a, which are located on both sides of the first steady rest 8 in the moving direction of the first steady rest 8.

[0052]

The case 12 has, next to the magnet 17, a through hole 18 through which
15 the angle adjustment shaft 4 can be passed. The first steady rest 8 can move within the hanger rail 4 while supporting the angle adjustment shaft 4 in the through hole 18.

[0053]

The case 12 has an upward protruding first locking portion 19 on the upper
20 surface of the case 12 over the through hole 18, and more specifically, over a position slightly closer to an inner side surface of the hanger rail 1 than the center of the through hole 18. The first locking portion 19 is engaged with the first stopper 10. In other words, the first stopper 10 is configured to be located on a moving trajectory made by the first locking portion 19 when the first steady
25 rest 8 moves within the hanger rail 1.

[0054]

As shown in FIGS. 4 and 6, the second steady rest 9 has the same configuration as the first steady rest 8 except for a second locking portion 21 formed on an upper portion of a case 20. The same components as those of the

first steady rest 8 are given the same reference signs and will not be described in detail. The second steady rest 9 can move within the hanger rail 4 while supporting the angle adjustment shaft 4 in the through hole 18.

[0055]

5 The second locking portion 21 of the second steady rest 9 is formed by upward bending an end of a support piece 22 extending from one side of the case 20 so that the second locking portion 21 protrudes to the same height as that of the first locking portion 19. The second locking portion 21 is formed in such a manner to protrude upward in a position over the through hole 18, and more
10 specifically, in a position slightly closer to the center of the case 20 than the center of the through hole 18. The second locking portion 21 is engaged with the second stopper 11. In other words, the second stopper 11 is configured to be located on a moving trajectory made by the second locking portion 21 when the second steady rest 9 moves within the hanger rail 1.

15 [0056]

The second locking portion 21 is elastically supported by the case 20 with the support piece 22 therebetween. When the second locking portion 21 of the second steady rest 9 which has been inserted into the hanger rail 1 from the left end thereof contacts a slope of the second stopper 11, the second locking portion
20 21 becomes deformed to get over the second stopper 11, as shown in FIG. 8.

[0057]

Note that in the present embodiment, the second steady rest 9 can also be inserted from the right end of the hanger rail 1 and assembled and therefore does not necessarily need a function of elastically supporting the second locking
25 portion 21. Accordingly, as with the first locking portion 19 of the first steady rest 8, the second locking portion 21 may protrude upward from the upper surface of the case 20.

[0058]

Next, the operation of the vertical blind thus configured will be described.

[0059]

The assembly process of this vertical blind will be described. First, a coated or wrapped, long hanger rail material is cut according to the ordered width. Next, the above lancing is performed on predetermined positions of the resulting
5 hanger rail 1 a predetermined number of times. The predetermined positions are previously set according to the ordered width.

[0060]

Subsequently, the runners 2 and leading runner 2a having the operation cord 7 inserted or fixed thereto and the steady rests are inserted into the hanger
10 rail 1 from an end of the hanger rail 1; the angle adjustment shaft 4 is inserted into the hanger rail 1; and the operation apparatus 5, an end cap, and the like are fitted to the hanger rail 1. Then, by adjusting the operation cord 7 so that it moves around in the hanger rail 1, there is formed a parts-mounted rail assembly, to which the required parts are mounted on the hanger rail.

15 [0061]

This parts-mounted rail assembly is fixed to the installation surface with mounting brackets therebetween or directly; the slats are suspended from and supported by the runners; and the slats are connected together using a bottom cord. In this way, the vertical blind is installed.

20 [0062]

During the assembly of the vertical blind, the first and second steady rests 8 and 9 are inserted into the hanger rail 1 from the right end thereof and, as shown in FIG. 1, attracted by the leading runner 2a.

[0063]

25 When the leading runner 2a is transferred to the right end of the hanger rail 1 and thus the slats 3 are drawn out, the first and second steady rests 8 and 9 are attracted by the leading runner 2a, as shown in FIG. 9.

[0064]

Assume that, in this state, the leading runner 2a is transferred in the

direction of arrow B and thus the slats 3 is folded up at the left end of the hanger rail 1. In this case, the first and second steady rests 8 and 9 are first transferred along with the leading runner 2a.

[0065]

5 Subsequently, the second steady rest 9 reaches the position of the second stopper 11, and the second locking portion 21 thereof becomes engaged with the second stopper 11. Thus, the second steady rest 9 is detached from the first steady rest 8 and supports the angle adjustment shaft 4 in this position.

[0066]

10 Subsequently, the leading runner 2a is further transferred in the same direction, and the first steady rest 8 reaches the position of the first stopper 10. The first locking portion 19 of the first steady rest 8 becomes engaged with the first stopper 10. Thus, the first steady rest 8 is detached from the leading runner 2a and supports the angle adjustment shaft 4 in this position. When
15 the leading runner 2a is transferred to near the left end of the hanger rail 1, the slats 3 are folded up at the left end of the hanger rail 1.

[0067]

At this time, as shown in FIG. 10, the first and second steady rests 8 and 9 are held in the positions obtained by dividing the entire length of the angle
20 adjustment shaft 4 into three parts and serve as bearings which rotatably support the angle adjustment shaft 4.

[0068]

When, in this state, the leading runner 2a is transferred to the right end of the hanger rail 1, the following runners 2 are sequentially drawn out at equal
25 intervals and thus the slats 3 are drawn out. When the leading runner 2a contacts the first steady rest 8, the first steady rest 8 is attracted by the leading runner 2a and transferred along therewith.

[0069]

When the leading runner 2a is further transferred in the same direction and

contacts the second steady rest 9, the second steady rest 9 is attracted by the first steady rest 8 and transferred along with the leading runner 2a and the first steady rest 8. Thus, the slats 3 are drawn out, and the leading runner 2a and the first and second steady rests 8 and 9 are transferred to the right end of the hanger rail 1.

[0070]

The vertical blind thus configured can obtain the following advantages.

[0071]

(1) When the slats 3 are folded up at the left end of the hanger rail 1, the first and second steady rests 8 and 9 can be located in the positions obtained by dividing the entire length of the angle adjustment shaft 4 into equal parts and support the angle adjustment shaft 4 in these positions. As a result, the angle adjustment shaft 4 can be prevented from becoming deformed by self-weight.

[0072]

(2) Since the first and second stoppers 10 and 11 for holding the first and second steady rests 8 and 9 in predetermined positions are disposed on the upper side of the hanger rail 1, the first and second stoppers 10 and 11 can be prevented from being exposed to inside the room. As a result, the appearance of the hanger rail 1 can be improved.

[0073]

(3) By lancing the upper side of the hanger rail 1, the first and second stoppers 10 and 11 can be easily formed, and the number of parts can be reduced, thereby reducing cost.

[0074]

(4) Since the first and second steady rests 8 and 9 are stopped by the first and second stoppers 10 and 11, respectively, the angle adjustment shaft 4 can be supported in the positions of the first and second stoppers 10 and 11. Accordingly, it is only necessary to form the same number of stoppers as that of the steady rests. As a result, it is possible to simplify the stopper formation

process and to reduce the manufacturing cost.

[0075]

(5) The first and second stoppers 10 and 11 are located within a range corresponding to the diameter of the angle adjustment shaft 4 over the angle
5 adjustment shaft 4. Thus, when the first and second steady rests 8 and 9 become engaged with and stopped by the first and second stoppers 10 and 11, respectively, the first and second steady rests 8 and 9 are not easily subjected to a horizontal torque centered on the angle adjustment shaft 4. As a result, it is possible to prevent an increase in the friction between the angle adjustment
10 shaft 4 and the through hole 18.

[0076]

(Second Embodiment)

Figure 11 shows a second embodiment. This embodiment illustrates a hanger rail to be used for vertical blinds casement type that the convoluted
15 toward both ends from the longitudinal central portion of the hanger rail slat.

[0077]

The hanger rail 1 shown in FIG 11, in a position to 3 equally divided substantially the entire length of 4 the angle adjustment shaft i.e. total length of the hanger rail (1), bending off in the direction of stopper 31 the third and fourth
20 are opposed to each other and is formed by machining.

[0078]

When we pull the slat, top runners two is transported in the longitudinal center portion of the hanger rail (1), vertical blinds casement type hanger slats that the top runner is transported toward the both ends of the hanger rail (1) I
25 will be folded at both ends of the rail 1.

[0079]

Against clothes rail 1 casement such a type is transferred toward the opposite ends of the central portion of the hanger rail (1) with the top runner operation convolution slats, locking engagement with the stopper 31 and 32 of

the third and fourth vibration and is held by.

[0080]

In the process of assembling the parts with rails assemblies, bracing of this embodiment, it is necessary to transfer the stopper 31 and 32 the third and fourth from either end of the hanger rail 1. Thus, using the nine steady rest a second exemplary embodiment of the first, as shown in Figure 8, while deflecting the locking portion 21 of the second to overcome the stopper 31 and 32 of the fourth or the third it is allowed to, and transferring between the stopper 32 and the fourth stopper 31 the third.

[0081]

Further, since the transport toward both ends from the longitudinal central portion of the hanger rail (1) the steady rest, the front-rear direction of the hanger rail (1), that the stopper 32 and the fourth stopper 31 third, 8 in this embodiment it is not necessary to shift the position in the lateral direction in.

[0082]

The double doors form vertical blinds that are configured in this manner, it is possible to obtain the same advantages and embodiments of the first.

[0083]

(Third Embodiment)

Figure 12 shows an embodiment of a third. This embodiment illustrates a hanger rail to be used for vertical blinds both stick type that is to be convoluted toward the longitudinal center portion from both ends of the hanger rail (1) the slats with the operation two poles.

[0084]

The hanger rail 1 shown in FIG 12, at a position 5 equally divided substantially the entire length of 4 the angle adjustment shaft i.e. total length of the hanger rail (1), it is formed by the processing 41 to 44 stopper fifth - eighth bending off are.

[0085]

The stopper 41 of the Sixth, is bent off and to protrude toward the left end side of the hanger rail (1), the stopper 43 of the eighth and seventh, toward the right end of the hanger rail (1) and the fifth as well be bent cutting Te to protrude, as in the first embodiment, and is formed by shifting the position in the longitudinal direction of the hanger rail 1.

[0086]

Then, the adsorbed stop shake similar to the preceding first embodiment in each of the top runner, when convoluting slats and transported toward the longitudinal center portion from the end side of the hanger rail (1) that the top runner and each stopper 41, 42, or stop is engaged in order to stopper 43 and 44 of the eighth and seventh in the sixth and fifth swing. And I rotatably supporting the angle adjustment shaft 4 at that position.

[0087]

In both stick form vertical blinds that are configured in this manner, it is possible to obtain the same advantages and embodiments of the first.

[0088]

(Fourth embodiment)

Figure 13 shows an embodiment of a fourth. This embodiment is formed with a stopper 45 and 46 tenth and ninth devoted pins from the upper side of the hanger rail 1. As in the first embodiment, it is provided with a position that is divided into three equal parts the entire length of the hanger rail 1, stoppers 45 and 46 of the tenth and ninth this, formed on both sides of the longitudinal direction center portion of the hanger rail (1) are.

[0089]

And vibration stopper 47 having a locking portion 48 which engages the stopper 45 of the ninth extending horizontally from one side of the case, the steady rest engages the stopper 45 of the tenth, ninth and Case using the stopper 50 shake with a locking portion 49 which engages the stop 46 of the tenth to extend horizontally from the central portion of the.

[0090]

It is possible to such a configuration, to obtain the same advantage of the benefits obtained in the preceding first embodiment (1) (2) and (4).

[0091]

5 (Fifth embodiment)

Figure 14 illustrates an embodiment of a fifth. Similar to the fourth embodiment, this embodiment is formed with a stopper 51 of the twelfth and eleventh devoted pins from the upper side of the hanger rail 1.

[0092]

10 It is provided with a position that three equally the entire length of the hanger rail 1, stoppers 51 and 52 of the twelfth, are formed on both sides of the longitudinal direction center portion of the hanger rail 1 and the eleventh. Further, the stopper 51 of the eleventh is formed at a position closer to the direction of longitudinal central portion of the hanger rail (1), the stopper 52 of
15 the twelfth is formed at a position closer to the side of the hanger rail 1.

[0093]

Steady rest engages the stopper 51, 52 twelfth, stop 53 shake with a locking portion 54 that engages the stopper 51 of the eleventh extending horizontally from one side of the case and the eleventh and, I use a stopper 56 shake with a
20 locking portion 55 that engages the stopper 52 of the twelfth and extends horizontally from the central portion of the case.

[0094]

It is possible to such a configuration, to obtain the same advantage of the benefits obtained in the preceding first embodiment (1) (2) and (4).

25 [0095]

(Embodiment of the sixth)

Figure 15 illustrates an embodiment of a sixth. This embodiment is formed with a stopper 145 and 146 of the tenth and ninth shoulder portion formed in the inclined plane toward the obliquely upward side of the upper hanger rail 1. It

is provided with a position that three equally the entire length of the hanger rail (1), the stopper 145 and 146 of the tenth and ninth This is formed at a position shifted in the vertical direction.

[0096]

5 A stopper 147 provided with a vibration engaging portion 148 which engages the stopper 145 and 146 of the tenth and ninth from one side of the case, the steady rest engages the stopper 145 and 146 of the tenth, ninth and lower use with a locking portion which engages the stopper 146 only the tenth, which is located in shake stop (not shown).

10 [0097]

It is possible to such a configuration, to obtain the same advantage of the benefits obtained in the preceding first embodiment (1) (2) and (3).

[0098]

(Seventh embodiment)

15 Figure 16 illustrates an embodiment of a seventh. This embodiment is formed with a stopper 151 and 152 of the twelfth and eleventh on the lower side of the hanger rail 1. It is provided with a position that three equally the entire length of the hanger rail (1), the stopper 151 and 152 of the twelfth, and is formed at a position shifted in the longitudinal direction of the hanger rail 1 and
20 the eleventh.

[0099]

Steady rest engages the stopper 151 and 152 of the twelfth, stop 154 shake equipped with a locking portion 153 which engages the stopper 151 and 152 of the twelfth and eleventh from the bottom of the case and the eleventh and, I use
25 with a locking portion which engages the stopper 152 only twelfth shake stop (not shown).

[0100]

It is possible to such a configuration, to obtain the same advantage of the benefits obtained in the preceding first embodiment (1) (2) and (3).

[0101]

(Eighth embodiment)

Figure 17 to Figure 20 shows an embodiment of the eighth. This embodiment illustrates a hanger rail vertical blinds with a stopper for locking
5 into place bracing up to five time convolution of the slat.

[0102]

The hanger rail (1), 61-65 stopper pieces 5 are formed at a position 6 equally divided the total length of the hanger rail 1. As in the first embodiment, the far right side of the hanger rail (1), ie a work piece bending off projecting diagonally
10 toward the drawer side of the slat 3, 61-65 the stopper (in this embodiment the same angle each Visit are bending switch 45 degrees).

[0103]

The length of the stopper 61 and 62 are formed shorter than the length of 63-65 stopper.

15 [0104]

As shown in (c) ~ (e) of FIG 18, the front-rear direction of the hanger rail (1), that are formed at different positions in the lateral direction in FIG 18, 63-65 wherein the stopper, the center of the hanger rail (1) most stopper 65 and is formed on the side.

20 [0105]

As shown (a) to (c) FIG 18, the stopper 63 and the stopper 61 is formed at the same position in the longitudinal direction of the hanger rail 1.

[0106]

Similarly, as shown in (b) (d) In Figure 18, the stopper 64 and the stopper 62
25 is formed at the same position in the longitudinal direction of the hanger rail 1.

[0107]

Against clothes rail 1 configured in this manner will be easy to the bracing of five with an engaging portion of different engages in any one of 61-65 stopper. Then, when convolution of the slat, and engaged sequentially steady rest to

61-65 stopper in accordance with the movement of the top runner, bracing each is held in a position to 6 equally divided the total length of the hanger rail rail 1.
[0108]

In the vertical blind constructed as described above, it is possible to obtain
5 the following advantages.
[0109]

When convolution on the left end side of the hanger rail (1) (1) slats it is possible to be positioned a steady rest at a position 6 equally divided the entire length of the angle adjustment shaft, for supporting the angle adjustment shaft.
10 Therefore, even when the angle adjustment shaft 4 supported by the hanger rail and one clothes rail 1 is long, it is possible to prevent the occurrence of deflection due to the weight of the four angle adjustment shaft.
[0110]

Since provided on the upper side of the hanger rail (1) and (2) 61-65 stopper,
15 it is possible to prevent exposure to indoor 61-65 stopper. Therefore, it is possible to improve the appearance of the clothes rail 1.
[0111]

Different lengths and 63-65 and stoppers (3) the stopper 61, i.e. the protruding height that protrudes downward from the upper side of the hanger
20 rail (1) that we have to be different, I with a locking portion corresponding to the stopper it is possible to be easily steady rest, to support the angle adjustment shaft 4 in a number of bracing.
[0112]

Since a plurality of columns arranged in rows at the same position in the
25 longitudinal direction of the hanger rail (1) and one of the 63-65 long stopper lengths (4) is, and one of the stoppers 61 and 62 short length, it is possible to arranged the stopper many upper side of the hanger rail (1), supporting the angle adjusting axis bracing number of the mobile position is regulated by the stopper. Accordingly, therefore, even when the angle adjustment shaft 4 supported by the

hanger rail 1 and the hanger rail (1) is long, it is possible to prevent the occurrence of deflection due to the weight of the four angle adjustment shaft.

[0113]

If it is shorter than the state (5) clothes rail 1 is shown in FIG 17, as shown
5 in FIG 19, by forming the hanger rail 1 63-65 stopper and the stopper 61, the angle adjustment shaft in the bracing four it is also possible to support 4.

[0114]

If it is shorter than the state (6) clothes rail 1 is shown in FIG 19, as shown
in FIG 21, by forming the hanger rail 1 and 63-65 the stopper, and supporting
10 the tilting axis 4 and the bracing three it can also be.

[0115]

(Embodiment of the ninth)

Figure 21 shows an embodiment of the ninth. In the eighth embodiment,
and the correspondence to the bracing of a number to form a stopper of different
15 lengths on the hanger rail 1, by forming the stopper in the bending cutting
different angles, this embodiment is similar it is obtained by such benefit.

[0116]

As shown in FIG 21, the bending angle is different from the switch 70-72
stopper and the stopper 68 and 69. 70-72 stopper is a bending angle of the cut
20 45 degrees to the upper side of the hanger rail (1) Similar to the embodiment of
the sixth.

[0117]

In the bending angle cut of about 30 degrees, the stopper 68 and 69 are
formed in the same length and 70-72 stopper against the upper side of the
25 hanger rail 1. Therefore, the projection height from the top of the hanger rail (1)
of the stopper 68 and 69 is lower than the protruding height of 70-72 stopper.
The protrusion height of the stopper 68 and 69 are formed so as to be equivalent
to the projecting height of the stopper 61 and 62 an eighth embodiment.

[0118]

With this configuration, using the stop shake similar to the eighth embodiment, it is possible to obtain the same advantages as in the eighth embodiment.

[0119]

5 It is also possible by bending the cutting angles and different lengths together to form a stopper projection height is different, as described above.

[0120]

Tenth Embodiment

FIGS. 22 to 28 show a tenth embodiment. The present embodiment shows
10 steady rests which are suitably used in a hanger rail 1 including the stoppers shown in the eighth or ninth embodiment. In these steady rests, a locking portion configured to contact a stopper is a component different from the case and is mounted on the case in such a manner that the position thereof can be adjusted.

15 [0121]

A steady rest 75 shown in FIG. 22 and a steady rest 77 shown in FIG. 27 are movably supported in a hanger rail 1. The steady rests 75 and 77 are formed in such a manner that an angle adjustment shaft 4 passes through a lower position than in the first and second steady rests 8 and 9 of the first embodiment and
20 that the distance between the upper surface of a case 76 and the upper side of the hanger rail 1 is larger than in the first and second steady rests 8 and 9 of the first embodiment. The case 76 has a through hole 86 for the angle adjustment shaft 4 and a through hole 87 through which a transfer shaft for transferring slats 3 is passed.

25 [0122]

On the upper side of the hanger rail 1, the three stoppers, 63,64,and 65, are formed in different positions in the front-back direction and the length direction of the hanger rail 1. As shown in FIGS. 27 and 28, the stoppers 61 and 62 are formed in positions which are identical to those of the stoppers 64 and 65 in the

front-back direction and which are different from each other in the length direction of the hanger rail 1.

[0123]

In the steady rest 75, a locking member 80 is mounted on a position on the upper surface of the case 76 under the stoppers 61 to 65. Specifically, as shown in FIG. 23, three elongated mounting grooves 81 are formed in the upper surface of the case 76 along the length direction of the hanger rail 1 at equal intervals in parallel. Each mounting grooves 81 is formed in such a manner to have a sectional shape whose lower portion is wider, and opens only toward one lengthwise side of the hanger rail 1, and more specifically, in the slat folding-up direction, and upward.

[0124]

The locking member 80 is formed of an elastic synthetic resin and has a bent shape like a crank. The locking member 80 has, beneath the lower side thereof, two elongated protrusions 82 which can be fitted into the mounting grooves 81 of the case 76. The elongated protrusions 82 can be laterally inserted and fitted into any adjacent two of the mounting grooves 81.

[0125]

The locking member 80 has an upward bent locking portion 83 at the end of the upper side thereof. As shown in FIGS. 22, 24, and 25, by changing the mounting position of the elongated protrusions 82 on the mounting grooves 81 and changing the mounting direction of the locking member 80 with respect to the front-back direction (the left-right direction of FIG. 22), it is possible to select the stopper that the locking portion 83 is to become engaged with, from among the stoppers 63 to 65.

[0126]

In the steady rest 77, a locking member 84 is mounted on the upper surface of the case 76, which is commonly used by the steady rest 77 and the steady rest 75. As shown in FIG. 26, the locking member 84 has, on the diagonally upward

extending upper side thereof, a locking portion 85 which is located higher than the locking portion 83 of the locking member 80. The other configuration of the locking member 84 is similar to that of the locking member 80.

[0127]

5 As shown in FIG. 27 and 28, by changing the mounting position of the elongated protrusions 82 of the locking member 84 on the mounting grooves 81, it is possible to select the stopper that the locking portion 85 is to become engaged with, from between the stoppers 61 and 62.

[0128]

10 Accordingly, by using the steady rests 75 and 77, it is possible to form five types of steady rests which adapt to the hanger rail 1 including the five stoppers, 61 to 65, of the eighth embodiment or the hanger rail 1 including the five stoppers, 68 to 72, of the ninth embodiment.

[0129]

15 Since the locking members 80 and 84 have elasticity, the locking portions 83 and 85 can become deformed downward. Accordingly, during assembly, it is also possible to insert the steady rests 75 and 77 into the hanger rail 1 from the left end thereof and to cause the steady rests 75 and 77 to get over, for example, the slopes of the stoppers 61 to 65 and to move to the right end of the hanger rail
20 1.

[0130]

A vertical blind including the steady rests 75 and 77 thus configured can obtain the advantages obtained in the first embodiment, as well as the following advantages.

25 [0131]

(1) By changing the mounting position of the locking members 80 and 84 on the mounting grooves 81, it is possible to form the five types of steady rests 75 which adapt to the stoppers 61 to 65 or the stoppers 68 to 72 by using the common case 76 and the locking members 80 and 84. Thus, using the common

component, it is possible to form steady rests which adapt to many types of stoppers having different protruding heights and protruding positions from the hanger rail 1. As a result, the number of parts of the steady rest can be reduced.

5 [0132]

(2) The steady rests 75 and 77 can be used in a vertical blind where the angle adjustment shaft 4 and the transfer shaft for transferring the slats are rotatably supported by the hanger rail 1.

[0133]

10 (Embodiment of the eleventh)

Figure 29 shows an embodiment of the eleventh. Respect to case 76 of the stop 75, by changing the mounting position of the locking member 80 and 84, it can accommodate 61-65 stopper plurality made of a protruding height and different positions different deflection in the tenth embodiment of to form the set
15 75, 77 and shake, this embodiment is such that by sliding relative to the case the locking member, and the correspondence to the plurality of stoppers.

[0134]

As shown in Figure 29, the locking member 93 is slidably supported in the longitudinal direction of the hanger rail (1) the guide groove 92 on the upper
20 surface of the case 91 of the steady rest. Recess 94 for holding by positioning three locations the locking member 93 is formed on the opening edge of the guide groove 92, protrusion that engages elastically in the recess 94 (not shown) is formed on the locking member 93 are. Is provided with a locking portion 95 abuts against the stopper of the hanger rail (1) on the upper surface of the
25 locking member 93.

[0135]

As correspond to 61-65 stopper projection height different, the locking member 93 to provide a locking member of the two types of the height of the locking portion 95 is different.

[0136]

The steady rest having such a configuration, it is possible to adjust the three stages in the longitudinal direction of the hanger rail (1) the position of the locking member 93, when inserted into the hanger rail 1 of the eighth embodiment, the stopper 61 it can be formed to a steady rest of the five corresponding to ~ 65.

[0137]

(Embodiment of the twelfth)

Figure 30 shows an embodiment of the twelfth. By screwing the locking member 97 a threaded shaft 96 which is rotatably supported by the casing 91, the present embodiment, the longitudinal direction of the hanger rail (1) with respect to 91 cases the locking member 97 by rotating the screw shaft 96 it is obtained by the slide operation possible.

[0138]

As correspond to 61-65 stopper projection height different, the locking member 97 to provide a locking member for two heights of the locking portion 98 is different.

[0139]

The steady rest having such a configuration, it is possible to adjust the longitudinal direction of the hanger rail (1) the position of the locking member 97, when inserted into the hanger rail 1 of the eighth embodiment, the 61-65 Stopper it can be formed to a steady rest of the five corresponding.

[0140]

(Embodiment of the thirteenth)

Figure 31 illustrates an embodiment of a thirteenth. Proximal end of the locking portion 99 is rotatably supported on the case of the steady rest, this embodiment has a position adjustable rotated in the longitudinal direction of the hanger rail (1) the distal end portion of the engaging portion 99 is intended.

[0141]

The steady rest having such a configuration, it is possible to adjust the longitudinal direction of the hanger rail (1) the rotational position of the locking portion 99, by inserting the hanger rail 1 of the eighth embodiment, the stopper 63 to it may be formed by a steady rest for three types corresponding to 65.

5 [0142]

Further, by changing the length of the engaging portion 99, it is also available to the stopper 61 and 62.

[0143]

(Embodiment of the fourteenth)

10 Figure 32 through Figure 34 illustrates an embodiment of a fourteenth. As another example of the configuration shown in FIG 16 and FIG 15, this embodiment shows the case of forming the side and upper outside of the hanger rail (1) a stopper formed by bending cut.

[0144]

15 FIG 32 is provided at a predetermined position in the longitudinal direction of the hanger rail (1) is a stopper 101 which is formed by implanted pins in the shoulder portion 102 which is located above the side of the hanger rail 1. Then, it is formed so as to lock the stopper 103 mentioned at the distal end of the stopper 101 that extends obliquely from above relative to the steady rest 103. The
20 stopper 101 may be formed by bending cut.

[0145]

FIG 33 is provided at a predetermined position in the longitudinal direction of the hanger rail (1) shoulder portion 102, the stopper 104 and 105 are formed by implanted pins is positioned above the side edges on both sides of the hanger
25 rail 1. Then, it is extended obliquely from above on both sides relative to the steady rest 103, stoppers 104 and 105 are formed so as to lock the stopper 103 mentioned at the distal end of the stopper 104 and 105. The stoppers 104 and 105 may be formed by bending cut.

[0146]

FIG 34 is formed at a predetermined position in the longitudinal direction of the hanger rail (1) is a stopper 108 that protrudes downward by bending cut the horizontal piece 107 extending horizontally inward from the inner surface of one of the hanger rails 1. Then, it is formed so as to lock the stopper 103 mentioned
5 at the distal end of the stopper 108.

[0147]

Further, the upper side of the hanger rail (1) through hole 109 which can be inserted a jig for applying a bending switch to horizontal piece 107 to the forming position of the stopper 108 is formed.

10 [0148]

It is possible to such a configuration, by providing the upper side outside of the hanger rail (1) a stopper 101,102,105,108, to hold in place the stop 103 shake. Further, stopper will not be exposed on the outer surface of the hanger rail (1), it is possible to improve the appearance of the clothes rail 1.

15 [0149]

The above embodiment may be implemented in the following manner.

[0150]

The bracing in the above embodiments, it may be supported only transfer shaft for transferring the sunlight shielding member is rotatably supported in
20 the hanger rail within.

[0151]

· In an embodiment of the first to third, it may be a pin that drove from the hanger rail outside each stopper.

[0152]

25 - In a first embodiment, according to the entire length of the tilting axis, it may be five or more or three steady rest as a stopper.

Description of code

[0153]

1... hanger rail, 2a... top runner, 3... slat, 4... axis (angle adjustment shaft), the

steady rest... 8,9,47,49,53,56, 10,11,31,34,41,42, 43,44,45,46,51,52... stopper,
19,21,48,49,54,55... locking portion.

CLAIMS

1. A vertical blind comprising:

a shaft having both ends rotatably supported by both ends of a hanger rail;

5 a steady rest movably supported by the hanger rail, the shaft being passed through the steady rest, the steady rest being transferred along with a leading runner in a slat-folding-up direction during folding up of slats; and

a stopper configured to hold the steady rest in a support position where deformation of the shaft is prevented,

10 wherein the stopper is disposed in a position other than a lateral side of the hanger rail.

2. The vertical blind of claim 1, wherein

the steady rest comprises a locking portion configured to become engaged
15 with the single stopper and to hold the steady rest in the shaft support position.

3. The vertical blind of claim 2, wherein

the stopper is disposed on an upper side of the hanger rail.

20 4. The vertical blind of claim 2, wherein

the stopper is disposed on a shoulder formed over a lateral side of the hanger rail.

5. The vertical blind of claim 2, wherein

25 the stopper is disposed on a lower side of the hanger rail.

6. The vertical blind of claim 3, wherein

the stopper protrudes from the upper side of the hanger rail diagonally along a length direction of the hanger rail, and

the locking portion has elasticity that allows the locking portion to, when contacting a slope of the stopper, become deformed and get over the stopper.

7. The vertical blind of any one of claims 1 to 6, wherein

5 the stopper is formed by lancing the hanger rail.

8. The vertical blind of claim 7, wherein

the stopper comprises a plurality of stoppers disposed in a length direction of the hanger rail and having at least two different protruding heights, the
10 protruding heights being heights from an inner surface of the hanger rail, and
a plurality of steady rests are movably supported by the hanger rail, and
each of the steady rests has a locking portion configured to become engaged with one of the stoppers and to stop the steady rest in a plurality of different support positions.

15

9. The vertical blind of claim 8, wherein

the stoppers are formed by lancing in such a manner to have different lengths so that the stoppers have a plurality of protruding heights, and
the steady rests each have a locking portion configured to become engaged
20 with one of the stoppers having the different protruding heights.

10. The vertical blind of claim 8, wherein

the stoppers are formed by lancing in such a manner to have different angles so that the stoppers have different protruding heights, and
25 the steady rests each have a locking portion configured to become engaged with one of the stoppers having the different protruding heights.

11. The vertical blind of claim 8, wherein

the stoppers are formed by lancing in such a manner to have different

lengths and different angles so that the stoppers have different protruding heights, and

the steady rests each have a locking portion configured to become engaged with one of the stoppers having the different protruding heights.

5

12. The vertical blind of one of claims 9 to 11, wherein

the stopper comprises a plurality of columns disposed in a front-back direction of the hanger rail and the columns each include a plurality of stoppers having different protruding heights.

10

13. The vertical blind of any one of claims 1 to 12, wherein

the stopper is disposed in a position obtained by dividing the shaft into equal parts in a length direction of the shaft.

15 14. The vertical blind of claim 3, wherein

the steady rest comprises a plurality of steady rests, and

the stopper engaged with each of the steady rests is located within a range corresponding to a diameter of the shaft directly above the shaft.

20 15. A hanger rail comprising

a stopper configured to, when slats are folded up, hold a steady rest in a shaft support position, wherein

the stopper is disposed in a position other than a lateral side of the hanger rail.

25

16. The hanger rail of claim 15, wherein

the stopper is formed by lancing.

17. The hanger rail of claim 16, wherein

the stopper comprises a plurality of stoppers disposed in a length direction of the hanger rail and having at least two different protruding heights, the protruding heights being heights from an inner surface of the hanger rail.

5 18. The hanger rail of claim 17, wherein

the stoppers are formed by lancing in such a manner to have different lengths so that the stoppers have a plurality of protruding heights.

19. The hanger rail of claim 17, wherein

10 the stoppers are formed by lancing in such a manner to have different angles so that the stoppers have a plurality of protruding heights.

20. The hanger rail of claim 17, wherein

15 the stoppers are formed by lancing in such a manner to have different lengths and different angles so that the stoppers have a plurality of protruding heights.

21. The hanger rail of one of claims 17 and 18, wherein

20 the stopper comprises a plurality of columns disposed in a front-back direction of the hanger rail and the columns each include a plurality of stoppers having different protruding heights.

22. A method for manufacturing a hanger rail for a vertical blind, comprising

25 lancing a position other than a lateral side of a hanger rail to form a stopper for a steady rest.