

TITLE OF INVENTION: CORD GUIDING DEVICE OF WINDOW CURTAIN

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a component of a window curtain and more particularly, to a cord guiding device that can reduce resistance of a cord and enhance operation smoothness of the cord.

2. Description of the Related Art

As shown in FIGS. 1 and 2, a traditional cord guiding device 50 comprises a base 51 and two shafts 52, 53. The base 51 has a cord hole 57. The shaft 52 is pivoted to the base 51 and correspondingly located above the cord hole 57, and the other shaft 53 is pivoted to the base 51 and spaced from the shaft 52. When a cord 54 is configured to the traditional cord guiding device 50, the cord 54 is penetrated through the cord hole 57 and wound around the shafts 52, 53 so as to be moved together with blades.

However, in the aforesaid prior art, because the two shafts 52, 53 extend straight, the diameters of the two shafts 52, 53 occupy most space through which the cord 54 passes, such that a situation that the cord 54 is eccentrically penetrated out of the base 51 through the cord hole 57 will occur (as shown in FIG. 2). In addition, because the two shafts 52, 53 extend straight, the cord 54 may be easily slipped when abutted against the two shafts 52, 53, such that the cord 54 is easily stuck in a slot formed by cutting of the cord 54 in the periphery wall of the cord hole 57. This causes lifting function of the blades to fail. As such, the traditional cord guiding device 50 still has room for improvement.

SUMMARY OF THE INVENTION

It is a primary objective of the present invention to provide a cord guiding device of a window curtain, which can correct a situation that a cord is eccentrically

penetrated out of a base and prevent the cord from cutting the base, and can reduce resistance of the cord and enhance operation smoothness of the cord.

To attain the above objective, the cord guiding device of the present invention comprises a base, a first shaft, and a second shaft. The base has a cord hole. The first shaft is pivoted to the base and correspondingly disposed above the cord hole. The second shaft is pivoted to the base and spacedly located at a first side of the first shaft. When a cord is configured to the cord guiding device, the cord is penetrated through the cord hole and wound around the first and second shafts. At least one of the first and second shafts is an adjustment rod including a first pivoting section extending along an axial direction and pivotally connected with the base, a second pivoting section extending along the axial direction and pivotally connected with the base, and a bending section connected between the first and second pivoting sections and deviated from the axial direction and abutted against the cord.

It can be seen from the above that when subjected to the force applied by the cord, the adjustment rod is swung with the first and second pivoting sections as its axis. This can reduce resistance of the cord and hold the cord in the center of the cord hole to correct the situation that the cord is eccentrically penetrated through the cord hole. In addition, the cord is constrained within the bending section without slipping back and forth, such that wear caused by friction between the cord and the periphery wall of the cord hole can be avoided, allowing blades to be lifted and lowered stably.

Preferably, the first shaft is the adjustment rod, and the second shaft is a guiding rod including first and second pivoting sections extending along an axial direction and pivotally connected with the base, and a middle section connected between the first and second pivoting sections and abutted against the cord. In this way, by means of the cooperation of the guiding rod and the adjustment rod with the bending section, the cord

has a larger angled turn when wound around the guiding rod and the adjustment rod to achieve an effect of adjusting resistance of the cord.

Preferably, a third shaft is pivotally connected with the base and spacedly located at a second side of the first shaft opposite to the first side of the first shaft, wherein when the cord is configured to the cord guiding device, the cord is penetrated through the cord hole and wound around the first, second, and third shafts. The third shaft is the adjustment rod or a guiding rod including first and second pivoting sections extending along an axial direction and pivotally connected with the base, and a middle section connected between the first and second pivoting sections and abutted against the cord. In this way, by means of the cooperation of the guiding rod and the adjustment rod with the bending section, the cord has a larger angled turn when wound around the guiding rod and the adjustment rod to achieve an effect of adjusting resistance of the cord.

Preferably, the first shaft is the adjustment rod, and the second and third shafts are the guiding rods. In this way, the resistance of the cord can be adjusted variably.

Preferably, a height at which the first pivoting section of the guiding rod is pivoted to the base is greater than a height at which the second pivoting section of the guiding rod is pivoted to the base. In this way, the turning angle of the cord can be increased, and the resistance of the cord can be adjusted variably.

Preferably, the axial direction of the guiding rod is not parallel to the axial direction of the adjustment rod. In this way, the turning angle of the cord can be increased, and further, the cord can be prevented from slipping back and forth when abutted against the adjustment rod and the guiding rod.

Preferably, the base has an elongated bottom plate provided with the cord hole and an elongated axial direction. The axial direction of the adjustment rod is not parallel to the elongated axial direction, and the axial direction of the guiding rod is not parallel

to the elongated axial direction. In this way, the cord can be prevented from slipping back and forth when abutted against the adjustment rod and the guiding rod.

Preferably, the middle section of the guiding rod has a shaft diameter greater than those of the first and second pivoting sections of the guiding rod. In this way, the turning angle of the cord can be increased to adjust the resistance of the cord.

Preferably, the first, second, and third shafts are the adjustment rods. In this way, the resistance of the cord can be adjusted variably.

Preferably, the bending section of the adjustment rod has two abutment planes extending along the axial direction of the adjustment rod and arranged in an opposite manner. In this way, the two abutment planes provide a large contact area against the cord to make the cord not easy to slip.

Other advantages and features of the present invention will be fully understood by reference to the following specification in conjunction with the accompanying drawings, in which like reference signs denote like components of structure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of a traditional cord guiding device.

FIG. 2 is a lateral sectional view of the traditional cord guiding device.

FIG. 3 is a perspective view of a cord guiding device according to a first embodiment of the present invention.

FIG. 4 is a top view of the cord guiding device according to the first embodiment of the present invention.

FIG. 5 is a lateral sectional view of the cord guiding device according to the first embodiment of the present invention.

FIG. 6 is a top view of the cord guiding device according to a second embodiment of the present invention.

FIG. 7 is a lateral sectional view of the cord guiding device according to the second embodiment of the present invention.

FIG. 8 is a top view of the cord guiding device according to a third embodiment of the present invention.

FIG. 9 is a lateral sectional view of the cord guiding device according to the third embodiment of the present invention.

FIG. 10 is a top view of the cord guiding device according to a fourth embodiment of the present invention.

FIG. 11 is a front view of the cord guiding device according to the fourth embodiment of the present invention.

FIG. 12 is a top view of the cord guiding device according to a fifth embodiment of the present invention.

FIG. 13 is a top view of the cord guiding device according to a sixth embodiment of the present invention.

FIG. 14 is a top view of the cord guiding device according to a seventh embodiment of the present invention.

FIG. 15 is a top view of the cord guiding device according to an eighth embodiment of the present invention.

FIG. 16 is a lateral sectional view of the cord guiding device according to the eighth embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

First of all, it is to be mentioned that the directions used in the following embodiments and the appendix claims are based on the directions in the appendix drawings. Further, same or similar reference numerals used in the following embodiments and the appendix drawings designate same or similar elements or the structural features

thereof.

Referring to FIGS. 3 and 4, a cord guiding device 1 according to a first embodiment of the present invention is used for a window curtain, comprising a base 10, a first shaft 20, and a second shaft 30.

The base 10 includes an elongated bottom plate 13 and a support bracket 14. The elongated bottom plate 13 extends along an elongated axial direction 11 and has a first pivoting section 15 and a cord hole 17 surrounded by the first pivoting section 15 (as shown in FIG. 4). The support bracket 14 is connected with four corners of the elongated bottom plate 13 through four legs 16 and provided with a second pivoting section 18.

The first shaft 20 is pivotally connected with the first pivoting section 15 of the base 10 and correspondingly disposed above the cord hole 17.

The second shaft 30 is pivotally connected with the second pivoting section 18 of the base 10 and spacedly located at a first side 21 of the first shaft 20.

As shown in FIG. 4, in this embodiment, the first shaft 20 is an adjustment rod including first and second pivoting sections 24, 25 extending along an axial direction A1 and a bending section 27 connected between the first and second pivoting sections 24, 25 and deviated from the axial direction A1. The first shaft 20 is pivotally connected with the base 10 through the first and pivoting sections 24, 25. In addition, in this embodiment, the second shaft 30 is a guiding rod including first and second pivoting sections 34, 35 extending along an axial direction A2 and a middle section 36 connected between the first and second pivoting sections 34, 35. The second shaft 30 is pivotally connected with the base 10 through the first and second pivoting sections 34, 35.

The above description is about the structure of the cord guiding device 1 provided by the first embodiment of the present invention, and the following description is about how to configure a cord 2 to the cord guiding device 1 and an effect of configuring

the cord 2 to the cord guiding device 1.

As shown in FIG. 5, when the cord 2 is configured to the cord guiding device 1, the cord 2 is abutted the middle section 36 of the second shaft 30 and the bending section 27 of the first shaft 20, such that the cord 2 has an angled turn when wound around the first and second shafts 27, 36, and then the cord 2 is penetrated out of the base 10 through the cord hole 17. As such, when subjected to the force applied by the cord 2, the adjustment rod is swung with the first and second pivoting sections 24, 25 as its axis. This can reduce resistance of the cord 2 and hold the cord 2 in the center of the cord hole 17 to correct the situation that the cord 2 is eccentrically penetrated through the cord hole 17. In addition, the cord 2 is constrained within the bending section 27 without slipping back and forth along the axial direction A1, such that wear of the cord 2 caused by friction between the cord 2 and the periphery wall of the cord hole 17 can be avoided, and further, the problem that the cord 2 is stuck in a slot formed by cutting of the cord 2 in the periphery wall of the cord hole 17 can be solved. This allows blades to be lifted and lowered stably.

In view of X-Y plane shown in FIG. 6, a cord guiding device 1a provided by a second embodiment of the present invention further comprises a third shaft 40. The third shaft 40 is pivotally connected with a third pivoting section 19 of the base 10 and spacedly located at a second side 23 of the first shaft 20 opposite to the first side 21 of the first shaft 20. In this embodiment, the third shaft 40 is a guiding rod including first and second pivoting sections 44, 45 extending along an axial direction A3 pivotally connected with the base 10, and a middle section 46 connected between the first and second pivoting sections 44, 45 for abutment of the cord 2. In this way, as shown in FIG. 7, when the cord 2 is configured to the cord guiding device 1a, the cord 2 is abutted against the bending section 27 of the first shaft 20, the middle section 36 of the second shaft 30, and the

middle section 46 of the third shaft 40, and then penetrated out of the base 10 through the cord hole 17. As such, in this embodiment, the cord 2 has a larger angled turn compared to the first embodiment to achieve an effect of adjusting resistance of the cord 2.

As shown in FIGS. 8 and 9, the main structure of a cord guiding device 1b provided by a third embodiment of the present invention is approximately the same with the second embodiment, but one of the differences therebetween is that the bending section 27 of the first shaft 20' (i.e., the adjustment rod) has two abutment planes 29 extending along the axial direction A1 of the first shaft 20' and arranged in an opposite manner for abutment of the cord 2. In this way, the two abutment planes 29 provide a large contact area against the cord 2 to make the cord 2 not easy to slip.

As shown in FIGS. 10 and 11, in view of X-Z plane shown in FIG. 11, the main structure of a cord guiding device 1c provided by a fourth embodiment of the present invention is approximately the same with the second embodiment, but one of the differences therebetween is that a height at which the first pivoting section 34 of the second shaft 30 (i.e., the guiding rod) is pivoted to the base 10 is lower than a height at which the second pivoting section 35 of the second shaft 30 (i.e., the guiding rod) is pivoted to the base 10, and a height at which the first pivoting section 44 of the third shaft 40 (i.e., the guiding rod) is pivoted to the base 10 is greater than a height at which the second pivoting section 45 of the third shaft 40 (i.e., the guiding rod) is pivoted to the base 10. In this way, when abutted against the second and third shafts 30, 40, the cord 2 has a larger angled turn to enable the resistance of the cord to be adjusted variably.

As shown in FIG. 12, in view of X-Y plane shown in FIG. 12, the main structure of a cord guiding device 1d provided by a fifth embodiment of the present invention is approximately the same with the second embodiment, but one of the differences therebetween is that the axial direction A1 of the first shaft 20 is parallel to the elongated

axial direction 11 of the base 10, and the axial direction A2 of the second shaft 30 and the axial direction A3 of the third shaft 40 are not parallel to the elongated axial direction 11 of the base 10. In this way, the cord 2 can be prevented from slipping back and forth when abutted against the second shaft 30 and the third shaft 40.

As shown in FIG. 13, in view of X-Y plane shown in FIG. 13, the main structure of a cord guiding device 1e provided by a sixth embodiment of the present invention is approximately the same with the fifth embodiment, but one of the differences therebetween is that the axial direction A2 of the second shaft 30 and the axial direction A3 of the third shaft 40 are not parallel to the elongated axial direction 11 of the base 10, and further, the axial direction A1 of the first shaft 20 is not parallel to the elongated axial direction 11 of the base 10. In this way, the turning angle of the cord 2 can be increased, and the cord 2 can be prevented from slipping back and forth when abutted against the first, second, and third shafts 20, 30, 40.

It is worth mentioning that if the blades have lighter weight, the resistance of the cord 2 needs to be reduced to allow the blades to be lifted and lowered stably. A cord guiding device 1f provided by a seventh embodiment of the present invention can meet the aforesaid requirement. As shown in FIG. 14, in this embodiment, the first, second, and third shafts 20, 30', 40' are the adjustment rods. When the cord 2 is abutted against the bending section 37 of the second shaft 30' and the bending section 47 of the third shaft 40', the cord 2 is constrained within the bending section 37, 47 without slipping back and forth, and further, the cord 2 is abutted against the bending section 27 of the first shaft 20 and penetrated out of the base 10 through the cord hole 17. As such, in addition to solve the problem that the cord 2 is eccentrically penetrated through the cord hole 17, the cord 2 is easily be pulled by an external force because of abutting the aforesaid position, such that the blades can be lifted and lowered stably and smoothly.

As shown in FIG. 15, the main structure of a cord guiding device 1g provided by an eighth embodiment of the present invention is approximately the same with the second embodiment, but one of the differences therebetween is that the second shaft 30'' and the third shaft 40'' are the guiding rods with shaft diameter variation. The shaft diameter of the middle section 36' of the second shaft 30 is greater than the shaft diameters of the first and second sections 34, 35 of the second shaft 30'', and the shaft diameter of the middle section 46' of the third shaft 40'' is greater than the shaft diameters of the first and second sections 44, 45 of the third shaft 40''. In addition, a bushing 38 is sleeved on the middle section 36' of the second shaft 30 and rotatable around the axial direction A2 of the second shaft 30''. A bushing 48 is sleeved on the middle section 46' of the third shaft 40'' and rotatable around the axial direction A3 of the third shaft 40''. When abutted against the bushings 38, 48, the cord 2 is easily be pulled. Thereafter, the cord 2 is abutted against the bending section 27 of the first shaft 20 and penetrated out of the base 10 through the cord hole 17. As such, in addition to solve the problem that the cord 2 is eccentrically penetrated through the cord hole 17, the cord 2 is easily be pulled to reduce resistance of the cord 2 and enhance operation smoothness of the cord 2.

As indicated above, the first, second, and third shaft 20, 30, 40 of the present invention can be configured in a different arrangement for abutment of the cord 2 to allow the cord 2 to have a larger angled turn, and further, the first, second, and third shaft 20, 30, 40 can be provided by using the adjustment rods or the guiding rods according to actual needs, such that the turning angle of the cord 2 can be increased and the effect of adjusting resistance of the cord 2 can be achieved, thereby facilitating manufacturers and customers to adjust resistance of the cord 2 according to different product specifications. In addition, the cord 2 can be constrained within the aforesaid position to prevent from slipping back and forth, and therefore the blades can be lifted and lowered stably and

smoothly.

The invention being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

WHAT IS CLAIMED IS:

[Claim 1]

A cord guiding device of a window curtain for penetrating and winding of a cord, the cord guiding device comprising:

a base having a cord hole;

a first shaft pivotally connected with the base and correspondingly disposed above the cord hole; and

a second shaft pivotally connected with the base and spacedly located at a first side of the first shaft;

wherein when the cord is configured to the cord guiding device, the cord is penetrated through the cord hole and wound around the first and second shafts;

the cord guiding device characterized in that:

at least one of the first and second shafts is an adjustment rod including first and second pivoting sections extending along an axial direction, and a bending section connected between the first and second pivoting sections and deviated from the axial direction, the adjustment rod being pivotally connected with the base through the first and second pivoting sections and abutted against the cord through the bending section.

[Claim 2]

The cord guiding device as claimed in claim 1, wherein the first shaft is the adjustment rod, and the second shaft is a guiding rod including first and second pivoting sections extending along an axial direction, and a middle section connected between the first and second pivoting sections; the guiding rod is pivotally connected with the base through the first and second pivoting sections and abutted against the cord through the middle section.

[Claim 3]

The cord guiding device as claimed in claim 1, further comprising a third shaft pivotally connected with the base and spacedly located at a second side of the first shaft opposite to the first side of the first shaft, wherein when the cord is configured to the cord guiding device, the cord is penetrated through the cord hole and wound around the first, second, and third shafts; the third shaft is the adjustment rod or a guiding rod including first and second pivoting sections extending along an axial direction, and a middle section connected between the first and second pivoting sections; the guiding rod is pivotally connected with the base through the first and second pivoting sections and abutted against the cord through the middle section

[Claim 4]

The cord guiding device as claimed in claim 3, wherein the first shaft is the adjustment rod, and the second and third shafts are the guiding rods.

[Claim 5]

The cord guiding device as claimed in claim 4, wherein a height at which the first pivoting section of the guiding rod is pivoted to the base is greater than a height at which the second pivoting section of the guiding rod is pivoted to the base.

[Claim 6]

The cord guiding device as claimed in claim 4, wherein the axial direction of the guiding rod is not parallel to the axial direction of the adjustment rod.

[Claim 7]

The cord guiding device as claimed in claim 4, wherein the base has an elongated bottom plate provided with the cord hole and an elongated axial direction; the axial direction of the adjustment rod is not parallel to the elongated axial direction, and the axial direction of the guiding rod is not parallel to the elongated axial direction.

[Claim 8]

The cord guiding device as claimed in claim 4, wherein the middle section of the guiding rod has a shaft diameter greater than those of the first and second pivoting sections of the guiding rod.

[Claim 9]

The cord guiding device as claimed in claim 3, wherein the first, second, and third shafts are the adjustment rods.

[Claim 10]

The cord guiding device as claimed in claim 1, wherein the bending section of the adjustment rod has two abutment planes extending along the axial direction of the adjustment rod and arranged in an opposite manner for abutment of the cord without slipping.