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Variable horizontal blind.

A blind of a type that a plurality of slats 3 which are aligned vertically are supported by a pair of ladder support cords 2 at given intervals, and a front vertical portion 2a and a rear vertical portion 2b of the support cord 2 are relatively moved up and down, thereby allowing the slats 3 to tilt, a lower end of a lifting cord 6 is fixed to the support cord in the vicinity of a front edge or a rear edge of a specified one of the slats which is determined arbitrarily.

BACKGROUND OF THE INVENTION

(Field of the Invention)

The present invention relates to a variable horizontal blind which is called a venetian blind in which a plurality of horizontal slats are aligned vertically in parallel with each other at given distances, and all the slats are made to rise and fall by means of a vertically moving cord to perform the open/close operation of the blind.

(Discussion of the Related Art)

The variable horizontal blind performs the open/close operation of the blind by allowing all the slats to go up and down by means of the vertically moving cord, and the slats are tilted in a state that the blind is closed, that is, the slats are shut, thereby making the slats in an open state and in a close state to adjust the light shielding. As a means for tilting the slats, the slats aligned in the vertical direction are supported at given intervals by ladder support cords to allow the front and rear vertical portions of the support cords to relatively go up and down.

In the blind thus organized, all the slats come into the open state or in the close state at a stretch by the vertically moving operation of the support cords, and therefore they could not be partially made in the open state or in the close state.

Under such a situation, there has been proposed a blind which is more useful by making the upper or lower side of the slats in the open or close state (Utility Model Unexamined Publication No. Sho 55-116194).

This blind is constituted in such a manner that a member for picking the vertical portion of a support cord is fixed to the vertical portion of the support cord between a slat positioned at a desired level and the front or rear side edge, thereby bringing the respective side edges of both slats in close contact with each other.

In the above-mentioned blind, there is a disadvantage in that the respective picking members must be attached to each of the support cords fixed to the end edge of the slat, and even in its operation, because the respective picking members must be manipulated individually, the operation takes heavy labor. There is also a disadvantage in that when the blind is being shut, that is, when the slats are being elevated, the picking member becomes obstructive. For that reason, under existing circumstances, such blinds have been hardly used.

SUMMARY OF THE INVENTION

In view of the above problems, an object of the invention is to provide a variable horizontal blind which

is capable of making the upper or lower side of the slats arranged toward the vertical direction in an open state or in a close state with simple operation.

The above object of the invention has been achieved by provision of a variable horizontal blind of a type that a plurality of slats which are aligned in a vertical direction are supported at given intervals by at least a pair of ladder support cords, and a front vertical portion and a rear vertical portion of said support cords are relatively moved up and down to allow said slats to tilt, characterized in that a lower end of a lifting cord is fixed to said support cords in the vicinity of a front edge or a rear edge of a specified one of said slats, which is determined arbitrarily.

The lower end of the lifting cord may be fixed to the support cords in the vicinity of a front edge and a rear edge of a specified one of the slats, which is determined arbitrarily.

Further, in a variable horizontal blind of such a type that a plurality of slats which are aligned in a vertical direction are supported at given intervals by at least a pair of ladder support cords, and a front vertical portion and a rear vertical portion of said support cords are relatively moved up and down to tilt said slats, one end of a lifting cord is fixed to an upper box on or in the vicinity of an upper end side of any one of a front vertical portion and a rear vertical portion of a support cord located on one side in the lateral direction among said support cords, cord guides movably hook said lifting cord are fitted to each of said support cords in the vicinity of a front edge and a rear edge of a specified one of said slats which are determined arbitrarily and to said upper box in the vicinity of the upper end side of any one of the front vertical portion and the rear vertical portion of said support cord on the other side in the lateral direction, and said lifting cord is successively hooked on from said cord guides fitted to each of said support cords to said cord guides fitted to said upper box.

Further, in the variable horizontal blind, one ends of said lifting cords are fixed to said upper box on or in the vicinity of the upper end side of the front vertical portion and the rear vertical portion of a support cord located on one side in the lateral direction among said support cords; cord guides on which said lifting cord is hooked are disposed on each of said support cords in the vicinity of the front edge portion and the rear edge portion of a specified one of said slats which is determined arbitrarily, and on said upper box in the vicinity of the upper end side of the front vertical portion and the rear vertical direction of a support cord located on the other side in the lateral direction; and said lifting cord is hooked on from said cord guide located on each of said support cords to said cord guide located on said upper box.

Further, the lifting cord may pass through-holes for insertion of a vertically moving cord, which are defined in the slats disposed above where the lifting

cord is fixed to.

In a variable horizontal blind of such a type that a plurality of slats which are aligned in a vertical direction are supported at given intervals by at least a pair of ladder support cords, and the front and rear vertical portions of the support cords are relatively moved up and down to tilt the slats, a lower end of a lifting cord is fixed to the support cord in the vicinity of a front edge or a rear edge of a specified one of the slats, which is determined arbitrarily. Therefore, when the lifting cord fixed to the support cord is lifted by the same amount as the distance between the adjacent slats, the support cord positioned below a portion of the support cord to which the lower end of the lifting cord is fixed, and with such operation, the slats fixed to the support cord positioned below that portion are tilted.

The lower end of the lifting cord is fixed to the support cord in the vicinity of the front edge and the rear edge of a specified one of the slats which is determined arbitrarily so that, when the slats stand in the close state, if one lifting cord is lifted, the support cord positioned below where the lower end of the lifting cord is fixed is lifted, and with such operation, the slats fixed to the support cord positioned below that portion are tilted thereby coming into the open state. Further, when the slats stand in the open state, if one lifting cord is lifted, the support cord positioned below that portion fixing the lower end of the lifting cord is lifted, and with such operation, the slats fixed to the support cord positioned below that portion are tilted thereby coming into the close state.

Further, in a variable horizontal blind of such a type that a plurality of slats which are aligned in a vertical direction are supported at given intervals by at least a pair of ladder support cords, and a front vertical portion and a rear vertical portion of the support cords are relatively moved up and down to tilt the slats, one end of a lifting cord is fixed to an upper box on or in the vicinity of an upper end side of any one of a front vertical portion and a rear vertical portion of a support cord located on one side in the lateral direction among the support cords, cord guides movably hook the lifting cord are fitted to each of the support cords in the vicinity of a front edge and a rear edge of a specified one of the slats which are determined arbitrarily and to the upper box in the vicinity of the upper end side of any one of the front vertical portion and the rear vertical portion of the support cord on the other side in the lateral direction, and the lifting cord is successively hooked on from said cord guides fitted to each of the support cords to said cord guides fitted to said upper box. Therefore, when the free end of the support cord is pulled, the support cord positioned below the cord guide is lifted through the cord guide fitted to the support cord, as the result of which the slats fixed to the support cords positioned below that portion are tilted.

Further, in a variable horizontal blind, one ends of the lifting cords are fixed to the upper box on or in the vicinity of the upper end side of the front vertical portion and the rear vertical portion of a support cord located on one side in the lateral direction among the support cords; cord guides on which the lifting cord is hooked are disposed on each of the support cords in the vicinity of the front edge portion and the rear edge portion of a specified one of the slats which is determined arbitrarily, and on the upper box in the vicinity of the upper end side of the front vertical portion and the rear vertical direction of a support cord located on the other side in the lateral direction; and the lifting cord is hooked on from the cord guide located on each of the support cords to the cord guide located on the upper box. Therefore, when the slats stand in the close state, if the free end of one lifting cord is pulled, the slats positioned below the cord guide are tilted through the cord guide on which the lifting cord is hooked, thereby coming into the open state. When the slats stand in the open state, if the other lifting cord is pulled, the slats positioned below the cord guide are tilted through the cord guide on which the lifting cord is hooked, thereby coming into the close state.

Further, the lifting cord is allowed to pass the through-holes for insertion of the vertically moving cord, which are defined in the slats located above that fixed portion, whereby when the slats stand in the open state, if the lifting cord is lifted, the edge of the slats is tilted to the nearly vertical state, thereby obtaining a good close state.

BRIEF DESCRIPTION OF THE DRAWINGS

Other objects, advantages and features of the invention will be apparent when carefully reading the following detailed description in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view showing a variable horizontal blind according to one embodiment of this invention;

Fig. 2 is a sectional view showing a partially expanded portion of the blind in Fig. 1;

Fig. 3 is an explanatory diagram showing an example for using the blind of the embodiment shown in Fig. 1;

Fig. 4 is an explanatory diagram showing an example for using the blind of the embodiment shown in Fig. 1;

Fig. 5 is a side-sectional view showing a partially expanded portion of a variable horizontal blind according to another embodiment of the invention;

Fig. 6 is a side-sectional view showing a partially expanded portion of a variable horizontal blind according to still another embodiment of the invention;

Fig. 7 is an explanatory diagram showing an example for using the blind of the embodiment shown in Fig. 6;

Fig. 8 is a perspective view showing a variable horizontal blind according to still another embodiment of the invention;

Fig. 9 is an explanatory diagram showing a variable horizontal blind according to still another embodiment of the invention;

Fig. 10 is an explanatory diagram showing a variable horizontal blind according to still another embodiment of the invention; and

Fig. 11 is a perspective view showing a variable horizontal blind according to still another embodiment of the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, embodiments of the invention will be described with reference to the accompanying drawings in detail.

Figs. 1 to 4 show a variable horizontal blind in accordance with one embodiment of the invention, and in the figure, reference numeral 1 denotes an upper box; 2, ladder support cords; 3, a plurality of slats supported at given intervals in the vertical direction by the support cords 2. The front and rear edges of these slats 3 are fixed to front and rear vertical portions 2a and 2b of the support cords 2, respectively, in such a manner that the front and rear vertical portions 2a and 2b are relatively moved up and down, thereby allowing the slats 3 to tilt so as to come into an open state or in a close state to adjust light shielding. Reference numeral 12 denotes a lower box; 4, vertically moving cords for performing the open/close operation of the blind by making all the slats 3 move vertically; and 5, through-holes defined in the slats 3 for insertion of the vertically moving cords.

The above-mentioned structure of the variable horizontal blind is not fundamentally different from that of the conventional variable horizontal blind. Therefore, a means for operating the front vertical portion 2a and the rear vertical portion 2b of the support cords 2 for supporting the slats 3 and for allowing the slats 3 to tilt, and a means for operating the vertically moving cord 4 for rising and/or falling all the slats 3 are identical with those of the conventional variable horizontal blind, and therefore these operating means are omitted in Fig. 1.

Reference numeral 6 denotes lifting cords whose number depends upon the number of the support cords 2, and an lower end of each lifting cord 6 is fixed onto the front vertical portion 2a or the rear vertical portion 2b of each of the support cords 2 in the vicinity of the front or rear edge of a specified one of the slats 3, which is determined arbitrarily. The lower end of each support cord 2 may be directly fixed to the por-

tions 2a or 2b by binding or the like, or it may be detachably fixed thereto through a fixed member 7 such as a fixed ring or the like.

Each of the lifting cords 6 is put around each pulley 8 disposed on the upper box 1 in the vicinity of the upper end of each support cord 2 in such a manner that ends of the lifting cords 6 are taken out of one side of the upper box 1 so as to be hung, and the portion thus hung constitutes a pulling member 9 (Fig. 1).

When the pulling member 9 is pulled by the substantially same distance as that between the adjacent slats 3, the support cords 2 positioned below where are fixed to the lower ends of the lifting cords 6 are allowed to lift, resulting in that the slats 3, which are fixed to the support cords 2 positioned below that portion, are tilted.

Then, in the case where the lower ends of the lifting cords 6 are fixed to the rear vertical portions 2b of the support cords 2, if the slats 3 stand in the close state and the lifting cords 6 are lifted, the slats 3 disposed below the rear vertical portions 2b to which the lower ends of the lifting cords 6 are fixed are tilted to come into the open state (Fig. 3).

On the other hand, in the case where the lower ends of the lifting cords 6 are fixed to the front vertical portions 2a of the support cords 2, if the slats 3 stand in the open state and the lifting cords 6 are lifted, the slats 3 located below the front vertical portions 2a to which the lower ends of the lifting cords 6 are fixed are tilted, thereby coming into the close state (Fig. 4).

Fig. 5 shows a variable horizontal blind in accordance with another embodiment of the invention. In this embodiment, the lower ends of the lifting cords 6 are fixed onto the front vertical portion 2a and the rear vertical portion 2b of the support cords 2 in the vicinity of the front and rear edges of specified ones of the slats 3 which are determined arbitrarily.

With such a structure, if the slats 3 are made in the close state and the lifting cords 6 whose lower ends are fixed to the rear vertical portions 2b of the support cords 2 are lifted, the slats 3 below the rear vertical portion 2b fixing the lower ends of the lifting cords 6 are tilted to come into the open state. If the slats 3 are made in the open state and the lifting cords 6 whose lower ends are fixed to the front and rear vertical portions 2a and 2b are lifted, then the slats 3 below the vertical portions 2a and 2b fixing the lower portions of the lifting cords 6 are tilted to come into the close state.

Fig. 6 shows a variable horizontal blind in accordance with still another embodiment of the invention shown in Figs. 1 and 5, and in the embodiment, the lifting cords 6 pass through-holes 5 for insertion of vertically moving cords, which are defined in the slats 3 disposed above the portion 2a fixing the lower ends of the lifting cords 6.

With such a structure, when the lifting cords 6 are lifted so that the slats 3 come into the close state,

the edge of the uppermost slat 3a which is tilted are lifted to the substantially central position of the slat 3b which are adjacent to and above the slats 3a in such a manner that the slat 3a is allowed to tilt in a vertical like state, thereby obtaining a good close state, as shown in Fig. 7.

Fig. 8 shows a variable horizontal blind in accordance with still another embodiment of the invention. In the figure, a means for operating each of the front vertical portion 2a, the rear vertical portion 2b and the vertically moving cord 4 is omitted as in Fig. 1.

In this embodiment, one end of the lifting cord 6 is properly fixed through a fixed member 10 onto the upper box 1 on or in the vicinity of the upper end side of any one of the front and rear vertical portions 2a and 2b of the support cords 2 disposed on one side in the lateral direction among the support cords 2-for supporting the slats 3.

In this embodiment, one end of the lifting cord 6 is fixed onto the upper box 1 in the vicinity of the upper end of the front vertical portion 2a of that support cord 2. A cord guide 11 on which the lifting cord 6 is freely hooked are movably fitted to a specified position of that support cords 2 determined arbitrarily in the vicinity of the front edge of the slats 3. Further, a cord guide 11 is likewise fitted to other support cords 2 at the same level, respectively, and other cord guides 11 are disposed on the upper box 1 in the vicinity of the upper end of the respective support cords 2. At first, the lifting cord 6 whose one end is fixed onto the upper box 1 is hooked on the cord guide 11 fitted to the support cord 2 below the fixed member 10. Then, after the lifting cord 6 is hooked on the cord guide 11 of the adjacent support cord 2, it is hooked on the cord guide 11 disposed on the upper box 1 above that adjacent support cord 2. The lifting cord 6 is then hooked on the cord guide 11 disposed on the upper box 1 above the next support cord 2, and subsequently is hooked on the cord guide 11 fitted to the support cord 2 below that cord guide 11. Thereafter, the lifting cord 6 is hooked on the cord guide 11 disposed on the further adjacent support cord 2, and hooked on the cord guide 11 of the upper box 1 above the further adjacent support cord 2 in such a manner that the lifting cord 6 is successively hooked on the respective cord guides 11. Finally, the lifting cord 6 is hung on the cord guide 11 disposed on the upper box above- the support cord 2 at the other side of the blind with the result that the other end of the lifting cord 6 forms a pulling member 9.

Figs. 9 and 10 show examples that a lifting cord 6 is hooked on cord guides 11 depending upon the number of the support cords 2, respectively.

In the above-mentioned embodiment, a pulley or ring is used as the cord guide 11. However, if the lifting cord 11 can be movably hooked on the guide 11, the kind of the guide 11 are not particularly limited.

In the above-mentioned embodiment, when the

pulling member 9 is pulled, the support cords 2 positioned below the cord guides 11 are lifted through the cord guides 11 fitted to the support cords 2 with a result that the slats 3 fixed to the support cords 2 positioned below the cord guides 11 are tilted, thereby making the blade in the open state or in the close state, as in the embodiment shown in Fig. 1.

Fig. 11 shows a variable horizontal blind in accordance with still another embodiment of the invention, in which a means for operating each of the front vertical portion 2a, the rear vertical portion 2b and the vertically moving cord 4 is omitted as in Fig. 1.

In the embodiment, one ends of the lifting cords 6 are fixed by the fixed members 10 to the upper box 1 in the vicinity of the upper ends of the front and rear vertical portions 2a and 2b of the support cords 2 located on one side in the lateral direction, respectively. Further, the cord guides 11 are fitted to each of the support cords 2 in the vicinity of the front and rear edges of a specified one of the slats 3 which is determined arbitrarily and also to the upper box 1 in the vicinity of the upper end sides of the front vertical portion 2a and the rear vertical portion 2b of the support cords 2 located on the other side in the lateral direction, respectively in such a manner that the lifting cord 6 is successively hooked on from the cord guides 11 fitted on the respective support cords 2 to the cord guide 11 disposed on the upper box 1.

According to this embodiment, when the slats 3 stand in the close state, if the pulling member 9 fitted to one of the lifting cords 6 is pulled, then the slats 3 positioned below the cord guide 11 is tilted through the cord guides 11 on which the lifting cord 6 are hooked, thereby making the slats 3 in the open state. When the slats 3 stand in the open state, if one of the lifting cords 6 is pulled, then the slats 3 positioned below the cord guide 11 are tilted through the cord guides on which the pulled lifting cord 6 is hooked, thereby making the slats 3 in the open state.

Further, as still another embodiment on the basis of the embodiments shown in Figs. 8 and 11, the lifting cord 6 may be inserted into a through-hole 5 which is defined in each of the slats 3 located above the cord guide 11, for insertion of the lifting cords, as in the embodiment shown in Fig. 6.

With such a structure, when the lifting cord 6 is lifted so that the slats 3 come into the close state, the edge of the uppermost slat 3a which is tilted is lifted to the substantially central position of the slat 3b which is adjacent to and above the slat 3a in such a manner that the slat 3a is tilted in the nearly vertical state as in that of Fig. 7, thereby obtaining a good close state.

In the above-mentioned embodiments, a means for pulling the pulling member 9 which constitutes an free end of the lifting cord 11 may be of a manual means, an electric means or any other means. Further, there is considered, in the embodiment shown in

Fig. 1, a method of winding the lifting cord 6 on a drum which is laterally equipped across the upper box 1, or in the embodiments shown in Figs. 8 and 11, a method of winding the pulling member 9 on the drum and rotating the drum from the exterior of the upper box 1. However, it is not limited to or by any means.

As was described above, according to this invention, there are the following advantages. Since the slats located below a specified one of the slats, which is determined arbitrarily, can come into the open state or in the close state by such simple operation as to pull the lifting cord, the blind of the invention is remarkably useful as a variable horizontal blind, and further since the blind is simple in structure, the manufacture is facilitated and the blinds are obtained inexpensively.

The foregoing description of preferred embodiments of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed, and modifications and variations are possible in light of the above teachings or may be acquired from practice of the invention. The embodiment was chosen and described in order to explain the principles of the invention and its practical application to enable one skilled in the art to utilize the invention in various embodiments and with various modifications as are suited to the particular use contemplated. It is intended that the scope of the invention be defined by the claims appended hereto, and their equivalents.

Claims

1. A variable horizontal blind of such a type that a plurality of slats which are aligned in a vertical direction are supported at given intervals by at least a pair of ladder support cords, and a front vertical portion and a rear vertical portion of said support cords are relatively moved up and down to tilt said slats, characterized in that a lower end of a lifting cord is fixed to said support cord in the vicinity of a front edge or a rear edge of a specified one of said slats, which is determined arbitrarily.
2. A variable horizontal blind as claimed in claim 1, wherein the lower end of said lifting cord is fixed to said support cord in the vicinity of the front edge and the rear edge of a specified one of said slats, which is determined arbitrarily.
3. A variable horizontal blind of such a type that a plurality of slats which are aligned in a vertical direction are supported at given intervals by at least a pair of ladder support cords, and a front vertical portion and a rear vertical portion of said

support cords are relatively moved up and down to tilt said slats, characterized in that one end of a lifting cord is fixed to an upper box on or in the vicinity of an upper end side of any one of a front vertical portion and a rear vertical portion of a support cord located on one side in the lateral direction among said support cords, cord guides movably hook said lifting cord are fitted to each of said support cords in the vicinity of a front edge and a rear edge of a specified one of said slats which are determined arbitrarily and to said upper box in the vicinity of the upper end side of any one of the front vertical portion and the rear vertical portion of said support cord on the other side in the lateral direction, and said lifting cord is successively hooked on from said cord guides fitted to each of said support cords to said cord guides fitted to said upper box.

4. A variable horizontal blind as claimed in claim 3, wherein one ends of said lifting cords are fixed to said upper box on or in the vicinity of the upper end side of the front vertical portion and the rear vertical portion of a support cord located on one side in the lateral direction among said support cords; cord guides on which said lifting cord is hooked are disposed on each of said support cords in the vicinity of the front edge portion and the rear edge portion of a specified one of said slats which is determined arbitrarily, and on said upper box in the vicinity of the upper end side of the front vertical portion and the rear vertical direction of a support cord located on the other side in the lateral direction; and said lifting cord is hooked on from said cord guide located on each of said support cords to said cord guide located on said upper box.
5. A variable horizontal blind as claimed in claim 1, 2, 3 or 4, wherein said lifting cord passes through-holes for insertion of vertically moving cord, which are defined in said slats located above where said lifting cord is fixed.

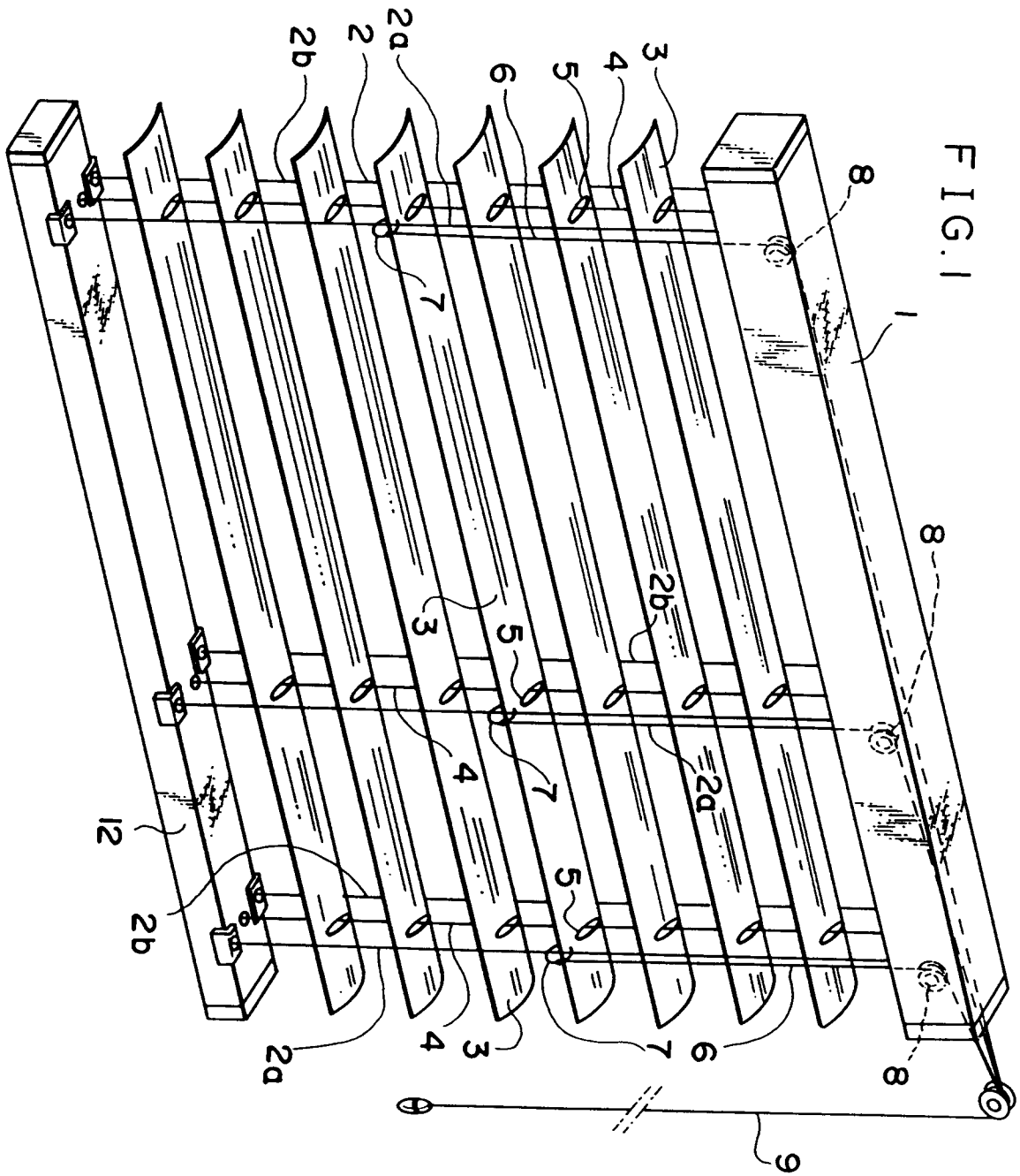


FIG.2

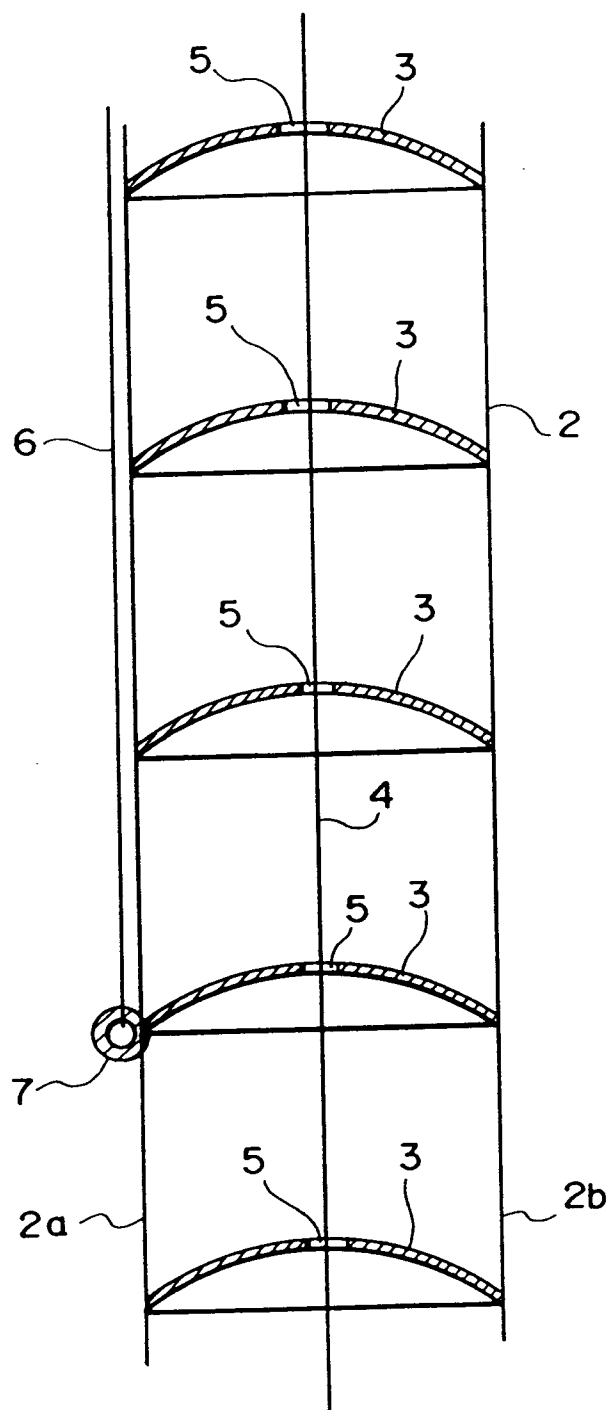


FIG.3

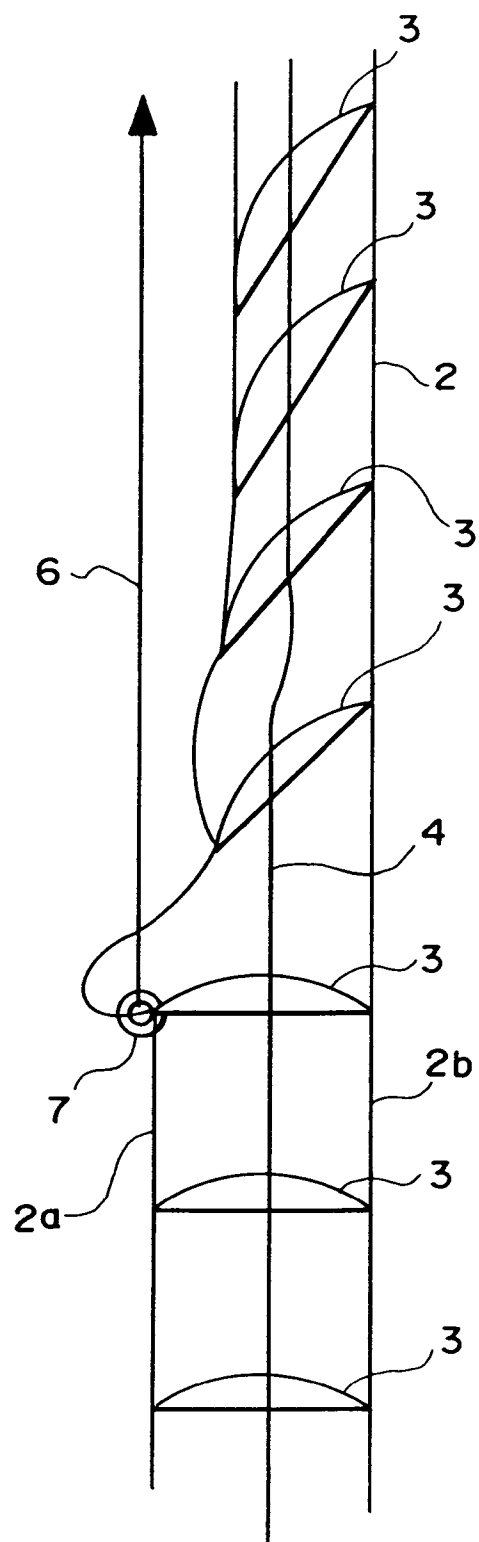


FIG. 4

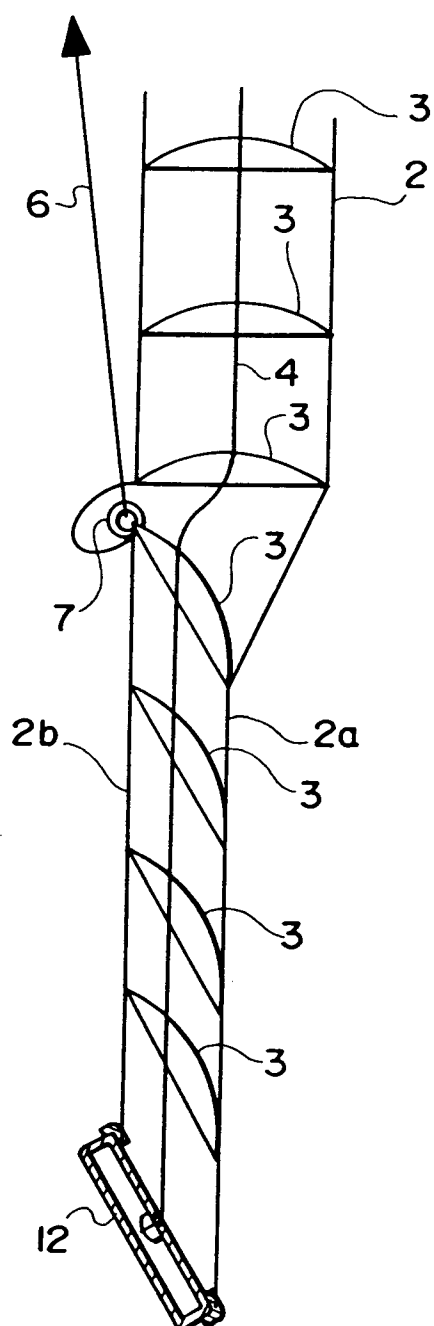


FIG. 5

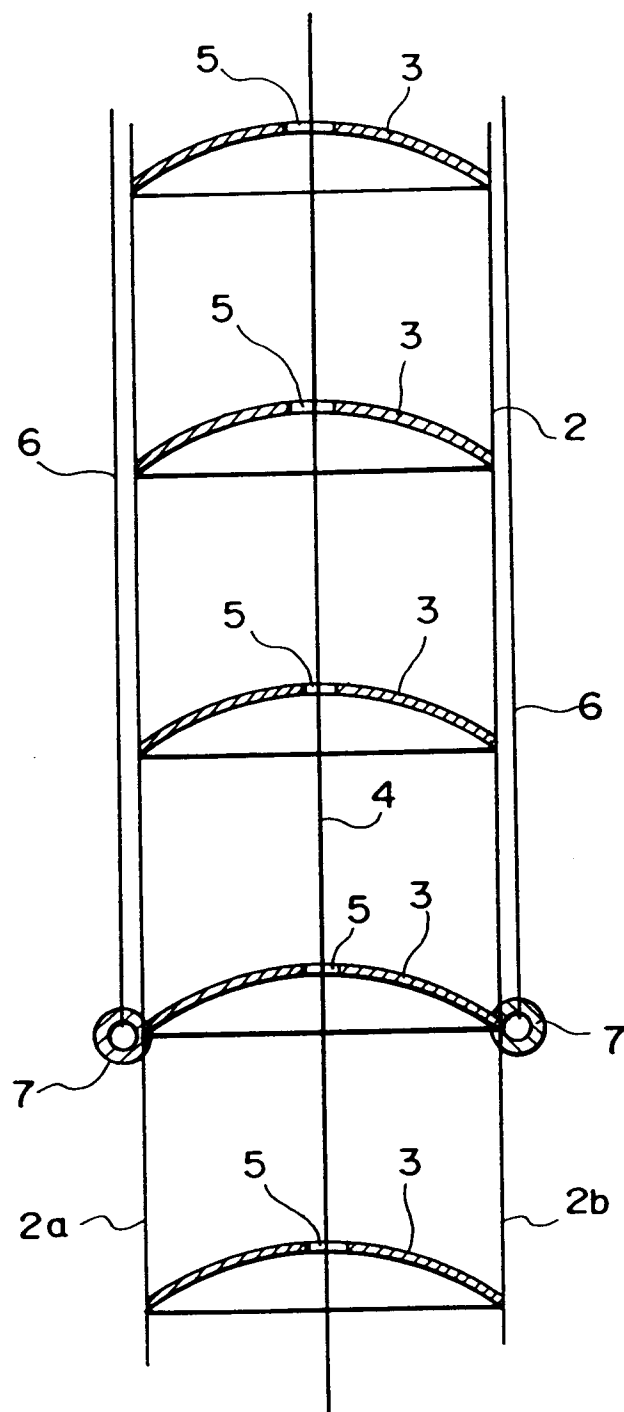


FIG. 6

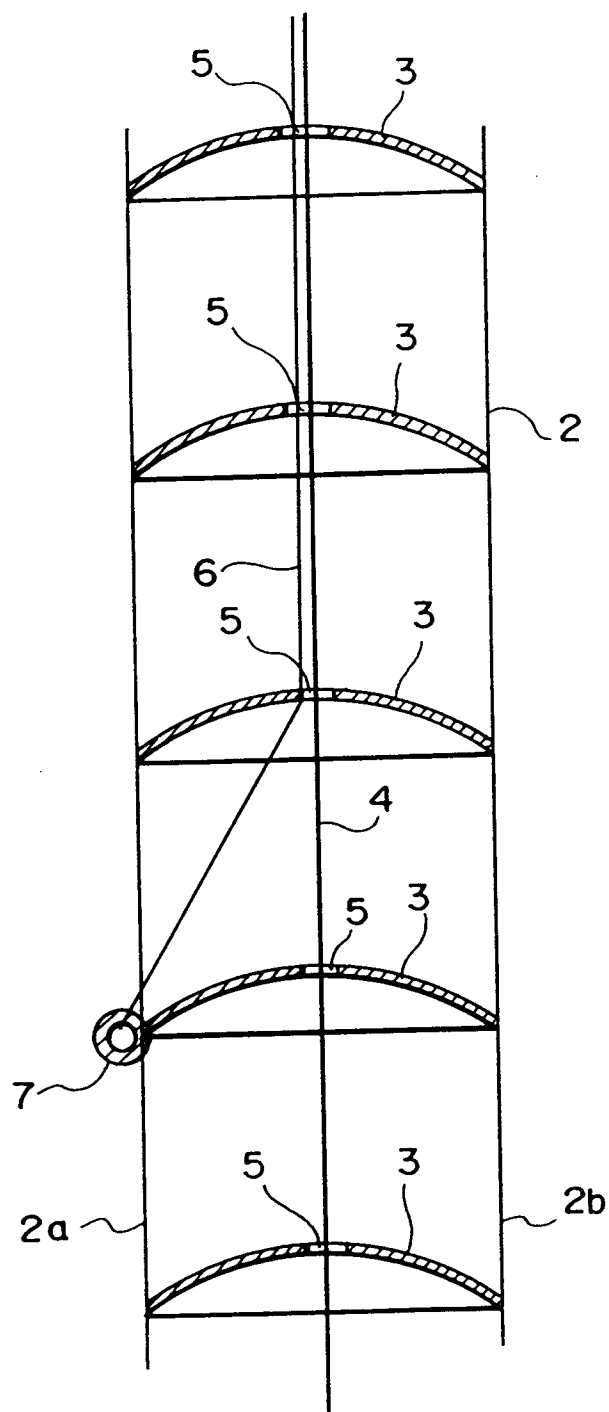
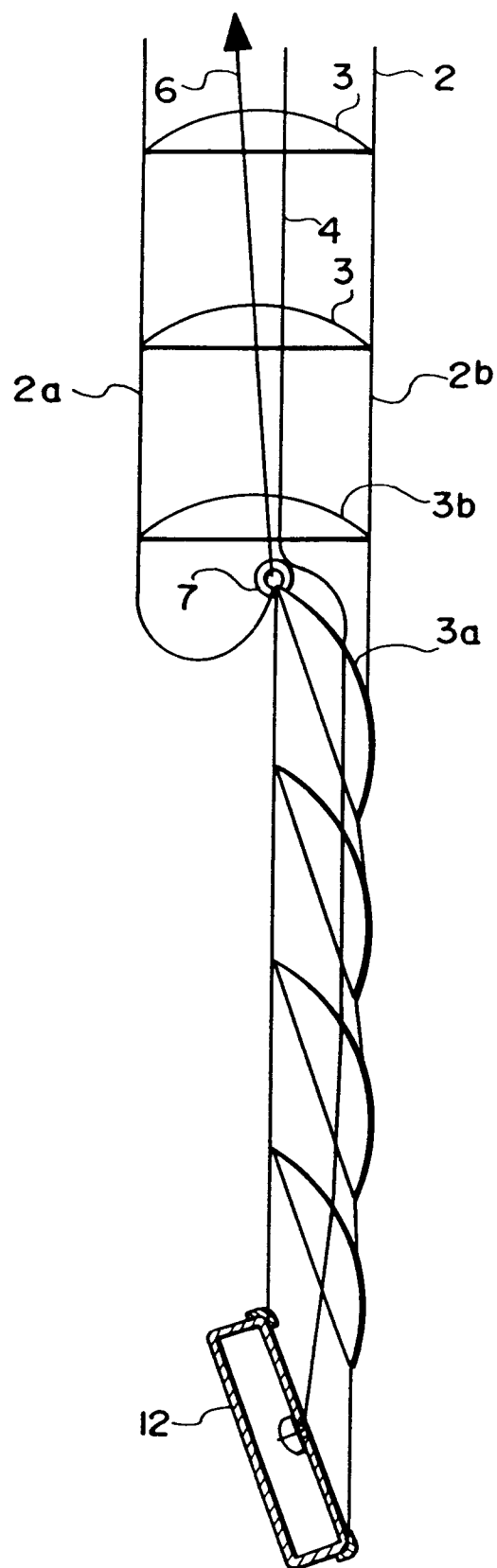


FIG. 7



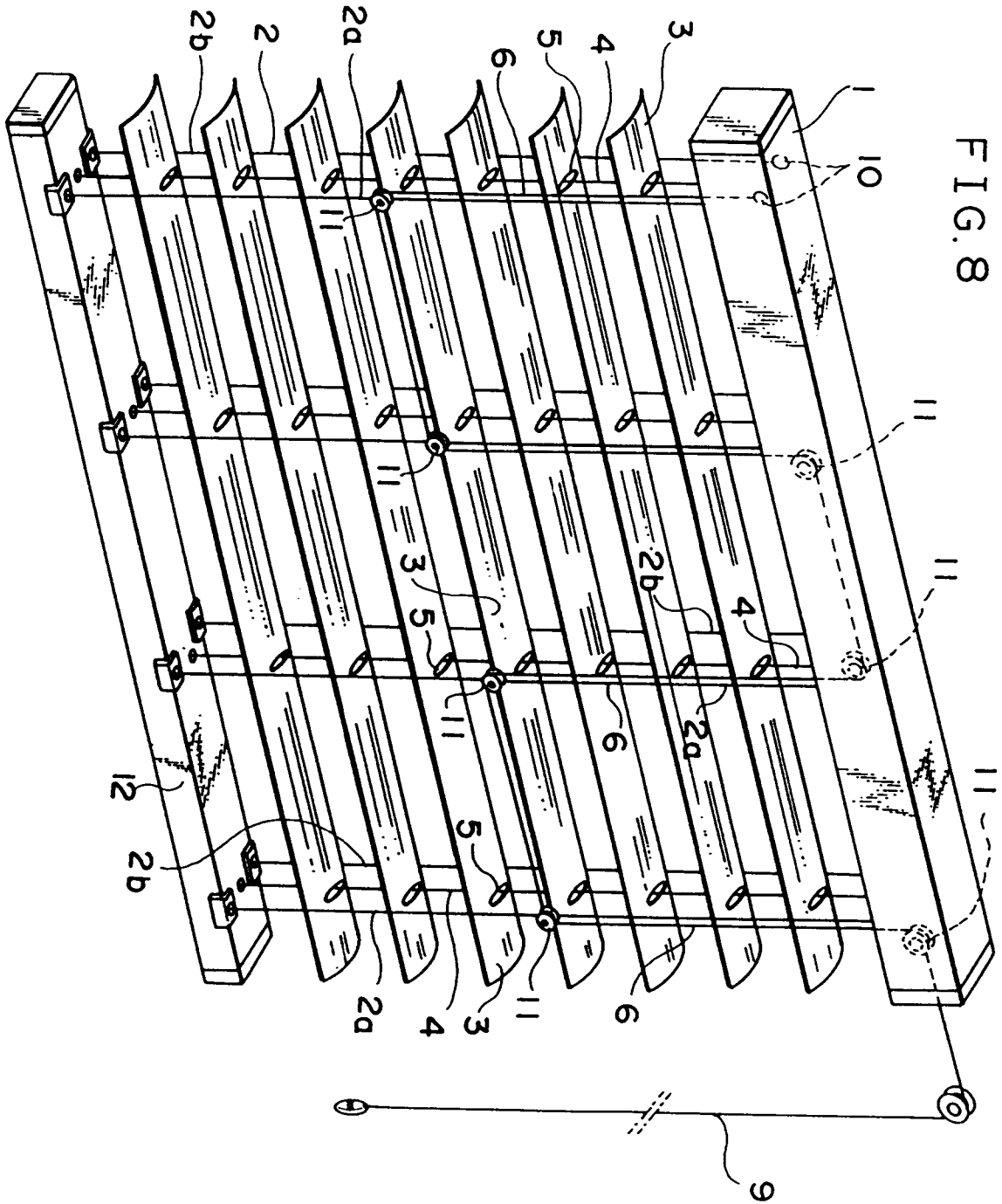


FIG. 9

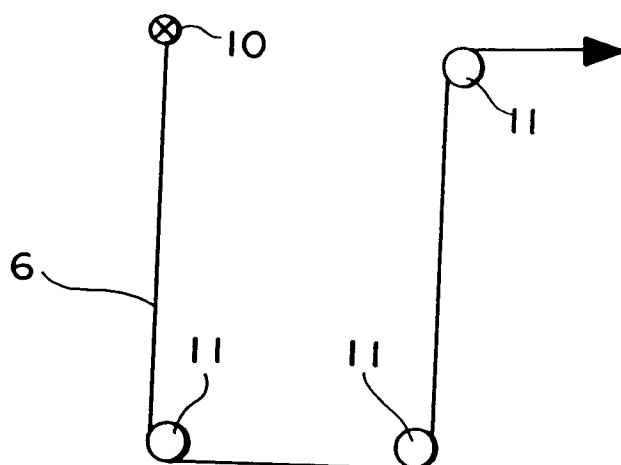
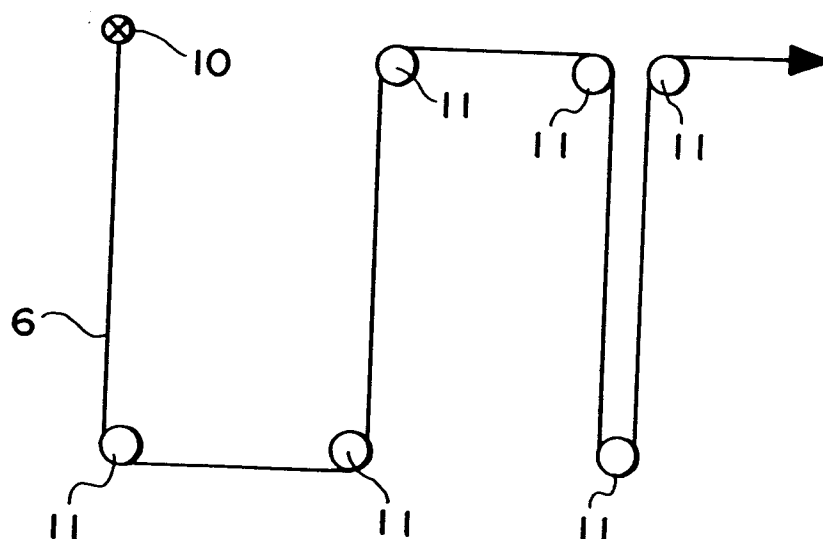
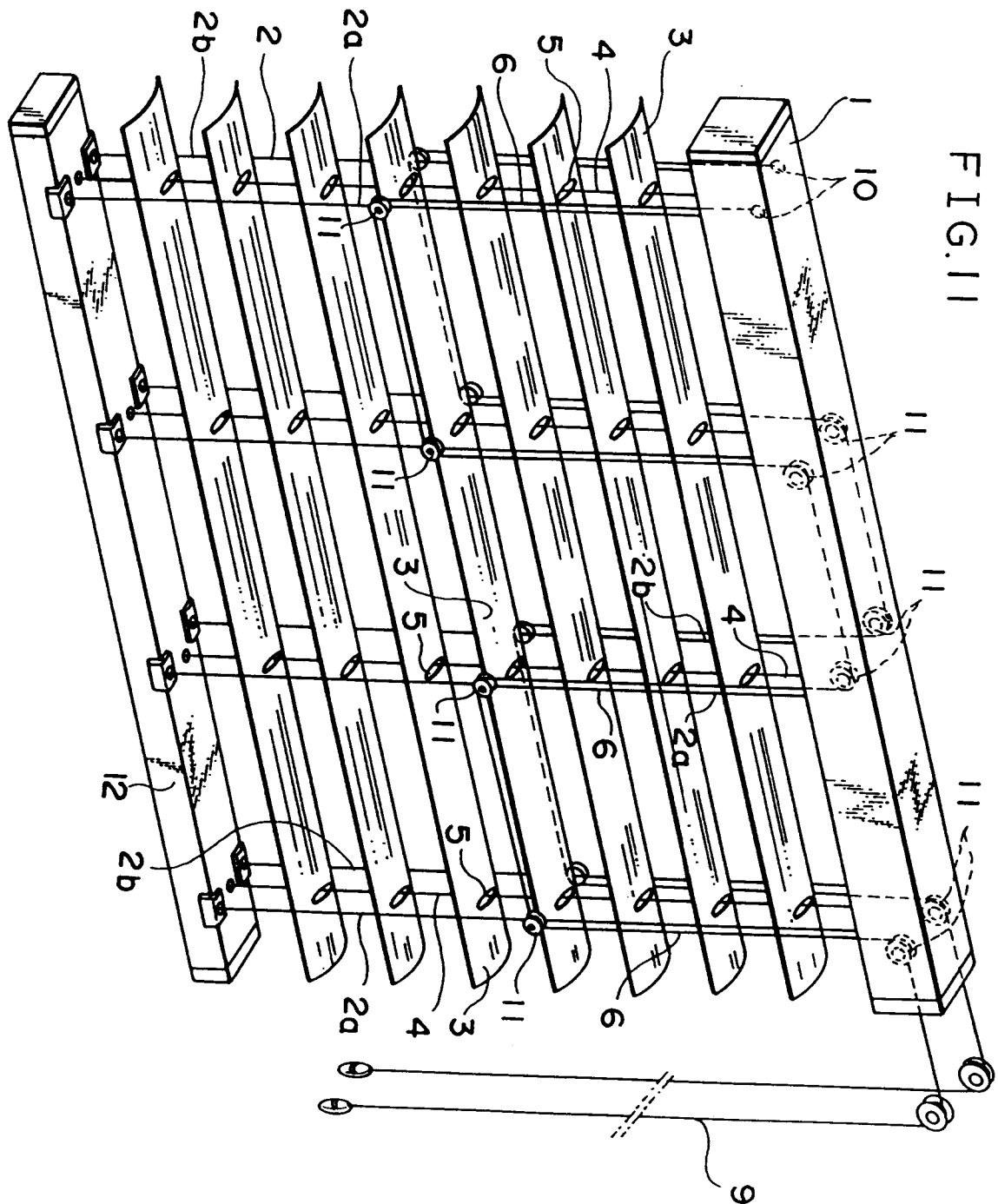


FIG. 10







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 94 30 1855

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
X A	US-A-2 647 572 (BISCOE & SLATER) * column 1, line 16 - line 25 *	1 2,3	E06B9/307
A	US-A-4 621 672 (HSU) * abstract; figure 1 *	1-3	
A	WO-A-92 09779 (VIGILANTE) * abstract *	3,4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			E06B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29 June 1994	Examiner Van Beurden, J
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 (03.82 (P04C01))