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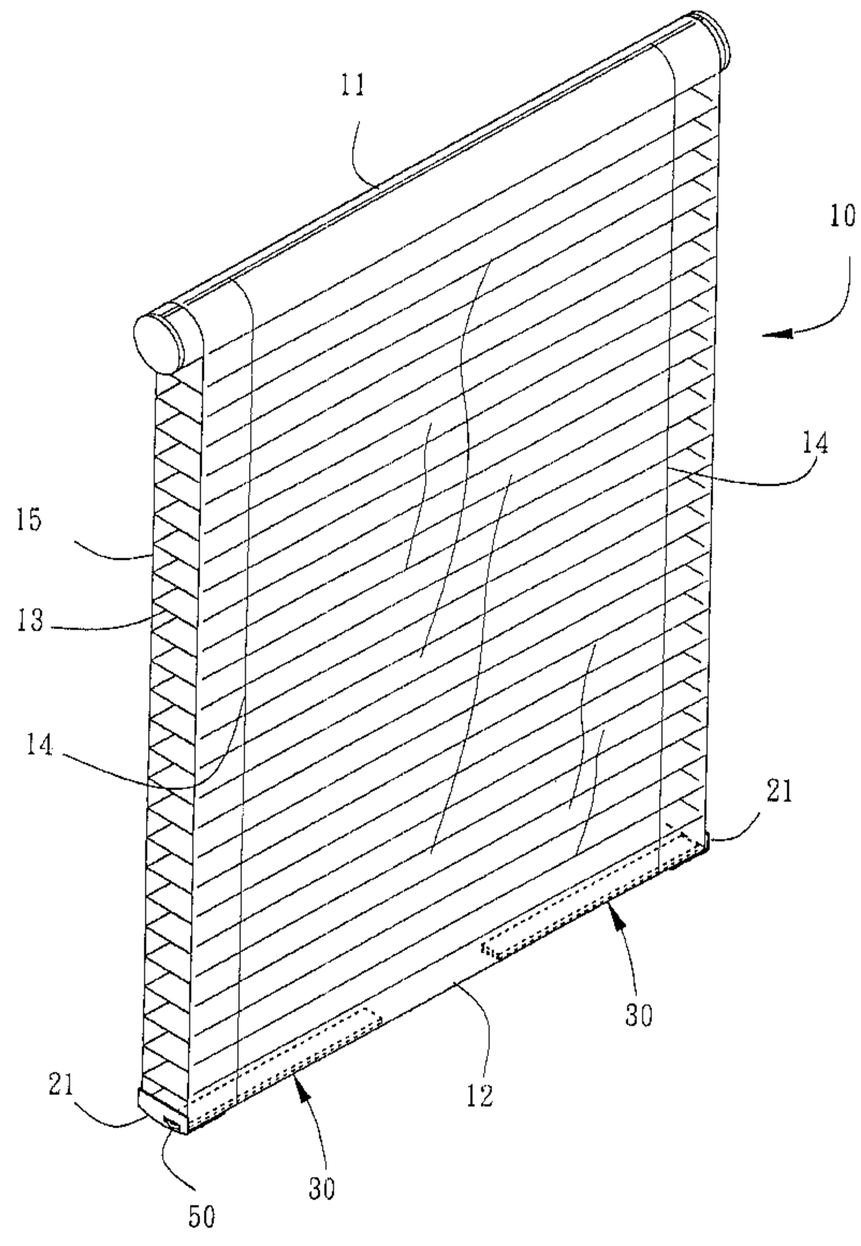
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(54) Titre : TRAVERSE INFERIEURE A CENTRE DE GRAVITE REGLABLE POUR STORE A RESSORT
(54) Title: CENTER OF GRAVITY ADJUSTABLE BOTTOM RAIL FOR WINDOW BLIND ASSEMBLY



(57) Abrégé/Abstract:
A center of gravity adjustment device installed in a bottom rail of a window blind assembly for adjusting the center of gravity of the bottom rail is disclosed to include an adjustment wheel fastened rotatably with the bottom rail for rotating by a user, a rotating wheel fastened rotatably with the bottom rail and spaced from the adjustment wheel at a distance, a weight movable in the bottom rail between the adjustment wheel and the rotating wheel, and a cord member mounted around the adjustment wheel and the rotating wheel and fastened to the weight for moving the weight in said bottom rail between the adjustment wheel and the rotating wheel upon rotation of the adjustment wheel.

CENTER OF GRAVITY ADJUSTABLE BOTTOM RAIL FOR WINDOW BLIND ASSEMBLY

ABSTRACT OF THE DISCLOSURE

A center of gravity adjustment device installed in a bottom rail of a window blind assembly for adjusting the center of gravity of the bottom rail is disclosed to include an adjustment wheel fastened rotatably with the bottom rail for rotating by a user, a rotating wheel fastened rotatably with the bottom rail and spaced from the adjustment wheel at a distance, a weight movable in the bottom rail between the adjustment wheel and the rotating wheel, and a cord member mounted around the adjustment wheel and the rotating wheel and fastened to the weight for moving the weight in said bottom rail between the adjustment wheel and the rotating wheel upon rotation of the adjustment wheel.

CENTER OF GRAVITY ADJUSTABLE BOTTOM RAIL FOR WINDOW BLIND ASSEMBLY

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to lifting window blinds (roll-up blinds, Venetian blinds) and, more specifically, to a center of gravity adjustable bottom rail for window blind. The invention relates to also to a window blind assembly having a center of gravity adjustable bottom rail.

2. Description of the Related Art

FIG. 7 shows a roller blind **90** according to the prior art. This structure of roller blind **90** comprises a barrel **91** fastened pivotally with the top of a window (not shown) in transverse direction, a bottom rail **92** arranged in parallel to and spaced below the barrel **91**, flexible slats **93** arranged in parallel between the barrel **91** and the bottom rail **91**, two thin covering sheets **95** respectively covering the slats **93** at front and back sides and connected between the barrel **91** and the bottom rail **92** to join the slats **93**. The covering sheets **95** soften the light passing through the window blind assembly **90**. The user can rotate the barrel **91** (manually or by a motor drive) to roll up the slats **93** and the covering sheets **95** around the periphery of the barrel **91**.

The aforesaid roller blind **90** is still not satisfactory in function. Because it is difficult to keep the tension of each covering sheet **95** (which is usually a piece of meshed fabric) in balance at left and right sides, the bottom rail **92** cannot be maintained in horizontal accurately. During fabrication and assembly process of the bottom rail **92** (which is comprised of an aluminum profile and two plastic end caps at

two ends of the aluminum profile), it is difficult to have the gravity weight evenly distributed in all directions. When installed in the covering sheets **95**, the bottom rail **92** may not be maintained in horizontal accurately. When the bottom rail **92** lifted to a relatively higher position close to the barrel **91**, it stands in an oblique position sloping downwards toward one lateral side of the blind (see FIG. 8), obstructing the sense of beauty of the roller blind **90**.

SUMMARY OF THE INVENTION

The present invention has been accomplished under the circumstances in view. It is the main object of the present invention to provide a center of gravity adjustment device, which is practical for use in a window blind assembly, such as a roll-up blind, lifting-type blind, etc., for enabling the user to adjust the center of gravity of the bottom rail to keep the bottom rail in horizontal.

It is another object of the present invention to provide a window blind assembly having a center of gravity adjustable bottom rail, which enables the user to adjust the center of gravity of the bottom rail, keeping the bottom rail in horizontal.

To achieve these objects of the present invention, a center of gravity adjustment device is installed in a bottom rail of a window blind assembly for adjusting the center of gravity of the bottom rail, comprising an adjustment wheel fastened rotatably with the bottom rail for rotating by a user, a rotating wheel fastened rotatably with the bottom rail and spaced from the adjustment wheel at a distance, a weight movable in the bottom rail between the adjustment wheel and the rotating wheel, and a cord member mounted around the adjustment wheel and the rotating wheel and fastened to the weight for moving the weight in said bottom rail between the adjustment wheel and the rotating wheel upon rotation of the adjustment wheel.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a window blind assembly constructed according to a preferred embodiment of the present invention.

FIG. 2 is an exploded view, in an enlarged scale, of the bottom rail of the window blind assembly shown in FIG. 1.

FIG. 3 is a top view, partially in section, of the bottom rail according to the present invention.

FIG. 4 is a front view, partially in section, of the bottom rail according to the present invention.

FIG. 5 is a sectional view taken along line 5-5 of FIG. 3.

FIG. 6 is similar to FIG. 3 but showing the position of the weight changed.

FIG. 7 shows a roller blind according to the prior art.

FIG. 8 is a schematic view showing the bottom rail lifted to a relatively higher position close to the barrel of the prior art roller blind shown in FIG. 7.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIG. 1, a window blind assembly **10** in accordance with the present invention is shown comprised of a barrel **11** fastened pivotally with the top side of a window (not shown), a bottom rail **12** arranged in parallel to and spaced below the barrel **11**, a plurality of flexible slats **13** arranged in parallel between the barrel **11** and the bottom rail **12**, two ladder tapes **14** bilaterally and vertically connected between the barrel **11** and the bottom rail **12** and joining the slats **13**, and a flexible covering sheet **15**. The covering sheet **15** has a first half disposed at the front side of the slats **13**, a second half disposed at the back side of the slats **13**, and a middle part connected between the first half and the second half below the bottom rail **12**. The top sides of the

first and second halves of the covering sheet **15** are respectively connected to the barrel **11**. Because the aforesaid basic structure of the window blind assembly is not within the scope of the claims of the present invention, no further detailed description in this regard is necessary.

Referring to FIG. 2 and FIG. 1 again, the main feature of the present invention is at the bottom rail **12**. The bottom rail **12** is a hollow elongated flat member extruded from aluminum, having a flat top surface, a convex bottom surface, and a longitudinally extended middle partition wall **16**. The partition wall **16** divides the internal space of the bottom rail **12** a longitudinally extended front chamber **17** and a longitudinally extended back chamber **18**. Further, the partition wall **16** has two end notches **19** respectively formed in the two distal ends on the middle.

Referring to FIGS. 3~5 and FIGS. 1 and 2 again, two end caps **21** are respectively fastened to the two ends of the bottom rail **12**. The end caps **21** are L-shaped cover members respectively injection-molded from plastics, each having a vertical wall **22** and a horizontal wall **23** connected at right angles, and two insertion blocks **24** bilaterally perpendicularly extended from the vertical wall **22** and suspending above the horizontal wall **23**. By mans of plugging the insertion blocks **24** into the longitudinally extended front chamber **17** and longitudinally extended back chamber **18** of the bottom rail **12**, the end caps **21** are fastened to the ends of the bottom rail **12**. When the end caps **21** installed, the vertical walls **22** of the end caps **21** close the ends of the bottom rail **12**, and the horizontal walls **23** of the end caps **21** are suspended below the bottom rail **12** and spaced from the bottom surface of the bottom rail **12** at a distance (for the passing of the covering sheet **15**). Further, the vertical wall **22** of each end cap **21** has a horizontally extended elongated slot **25** corresponding to the longitudinally extended front chamber **17** of the bottom rail **12**. In order to save

manufacturing cost, the end caps **21** are made having two frames of line formed of dents and disposed in the respective vertical wall **22** corresponding to the longitudinally extended front chamber **17** and the longitudinally extended back chamber **18**. Therefore, the user can remove the area within one frame of line and keep the area within the other frame of line intact. By means of selectively piercing one frame of line, a horizontally extended elongated slot **25** is formed in each end cap **21** corresponding to the longitudinally extended front chamber **17**.

As illustrated in FIG. 1, two identical center of gravity adjustment devices **30** are symmetrically mounted in the two ends of the bottom rail **12**. FIGS. 2~6 show only one center of gravity adjustment device **30**. Each center of gravity adjustment device **30** comprises a track **40**, an adjustment wheel **50**, a rotating wheel **60**, a weight **70**, and a cord member **80**.

The track **40** is an elongated flat bar having a longitudinally extended center opening **41**, two end holes **42** and **43** formed in the two ends in communication with the center opening **41**, and a retaining portion **44** protruded from one end. The track **40** is inserted into the longitudinally extended front chamber **17** of the bottom rail **12** to engage the retaining portion **44** into one end notch **19** of the partition wall **16**. When the retaining portion **44** engaged into one end notch **19** of the partition wall **16**, the track **40** is set in position and maintained in flush with one end of the bottom rail **12**.

The adjustment wheel **50** is a flat circular wheel having an endless groove **51** around the periphery. The surface of the endless groove **51** is coarsened or embossed with a pattern (not shown). The adjustment wheel **50** is pivotally mounted in the outer end hole **42** of the track **40** by a pin **52**. When installed, the adjustment wheel **50** has a part disposed outside the outer end of the track **40** (i.e., outside one end of the bottom rail **12**) and projecting out of the elongated slot **25** of the corresponding end cap **21**.

Therefore, the user can rotate the adjustment wheel **50** with the thumb conveniently.

The rotating wheel **60** is same as the adjustment wheel **50** in shape, having an endless groove **61** around the periphery. The rotating wheel **60** is pivotally mounted in the inner end hole **42** of the track **40** by a pin **62**.

The weight **70** is an elongated flat heavy metal plate smaller than the longitudinally extended center opening **41** of the track **40**, having two longitudinal slots **71** cut through the top and bottom sides and arranged in parallel, and two pairs of end holes **72** aligned in the two ends in communication with the longitudinal slots **71**. The weight **70** is longitudinally movably suspended in the longitudinally extended center opening **41** of the track **40**.

The cord member **80** is mounted around the endless groove **51** of the adjustment wheel **50** and the endless groove **61** of the rotating wheel **60** and inserted through the back end holes **72** of the weight **70** and the corresponding longitudinal slot **71**, having two ends respectively inserted through the front end holes **72** of the weight **70** into the corresponding longitudinal slot **71** and then respectively tied in a knot **81** or **82**. The two knots **81** and **82** of the cord member **80** are respectively stopped in connection areas between the front end holes **72** of the weight **70** and the corresponding longitudinal slot **71**. The friction resistance between the wheels **50** and **60** and the cord member **80** enables the cord member **80** to be moved to carry the weight **70** leftwards or rightwards upon rotary motion of the adjustment wheel **50**. For example, when the user rotating the adjustment wheel **50** clockwise, the cord member **80** is turned with the adjustment wheel **50**, thereby causing the left knot **81** to pull the weight **70** leftwards (at the same time, the right knot **82** pushes the weight **70** leftwards) to the position shown in FIG. 6.

The aforesaid description explains the structure and function of the bottom

rail **12**. During installation, the adjustment wheel **50** and the rotating wheel **60** are respectively pivotally mounted in the two ends of the track **40** at first, and then the weight **70** is put in the longitudinally extended center opening **41** of the track **40**, and then one end of the cord member **80** is tied in a knot **82**, and then the other end of the cord member **80** is inserted from the front longitudinal slot **71** of the weight **70** through one front end hole **72** of the weight **70** and then extended over the endless groove **61** of the rotating wheel **60** and inserted through the back end holes **72** and back longitudinal slot **71** of the weight **70** and then extended over the endless groove **51** of the adjustment wheel **50** and then inserted through the other front end hole **72** of the weight **70** into the longitudinally extended center opening **41** of the track **40** and then tied in a knot **81**. Thereafter, the two center of gravity adjustment devices **30** are respectively mounted in the bottom rail **12**, and then the end caps **21** are fastened to the ends of the bottom rail **12**.

When the bottom rail **12** installed in the window blind assembly **10**, the user can rotate the adjustment wheel **50** of each center of gravity adjustment device **30** to adjust the position of the respective weight **70** in the respective track **40**, so as to further adjust the center of gravity of the bottom rail **12**, keeping the bottom rail **12** in horizontal accurately. For example, if the bottom rail **12** sloping downwards from the left side toward the right sight, the user can rotate the adjustment wheel **50** of the left center of gravity adjustment device **30** to adjust the position of the respective weight **70** leftwards (the user may adjust the two center of gravity adjustment devices **30** if necessary), so as to further shift the center of gravity of the bottom rail **12** leftwards, enabling the bottom rail **12** to be held in horizontal.

According to the aforesaid embodiment of the present invention, the center of gravity adjustment devices **30** are mounted in the bottom rail **12** near the front side

of the bottom rail **12**. When the user rotating the barrel **11** to roll up the covering sheet **15** and the slats **13**, the bottom rail **12** is gradually turned from a horizontal position to a vertical position, i.e., the back side of the bottom rail **12** is gradually turned upwards and the front side of the bottom rail **12** is gradually turned downwards. Because the center of gravity adjustment devices **30** are mounted in the bottom rail **12** near the front side of the bottom rail **12**, the center of gravity of the bottom rail **12** can smoothly be shifted to the bottom side to stretch the cover sheet **15** when turned from the horizontal position to the vertical position.

While only one embodiment of the present invention has been shown and described, it will be understood that various modifications and changes could be made thereunto without departing from the spirit of the invention. For example, the bottom rail can be made having only one center of gravity adjustment device on the middle for adjustment, and the center of gravity adjustment device of the present invention can be installed in the bottom rail of any type of window blind assembly, such as roller blind, Venetian blind, pleated blind, etc. Accordingly, the invention is not to be limited except as by the appended claims.

WHAT IS CLAIMED IS:

1. A center of gravity adjustment device for a bottom rail of a window blind assembly, comprising:

an adjustment wheel fastened rotatably with said bottom rail for rotating by a user;

a rotating wheel fastened rotatably with said bottom rail and spaced from said adjustment wheel at a distance;

a weight movable in said bottom rail between said adjustment wheel and said rotating wheel; and

a cord member mounted around said adjustment wheel and said rotating wheel and fastened to said weight for moving said weight in said bottom rail between said adjustment wheel and said rotating wheel upon rotation of said adjustment wheel.

2. The center of gravity adjustment device as claimed in claim 1, further comprising a hollow elongated track mounted inside said bottom rail and adapted to accommodate said adjustment wheel, said rotating wheel, said weight and said cord member.

3. The center of gravity adjustment device as claimed in claim 2, wherein said track has a longitudinally extended center opening, and two end holes in two ends thereof in communication with said center opening; said adjustment wheel and said rotating wheel are respectively rotatably mounted in the end holes of said track, and said adjustment wheel has a part projecting out of said track; said weight is movable in said center opening of said track between said adjustment wheel and said rotating

wheel.

4. The center of gravity adjustment device as claimed in claim 1, wherein said weight is an elongated heavy plate member having a front longitudinal slot and a rear longitudinal slot respectively cut through top and bottom sides thereof and arranged in parallel, and a front pair of end holes and a rear pair of end holes aligned in two ends thereof in communication with said front longitudinal slot and said rear longitudinal slot; said cord member is inserted through said rear longitudinal slot and said rear pair of end holes of said weight, having two ends respectively inserted through said front end holes of said weight into said front longitudinal slot and tied in a respective knot.

5. A window blind assembly having at least one center of gravity adjustment device installed in a bottom rail thereof and adapted for adjusting the center of gravity of said bottom rail, said at least one center of gravity adjustment device each comprising:

an adjustment wheel fastened rotatably with said bottom rail for rotating by a user;

a rotating wheel fastened rotatably with said bottom rail and spaced from said adjustment wheel at a distance;

a weight movable in said bottom rail between said adjustment wheel and said rotating wheel; and

a cord member mounted around said adjustment wheel and said rotating wheel and fastened to said weight for moving said weight in said bottom rail between said adjustment wheel and said rotating wheel upon rotation of said adjustment wheel.

6. The window blind assembly as claimed in claim 5, wherein said at least one center of gravity adjustment device each further comprises a hollow elongated track mounted inside said bottom rail and adapted to accommodate the adjustment wheel, rotating wheel, weight and cord member of the respective center of gravity adjustment device.

7. The window blind assembly as claimed in claim 6, wherein said track has a longitudinally extended center opening, and two end holes in two ends thereof in communication with said center opening; said adjustment wheel and said rotating wheel are respectively rotatably mounted in the end holes of the track of the respective center of gravity adjustment device, and said adjustment wheel has a part projecting out of the track of the respective center of gravity adjustment device; said weight is movable in the center opening of the track of the respective center of gravity adjustment device between the adjustment wheel and rotating wheel of the respective center of gravity adjustment device.

8. The window blind assembly as claimed in claim 5, wherein said weight is an elongated heavy plate member having a front longitudinal slot and a rear longitudinal slot respectively cut through top and bottom sides thereof and arranged in parallel, and a front pair of end holes and a rear pair of end holes aligned in two ends thereof in communication with said front longitudinal slot and said rear longitudinal slot; said cord member is inserted through the rear longitudinal slot and rear pair of end holes of the weight of the respective center of gravity adjustment device, having two ends respectively inserted through the front end holes of the weight of the respective

center of gravity adjustment device into the front longitudinal slot of the weight of the respective center of gravity adjustment device and tied in a respective knot.

9. The window blind assembly as claimed in claim 5, wherein the number of said at least one center of gravity adjustment device is 2, and the two center of gravity adjustment devices are installed in two distal ends of said bottom rail.

10. The window blind assembly as claimed in claim 5, wherein the adjustment wheel of each of said at least one center of gravity adjustment device is partially peripherally disposed outside said bottom rail for operation by the user.

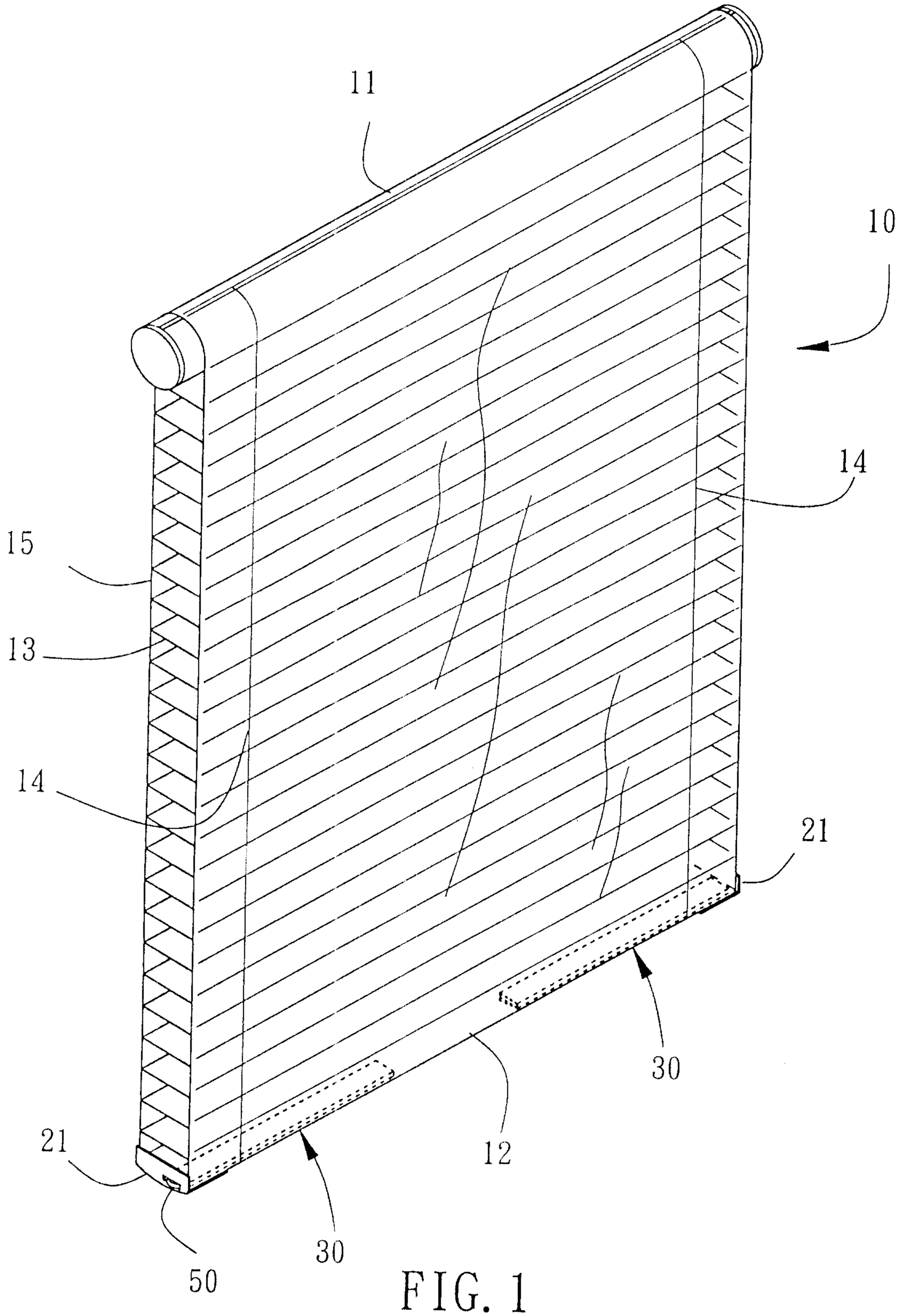


FIG. 1

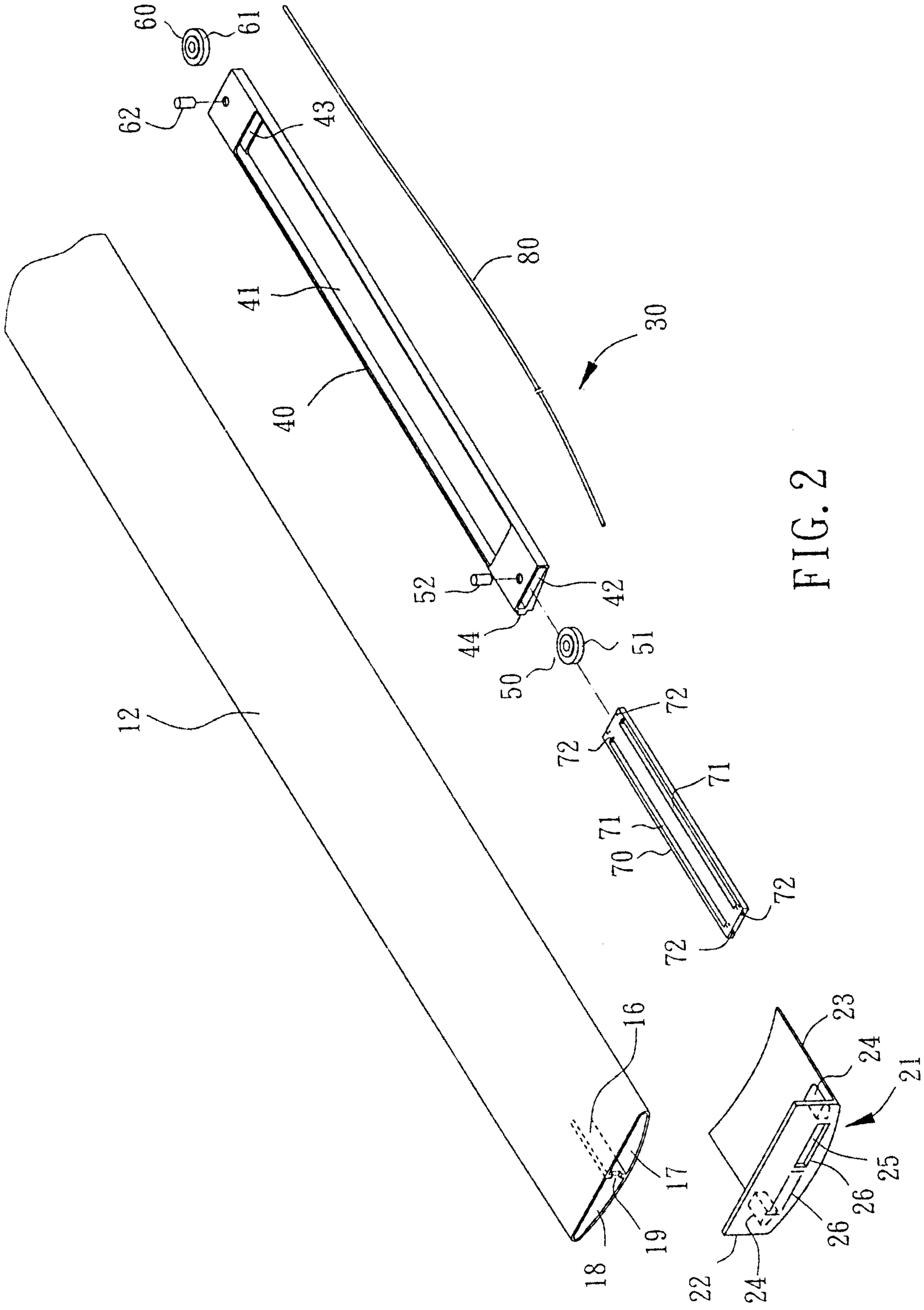

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FIG. 2

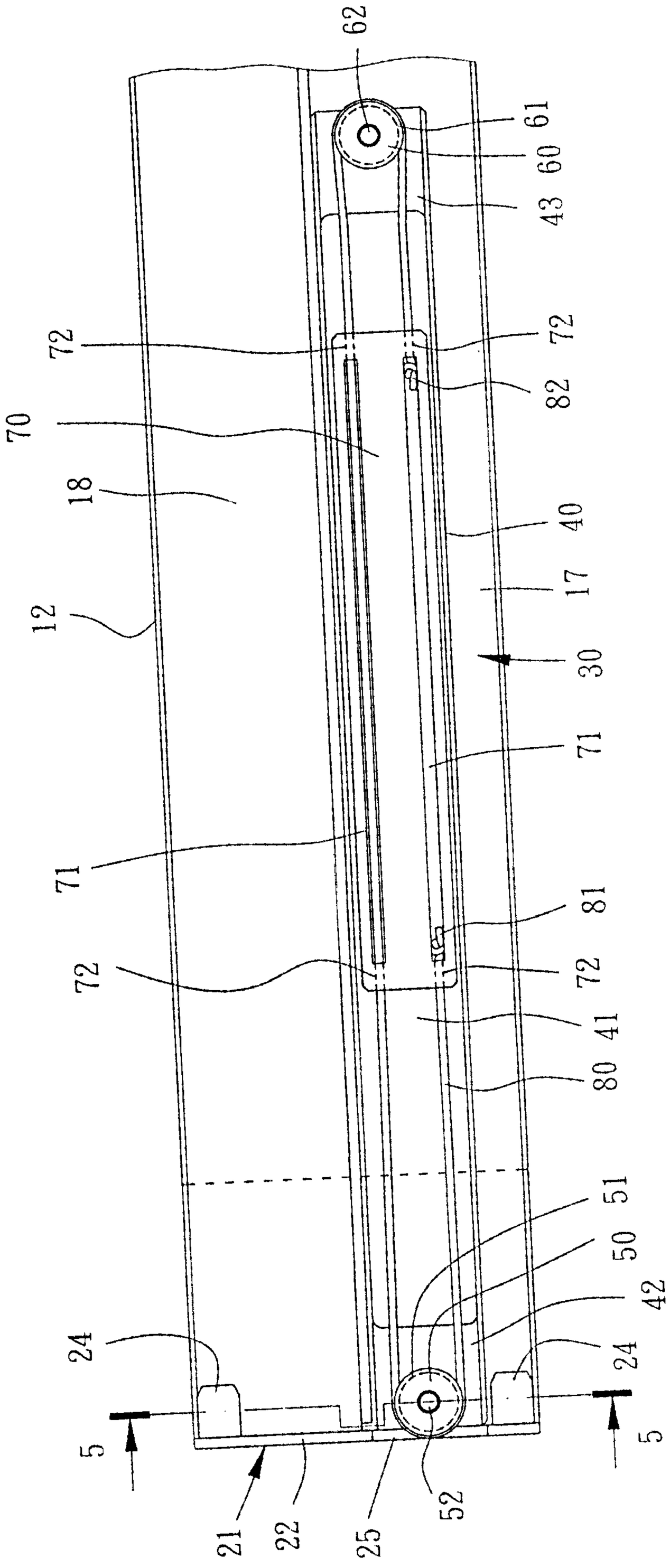

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FIG. 3

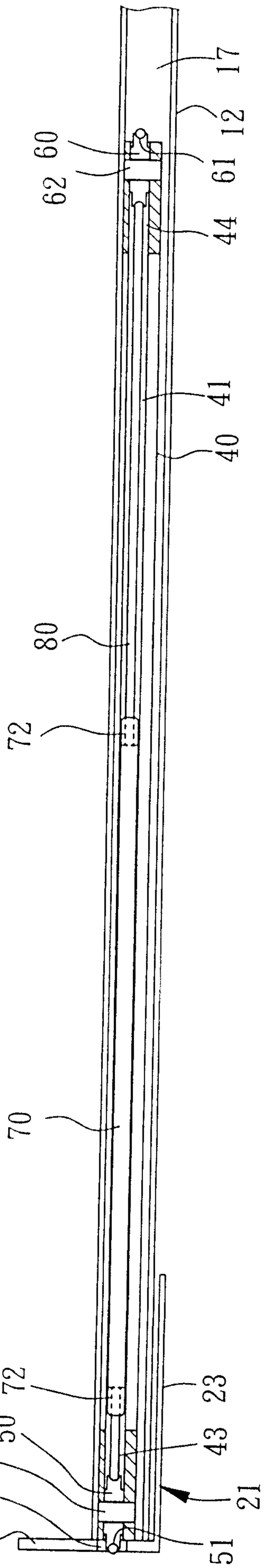

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FIG. 4

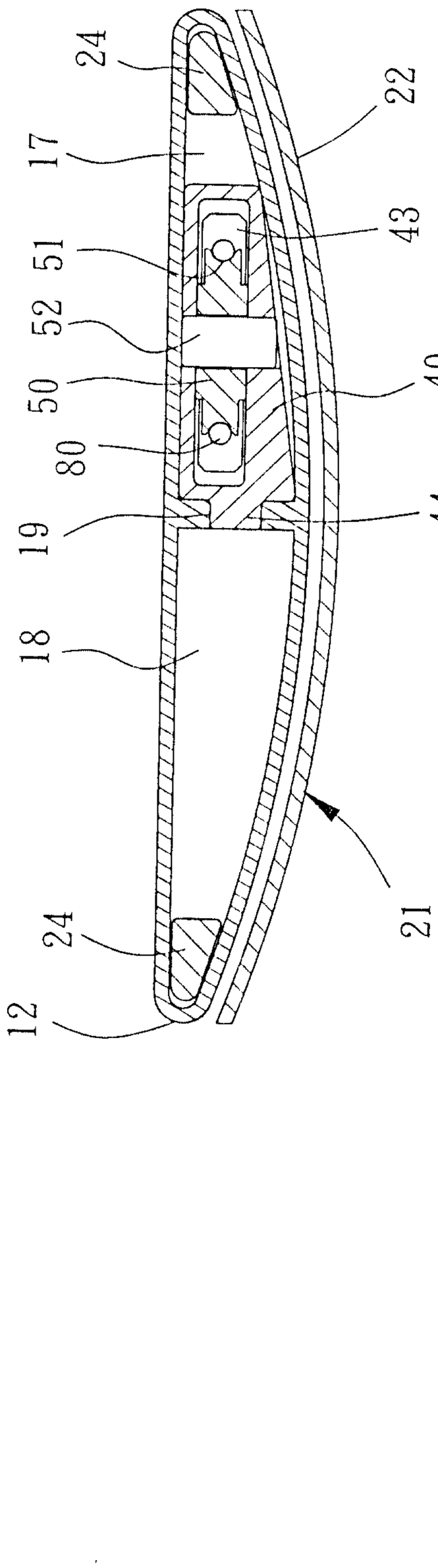

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FIG. 5

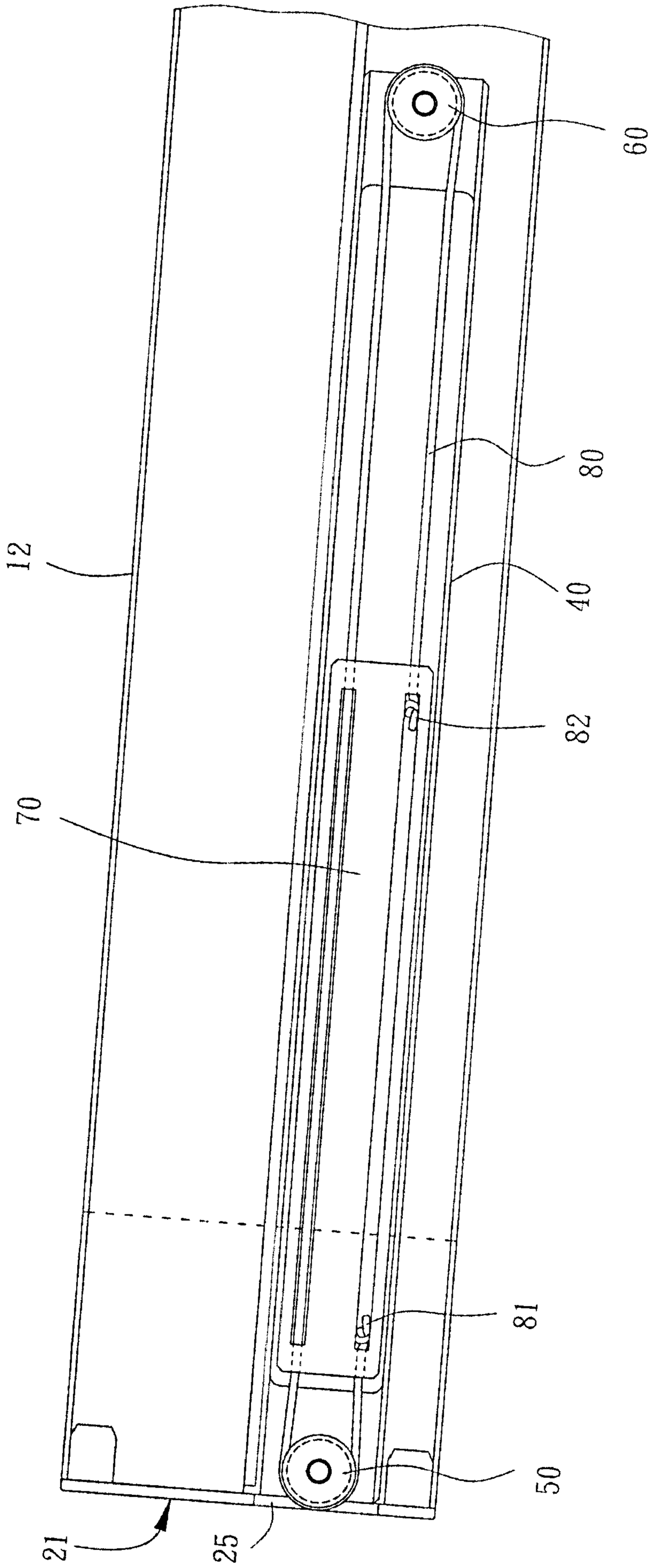


FIG. 6

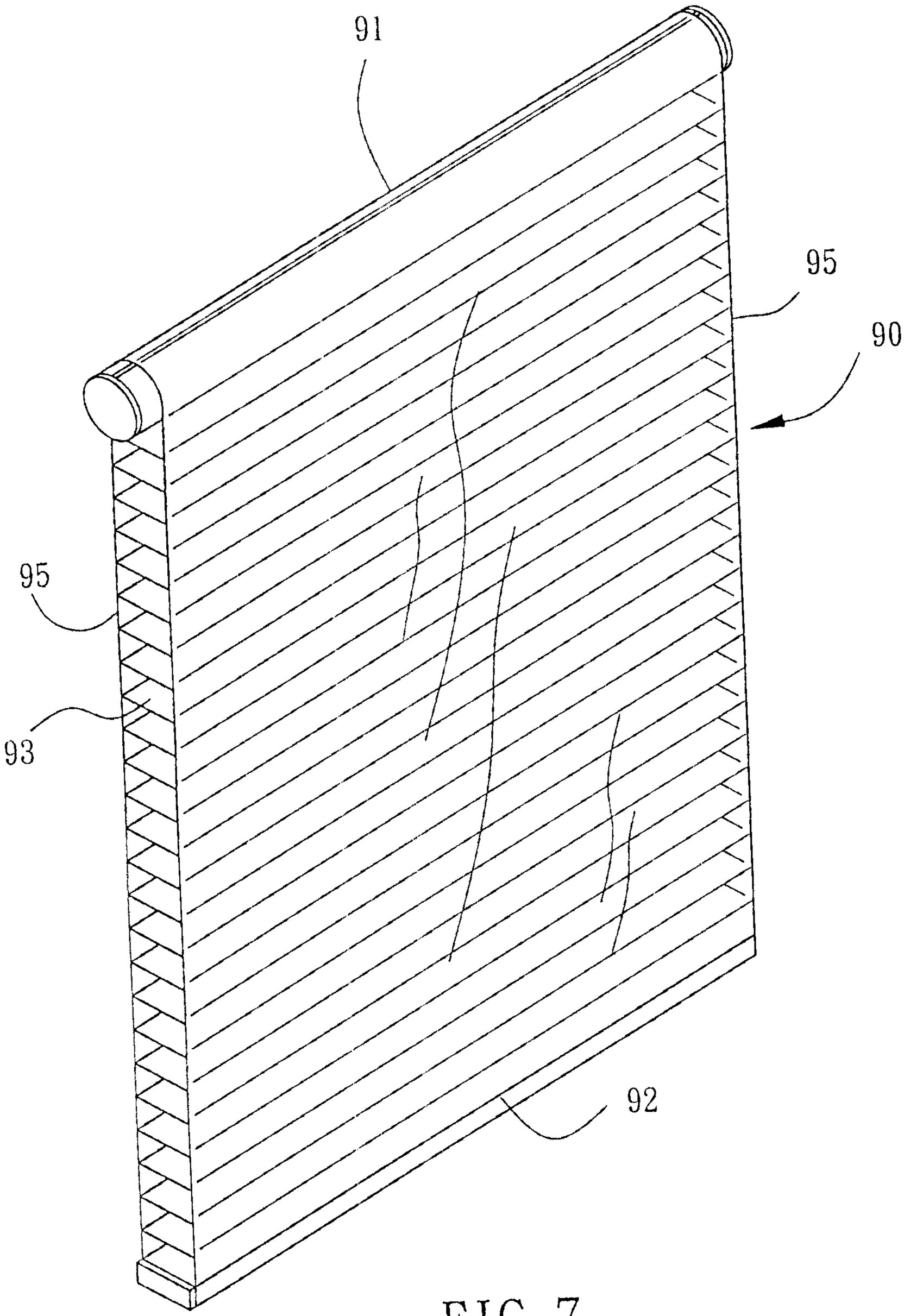


FIG. 7
PRIOR ART

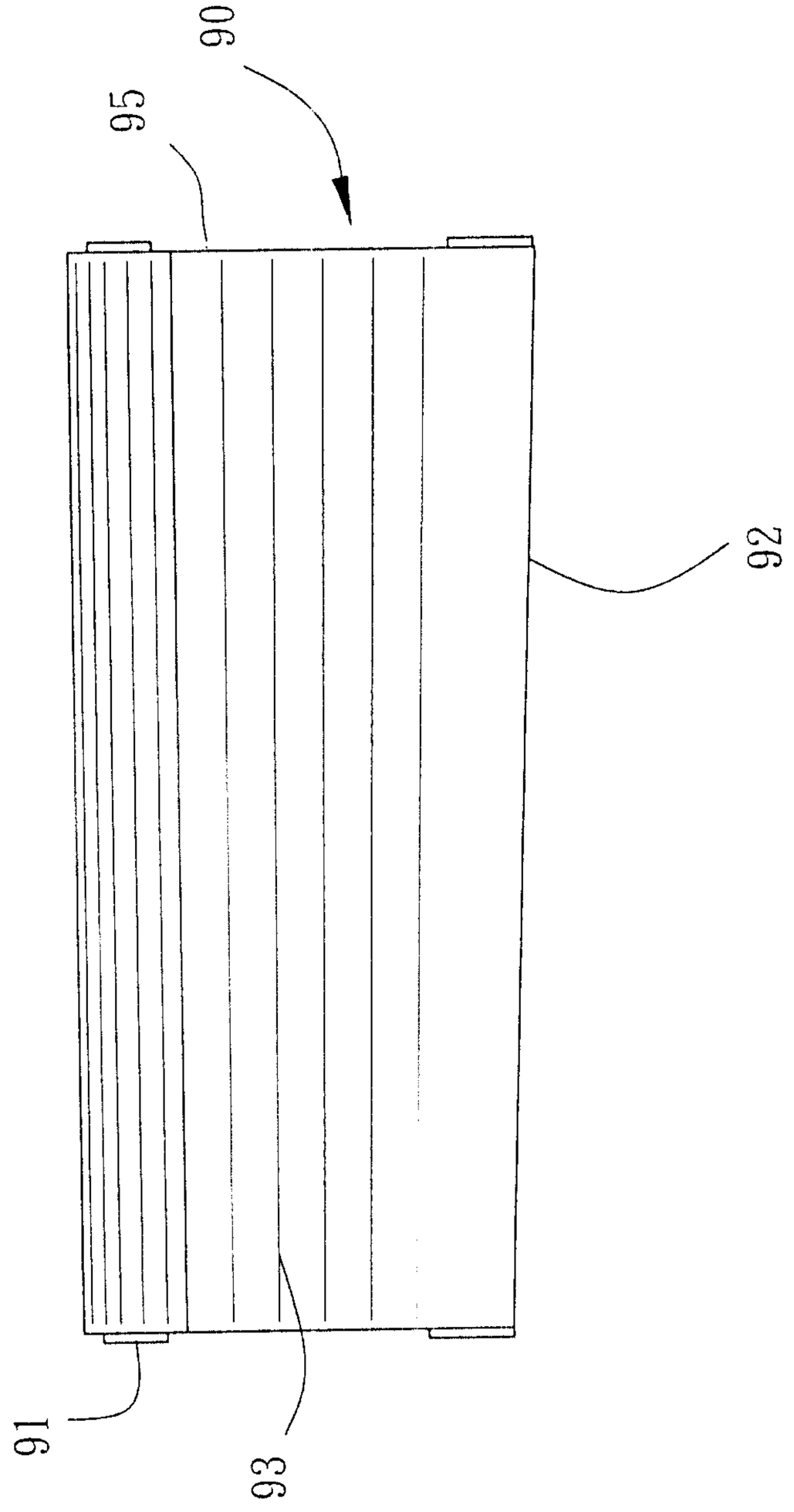
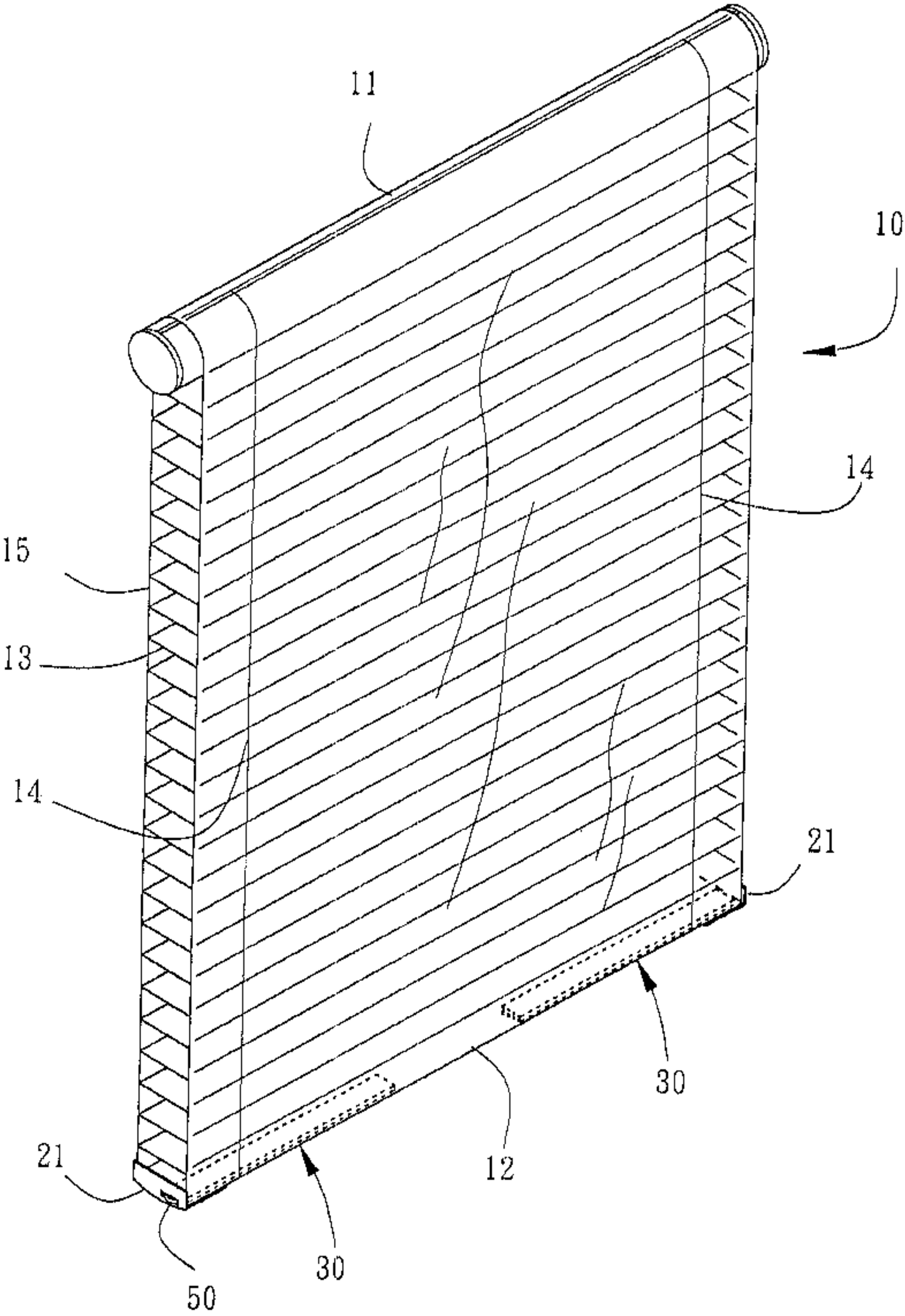


FIG. 8
PRIOR ART


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