Nov. 18, 1941. H. K. LORENTZEN 2,262,949

VENETIAN BLIND STRUCTURE

Filed June 8, 1940 2 Sheets-Sheet 1

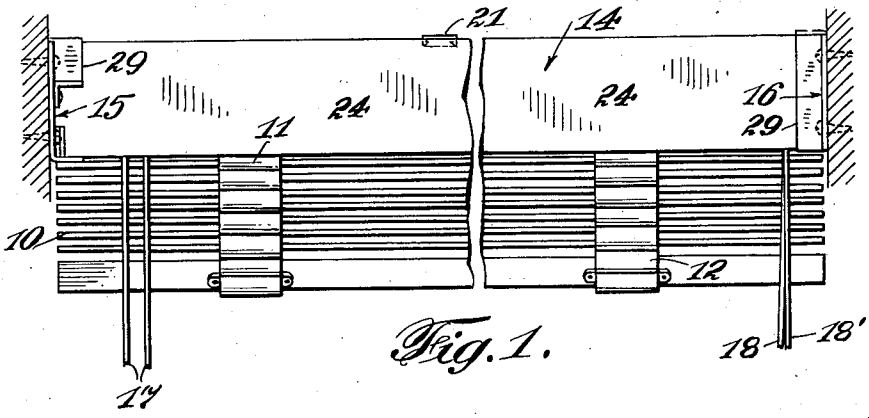


Fig. 1.

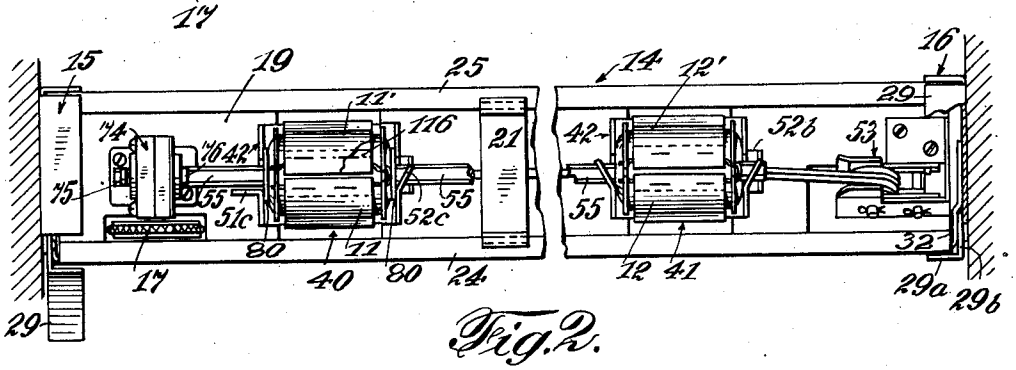


Fig. 2.

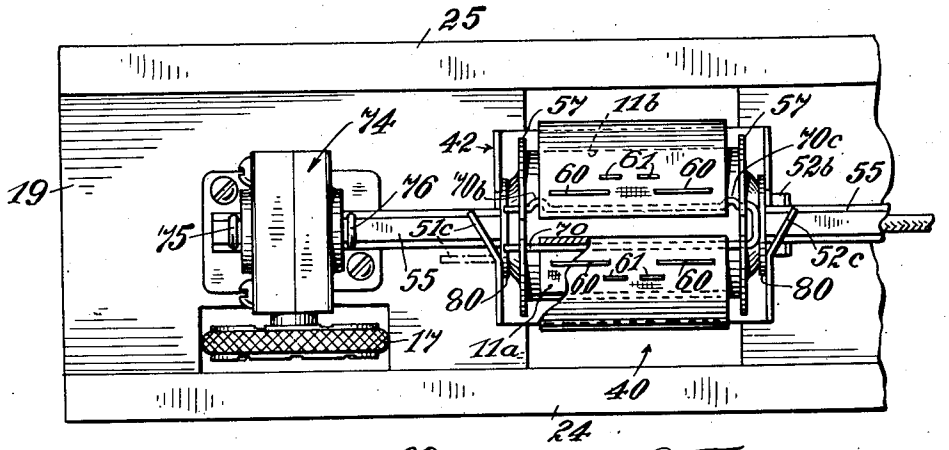


Fig. 3.

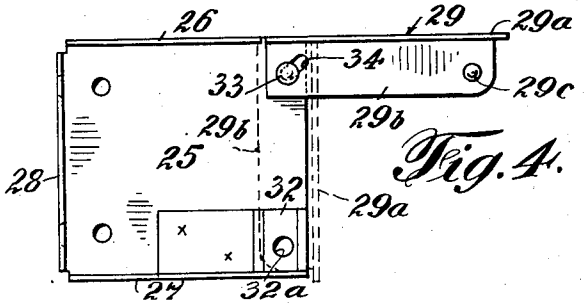


Fig. 4.

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VENETIAN BLIND STRUCTURE

Filed June 8, 1940 2 Sheets-Sheet 2

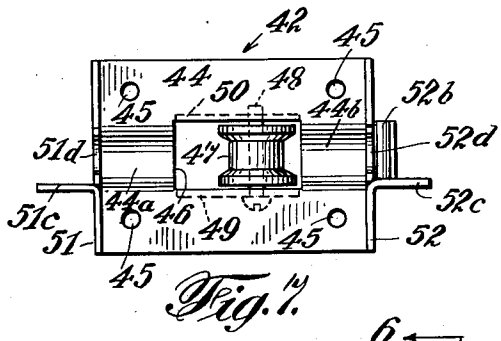


Fig. 7.

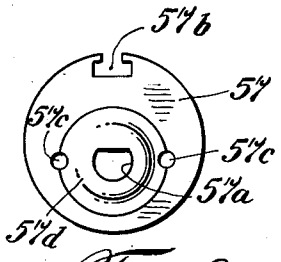


Fig. 8.

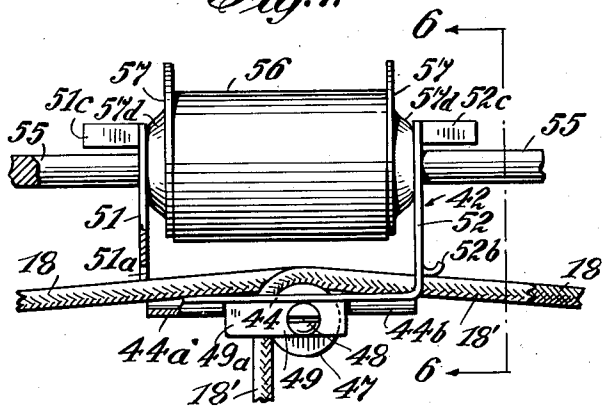


Fig. 5.

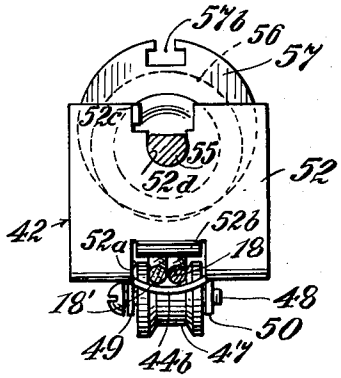


Fig. 6.

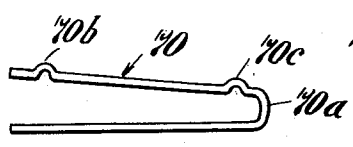


Fig. 9.

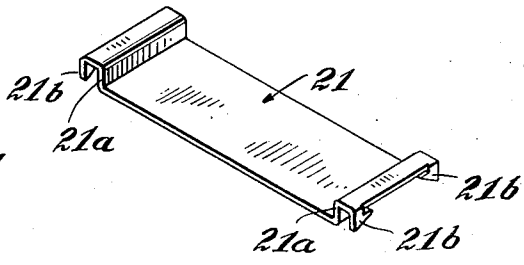


Fig. 10.

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UNITED STATES PATENT OFFICE

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VENETIAN BLIND STRUCTURE

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Application June 8, 1940, Serial No. 339,467

12 Claims. (Cl. 156—17)

This invention relates to Venetian blinds and particularly to the structure for suspending the ladder tapes and adjusting the same to incline the slats of the blind.

A general object of the invention is to simplify and reduce the cost of the structure used to suspend and adjust the ladder tapes of a Venetian blind.

Another object of the invention is to provide a simple, reliable, and inexpensive structure, adapted for quantity production, for suspending and adjusting the ladder tapes of a Venetian blind.

A further object of the invention is to provide inexpensive and reliable mechanism for suspending and adjusting ladder tapes, which mechanism can be readily and rapidly assembled with a wooden or other head bar to suspend and adjust the ladder tapes of a Venetian blind.

A still further object of the invention is to provide reliable, inexpensive, and convenient means for quickly attaching and detaching the ladder tapes to and from the mechanism by which they are suspended and adjusted.

Various other objects of the invention will be apparent from the following disclosure.

Fig. 1 is a front elevation of the Venetian blind showing diagrammatically how the same may be attached to a window frame. To improve the scale of the figure, an intermediate length of the blind is broken away.

Fig. 2 is a top plan view of the structure shown in Fig. 1, certain parts being broken away.

Fig. 3 is an enlarged top plan view of the left end of the head bar, showing one of the ladder tapes attached to its supporting and adjusting mechanism.

Fig. 4 is a side elevation of one of the mounting brackets shown in Figs. 1 and 2.

Fig. 5 is a front elevation (with a part broken away) showing a mechanical unit used in supporting and adjusting one of the ladder tapes.

Fig. 6 is a view taken on the line 6—6 of Fig. 5.

Fig. 7 is a top plan view of the frame and pulley shown in Figs. 5 and 6.

Fig. 8 is a side elevation of a dish-like member shown on the shaft shown in Fig. 5.

Fig. 9 is a plan view of a bridge member used in attaching the ladder tapes to the supporting and adjusting unit.

Fig. 10 is an isometric view of a head bar brace shown in Figs. 1 and 2.

The blind includes a plurality of superimposed slats 10 which are supported and tilted by a pair of ladder tapes 11 and 12. The ladder tapes are in turn suspended from and adjusted by mechanism enclosed within a head bar 14 that is mounted upon brackets 15 and 16. At the left end of the blind there is the usual tilt cord 17 which is pulled to tilt the slats. At the right end of the blind there are the lift cords 18 and 18' used in raising and lowering the slats of the blind.

The head bar is an open hollow member of U-shaped cross-section, having a bottom 19, front wall 24, and back wall 25, all of which may be made of wood and appropriately united together. To strengthen the construction one or more braces 21 are used to connect the upper edges of the front and back walls. Each brace may be a stamped sheet metal piece such as shown in Fig. 10, having vertical portions 21*a*, 21*a* which lie against the inner faces of walls 24 and 25, and having depending barbed prongs such as 21*b* which are driven down into the upper edge portions of such walls.

The two mounting brackets 15 and 16 are alike except that they are of opposite hand. These are of stamped sheet metal and have (see also Fig. 4) a rectangular body portion 25, top and bottom flanges 26 and 27, back flange 28, and swinging retainer 29. The body 25 is provided with screw holes so that it can be screwed against the jamb of a window frame, as shown in Figs. 1 and 2, to provide a so-called "inside" mounting for the blind. Back flange 28 is provided with screw holes so that, in the alternative, the bracket can be fastened against the front face of a window frame to provide a so-called "outside" mounting for the blind. With the swinging retainer 29 in the fully open position shown in Fig. 4, the end of the head bar 14 can be pushed in place on the bracket so that the head bar rests upon bottom flange 27 and is confined back and top by flanges 28 and 26. With the head bar in place on the bracket, the swinging retainer 29 is closed by swinging it downwardly. In Figs. 1 and 2 bracket 15 is shown with retainer 29 partly closed and bracket 16 is shown with the retainer 29 fully closed. The fully closed position of the swinging retainer 29 is also shown in dotted lines in Fig. 4.

The retainer 29 is L-shaped in cross section, having a flange 29*a* which confines the head bar against forward movement in the bracket, and having a flange 29*b* which lies against bracket body 25. In closed position of the retainer, the lower end of flange 29*b* lies behind springy keeper 32, with protuberance 29*c* of the retainer

snapped into hole 32*a* of keeper 32. Thus the retainer 29 is snap fastened in closed position. The swinging connection of retainer 29 to the bracket body 25 is by means of a headed pivot pin 33 which is attached to the bracket body and which passes through a slot 34 in retainer flange 29*b*. This pin-and-slot connection permits retainer 29 to be fully opened, as shown in Fig. 4, without any part of the retainer extending above top flange 26.

Within the head bar are two supporting and adjusting units 40 and 41 from which the ladder tapes are suspended and by which they are adjusted to change the inclination of the slats 10. In actual practice, the units 40 and 41 are preferably identical, but in the drawings there is shown a slight variation between the two units in order to illustrate an alternative construction.

Each of the units 40 and 41 has a stamped sheet metal frame which is best seen in Figs. 5, 6, and 7. This frame, designated as a whole by 42, has bottom portion 44 which is seated against the bottom 19 of the head bar. Holes such as 45 are provided in the frame bottom 44 so that screws can be inserted to hold the frame 42 in place. Near its center frame bottom 44 is provided with a rectangular hole 46 in which a pulley 47 is located. The pulley is mounted on a pivot 48 passing through depending ears 49 and 50 that are formed by metal pressed out in making hole 46. Integral with frame bottom 44 are upstanding frame ends 51 and 52 which are provided with holes 51*a* and 52*a* for the passage of lift cords. In the case of unit 40 there is a single lift cord which comes upwardly to pulley 47, makes a right angle bend over the pulley, and passes onwardly through hole 52*a*. In the case of unit 41 there is a similarly disposed lift cord 18' (see Figs. 5 and 6) plus the lift cord 18 coming from unit 40 through hole 51*a* of unit 41 and out through hole 52*a* in unit 41. From unit 41 the two lift cords 18 and 18' pass through cord lock 53 (Fig. 2) and then downwardly in front of the blind (Fig. 1). To keep the lift cords as low as possible in units 40 and 41 while providing sufficient clearance for their passage, the bottom 44 of the frame 42 is provided with depressed groove portions 44*a* and 44*b* in alignment with holes 51*a* and 52*a*. Formed from the metal stamped from hole 52*a* is a curved guide 52*b* which serves to hold the cords down. Ears 49 and 50 which support pulley 47 are provided with extending portions, such as 49*a* shown in Fig. 5, which serve as lateral guides for the vertically approaching branch of the cord.

Struck out from the tops of ends 51 and 52 are wings 51*c* and 52*c* which leave notches in the upper edges of the ends 51 and 52; and beneath these notches there are formed semi-circular bearings 51*d* and 52*d* for the reception of shaft 55.

For each of units 40 and 41 there is on shaft 55 an axially perforated wooden cylinder 56 at the ends of which are identical dish-like members 57. These dish-like members are stamped of sheet metal and have a hole 57*a* shaped to correspond with the flat topped shaft 55. In assembly, a cylinder 56 and its companion dish-like members 57, 57 are telescoped onto shaft 55 and then the shaft is laid into bearing portions 51*d* and 52*d*. Ears 51*c* and 52*c* are then bent over the shaft, holding the same in assembled relation with respect to the frame 42. For the purpose of illustration, Figs. 5 and 7 show the ears 51*c* and 52*c* before they have been bent over the shaft, while Fig. 3 shows these ears after they have been bent over the shaft. In Fig. 2 the ears 51*c* and 52*c* of unit 41 are shown bent over the shaft, while unit 40 in the same figure is shown with ear 15*c* before it has been bent over the shaft and with ear 52*c* after it has been bent over the shaft.

The ladder tape 11 has branches 11 and 11' and the ladder tape 12 has branches 12 and 12'. All of these branches pass upwardly through openings in the bottom 19 of the head bar. At the end of each such ladder tape branch it is formed into a loop by the branch being folded backwardly on itself and secured in folded position, as at 11*a* and 11*b* of Fig. 3. These looped portions may be secured in any suitable way as by sewing, adhesive, etc. In Fig. 3 the looped portions are shown as secured by stapling such as 60 and 61.

Dish-like members 57 are formed with dovetail-like openings 57*b*, best seen in Figs. 6 and 8. In each of the supporting and adjusting units 40 and 41 the two dish-like members 57 are adapted to be bridged by a springy hairpin-shaped bridge member 70, as best seen in Fig. 9. The head 70*a* of the bridge member is telescoped into the opening 57*b* in one dish-like member 57 and the free ends of the member 70 are then pressed together and inserted laterally into the opening 57*b* of the other dish-like member 57. After insertion the free ends of hairpin-like member 70 spring apart, thus locking this bridge member in place, as shown in Fig. 3. Bends 70*b* and 70*c* engage the opposed inner faces of the two members 57 of each unit, thereby preventing longitudinal shifting of the bridge member 70.

When the ladder tapes are to be connected to their supporting adjusting units, the two legs of the bridge member 70 are first passed through the two loops at the ends of the two branches of the ladder tape and then the bridge member is put in place to the position shown in Fig. 3. Thus, the bridge member secures the ends of the ladder tape to dish-like members 57, 57 and the two branches of the ladder tape depend over the surface of cylinder 11 and hang down through slots in the bottom 19 of the head bar. It will be apparent that this bridge member 70 provides a ready and convenient means for attaching the ladder tapes to the dish-like members 57, 57.

The common shaft 55 passes through the two supporting and adjusting units 40 and 41, the movable parts of which are confined against axial movement on the shaft by the frames of the units 40 and 41. The left-hand end of shaft 50 passes through the hub of a conventional tilting device 74 actuated by cord 17. Thus when cord 17 is pulled the tilting device 74 acts to rotate shaft 55 and thereby rotate the dish-like members 57 of each of the supporting and adjusting units 40 and 41. To prevent longitudinal shifting of the shaft 55, it may be pierced by cotter pins located on either side of the tilter 74; and the heads of these cotter pins are seen at 75 and 76 in Figs. 3 and 2.

When the shaft 55 is oscillated, the dish-like members 57 are likewise oscillated due to the shape of holes 57*a* which fit the non-circular shaft. This movement, in conjunction with cylinder 56 which acts as a rocker, raises one branch of the ladder tape and lowers the other. This tilts the slats of the blind. Since the ends of the ladder tapes are positively moved by members 57, 57 and bridge 70, cylinder 56 may be loose on the shaft. However, members 57 are pro-

vided with holes 57c, 57c; and nails or screws may be inserted through these to attach the cylinder 56 to its end members 57, 57.

During the oscillating movement of the units 40 and 41 the ends of bridge 70 should adequately clear frame ends 51 and 52. This may be assured by adequate dishing of the members 57 at 57d in conjunction with appropriate dimensioning of bridge 70. This is shown in Fig. 5 and in unit 41 of Fig. 2. However, additional clearance may be provided by washers 80, 80 as shown in unit 40, Figs. 3 and 2. Otherwise the showing of units 40 and 41 are identical.

In compliance with the patent statutes, I have disclosed the best form in which I have contemplated applying my invention, but it will be realized that the disclosure is merely illustrative of the many specific forms in which the invention may be embodied.

What I claim is:

1. In a Venetian blind, means for supporting and adjusting the ladder tapes; said means comprising: a hollow head bar; a shaft journalled in the head bar; cylinders on the shaft over which the end portions of the ladder tapes pass; members rotatable by the shaft and located at the ends of the cylinders, said members extending radially beyond the surfaces of the cylinders; and means attaching the ladder tapes to said members.

2. In a Venetian blind, means for supporting and adjusting the ladder tapes; said means comprising: a hollow head bar; a shaft journalled in the head bar; cylinders on the shaft over which the end portions of the ladder tapes pass, the ends of the ladder tapes being formed into loops; members rotatable by the shaft and located at the ends of the cylinders, said members extending radially beyond the surfaces of the cylinders; and bridge means extending between the members at the opposite ends of each cylinder, said bridge means passing through said ladder tape loops and thereby attaching the ladder tapes to said members.

3. In a Venetian blind, supporting and adjusting means for the ladder tapes, comprising: a frame; a shaft extending through the frame; a cylinder on the shaft; members rotatable by the shaft and located adjacent to the ends of the cylinder, the frame axially confining said cylinder and said members; and means to attach the ladder tapes to said members.

4. In a Venetian blind, supporting and adjusting means for the ladder tapes, comprising: a frame having spaced ends; a shaft journalled in said ends; a cylinder on the shaft; sheet metal dish-like members on the shaft at each end of the cylinder, both the cylinder and the dish-like members being located between said frame ends and the dish-like members being rotatable by the shaft; and bridge means extending between the dish-like members and adapted to attach a ladder tape thereto.

5. In a Venetian blind, means for supporting and adjusting a ladder tape, comprising: a sheet metal frame having ends formed with open bearings therein, a shaft journalled in said bearings, rocking means on the shaft between said frame ends to support and adjust the ladder tape, and an ear operatively integral with at least one of said ends and adapted to be bent into overlapping relation to said shaft to thereby hold it in said bearings.

6. In a Venetian blind, means for supporting and adjusting a ladder tape, comprising: a sheet metal frame having ends formed with notches at the top and open bearings beneath the notches, a shaft journalled in said bearings, rocking means on the shaft between said frame ends to support and adjust the ladder tape, and struck out ears adjacent to said notches and adapted to be bent into overlapping relation to said shaft to thereby hold it in said bearings.

7. In a Venetian blind structure, tape attaching means comprising: a springy hairpin shaped member, and means adapted to receive and retain the hairpin shaped member, said member having offsets which hold it against longitudinal movement with respect to said receiving means.

8. In a Venetian blind, means for supporting and adjusting the ladder tapes; said means comprising: a hollow head bar; a shaft journalled in the head bar; cylinders on the shaft over which the end portions of the ladder tapes pass; members rotatable by the shaft and located at the ends of the cylinders; and means attaching the ladder tapes to said members.

9. In a Venetian blind, a sheet metal shaft support formed with an open bearing for a shaft, and an ear operatively integral with the support and adapted to be bent into overlapping relation to a shaft in the bearing to thereby hold the shaft in place.

10. In a Venetian blind, means for supporting and adjusting a pair of ladder tapes, comprising: a pair of rocking means to which the respective ladder tapes are attached, a pair of metal frames associated with the respective rocking means, and a common shaft to which both rocking means are attached; each frame having an end formed with an open bearing in which the shaft is journalled, and each frame having an ear operatively integral with said end and adapted to be bent into overlapping relation to said shaft to thereby hold it in said bearing.

11. In a Venetian blind; a ladder tape having loops formed on the upper ends of its two vertical branches; rocking means from which the ladder tape is suspended; and a hairpin shaped member attaching the ladder tape to the rocking means, the hairpin shaped member having two legs one of which extends through each of said loops.

12. In a Venetian blind; a ladder tape having loops formed on the upper ends of its two vertical branches; rocking means from which the ladder tape is suspended; and a springy hairpin shaped member attaching the ladder tape to the rocking means, the hairpin shaped member having two legs one of which extends through each of said loops, and the two legs springing apart into holding engagement with said rocking means.

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