

Oct. 23, 1951

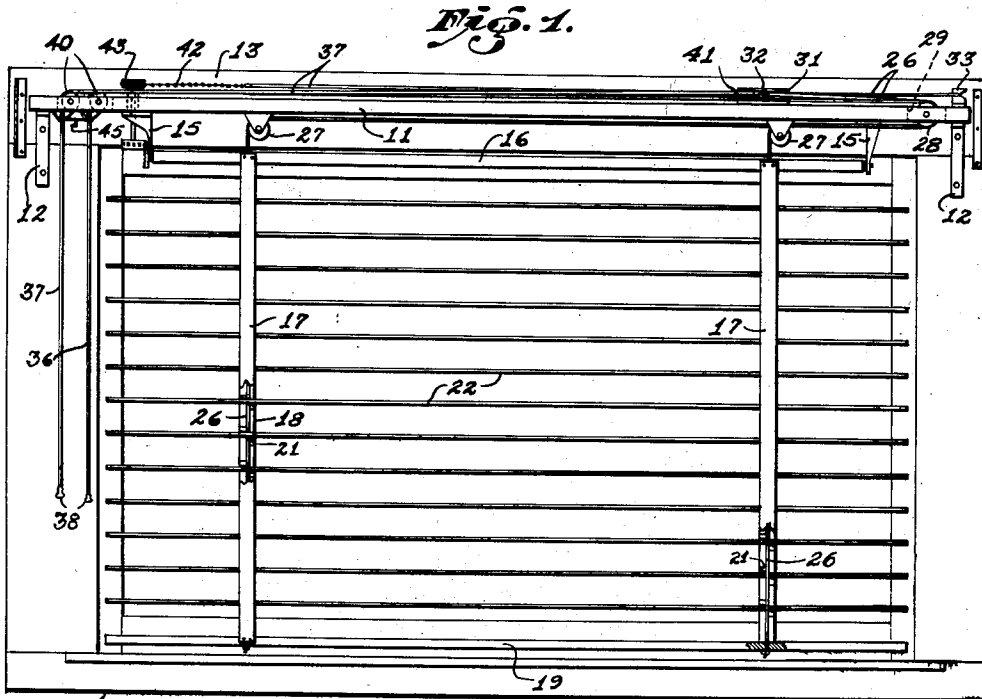
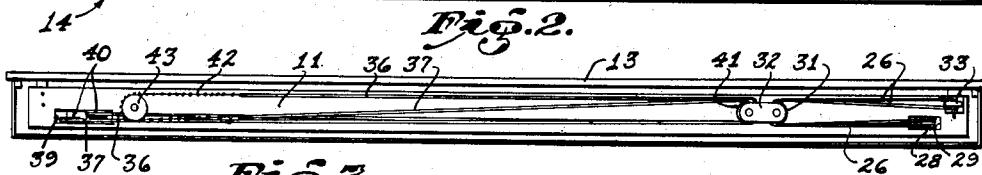
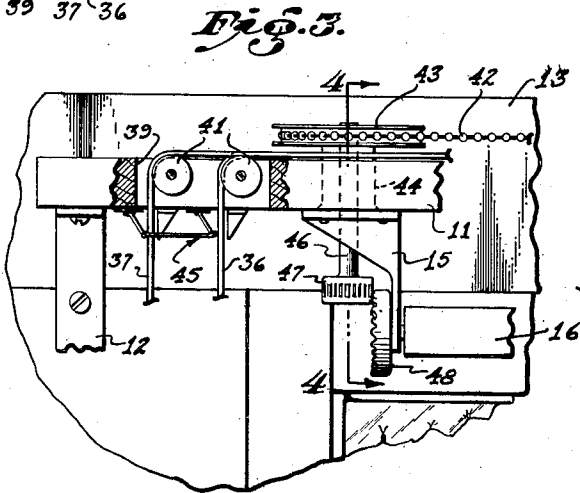
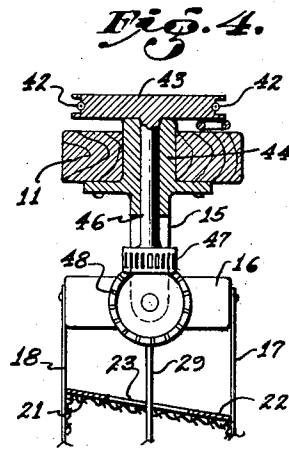
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2,572,291

VENETIAN BLIND

Filed March 17, 1947

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

Fig. 5.

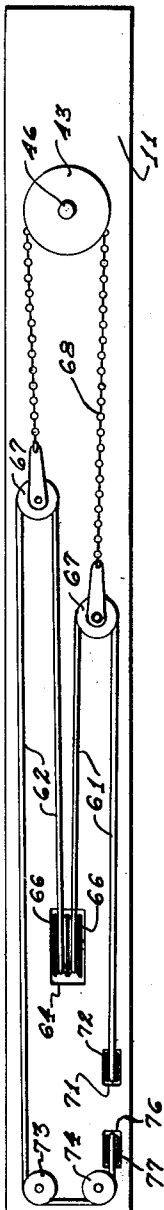
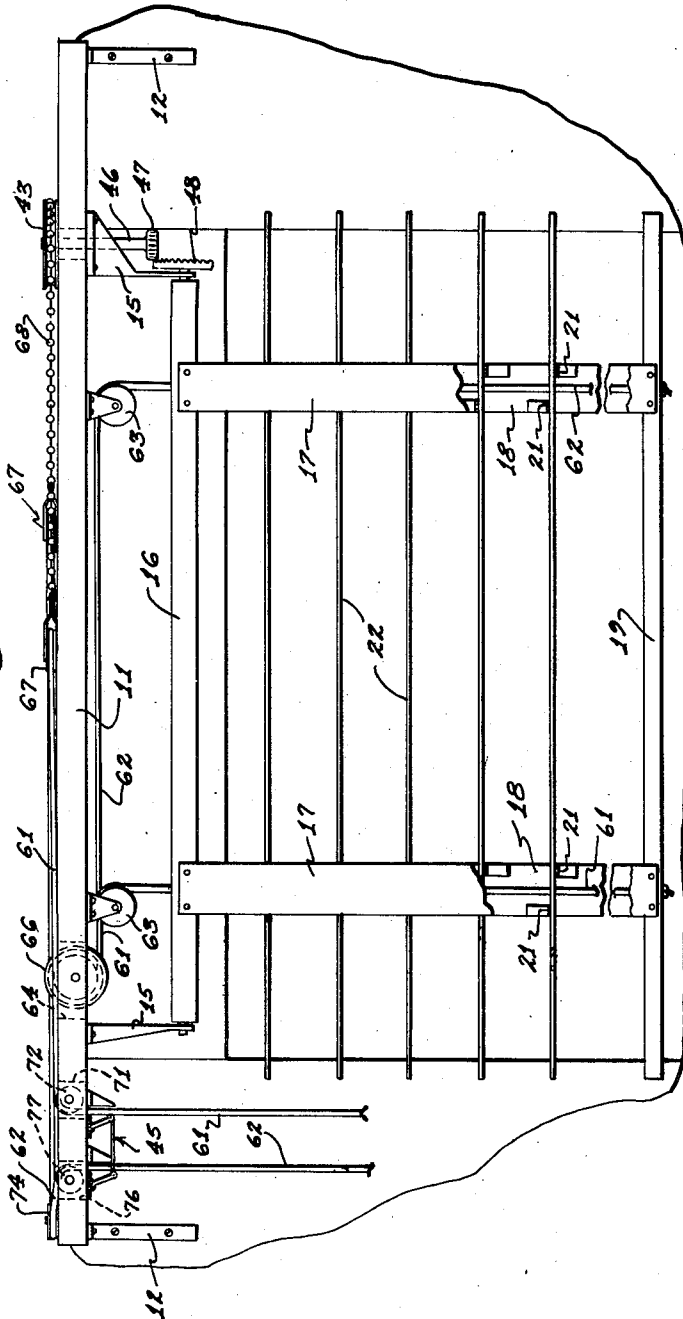


Fig. 6.



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VENETIAN BLIND

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4 Claims. (Cl. 160—168)

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The present invention relates to Venetian blinds in general and particularly to an improved Venetian blind of simple construction and improved operating characteristics. More specifically the invention comprises a Venetian blind in which a single pair of control cords functions to raise and lower the slats and also to change their angularity.

The control of the passage of light and air thru a window and into a room is an important function and the modern Venetian blind has won acceptance as a means for such control. In its operative or lowered position the blind properly positioned in a window can permit light and air to pass therethru substantially without hindrance or, by a simple operation, can be altered to prevent the passage of those elements. Being integrated for relative movement in its parts it is adapted to be raised so that it is entirely inoperative.

The usual and well known Venetian blind is raised, lowered and angularly adjusted by means of two pairs of control cords which are usually positioned at opposite sides of the blind, although they can, if preferred, be positioned upon the same side. In the usual construction the occupant of the room, if he desires to raise the blind, pulls only upon one pair of cords whereupon the blind is progressively collapsed by the force which he exerts and is moved to the upper end of the window. If the occupant intends merely to vary the rate of entrance of light or air into the room he pulls upon one or the other member of the second pair of cords. A pull upon one cord will cause the slats to move toward a substantially vertical, parallel, single plane relationship in which the passage of light and air is effectively prevented, while a pull upon the other cord will move them toward spaced parallelism in which each slat lies flat in a horizontal plane, only its width, which is relatively slight, preventing the passage of light and air. These control cords, however, greatly resemble each other and frequently the room occupant when desiring to raise the blind finds instead that he is pulling upon that pair of cords which is adapted to change the angularity of the slats. Similarly when he wishes to change the slat angularity he finds himself pulling upon one or the other of the cords which are adapted to function to raise the entire blind. Of course the shift from one pair of cords to the other can be made once the mistake is discovered but the necessity of making two attempts to accomplish a simple operation is unsatisfactory to most persons.

With an appreciation of the functional defects of the construction of the prior art Venetian blinds constructed in accordance with the present invention are so designed and related as to obviate the shortcomings of the earlier constructions and it is, accordingly, an object of the present invention to provide a new and improved Venetian blind.

It is another object of the invention to provide a new and improved Venetian blind in which the blind is both raised and lowered and the angularity of its slats altered by means of a single pair of control cords.

A still further object of the invention is to provide a simplified and improved Venetian blind construction in which a single pair of control cords positioned at one side of the blind is functionally capable of raising and lowering the blind and also of changing the slat angularity.

These and other more specific objects will appear upon reading the following specification and claims and upon considering in connection therewith attached drawing to which they relate.

In the drawing in which a preferred embodiment of the invention is illustrated:

Figure 1 is a view of a window provided with a Venetian blind constructed in accordance with the present invention, the appearance case being broken away better to disclose the working parts;

Figure 2 is a top view of the construction of Figure 1;

Figure 3 is an enlargement of the upper left portion of Figure 2;

Figure 4 is a section upon the line 4—4 of Figure 3;

Figure 5 is a top view of a second preferred embodiment of the invention; and

Figure 6 is a view similar to Figure 1 showing the second preferred embodiment of the invention.

Referring again to the drawing, the Venetian blind constructed in accordance with the present invention is seen to comprise a head or supporting board 11 suitably fixed adjacent its ends by a pair of brackets 12 to the upper member 13 of a window frame, indicated generally by the reference character 14. Supporting board 11 is, as its name indicates, the base or support upon which the Venetian blind proper is supported and relative to which it is adjustable.

The Venetian blind proper, and by this is meant the cooperative elements which function directly to exclude light or air, includes a tiltable cross bar 16 supported at its opposite ends by brackets 15 extended downwardly from the underside of

head 11. Spaced pairs of front and rear tapes 17 and 18, respectively, extend downwardly from cross bar 16, to which they are fixedly secured, and carry an end slat or base element 19 at their lower ends. Webs 21 extend at equally spaced intervals between the front and rear tapes 17 and 18 and function as the supporting means for slats 22 which have a length slightly less than the width of the window as defined by the interior dimensions of window frame 14. Each slat is transversely slotted, as indicated at 23 in Figure 4, immediately adjacent the webs 21 for a purpose to be explained.

A continuous cord 26 is secured at its opposite ends to the base element 19 and extends upwardly thru the vertically aligned slots 23 in the slats 22 to pass over pulleys 27 supported from the underside of head 11. The two extensions of the cord pass to the right along the underside of head 11 and then upwardly and over a pair of pulleys 28 rotatably mounted in a vertical slot 29 at one end of the head. Upon the upper side of the head the extensions of cord 26 reach toward the center of the window, pass around a pair of pulleys 31 carried by a movable bracket or frame 32, and then double back to be secured by a fixed retaining hook element 33. As the cord 26 is of fixed length it is clear that movement of pulley block 32 to the left, as viewed in Figures 1 and 2, will result in the upward movement of its ends and in the raising of the base element 19. As the latter element moves upwardly it collects and effects the subsequent collapse, slat by slat, of the entire blind, the movement continuing sufficiently.

To raise the blind by effecting the transverse movement of the pulley-carrying block 32 a pair of cords 36 and 37 are provided which hang downwardly at one end of the blind and preferably are provided with suitable end members or elements 38. Cords 36 and 37 extend upwardly thru a vertical slot 39 in support element 11 passing over suitable pulleys 40 rotatably mounted therein in slightly spaced relationship, both laterally and longitudinally, as is illustrated in Figure 2. From the pulleys 40 cords 36 and 37 extend to the right, as viewed in Figures 1 and 2, and pass around a pair of pulleys 41 also carried by the block 32 and so movable with the aforescribed pair of pulleys 31. After passing around pulleys 41, the cords 36 and 37 extend again toward the slot 39, their ends being joined by a suitable chain 42 encircling a pulley 43, the peripheral surface of which is roughened to prevent slippage.

Pulley 43 is rotatably supported upon the upper end of a bushing 44 preferably formed integrally with a bracket 15 supporting one end of the cross bar 16. A shaft 46 fixed to the pulley extends downwardly thru bushing 44 and carries at its lower end a peripherally slotted drum or cylinder 47 which functions as a gear or pinion in mesh with an adjacent gear 48 fixed to the supporting shaft of the cross bar 16 and upon the opposite side of the bracket 15 therefrom. Clearly rotation of shaft 46 will affect rotation of gears 47 and 48 and the angular tilting of the cross bar 16. As is clearly shown in the drawing the diameters of the pulley 43 and gears 47 and 48 are so proportioned as to provide a mechanical advantage in the sense that the force provided at the pulley surface produces a greater force at the cross bar. Because front and rear tapes 17 and 18 are fixedly connected respectively to the front and rear sides of cross bar 16 its tilting will affect a shift in the relative vertical positions of ends of the webs 21 and bring about a tilting or an-

gular variation in position of the slats 22 supported thereby. It is also clear that a force exerted simultaneously upon cords 36 and 37 resulting in an equal displacement of each cord will not result in rotation of gear 43 but instead in the movement of pulley block 32 toward the left to effect a raising of the blind. Similarly, a conjoint upward movement of the cords 36 and 37 produces a movement to the right of block 32 and the lowering of the blind. A downward force exerted only upon one or the other of cords 36 and 37, however, results in the turning of pulley 43, the rotation of shaft 46 and the angular adjustment of the blind as described.

As in the usual blind construction means comprising pivoted locking links, indicated generally at 45, are provided to retain the cords 36 and 37 in a set position from which they can be released by pulling the lower end of the cords in the proper direction, in a manner well known in the art.

The operation of the Venetian blind constructed in accordance with the present invention is believed to be clear from the foregoing. It being desired to raise the blind the operator grasps both the draw cords 36 and 37 and pulls downwardly thereon. This movement effects a shortening of that section of the cords 36 and 37 between the block 32 and the pulley 43 and the former is drawn to the left, as illustrated in Figures 1 and 2, thereby effecting the upward movement of the lower ends of cord 26 and the raising of the blind. To lower the blind the reverse operation takes place, that is, cords 36 and 37, after first being released from the retaining hold of the locking means 45, are permitted to rise to the same extent whereupon the blind is lowered.

To change the angular adjustments of the slats 22, and depending upon whether it is desired to open or to close the blind, the cord 36 or 37 is pulled downwardly. If cord 36 is pulled downwardly cord 37 travels upwardly an equal amount, the weight of the supporting structure being sufficient to prevent travel of the block 32. The downward movement of cord 36 produces movement in the chain 42 whereupon pulley 43 is rotated and this rotation is transmitted thru shaft 46 to gear 47 meshing with gear 48 whereupon the cross bar 16 is angularly adjusted effecting the adjustment of all of the slats as previously mentioned. The same force exerted upon the cord 37 effects an opposite movement of the slats.

Referring now particularly to Figures 5 and 6, a second preferred embodiment of the invention is illustrated, one functionally similar to the first described embodiment but of somewhat simpler construction. The head or supporting board 11 and its supporting brackets 12 are the same as in the first embodiment and the cross bar 16 is again tiltably supported at its opposite ends by brackets 15. Its angular adjustment is effected by the co-operation of the gear 48 secured to its end with the gear 47 positioned at the lower end of the shaft 46 carried by the adjacent brackets 15. As in the first embodiment the upper end of shaft 46 carries a pulley 43 above the head 11 and spaced pairs of front and rear tapes 17 and 18 tiltably support slats 22 as before. The important distinctions lie in the cord operating means which will now be described.

A pair of cords, indicated at 61 and 62, are secured at their inner ends to the lowermost slat or base element 19 and extend upwardly through the slats 22, through the cross bar 16 and over pulleys 63 carried below the supporting board 11 in the manner of pulleys 27 in the first embodi-

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ment. Cords 61 and 62, after passing around pulleys 63, extend longitudinally below the head element 11 and upwardly through a slot 64 therein, being guided in the separate and deep V grooves of a pulley 66. The grooves of the pulley grip the cords and insure synchronous equal adjustment. Upon the upper side of head 11 the cords extend longitudinally toward the fixedly positioned pulley 43 to encircle pulleys 67 attached to opposite ends of a chain 68 encircling the aforescribed pulley 43. From its pulley 67 each of the cords 61 and 62 reverses its direction and extends along the opposite sides of the head element past the pulleys 66. Cord 61 extends downwardly through head 11 at a slot 71, encircling a pulley 72, while the cord 62, being positioned upon the opposite side of the head, is guided by spaced pulleys 73 and 74 into position to extend downwardly through a second and adjacent slot 76, corresponding to the aforementioned slot 71, in which it rides upon a pulley 77. Immediately below the head element 11 a locking fixture 45 is again provided, as in the first embodiment, by which the cords are releasably secured against unintended displacement as in the usual Venetian blind construction.

The operation of this second preferred embodiment of the invention is believed to be clear and it is particularly to be noted that but a single pair of cords is required. To raise the blind the operator simply pulls downwardly upon both cords 61 and 62. Therefore, the cords being pulled equally, but one result can follow and that comprises of the raising of the base element 19 which, as it moves upwardly, successively collects the spaced slats 22 thereabove. It being desired to change the angularity of the slats, however, the operator simply pulls downwardly upon one or the other of cords 61 and 62. A downward force upon cord 61, for example, exerts a force which tends both to raise the base element 19, at its point of connection therewith, and also to pull the pulley 67, around which it passes, toward the pulley 66. Opposing this shifting movement of pulley 67 is only the force exerted upon the second pulley 67 at the opposite end of the connecting chain 68 and any frictional resistance to the movement present in the pulley 43 and the movable parts gear-connected thereto. The weight of the blind opposing the upward movement of the base 19 exceeds the force opposing the rotation of pulley 43 and, as a result, the force in cord 61 effects the movement of pulley 67 which it encircles toward the left, as viewed in Figure 5, whereupon pulley 43 rotates. The movement of the chain 68 also, and incidentally, resulting in the shifting of the second pulley 67, that encircled by cord 62, to the right, as viewed in Figure 5, which results in the upward movement of the operator's end of cord 62. The rotation of the pulley 43, of course, results in the rotation of shaft 46 and of gears 47 and 48, the latter effecting the tilting of the cross bar 16 to which it is attached. As in the first embodiment the tilting of cross bar 16 affects the relative displacement of the tapes 17 and 18, whereupon the angularity of each of the slats 22 is changed. Obviously a force exerted upon cord 62, rather than upon cord 61 as described, will produce rotation of the pulley 43 in the opposite direction and a shift in the angularity of slats 22 opposite to that produced by the pull upon cord 61.

While the particular constructions herein shown and described in detail are fully capable of attaining the objects and providing the ad-

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vantages hereinbefore stated, it is to be understood that they are merely illustrative of the presently preferred embodiment of the invention and that no limitations are intended to the details of construction or design herein shown and as defined in the appended claims.

I claim:

1. A Venetian blind comprising a supporting head bar, a cross bar mounted below said head bar for tilting movement about a horizontal axis, a plurality of parallel slats positioned below said cross bar, tapes depending from opposite sides of said cross bar supporting said slats in spaced relationship for conjoint tilting movement with said cross bar, a pair of cords attached to the lowermost slat at spaced points extended upwardly through said slats, said cross bar, and said head bar, each of said pair of cords encircling a traveling pulley and extended downwardly through said head bar, a fixed axis pulley on said head bar, a chain encircling said fixed axis pulley and connected to said traveling pulleys adapted to rotate said fixed axis pulley upon being itself displaced by the relative movement of said traveling pulleys, a power transmission between said fixed axis pulley and said cross bar to turn said cross bar about said horizontal axis to effect a tilting movement of said bar and of said slats connected thereto, characterized in that the resistance to turning of said pulley with a fixed axis including its connected load is sufficiently reduced that a pull upon one only of said pair of cords displaces the connected traveling pulley and connected chain to effect the rotation of said pulley.

2. In a Venetian blind of the type including a fixed horizontal head bar, a cross bar tiltably mounted thereunder, spaced pairs of tapes connected at their upper ends to opposite sides of said cross bar supporting parallel slats for conjoint tilting movement with said cross bar therebelow, means to raise and lower said slats and means to change their angularity, said means to raise and lower said slats comprising: a pair of cords having their free ends hanging at the side of said slats extended upwardly through said head bar and horizontally therealong to encircle individually displaceable pulleys, each cord reversing its direction of travel upon encircling said displaceable pulley, then extending downwardly through said head bar, cross bar and slats to connect in each instance to the lowermost slat; said means to change the angularity of said slats comprising: a fixed axis rotatable element carried by said head bar, a gear and shaft connection between said rotatable element and said cross bar to transmit the movement of said element to said bar to tilt it, and a force-transmitting element connecting said rotatable element to said displaceable pulleys to rotate said element in one direction upon the displacement of one of said displaceable pulleys and in the opposite direction upon the displacement of the other of said pulleys.

3. In a Venetian blind of the type including a fixed horizontal head bar, a cross bar tiltably mounted thereunder, spaced pairs of tapes connected at their upper ends to opposite sides of said cross bar supporting parallel slats for conjoint tilting movement with said cross bar therebelow, means to raise and lower said slats and means to change their angularity, said means to raise and lower said slats comprising: a pair of cords having their free ends hanging at the side of said slats extended upwardly through said head bar and horizontally therealong to encircle indi-

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vidually displaceable pulleys, each cord reversing its direction of travel upon encircling said displaceable pulley, then extending downwardly through said head bar, cross bar and slats to connect in each instance to the lowermost slat; said means to change the angularity of said slats comprising: a fixed axis rotatable pulley carried by said head bar for rotation about a fixed axis, a shaft fixed to said last-mentioned pulley extended downwardly through said head bar, co-
 10 operating gears upon the end of said cross bar and said shaft to transmit the rotation of said shaft to said cross bar, and a chain encircling said last-mentioned pulley and connected at its
 15 opposite ends to said displaceable pulleys and adapted to rotate said pulley in opposite directions upon the movement of said displaceable pulleys in opposite directions.

4. In a Venetian blind of the type including a fixed horizontal head bar, a cross bar tiltably
 20 mounted thereunder, spaced pairs of tapes connected at their upper ends to opposite sides of said cross bar supporting parallel slats for conjoint tilting movement with said cross bar there-
 25 below, means to raise and lower said slats and means to change their angularity, comprising: a rotatable shaft extended vertically downwardly through said head bar adjacent the end of said
 30 cross bar, gears upon said shaft and upon said cross bar to transmit the rotation of the former to the latter, a pulley carried by said shaft above said head bar, the diameters of said pulley and

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gears being proportioned to provide a mechanical advantage upon the application of a rotating force to said pulley, a chain encircling said pulley, a pair of pulleys carried by the ends of said chain, a pair of cords extending upwardly through said head bar, encircling said pulleys and reversing their direction of travel and then extending downwardly through said head bar, cross bar and slats to connect to the lowermost slat, charac-
 10 terized in that upon the conjoint downward movement of the free ends of said cords the pulleys at the ends of said chain remain fixed and said cords travel therearound to effect the displacement of the lowermost slat element, and
 15 in that upon the downward movement of the free end of only one of said cords the pulley encircled thereby is displaced to effect the movement of said chain and the rotation of said pulley with a fixed axis to effect the tilting of said cross bar.

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