

Aug. 21, 1956

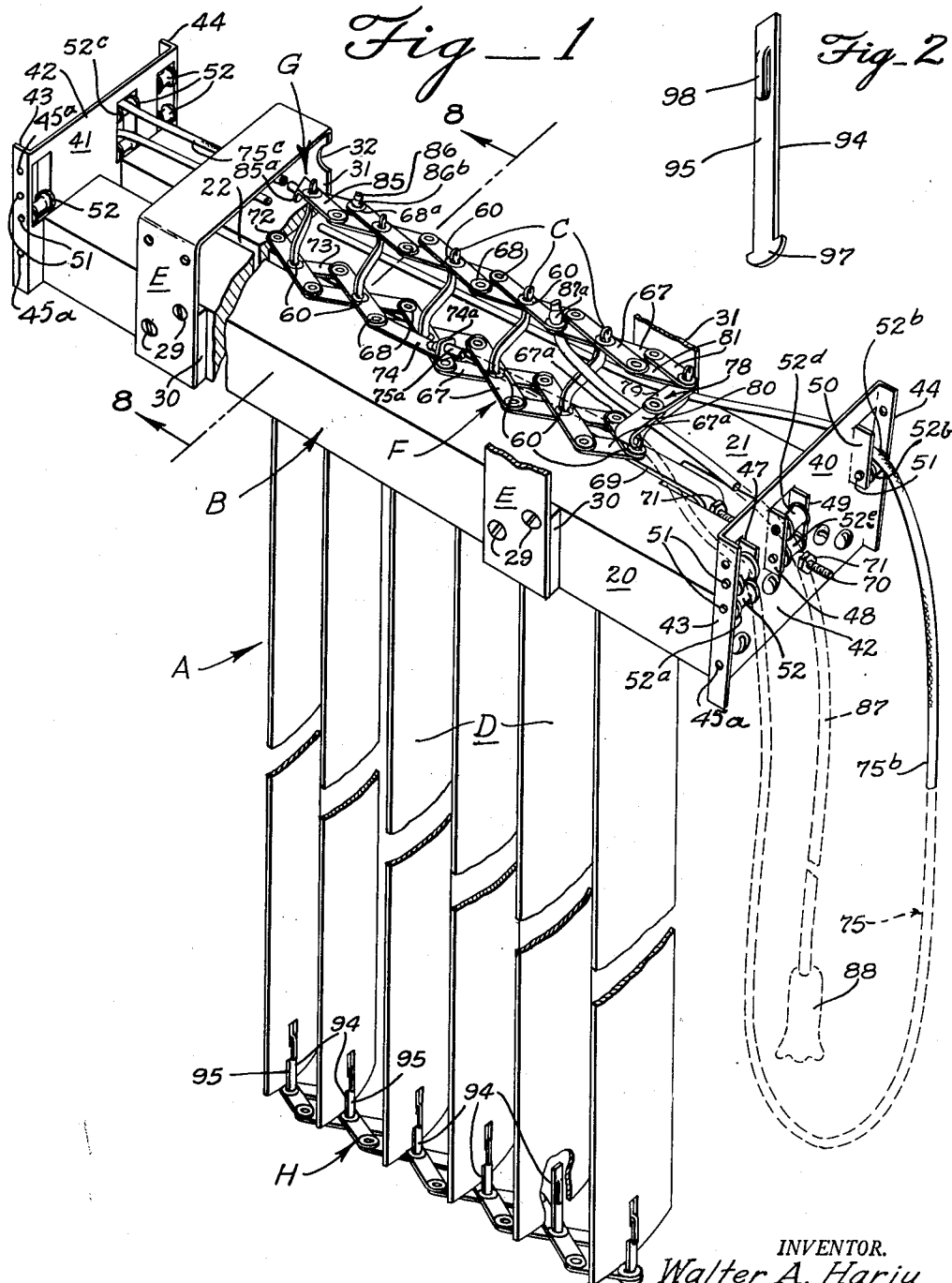
W. A. HARJU

2,759,534

VERTICAL SLAT VENETIAN BLIND

Filed May 25, 1953

3 Sheets-Sheet 1



INVENTOR.
Walter A. Harju
BY
Hansen and Lane

Aug. 21, 1956

W. A. HARJU

2,759,534

VERTICAL SLAT VENETIAN BLIND

Filed May 25, 1953

3 Sheets-Sheet 2

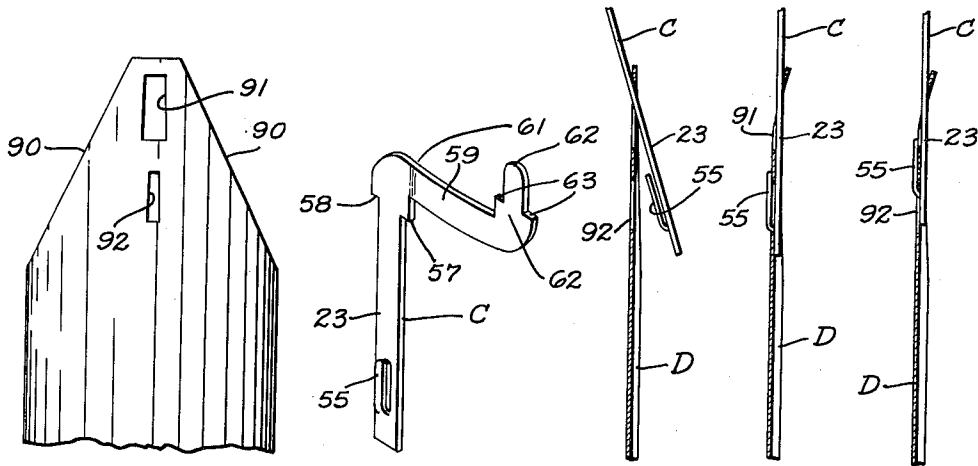


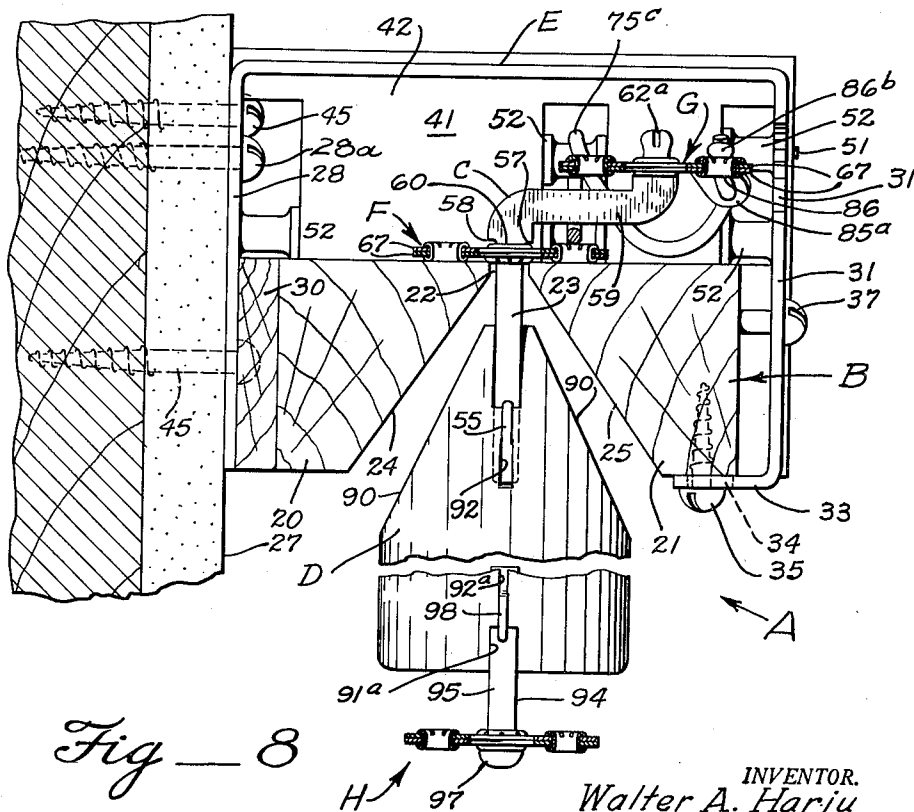
Fig-3

Fig_4

Fig-5

Fig-6

Fig-7



Fig—8

INVENTOR.
Walter A. Harju

BY

BY
Hansen and Lane

Aug. 21, 1956

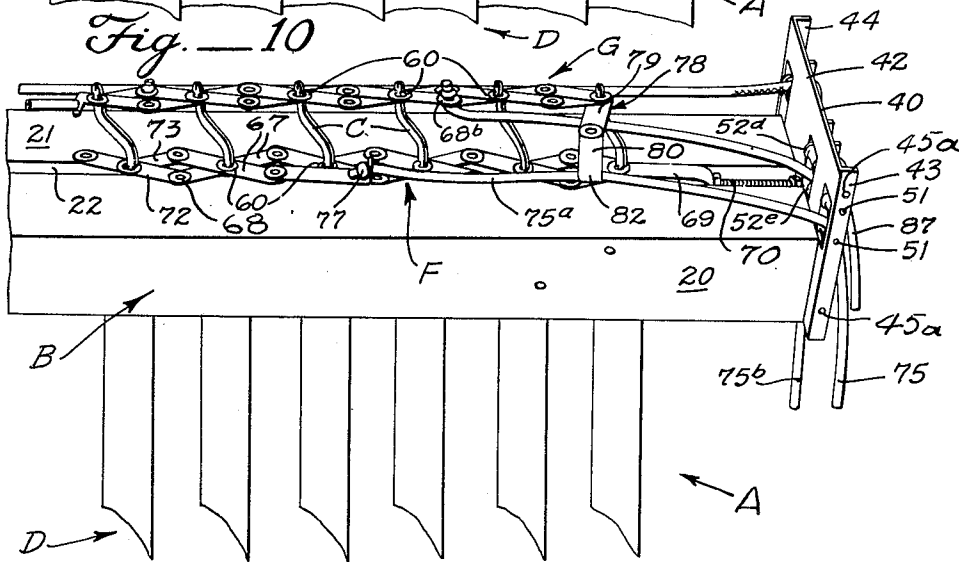
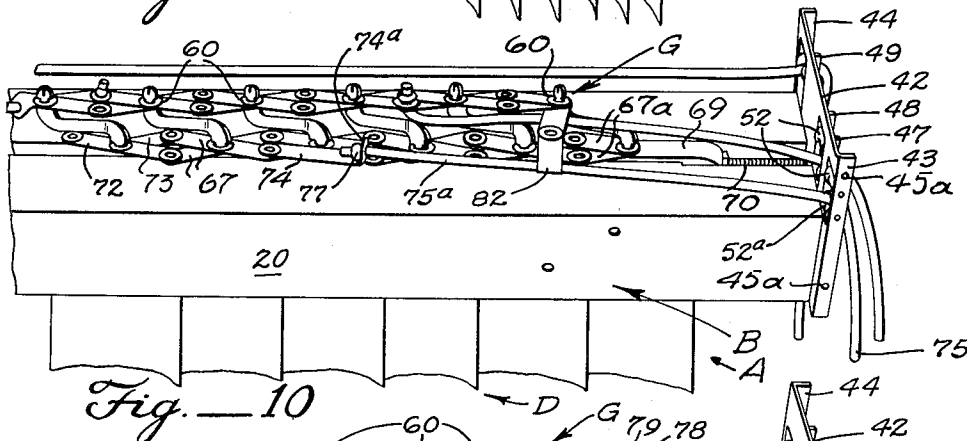
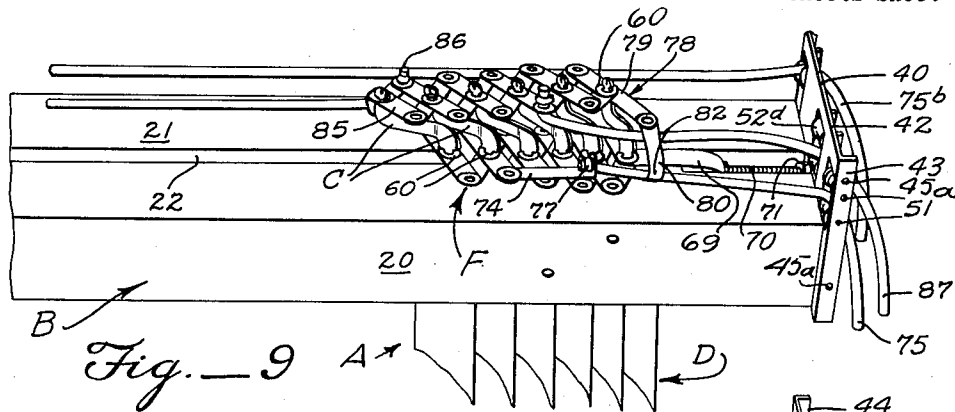
W. A. HARJU

2,759,534

VERTICAL SLAT VENETIAN BLIND

Filed May 25, 1953

3 Sheets-Sheet 3



INVENTOR.
Walter A. Harju
BY
Hansen and Lane

1

2,759,534

VERTICAL SLAT VENETIAN BLIND

Walter A. Harju, Palo Alto, Calif.

Application May 25, 1953, Serial No. 356,937

20 Claims. (Cl. 160—168)

The present invention relates to blinds, and pertains more particularly to a vertical slat Venetian blind.

In recent years a considerable amount of development work has been done on vertical slat Venetian blinds. This type of blind is found very effective in controlling the entrance of light through windows, and has an important advantage over the ordinary horizontal slat Venetian blind in that the slats of the blinds being disposed vertically are not subject to the collection of dust in the same manner as are the horizontally disposed slats. Also, since the slats can be turned to adjust to the direction of the rays during the progress of the sun, adequate amounts of light may be admitted through the blind while at the same time cutting off the entrance of the direct rays which are damaging to rugs and furniture.

A blind of this general character is shown in my Patent No. 2,448,800 issued September 7, 1948.

The present invention contemplates the provision of an improved vertical slat Venetian blind. The invention also provides a vertical slat Venetian blind in which the slats may be either separated to extend across a window opening, while maintaining substantially equally spaced relation between the slats, or compacted into a pack at a side of the window opening, and wherein, in an extended position thereof, the slats may be adjusted angularly to control the admission of light through the window opening.

It is also an object of the invention to provide an improved track and support bracket arrangement for a vertical slat Venetian blind with control means which are jointly compactable.

A further object of the invention is to provide improved track and bracket support means for Venetian blinds which facilitates the leveling and adjusting of the blind.

It is a further object of the invention to provide improved individual support and attaching means for the slats of a vertical slat Venetian blind, as well as improved means for connecting the lower ends of the slats for uniform spacing thereof in various positions of blind adjustment.

The foregoing, and other objects and advantages of the invention will be apparent from the following description and the accompanying drawings, wherein:

Fig. 1 is a perspective view of a portion of a blind embodying the present invention, portions thereof being broken away.

Fig. 2 is an enlarged, perspective view of a pin for supporting a spacing connector for the lower ends of the slats of the blind shown in Fig. 1.

Fig. 3 is an enlarged, fragmentary elevational view showing the upper end of one of the slats of the blind shown in Fig. 1.

Fig. 4 is a similarly enlarged perspective view of crank suspension member for the slats of the blind shown in Fig. 1.

Figs. 5, 6 and 7 are sectional views through the upper end of a slat similar to that shown in Fig. 3 with a sup-

2

porting crank similar to that shown in Fig. 4 in various states of assembly therewith.

Fig. 8 is an enlarged transverse, vertical sectional view through the blind shown in Fig. 1, as it would appear mounted on a wall, portions being broken away.

Fig. 9 is a fragmentary perspective view showing the righthand portion of the blind structure illustrated in Fig. 1 with the slats of the blind compacted into a pack at one end of the track, the supporting brackets being omitted.

Fig. 10 is a view similar to Fig. 9 with the slats extended and in their closed position.

Fig. 11 is a view similar to Fig. 10 with the slats turned angularly to their open position.

In general, the invention comprises a blind assembly A mounted on a supporting track B. The blind A consists of a plurality of slat supporting cranks C with a blind slat D attached to the shank of each crank. The track B is supported by mounting brackets E, and the operation of the cranks C to control their respectively supported slats D is accomplished by two lazy-tongs assemblies F and G. A third lazy-tongs assembly H is mounted on the bottom of the slats to conform with the extension and contraction of the top lazy-tongs F and G. The track B consists of a pair of elongated track members 20 and 21 which may be of wood. These track members are mounted in laterally adjacent parallel relation and are spaced apart slightly to provide an elongated gap 22 to receive the shank portions 23 (Fig. 8) of a plurality of slat suspending crank members C therebetween.

The laterally adjacent sides 24 and 25 of the track members 20 and 21, respectively, are beveled as shown in Fig. 8 to receive the tapered upper ends of the blind slats D for travel lengthwise therebetween. The track member 20 closest to the wall 27 (Fig. 8) is secured to the inner vertical leg 28 of each of the inverted U-shaped mounting brackets E, E by screws 29, 29 (Fig. 1) and may be spaced from the bracket leg 28 by a spacing block 30.

The outer vertical leg 31 of each bracket E is notched out as at 32 to provide clearance for the shank of a screwdriver (not shown) when driving screws 28a which support the bracket into the wall 27.

The lower end portion 33 (Fig. 8) of the outer leg 31 of each bracket E is bent inwardly and a slotted hole 34 is provided to extend lengthwise therein. A first track adjusting screw 35 is driven through this slotted hole 34 and upwardly into the outer track member 21. A second track adjusting screw 37 is inserted through a hole provided therefor in the vertical outer leg 31 of each bracket E and is driven into the outer side of the outer track member 21.

By loosening the lower screw 35 and screwing in the upper screw 37 the outer track member 21 can be moved bodily toward the vertical outer leg 31 of the bracket, the slotted lower opening 34 permitting the shank of the lower screw 35 to slide freely therein. Such movement of the outer track member 21 increases the width of the gap 22 separating the track members 20 and 21. To reduce the width of this gap 22, the lower screw 35 may be loosened, the outer screw 37 backed out a desired amount, the tracks separated as desired, and the lower screw 35 again tightened to secure the outer track 21 in adjusted position. As will be apparent later herein, the ends of the track members 20 and 21 are fixedly held in desired adjusted relation, and the adjustment of the track members at the brackets is merely to correct for any tendency to deviate from a straight condition.

If it is desired to twist or tilt the outer track 21 so as to elevate its inner edge adjacent the gap 22, this may

3

be accomplished by first tightening the lower screw 35 and then screwing the side screws 37 into the outer track member 21 to draw it toward the vertical outer leg 31 of the bracket E.

A pair of track end plates 40 and 41 are mounted one across each end of the track members 20 and 21. Each of these end plates comprises a planiform sheet metal central portion 42 with outwardly bent side flanges 43 and 44. The end plates 40 and 41 are mounted so as to extend inwardly beyond the inner track member 20 a distance equal to the thickness of the spacing blocks 30 plus the thickness of the inner leg 28 of the track mounting brackets E so as to reach the wall 27 (Fig. 8) and receive mounting screws 45, 45 in holes 45a, 45a (Figs. 1, 9, 10 and 11) provided therefor in the end plate side flanges 43 and 44, respectively, on the opposite end plates 40 and 41.

Pulley mounting flanges 47, 48, 49 and 50 are severed from the material of the central portion 42 of each end plate 40 and 41. These flanges are bent outwardly at right angles to the plate to provide support for a plurality of pulley axle pins 51. Pulleys 52 are journaled on the pins 51 to support control cords for controlling the blind in a manner to be described later herein. The two track end plates 40 and 41 are similar to each other, and are reversible, as shown in Fig. 1, for mounting on either end of the track members 20 and 21 as required.

The crank members C may be stamped from sheet metal by conventional punch press mechanism. Each crank C has an upwardly extending slat engaging tongue 55 punched from the material of its shank portion 23. The tongue 55 is offset laterally from the shank 23 by a distance substantially equal to the thickness of the stock from which the slat D (Figs. 3, 5, 6 and 7) are fabricated.

At the upper end of the shank portion 23 a pair of laterally extending shoulders 57 and 58 are formed. The shoulder 57 nearest the laterally extending portion 59 of the crank C (Figs. 4 and 8) is slightly lower than the other shoulder 58, so that the weight of the crank and its supported parts will be carried by this low shoulder 57 when the shank 23 is inserted in an eyelet 60 of the lower lazy-tongs assembly F, of two lazy-tongs assemblies F and G mounted at the top of the blind. Supporting the entire weight of each crank and its supported parts on the single shoulder 57 of each crank thus will exert a tilting effect on the crank and on the slat D supported thereby. This tends to compensate for the weight of an upper lazy-tongs assembly G which is supported on the free ends of the cranks C as shown in Fig. 8, and also assists in extending a bottom lazy-tongs assembly H, to be described later herein, when extending the blind. The laterally extending arm portion 59 of each crank C has a slight offset bend 61 (Fig. 4) formed therein for a purpose which will be brought out later herein.

The outer or throw end of each crank member C extends upwardly in a throw portion 62, and has a pair of laterally extending shoulders 63, 63 formed at the base thereof to support the upper lazy-tongs assembly G. After the upper lazy-tongs is mounted on the cranks with the throws of the cranks inserted in the eyelets 60 at the centers of intersections of the lazy-tongs links, the upper end of each crank throw 62 is split at 62a by a suitable tool (not shown) to retain the eyelets against accidental displacement therefrom.

Both lazy-tong assemblies F and G at the top of the blind are generally alike, and each comprises a plurality of crossed links 67, 67 pivotally connected to each other at their centers by the eyelets 60. The eyelets 60 of the lower lazy-tongs F receive the shanks 23 of the cranks C for rotative movement therein.

Endwise adjacent pairs of the crossed links 67, 67 are pivotally connected to each other at their ends in conventional lazy-tong manner by eyelets 68. The fixed end of the lower lazy-tong assembly F is adjustably secured to a track end plate such as the end plate 40 in Fig. 1, by an elongated connecting link 69 (Figs. 1, 9, 10 and 11).

4

This extension link 69 is adjustably connected to the end plate 40 by a screw 70 and nuts 71, 71. The terminal pair of links 67a, 67a on the righthand end of the lower lazy-tongs F are only slightly more than one-half the length of the crossed intermediate links 67 of the lazy-tongs. The free, or lefthand end of the lower lazy-tongs F as shown in Figs. 1, 9, 10 and 11 terminates in one full length link 72 and one short link 73. The full length link 72 exerts a camming effect on a similar, but angularly oppositely disposed link (not shown) on the outer end of the lower lazy-tongs of the other half of the blind (also not shown) when two half blinds are mounted on a single track and are drawn together to bring their movable ends into close juxtaposition with each other.

For moving the blind to its retracted or compacted condition shown in Fig. 9, a connecting link 74 is pivotally connected to the lower lazy-tongs F near its free or lefthand end as shown in Figs. 1, 9, 10 and 11. This connecting link 74 has an upwardly bent end portions 74a with a hole therein to receive the retracting run 75a of an operating cord 75. A split ball 77 is clipped onto the end of the run 75a of cord 75 beyond its point of insertion in the link 74 to prevent withdrawal of the cord.

An articulated guide link 78, for guiding the retracting run 75a of cord 75 during operation of the blind comprises a pair of pivotally connected link elements 79 and 80. One end of this articulated link 78 is connected to the eyelet which connects the righthand end pair of short links 81, 81 (Figs. 1, 9, 10 and 11) of the upper lazy-tongs assembly G to each other.

The outer or free end of the articulated link 78 is curled reversely upon itself as shown at 82 to form a guide through which the retracting run 75a of cord 75 may be slidably inserted. The retracting run 75a of cord 75 passes over the lowermost pulley 52a of a pair thereof journaled on a pin 51, between the flanges 43 and 47 of the righthand end plate 40 as shown in Figs. 1, 9, 10 and 11, and depends downwardly therefrom.

The cord 75 is doubled upon itself and extends upwardly as at 75b (Fig. 1) and is carried inwardly over the pulley 52b at the righthand side of the end plate 40 as shown in Fig. 1. The run 75b of the cord 75 extends lengthwise the entire length of the blind track B, and is passed around the upper roller 52c of a pair of pulleys mounted in the lefthand end plate 41 as shown in Fig. 1. The cord 75 then extends back toward the right in a run 75c and its end is inserted through an opening provided therefor in the downturned end 85a of an end link 85 at the lefthand or free end of the upper lazy-tong assembly G and then is passed upwardly at 86 through one connecting eyelet 68a (Fig. 1) where it is secured against withdrawal by a split ball 86b clamped onto the end of the cord.

For adjusting the angular position of the cranks C, to open the slat D, as shown in Fig. 11, an adjusting cord 87 is inserted through an eyelet 68b connecting a pair of the links 67, 67 near the righthand end of the upper lazy-tongs G, as shown in Figs. 1, 9, 10 and 11. A split ball 87a secured to the end of the cord 87 prevents its withdrawal. This blind opening cord 87 passes over the lowermost of a pair of pulleys 52d and 52e in the righthand end plate 40 and depends therefrom. A conventional tassel or finger grip knob 88 is provided on the lower end of the cord 87.

The slats D are connected to their respective cranks C as best shown in Figs. 3 to 8 inclusive. The upper end of each slat D is beveled as at 90, 90 (Figs. 3 and 8) to a truncated point. Two openings 91 and 92 are provided in each slat D in centrally aligned relation near the upper end thereof. The uppermost opening 91 is of a width to receive the shank 23 of a crank C closely therein and tapers inwardly at its upper end (Figs. 3 and 8) to a width which will closely engage the shank when pressed therein. This upper opening 91 is of sufficient length to permit the crank to be tilted to a position at a

5

slight acute angle from the longitudinal center line of the slat C as shown in Fig. 5 before encountering both ends of the upper opening 9.

Each lower opening 92 is of a size to receive the tongue 55 of a crank C therein, and it also tapers inwardly toward its upper end as best shown in Figs. 3 and 8 to a width which will closely engage the base of the tongue 55 when it is pressed therein. Therefore, when the shank 23 of a crank C is inserted through the upper opening 91, as shown in Fig. 5, is swung into alignment with the slat D as shown in Fig. 6 to cause the tongue 55 to pass into and through the lower opening 92 and then is drawn bodily upwardly to the position shown in Figs. 7 and 8, the lateral edges of the shank 23 and of the base of the tongue 55 will be jammed against the sides of the upper ends of the openings 91 and 92, respectively. This arrangement securely binds each crank to its supported slat and insures against relative lateral tilting movement of these members.

For retaining the lower ends of the slats D in equally spaced relation in various degrees of extension and retraction of the blind, a third or bottom lazy tongs H preferably is provided below the lower ends of the slats D. This bottom lazy tongs D is generally similar to the two lazy tongs F and G described previously herein. The bottom lazy tongs H is connected to the lower ends of the slats D by pins 94 (Figs. 1, 2 and 8) each of which has a straight shank portion 95 similar to the shank portion of the crank D, and a widened head portion 97.

A tongue 98, similar to the tongues 55 of the crank shanks 23, is formed from the material of each pin 94. The lower end of each slat D has a pair of openings 91a and 92a therein which are similar to the correspondingly numbered openings 91 and 92 shown in Fig. 3 and described previously herein. The bottom pins 94 are inserted in these openings and are secured in position on the lower ends of the slats in a manner similar to that previously described herein for attaching the shanks 23 of the cranks C to the upper ends of the slats.

The weight of the slats D while small, nevertheless is sufficient to maintain them substantially vertical, and thus to actuate the bottom lazy tongs H so as to maintain it in a degree of extension comparable to that of the two top lazy tongs F and G.

The operation of the device is as follows: The track B is mounted by means of screws 28a and 45 (Fig. 8) to extend transversely above a window or other opening which it is desired to screen. Usually it is desirable to provide two blind assemblies A, similar to that shown in Fig. 1, and to operate the assemblies from opposite ends of the track B so that each blind assembly covers half of the opening to be screened. If desired, a single blind assembly (not shown) may be provided of a length to extend entirely across the opening to be screened. Since this practice is well known to those familiar with the art of vertical Venetian blinds, a more detailed explanation is unnecessary to a full understanding thereof.

In the event that two blind assemblies are employed, one thereof will be secured in adjusted position at each end of the track B to occupy, when extended, one half the length of the track. The other half blind (not shown) would be operated by cords (also not shown) passing over or around the extra pulleys 52 provided in the end plates 40 and 41. Thus, each half blind assembly A may be operated independently of the other to provide for a wide range of light control.

Each blind assembly A, whether it is of the full length of the track B when extended, or only one half of such length, is operated as an individual unit.

For extending the blind, and at the same time pivotally moving the slats D thereof to their closed position, the depending portion of the run 75b of the cord 75 is pulled. This moves the cord 75 around the pulleys 52b and 52c (Fig. 1), and draws the free lefthand end of the upper lazy-tongs G to its extreme lefthand po-

6

sition as shown in Fig. 10. This action moves the upper lazy-tongs assembly G toward the left relatively to lower lazy-tongs F, and thereby swings all of the cranks C approximately 90° in a counterclockwise direction from their positions shown in Fig. 9 to their position in Fig. 10. This moves the blind A to its extended, closed position shown in Fig. 10.

The offset bends 61 (Fig. 4) in the laterally extended portions of the cranks C cause the slats D to be swung by this movement into properly overlapped relation. The bends 61 also prevent the slats from exerting too much pressure on each other where they contact in overlapping relation, and thereby avoid damage to their finish.

From the fully extended closed position of the blind A shown in Fig. 10, or from any intermediate degree of extension between the two positions thereof shown in Figs. 9 and 10, the slats D may be swung angularly about their longitudinal axes by pulling on either the slat opening cord 87 or the blind extending run 75b of the cord 75 as required.

For drawing the blind A to its retracted position shown in Fig. 9, the slats D preferably first are turned to their open position, substantially as shown in Fig. 11, by means of the cord 87. The friction of the eyelets of the lower lazy-tongs F riding on the track B resists movement of the lower lazy-tongs during such angular adjustment of the slats, and therefore the degree of extension of the blind is not changed thereby. By then drawing on the retracting run 75b of the cord 75, the lower lazy-tongs F will be collapsed to the position shown in Fig. 9. The frictional resistance of the cranks C to turning in their respective eyelets in the lower lazy-tongs F is greater than the resistance of the upper lazy-tongs G to collapsing, so that this collapsing of the lower lazy tongs F moves the upper lazy-tongs assembly G to a corresponding position without changing the angular position of the slats.

During any extension or collapsing of the two top lazy-tongs F and G, gravity, tending to keep the slats substantially vertical, moves the bottom lazy-tongs H to a corresponding position. From the foregoing it is obvious that the extension or collapse of either of the lazy-tongs F or G will move the other two lazy-tongs to a corresponding degree of extension or collapse.

For adjusting the position of the fixed end of the blind A in proper relation to the side of the window or other opening which the blind is intended to screen, the screw 70 may be adjusted, together with the nuts 71, 71 thereon, to position the connecting link 69 as desired.

The present invention provides a simple, sturdy vertical slat Venetian blind which requires only a few different types of easily fabricated parts for its construction. The blind is easy to mount and to adjust, and is positive in action and extremely long lived.

While I have illustrated and described a preferred embodiment of the present invention, it will be understood however that various changes and modifications may be made in the details thereof without departing from the spirit and scope of the invention as set forth in the appended claims.

Having thus described the invention, what I claim as new and desire to protect by Letters Patent is defined in the following claims.

I claim:

1. In a vertical slat Venetian blind comprising a pair of track members, a plurality of inverted U-shaped brackets mounted to span said track members, and secured to the outer face thereof, one leg of the bracket being bent to extend beneath a track member means for securing the track members one to each leg of the bracket in laterally opposite, spaced relation, the track member having the bracket extending therebeneath being spaced from its supporting bracket leg, and screw means for controlling the separation between the leg of the bracket and the track member spaced therefrom for tiltably adjusting the upper,

7

inner edge of the latter track member into parallelism with the upper, inner edge of the opposite track member.

2. An arrangement according to claim 1 wherein the opposed sides of the tracks are beveled outwardly toward their lower ends to receive the tapered upper ends of a plurality of blind slats therebetween.

3. In a vertical slat Venetian blind comprising a pair of track members, a plurality of inverted U-shaped brackets mounted to span said track members, a bent portion on the bottom of one leg of each bracket extending beneath one of the track members, means for fixedly securing one track member to the other leg of the bracket, means for securing the bent end portion of said one bracket leg in adjusted position to the bottom of the other track beneath which it extends to position the tracks in laterally opposite, spaced relation, with the outer face of said other track member spaced from the side of its bracket leg, and screw means mounted to adjust the separation between the leg of the bracket having the bent end portion and the upper portion of the track member secured thereto for adjustably tilting the upper, inner edge of the latter track member into parallelism with the upper, inner edge of the opposite track member.

4. In a vertical slat Venetian blind comprising a pair of track members, an end plate secured transversely across each end of said track members, a plurality of pulleys mounted in each end plate, a plurality of inverted U-shaped brackets mounted at spaced intervals lengthwise of the track members to span said track members, means for securing the track members one to each leg of the bracket in laterally opposite, spaced relation, one of said track members being spaced from its supporting bracket leg, securing one portion of said one track member to its supporting bracket leg and means for controlling the separation between a second portion of said one track member to its supporting leg of the bracket at a point spaced longitudinally of its latter bracket leg to controllably twist the latter track member to bring its inner upper edge into parallelism with the inner upper edge of the opposite track member.

5. A vertical slat Venetian blind comprising a pair of track members mounted in laterally spaced parallel relation, a first lazy-tongs assembly having eyelet connections at their centers of link intersection, means for securing one end of said first lazy-tongs to an end of said track members, a crank member having a stem portion thereof inserted for pivotal movement in each of the intersection eyelets of the first lazy-tongs assembly and extending into the space between the track members, a second similar lazy-tongs assembly mounted with its link connection eyelets pivotally receiving offset portions of the crank members therein, a Venetian blind slat mounted in coextensive depending relation on the shank of each crank member, a blind extending cord attached to the free end of one of said lazy-tongs assemblies, a compacting cord attached to an intermediate portion one of said lazy-tongs assembly, and a slat adjusting cord connected to control endwise movement of the second lazy-tongs assembly relative to the first lazy-tong assembly.

6. A vertical slat Venetian blind comprising a pair of track members mounted in laterally spaced, parallel relation, means for adjusting one of such track members relative to the other, a first lazy-tongs assembly having eyelet connections at their centers of link intersection, means for securing one end of said first lazy-tongs to an end of said track members, a crank member having a stem portion thereof inserted for pivotal movement in each of the intersection eyelets of the first lazy-tongs assembly and extending into the space between the track members, a second similar lazy-tongs assembly mounted with its link connection eyelets pivotally receiving offset portions of the crank members therein, a Venetian blind slat mounted in coextensive depending relation on the shank of each crank member, blind extending means attached to the free end of one of said lazy-tongs assemblies,

8

compacting means attached to an intermediate portion of the first lazy-tongs assembly, slat angle adjusting means connected to move the first and second lazy-tong assemblies relative to each other lengthwise of the track.

7. A vertical slat Venetian blind comprising a pair of end plates, a pair of track members mounted in laterally spaced, parallel relation to extend between said end plates, means for adjustably twisting one of such track members relative to the other to bring their upper inner edges into parallelism with the others, a first lazy-tongs assembly having eyelet connections at their centers of link intersection, means for securing one end of said first lazy-tongs to an end of said track members, a crank member mounted with a stem portion thereof inserted for pivotal movement in each of the central link intersection eyelets of the first lazy-tongs assembly and extending into the space between the track members, a second, similar lazy-tongs assembly mounted with its central link connection eyelets pivotally receiving offset portions of the crank members therein, a Venetian blind slat mounted in coextensive, depending relation on the shank of each crank member, a blind extending cord attached to the free end of one of said lazy-tongs assemblies, a blind compacting cord attached to the first lazy-tongs assembly at a point spaced from the secured end thereof, and a cord connected to the second lazy-tong assembly for adjusting it lengthwise relative to the first lazy-tong assembly.

8. A vertical slat Venetian blind comprising a track, a plurality of slat support members mounted for movement lengthwise of said track, a first lazy-tongs mounted with the slat supports pivotally connected thereto at equally spaced intervals therealong, and a second lazy-tongs similarly connected to each of said slat supports eccentrically of its axis of pivotal connection to the first lazy-tongs, said second lazy-tongs being bodily movable relative to said first lazy-tongs lengthwise of said track for angular adjustment of the supports and the slats supported thereby about the axes of pivotal connection of the slat supports to the first lazy-tongs.

9. A vertical slat Venetian blind comprising a track, a plurality of slat support members mounted for movement lengthwise of said track, a first lazy-tongs mounted with the slat supports pivotally connected thereto at equally spaced intervals therealong, a second lazy-tongs similarly connected to each of said slat supports eccentrically of its axis of pivotal connection to the first lazy-tongs, said second lazy-tongs being bodily movable relative to said first lazy-tongs lengthwise of said track for angular adjustment of the supports and the slats supported thereby about the axes of pivotal connection of the slat supports to the first lazy-tongs, means adjustably securing an end of the first lazy-tongs to an end of said track, a cord guide on the outer end of the end link on the free end of the second lazy-tongs, and a cord slidably inserted through said guide and connected to an end of a longitudinally adjacent link of the second lazy-tongs for bodily moving the second lazy-tongs to a predetermined limit of movement relative to the first lazy-tongs while extending both lazy-tongs along said track upon pulling said cord.

10. A vertical slat Venetian blind comprising a track, a plurality of slat support members mounted for movement lengthwise of said track, a first lazy-tongs mounted with the slat supports pivotally connected thereto at equally spaced intervals therealong, a second lazy-tongs similarly connected to each of said slat supports eccentrically of its axis of pivotal connection to the first lazy-tongs, said second lazy-tongs being bodily movable relative to said first lazy-tongs lengthwise of said track for angular adjustment of the supports and the slats supported thereby about the axes of pivotal connection of the slat supports to the first lazy-tongs, and a retracting cord connected to an end of a link of the lower lazy-tongs near its free end for compaction of the lazy-tongs and the slats supported thereby upon pulling said cord.

11. In a vertical slat Venetian blind, a track, a first lazy-tongs supported for slidable extending and contracting movement lengthwise on said track, the centers of its crossed links being perforated and pivotally connected by eyelets inserted in the perforations, a plurality of slat supporting cranks, each provided with a downwardly extending shank inserted for pivotal movement in one of said center eyelets, a Venetian blind slat suspended from the shank of each crank for pivotal movement therewith, a second similar lazy-tongs mounted with a throw portion of each crank pivotally inserted in a center eyelet thereof, means for securing an end of one of the lazy-tongs to said track, means for extending and retracting said lazy-tongs, and means for moving said lazy-tongs relative to each other lengthwise of the track for adjustably controlling the angular position of the cranks and the slats suspended therefrom.

12. In a vertical slat Venetian blind having a track, a plurality of cranks formed from sheet metal and having a shank portion for movement along said track, a pair of shoulders formed at the upper end of the shank portion, one of the shoulders being higher than the other to support the weight of the crank entirely on one of said shoulders when the shank of the crank is inserted in a bearing for rotative movement therein, an upwardly extending throw portion formed on the crank eccentrically of the shank portion, and means for attaching a slat co-extensively with each shank portion for rotative movement therewith.

13. In a vertical slat Venetian blind having a track, a plurality of cranks formed from sheet metal and having a shank portion for movement along said track, a pair of shoulders formed at the upper end of the shank portion, one of the shoulders being higher than the other to support the weight of the crank entirely on one of said shoulders when the shank of the crank is inserted in a bearing for rotative movement therein, an upwardly extending throw portion formed on the crank eccentrically of the shank portion, a tongue extending along said shank portion and spaced therefrom to receive a portion of a blind slat therein, a blind slat having a pair of longitudinally aligned holes therein near the upper end of said slat, one of said holes being of a size to receive the shank of the crank therein, the other hole being formed to receive said tongue with the shank of the crank inserted in said one hole, the crank being movable lengthwise of the slat to hook the tongue into engagement with a portion of slat material located between the holes.

14. An arrangement according to claim 13 wherein the slat material defining the sides of one of the holes converges inwardly toward the top of the slat to bend the crank against lateral movement relative to the slat.

15. An arrangement according to claim 13 wherein the slat material defining the sides of both of said holes converges inwardly toward the top of the slat to bind the crank against angular displacement relative to the slat.

16. In a vertical slat Venetian blind having a longitudinally slotted track, a plurality of slat supporting members mounted for slidable and rotative movement in said slotted openings, a lazy-tongs supported for extension and compaction lengthwise along said track, each of said slat supporting members having a portion thereof connected for pivotal movement to an extensible portion of said lazy-tongs, and means for securing one end of said lazy-tongs to an end of said track, said securing means comprising a screw secured to a track element to extend lengthwise of said track, a link pivotally secured to an end of said lazy-tongs and having an opening therein to receive said screw, and means for adjusting said screw to

control the positioning of the secured end of said lazy-tongs to said track element.

17. A vertical slat Venetian blind comprising a track having a slotted opening therein extending lengthwise thereof, a plurality of slats, a crank secured to the upper end of each slat, the shanks of the crank being positioned for slidable movement in said slotted opening, a first lazy-tongs mounted for slidable extending and retracting movement along said track, means for pivotally connecting the shank of each crank for pivotal movement to said first lazy-tongs with the cranks spaced symmetrically lengthwise of said first lazy-tongs, a second similar lazy-tongs similarly mounted on the throws of said cranks, and a third lazy-tongs mounted for extension and retraction with the first and second lazy-tongs and secured to the bottom of the slats by pins mounted on the lower ends of the slats in axial alignment with the shanks of the cranks.

18. A vertical slat Venetian blind comprising a track, a crank stamped from sheet metal mounted for movement along said track, a slat interlockingly engaged with each crank to depend therefrom, a first lazy-tongs mounted for slidable extending and retracting movement along said track, means pivotally connecting each crank for pivotal movement to said first lazy-tongs with the cranks spaced symmetrically lengthwise of said first lazy-tongs, a second similar lazy-tongs pivotally connected to the throw of each of said cranks, a third lazy-tongs mounted for extension and retraction with the first and second lazy-tongs and a pin interlockingly engaging the lower end of each slat and pivotally connected to the bottom lazy-tongs.

19. A vertical slat Venetian blind comprising a track, a plurality of slat support members mounted for movement lengthwise of said track, a first lazy-tongs mounted with the slat supports pivotally connected there to at equally spaced intervals therealong, a second lazy-tongs similarly connected to each of said slat supports eccentrically of its axis of pivotal connection to the first lazy-tongs, said second lazy-tongs being bodily movable relative to said first lazy-tongs lengthwise of said track for angular adjustment of the support and the slats supported thereby about the axes of pivotal connections of the slat supports to the first lazy-tongs.

20. In a vertical slat Venetian blind having a track, a plurality of cranks formed of sheet metal and having a shank portion for movement along said track, a pair of shoulders formed at the upper end of the shank portion to support the weight of the crank when the shank of the crank is inserted in a bearing for rotative movement therein, the shank having a tongue blanked therefrom and extending lengthwise of the shank toward the shoulders to receive a thickness of metal Venetian blind material therein for insertion of the shank in one hole provided adjacent the end of a slat with the tongue inserted bodily transversely of the slat to a second hole therein, the spacing of the holes in the slats lengthwise thereof being less than the length of the tongue to grip the slat against endwise movement in either direction relative to the shank.

References Cited in the file of this patent

UNITED STATES PATENTS

2,135,647	Streby	Nov. 8, 1938
2,139,781	Trammell	Dec. 13, 1938
2,158,454	Zubiria	May 16, 1939
2,188,575	McLennan	Jan. 30, 1940
2,503,441	Kamm	Apr. 11, 1950
2,625,219	Peck	Jan. 13, 1953