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W. J. STUBER ET AL
VENETIAN BLIND MECHANISM

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3 Sheets-Sheet 1

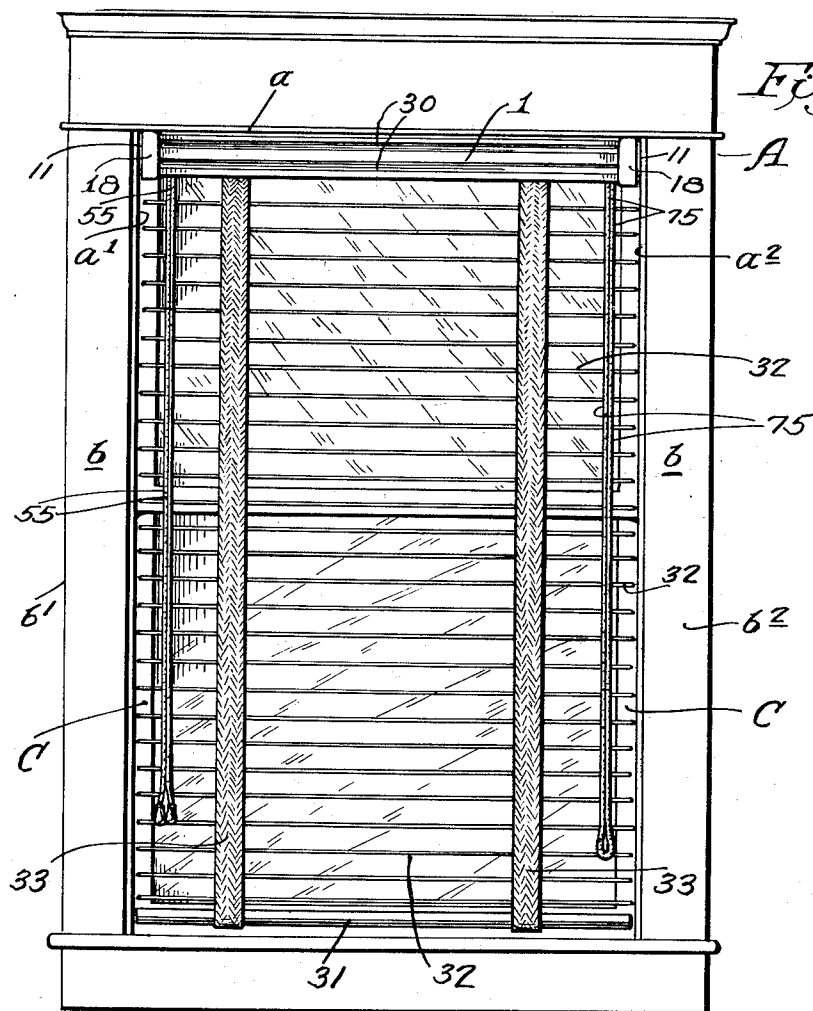


Fig. 1.

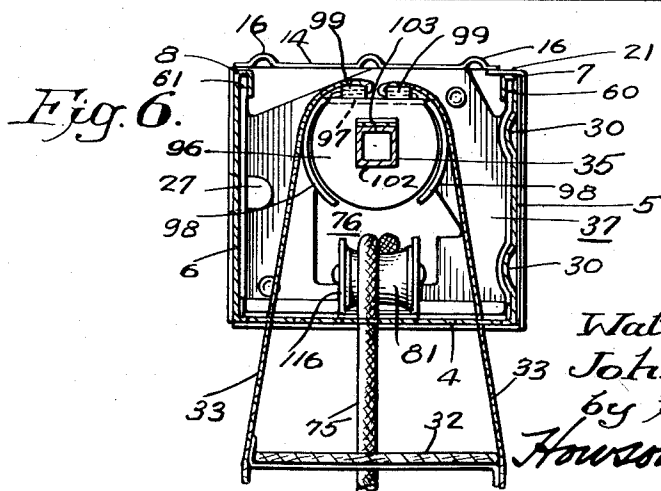


Fig. 6.

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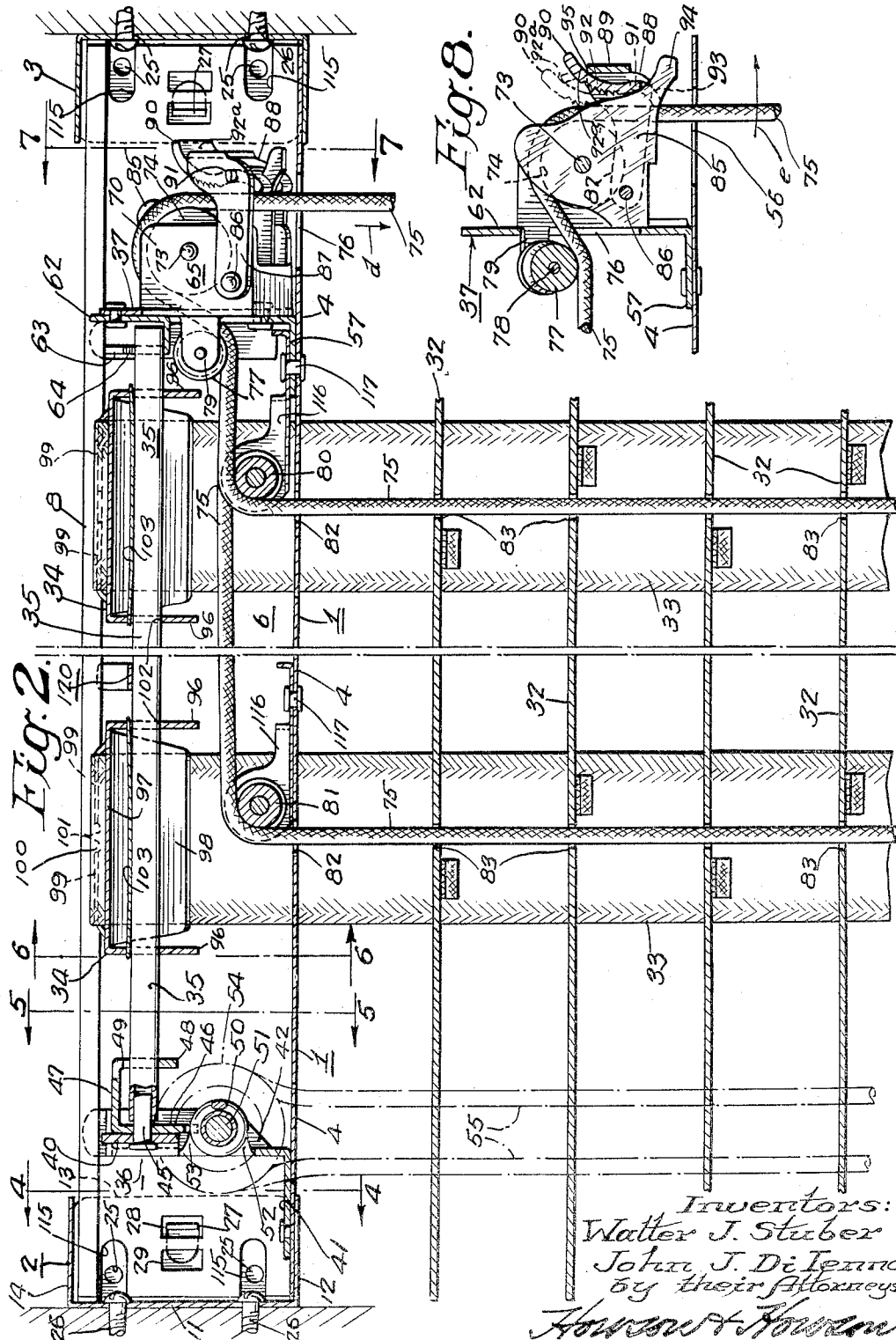
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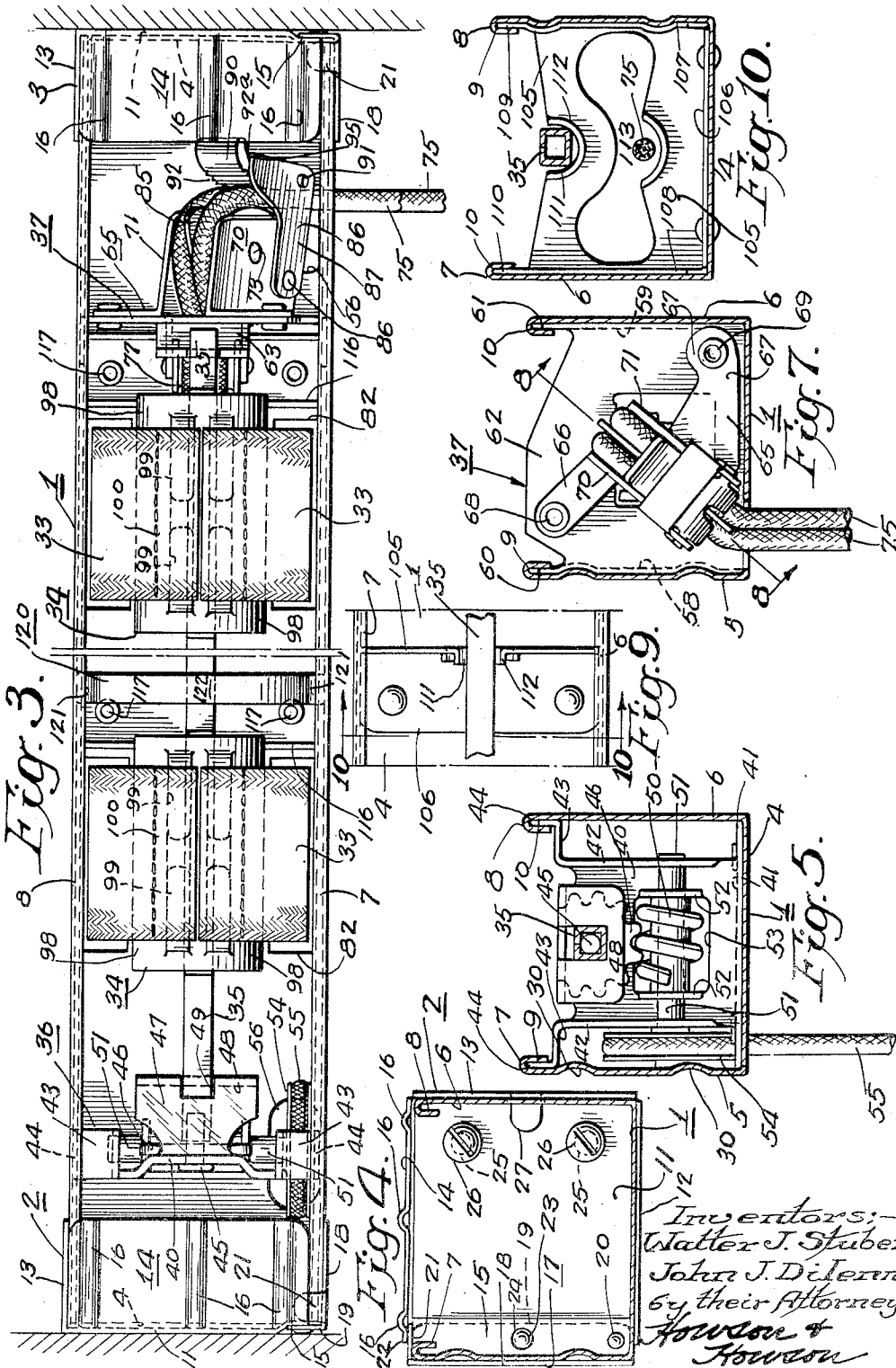
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UNITED STATES PATENT OFFICE

2,534,080

VENETIAN BLIND MECHANISM

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3 Claims. (Cl. 160—166)

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This invention relates to Venetian blinds and in the present instance is directed to all-metal blinds, with the exception of the fabric tapes normally provided for suspending the slats of the blind from the tilting mechanism thereof.

Another feature of the invention resides in the provision of a blind having a head casing supported by suitable end brackets for enclosing and supporting the operating mechanism of the blind, in lieu of the commonplace wooden head rail and valance board usually employed in Venetian blind structures.

Another feature of the invention is directed to a plurality of transverse frames mounted within the casing and adapted to support the tilting mechanism and the cord locking elements of the slat elevating mechanism of the blind, and which, in addition thereto, function to stiffen the casing.

Another feature of the invention resides in the cord locking mechanism of the blind by which the slats of the blind may be maintained at any desired elevation and subsequently released to change said elevation with a minimum of effort.

Another feature of the invention resides in the construction of the cord locking mechanism by which accidental descent of the slats from any given elevation will be immediately arrested in the event of a person letting go of the elevating cords after having released the locking mechanism.

The above-noted features will be clearly understood from the following description and the accompanying drawings of which:

Fig. 1 is a front elevation of a window equipped with a Venetian blind constructed and adapted to operate in accordance with the principles of the present invention;

Fig. 2 is an enlarged longitudinal sectional elevation of the head casing, with a portion intermediate the slat supporting tapes broken away;

Fig. 3 is a plan view of the head casing as shown in Fig. 2;

Fig. 4 is a transverse sectional elevation taken on the line 4—4, Fig. 2;

Fig. 5 is a transverse sectional elevation taken on the line 5—5, Fig. 2;

Fig. 6 is a transverse sectional elevation taken on the line 6—6, Fig. 2;

Fig. 7 is a transverse sectional elevation taken on the line 7—7, Fig. 2;

Fig. 8 is an oblique sectional elevation taken on the line 8—8, Fig. 7;

Fig. 9 is a fragmentary sectional elevation of the portion removed from between the tapes in Fig. 2; and

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Fig. 10 is a transverse sectional elevation taken on the line 10—10, Fig. 9.

As shown in Fig. 1, the Venetian blind of the present invention comprises a head casing 1 adapted to be installed in a window frame A immediately below the underside of the top rail a, between the left side rail a1 and right side rail a2, with no part of the blind projecting into the room in which the window frame A is built beyond the inner faces b, b of the trim pieces b1, b2 lying adjacent the side rails a1 and a2 respectively of the window frame.

As will be later disclosed, if the recess between the faces b, b of the trim pieces b1 and b2 and the window sash C is not sufficiently deep to accommodate the blind, the blind may be mounted on the faces b, b of the trim pieces b1 and b2 with the blind being of sufficient width to overlap said trim pieces beyond the side rails a1 and a2 of the frame A.

As shown in Figs. 2 and 3, the left and right ends respectively of the casing 1 are supported in hanger brackets 2 and 3 respectively. These brackets are substantially identical in construction except for the fact that one is made "left" and the other is made "right."

As shown in Fig. 4, for example, the head casing 1 is of a U-shaped cross section and includes a bottom panel 4, a front panel 5, and a back panel 6, said casing being shaped and pressed from a single strip of sheet metal.

The front and back panels 5 and 6 respectively are provided along their upper edges with turned and downwardly extending flanges 7 and 8 which stiffen the upper edges of the casing and provide longitudinal channels 9 and 10 respectively along the upper edges of said panels, for purposes hereinafter described.

The end brackets 2 and 3 each comprises a main body plate 11 having right angle flanges 12, 13 and 14 along its bottom, rear, and top edges respectively. The plate 11, along its front edge, in each instance is provided with a marginal strip 15 which is perpendicularly offset inwardly with respect to the plate 11 and lies in a plane substantially parallel to the plane of the plate 11. The opposite ends of the casing 1 rest on and are supported by the bottom flanges 12, 12 of the brackets 2 and 3 respectively, with the rear panel 6 of the casing 1 in abutting contact with the rear flanges 13, 13 of said brackets. The top flanges 14, 14 of said brackets overhang the open ends of the casing 1 and are provided with stiffening ribs 16, 16 pressed in the flanges 14, 14.

The casing 1, with all the operating mecha-

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nism of the blind mounted therein, is adapted to be slipped into the open front ends of the brackets 2 and 3 and to be held therein against accidental creeping by retaining elements 17. These retainers are of right angular cross section and include a front flange 18, which lies in front of the end of the front panel 5 at each end thereof, as clearly shown in Fig. 1; and a side flange 19 which abuts against the outer surface of the offset marginal strip 15 of each of the brackets 2 and 3.

The side flange 19 of the retaining element 17, in each instance, is pivoted at 20 adjacent the lower front corner of the offset 15, and the upper end of the front flange 18 of the securing element 17, in each instance, is provided with an inwardly projecting tongue 21 which is adapted to project inwardly over the inturned flange 7 of the casing 1 and under the forward end 22 of the top flange 14 of the bracket 2 or 3, as the case may be. The upper end of the element 17 is thereby frictionally held against rotation about the pivot 20.

In addition thereto, the securing element 17 is further held against rotation about its pivot 20 by means of a small protuberance 23 pressed out of the side flange 19 of said element and projecting into a hole 24 punched in the offset marginal strip 15 of the body plate 11 of the bracket 2 or 3.

The plate 11 and the back flange 13 of each bracket is provided with holes 25, 25 for the reception of screws 26 by which the end brackets may be mounted on the side rails *a1* and *a2*, or on the faces *b, b* of the trim pieces *b1* and *b2* of the window frame, as desired.

The back flange 13 of each bracket is provided with an inturned tongue 27 adapted to project through an aperture 28 or 29 formed in the back panel 6 of the casing 1, for centering the casing with respect to the brackets when the spacing of the brackets 2 and 3 varies by reason of the brackets being mounted on the inside surfaces of the side rails *a1, a2* of the window frames A, or on the faces *b, b* of the trim pieces *b1, b2* of the window frame as noted above.

In order to stiffen the front panel 5 of the casing 1, said panel is provided with a pair of longitudinally extending corrugations 30, 30 adjacent the upper and lower edges respectively of the front panel 5.

The bottom rail 31 and the perpendicularly spaced slats 32, 32 of the blind are supported in the usual manner by a pair of laterally spaced ladder tapes 33, 33. The upper ends of the tapes 33, 33 are attached to drum segments 34, 34 which, in turn, are mounted on a tilt shaft 35 within the casing 1. The opposite ends of the tilt shaft 35 are rotatably supported in cross frames 36 and 37 respectively, which extend transversely of the casing 1.

The cross frame 36 is formed of a plate 40 having a foot flange 41 resting on and secured to the bottom panel 4 of the head casing 1. The plate 40 is provided with right angle flanges 42, 42 along its vertical opposite side edges, said flanges having lateral extensions 43, 43 projecting horizontally from the upper ends thereof and terminating in vertical lug-like projections or ears 44, 44 extending into the longitudinal channels 9 and 10 respectively at the upper edges of the front panel 5 and rear panel 6 of the head casing 1. This construction lends rigidity to the front and rear panels 5 and 6 of said head casing.

The plate 40 is bored to receive a pin or trun-

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nion 45 which projects into the hollow center of the rectangular tilt shaft 35. Rockably mounted on the trunnion 45 is a worm wheel segment 46. The worm wheel segment 46 is provided with an axial extension 47 terminating in a right angle arm 48 disposed on a plane parallel to the plane of the gear segment 46 and spaced axially therefrom. The lug 48 is provided with a rectangular opening 49 through which the rectangular tilt shaft 35 extends, to key said shaft to said worm segment for concurrent rocking motion therewith.

The worm wheel segment 46 meshes with the worm 50 which is fixed to a cross shaft 51, said cross shaft being rotatably mounted in the flanges 42, 42 of the plate 40 and a pair of intermediate ears 52, 52 pressed out of the plate 40 and providing an open space 53 in which the worm 50 is mounted.

One end of the cross shaft 51 is provided with a rope sheave 54 about which is trained a tilting cord or rope 55 for rotating the worm 50 in either direction, whereby the slats of the blind may be tilted as desired. The rope 55 hangs through an opening 56 formed in the bottom panel 4 of the head casing 1.

The cross frame 37, like the cross frame 36, is provided with a foot flange 57. The cross frame 37 is also provided with vertical side edge flanges 58 and 59 which lie in abutting contact with the front and rear panels 5 and 6 respectively of the head casing 1. The flanges 58 and 59 terminate in upwardly projecting lugs or ears 60 and 61 respectively which extend into the channels 9 and 10 formed along the upper edges of the panels 5 and 6 respectively and tend to stiffen the head casing 1.

Pressed out of the main plate portion 62 of the cross frame 37 is a portion 63 of said plate which is bent at right angles to said plate and then parallel to said plate. The parallel portion 63 is apertured at 64 to form a bearing for the second end of the tilt shaft 35.

Secured to one side of the main plate 62 of the cross frame 37 is a supplementary frame comprising a plate 65 having arms 66 and 67 by which said supplementary plate is attached to the main plate 62, through rivets 68 and 69. The supplementary frame 65 comprises a pair of parallel laterally spaced wall portions 70 and 71 which extend at right angles to the plane of the plate 62 and support a shaft 73 on which is rotatably mounted a pair of plain faced wheels 74. A pair of parallel elevating cords 75, 75 are trained around the wheels 74 and through an opening 76 formed in the plate 62. The elevating cords 75 then pass under a roller 77 which is rotatably mounted on a fixed shaft 78 carried by a pair of lugs 79 which form a part of supplementary frame 65.

From the guide roller 77, the elevating cords 75 extend longitudinally through the head casing 1 and pass around guide rollers 80 and 81 from which the ropes 75, 75 drop through openings 82, 82 formed in the bottom panel 4 of the head casing 1 and through transverse slots 83, 83 formed in the slats 32, 32, intermediate the opposite edges of each of the tapes 33, 33, the lower ends of the elevating cords 75, 75 being attached to the bottom rail 31 of the blind in the usual manner.

Within the supplementary frame 65, between the parallel wall portions 70 and 71 thereof, the cords 75, 75 are maintained in separated side-by-side relation to each other by a separating

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plate 85, which lies intermediate the rope guide wheels 74, 74. The separating or dividing plate 85 is held in position by the shaft 73 and is prevented from rotating about said shaft by a transversely extending pin 86 which is anchored at its opposite ends in the parallel wall portions 70 and 71 of the supplementary frame 65.

Pivotaly mounted on the opposite ends of the pin 86, adjacent the walls 70 and 71 respectively, are side arms 87, 87 of a U-shaped lever 88, said side arms being connected by a transversely extending portion 89 of the lever 88. Mounted in the lever 88, between the side arms 87, 87, is a cord locking latch 90 having trunnions 91, 91 which are rotatably mounted in said side arms 87, 87 adjacent the cross bar 89 of said lever. The latch 90 is provided with a convex serrated surface 92 which is adapted to engage the elevating cords 75. Below its trunnions 91, 91 the latch 90 is provided with a pair of toes 93, 93 lying at opposite sides respectively of the dividing plate 85, which latter is provided with an extended arm 94, as shown in Fig. 8.

In Figs. 2, 3 and 8, the latch 90 is shown in inactive position which it would normally occupy when the blind is fully extended, as illustrated in Fig. 1. In order to elevate the slats 32, and the bottom rail 31 of the blind, the freely hanging portions of the elevating cords 75, 75 which extend downwardly from the wheels 74, 74 are pulled downwardly, as indicated by the arrow *d* in Fig. 2, which raises the bottom rail 31 and the superposed slats 32, 32 successively. When the desired elevation of the bottom rail and slats has been attained, the cords 75, 75 are swung to the right, as indicated by the arrow *e* in Fig. 8. By this action, the cords 75, 75 press upon the toes 93, 93 of the latch 90 swinging said latch about its trunnions 91 and throwing the convex serrated surface 92 into contact with the ropes 75, 75. Then, by slightly retracting the pull on the cords 75, 75, while maintaining the serrated surface 92 of the latch 90 in contact with said cords, the cords tend to lift the latch 90 and, in so doing, swing the lever 88 about its pivot 86, by reason of the pivot 86 of the lever 88 being eccentric with respect to the shaft 73 about which the rope wheels 74 rotate. The upper inner edge 95 of the cross bar 89 of the lever 88 is caused to bear against the concave face 92a of the latch 90 and force the serrated convex surface 92 of said latch into tighter gripping contact with the rope 75 while pressing said ropes tightly against the peripheral surfaces of the rope wheels 74, thus retaining the slats at the desired elevation.

If for any reason the depending portions of the ropes 75, 75 should be totally released, accidentally or otherwise, as a person is operating said depending portions of said ropes to elevate the slats, such release, due to the weight of the slats, would cause the depending portions of the ropes 75, 75 to move upwardly. The frictional contact of the toes 93 and the serrated convex surface 92 of the latch 90 against the ropes 75 would automatically swing the lever 88 upwardly and jam the latch 90 into locking contact with the cords 75, thereby preventing the slats from dropping to the full extent of the supporting tapes 33, which frequently is responsible for damage to the slats and the operating mechanisms of a Venetian blind.

The locking latch 90 is released by merely pulling downwardly on the depending portion of the elevating cords 75, 75 which effects reverse rocking of the lever 88 and a complete releasing of

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the latch 90 from said cords. Then, by swinging said cords in the direction opposite to that designated by the arrow *e* in Fig. 8, said cords may be operated to either raise or lower the slats, as desired, after which the swinging of the cords in the direction of the arrow *e* will again effect locking of the slats in the position to which they have been elevated.

The tape drum segments 34 consist of a pair of axially spaced end plates 96, 96 integrally connected by a longitudinal flat top plate 97, to the opposite longitudinal edges of which are connected resilient arcuate side plates 98, 98. The top plate 97 is provided with longitudinally extending, laterally spaced fingers 99, 99 which are adapted to extend into hems 100, 100 formed at the upper ends of the tape 33, 33, a gap 101 being provided intermediate the ends of the inwardly projecting fingers 99, 99 to afford attachment of the hems 100 to said fingers.

The resilient side plates 98, 98 are provided to yield and relieve strain on the tapes 33, 33 when the slats are tilted to a maximum extent in either direction and to permit the tapes 33, 33 to assume a closely adjacent relationship when the slats are fully closed for the purpose of reducing the space between adjacent edges of successive slats to a minimum.

The end plates 96, 96 are provided with rectangular openings 102 for passage of the rectangular tilt shaft 35 therethrough. The rectangular openings 102 are elongated upwardly in the end plates 96 to receive bow springs 103, 103, which bear frictionally on the upper side of the rectangular shaft 35 and maintain the drum segments 34 in any position to which they may be slidably adjusted axially of the shaft 35.

As previously noted, the cross frames 36 and 37 tend to stiffen the head casing 1. In blinds of narrow widths, the frames 36 and 37 suffice to maintain the front and back panels 5 and 6 of the casing 1 in substantially rigid parallel relation to each other. In blinds of the wider variety, it is preferable to employ an intermediate stiffening cross frame, as indicated in Figs. 9 and 10. As shown in Fig. 10, this intermediate cross frame comprises a body plate 105 having a foot flange 106 adapted to rest on and be secured to the bottom panel 4 of the head casing 1. The plate 105 is provided with vertical edge flanges 107 and 108 which terminate at their upper ends in lugs or ears 109 and 110 which are adapted to fit within the channels 9 and 10 respectively at the upper edges of the front and back panels 5 and 6 of the head casing 1. The upper edge of the plate 105 is centrally apertured at 111 and provided with a flange 112 affording a bearing to receive and rotatably support the central portion of the tilt shaft 35, intermediate the drum segments 34, 34. The plate 105 is also apertured at 113 below the aperture 111 to afford free passage for one of the elevating cords 75.

Obviously, additional stiffening cross frames of this same general character may be provided at desired intervals throughout the length of the head casing 1 to provide any degree of rigidity in the head casing 1 which may be deemed necessary or advisable.

The back flanges 13 of the end brackets 2 and 3, as previously noted, are provided with openings 25 for receiving screws or nails by which said brackets may be fastened to the face of the window trim under certain circumstances and the opposite ends of the back panel 6 of the head casing 1 is provided with longitudinally elongated

slots 115 extending inwardly from the end edges of said panel to afford clearance around the openings 25 for the heads of the attachment screws passing through the openings 25, to provide for any relative adjustment that may be made between the end brackets 2 and 3 and the adjacent ends of the head casing 1.

The guide pulleys 30 and 31 are mounted in carriers 116, 116 which are secured to the bottom panel 4 of the head casing 1, by rivets 117, 117 which are remote to the guide rollers 30 and 31 respectively. While the rivets 117 firmly maintain the carriers 116, 116 in place, they also afford a slight axial adjustment of the rollers 30 and 31 to provide for accurate alignment of the ropes 75, 75 in passing through the slots 82, 82 in the bottom panel 4 to prevent chaffing of the ropes against the edges of the openings 82, 82 if proper alignment between the ropes 75 and slots or openings is not effected.

When a complete blind is being packed for shipping, a bow spring 120 is placed in the head casing 1, intermediate the tape drum segments 34, 34, with upwardly bent ends 121, 121 of the spring hooked under the top flanges 7 and 8 of the front and rear panels 5 and 6 respectively, and with the center 122 of the spring bearing on the upper side of the rectangular tilt shaft 35, to retain the shaft against vertical displacement from its supporting bearing in the cross frame 37 in transit. This spring is removed and discarded when the blind is being hung for use.

We claim:

1. A head casing structure for Venetian blinds; comprising a member including integral bottom, front and back panels; longitudinal channels formed at the upper edges of said front and back panels respectively, a cross-frame for supporting one end of a tilt rod extending transversely in said member and comprising a plate, and lateral extensions on said plate being provided with upstanding projections at opposite sides of the plate engaged within the longitudinal channels at the upper side edges of the front and back panels.

2. A head casing structure for Venetian blinds; comprising a member including integral bottom, front and back panels; longitudinal channels formed at the upper edges of said front and back panels respectively, a cross-frame for supporting one end of a tilt rod extending transversely in said member and comprising a plate, a foot flange on said plate secured to the bottom panel of the member, and lateral extensions on said plate being provided with upstanding projections at opposite sides of the plate engaged within the longitudinal channels at the upper side edges of the front and back panels.

3. A head casing structure for Venetian blinds; comprising a member including integral bottom, front and back panels; longitudinal channels formed at the upper edges of said front and back panels respectively, a cross-frame for supporting one end of a tilt rod extending transversely in said member and comprising a plate, a foot flange on said plate secured to the bottom panel of the member, and side flanges on said plate having lateral extensions provided with upstanding projections at opposite sides of the plate engaged within the longitudinal channels at the upper side edges of the front and back panels.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,957,272	Kuyper	May 1, 1934
2,135,795	Burns	Nov. 8, 1938
2,141,502	Ajovelo	Dec. 27, 1938
2,155,945	Lewis	Apr. 25, 1939
2,172,657	Haase	Sept. 12, 1939
2,220,796	Stuber	Nov. 5, 1940
2,334,132	Sherwood	Nov. 9, 1943
2,455,135	Nelson	Nov. 30, 1948
2,465,246	Mackin	Mar. 22, 1949