

[54] VERTICAL VENETIAN BLINDS

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[52] U.S. Cl. **160/166 A; 160/172**
[51] Int. Cl.² **E06B 9/26**
[58] Field of Search **160/166-178,**
160/166 A

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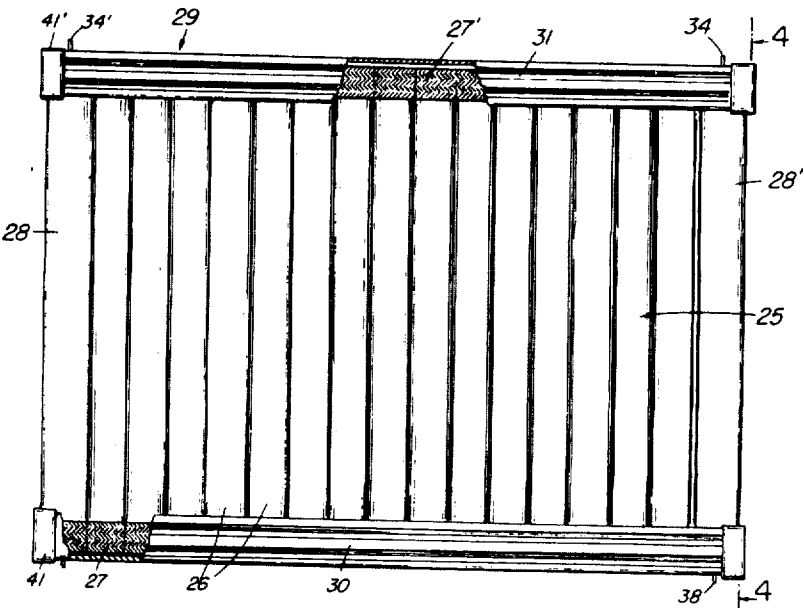
Primary Examiner—Philip C. Kannan
Attorney, Agent, or Firm—Lucke & Lucke

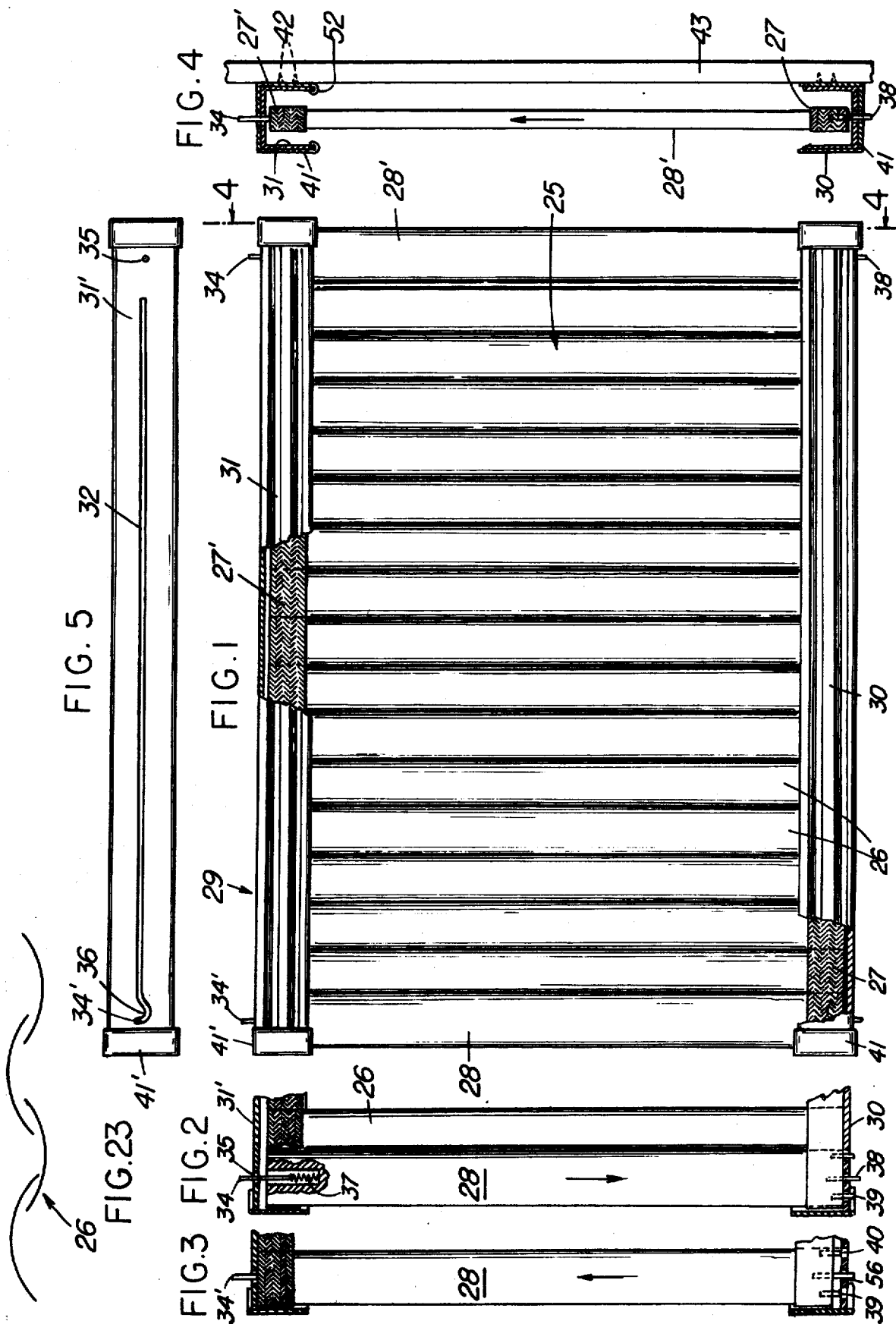
[57] **ABSTRACT**

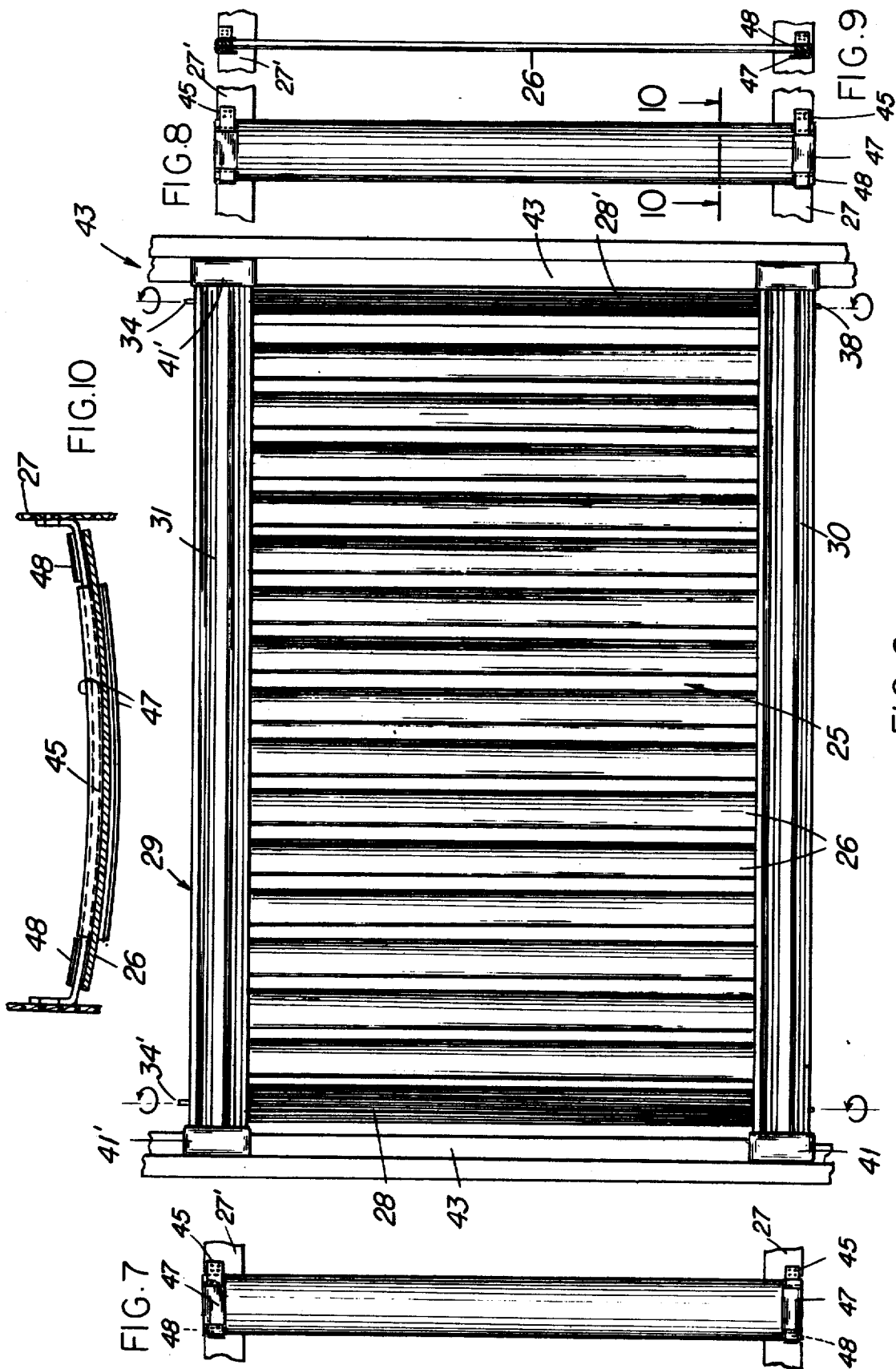
Vertical Venetian blinds supported by a lower horizontal U-shaped channel and guided by an upper inverted U-shaped channel member. The ends of the slats forming the blinds may be connected together by unseen conventional tape or by strings with ladders within the channels to an end rail on either side. A releasable pin projects downwardly from the end rails through an aperture in the lower channel to retain the blind in fully extended position. The end rails can be rotated in place to lock the overlapped slats in closed position.

A rigid pin extends upwardly from the top of the end rails which cooperates with means disposed on the upper channel for holding the slats in a vertical position when the blind is drawn to either side. Each ladder is secured within a bentover portion or portions of both ends of the slats.

16 Claims, 23 Drawing Figures







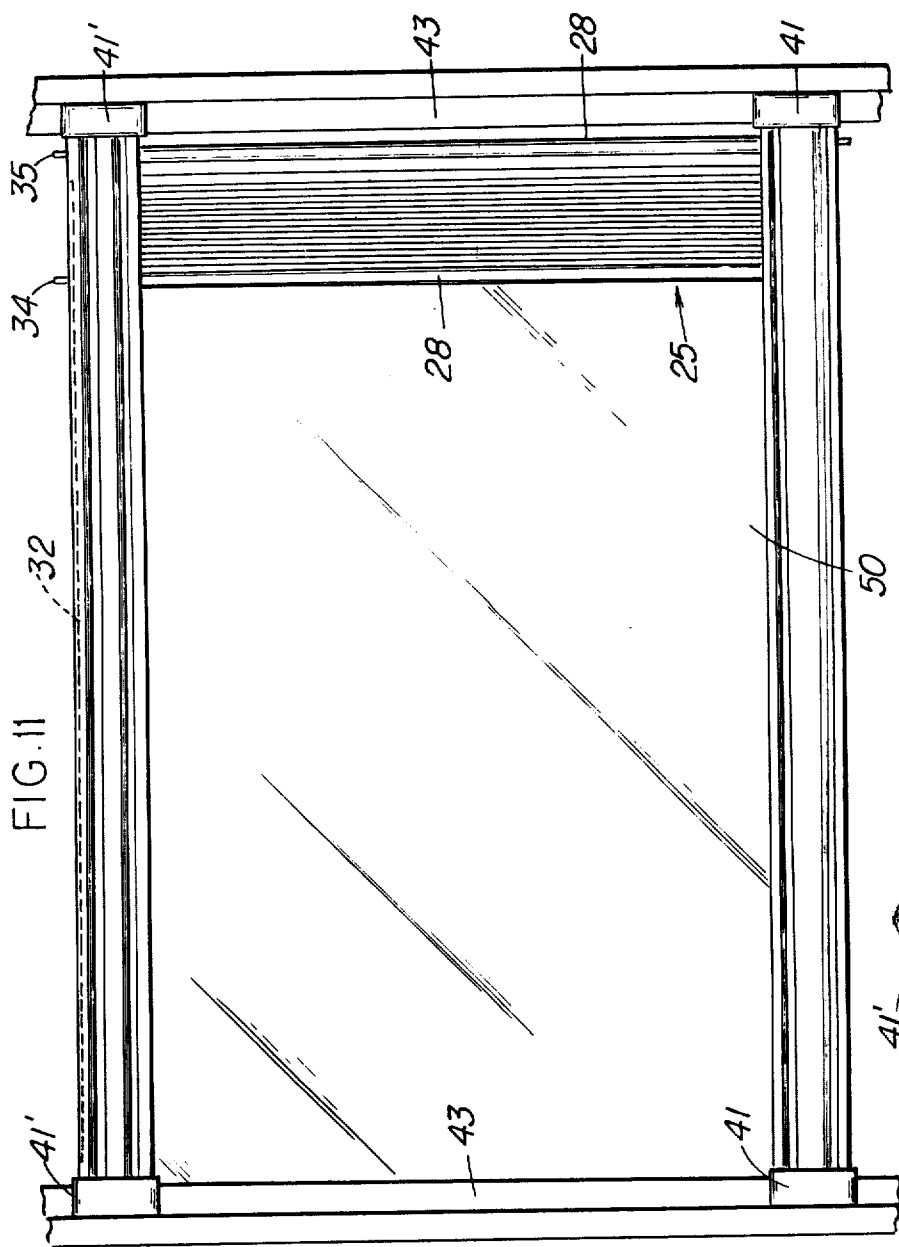
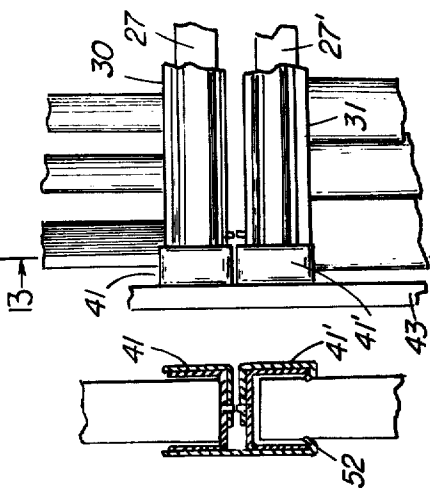


FIG. 12

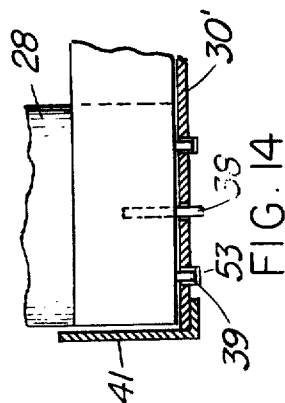


FIG. 14

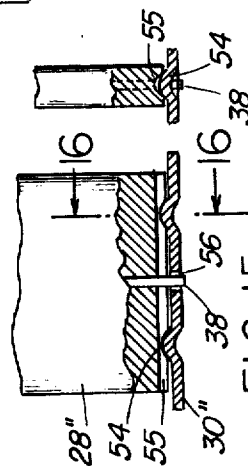


FIG. 15

FIG. 16

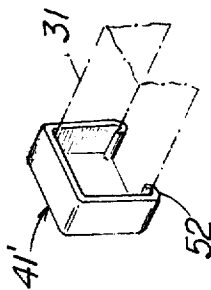


FIG. 20

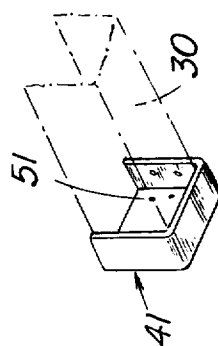


FIG. 21

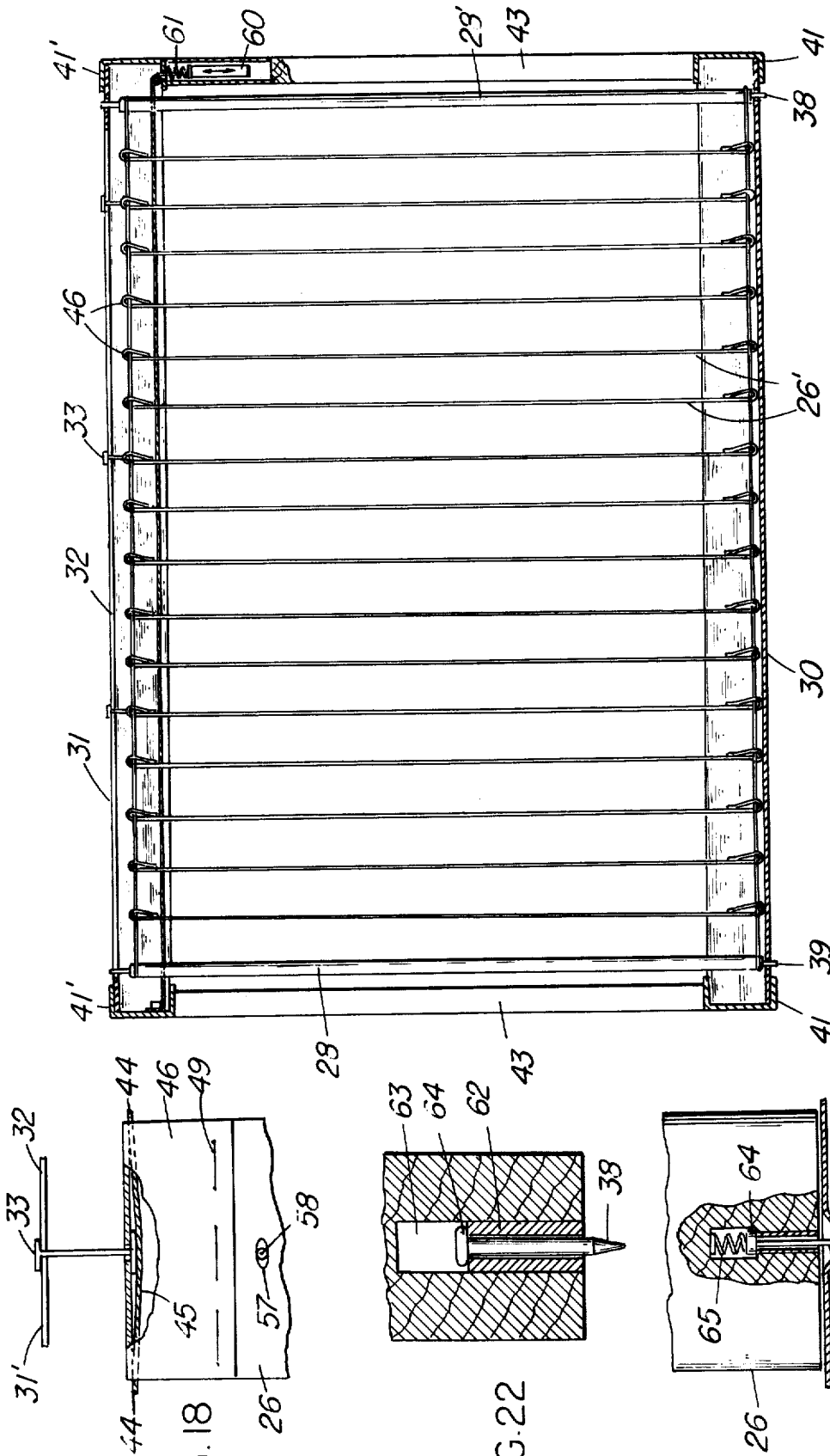


FIG. 17

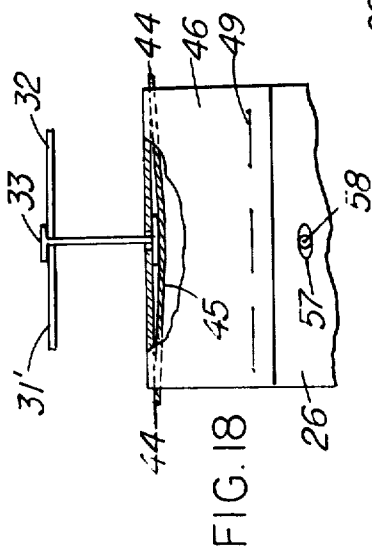


FIG. 18

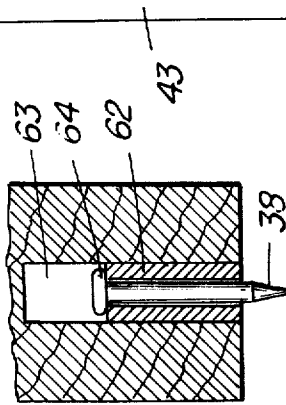


FIG. 22

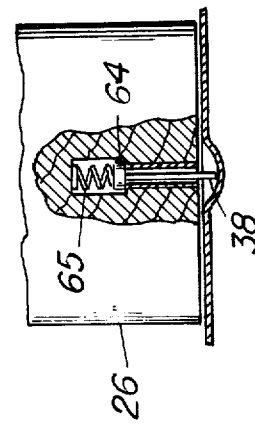


FIG. 19

VERTICAL VENETIAN BLINDS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to Venetian blinds and in particular to vertically mounted Venetian blinds having cloth, wood or metal slats.

2. Description of the Prior Art

Conventional Venetian blinds have several disadvantages. First, the horizontal slats are prone to dust build-up and are difficult to clean. If used in an open window there is nothing to stop them from blowing freely in the breeze, especially at the bottom. The pull cords break with use and the vertical tapes discolor and tear requiring periodic replacement.

Known vertical blinds are constructed on the traverse principle of drawing them to the sides by a pull cord. The metal slats are completely supported by a top track. The slats are spaced apart by either a chain or linked brackets mounted in the track to which the slats are attached. The slats hang by gravity from the track and are only connected to each other by spacers at the bottom. The blinds are rotatably adjusted by pulling a cord attached to a tilter which moves the track backwards or forwards thereby pushing the slats closed in either desired direction.

Cloth vertical slats are folded and sewed to form a loop at top and bottom. The loops are slipped onto a series of spaced prongs which project from the track and move from side to side to tilt the blind. These known constructions are both complicated and costly to manufacture.

SUMMARY OF THE INVENTION

The present invention is of a more simplified and economical construction and has many advantageous practical features over the prior art. The blind per se is mounted between two wooden end rails within an assembled frame having a bottom U-shaped channel, a top inverted U-shaped channel with a center longitudinal guiding groove running along the horizontal upper plate thereof. The slats may be connected to the end rails by conventional tape or by strings with ladders, running horizontally rather than vertically and completely hidden from view within the channels. This not only protects the tape from atmospheric conditions, soil, fading or discoloration, but also removes the stress of supporting horizontal slats. The end rails can be positively positioned relative to the channels and actually locked in closed position so that the blind cannot blow in the breeze or be inadvertently pushed aside by a trespasser.

One rail is raised and tilted from locked position and then pushed toward the opposite rail to draw the blind. The slats are retained in parallel position by being bent over the ladders, i.e., the ends of each slat are slit, then the two outer portions are bent one way and the center portion is bent the other way, so that the blind can be partially opened by merely rotating the rails to any desired degree.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be more particularly described with reference to the drawings in which:

FIG. 1 is a front elevational view of a unit containing a verticle Venetian blind locked in closed position

within its channel members which are partially broken away to show the connecting tapes;

FIG. 2 is an elevational view of the left end rail, partly in section, and depressed in the direction of the arrow to show the means of locking the blind in the closed position illustrated in FIG. 1;

FIG. 3 is a similar view of the end rail shown in FIG. 2, but raised in the direction of the arrow to unlock it from the lower channel member;

FIG. 4 is an end elevational view of the right end rail of the blind in raised unlocked position with its mounting brackets secured to a window frame, taken on line 4—4 of FIG. 1;

FIG. 5 is a top plan view of the blind illustrated in FIG. 1 showing one type of a guiding groove in the upper channel member for retaining the slats in upright centered position;

FIG. 6 is a front elevational view of the blind illustrated in FIG. 1, but with the slats shown in partially opened position by unlocking the rails and turning them in the direction of the arrows;

FIG. 7 is a detailed view of one vertical slat showing one means of attaching each end thereof to a horizontal tape running across the top and bottom of the blind;

FIG. 8 is a similar view to that of FIG. 7, but with the ends of the slats slitted to form a large center fold bent in one direction and two small outer folds bent in the opposite direction in which the ladder is woven in and out so that it is enclosed within all three folds;

FIG. 9 is a side elevation of the tape mounted slat shown in FIG. 7;

FIG. 10 is a greatly enlarged sectional view taken along line 10—10 of FIG. 8;

FIG. 11 is a front elevational view of a vertical Venetian blind with one rail manually released from its left-hand extended position and pushed all the way toward the right rail to open the blind;

FIG. 12 is a partial detailed view of two vertical Venetian blind units mounted to a window frame in superimposed position to afford different lighting arrangements in the lower and upper parts of a window;

FIG. 13 is an end view of the dual blind arrangement taken from line 13—13 of FIG. 12;

FIG. 14 is a detailed view of a locking arrangement at the bottom of the rails;

FIG. 15 is a modified locking arrangement to that shown in FIGS. 2, 3 and 14;

FIG. 16 is an end view of the rail taken on line 16—16 of FIG. 15;

FIG. 17 is a front elevational view partly in section of a tapeless Venetian blind unit with the slats fully open to edge position showing the slats spaced by string connected ladders to the rails, wherein the ends of each slat are bent over to fully enclose each ladder. The side rails and slats are slotted near the top to allow a regular Venetian blind cord to pass therethrough. The slats slide to and from open position on the cord which is held taught by a weight at one end;

FIG. 18 is an enlarged fragmentary rear view, partly in section, of the top of a slat shown in FIG. 17 with its end folded over a ladder of a string "tape" and then stapled to retain the ladder within the fold;

FIG. 19 is an enlarged view of the bottom of an end rail partly in section, showing a modified means of anchoring the rail to the channel;

FIG. 20 is a detailed perspective view of a bracket for mounting the lower channel member to a window frame;

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FIG. 21 is a similar perspective view of a bracket for mounting the upper channel member to a window frame;

FIG. 22 is a similar view to that of FIG. 19 showing a further modification of the bottom retaining pin; and

FIG. 23 is a partial schematic plan view of a blind in which the slats are alternately reversed so that their edges overlap to obtain an exterior light proof result.

DESCRIPTION OF PREFERRED EMBODIMENTS

The Venetian blind generally designated 25 illustrated in FIG. 1 shows a plurality of vertical metal slats 26 mounted between an upper and lower length of conventional blind tapes 27, 27' which are attached to a wooden rail 28, 28' at each end thereof. The rails are locked in closed position within a unit 29 consisting of a U-shaped bottom channel 30, and an inverted U-shaped upper channel 31.

A longitudinal groove 32 is disposed in the center of the horizontal plane or top 31' of the upper channel 31. The heads of I-shaped elements 33, see FIGS. 17 and 18, attached to the top folded portion of spaced slats 26 ride along the groove to retain the blind in upright position when it is pushed to one side or the other of the unit 29 as illustrated in FIG. 11.

A pin 34 which may be resiliently mounted as shown in FIG. 2, is inset in the top of the rails so that a portion thereof projects through a hole 35 in the top or roof 31' of the upper channel as shown at the right of FIG. 5. Or the guiding groove 32 can extend to the end of the channel as shown at the left of FIG. 5 in which case a restraining or blocking curve 36 is provided to prevent a rigid pin 34' from inadvertently slipping to the right along groove 32.

As will be seen from FIGS. 2 and 3, a pin 38 projects downwardly from the center of rails 28, 28' through an aperture 56 in the bottom of channel member 30 to retain the blind in fully extended position across a window. When it is desired to close the blind 25 to the position illustrated in FIG. 1, the end rails are pushed to ultimate position within the unit and turned in place until two prongs 39 disposed on either side of pin 38 are depressed and seated in complementary holes 40, as shown in FIG. 2. This locks the blind in a tightly closed position against inadvertent opening. The blind may be locked only in closed position, which is an important safety feature. To unlock the blind, rails 28, 28' are raised in the direction of the arrow shown in FIG. 3 and then turned to any desired degree of opening as seen in FIG. 6.

To move the blind to the left of unit 29, pin 34 is depressed against the action of spring 37, see FIG. 2, to escape from retaining hole 35 and pin 38 pushed upwardly to unseat it from channel 30. Then rail 28' is pushed to the left until pin 34 returns to its full projection through groove 32, while pin 38 rides along the bottom or floor of channel 30.

The ends of channel members 30, 31 are enclosed by brackets 41, 41', see FIGS. 20 and 21, to contain the blind 25 within unit 29. Holes 51 are provided at the rear and end of the brackets through which screws 42 can fasten the brackets to the mullion bars 43 of a window frame as shown in FIG. 4. After the brackets are fixed in place, the channel members are seated in them and then the blind 25 is inserted between the channels. The side portions of upper brackets 41' terminate in inwardly curved lips or edges to form a pair of parallel curved flanges 52 which support and retain the lower

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edges of upper channel 31. Or it may be preferable to fit the upper channel 31' over its end brackets, not shown.

Although the slats can be joined by conventional cloth or plastic tape 27, 27' as shown in FIGS. 1, 2 and 3 they can more advantageously be joined by parallel strings 44 with connecting ladders 45, see FIGS. 17 and 18. These strings are substantially friction free and only half the cost of regular tapes. There are several optional ways of attaching the slats to the ladders of both cloth and string tape, but in most instances the ends of the slats are bent over at top and bottom to form a single fold 46, as shown in FIGS. 17 and 18, or a center fold 47 bent over in one direction with two end folds 48 bent over in the opposite direction as shown in FIGS. 8 and 10.

The ladder is retained, within the single fold or woven between two or more folds, by staples 49 as illustrated in FIG. 18. Or by crimping, pop riveting, pressing part of one layer of slat through the other, or by gluing, (not shown) the folded or bent ends of the slats together to form a closed loop or loops 46, 47 and 48. Alternatively, the ends of the slats can be tightly rolled over to enclose the ladders, not shown, etc.

Where it is desirable to vary the light conditions between the upper and lower parts of a window, two superimposed units can be used in cabaret fashion as illustrated in FIGS. 12 and 13. Here the lower blind 25 is closed while the upper blind is partially opened.

FIG. 14 shows a modified lower channel formation with two downwardly projecting indentations 53 into which locking prongs 39 are seated when the blind is drawn, thus locking the rails 28, 28' against rotation.

A modified locking means is illustrated in FIGS. 15 and 16. Here channel member 30'' is pressed upwardly to form two indentations 54 and the center of rail 28'' is gouged to form a complementary recess 55 which straddles the raised ridges 54 and locks the rail in closed position when it is pushed downwardly to that shown in FIG. 16. FIG. 15 shows rail 28'' raised sufficiently to clear ridges 54 while the pin 38, still inserted in hole 56, retains the blind in fully extended position. When the pin 38 is raised to escape hole 56 it will glide over ridge 54 if rail 28'' is pushed to either side of the window.

FIG. 17 shows a modified means of retaining the slats in upright, evenly spaced position when manually drawn across a window. Here rails 28, 28' have been rotated to fully open the slats 26' to edge position. In addition to being spaced by ladders 45 between parallel strings 44, see FIG. 18, these slats are slotted as at 57, beneath the top fold 46, through which a Venetian cord 58 passes from one side of a window frame 43 to a weight 60 counter sunk in the opposite side of the window frame. Weight 60 acts against a spring 61 to keep cord 58 taught against the friction caused by slats 26' sliding across it when the blind is drawn from side to side, and yet is sufficiently extendable in length when the slats 26' are rotated to closed position.

At spaced intervals the I-shaped elements 33 with their heads riding astride groove 32, are attached to the top fold 46, 47 of the slats to keep them in proper alignment when being pushed from side to side.

Pin 38 can be moveable in a slot in the bottom of the rails so that it can be forced upwardly to clear hole 56 in the bottom channel before the blind can be pushed from one side to another. Alternatively, pin 38 can be seated in a sleeve 62 partially lining the slot 63, as seen

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in FIG. 22, so that the pin can be pushed upwardly until its head 64 abuts the end of the slot, whereupon it falls by gravity until head 64 strikes the top of sleeve 62.

Another modification is illustrated in FIG. 19 wherein a spring 65 is mounted between the end of slot 63 and head 64 so that pin 38 is forced downwardly by the spring when upward pressure is released.

All Venetian blind slats have a convex outer surface and a concave inner surface. To positively close a Venetian blind, the slats can be alternately reversed when attaching them to the ladders so that the edges of the slats overlap as indicated in FIG. 23 to give one privacy from intruders.

One method of installing the instant vertical blinds is first to install the two upper brackets to a window frame and mount the inverted U-shaped channel over them. Then the two lower brackets are attached to the bottom of the frame and the other U-shaped channel member is fitted into them. The blind is then tilted and inserted between the channel members and straightened up so that the heads 33 of the I-shaped members are turned to pass through groove 32 before riding astride it until rails 28, 28' are extended full length across the window when upper pins 34, 34' and lower pins 38, 38' are seated in their cooperating apertures in the upper and lower channel members, respectively.

The forms of the invention here described and illustrated are presented merely as examples of how the invention may be embodied and applied. Other forms, embodiments and applications of the invention will suggest themselves to those skilled in the art.

I claim:

1. A Venetian blind comprising two vertical end rails, a plurality of vertical slats, a horizontal tape provided with transverse ladders connecting said rails at top and bottom thereof, said ladders spacing said slats between said rails, a horizontal lower member and a horizontal upper member, said lower member supporting said blind, and guide means disposed in said upper member for retaining said blind in upright position when being drawn from end to end.

2. A Venetian blind according to claim 1, wherein an upright channel member forms said lower member and an inverted channel member forms said upper member.

3. A Venetian blind according to claim 1, wherein said guide means comprises a groove running longitudinally along the roof of said upper member.

4. A Venetian blind according to claim 3, wherein two angle members mounted edge to edge form said upper member with said edges spaced apart to form said groove.

5. A Venetian blind according to claim 1, wherein both ends of each said slat are bent over to enclose one of said ladders.

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6. A Venetian blind according to claim 5, wherein each of said ends are folded over one of said ladders, and including means for retaining said ladders within the resulting fold.

7. A Venetian blind according to claim 6, wherein portions of said ends are folded over in opposite directions and said ladder is retained within each resulting fold.

8. A Venetian blind according to claim 7, wherein the ends of said slats are slit to form two small end flaps and one large center flap, said center flap being folded in one direction and said end flaps being folded in the opposite direction and said ladder being trapped beneath said center and end folds.

9. A Venetian blind according to claim 1, including retaining means disposed in said rails wherein a first pin projects upwardly from the top of said rail through a first aperture in said upper channel and a second pin projects downwardly from the bottom of said rail through a second aperture in said lower channel.

10. A Venetian blind according to claim 9, wherein a longitudinal groove through the roof of said upper member forms said guide means and said first pin is depressably mounted against a first spring within said rail to escape said first aperture and rebound into said groove for gliding therein when said blind is drawn.

11. A Venetian blind according to claim 9, wherein said second pin is depressably mounted against a second spring within said rail to escape said second aperture for gliding across the floor of said lower channel when said blind is drawn.

12. A Venetian blind according to claim 9, wherein at least two rigid prongs are disposed on either side of said second pin, said prongs projecting downwardly through complementary apertures in said lower channel to lock said blind in closed position.

13. A Venetian blind according to claim 1, wherein the inner and outer surfaces of said slats are alternated in said blind so that their reversely curved edges overlap thus producing a view-proof blind when closed.

14. A Venetian blind according to claim 1, wherein said tape is hidden from view behind said upper and lower members.

15. A Venetian blind according to claim 1, wherein slots are disposed proximate the top of said slats and said rails, a spring biased weight is counter sunk within a supporting structure proximate the top of one of said rails, a cord fastened between said weight and the opposite of said rails, said cord passing through said slots and said slats sliding across said cord from side to side when pushed by one of said rails to open and closed positions.

16. A Venetian blind according to claim 3, wherein a blocking curve terminates at least one end of said groove.

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