March 21, 1961 E. F. TAYLOR ET AL 2,975,831

ROTARY LOUVER TRAVERSE BLIND

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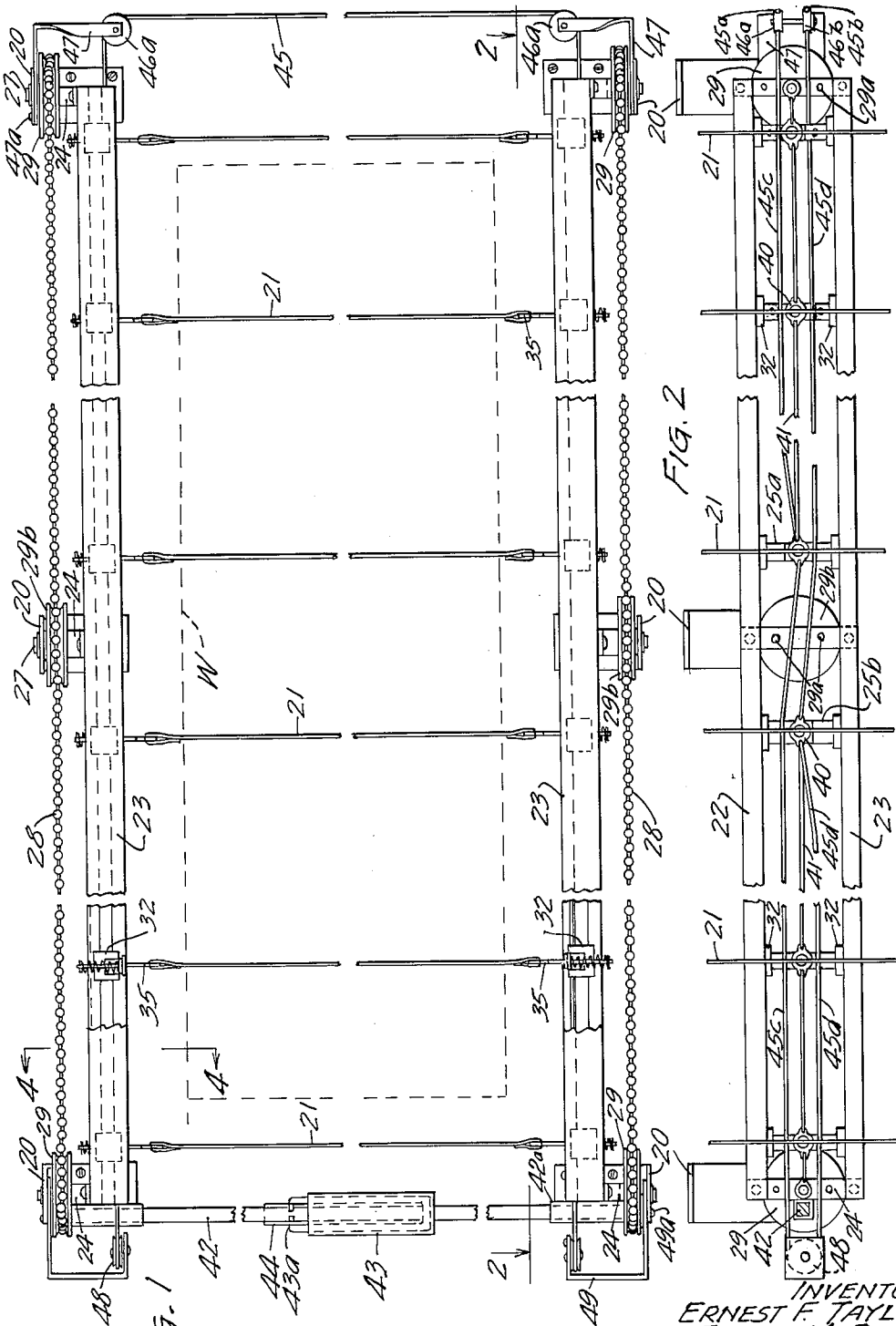


FIG. 1

FIG. 2

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FIG. 3

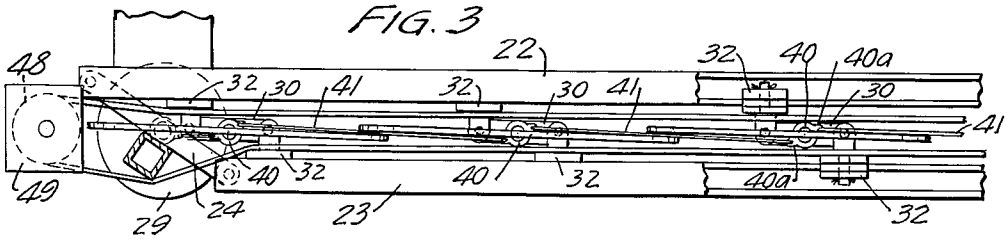


FIG. 4

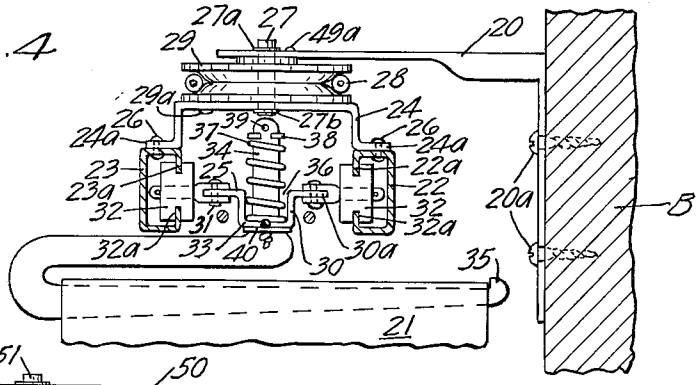


FIG. 5

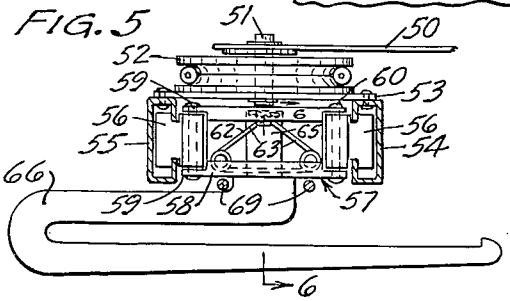


FIG. 6

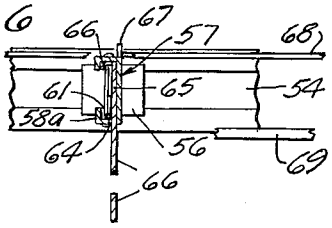


FIG. 7

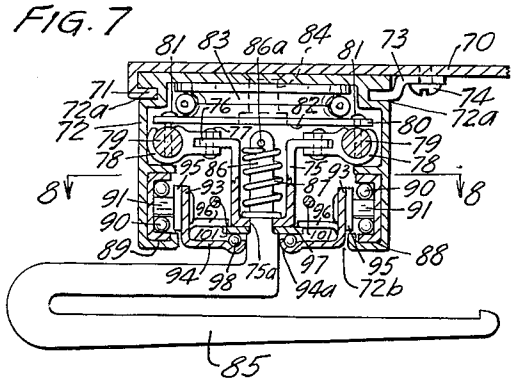
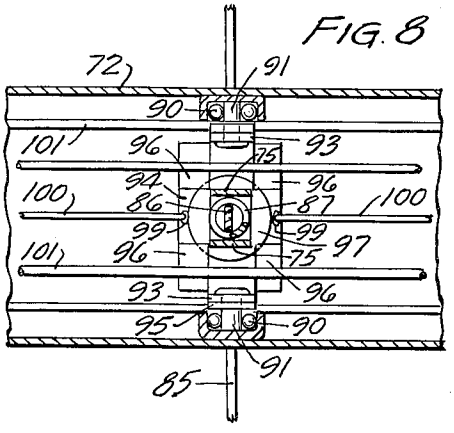


FIG. 8



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ROTARY LOUVER TRAVERSE BLIND

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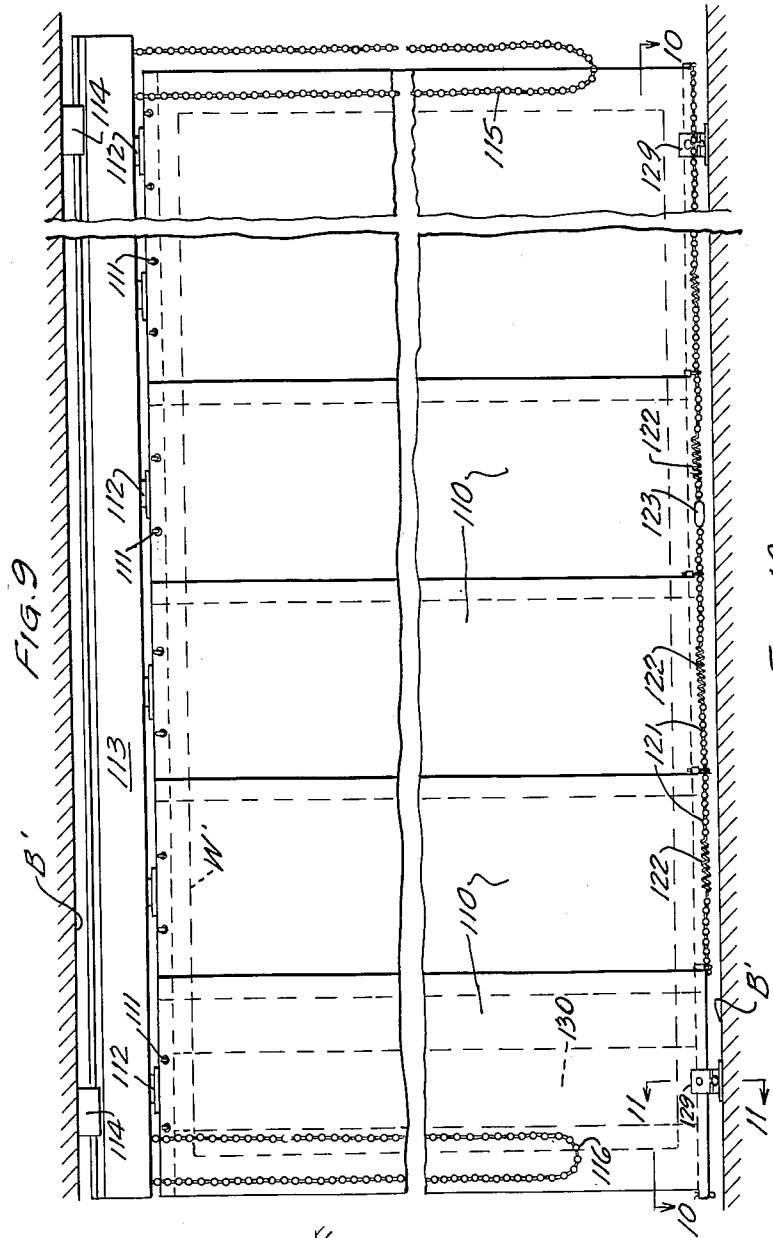


FIG. 9

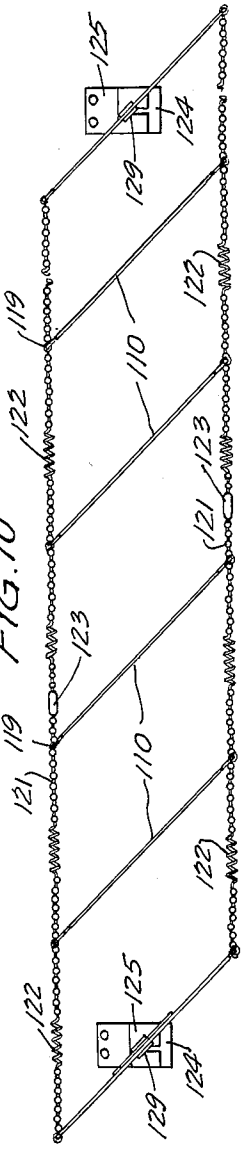


FIG. 10

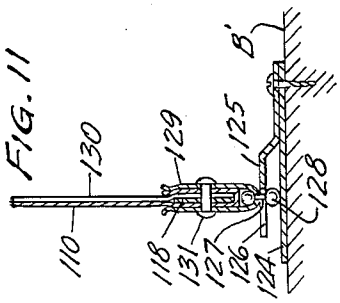


FIG. 11

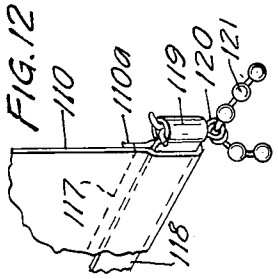


FIG. 12

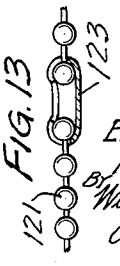


FIG. 13

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ROTARY LOUVER TRAVERSE BLIND

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Filed Oct. 10, 1957, Ser. No. 689,397

3 Claims. (Cl. 160—176)

This invention relates to window blinds and more particularly relates to louver control mechanism in such a blind.

An object of our invention is to provide a new and improved movable louver blind construction which is substantially simpler and less expensive than blinds heretofore known.

Another object of our invention is the provision of a novel blind construction wherein the louver mountings are carried in tracks which are movable to facilitate rotation and transverse movement of the louvers for opening and closing of the blind.

A further object of our invention is to provide an improved blind construction wherein the upper and lower louver mounting tracks are simultaneously movable for rotating the upper and lower ends of the louvers.

These and other objects and advantages of my invention will more fully appear from the following description made in connection with the accompanying drawings wherein like reference characters refer to the same or similar parts throughout the several views and in which:

Fig. 1 is a front elevation view of the window blind construction, partly in section and partly broken away;

Fig. 2 is a section view of the window blind construction taken on a substantially horizontal plane as indicated at 2—2 in Fig. 1;

Fig. 3 is a detail section view similar to Fig. 2, but showing the louvers or window blinds in closed condition;

Fig. 4 is a detail transverse section taken on a vertical plane as indicated substantially at 4—4 in Fig. 1;

Fig. 5 is a detail transverse section view similar to Fig. 4, but showing a modified form of the invention;

Fig. 6 is a detail section view taken on a plane as indicated substantially at 6—6 in Fig. 5;

Fig. 7 is a detail transverse section view similar to Fig. 4, but showing another modified form of the invention;

Fig. 8 is a detail section view taken on a substantially horizontal plane as indicated at 8—8 in Fig. 7;

Fig. 9 is a front elevation view, partly broken away, showing another form of the invention;

Fig. 10 is a detail section view taken on a horizontal plane substantially at 10—10 in Fig. 9;

Fig. 11 is a detail section view taken on a plane at substantially 11—11 in Fig. 9;

Fig. 12 is a detail perspective view showing a portion of the invention shown in Fig. 9; and

Fig. 13 is a greatly enlarged view of a section of the chain interconnecting the louvers or blinds in Fig. 9.

The window blind construction shown in Figs. 1–4 is adapted for mounting at the opposite sides of a window opening W. The window blind construction is provided with supporting structure which consists in a plurality of angle brackets 20 adapted to be secured as by screws 20*a* to the building wall B. Identical brackets 20 are used both at the upper and lower edges of the window opening except that the brackets 20 at the bottom of the window opening are oriented in an inverted position.

The window blind construction includes a plurality of upright parallel louvers 21 which are spaced equal distances from each other, and which may be constructed of any suitable material such as pliable fabric or substantially rigid slats or the like.

Mechanism is provided for supporting and controlling movement of the louvers 21 to facilitate rotary and transverse movement thereof relative to the window opening W. Such mechanism includes, at each side of the window opening, a pair of elongated and parallel members or tracks 22 and 23 which are adapted for movement toward and away from each other to produce rotation of the louvers 21. In the form shown, the tracks 22 and 23 are generally channel shaped and are arranged in opposed relation with each other with the channel openings facing each other. The tracks 22 and 23 are both provided with inturned track edges or flanges 22*a* and 23*a* respectively. A plurality of interconnecting members extend transversely between and are swingably related with the control members or tracks 22 and 23. Certain of the interconnecting members 24 are immovable longitudinally of the tracks 22 and 23, and others interconnecting members 25 are longitudinally movable along the tracks 22 and 23 and comprise mountings for the louvers 21.

The mechanism for moving the tracks toward and away from each other with swinging movement includes the interconnecting members 24, which comprise U-shaped straps with outturned ends 24*a* swingably connected with the tracks 22 and 23 as by pivot pins or rivets 26. A plurality of shafts 27 are provided for carrying the several interconnecting or track mounting members 24 and each of the shafts 27 projects through a suitable aperture in a bracket 20 and is retained therein as by E-ring 27*a*. The lower end of the shaft 27 projects through a suitable aperture in the member 24 and is secured therein as by E-ring 27*b*. It will therefore be seen that the tracks 22 and 23 are adapted for swinging movement toward and away from each other and about the axes of shafts 27.

Means are provided for maintaining the interconnecting members or straps 24 in parallel relation with each other so as to produce identical movement of the opposite ends of the tracks 22 and 23. In the form shown such means includes a rotary driving connection between the interconnecting members 24 at the opposite ends of the tracks 22 and 23, which driving connection is provided by an elongated endless chain 28 of the ball and swivel type, which is trained around chain pulleys 29 of conventional type adapted to restrict slipping between the chain and the pulleys. The pulleys 29 are affixed by any suitable means such as rivets 29*a* to the members 24.

As best seen in Fig. 1, it will be noted that a pulley 29*b* is mounted intermediate the opposite ends of the pair of tracks in substantially the same manner as the other pulleys and is swingably connected to the tracks by means of the strap 24. The chain 28 is trained along and in driving engagement with the opposite sides of pulley 29*b*.

The louver mountings 25 each include a generally U-shaped mounting element or strap 30 having outturned ends 30*a* swingably connected as by pins 31 to slide bearings 32 which are notched at 32*a* to receive the inturned edges 23*a* and 22*a* of tracks 23 and 22 respectively. In the form shown, the slide bearings 32 are constructed of nylon and are of square configuration. It should be understood that the bearings 32 might comprise rotary wheels for rolling along the track edges. The saddle portion 33 of the U-shaped mounting structure 30 is apertured to non-rotatably, but slidably receive shaft portion 34 of the louver mounting hook 35 therethrough,

and the saddle portion 33 also defines a notch 36 in which the spring 37 may be seated. The upper end of spring 37 bears against a washer 38 on the shaft 34 which is held thereon by means of a pin 39 through the shaft and comprises an abutment for limiting the upward movement of the spring along the shaft 34. Another washer 40 on shaft 34 and disposed below the saddle 33 is adapted to rotate with respect to the shaft 34. Washer 40 is provided with apertured ears 40*a* at the opposite sides thereof for receiving and facilitating attachment of the spacer tapes 41 between each of the adjacent louver mountings to facilitate spacing of the louvers at equal distances across the window opening.

Mechanism is provided for moving all of the tracks 22 and 23 simultaneously toward and away from each other, whereby to rotate both the upper and lower ends of each of the louvers 21. In the form shown, such means includes a vertical rod 42 extending between the opposite pairs of tracks 22 and 23 and non-rotatably secured at its opposite ends to the pulleys 29 by means of sleeves 42*a* which are affixed as by welding to the pulleys 29. The rod 42 and sleeve 43 may be squared so as to transmit rotation between the upper and lower pulleys 29. A handle 43 is swingably connected as by pins 43*a* to a bracket 44 which is affixed to the rod 42 to facilitate ready and easy turning of the rod 42.

Mechanism is also provided for producing traverse movement of the mountings 25 and louvers 21 across the window opening W. Such means includes an elongated, flexible and endless element or cord 45 which has a pair of parallel vertical runs 45*a* and 45*b* extending along one side of the window opening and which also has a pair of horizontal, parallel runs 45*c* and 45*d* extending between each pair of tracks 22 and 23. Pulleys 46*a* and 46*b* are provided at the opposite ends of the vertical runs 45*a* and 45*b* of the cord 45 for guiding the cord between the tracks 22 and 23. The pulleys 46*a* and 46*b* are journalled on horizontal axes adjacent one end of the tracks 22 and 23 and are mounted on brackets 47 which are fixed as by rivets 47*a* to the brackets 20. Pulleys 48, being journalled on vertical axes on brackets 49 adjacent the other ends of the tracks 22 and 23 are provided for mounting the cord 45 and bending the same back upon itself at the ends of runs 45*c* and 45*d*. Brackets 49 are affixed as by rivets 49*a* to the brackets 20.

As best seen in Fig. 2 the run 45*c* is affixed to the washer of louver mounting 25*a* so as to facilitate producing traverse movement of a corresponding louver; and run 45*d* is connected to the washer 40 of louver mounting 25*b* to facilitate producing traverse movement thereof and the corresponding louver. When the run 45*a* of the cord 45 is moved downwardly, and the opposite run 45*b* is correspondingly moved upwardly, the mounting 25*a* is moved to the right in Fig. 2 and the mounting 25*b* is moved to the left, causing traverse movement of the corresponding louvers outwardly toward the edges of the window opening. As the mountings 25*a* and 25*b* engage the adjacent mountings in the tracks 22 and 23, they will be carried along in an outward direction.

In the operation of this form of the invention, the louvers may be moved with transverse movement in the manner just previously described. To rotate the louvers simultaneously, the handle 43 is manipulated so as to turn the rod 42 and cause rotation of the pulleys 29. The chain 28 will cause simultaneous rotation of all of the pulleys 29, which cause the interconnecting members 24 to turn about the axes of shafts 27. As the interconnecting members 24 are turned, the tracks 22 and 23 move toward each other with a swinging movement, causing the louver mounting elements 30 to swing on the pivots 31. It will be noted that the pivots 31 at the ends of each mounting element 30 are substantially closer together than the pivots 26 at the ends of members 24. It will therefore be understood that the rotation of the elements 30 and of the louvers 21 is at a substantially faster rate than the swinging of the members 24. As best seen in Figs. 2 and 3, the members 24 swing through approximately 60 degrees, the mounting elements 30 and the louvers 31 rotate through approximately 90 degrees. Because the movement of the opposite ends of each pair of tracks are closely controlled, the rotary movements of all of the louvers 21 are identical. It will be further noted that the louvers 21 may be swung in either direction from the position shown in Figs. 1 and 2. Normally, the louvers 21 will be swung to a position substantially normal to the tracks 22 annd 23 before they are moved longitudinally along the tracks in traverse movement.

The form of the invention shown in Fig. 5 is substantially similar to that shown in Figs. 1–4, and in this form of the invention, the window blind construction also includes a mounting bracket 50 which carries a shaft 51 for rotatably mounting the chain pulley 52 and the interconnecting member 53 which supports the tracks 54 and 55 along which are adapted to slide the slide mountings 56 comprising the opposite ends of the louver mountings, indicated in general by numeral 57. The louver mounting includes a generally channel shaped mounting element 58 which has bifurcated ends as at 59, which are apertured to receive pins 60 for rotatably mounting the ends of the mounting element 58 on the slide bearings 56. The channel-shaped mounting element 58 has inturned edges 58*a* the lower portion of which defines a spring-mounting notch 61 in which lies an elongated spring 62, the ends 63 of which are bent back upon themselves and are crossed adjacent the upper portion of the channel-shaped mounting element. The channel-shaped mounting element is apertured at the lower portion thereof, at 64, to slidably and non-rotatably receive the shaft 65 of the louver-mounting hook 66 therethrough. The upper end of the shaft 65 has an abutment-forming hook 66 formed integrally thereof, and the opposite ends 63 of spring 62 are crossed on each other below the hook 66 whereby to provide upwardly directed pressure on the shaft 65 for exerting tension on the louver which is secured to the hook 66.

In this form of the invention, each of the louver mountings 57 has an upwardly projecting finger 67 for securing the spacer tapes 68 thereto so as to restrict the maximum distance between adjacent louver mountings. Of course the form of the invention shown in Figs. 5 and 6 is provided with traverse cords 69 for moving the louver mountings 57 along the tracks 54 and thereby facilitating traverse movement of the louvers across the window opening, substantially in the same fashion described in the form of the invention shown in Figs. 1–4.

This form of the invention operates substantially identically to the form shown in Figs. 1–4 with the exception that when tension is exterted on the hook 66, the shaft 65 will slide through the aperture 64 and the opposite ends 63 of the spring 62 will flex downwardly and urge the shaft upwardly for maintaining tension on the louver.

The form of the invention shown in Figs. 7 and 8 is similar to that shown in Figs. 1–4. This form of the window blind construction includes mounting brackets 70 which are similar to the mounting brackets 20 but have jaw-forming hook portions 71 formed at the outer ends thereof. This form of the invention includes an elongated, rigid, generally channel-shaped frame structure 72 which has a pair of longitudinally extending grooves 72*a* on opposite sides thereof for receiving the jaw-forming hooks 71 of the mounting bracket 70 and another releasable jaw-forming clamping element 73 which is secured to the bracket 70 as by screw 74. The channel-shaped frame structures 72 extend along opposite sides of the window opening and have their longitudinally extending channel openings 72*b* facing inwardly toward the window opening.

Means are provided for supporting and controlling

rotary movement of the ends of the louvers, and such means include, in the form shown, louver mountings 75 which are generally U-shaped and have outturned end portions 76 which are swingably connected by pivots 77 to slide bearings 78 which substantially encompass track-forming rods or control members 79. The rods 79, in this form of the invention, are circular in cross section and permit ready and easy sliding of the bearings 78 therealong.

Means are provided for producing swinging movement of the track-forming rods 79 toward and away from each other so as to produce swinging of the louver mountings 75. In the form shown, interconnecting members 80 extend between and are swingably connected to the rods 79 as by pivots 81. Each of the interconnecting members 80 is affixed as by rivets 82 to a chain pulley 83, which is mounted on a central pivot-forming stud 84. Studs 84 are affixed to the frame structure 72.

Louver-mounting hooks 85 are provided with shank or shaft portions 86 each of which extend, in slidable relation, through a cooperatively fitting aperture 75*a* in the saddle portion of the louver mounting 75. As best seen in Fig. 8, the shank portion 86 is substantially rectangular in cross section and the aperture 75*a* is of similar configuration so as to prevent relative rotation between the shaft 86 and the louver mounting 75. A spring 87 encompasses the upper portion of shank 86 and is seated in the saddle portion of the louver mounting 75 and bears upwardly against a pin 86*a* in the upper end of shaft 86.

This form of the invention also includes additional mechanism for supporting each of the louver mountings 75 to relieve the transverse forces exerted thereby, through the slide bearings 78, on the rods 79. Such mechanism includes a pair of opposed stationary tracks 88 and 89 which are formed integrally of the frame structure 72 and which carry ball bearings 90. The ball bearings 90 are carried on studs 91 which are fixed to the upturned end portions 93 of support elements 94 which extend across the opening 72*b* of the frame structure 72. Washers 95 are also carried on the studs 91 for retaining the ball bearings in place. The support element 94 has a plurality of inturned ear portions, 96, which are bent back upon themselves to engage and retain a washer 97 which holds ball bearings 98 in an annular raceway in the support element 94 and surrounding the circular aperture 94*a* therein through which the shaft 86 of the louver-mounting hook 85 extends. Shaft 86 will rotate with respect to the support element 94. As best seen in Fig. 8 apertures 99 are provided on each side of the support element 94 to receive and anchor therein the ends of spacer cords or tapes 100.

This form of the invention is also provided with mechanism for controlling traverse movement of the louvers and in the form shown, such means includes the traverse cords 101 which are arranged in a fashion similar to that described in connection with the form of the invention shown in Figs. 1–4. The traverse cords 101 will be connected to certain of the supporting elements 94 at the apertures 99 substantially midway between the ends of the frame structures 72 so as to move the louver mountings along the tracks 88 and 89 and along the rods 79.

The operation of this form of the invention is substantially identical to that described in connection with Figs. 1–4 with the exception that the louver mountings 75 are supported through the washers 97, bearings 98 on the support element 94 and are thereby supported by the ball bearings 90 from the tracks 88 and 89. The track-forming rods 79 are for the purpose of controlling the rotation of the louver mountings 75 and the hook 85.

The form of the invention shown in Figs. 9-13 includes a plurality of louvers 110 which extend between the opposite sides of a window opening W' and which are supported at their opposite ends in such a manner as to permit rotary and traverse movement thereof. The upper ends of the louvers 110 are supported as by hooks 111 which are affixed to a rotary shaft 112. Suitable mechanism is provided in the housing or frame member 113 for rotating the louvers 110 on their individual axes and for moving the louvers across the window opening W'. The frame member 113 may be secured to the building wall B' by any suitable means such as brackets 114. The mechanism in the housing or frame member 113, for controlling rotation and traverse movement of the louvers may be of any suitable construction such as that set forth in the co-pending application for U.S. Letters Patent by Edward Otto Bopp and Ernest Taylor, S.N. 560,361, filed January 28, 1956 and entitled Louver Type Window Blind. Elongated flexible elements 115 and 116 respectively are provided for producing rotation and traverse movement, respectively, of the shafts 112 and louvers 110.

Mechanism is provided for securing the lower ends of the louvers 110 to the opposite side of the window opening and for controlling movement of the louvers. As best seen in Fig. 12, the lower end 110*a* of each of the louvers 110 is folded back upon itself and is stitched at 117 so as to provide a loop at the bottom of the louver. A metal bar 118 extends through the loop end of the louver and is bent back upon itself in a loop at 119 to receive therethrough a looped wire 120 which carries a ball and swivel chain 121. A pair of these chains 121 are provided, one extending along and being secured to the inner edges of each of the louvers 110 and the other extending along the outer edges of the louvers 110. Between each of the louvers 110, chain 121 has a short section of tension spring 122 fastened therein. The chain also has a fastener 123 located substantially midway along the length of the frame members 113 so as to permit the centralmost louvers 110 to be separated for traverse movement across the window opening. When the chain 121 is held by the fastener 123, the springs 122 are all tensioned slightly so as to prevent fluttering of the louvers.

The outermost or end louvers 110 are secured to the building wall B' in such a manner as to permit rotation of the louver on its axis. As best seen in Fig. 11, the end louver 110 is secured to the building wall B' as by a flat plate bracket 124 which has a bifurcated clip 125 affixed thereto as by welding. The clip 125 has a notch 126 opening through the outer edge thereof and adapted to receive therein, the swivel link 127 of a ball and swivel chain 128. The chain 128 has one of the balls disposed below the clip 125 and has another of the balls disposed within the apex portion of a generally U-shaped louver-gripping clip 129 which substantially encompasses the lower looped portion of the louver 110.

Means are provided for transmitting the rotary motion of the upper ends of the louvers 110 to the lower ends thereof and in the form shown, a flat rigid and elongated plate 130 is affixed to the outermost or end louver 110. The rigid plate 130 is affixed to the upper end of the louver 110 as by the hooks 111 which project through suitably provided apertures in the plate 130. The lower end of plate 130 projects into the clip 129 and is secured therein and to the louver and bar 118 by the rivet 131. It will therefore be seen that when the upper ends of the louvers 110 are turned, rotary motion is transmitted by the plate 130 to the lower end of the outermost or end louver. As the lower end of the outermost louver is rotated, the rotary motion is transmitted by the chain 121 and spring 122 to each of the louvers over the window opening.

It will also be clearly understood that when the louvers are to be moved in traverse movement across the window opening, the chain 121 will be released from the fastener 123 so as to permit the centralmost louvers to separate. The chain 116 is then operated to move the louvers in traverse movement across the window opening.

It will be seen that we have provided an improved mechanism of simple and inexpensive construction and

operation for controlling rotation and traverse movement of louvers across and with respect to a window opening.

It will, of course, be understood that various changes may be made in the form, detail, arrangement and proportion of the parts without departing from the scope of my invention which consists of the matter described herein and set forth in the appended claims.

What is claimed is:

1. A window blind construction comprising supporting structure at opposite sides of the window, a plurality of louvers extending across the window opening between said opposite sides thereof for rotation on longitudinal axes, a pair of parallel tracks extending along one side of the window, means mounting said tracks on the supporting structure whereby to permit at least one of the tracks to move toward and away from the other of the tracks, a plurality of louver mountings each including a pair of slide bearings opposite each other on the tracks and each of the mountings also including a mounting element extending between the bearings and swingably connected thereto on axes longitudinal of the louvers, said mounting elements swinging in response to movement of the movable track toward and away from the other track, each of said mounting elements having a notch opening outwardly from the window and also having an aperture at the bottom of the notch, means non-rotatably connecting the mounting elements with the ends of corresponding louvers and including a plurality of shafts each slidably mounted in an aperture of a corresponding mounting element and having an inner end connected with the louver and also having an outer end with a transverse abutment thereon, a plurality of springs each seated in the notch of a corresponding mounting element and bearing against the shaft abutment and urging the shaft outwardly whereby to place tension on the louver, and mechanism across the window opening from the tracks and anchoring the other ends of the louvers to the supporting structure and permitting rotation of the louvers on longitudinal axes and permitting traverse movement of the louvers across the window opening.

2. A window blind construction comprising supporting structure at opposite sides of the window, a plurality of pliable louvers extending across the window opening between opposite sides therefor for rotation on longitudinal axes, a pair of louver-mounting mechanisms respectively disposed adjacent opposite ends of the louvers and secured to said supporting structure, each of said mechanisms including a pair of parallel tracks extending along the side of the window and means mounting said tracks for swinging oscillation toward and away from each other, said tracks being spaced apart a distance substantially less than the width of the louvers, a plurality of louver-mounting bars each extending across the end of a respective louver and being secured thereto, said bars being spaced inwardly toward the window opening from said tracks, each of said bars having a shaft extending transversely between the adjacent tracks, a plurality of louver mountings each including a pair of slide bearings opposite each other on a pair of tracks and each of the mountings also including an elongate bar-shaped mounting element extending between said pair of bearings and having end portions swingably connected to said bearings on axes extending longitudinal of the louvers, said mounting elements also having an apertured, substantially U-shaped intermediate portion non-rotatably, but slidably receiving said shaft of a respective louver-mounting bar therethrough, each of said shafts having an outer end with a transverse abutment thereon, and a plurality of springs each being respectively seated in the U-shaped intermediate portion of a respective mounting element and bearing against said abutment to place tension upon the louver.

3. A window blind construction comprising supporting structure on opposite sides of the window, a plurality of louvers extending across the window opening between said opposite sides thereof for rotation on longitudinal axes, a pair of parallel tracks extending along one side of the window, means mounting said tracks on the supporting structure whereby to permit at least one of the tracks to move toward and away from the other of the tracks, a plurality of louver mountings each including a pair of slide bearings opposite each other on the tracks and each of the mountings also including a mounting element extending between the bearings and swingably connected thereto on axes longitudinal of the louvers, said mounting elements swinging in response to movement of the movable track toward and away from the other track, each of the said mounting elements having an aperture intermediate the ends thereof, means non-rotatably connecting the mounting elements with the ends of the corresponding louvers and including a plurality of shafts each slidably mounted in an aperture of the corresponding mounting element and having an inner end connected with the louver and also having an outer end with a transverse abutment thereon, a plurality of springs each bearing against a corresponding mounting element and also bearing against the shaft abutment and urging the shaft outwardly whereby to place tension on the louver and mechanism across the window opening from the tracks and anchoring the other ends of the louvers to the supporting structure and permitting rotation of the louvers on longitudinal axes and permitting transverse movement of the louvers across the window opening.

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