

[54] **OUTSIDE VENETIAN BLIND CONSTRUCTION**

[76] Inventor: **Adolph H. Wellensiek**, 3300
Norwood Road, Shaker Heights,
Ohio 44122

[22] Filed: **Sept. 23, 1971**

[21] Appl. No.: **183,146**

[52] U.S. Cl. **160/169, 160/172**

[51] Int. Cl. **E06b 9/30**

[58] Field of Search **160/169, 172, 107;
242/107.1, 107.12, 107.13, 75.3**

[56] **References Cited**

UNITED STATES PATENTS

2,556,352	6/1951	Wellensiek.....	160/169
1,361,465	12/1920	Johnson	242/107.12
539,654	5/1895	Stewart	242/107.13
2,874,771	2/1959	Muhr	160/172

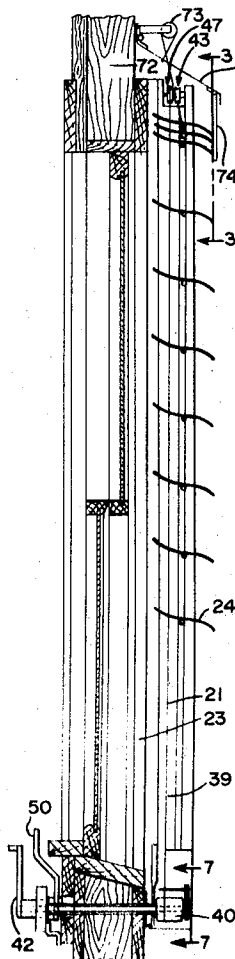
2,545,631	3/1951	Ribley.....	160/172
3,443,624	5/1969	Toth	160/107

Primary Examiner—Peter M. Caun
Attorney—Arthur H. Van Horn

[57] **ABSTRACT**

An outside venetian blind construction for application in front of a window and by which the window louvers can be moved vertically to cover all or any selected fractional portion of the window, and in which all of the louvers may be moved into nested position in an overhead storage area to clear the window entirely when the louvers are not needed in use, and to provide novel means for tilting and holding the louvers at any desired angular position from the substantially vertical to the substantially horizontal position while they are extended over the window.

2 Claims, 14 Drawing Figures



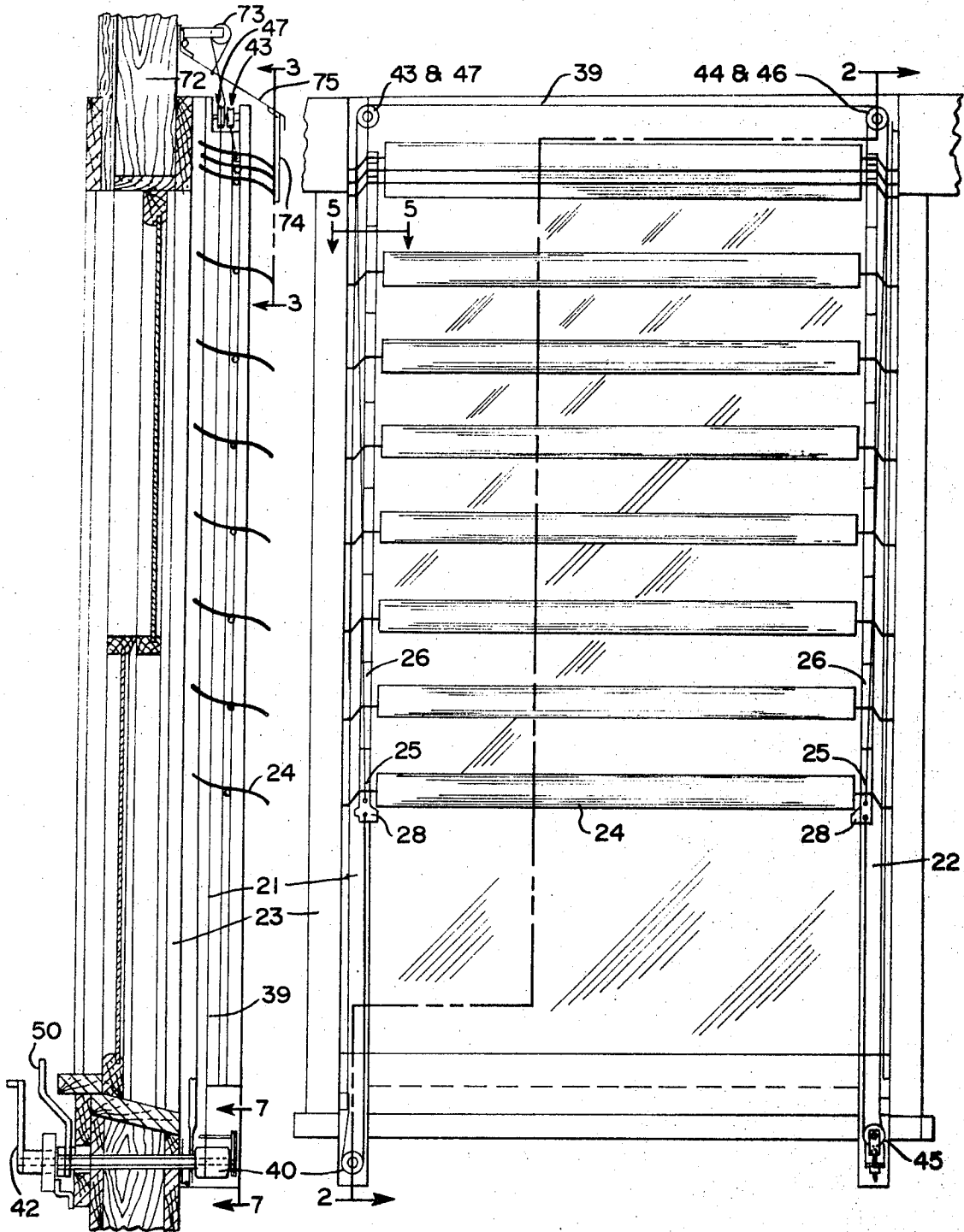
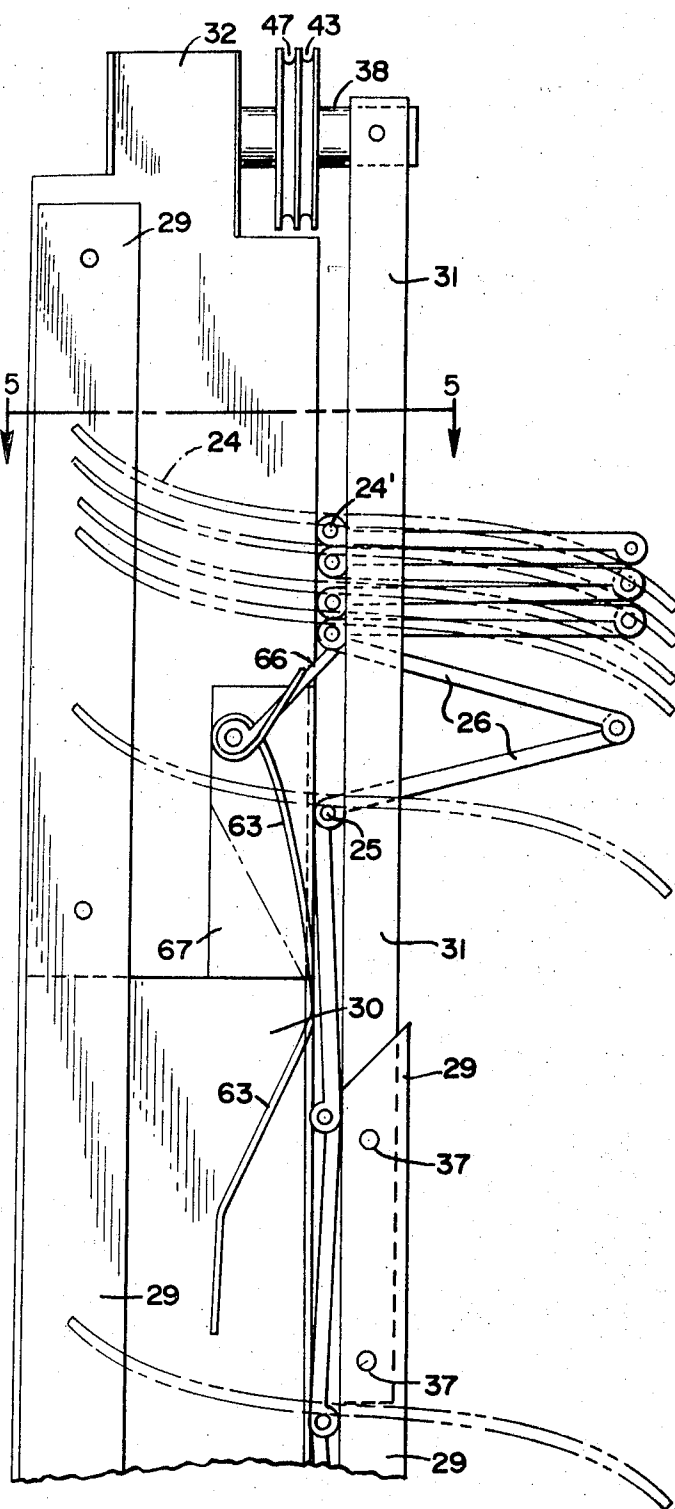
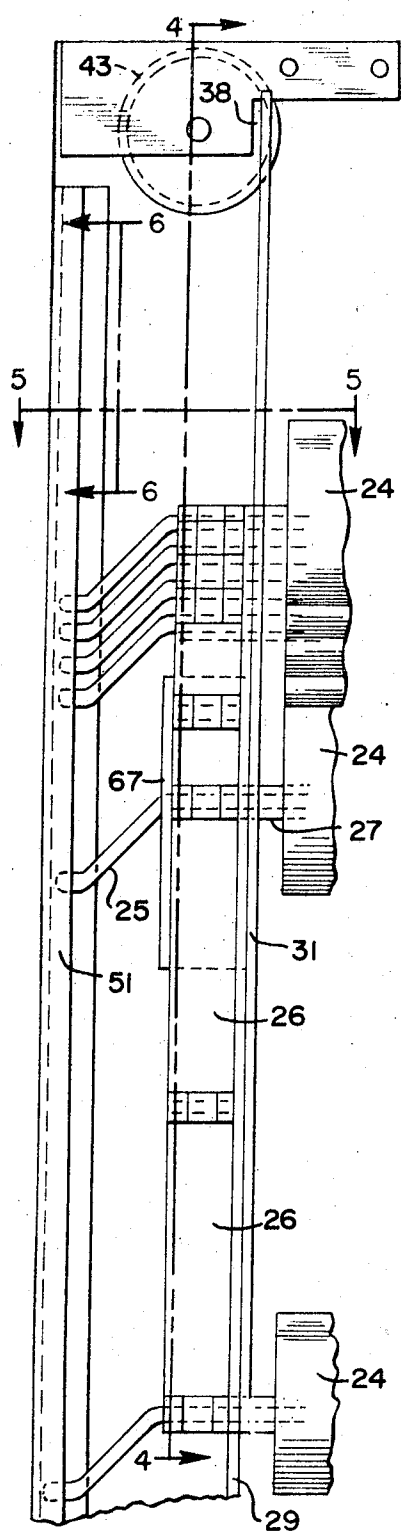


FIG. 2

FIG. 1

INVENTOR
 ADOLPH H. WELLENSIEK
 BY
Arthur H. San Horn
 ATTORNEY.



INVENTOR.

ADOLPH H. WELLENSIEK
BY

BY

Richard H. Van Horn

ATTORNEY.

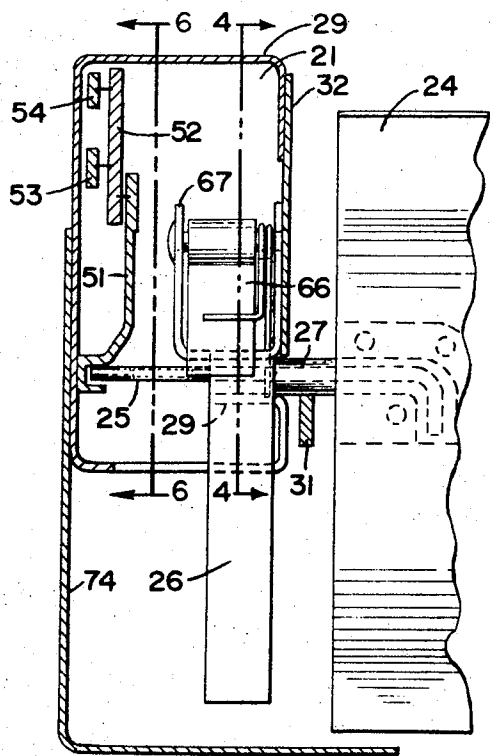


FIG. 5

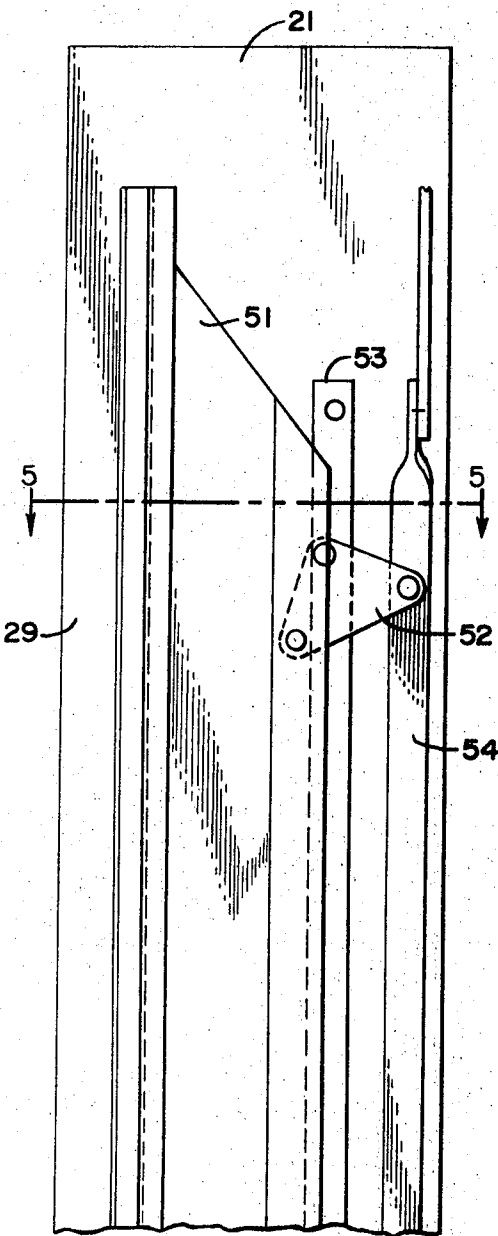


FIG. 6

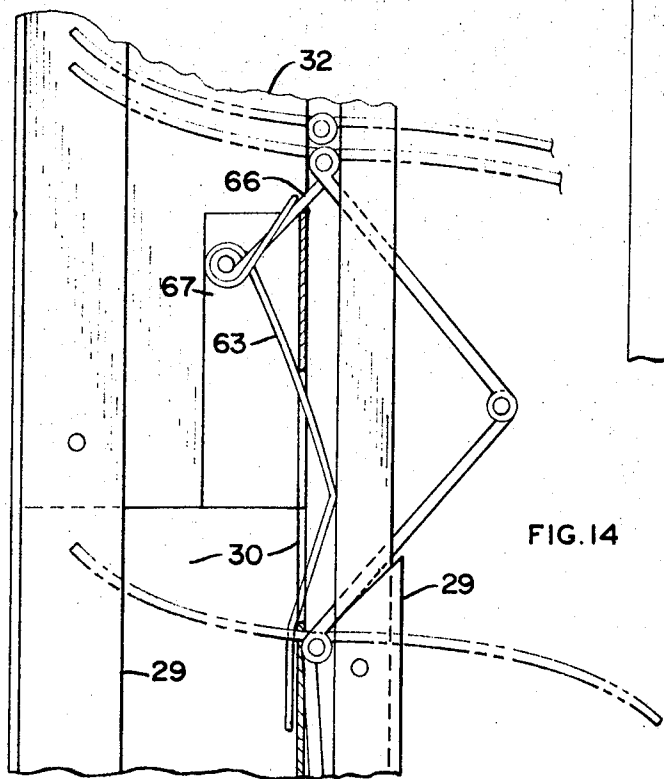


FIG. 14

INVENTOR
ADOLPH H. WELLENSIEK
BY *Robert H. Sanborn*
ATTORNEY.

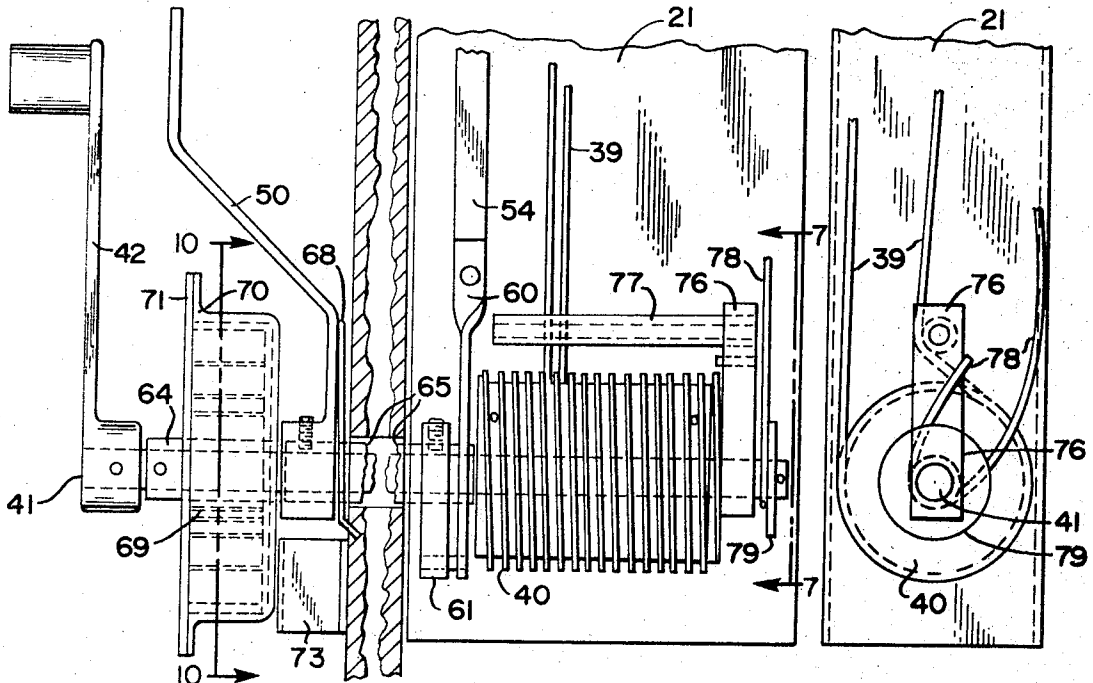


FIG. 9

FIG. 8

FIG. 7

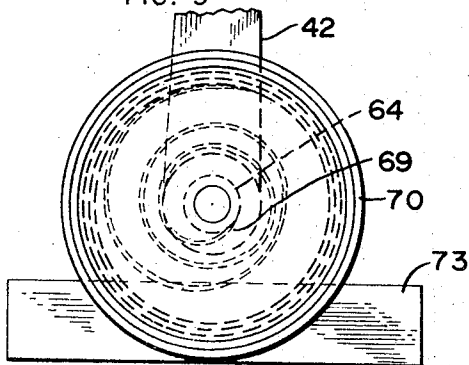


FIG. 10

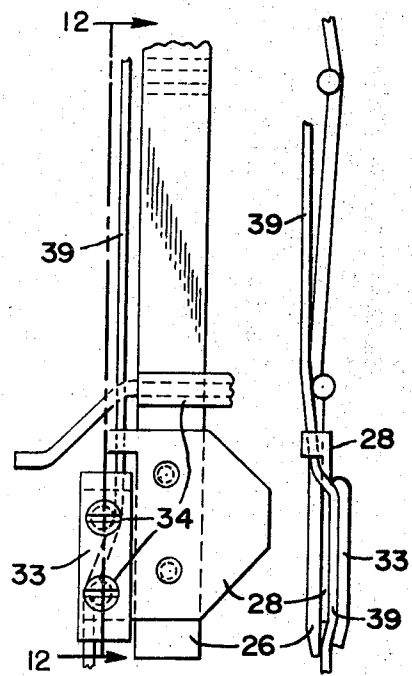


FIG. 11

FIG. 12

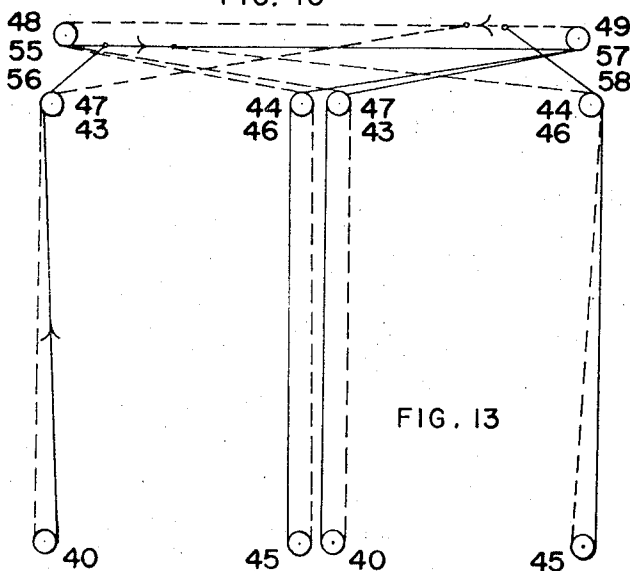


FIG. 13

INVENTOR
ADOLPH H. WELLENSIEK
BY
Adolph H. Wellensiek
ATTORNEY.

OUTSIDE VENETIAN BLIND CONSTRUCTION

NATURE AND OBJECT OF THE INVENTION

This invention is an improvement in venetian blinds for assembly as a unit on the outside of a window and is equipped with vertically movable and tiltable louvers operable by indoor controls, whereby the louvers may be moved vertically to cover or uncover the outside of all or any fractional portion of a window, or to move all the louvers into nested relation in an overhead storage area to clear the window entirely when they are not needed in use, or to selectively tilt all the louvers to any desired angle about a horizontal axis from the substantially vertical to a substantially horizontal position while they are extended over the window.

The invention also includes the provision novel means for guidance and necessary control of a small diameter, but adequately strong, louver lifting cord (preferably steel or moulded of nylon) to operate satisfactorily over a necessarily smaller diameter than normal hoisting drum, in the small space available for it, immediately upon starting to lift the louvers off the window when considerable slack is suddenly created in a relatively short section of the cord. The weight of the louvers may be partly counterbalanced while being placed in position for covering all or only a fractional portion of the window, by the provision of a coiled spring. Other objects of the invention providing a construction of the above nature, including means for safely clamping the lifting cord in an adjustable fastener without permanently deforming that portion of the cord, which is clamped, so that subsequent changes of position on the cord can be made safely.

THE DRAWING

In the drawing:

FIG. 1 is a front elevation of a retractable adjustable louver assembly constructed according to the present invention and mounted on the face of a standard residential window frame, showing some of the louvers in extended position over a portion of the window opening and others in folded stack position immediately outside of the top of the window frame.

FIG. 2 is a sectional view, taken on line 2—2 of FIG. 1. It shows the louver assembly frame adjacent to the outside face (trim) of a standard wooden residential window frame.

FIG. 3 is an enlarged section taken on line 3—3 of FIG. 2 of the mechanism in the upper portion of the left guide rail assembly, except that four louvers are shown in stacked position instead of three in that area of FIGS. 1 and 2.

FIG. 4 is a section taken on line 4—4 of FIG. 3, showing the strap link chain assembly, the link tripper and stop, the upper left sheaves and dash-line indication of the shape and position of some of the louvers.

FIG. 5 is a detailed cross-section plan view of the guide rail parts and mechanism shown in FIGS. 1, 3, 4 and 6.

FIG. 6 is a vertical section taken on line 6—6 of FIGS. 3 and 5 of the upper portion of the left side guide rail assembly.

FIG. 7 is a vertical section taken on line 7—7 of FIGS. 2 and 8 showing the automatic cord-slack guide and end view of the hoisting drum and the steel cord.

FIG. 8 is an enlarged vertical and side view of the outdoor portion of the lower end section of FIG. 2, showing the hoisting drum, etc.

FIG. 9 is an enlarged vertical view of the indoor controls extension shown in the lower portion of FIG. 2. This shows the telescoped shafts, with a tube shaft carrying the louver tilting lever, and the inner bar-shaft carrying the louver lifting crank.

FIG. 10 is an enlarged vertical view of the specially designed coiled flat-wire spring, together with its container and cross-section of the telescoped shafts, taken on line 10—10 of FIG. 9.

FIG. 11 is a vertical view of the specially designed steel cord fastener, used to attach the louver lifting cord to the bottom links of the flat collapsible link chains which carry the louvers.

FIG. 12 is a sectional view taken on line 12—12 of FIG. 11.

FIG. 13 is a diagram showing in detail the inventor's plan for inter-connecting the steel cords with which to move vertically two or more sets of louvers covering adjoining, or nearby, windows by means of a single hoisting drum.

FIG. 14 is a portion of the section taken on line 4—4 of FIG. 3, showing a portion of the strap link chain assembly with a pair of the links partly tilted outward and the range of operation of the lower wing of the link tripper spring.

DESCRIPTION

The present embodiment of the invention is shown as comprising a single set of louvers covering one window unit, but it will be clear that two or more nearby windows, particularly adjoining window units commonly known as single mullion, or double mullion, windows may be equipped with separate sets of louvers for each window unit. But all such adjoining units may be operated and controlled by means of interconnecting steel cords over suitable sheaves to a single hoisting drum for operating the group of adjustable louver assembly units.

In the accompanying drawings, in which the embodiment of the invention is illustrated, the invention is shown as applied in use in FIGS. 1 and 2, while FIGS. 3 to 13, inclusive, illustrate the same in greater structural detail. In carrying out the invention, the guide rail assemblies 21 and 22 are adapted to be attached in a vertical position to the outside face of the side members of a window frame 23. Louvers 24 having attached shaft extensions 25 are pivotally mounted at each end in the alternate hinges 24' connecting the links of the strap chains 26 shown in detail in FIGS. 3 and 4.

Spacer tubes 27 in FIGS. 3 and 5 are carried on the shafts 25. They maintain properly positioned alignment of the chain links 26 between guide rail members 29 and 67 as shown in FIG. 5.

The new improved guide rail assemblies 21 and 22 FIG. 1 are similar as to most of their structural details. The principal difference being in the control mechanism maintained inside the lower end of these assembly units as will be explained more fully hereinafter. This new improved design shows parts, numbered 29, FIGS. 5, 32 and 30 in FIG. 4, which are fastened together to form rectangular tubes with inward flanges along one side to form the rails for guiding the collapsible flat-link chains 26. These new rectangular tubes, window height, sections form a firm support as well as en-

sure of operating parts in the new guide rail assemblies 21 and 22.

Guide rail assembly member 31, FIGS. 3, 4 and 5, consists of flat-bar sections attached to the upper end and outside of guide rail 29, FIG. 4, so that one edge of it will bear against louver shaft collars 27, FIGS. 3 and 5. These flat bars are attached to the upper end of rails 29 by means of sheet metal screw and speed nut fasteners 37, FIG. 4, and extend to the upper end of the guide rail assemblies where they are fastened to brackets 38, FIGS. 3 and 4, which in turn are fastened to brackets 32, FIG. 4, which again in turn are attached to the rear flange of guide rail 29, FIG. 4, in a spaced position so as to permit free movement vertically for the louver shafts while providing clearance for spacer links 26, FIGS. 3 and 4, to fold for stacking the louvers.

The steel cord 39, FIGS. 2, 7, 8, 11 and 12, is operated by means of a hoisting drum 40, FIGS. 1, 2, 7 and 8, mounted inside of and near the lower end of guide rail assembly 21, FIGS. 1 and 2, on a shaft 41, FIGS. 8 and 9, which is carried inside of a tube shaft 65 and with the tube through the building wall to a hand crank 42, FIGS. 2, 8 and 9, located on the inside of the wall.

The steel cord extends from a cord fastener inside of and near one end in the hoisting drum 40, and one or more turns around the drum to sheave 43, FIGS. 1, 2, 3 and 4, then in rotation to sheaves 44, 45 and 46 on guide rail 22, FIG. 1, then to sheave 47, FIGS. 1 and 2, then back to further turns around the hoisting drum to a fastener inside of and near the other end in the hoisting drum. Each guide rail assembly then will have a segment of the steel cord in upward motion while another segment of the cord is moving downward.

The shaft extensions 25, FIGS. 1, 3 and 5, at the ends of the louvers have a right-angle bend in the area of attachment to the louvers to hold them from turning or sliding on the surface of the louvers. These shaft extensions are also bent at the outside of the spacer links 26, FIGS. 1 and 3, so as to form cranks, the webs of which are set at an angle of about 60 degrees from the shaft and crank pin center lines so that when the crank shafts of the several louvers are closely assembled in the stacked storage position of the louvers, the crank webs will not interfere with each other in tilting the louvers.

The crank pins of the crank shaft extensions 25 are slidably mounted in channels 51, FIGS. 3 and 5, which are movable at right angles to movement of the crank shafts 25 but so mounted that they maintain a position parallel to guide rails 29 and 30, FIGS. 3, 5 and 6. Only one louver slide channel 51, FIGS. 3, is ordinarily needed for operating the louvers not more than about 54 inches in length. This will let the crank pins at the other end of the louvers bear freely against the inner side of frame section 29, FIG. 5, and those cranks will still serve a purpose in keeping the collapsible chain links 26, FIG. 3, in proper alignment.

Channel 51 is pivotally attached to one crank pin of each of two double end bell cranks 52, FIG. 6, with 90 degree separation of crank pins which swing at the central or right-angle corner on a pivotal attachment to base bar 53, which in turn is attached to and rigidly supported by guide rail wall section 29, FIGS. 5 and 6, in a position parallel to the guide rails 29 and 30.

Connecting bar 54 in guide rail assembly 21, FIGS. 6 and 8 is pivotally attached to the other crank pin of bell cranks 52. The lower end of connecting bar 54 is pivotally attached to connecting link 60, FIG. 8, which

in turn is connected to the crank pin of a crank 61 mounted on a telescoped tube shaft 65 extending through the base of the guide rail assembly and through the wall below the window, FIGS. 2, 8 and 9, where it is attached to a hand lever 50, FIGS. 2, 8 and 9.

Shaft 65, FIGS. 8 and 9, driven by hand lever 50 and carrying crank 61 accordingly drives connecting links 60 and 54 to operate bell cranks 52 and channel 51, FIG. 6, which in turn operate the crank shafts 25, attached to louvers 24, FIGS. 1, 3 and 5, thus furnishing the tilting motion to adjust the louvers to any angle necessary for protection from the sun, or from a rainstorm.

Upon release of lever 50, FIGS. 1 and 9, the friction between a wire-spring brake shoe 68, FIG. 9, fastened to the wall and bearing against the hand lever 50, automatically holds the louvers at any desired angle in any position of the louvers along the guide rails.

The folding and unfolding of strap chains 26, in stacking the louvers at the upper end of the frame, is performed and controlled automatically by pawls 66, FIG. 4. The chain-bearing flange on guide rail 29, FIG. 4, is carried to a height just sufficient to prevent folding of the strap-chain links until the shafts of the next above louver have been pushed above the pawls 66. When the louvers are drawn downward from the stacked position, the successive pairs of strap links will then unfold, one pair at a time, and enter the side-frame channels to hold them for operation over the window.

The pawls 66 are pivotally mounted and supported by tangential springs 63, FIG. 4, so as to bear against the strap chains 26 to trip the free ends of the links outward and permit the ends supporting the louver shafts to fold into adjoining position, thus stacking the louvers closely together. The pawls 66 can then hold the louvers in the stacked position until they are again needed for operation over the window. The stacked louvers may be lowered to any desired position in the frame by rotating the drum 40 and hoisting cable in a reverse direction through the operation of the crank 42. The lower portion of the tangential springs 63, FIG. 4, is formed to press successively against the strap-chain links 26 at the point shown in FIG. 4, to assist the pawls 66 in tripping the free end of the links outwardly and upwardly successively to stacked position.

The shaft 41, FIGS. 7, 8 and 9, passes through shaft collar 64. The inner end of a coiled flat-wire spring 69, FIGS. 9 and 10, is attached to the shaft collar 64. The spring is mounted inside of a cylindrical housing 70, and set to point toward the right, and attached to the spring housing 70. The spring housing is attached to a wall bracket 73, which in turn is attached to the wall. The shaft collar 64 extends outward from the spring housing toward the hub of crank 42 where it is fastened to the shaft 41. A counter-clockwise motion of the shaft will then put the spring under tension while the louvers are brought downward over the window and thus assists in automatically holding the louvers in place when covering only a fractional portion of a window.

The shaft 41, FIGS. 7 and 8, carries a pivotally mounted bracket 76 near its outer end which in turn supports one end of a bar 77 extending outward over the hoisting drum 40, and parallel to shaft 41, to engage and take up any slack in the steel louver lifting cord 39, FIG. 7, at the start of a louver lifting operation. The

pressure between bar 77 and lifting cord 39 is provided by tangential spring 78, FIG. 7.

FIGS. 11 and 12 show a vertical view and a sectional view, respectively, of a specially designed fastener for attaching the steel cord 39 to the bottom links of the collapsible link chains 26. The fastener consists of a base plate 28, riveted to the chain link, and a bearing plate 33, made to fit over one side wing of plate 28, and both punched for holes for fastening with sheet metal screws and nuts to grip the cord between the two plates without damage to the cord. Any dent or other damage to the steel cord would interfere with satisfactory subsequent adjustments for endwise leveling of the louvers for alignment on window walls.

FIG. 13 shows a diagram illustrating the provision for locations of fastening the several segments of steel cord for lifting the louvers in two or more window units of the blinds and connecting them to a main loop of larger diameter strong cord for combined operation by a single hoisting drum. The main loop of the larger diameter cord is herein considered as operable by hoisting drum 48, and held taut by idler pulley 49. The drawing shows this power-operated line somewhat above the line of upper sheaves in the blinds in order to show lines of connection more clearly. However, in practice, the hoisting drum and idler pulley would be aligned close to the line of upper sheaves in the blinds. The arrows indicate the direction for next movement for segments of the lines when in position for lifting the louvers. The sheave numbers on each window-blind unit correspond to those shown in FIG. 1.

The guide rail assemblies 21 and 22 are self-enclosed for protection of parts and good framework appearance. The upper ends of these assemblies and area between where the louvers are stacked, should be covered by a hinged two-piece hood 74 and 75, FIG. 2, as indicated by cross-section in FIG. 2 to enhance the general appearance of the assembly, and protect the enclosed parts from unfavorable weather. The hinged part 75 can be tilted upward for increased ventilation of heat from the louvers when so desired.

The upward tilt of part 75, FIG. 2, can be accomplished automatically by a bracket supported sheave 73 and cord 72 attached to the end of part 75 and the end shaft of top louver 24 of the louver assembly.

Only one louver shaft slide channel, 51, FIG. 3, is ordinarily needed for operating louvers not more than about 54 inches long. This would still let the crank pins at the other end of the louvers bear freely against the inner side of frame section 29, FIG. 5, to hold the collapsible chain links 26, FIG. 3, in proper alignment. However, a straight extension of the louver shaft through a spacer collar would be preferable to avoid frictional interference in tilting both ends of the louvers uniformly.

The foregoing description and accompanying draw-

ing are considered as illustrative only of the principles of the invention and the adjustable louver of the present invention is not to be regarded as limited by the above described embodiments. Alternative arrangements of parts, substitution of materials and other organization and assembly procedures, apparent to those skilled in the art, may be employed without departing from the scope and spirit of the invention as claimed.

I claim:

1. A window frame insert comprising an adjustable louver assembly, a frame for said assembly, a series of overlapping foldable louvers, slidably supported in said frame, selective means operable externally of said frame to propel said louvers between stacked and spaced apart relationships along the frame, and selectively tilt said spaced apart louvers to a predetermined angular position about their turning axes in said frame, said means including a pair of channel members disposed longitudinally vertically along opposite sides of the frame, said louvers each having arms, oppositely disposed crank members slidably and rotatably supported along said channel members, a base bar, a bell crank pivotally carried by said base bar, said bell crank having pins each disposed approximately 90° from its pivotal connection with said base bar, a connecting bar, one of said pins having pivotal connection with said connecting bar, the other of said bell crank pins being pivotally connected with said connecting bar, a connecting link pivotally attached to said connecting bar, said first named means including a spring loaded louver hoisting drum, a louver hoisting cable on said drum and having driving connection with said louvers, a shaft coaxial with the rotating axis of the drum and relatively movable on said drum axis, a crank carried by said coaxial shaft, means pivotally carried on an end portion of the connecting bar and having driving connection with said crank, a lever on said coaxial shaft, braking means carried by said frame and operable by said lever to releasably hold the louvers in selected angular position and spaced relationships.

2. The invention defined in claim 1 in which louver stacking means comprises a pawl, a guide rail, a link chain bearing plate located at a height along the rail sufficient to prevent folding of a link of the chain until the next preceding link has been folded, and tension means adjacent the path of said link chain having one end exerting a force against said pawl and its opposite end portion exerting a relatively lighter force against the next succeeding unfolded link in the chain to urge the unfolded link against said bearing plate, said tension means comprising a bowed intermediate portion for exerting a tension against the unfolded links of the chain as they approach the folding portion of the path of their movement.

* * * * *