TILT-TAKE-OUT WINDOW ASSEMBLY

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The specification and drawings disclose a tilt-take-out window assembly which includes a frame having a pair of spaced apart, generally parallel jamb members which between them define a recess. Guide members in the form of flexible, elongated strips are joined to each of the jamb members to define parallel guide tracks intermediate outwardly extending, raised portions. The flexible strips are joined to the jamb members along at least one of their edges and have a normal configuration to bow into the recess. Window sash members (having lateral edges spaced apart a width very slightly less than the distance between the jamb members but greater than the distance between the strips in their bowed configuration) are positioned between the guide tracks. For example, the window sash members may have lateral edges spaced apart a width about 3/16 inch less than the distance between the jamb members as compared with the usual width of prior art constructions of about 1 3/16 inches less than the distance between the jamb members. The lateral edges of the sash members have guide grooves formed therein to receive the outwardly extending portions of the flexible strips. Additionally, counterbalance spring members are carried in each of the guide grooves and have one end provided with hook members adapted to releasably engage the jamb members. Pivot block means are joined to the other ends of the spring members and are adapted to be connected to the edges of the sash members. Carried in each of the pivot block members is an outwardly biased pin means adapted to engage in a groove in the guide track.

7 Claims, 12 Drawing Figures
TILT-TAKE-OUT WINDOW ASSEMBLY

BACKGROUND OF THE INVENTION

The subject invention is directed toward the window art and more particularly to a window assembly of the type having tilt-take-out sash units.

A primary object of the invention is the provision of a tilt-take-out sash type window assembly which can be used with standard window frame and sash units.

Tilt-take-out sash type window assemblies are well known and in widespread use. The typical prior art tilt-take-out sash assembly, however, has a relatively complex frame-track assembly and requires sash units of special size and design (e.g., non-standard). It is well here to define a standard window frame. Standard window frames are made with dimensions that are accepted in the industry and thus the size can be relied on by architects and builders to be of a size which will fit in dimensioned openings. Such standard window frames have an inside width dimension between the jambs which is a multiple of 2 inches and usually a multiple of 4 inches. Widths range from 1 foot, 8 inches to 3 feet 8 inches (i.e., 20 to 44 inches). Window sash is also normally standardized except for special window sash, as for example, such sash as is designed in the prior art for tilt-take-out window sash. Such standard sash has a width three-sixteenth inch less than the window frame opening with tolerances of not more than one-sixteenth inch. Because of the general complexity of the prior art tilt-take-out window design, it has not been possible to use both standard frame and sash units in such prior art designs. Thus, if a company desires to manufacture and sell both standard window assemblies and tilt-take-out window assemblies of the prior art designs, two entirely different designs are required in either one or both of the frames and sash units.

BRIEF STATEMENT OF THE INVENTION

The subject invention overcomes these problems and provides a highly simplified assembly in which standard frame and sash units can be used.

According to the subject invention, the assembly includes a frame having a pair of spaced apart, generally parallel jamb members which define a recess between them. Guide members in the form of flexible, elongated strips are joined to each of the jamb members to define parallel guide tracks intermediate outwardly extending raised portions. The strips preferably are joined to the jamb members along at least one of their edges and have a normal configuration to bow into the recess. Window sash members (having lateral edges spaced apart a width slightly less than the distance between the jamb members but greater than the distance between the strips in their bowed configuration) are positioned between the guide tracks. The lateral edges of the sash members have guide grooves formed to receive the outwardly extending portions of the strips. Additionally, counterbalance spring members are carried in each of the guide grooves and have one end provided with hook members adapted to releasably engage the jamb members. Pivot block means are joined to the other ends of the spring members and are adapted to be connected to the edge of the sash members. Carried in each of the pivot block members is an outwardly biased pin means (such outwardly biased pin means being spring loaded pins) adapted to engage the guide track.

According to a more limited aspect of the invention, the flexible strips are formed from a resilient plastic, such as polyvinylchloride, and are relatively thin and flexible. They are preferably joined to the frame by an integral flange having a flexible hook formed thereon. The hook has a normal dimension which is slightly greater than the dimension of a slot formed in the jamb member. Thus, the strips can be attached to the jamb merely by forcing the hook member into the slot. This attaches the sash strips and also provides an air-tight seal between the jamb and the strip.

As can be appreciated, the resilient strips resiliently and sealingly grip the edges of the sash units. However, the sash units slide freely on the strips. Moreover, to tilt either of the sash units inwardly as for washing the outside, it is necessary only to remove each of the spring hooks from the cooperating inclined hole in the associated jamb and then turn the hooks and position them on the tops of the associated sash units and thereafter pull the top of the sash unit inwardly. The outer edges of the sash units cam the strips outwardly and the sash units pivot about the pins in the pivot blocks. To remove either sash, it is first pivoted approximately to a horizontal position and then rotated about the perpendicular axis so as to raise (or lower) one of the pivot pins relative to the other and release the pivot pins from the guide tracks.

Because of the nature of the sash strip and the counterbalance spring mechanisms, the assembly can be used on slightly modified standard, non-tilt-out window frames and sash units. Thus, the same basic frame-sash assembly can be used either for a conventional non-tilt-out window or a tilt-out type sash unit. Little or no change need be made to the frame except for the formation of slanted holes in the jambs for receipt of the hooks supporting the upper ends of the counterbalance spring members and little or no change need be made to the sash units except for the guide and spring receiving grooves formed in the edges of each sash unit. Substantial cost savings are achieved. The balance system is accomplished with approximately one third of the cost of prior tilt-take-out constructions. The simplicity of the jamb liner forming the guide tracks also achieves substantial cost savings. The improved construction does not require relatively expensive clutch holding balance mechanism.

The above and other objects and advantages will become apparent from the following description when read in conjunction with the accompanying drawings wherein:

FIG. 1 is a pictorial view of a typical window assembly incorporating the invention;

FIG. 2 is a substantially enlarged cross-sectional view taken on line 2—2 of FIG. 1;

FIG. 3 is an enlarged cross-sectional view taken on line 3—3 of FIG. 1 and showing in detail a counterbalance spring assembly of the invention;

FIG. 4 is a cross-sectional view taken on line 4—4 of FIG. 3;

FIG. 5 is an enlarged view of the circled area of FIG. 2;

FIG. 6 is a view of the circled area of FIG. 5 showing the strip attaching hook portion separated from the associated frame slot;

FIG. 7 is an enlarged side view of one of the pivot block members of the counterbalance sash assembly;
FIG. 8 is a view taken on line 8—8 of FIG. 7; FIG. 9 is an enlarged cross-sectional view taken on line 9—9 of FIG. 7; FIG. 10 is a view in perspective similar to FIG. 1 but showing some modifications and showing the lower sash tilted inwardly; FIG. 11 is a view in perspective similar to FIGS. 1 and 10, but showing the lower sash of FIG. 10 rotated from the horizontal position to release the pivot pins from the guide tracks; and FIG. 12 is a view in perspective similar to FIGS. 1, 10 and 11, showing the lower sash of FIG. 10 removed and the upper sash thereof lowered preparatory to either tilting it or removing it.

Referring more particularly to the drawings wherein the showings are for the purpose of illustrating a preferred embodiment of the invention only and not for the purpose of limiting the same, FIG. 1 shows a window assembly 10 which incorporates features of the invention and comprises a relatively conventional, generally rectangular frame assembly 12 having upper and lower window sash units 14 and 16 positioned therein. The subject device is arranged so that the sash units 14 and 16 can slide vertically in the conventional manner and also can be tilted out of the frame or removed therefrom.

In the embodiment under consideration, the frame 12 is formed from wood; however, it should be appreciated that any desired type of material could be used. As best illustrated in FIG. 1, frame assembly 12 includes a pair of vertically extending side frame members or jambs 18 and 20 joined at their upper ends by a horizontally extending frame member 22 to define a recess which receives the sash units 14 and 16. A sill frame member 24 extends horizontally between the lower end portions of the side frames or jambs members 18 and 20 and is received in suitable dados formed in the inner faces of the side frames 18 and 20. The frame members can be joined in any desired manner; however, in the subject embodiment, they are simply nailed.

The upper and lower window sash units 14 and 16 are mounted within the recess defined by the frame 12 and are arranged for conventional vertical sliding movement. The upper sash unit 14 is illustrated as including a pair of vertical side members 26 and 28 connected by horizontally extending upper and lower frame members 30 (not illustrated) and 32, respectively. Glass 34 is suitably sealed within the frame defined by members 26, 28, 30 and 32. The lower sash unit 16 is similarly formed and includes the side members 35 and 36 and the upper and lower members 38 and 40. A sheet of glass 42 is mounted in the lower sash frame. FIG. 1 illustrates the sash members in their closed position and a conventional cam-type sash lock 49-49a is arranged to hold them in this closed position.

Of particular importance to the subject invention is the manner in which the window sash units 14 and 16 are mounted within the frame assembly 12. The assembly is designed such that the frame assembly 12 is less complex and the construction of the window guides is much simpler than prior art units. Additionally, the construction allows the sash units to be readily tilted inwardly and/or, if desired, removed for cleaning, maintenance and the like. As best shown in FIGS. 1, 2 and 5, the guide tracks for the vertical sliding movement of the sash units 14, 16 are defined by resilient, vertically extending strip members 50. One of the strips 50 extends substantially the entire length of the inner surface of each of the side frame or jamb members 18 and 20. In the embodiment under consideration, the strips 50 are formed from a suitable plastic, such as polystyrenechloride, and are preferably configured so that they can be made by a simple extrusion process. That is, they are of constant, uniform cross-section throughout their length. As best shown in FIGS. 2 and 5, each strip 50 defines a pair of vertically extending guide tracks 52 and 54 (see FIG. 2) which extend the entire length of each strip 50. Adjacent each of the guide tracks or grooves 52 and 54 are raised sections 56 and 57, and 56' and 57', respectively.

Although the raised sections 56 and 57 are illustrated as having side walls inclined at 45°, this angle could vary in the range of from approximately 30° to approximately 60°. It should be noted that the edges of each of the sash units 14 and 16 have grooves 58 formed along their edges. The grooves 58 preferably have a semicircular bottom wall 59 and outer edges shaped to receive and embrace the raised portions 56 and 57 of the side strips 50. Additionally, referring to FIG. 5, it will be noted that the side strips 50 preferably have an unpressed or normal configuration which bows outwardly between the lateral edges of the strips. FIG. 5 illustrates the unpressed normal bowed position of the side strips 50 with the dotted line showing identified with the number 59a. As can be appreciated, when the sash units are placed in position with the raised portions 56 or 57 received in their side grooves, the strips 50 are compressed to the solid line position. This maintains the strips in tight sealing engagement with the edges of the sash while permitting the sash to slide freely along the side strips.

The strips 50 could be connected to the frames in many ways; however, in the subject embodiment, each of the side strips 50 preferably includes a laterally extending flange portion 60 (see FIGS. 5 and 6) which terminates in a hook member 62. The width of hook member 62 is identified with a “W” as shown in FIG. 6. The flange 60 and the hook member 62 are arranged to be received in a slot or groove 64 formed along the corresponding side frame members. The slot 64 has a width T which is less than W. Accordingly, the side strip can be placed with the hook over the slot 64 and then driven into the groove. The shape of the hook is such that it acts to grip the sides of the slot 64 to prevent withdrawal. This provides a simple method for connecting the side strips 50 and, additionally, it assures an air-tight seal between the side strips 50 and the frame. The edge of the side strips 50 opposite the flange 60 can remain loose, or, for example, they can be received in a slot formed in a blind stop 65 connected to frame member 20 along the length of the frame.

As can be seen, the described side strip arrangement allows ready assembly of the window unit and permits free vertical sliding movement of the sash units. Additionally, the configuration of the sash strip is such as to maintain a tight seal about the sash units. Moreover, it should be noted that the frame components can be relatively simple with slight modifications from conventional frame units. Thus, the frame is a standard or con-
ventional frame except for the slots or grooves 64 and except for holes 84 later to be described.

Referring to FIG. 2, it will be seen that the sash units 14 and 16 embrace and are guided by raised sections 56 and 57 and 56a and 57'. When the sashes are in the closed position as illustrated in FIG. 1, their respective lower and upper edges are adjacent each other. A resilient seal strip (shown in section at 71) is preferably attached to one or the other of the sash members to maintain a tight seal. At the ends of the seal strip, resilient foam blocks or the like 66 are connected to one or the other of the sash units so that an air-tight seal is maintained at the ends of the seal strip between the sash units and the side strips 50. For example, in the subject embodiment, the resilient blocks 66 are connected to the upper sash 14 and extend inwardly sufficiently for engagement with the surface of the lower sash 16.

The structure thus far described could be used without counterbalance assemblies if desired. If so used, it is possible to remove the sash inwardly out of the frame merely by releasing the cam lock 49 and raising the lower sash unit a short distance. Thereafter, the sash unit can be pulled inwardly, and, as shown in dotted line 50b in FIG. 5, the side strips 50 on each side will be cammed outwardly by the cooperating surfaces of the sash strip and the grooves 58 in the edge of the sash. Dotted line showing 50b illustrates the position of the side strip as the window is pulled from the frame.

A relatively important aspect of the subject invention, however, concerns the arrangement of counterbalance spring assemblies associated with each of the sashes 14 and 16. FIGS. 3 and 4 illustrate the preferred form of the counterbalance spring assemblies. Note that a pair of counterbalance spring assemblies 74 are associated with the lower sash 16 (one of the pair being illustrated in FIG. 3). A similar pair of counterbalance spring assemblies 72 (one of the pair being shown in FIG. 4) are associated with the upper sash 14. Because the assemblies 72, 74 are substantially identical (same length) only one will be described in detail, and the description thereof is to be taken as equally applicable to the others except where noted.

In particular, each of the counterbalance spring assemblies includes a first hook block member 75 adapted to be releasably connected with the frame. Block members 75 are preferably formed from plastic and have a generally cylindrical main body 76 provided with laterally inwardly extending recesses 78. Recesses 78 provides a convenient portion for gripping, for reasons which will subsequently be explained. Extending laterally from the main body 76 is a hook 80 having a generally rectangular cross-section and provided with a plurality of short serrations or teeth 82. Preferably, and for reasons which will hereafter become apparent, the hook portion 80 is downwardly inclined slightly. In the subject embodiment, the angle of inclination is preferably approximately 10°, forming an included angle of 80° between the hook member and the axis of the main body. The hook is arranged to removably engage with the side frame. As shown in FIG. 3, an inclined hole 84 is formed into the associated side frame at an angle corresponding to the angle of the hook portion 80. The hole 84 is preferably slightly greater in diameter than the total width of the hook member over the tooth portion 82. This allows easy insertion and removal of the hook.

Extending downwardly from the cylindrical body portion 76 is a hook 86 adapted to receive the end of a coil spring 88. The coil spring 88 has a diameter to fit easily within the sash side groove 58 and is sized so that it will nearly counterbalance the weight of the lower sash member 16.

The lower end of spring 88 is connected to the lower edge portion of the sash unit 16 by a pivot block assembly 92. The pivot block assemblies 92 are arranged to be received within the vertically extending grooves 58 formed in the lateral side edges of the sash members. As best shown in FIGS. 7 through 9, each of the pivot block members 92 includes a main body 94 having a semi-cylindrical wall which is sized so as to closely fit within the semi-cylindrical groove 58. An opening 96 extends through the body from a triangular recess 97. This allows a screw or the like to be passed through the opening into engagement with the sash. For example, a screw 98 is shown connecting the sash block 92 to the lower sash assembly 16. A hook portion 100 extends upwardly from the upper end of the body 94 for engagement with the lower end of the spring 88. The spring 88 is sized so that it has an extended length sufficient to extend from the upper portion of the frame to the lower portion of the frame and when in this extended position the force exerted by it nearly counterbalances the weight of the lower sash 16.

In the embodiment under consideration, the exposed portion of the spring is enclosed by a plastic tube 102 which extends from the hook block assembly 74 to a position slightly below the upper edge of sash unit 16. This presents a clear appearance, and also prevents the spring from catching the upper edge of the sash. Additionally, it will be noted that the lower end of the hook block 75 has a reduced diameter portion which fits closely within the plastic tube 102. The tube is connected to the hook block 75 in any convenient manner such as through the use of a cross pin 104 which extends through an opening formed in the hook block.

One feature of particular importance to the pivot block assembly 92 is the provision of a spring biased guide and tilt pin member 106 which is adapted to fit within the corresponding side strip or track 54. As best shown in FIGS. 7 through 9, the tilt pin 106 has a generally rectangular body portion 108 which is received within a rectangular opening 110 formed through the tilt block body 94. The outer end 120 of the pin 106 is circular and has a diameter slightly greater than the opening across the end of opening 110. This allows the pivot pin to be pushed from the left through opening 110 and snap its head portion 120 through the small flanges 122 formed in the tilt block body. The opposite end of the tilt block body is provided with small outwardly extending tabs or flanges 124 which prevent the block from being moved to the right - out of the opening 110 (as viewed in FIG. 9). The left hand end of tilt pin 106 has a reduced diameter portion 113 having at its left hand end a head 114 which is arranged to enter the end convolution of a compression spring 116 to removably attach the spring to the pivot pin. When the tilt block is assembled into the sash (as shown in FIGS. 3 and 4), the tilt pin is biased into tight engagement with the corresponding
guide groove 52 or 54 of the strip 50. This provides a positive engagement between the sash and the guide grooves while permitting removal of the sash or tilting of the sash out of the frame assembly.

To explain the operation and the simplicity of the tilting or removal operation, reference is made to FIGS. 1, 2, 10, 11 and 12. If it is desired to, for example, remove the lower sash 16 from the frame, all that is necessary is that the hook members 80 on each side be lifted upward slightly, disengaging their teeth 82 from the side of the hole 84. They can then be pulled out of the hole and rotated and moved downward so that they engage the upper surface of the lower sash unit 16 (as shown in FIGS. 10 and 11). With the hook assemblies on each side of the sash unit removed and moved to a lower position, the top edge of the sash unit 16 can be gripped and pulled outwardly, camming the side strips 50 laterally and permitting the upper portions of the sash to be tilted out of the frame. The heads 120 of the pivot pins 106 in each of the lower tilt block assemblies will remain firmly engaged in the guide grooves, however. The sash unit 16 is, of course, tilted into the room as shown in FIG. 10 and the outside surface of the glass can be cleaned or the like.

If it is desired to completely remove the sash unit 16 from the window, it can be rotated slightly (as shown in FIG. 11) to remove one of the pivot pins 106 from engagement with its guide groove after which the other pivot pin can similarly be removed and the entire sash unit removed (as shown in FIG. 12).

A similar sequence of operations allows the upper sash unit 14 to be removed; that is, the upper sash can be moved either a short or long distance, exposing the hook members 80 which can be removed from their engagement with the frame and moved into engagement with the top surface of the corresponding sash. After this, the sash can be tilted inwardly, camming over its own raised portions and the raised portions of the lower sash guide groove to a position in which it is tilted into the room. Thereafter, it can be rotated slightly, disengaging its pivot pins for removal from the window frame.

For ease of description, the principles of the invention have been set forth in connection with a single embodiment. It is not intended that the illustrated embodiment nor the terminology employed in describing it be limited inasmuch as variations in it may be made by one of ordinary skill in the art without departing from the spirit of the invention. Rather, it is desired to be restricted only by the scope of the appended claims.

What is claimed is:

1. A window assembly comprising:
   a substantially standard window frame including a pair of spaced apart, generally parallel jamb members defining a recess;
   a second sash member; said strips each including a second strip guide groove parallel to said first strip guide groove;
   said second sash being slidingly received between said strips; and
   including pin members extending into said second strip guide groove.

2. The window assembly as defined in claim 1, wherein the second end of each said spring member is connected to said frame by a connecting member size to fit within said sash groove and having an integral laterally extending portion removably received in a hole formed in the respective jamb member.

3. The window assembly as defined in claim 2, wherein said hole and said laterally extending portion are inclined in a direction toward said first end of said spring members.

4. The window assembly as defined in claim 1, wherein said pivot block means comprise relatively rigid block members positioned in each sash groove and having an outwardly facing surface adapted to slidingly engage the associated strip member, said pin members extending out of said outwardly facing surfaces and biased into the associated strip guide groove by a spring carried in the block member.

5. The window assembly as defined in claim 1, wherein said side strip members are formed of plastic and are joined to their respective jamb members by tabs forced into slots formed in said jamb members.

6. The window assembly as defined in claim 1, wherein said second end of said spring can be readily disconnected from said frame, and wherein said strips are sufficiently resilient to allow said sash members to be moved out of said frame by deflecting said strips and tilting of the sash member about said pin members.

7. The window assembly as defined in claim 6, including a second sash member; said strips each including a second strip guide groove parallel to said first strip guide groove; said second sash being slidingly received between said strips; and including pin members extending into said second strip guide groove.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,724,131 Dated April 3, 1973

Inventor(s) Theodore H. Schnormeier

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, lines 51-52 should read:
"Recesses 78 provide a convenient portion for gripping ..." rather than -- Recesses 78 provides --.

Column 6, line 35, "This presents a clear appearance" should read -- This presents a clean appearance --.

This certificate supersedes the Certificate of Correction issued August 14, 1973.

Signed and sealed this 26th day of March 1974.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR. G. MARSHALL DANN
Attesting Officer Commissioner of Patents