June 21, 1966 R. E. JOHNSON 3,256,641

WINDOW UNITS

Filed Dec. 20, 1962 3 Sheets-Sheet 1

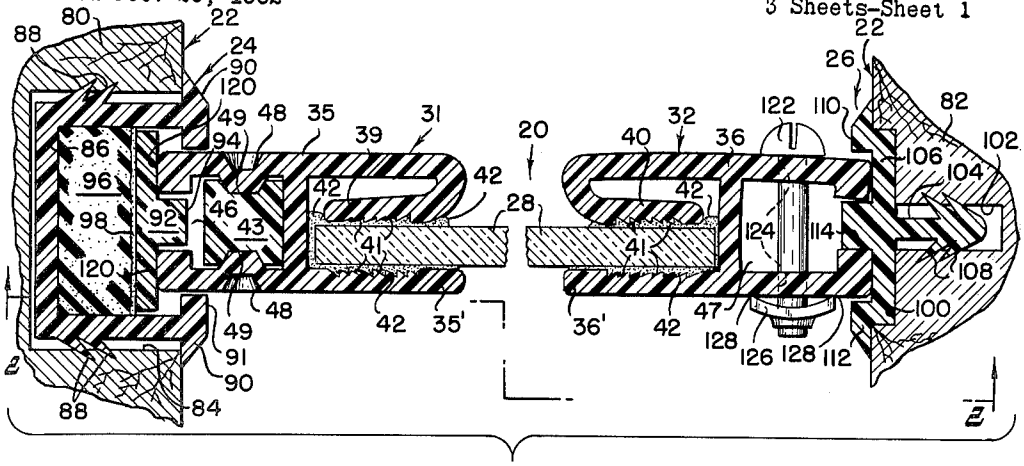


Fig. 1

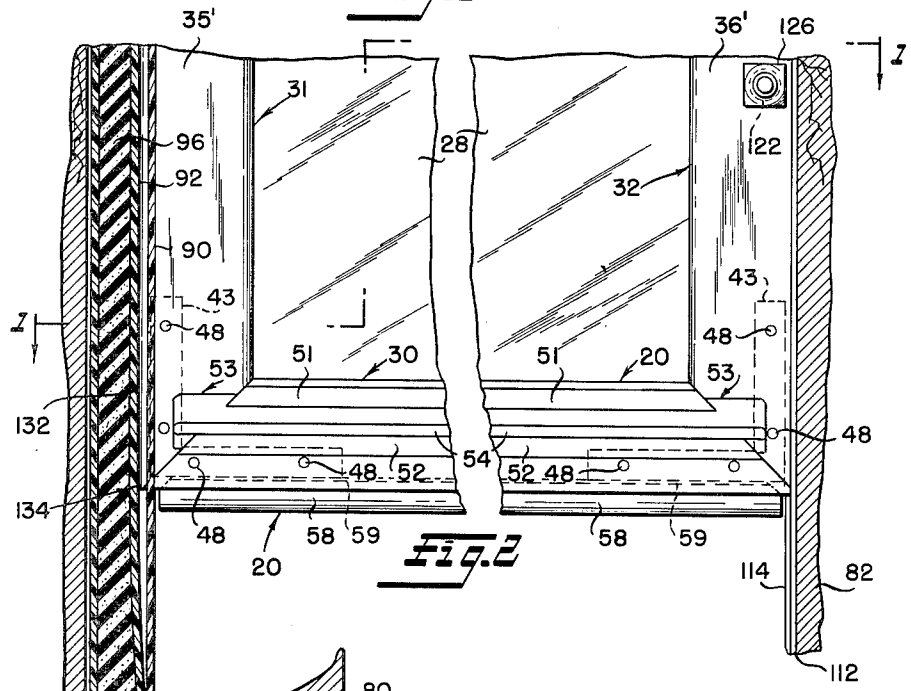


Fig. 2

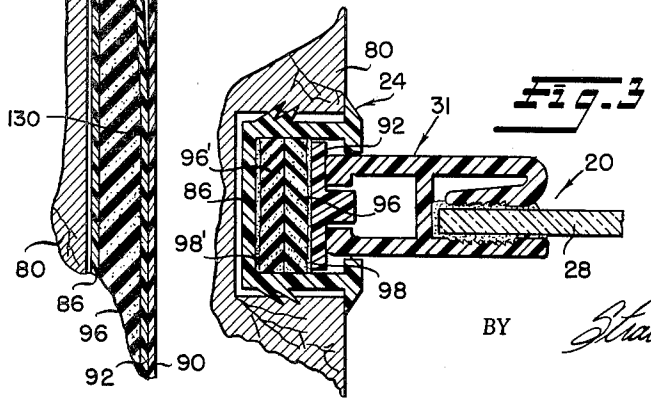


Fig. 3

INVENTOR
Raymond E. Johnson

BY Strauch, Nolan & Neale
ATTORNEYS

June 21, 1966 R. E. JOHNSON 3,256,641

WINDOW UNITS

Filed Dec. 20, 1962 3 Sheets-Sheet 2

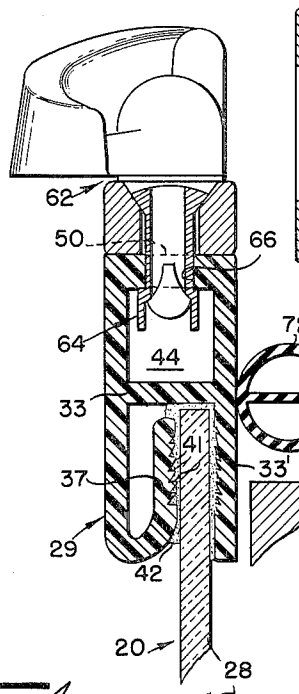


Fig. 4

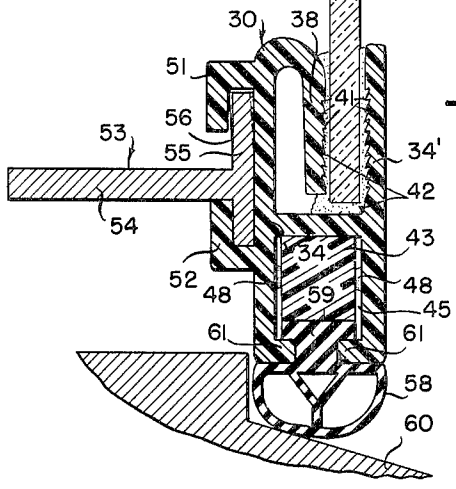


Fig. 5

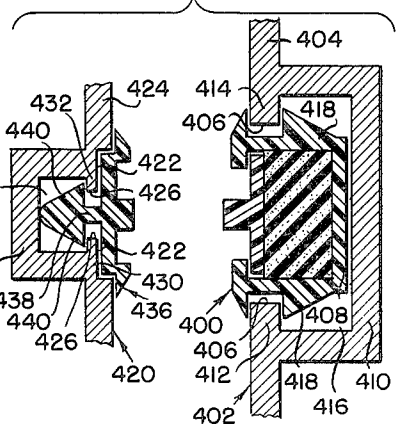
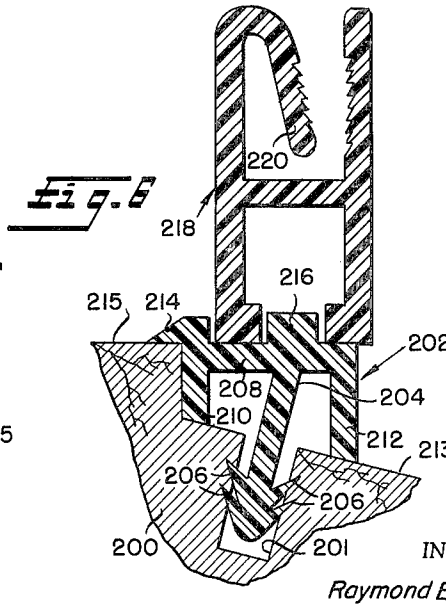


Fig. 6



INVENTOR
Raymond E. Johnson

BY Strauch, Nolan & Neale
ATTORNEYS

June 21, 1966 R. E. JOHNSON 3,256,641

WINDOW UNITS

Filed Dec. 20, 1962 3 Sheets-Sheet 3

Fig. 5

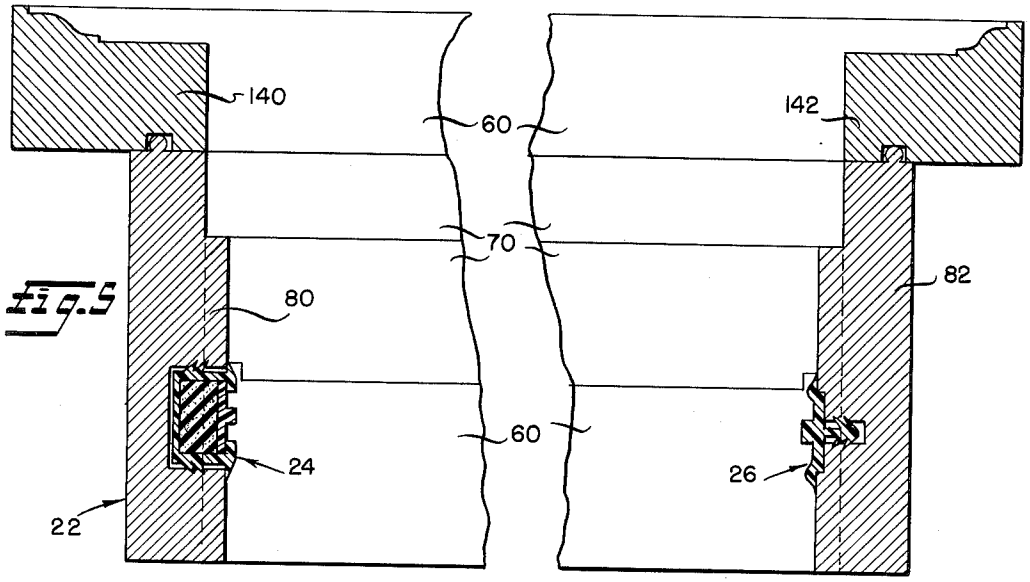
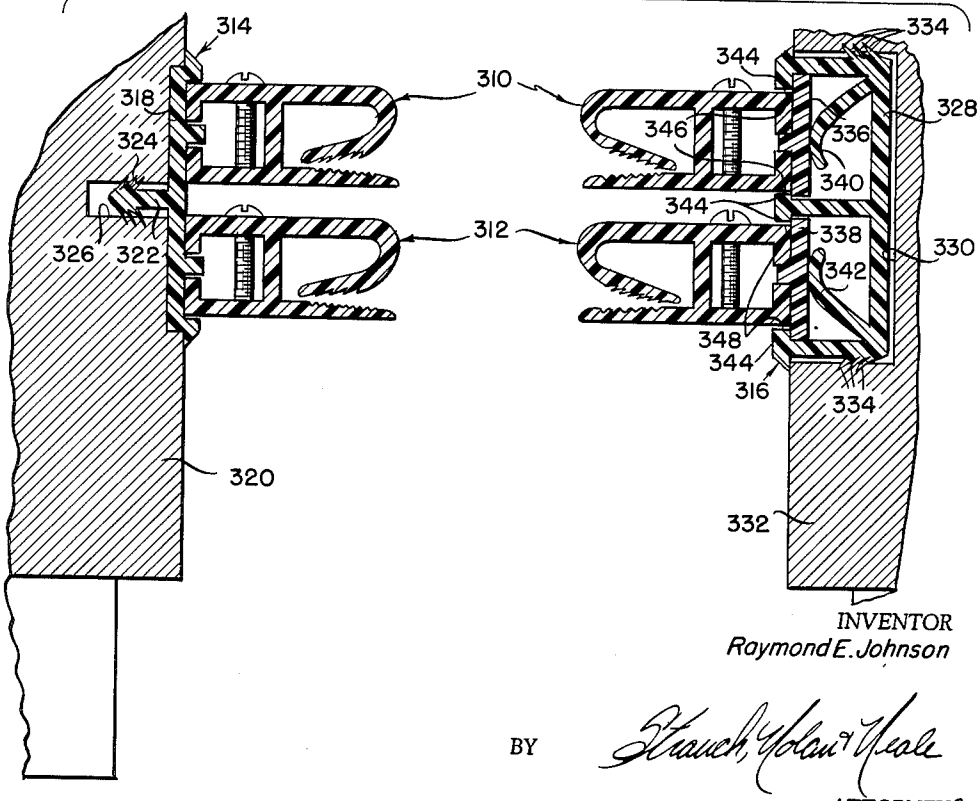


Fig. 7



INVENTOR
Raymond E. Johnson

BY Staudt, Nolan & Neale

ATTORNEYS

United States Patent Office

3,256,641

Patented June 21, 1966

3,256,641

WINDOW UNITS

Raymond E. Johnson, McConnelsville, Ohio, assignor to Malta Manufacturing Company, Malta, Ohio, a corporation of Ohio

Filed Dec. 20, 1962, Ser. No. 246,036
9 Claims. (Cl. 49—419)

The present invention relates to window units, particularly window units having sliding sashes, and to assembly methods therefor.

In past attempts to provide efficient sliding sash window units, some or all of the following disadvantages appear. First, as shown in United States Letters Patent No. 2,744,297 to Baker et al., the window frame structure employed to guide the sliding sash and to prevent air leakage around the sash is commonly a complicated and expensive, multi-component, built-up construction which frequently is unsightly when the sash is in its open position. Second, as exemplarily shown in United States Letters Patent No. 2,688,165 to Kinish, sliding sashes are generally constructed of bulky members of considerable depth and width or alternatively of a heavy, strong metallic material in order to provide the structural rigidity necessary to keep the sash square and to prevent undue transverse deflection under the application of loads normal to the plane of the sash. Third, in window units in which a vertically sliding sash is held in a desired opened position by a spring-loaded track, as shown in United States Letters Patent No. 2,157,426 to Nelson and in the Kinish patent referred to above, the spring-loaded track member is difficult to adjust and tends either to hold the sash too tightly or to let the sash slip.

It is therefore a primary object of the present invention to provide an improved sliding sash window unit which obviates these and other disadvantages of the prior art assemblies.

To accomplish this objective, the present invention provides a greatly simplified window unit construction in which the sash is constructed of four peripheral lengths of light weight sash rail rigidly assembled to the glass pane. Thus, the "square" rigidity of the glass pane is imparted to the sash which therefore need not be a bulky or heavy structure as in the prior art arrangements. As the sash rails in the present invention serve primarily to guide the glass pane along the frame and to support the weather stripping and fixtures necessary for a sliding sash, they can be kept to minimum dimensions. Consequently, the sash can be received in track assemblies of sufficiently small dimensions that they can be flush-mounted in grooves or the like in unitary window frame members such as jambs or sills. The necessity for multi-component, built-up, unsightly frame members is therefore obviated.

Further, because of the simplified construction and reduced weight of the sliding sash of the present invention, it may be effectively supported in substantially air-tight relationship to the frame by a novel, simple, spring-loaded, flexible track which provides more uniform operating and holding characteristics than the prior art arrangements. The novel sash rail and track assembly structure of the present invention also accomodates the incorporation of the novel adjustable device for controlling the friction between the sash and track assemblies to retain the sash in a selected opened position. In addition, the novel sash rail structure of the present invention is particularly adapted to be reinforced in those areas where the sash is apt to receive loads normal to the sash plane such as the exposed transverse lower rail of a vertically sliding sash.

Accordingly, further objects of the present invention include:

1. The provision of novel sliding-sash window units which are lighter and more streamlined and therefore more aesthetically pleasing and easier to handle, package, and install than those of the prior art;

2. The provision of novel sliding-sash window units which are more simple and have fewer components than those heretofore employed and which are therefore less expensive to manufacture and maintain;

3. The provision of novel sliding-sash window units which are substantially corrosion proof;

4. The provision of a novel sliding-sash window units in which all but the minor components may be inexpensive, corrosion resistant, aesthetically pleasing plastic extrusions;

5. The provision of novel, biased, floating track assemblies for sliding-sash window units;

6. In conjunction with the preceding object, the provision of track assemblies which can quickly and easily be flush-mounted in window-unit frame members;

7. In conjunction with the preceding object, the provision of sliding-sash window units in which the sash-retaining friction may be selectively varied;

8. The provision of simple, slightly, substantially air-tight track assemblies for windows which obviate the necessity for expensive, multi-component frame members;

9. The provision of improved light weight, minimum-dimension window-unit sash rails;

10. The provision of novel improved window sashes which may be more easily assembled than those of the prior art and to which window fittings may be more easily and simply secured; and

11. The provision of a novel improved method of assembling window sashes which ensures a fixed, sealed engagement between the glass pane and the sash rails.

These and other objects of the present invention will appear from the following description and the appended claims when read in conjunction with the drawings wherein:

FIGURE 1 is a fragmentary, broken horizontal section of a single-hung, vertically sliding window unit according to the present invention;

FIGURE 2 is a fragmentary, broken vertical section taken along line 2—2 of FIGURE 1;

FIGURE 3 is a fragmentary horizontal section of a floating track assembly employed in the window unit of FIGURE 1 but showing two strips of spring-biasing foam rubber installed;

FIGURE 4 is a fragmentary, broken vertical section through the window unit of FIGURE 1;

FIGURE 5 is a fragmentary, broken horizontal section taken through the upper portion of the window unit of FIGURE 1 and shows the simplified window frame construction made possible by the present invention;

FIGURE 6 is a fragmentary vertical section through the sill track assembly and lower sash rail of a horizontally sliding window unit having a single sliding sash according to a modified embodiment of the present invention;

FIGURE 7 is a broken, fragmentary horizontal section through a double-hung, vertically sliding window unit according to another modified embodiment of the present invention; and

FIGURE 8 is a broken, fragmentary section through a window unit according to a further modified embodiment of the present invention.

Referring to the drawings in detail, FIGURE 1 shows a window unit constructed according to the present invention and having a vertically sliding sash 20 guided for movement within a structurally simplified window frame

22 by a flush-mounted floating track assembly 24 and a flush-mounted fixed track assembly 26 mounted on opposite sides of the frame.

SLIDING SASH 20

As shown in FIGURES 1, 2, and 4, sliding sash 20 includes a glass pane 28 fitted into and surrounded by an upper sash rail 29, lower sash rail 30, and side sash rails 31 and 32 which are all preferably generally H-sectioned, hard vinyl plastic extrusions. The respective sides 33, 34, 35, and 36 of the four sash rails face the inside of the building and have, at the glass receiving ends of the H-shaped cross sections, turned-back resilient lips 37, 38, 39, and 40 running the length of the rails. These resilient lips and the opposing exterior sash rail sides 33', 34', 35', and 36' are provided with tooth-like structures 41 running the length of the sash rails along the glass pane facing surfaces to engage a suitable adhesive material 42 to retain the pane 28 in the rails. Pane 28 is rigidly secured to the sash rails 29 to 32 by the adhesive material which may be "Perma Bed," a bedding adhesive produced by the Biddle Company of St. Louis, Missouri.

In a specific example of this construction technique, the semi-fluid adhesive material 42 is squeezed from an applying gun into the recess of the sash rail in a bead of approximately ⅛ inch diameter prior to insertion of pane 28. Upon assembly of the sash, the glass pane flexes the resilient lips 37 to 40 toward the sides 33 to 36 of the sash rails and squeezes the adhesive 42 into the sealing disposition as shown in FIGURES 1 and 4. The resiliency of the turned back lips provides an inherent continual clamping pressure in the assembled sash to ensure an adhesive seal between the pane and the sash rails.

As shown in FIGURES 1 and 2, the ends of sash rails 29 to 32 are mitered and assembled around pane 28 with L-shaped corner braces 43 inserted longitudinally in the ends of the respective outer recesses 44, 45, 46, and 47 of the sash rails. The sides of the sash rails are partially punched or deformed as at 48 to fixedly engage the rails with depressions 49 provided in adjacent portions of the L-braces 43.

Referring particularly to FIGURE 4, the outer recess 44 of the upper sash rail 29 is preferably closed by an integral wall member 50 to prevent moisture from collecting in the recess. Lower sash rail 30, by which the sliding sash 20 is normally moved upwardly and downwardly to open and close the window, is preferably provided on interior side 34 with flanges 51 and 52 which fixedly receive a longitudinal metallic fitting or grip 53 having a section 54 extending a substantial distance inwardly from main body section 55 to strengthen the sliding sash against loads applied normally to the plane of the sash. Section 55 of grip 53 fits closely within flanges 51 and 52 and may be provided with crimps 56 or the like to secure the grip in longitudinal position along the sash rail 30. The turned-back lip 38 of lower sash rail 30 permits the interior sash rail side 34 to resiliently flex in transmitting the operating forces applied to grip 53 to the sash rail without disturbing the lower rail adhesive seal at 42.

The lower sash rail 30 also receives in outer recess 45 a sealing fitting such as a soft vinyl weather strip 58 having tripartite, webbed configuration which flexibly engages a sill 60 and provides a seal between the bottom of the sash and the frame when the window is closed. As shown in FIGURE 4, weather strip 58 is provided with an elongated T-shaped protruding portion 59 which is floatingly retained by the in-turned flanges 61 of the lower sash rail 30, thus permitting the weather strip to slide longitudinally into the sash rail during assembly. At both ends of the lower sash rail, the T-shaped portion 59 of the weather strip is anchored or gripped between the corner braces 43 and the flanges 61 to retain the weather strip in assembled longitudinal position in the sash rail.

Still referring to FIGURE 4, a conventional locking fitting or attachment 62 may be secured to the upper sash rail by blind rivets 64 extending through holes 66 in the wall 50 of the generally H-shaped upper sash rail. Locking device 62 cooperates with a fixture 68 securely fixed to a center bar 70 of the window frame in any desired manner to selectively lock the sash in the closed position. Also, the center bar 70 of the window unit frame preferably supports a second soft vinyl weather strip 72 which has a tripartite, webbed construction and is retained in center bar 70 by barb-like devices 74 inserted in a saw kerf 76.

FLOATING TRACK ASSEMBLY 24

As shown in FIGURE 1, window unit frame 22 has two wooden upright jambs 80 and 82. To receive the floating track assembly 24, one of the jambs 80 has a groove or slot 84 cut along the length of its exterior surface. The floating track assembly 24 includes a generally U-shaped track support 86 preferably extruded from a hard vinyl plastic and having laterally projecting, barb-like members 88, hereinafter called fishhooks, which resiliently deform to permit insertion of track assembly 24 but which penetratingly engage the sides of groove 84 to resist withdrawal of track support therefrom. Track support 86 also has beveled flanges 90 on both sides of the "top" or open side of the U-shaped cross section which provide a neat, flush engagement with jamb 80 and which extend as lugs 89 and 91 partially across the open end of the cross section of the track support.

A flexible track member 92, movably mounted within track support 86, is co-extensive in length therewith and like track support 86 is preferably extruded from a hard vinyl plastic. Track member 92 normally extends across the open "top" of the U-shaped cross section of the track support and is retained therein by overhanging flanges 90 with lugs 89 and 91.

Track member 92 includes elongated, rectangularly sectioned guide rail 94 which protrudes outwardly from track member 92 between the flanges 90 of the track support. The longitudinal flexibility of track member 92, which is important for purposes explained below, is provided in part by the material of which it is fabricated, vinyl plastic, and in part by its proper dimensioning. In a specific preferred form the track member is ½ inch wide and 1/16 inch deep with guide rail protruding 1/10 inch from its exterior surface.

Floating track assembly 24 also includes a foam rubber strip 96 co-extensive in length with and inserted in the U-shaped track support 86 behind track member 92. Foam rubber strip 96 is of a sufficient initial thickness to normally bias track member 92 into contact with the flanges 90 of the track support. Foam rubber strip 96 is faced with a strip of fabric 98 bonded thereto to eliminate the effects of unevenness in the foam rubber strip and to prevent the foam rubber from sticking to the plastic track member 92. This is of particular importance during the assembly of the floating track in which track member 92 can be inserted longitudinally in the track support 86.

Although a foam rubber strip is employed in the preferred embodiment of this invention to bias track member 92 into contact with flanges 88 and 90 of track support 86, it would be obvious, to one skilled in the art, that other kinds of biasing members could be employed for this purpose, if desired. For example, United States Patents 2,303,129 issued November 24, 1942 to G. J. Kurtz; 2,664,599 issued January 5, 1954 to A. Zitomer; 2,846,734 issued August 12, 1958 to A. Zitomer; and 3,065,507 issued November 27, 1962 to J. T. Cloutier all disclose undulating leaf springs in a setting similar to applicant's foam rubber strip 96; and such leaf springs could obviously be employed instead of applicant's foam rubber strip, if desired.

FIXED TRACK ASSEMBLY 26

On the opposite side of frame 22, fixed track assembly 26, which is preferably formed of extruded hard vinyl, is mounted in a shallow groove 100 formed in the other upright jamb 82. A saw kerf or slot 102 is centrally cut in the bottom of groove 100 to receive track assembly support 104 which is formed integrally with track member 106 and has integral, laterally projecting fishhooks 108 which engage the sides of saw kerf 102 to resist withdrawal of the fixed track assembly 26 therefrom. Track member 106 has beveled flanges 110 and 112 which provide a flush fit and a neat appearance with the jamb 82 and cooperate with a guide rail 114 protruding outwardly from the center of track member 106 to guide the sash 20 therealong.

SASH RAIL AND SASH TRACK INTERACTION

As shown in FIGURE 1, sliding sash 20 is slidably disposed in the floating track assembly 24 with the H-shaped side sash rail 31 fitting closely between flanges 90 of track support 86 and contacting track member 92 on either side of guide rail 94. The close plastic to plastic, sliding fit of sash rail sides 35 and 35' to flanges 90 and to the rail 94 together with the spring-biased plastic to plastic, frictional fit between track member 92 and the edge surfaces 120 of sash rail 31 results in a smooth operating, durable fit between sash 20 and frame 22 that is substantially free of air leakage and free from corrosion.

A similar tight sliding engagement is provided on the other side of frame 22 where sash rail 32 of sliding sash 20 is biased into engagement with track member 106 on either side of guide rail 114 by foam rubber strip 96.

In vertically sliding windows, it may be necessary to enhance the restraining action of the friction resulting from spring-biased track assembly 24 by clamping sides 36 and 36' of sash rail 32 upon the guide rail 114 of fixed track assembly 26. An adjusting mechanism for this purpose, as shown in FIGURE 1, may be a screw 122 extending through suitable holes 124 in sash rail sides 36 and 36' into threaded engagement with a special curved sheet metal nut 126 on the exterior of sliding sash 20. Nut 126 is rust protected as by cadmium plating and has four relatively sharp corners 128 which engage the outside surface of side 36' of plastic sash rail 32 to prevent nut 126 from rotating with screw 122.

The sash rail of the present invention is peculiarly adapted to this type of friction control device as the lip 40 allows sash rail side 36 to resiliently flex under the tightening action of screw 122 without disturbing the fixedly sealed engagement at 42 between the toothed surfaces of the sash rail and the glass sash pane.

As shown in FIGURE 2, the use of a thin, flexible track member 92 in conjunction with resilient foam rubber strip 96 results in a particularly advantageous coaction between floating guide assembly 24 and the sliding sash 20. Thus, at a point 130 and below, the flexible track member 92 is urged into contact with flange 90 of the floating track assembly by the resiliency of the foam rubber 96. In the vicinity of point 132 and above, flexible track member 92 is urged into contact with side 35' of sash rail 31. Between points 130 and 132, track member 92 takes on a curved configuration from an undepressed condition at 130 to a fully depressed condition at 132 indicated in FIGURE 2. Track 92 is, thus, inclined from point 130 to the point of contact with lower corner 134 of the sliding sash 20. Thus, sash 20 is actually supported and restrained from sliding by an inclined section of track at the lower corner thereof. Further, except for the short section of floating track between the corner 134 of sash 20 and point 130, the track assembly 24 is closed either by the sash 20 or by the abutment of the track member 92 with flanges 90 to prevent entry to its interior of foreign matter which might otherwise interfere with the proper operation of the track and the sash.

The strip 96 may also be an integral resilient portion of the track support.

As shown in FIGURE 3, the floating track assembly 24 may include two strips of foam rubber 96 and 96'. These strips each have the same unloaded thickness as the strip 96 discussed in reference to FIGURE 1 and, when assembled, have the effect of increasing the spring-bias force on track member 92. In this technique of installing the foam rubber in the floating track assembly, fabric facings 98' and 98 are positioned in contact with the "bottom" of U-shaped track support 86 and the interior surface of track member 92, respectively.

FRAME 22

The novel sash and track assembly structure shown in detail in FIGURES 1 to 4 permits a greatly simplified frame construction to be employed as shown in FIGURE 5. When the track assemblies 24 and 26 as described above are used, the jambs 80 and 82 of frame 22 may be integral pieces of only ¾ inch thickness, in one specific instance, and yet retain the self-mounting track assemblies in grooves therein. Further, these track assemblies require no additional strips of wood or weather stripping affixed along the jambs to quide the sliding sash, to check air leakage, or to provide a pleasing appearance to the window unit. With such integral jambs, the frame requires only eight separate members in its construction. Four of these frame members have been mentioned: the two side jambs 80 and 82, the sill 60, and the center bar 70. The frame is completed by four additional pieces: side casings 140 and 142, a head jamb, and a head casing which are not shown but are similar in appearance to the side jambs and casings, respectively.

MODIFICATIONS

FIGURES 1 to 5 show a vertically sliding window unit having a single sliding sash according to the present invention. It should be understood that the window unit construction technique of the present invention can be readily applied to a window unit having a horizontally sliding sash or to units having a plurality of sliding sashes. In a horizontally sliding sash window unit, a floating track assembly, such as shown in FIGURE 1 at 24, is flush mounted in the lower surface of the window head jamb, and a fixed track assembly is mounted in the sill.

In this application of the invention, the fixed track assembly is the only portion of the sash rail and sash track structure as described above that requires substantial modification. As shown in FIGURE 6, the sill 200 has an inclined saw kerf 201 cut therein. A fixed track assembly 202 has a fastening member 204 with laterally projecting fishhooks 206 inserted in saw kerf 201.

Fixed track assembly 202 also includes a track member 208 which is further supported by legs 210 and 212 on the sloped portion 213 of sill 200. In addition track member 208 has a beveled flange 214 which forms a flush fit with the horizontal inner portion 215 of sill 200 and an upwardly protruding guide rail 216 which cooperates with flange 214 to receive and to guide sash rail 218 therealong. Sash rail 218 is shown for purposes of illustration without a sash pane and shows turned back lip 220 in its glass receivinng position.

As shown in FIGURE 7, the present invention may be utilized in a window unit having double sliding sashes. In this embodiment sliding sashes 310 and 312, having sash rails similar to those of FIGURES 1 to 6 and shown here without glass sash panes, are slidingly mounted between a fixed double track assembly 314 and a floating double track assembly 316 which are preferably hard vinyl extrusions. Track assembly 314 is flush-mounted in a shallow groove 318 in a jamb 320 and is secured therein by a track support 322 having laterally extending fishhooks 324 engaging the sides of saw kerf 326. The floating track assembly 316 includes a track support 328 mounted in a groove 330 in jamb 332 by means of

laterally extending fishhooks **334**. Independently floating track members **336** and **338**, which are substantially identical to the track member **92** described above, are movably retained in track support **328** and are spring-biased outwardly from the track support by integral, resilient spring-fingers **340** and **342** which run the length of track support **328** and bias track members **336** and **338** against lugs **344** extending partially across openings **346** and **348** formed in the exterior side of the track support. When a complete window sash is installed, track members **336** or **338** may be depressed somewhat from the positions shown in FIGURE 7.

The sash and track assembly structure of the present invention can be advantageously employed with window frame members of materials other than wood, for example, hard vinyl or aluminum. As shown in FIGURE 8, a floating track assembly **400**, which is similar to the track assembly **24** described herein, is substantially flush-mounted in jamb **402** which is preferably an aluminum or hard vinyl plastic extrusion. The track receiving side **404** of jamb **402** is provided with a slot **406** running the length thereof to receive track support **408**. Jamb **402** also has an integral U-sectioned portion **410** to join the two sections **412** and **414** of jamb side **404** closely adjacent their edges at slot **406** and to form a recessed portion **416** of slot **406**. Track support **408** is retained in jamb **402** by laterally projecting fishhooks as described above but which in this embodiment may preferably be of a modified form as shown at **418**. Fishhooks **418** are resiliently flexible to deform to permit insertion of track support **408** in jamb **402** but expand in recessed portion **416** after insertion to engage the inner surfaces of jamb sections **412** and **414** to resist withdrawal of the track assembly.

The opposite jamb **420** is also an aluminum or hard vinyl extrusion and has a shallow groove **422** in its track receiving side **424** and a slot **426** running the length thereof down the center of groove **422**. Jamb **420** has an integral U-shaped portion **428** to join the two sections **430** and **432** closely adjacent their edges at slot **426** and to form a recessed portion **434** of slot **426**. Fixed track assembly **436** which is similar to track assembly **26** described above has a track support **438** with laterally projecting fishhooks of the shape seen at **440** in FIGURE 8. Fishhooks **440** resiliently deform upon insertion of track support **438** into jamb **420** and then expand to engage the recessed portion **434** of slot **426** at the inner surfaces of jamb sections **430** and **432** to resist withdrawal of the track assembly from the jamb.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive. The scope of the invention is indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. A frictionally-held, sliding-sash window unit comprising:

(a) a multi-member, generally rectangular window frame;

(b) a sash disposed in said window frame and having first and second substantially parallel sash rails;

(c) a track assembly mounted on one of the frame members, said assembly comprising: a track support, an elongated flexible track member movably retained in said track support, and a strip of resilient material positioned in contact with said track member between said track member and said track support to bias said track member into frictional sliding contact with said first sash rail;

(d) a fixedly mounted track assembly on a second frame member opposite said one frame member, said second sash rail being in frictional sliding contact with said fixedly mounted track assembly; and

(e) means on at least one of said sash rails for selectively controlling the sliding friction between said at least one sash rail and the track assembly it contacts.

2. In a window unit having a hollow frame and a sliding sash disposed in said frame and having substantially parallel sash rails, a sash guide assembly comprising:

(a) a sash-guiding track assembly on one side of said frame;

(b) an elongated guide rail protruding intermediately from said track assembly;

(c) H-shaped sections on said sash rails having end portions including flanges for contacting opposite sides of said protruding intermediate guide rail; and

(d) means on a sash rail for selectively varying the spaced relationship of said guide rail contacting flanges to control the sliding friction between said track assembly and said sash.

3. A spring biased sash-guiding track assembly for use in window units having a frame and a sliding sash comprising:

(a) a hollow track support mounted in said frame;

(b) an elongated flexible track member movably retained in said track support; and

(c) a strip of resilient material mounted to contact with said track member between said track support and said track member for biasing said track member into frictional sliding contact with a sliding sash, wherein the side of said resilient strip contacting the flexible track member is faced with fabric.

4. A sliding guide assembly for use in window units having a frame and a sliding sash member comprising:

(a) a floating track assembly having:

(1) a track support fixedly recessed in said frame,

(2) a flexible track member movably retained within said track support, and

(3) a spring-biasing strip of resilient material wholly enclosed within said track support between said track support and said track member; and

(b) an H-shaped sash rail, one side of said rail receiving a glass sash pane and the other side having substantially parallel flanges contacting said track member to depress it against the spring-bias of said strip as it slides therealong whereby said track member is inclined inwardly from a fully depressed portion longitudinally spaced from the end of said sash rail and said inclined portion of said track member supports the weight of said sash to prevent movement thereof in the absence of an outside force sufficient to overcome the biasing force of said strip.

5. In a window unit having a hollow frame including a sill having a horizontal interior surface and a recessed inclined exterior surface and a sliding sash disposed in said frame, a sash-guiding track comprising:

(a) a track member mounted on and interiorly of the frame and slidingly contacting the sash;

(b) a beveled flange integral with said track member whose outer end provides a substantially flush engagement between said track member and the frame;

(c) a guide rail protruding from said track member for slidingly engaging and guiding said sash; and

(d) integral track supports extending normally from said track member and abutting said inclined recessed surface of said sill to position said track member in aligned flush relation to said horizontal surface.

6. The combination of claim **4** wherein said sash rail includes an elongated lip turned back into one side of said rail to hold the glass pane between said turned back lip and the opposite wall of said side.

7. The combination of claim 6 wherein the mutually facing surfaces of said lip and said opposite wall are provided with a plurality of longitudinal teeth for gripping the sash pane.

8. The combination of claim 6 including an elongated metallic crosspiece rigidly secured to a sash rail extending transversely between said track members to strengthen said rail against lateral bending and to provide a hand grip for operating said sliding sash.

9. In a window unit having a hollow frame and a sliding sash having substantially parallel sash rails, a sash mounting and guide assembly mounted in a slot formed in said frame and having its outer end substantially aligned with said frame comprising:

(a) a sash-guiding track assembly on one side of said frame;

(b) an elongated guide rail protruding intermediately from said track assembly;

(c) H-shaped sections on at least one of said sash rails having end portions including flanges for contacting opposite sides of said protruding guide rail; and

(d) elongated laterally projecting fish-hooks integral with said sash guide assembly engaging the sides of said slot for retaining said sash guide assembly in said slot.

References Cited by the Examiner

UNITED STATES PATENTS

1,256,046	2/1918	Shroyer	189—76
1,704,314	3/1929	Edwards et al.	189—76
1,921,386	8/1933	Edwards	189—72
2,111,224	3/1938	Peremi et al.	189—72
2,191,549	2/1940	Sparagen.	
2,303,129	11/1942	Kurtz.	
2,430,772	11/1947	Kammerer	189—72
2,602,501	7/1952	Roos	20—52
2,651,818	9/1953	Schwartz	189—72 X
2,676,367	4/1954	Trammell et al.	20—52.2
2,688,165	9/1954	Kinish	20—52.2 X
2,767,814	10/1956	Johnson	189—36 X
2,793,406	5/1957	Focht	20—69
2,877,511	3/1959	Piola	20—52.8
2,883,715	4/1959	Walker	20—52.2
2,917,788	12/1959	Kunkel	20—11
2,939,187	6/1960	Hilgendorf	20—52.2
3,009,215	11/1961	Fraleigh.	
3,022,546	2/1962	Nevotti	20—52.2
3,054,152	9/1962	Trammel	20—52
3,065,507	11/1962	Cloutier et al.	20—52
3,103,711	9/1963	Teggelaar	20—52.2 X
3,124,850	3/1964	Johnson	20—52.2
3,147,517	9/1964	Dinsmore	20—52.2

FOREIGN PATENTS

631,113	11/1961	Canada.

CHARLES E. O'CONNELL, *Primary Examiner.*

HARRISON R. MOSELEY, *Examiner.*

A. I. BREIER, *Assistant Examiner.*