Oct. 21, 1969 F. C. OSTEN, SR 3,473,263

SELF-LOCKING REMOVABLE SASH WINDOW INSTALLATION

Original Filed March 9, 1966 3 Sheets-Sheet 1

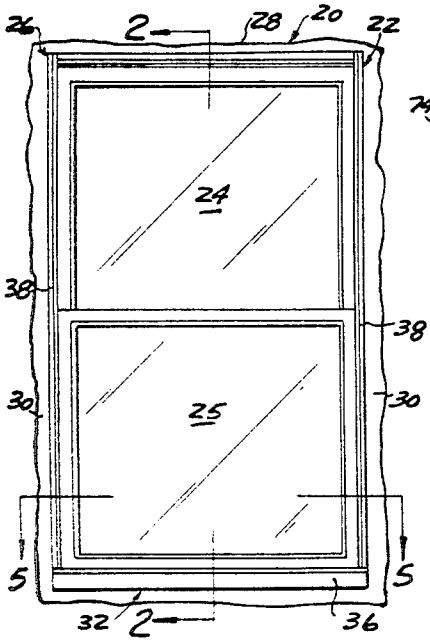


FIG. 1

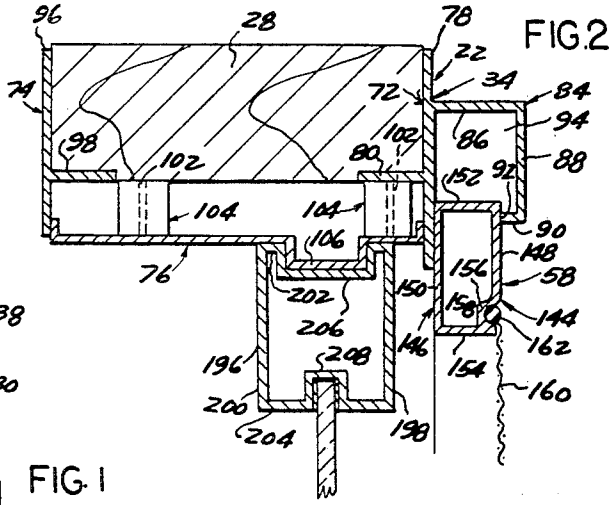


FIG. 2

FIG. 3

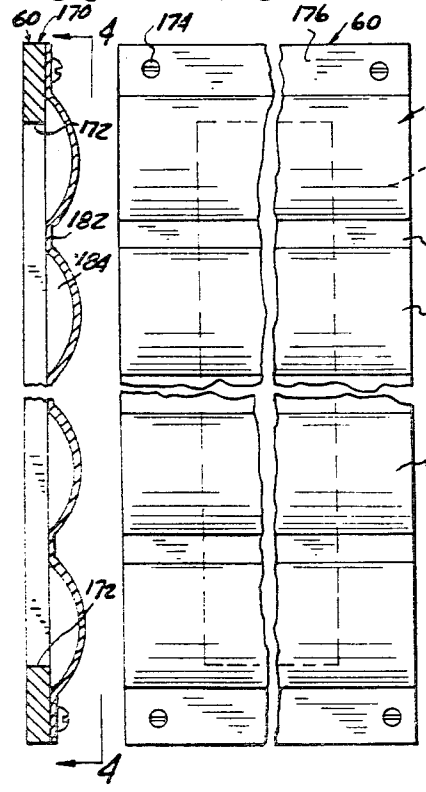
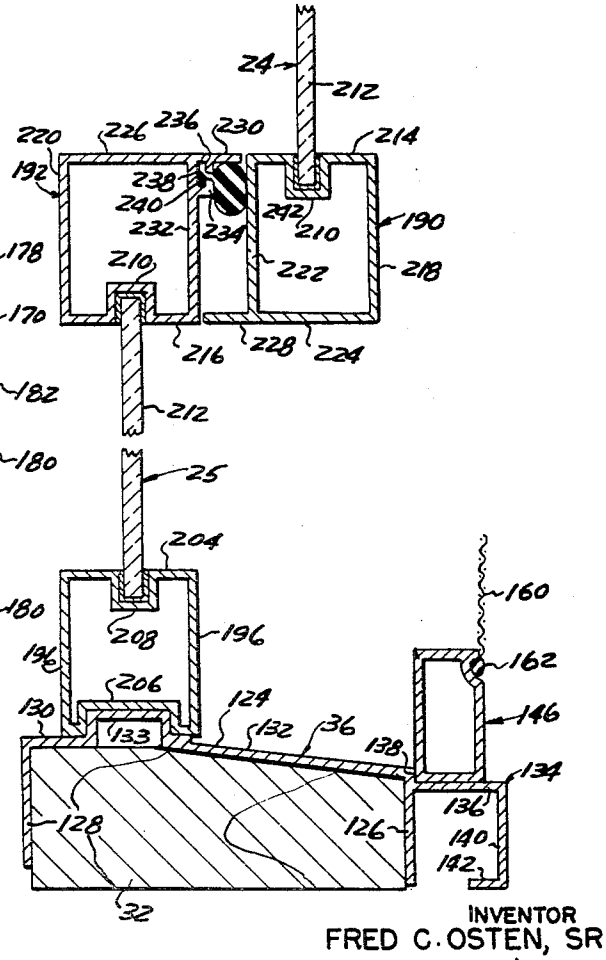


FIG. 4

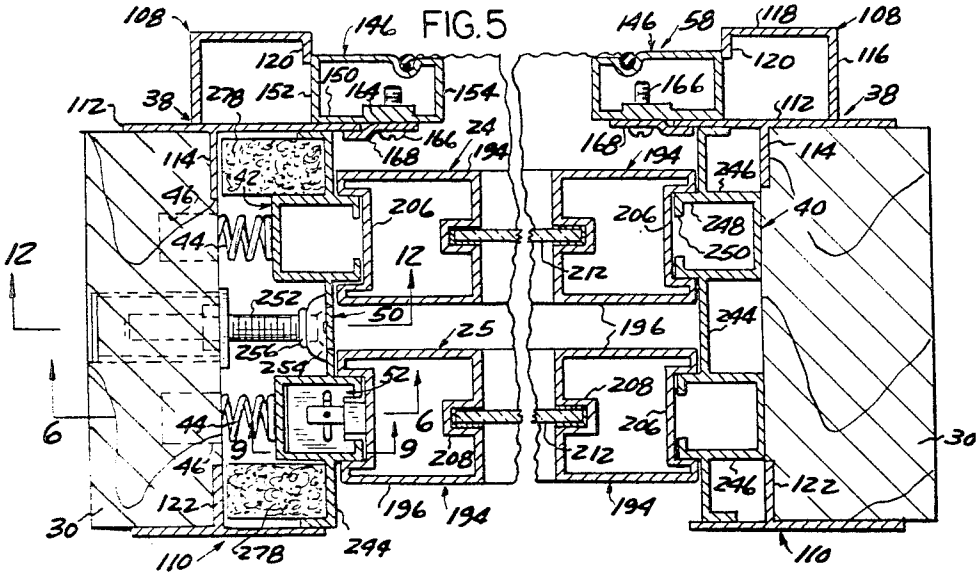


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SELF-LOCKING REMOVABLE SASH WINDOW INSTALLATION

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FIG. 5



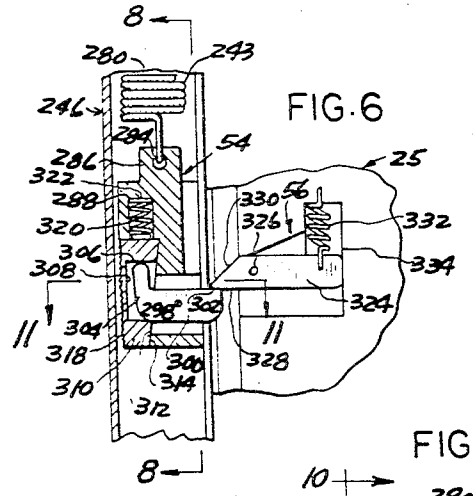


FIG. 6

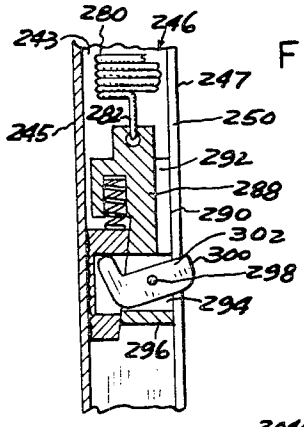


FIG. 7

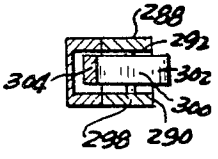


FIG. 11

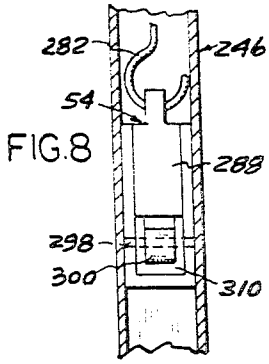
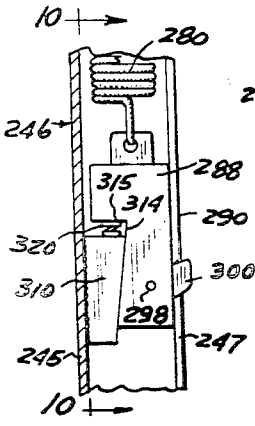


FIG. 8

FIG. 9



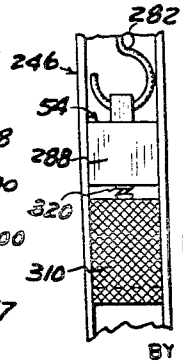


FIG. 10

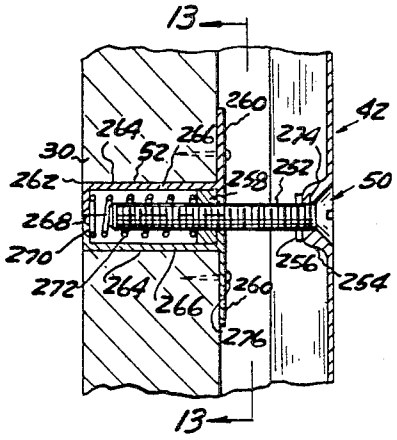
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SELF-LOCKING REMOVABLE SASH WINDOW INSTALLATION

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FIG. 12



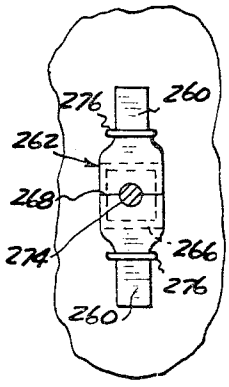


FIG. 13

FIG. 14

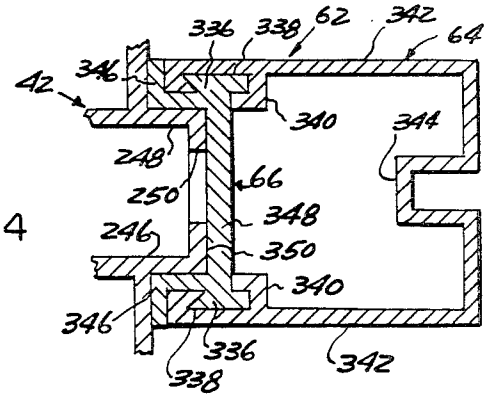
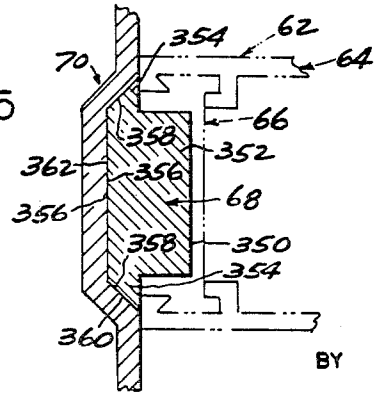


FIG. 15



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3,473,263

SELF-LOCKING REMOVABLE SASH WINDOW INSTALLATION

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Original application Mar. 9, 1966, Ser. No. 533,044, now Patent No. 3,375,611, dated Apr. 2, 1968. Divided and this application Mar. 25, 1968, Ser. No. 739,997

Int. Cl. E05d *15/18, 13/12*

U.S. Cl. 49—161 3 Claims

ABSTRACT OF THE DISCLOSURE

A removable double-hung sash window installation with self-locking automatically unlocking sash balances having double-hung sliding sashes mounted in sash guides with resilient sash balances interconnecting the sashes and the sash guides. Sash guide engaging portions on the sash comprising a groove, and a tilting sash adapter element having a base portion disposed in mating engagement with the groove and having a beveled cam portion connected to the base portion for converting the removable sliding sash window into a removable sliding and tilting sash window.

This is a division of application Ser. No. 533,044, filed Mar. 9, 1966, now U.S. Patent No. 3,375,611.

This invention relates to removable sash window installations with self-locking automatically unlocking sash balances. Its objects are to provide such an installation including a double-hung sash window frame and sash frame having an auxiliary frame portion adapted to removably receive a window screen and also optionally interchangeably receive a hurricane shutter in place of the screen; also to provide a resilient mounting device for the channel sash guides of such an installation which is of simple and inexpensive yet strong construction and which is easily adjusted to provide adjustability of the sash guide channel; also to provide an improved and positively securing automatically locking sash balance which operates by a wedging action without indenting or otherwise disfiguring its housing; and also to provide a window sash border structure of hollow metallic or plastic construction, the components of which are adapted to be produced by extrusion and interchangeably receiving, in the side rails, adapter strips for converting the removable sliding sash window into a removable sliding-and-tilting sash window.

FIGURE 1 is a rear elevation on a reduced scale, of a removable double-hung sash window installation with an automatically locking sash balance, according to the present invention;

FIGURE 2 is a vertical section upon an enlarged scale, taken along the line **2**—**2** in FIGURE 1;

FIGURE 3 is a central vertical section through a hurricane shutter which is interchangeable with the screen shown in FIGURE 2;

FIGURE 4 is a fragmentary front elevation of the hurricane shutter shown in FIGURE 3;

FIGURE 5 is a horizontal section, upon an enlarged scale, taken along the line **5**—**5** in FIGURE 1; showing the improved window installation of the invention with the upper sash in its lowered position so as to show its relationship to the lower sash;

FIGURE 6 is a fragmentary vertical section taken along the line **6**—**6** in FIGURE 5, showing one of the self-locking automatically releasing sash balances according to the invention, in its unlocked position with the sash in place;

FIGURE 7 is a view similar to FIGURE 6, but with the sash removed and the sash balance self-locked;

FIGURE 8 is a vertical section, mainly in front elevation, of the self-locking sash balance of FIGURES 6 and 7, taken along the line **8**—**8** in FIGURE 6;

FIGURE 9 is a view similar to FIGURE 7, showing the self-locking sash balance in side elevation;

FIGURE 10 is a vertical section, mainly in rear elevation of the self-locking sash balance on FIGURES 6 to 9, taken along the line **10**—**10** in FIGURE 9;

FIGURE 11 is a horizontal cross-section taken along the line **11**—**11** in FIGURE 6, of the self-locking sash balance, removed from its housing;

FIGURE 12 is a vertical section through a simplified adjustable resilient sash guide mounting device, according to the invention, taken along the line **12**—**12** in FIGURE 5;

FIGURE 13 is a vertical section, mainly in front elevation, of the resilient mounting of FIGURE 12, taken along the line **13**—**13** therein;

FIGURE 14 is a fragmentary horizontal section through a hollow composite window sash rail constituting a modification of that shown in FIGURE 5, together with a portion of its sash guide; and

FIGURE 15 is a horizontal section through an adapter strip for converting the hollow sash rail of FIGURE 14 from a removable sliding sash window to a removable sliding-and-tilting sash window together with a portion of its sash guide.

GENERAL ARRANGEMENT

Referring to the drawings in general, FIGURE 1 shows a self-locking automatically unlocking removable sash window installation, generally designated **20**, according to one form of the present invention as consisting generally of a window frame **22** of metallic or plastic construction adapted to slidably receive double-hung upper and lower sliding sashes **24** and **25**, respectively. The window frame **22** is adapted to be mounted in and secured to the adjacent building window opening frame, generally designated **26**, which includes a building opening top member **28**, building opening side members **30** and a building opening bottom member or sill supporting member **32** (FIGURE 2). The window frame **22** consists of upper and lower or top and sill members **34** and **36** fitting over their respective building structure members **28** and **32**, the latter of which are ordinarily of wood. The members **34** and **36** (FIGURE 2) are interconnected by opposite window side frame members **38** of similar construction secured to the building frame side members **30** and adapted, in turn, to receive on one side a fixed sash guide **40** and on the other side a yieldingly mounted sash guide **42**. The latter is resiliently supported upon springs **44** set into recesses **46** in the adjacent building structure side member **30**. The position of the yieldable sash guide **42** is adjusted by means of resilient adjustable mounting devices, generally designated **30** (FIGURES 5, 12 and 13) disposed at vertically spaced intervals along the adjacent vertical building structural member **30** into which these are inserted in spaced holes **52** (FIGURE 12).

The weights of the upper and lower sashes **24** and **25** are balanced by self-locking automatically unlocking sash balances, generally designated **54** (FIGURES 5 to 11, inclusive), operated by tripping devices, generally designated **36** (FIGURE 6), one of which is seated in each sash **24** or **26** a short distance above the lower adjacent corner thereof. Each window frame **34** removably and interchangeably receives a window screen, generally designated **58** (FIGURES 2 and 5), or a hurricane shutter **60** (FIGURES 3 and 4) as described more fully below.

A modified two-piece sash side rail, generally designated **62** (FIGURE 14), composed of interfitting parts

64 and 66 is adapted to be substituted for the side sash rails shown in FIGURE 5 to slidably engage the sash guides 40 and 42 for sidewise removal of the sashes 24 and 25. The outer member 66 is further adapted to receive an adapter strip 68 (FIGURE 15) for conversion thereof into a sliding-and-tilting removable sash window construction having a camming action upon a flared channel yieldable sash guide 70. These constructions are described in detail below, under their respective headings.

The top member 34 of the window frame 22 (FIGURE 2) includes outer and inner components 72 and 74 respectively interconnected by a lower component 76. The outer component 72 includes a vertical base portion 78 of T-shaped cross section secured to the outer side of the window frame opening top member 28 and having a horizontal portion 80 recessed into the lower outer portion of the member 28. The outer frame component 72 additionally includes a downwardly facing channel extension 84 consisting of an upper wall or horizontal web portion 86 integral with and projecting outwardly from the vertical base portion 78, and also includes a vertical outer wall 88 extending downwardly from the upper wall 86 and terminating in an inwardly extending flange portion 90 spaced horizontally away from the base portion 78 and defining an elongated opening 92 leading into a chamber 94 and adapted to interchangeably receive the screen 58 or hurricane shutter 60, as explained more fully below.

The inner component 74 (FIGURE 2) likewise has a vertical base portion 96 of T-shaped cross section secured to the inner face of the window frame opening top member 28 and having a horizontal portion 98 likewise recessed into the lower rearward corner of the member 28 in a manner similar to that of the portion 80. Secured as by fasteners 102 to the underside of the window frame opening top member 28 are spacers 104 (FIGURE 2) to the lower sides of which the lower component 76 is secured. The lower component 76 is flanged at its outer and inner edges adjacent the bases 78 and 96 and near the outer spacers 104 is provided with a downwardly extending hollow rib portion 106 of rectangular cross-section interfitting with the top of the upper sash 24 to provide a weather seal, as described below.

The window frame side members 38 (FIGURE 5) likewise include outer and inner components 108 and 110, respectively. The individual components of each of the two pairs of outer and inner components 108 and 110 are of similar but oppositely facing construction. Each outer component 108 includes a vertical base portion 112 of T-shaped cross section secured to the outer face of each of the window opening side members 30 and an inwardly extending flange portion 114 recessed into the inner corner edge of the member 30. Projecting outwardly from each base portion 112 is a perpendicular vertical wall 116 from which extend a parallel vertical wall 118 terminating in a rearward extending flange 120 (FIGURE 5). From FIGURE 5 it will be seen that the screen 58 fits into the space between the flanges 120 and the base portions 112 which extend toward one another past the flange portions 114. The outer components 110 are also of T-shaped cross-section (FIGURE 5) with inwardly extending flange portions 122 similarly recessed into the window opening frame members 30 and, of course, secured thereto.

The window frame side members 38 at their lower ends abut the opposite ends of the window frame sill member or bottom member 36. The latter is of approximately channel cross-section (FIGURE 2) with a top wall 124 forming the web of the channel and parallel downwardly extending outer and inner flange portions 126 and 128 respectively, these three portions extending down over the window frame opening bottom or sill member 32 and secured thereto. The top wall 124 has a horizontal inner portion 130 and a downwardly and outwardly sloping outer portion 132 separated from one another by an upstanding hollow horizontal rib 133 of rectangular cross-section which, as will be seen below, interfits with the bottom of the lower sash 25 to provide a weather seal. Projecting substantially horizontally from the upper edge of the outer flange portion 126 slightly below its junction with the slanting top wall portion 132 is a hollow sill extension or screen ledge 134 (FIGURE 2) also of approximately rectangular cross-section with an upper wall 136 meeting the edge of the top wall portion 132 in a shoulder 138, and a vertical outer wall 140 extending downwardly from the upper wall 136 and terminating in an inwardly extending flange portion 142. The upper wall 136 and shoulder 138 form a seat for the lower end of the screen 58 as will be seen below.

Screen construction

The screen 58 (FIGURE 2) includes an open-centered rectangular border frame 144 composed of four hollow metallic or plastic frame components 146 of roughly rectangular cross-section. Each frame component 146 has parallel front and rear walls 148 and 150 respectively and parallel outer and inner peripheral walls 132 and 134 respectively, the members 146 being preferably formed by extrusion. The front wall 148 adjacent the inner peripheral walls 154 is provided with an inwardly projecting rib 156 containing a groove 158 in which is secured the edge portion of a mesh screen sheet 160, as by a suitable plastic or metallic filler 162. The topmost component 146 of the screen 58 fits into the opening 92 of the channel extension 84 (FIGURE 2) while the lowermost component 146 rests upon the upper wall 136 of the screen ledge 134 against the shoulder 138 as a stop. The rear walls 150 of the side frame components 146 (FIGURE 5) are provided with inwardly extending ribs 164 forming thickened portions which are drilled and threaded for the reception of screws 166 which are inserted through four offset or Z-shaped rotatable clips or latches 168, the outer ends of which overlap the base portions 112 and the inner ends of which engage the rearward walls 150 to removably lock the screen 58 in position.

Hurricane shutter construction

The hurricane shutter 60 which is interchangeable with the screen 58 (FIGURES 3 and 4) consists of an open-centered rectangular border frame 170 made up of four frame components 172 to which are secured as by fasteners 174 the border flange portions 176 of a corrugated closure member, generally designated 178, having approximately semicylindrical humps 180 separated from one another by flat portions 182. The corrugated closure member 178 is conveniently made of rolled sheet aluminum and the end openings of the humps 180 are closed by sheet metal end walls 184 welded or otherwise secured thereto so as to provide a weather-tight joint. From FIGURES 2, 3 and 5 it will be seen that when the clips 168 are either removed or swung to one side after loosening the screws 166, the screen 58 may be removed by pushing its lower frame component 146 outward off the ledge portion 134 and sliding the upper component 146 downward through the opening 92 in the channel extension 84 (FIGURE 2). The uppermost component 172 of the border frame 170 is then slid upward through the opening 92 and the lower one pulled inward over the ledge 134 into engagement with the shoulder 138 and locked in position by clips (not shown) similar to the clips 168 secured to the border frame 170 and similarly engaging the base portions 112 (FIGURE 5). Thus, the window sashes 24 and 25 are protected from being shattered by flying debris, such as branches, coconuts, and the like carried by hurricane winds. The hurricane shutter 60 replaces the ordinary flat wood hurricane shutter and is much more rapidly installed and removed, while the cylindrical humps or corrugations 180 provide added structural strength and rigidity to resist deformation or penetration. The hurricane shutter 60 also replaces metal awnings which do not provide adequate protection since they do not completely cover the window opening or the sash panes.

Sash construction

The upper and lower sashes 24 and 25 (FIGURES 1, 2 and 5) are of similar constructions, except for their meeting rails, hence, excepting the latter construction, a single description will suffice for both. Each sash 24 or 25 includes a meeting rail 190 or 192 respectively, side rails 194 and a fourth or remaining rail 196 which is the top rail of the upper sash 24 and the bottom rail of the lower sash 25. Each of the rails 194 or 196 is of hollow approximately rectangular construction with parallel forward and rearward walls 198 and 200 respectively (FIGURE 2) interconnected by recessed outer and inner walls 202 and 204, respectively. The outer wall 202 has a broader inset or channel portion 206 which mates with either of the downwardly extending hollow rib portion 106 of the lower components 76 of the top member 34 or with the upstanding hollow horizontal rib 133 of the sill member 36, as the case may be (FIGURE 2), thereby providing a weather seal, as previously stated. The inner wall 204 of each rail 194 or 196 is provided with an inwardly extending narrow channel portion 208, and the meeting rails 190 and 192 with similar channel portions 210 in which the edges of the panes 212 of the upper and lower sashes 24 and 25 are seated and seated in any conventional manner. While for purposes of simplicity FIGURES 2 and 4 show single panes 212, it will be obvious that the channels 208 may be broadened, like the channels 206, to receive conventional double pane glazing (not shown) of the thermal type well known to those skilled in the window glass industry.

The meeting rail 190 of the upper sash 24 has a narrow channel upper wall 214 (FIGURE 2) containing the pane-receiving channel portion 210, whereas the meeting rail 192 of the lower sash 25 has a similar lower wall 216. The forward wall 218 of the upper sash meeting rail 190 and the rearward wall 220 of the lower sash meeting rail 192 are flat and parallel as is the rearward wall 222 of the upper sash meeting rail 190. The bottom wall 224 thereof, however, and the top wall 226 of the meeting rail 192 have rearwardly and forwardly directed extensions 228 and 230, respectively, spacing the rearward wall 222 of the rail 190 away from the forward wall 232 of the meeting rail 192. The wall 232 and the extension 230 have ribs 234 and 236, respectively, extending toward one another to define an elongated horizontal channel 238 with entrance flanges 234 and 236 receiving the base portion 240 of a resilient sealing strip 242 of natural or synthetic rubber or resilient synthetic plastic, the neck or narrowed portion of which extends between the opening or slot provided by the ribs or flanged portions 234 and 236. The sealing strip 242 resiliently engages the rear wall 222 of the upper sash meetting rail 190 to seal the gap or crack between the meeting rails 190 and 192 to prevent the entrance of wind and weather.

Sash guide construction

The fixed and yieldingly mounted sash guides 40 and 42 are of identical but oppositely facing construction and differ only in their mounting arrangements, hence a single description will suffice for both. Each is conveniently made of aluminum by extrusion and consists of a vertical base plate 244 (FIGURE 5) including two spaced sash balance spring casings 246 of rectangular cross-section, one for the upper sash 24 and the other for the lower sash 25, and each having a sidewall structure 243 with front and rear walls 245 and 247, respectively. Each spring casing 246 has a sash guide rib portion 248 projecting beyond the base plate 244 for relative sliding mating engagement with the broader channel portions 206 of the sash side rails 194, and also has an elongated vertical slot 250 in the front wall 147 thereof. The fixed sash guide 40, as its name indicates, is fixedly secured, as by suitable fasteners (not shown) to the window frame opening side member 30 immediately adjacent it and, in the form of the invention shown in FIGURE 5, the casings 246 do not contain balancing springs but serve solely as guides for sliding engagement by the upper and lower sashes 24 and 25.

Resilient sash guide mounting construction

The yieldingly mounted sash guide 42, as previously stated, is of identical construction to the fixed sash guide 40 (FIGURE 5) and is movably and resiliently mounted upon compression springs 44 adjusted by the mounting devices 50, and contains balancing springs. For resiliently adjusting the movable sash guide 42, the adjacent window frame opening side member 30 is centrally bored and cupped at 254 at vertically spaced intervals to rotatably receive the beveled heads of adjusting screws 252 having annular enlarged portions 256 behind the cupped portions 254 to rotatably retain the adjusting screws 252 in connection with the base portion 244 of the sash guide 42. Each screw 252 is threaded through a nut 258 located behind the apertured front wall halves or mountive plate or face plate 260 of a two-part housing 262. The housing 262 (FIGURES 12 and 13), has oppositely facing housing valves 264 of rectangular cross-section with half-cupped portions 266 meeting one another along a parting plane 268 (FIGURE 13).

Each housing half 264 has a rear wall portion 270 which serves as an abutment for one-half of the rearward end of a compression spring 272, the forward end of which engages the nut 258 and urges it against the front wall halves 260. Since the nut 258 is rectangular and snugly fits the interior of the housing 262, it cannot rotate, hence the threaded shank of the adjusting screw 252 moves in or out as the latter is rotated within the front wall hole 274 by means of a screw driver. This action, through the connection of the screw head with its cupped portion 254 moves the sash guide 42 inward or outward as the case may be, while yieldably supporting it upon the springs 44 and 272. As previously stated, the resilient adjustable mounting devices 50 are mounted in the vertically-spaced holes 52 in the adjacent window frame opening side member 30, and their half member construction not only greatly simplifies their manufacture and installation by means of U-nails or double pronged nails 276 (FIGURE 13).

The housings 262 are also conveniently manufactured by their halves 264 being molded from synthetic plastic material, which considerably reduces their cost as well as rendering them weather-proof. Resilient insulation strips 278 of rectangular cross-section and of any suitable heat-insulating material, such as fibrous glass, are interposed between the resiliently mounted sash guide 42 and the flange portions 114 and 122 of the outer and inner components 108 and 110 (FIGURE 5). These insulating strips 278 expand and contract as the sash guide 50 is moved inward or outward by rotating the adjusting screws 252 of their adjustable resilient mounting devices 50.

Self-locking automatically unlocking sash balance construction

Each self-locking automatically unlocking sash balance 54 (FIGURES 5 to 11 inclusive) is housed in one of the casings 246 of the resiliently-mounted sash guide 42, one for the upper sash 24 and the other for the lower sash 25. FIGURE 5 shows only the sash balance 54 for the lower sash 25 since the other sash balance 54 for the upper sash 24 is above the plane of section. Each sash balance 54 includes an elongated sash balancing spring 280 (FIGURES 6, 7 and 9), the looped upper end of which (not shown) is hooked over the top of the casing 246 of the sash guide 42. The lower end loop 282 of the sash balancing spring 280 is hooked through a hole 284 in an upstanding lug 286 in the top of a sash balancing lock carrier 288 in the form of a block of synthetic plastic material, such as nylon, of rectangular cross-section snugly but slidably fitting the interior of the casing 246. The

lock carrier 288 along its forward face 290 has a channel 292 (FIGURES 7 and 11) terminating in a horizontal hole 294 below which is a lower end wall 296.

Pivotally mounted within the hole 294 upon a pivot pin 298 mounted in the lock carrier 288 is a bent lock operating lever 300, the outer arm 302 of which passes through the slot 250 in the housing 246 into the path of the tripping device 56 mounted on the upper or lower sash 24 or 25, that shown in FIGURE 6 being on the lower sash 25. The upwardly bent inner arm 304 of the lever 300 (FIGURES 6 and 7) terminates in a rounded upper end which engages a contact surface 306 formed by the upper end of a slot 308 in a vertically sliding sash-locking wedge or locking member 310, also preferably of synthetic plastic such as nylon. The locking wedge 310 has an inclined rearward thrust surface 312 (FIGURES 7, 9 and 11) which slidably engages a correspondingly oppositely inclined abutment surface 314 forming the rearward side of a cutaway notch 316 in the lock carrier 288. The side of the locking wedge 310 opposite the inclined surface 312 is roughened as at 318 to impart a maximum frictional engagement between it and the rear wall of the housing 246 in the locking position shown in FIGURE 7. The roughened surface 318 may be integral with the locking wedge 310, such as by providing it with a criss-cross or knurled surface or such surface may be formed on a separate sheet of material adhesively secured thereto, the former construction being shown. The upper end of the wedge 310 is engaged by a compression spring 320 (FIGURE 6) seated in a socket 322 in the lock carrier 288.

Extending into the path of the lock operating lever 300 is a tripping lever 324 (FIGURE 6) of the tripping device 56. The tripping lever 324 is pivotally mounted upon a pivot pin 326. The forward arm of the lever 324 has a flat or horizontal lower side 328 and a beveled upper side 330, whereas the rearward arm of the tripping lever 324 is drilled to receive the looped lower end of a tension spring 332, the hole being mounted in a recess 334 in the sash 24 or 25 or, in actual practice, in a casing (not shown) inserted in the recess 334 and carrying the opposite ends of the pivot pin 326.

In the operation of the self-locking automatically unlocking sash balance 54, let it be assumed that the sash 24 or 25 is in its inserted position within the window frame 22 so as to slide vertically in the sash guides 40 and 42 (FIGURE 5) and that the horizontal lower outer end surface 328 of the tripping lever 324 is in engagement with the outer arm 302 of the lock-operating lever 300 (FIGURE 6). Under these circumstances, the weight of the sash 25 exerted upon the tripping lever 324 pushes downward upon the forward end 302 of the lock-operating lever 300, tilting it clockwise around its pivot pin 298 and causing its bent inner arm 304 to push upward against the contact surface 306 of the sash locking wedge 310, pushing the latter upward and inward by the sliding engagement of its inclined thrust surface 312 with the inclined abutment surface 314 of the lock carrier 288. This action withdraws the roughened rearward surface 318 of the locking wedge 310 from engagement with the rear wall 245 of the casing 246 and the front surface 290 of the lock carrier 288 from engagement with the front wall 247 thereof, thereby freeing the lock 254 to be pulled upward by the sash balancing spring 280 and thus balancing the weight of the sash 24 or 25.

If, now, the user desires to remove one of the sashes, for example the lower sash 25, he pushes sidewise to the left thereon, compressing the springs 44 and 272 as he moves the sash guide 42 laterally until the channel portion 206 of the opposite side rail 194 clears the guide portion 248 of the fixed sash guide 40, whereupon he swings the said opposite side rail 194 horizontally toward himself out of the window frame 22. He then moves the sash 25 obliquely outward in its own plane entirely out of the window frame.

In so doing, the instant the bottom surface 328 of the tripping lever 324 slides off the forward arm 302 of the lock operating lever 300, the compression spring 320 is able to push downward upon the locking wedge 310 from the unlocked position of FIGURE 6 to the locked position of FIGURE 7, jamming the roughened surface 318 thereof against the rear wall 245 of the casing 246, and its forward face 290 against the forward wall 247. This action securely locks the lock carrier 288 and therefore the sash balance lock 54 in its attained position, regardless of the tension existing in the balancing spring 280 and thus regardless of the location at which the sash 25 is removed.

If the sash 25 is replaced in the window frame 22 in such a position that the tripping lever 324 lies below the lock-operating lever 300, the raising of the sash 25 merely causes the downwardly inclined end surface 330 of the tripping lever 324 to slide past the rounded outer end of the outer arm 302 of the lock-operating lever 300, tilting as it passes and snapping back into its position of FIGURE 6 by the action of the tension spring 332. Then when the operator pushes downward upon the sash 25 to engage the lower end surface 328 of the tripping lever 324 with the upper surface of the forward arm 302 of the lock-operating lever 300, it again tilts the latter around its pivot pin 298 so that the bent rearward arm 304 pushes the locking wedge 310 upward out of the locked position of FIGURE 7 into the unlocked position of FIGURE 6, as before.

Modified composite sash rail

In the modified composite sash rail 62 of FIGURE 14, the interfitting parts 64 and 66 are produced by extrusion and joined to one another by opposite dovetail ribs 336 which are slidable into interfitting engagement with corresponding dovetail grooves 338 formed in the internal enlargements 340 of the opposite side walls 342 of the component 64. The latter has a narrow internal channel portion 344 adapted to receive the window pane, as in the case of the channel portions 208 of FIGURE 5. The component 66 has oppositely facing angle portions 346 extending outwardly from the base portion 348 thereof (FIGURE 14) and forming a channel groove 350 engaging the forwardly projecting guide portion 248 of the sash balance housing 246.

When the composite sash rail 62 is used for a sliding and tilting sash in contrast to the solely sliding sash employing the sash guides 40 and 42 of FIGURE 5, the adapter strip 68 is employed. It consists of an elongated base portion 352 (FIGURE 15) which snugly fits the channel groove 350 and which has an enlarged rib or guideway-engaging portion 354 with a flat central surface 356 and inclined or obtusely oblique cam surfaces 358 on the portion 354 overhanging the base portion 352. The inclined surfaces 358 and flat central surface 356 slidably engage corresponding inclined or flared outer surfaces 360 and central surface 362 in the correspondingly-shaped sash guide 70.

In operation, when the sash equipped with the sash rail 62 and adapter strip 68 is swung in the plane of the drawing, as by being pivoted above or below the plane of the drawing, one of the inclined cam surfaces 358 slidably engages the adjacent inclined surface 360 and in so doing pushes the sash guide 70 laterally out of the way during the tilting action.

What I claim is:

1. A double-hung sliding-sash window construction, comprising

a window frame including metallic top, bottom and side members,

sash guides disposed in said window frame in spaced parallel relationship adjacent said side members,

double-hung sliding sashes slidably mounted in said sash guides,

and resilient sash balances interconnecting said sashes and said sash guides,

each of said sashes including border frames and transparent panes secured in said frames,

each frame having hollow composite side rails including an outwardly facing channel element and a channel closure element disposed on the outer side of said channel element in interfitting closing relationship therewith,

said closure element having a sash-guide-engaging portion on the outer side thereof slidably engaging one of said sash guides,

one of said elements having longitudinal grooves therein and the other element having longitudinal ribs thereon disposed in rigidly interfitting engagement therewith.

2. A resiliently mounted window sash guide for a sliding sash window in a window frame, said sash guide comprising

an elongated sash guide member,

an elongated longitudinally divided plural-part hollow casing adapted to be fixedly secured to the window frame and having spaced parallel opposite side walls,

a spring-pressed internally threaded polygonal nut disposed in said casing and having spaced parallel opposite side surfaces slidably and guidedly engaging said side walls in relative-rotation-preventing relationship therewith,

and a screw element rotatably connected to said sash guide against axial motion relatively thereto and threadedly engaging said internally threaded nut.

3. A double-hung sliding-sash window construction, comprising

a window frame including metallic top, bottom and side members,

sash guides disposed in said window frame in spaced parallel relationship adjacent said side members,

double-hung sliding sashes slidably mounted in said sash guides,

and resilient sash balances interconnecting said sashes and said sash guides,

each of said sashes including border frames and transparent panes secured in said frames,

each frame having hollow composite side rails including an outwardly facing channel element and a channel closure element disposed on the outer side of said channel element in interfitting closing relationship therewith,

said closure element having a sash-guide-engaging portion on the outer side thereof slidably engaging one of said sash guides, said sash-guide-engaging portion comprising a groove, and a tilting sash adapter element having a base portion disposed in mating engagement with said groove and having a beveled cam portion connected to said base portion.

References Cited

UNITED STATES PATENTS

1,730,222	10/1929	Linn	49—161 X
2,667,668	2/1954	Osten	49—418
2,718,035	9/1955	Schwerak	49—418
3,228,068	1/1966	Trout	49—417
3,335,523	8/1967	Isler et al.	49—176

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