Feb. 26, 1963 D. K. MINICK 3,078,524

LATCH FOR SLIDING WINDOW

Original Filed Aug. 6, 1957 5 Sheets-Sheet 1

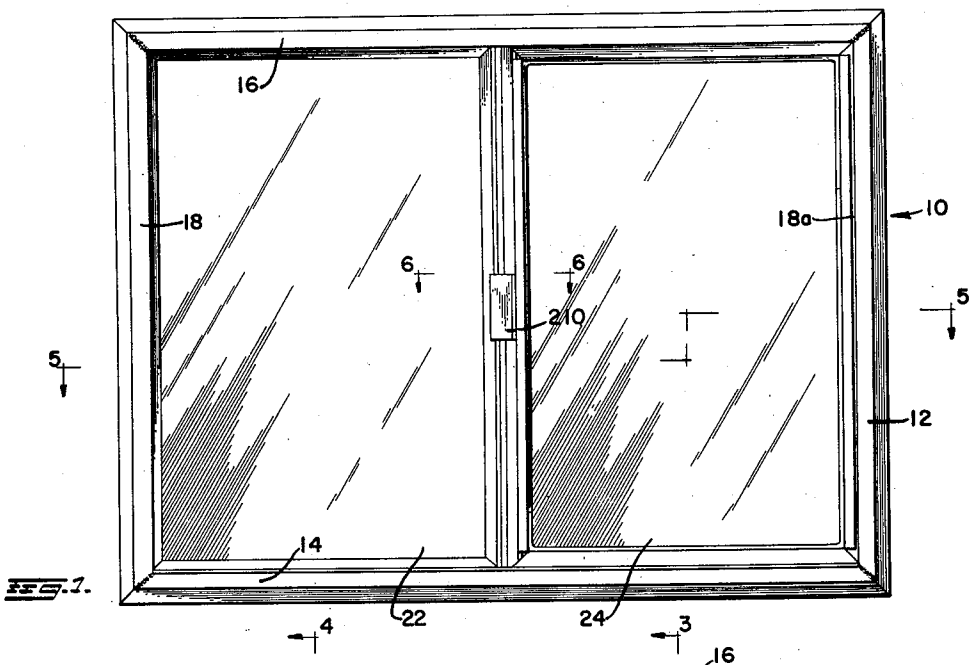

FIG. 1.

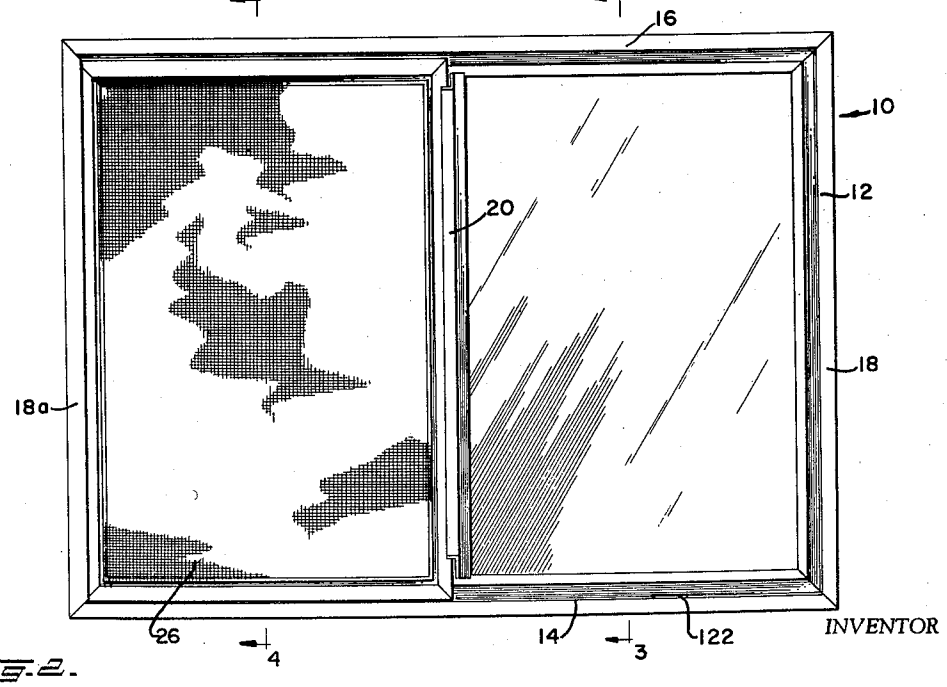

FIG. 2.

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FIG. 3

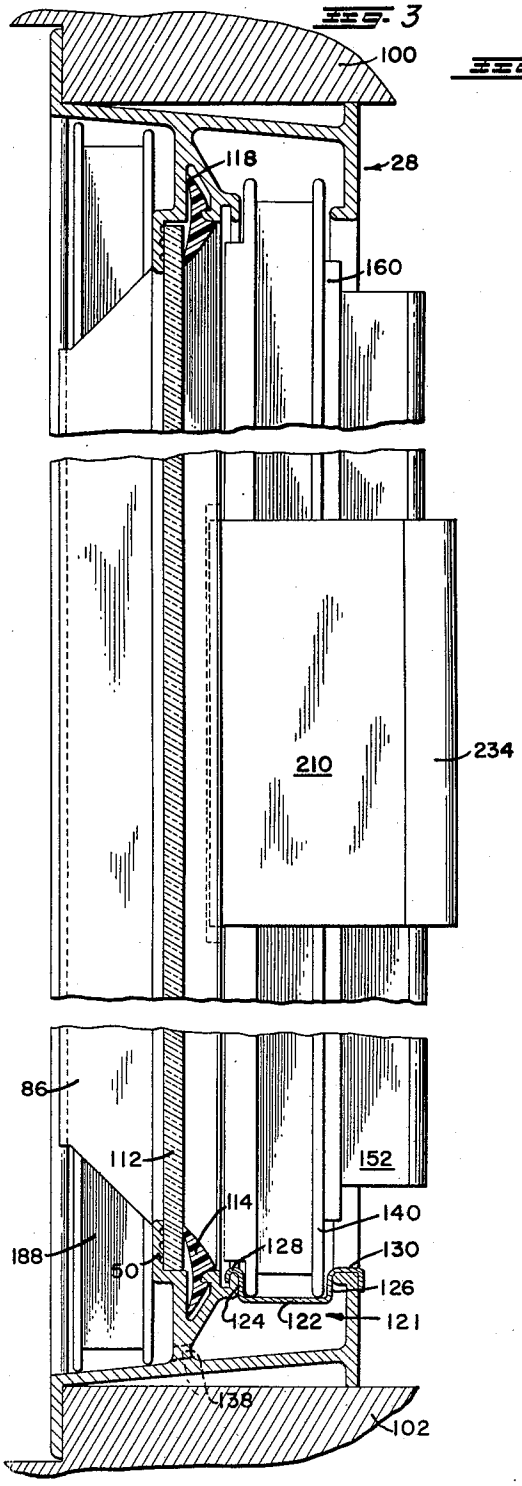
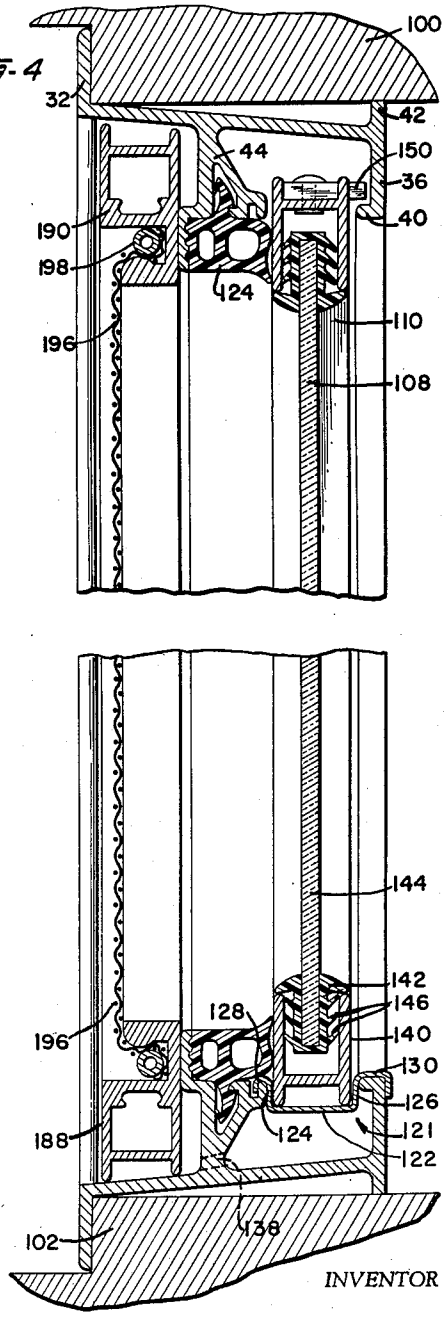


FIG. 4



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LATCH FOR SLIDING WINDOW

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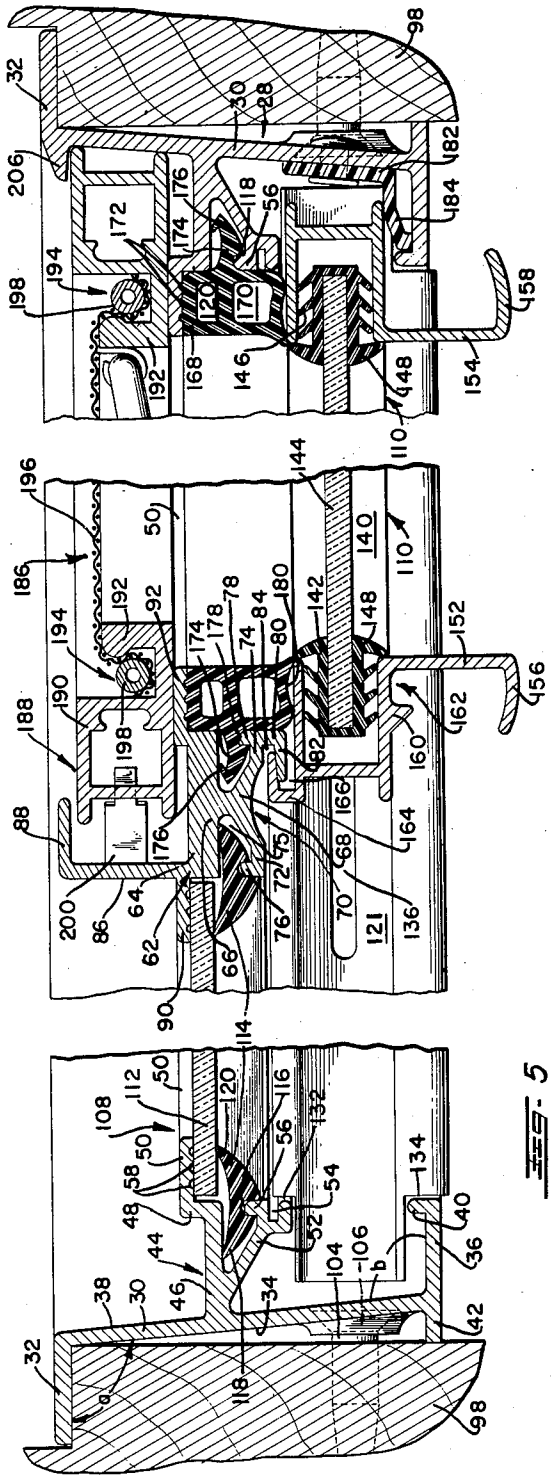

FIG. 5

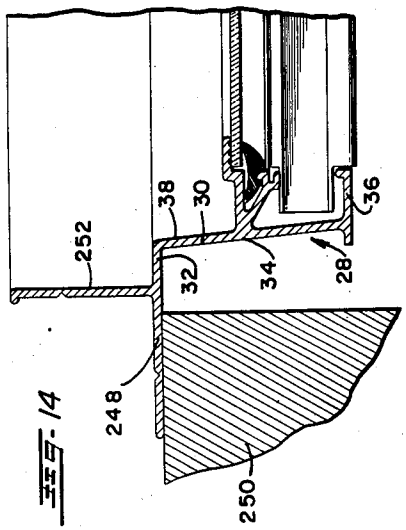

FIG. 14

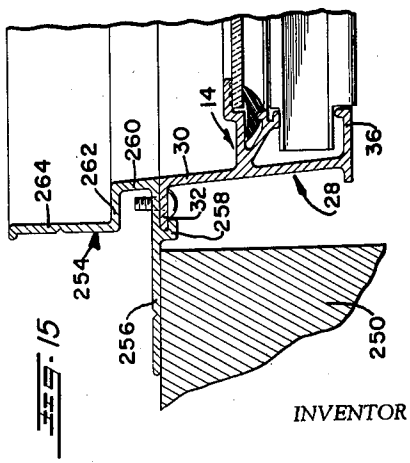

FIG. 15

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FIG. 6

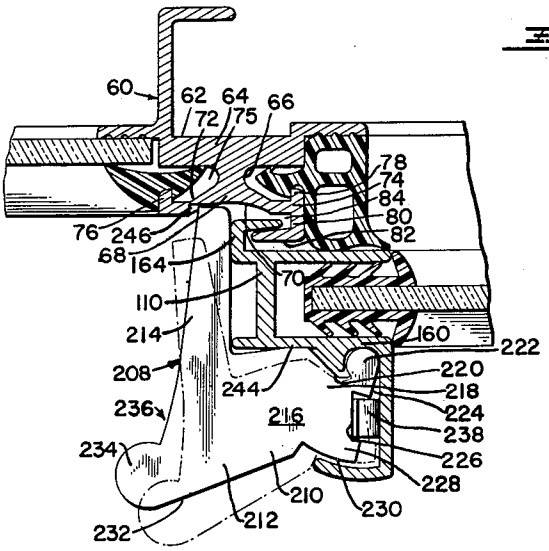


FIG. 8

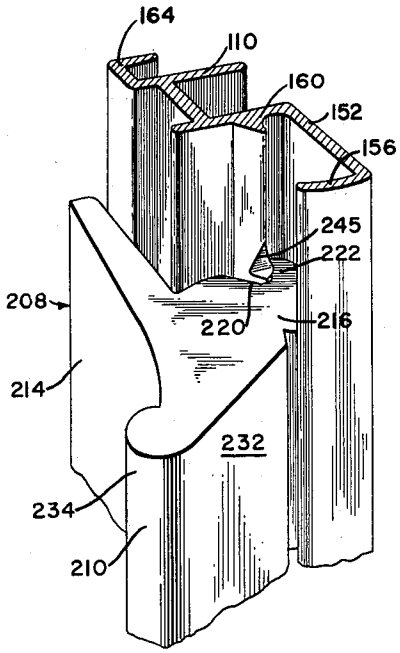


FIG. 7

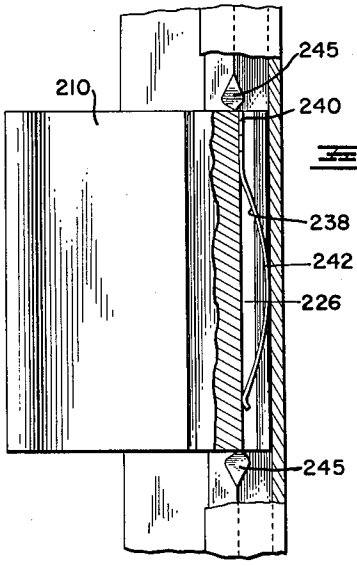
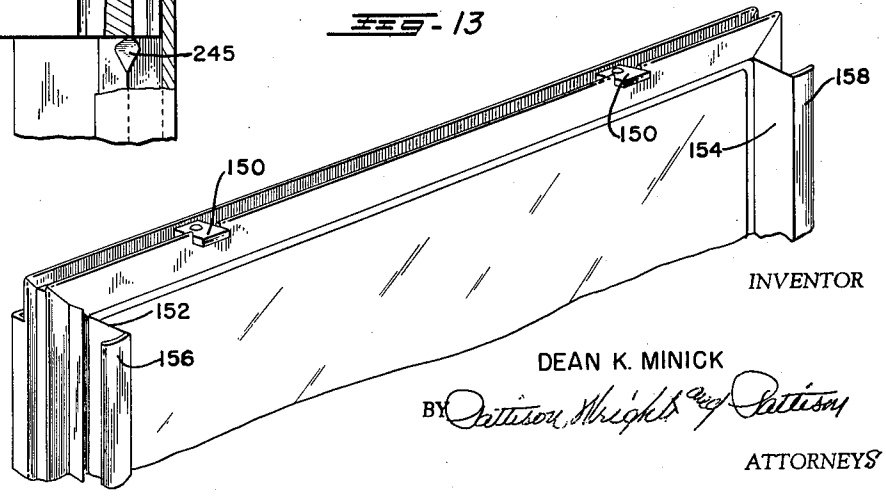


FIG. 13



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LATCH FOR SLIDING WINDOW

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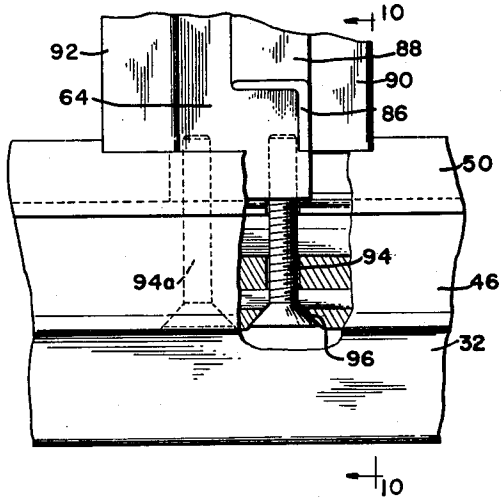


FIG. 9

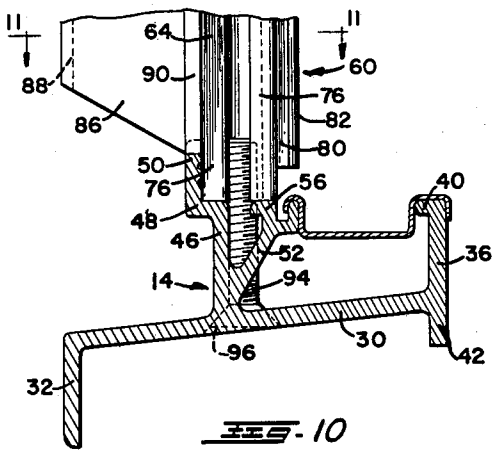


FIG. 10

FIG. 11

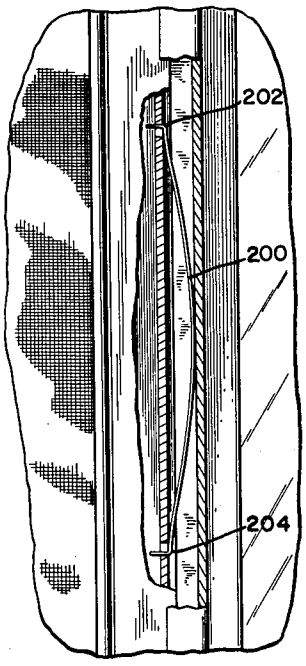
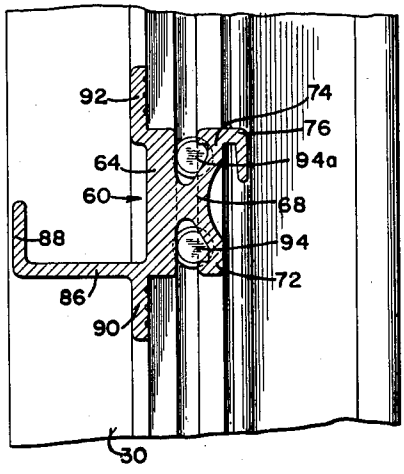


FIG. 12



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United States Patent Office 3,078,524 Patented Feb. 26, 1963

3,078,524

LATCH FOR SLIDING WINDOW

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Original application Aug. 6, 1957, Ser. No. 676,629, now Patent No. 2,953,824, dated Sept. 27, 1960. Divided and this application Aug. 1, 1960, Ser. No. 47,890

6 Claims. (Cl. 20—52)

The present invention relates generally to the window art and more specifically and in particular to new and useful improvements in latch mechanism for horizontal sliding sash window constructions.

This application is a division of my original application Serial No. 676,629, filed August 6, 1957, now Patent No. 2,953,824, granted September 27, 1960.

There are many prior art window constructions of the horizontal or lateral sliding type which serve to provide in a window opening one or more fixed sashes in combination with one or more horizontally openable sashes which slide in parallel relationship with the fixed sash components. It has been discovered that there are many features of construction throughout prior art structures which are disadvantageous for one reason or another.

The principal disadvantage inherent in substantially all prior art horizontal sliding windows arises from high cost of manufacture of the intricate and complex structures heretofore utilized. Other disadvantages found to be prominent throughout these prior art structures relate to inadequate and insufficient weather sealing, inefficient and poor working parts, and costly and unsightly locking or latch means which are difficult and cumbersome in operation.

It is, therefore, a general object of the present invention to provide a window of the horizontal sliding type the construction of which serves to eliminate substantially all of the disadvantages and problems inherent throughout the prior art structures.

It is a principal object of this invention to provide a window construction which is of extremely simple and inexpensive design lending itself readily to low cost manufacture without sacrificing any of the requisite characteristics of strength, durability, or appearance.

It is another object of this invention to provide a window of the type described wherein the simplification of design and parts and the low cost of manufacture are made possible through the utilization of a simple, extruded structural member which serves substantially universally in the fabrication and assembly of the window unit.

Still a further object of this invention is the provision of a window of the type described wherein the simplified and unique structural member utilized substantially universally in the fabrication and assembly of the window construction permits a substantial savings in the amount of material required to construct the structural components of the window relative to the material requirements of prior art structures. The structural member utilized is of such a construction as to satisfy maximum requirements of strength notwithstanding the substantial reduction in material utilized in its formation.

A still further object of this invention rests in the provision of a window construction of the type described wherein unique structures are utilized in the formation of glazing seals and weather seals for the sash elements of the window which serve to afford weather sealing and cushioning characteristics of maximum efficiency for the window unit.

The glazing and weather sealing components utilized in the instant window construction are of extremely simple and inexpensive design and are readily incorporated in the window construction at time of fabrication at a minimum cost attributable to materials and to labor.

Another and important object of this invention resides in the provision of a unique and utilitarian latch mechanism incorporated in the window unit cooperatively with the horizontal sliding sash components to provide a positive, self-locking construction for the openable sash components of the window. In addition to the novel construction and operation of the self-locking latch mechanism incorporated in the window unit, the latch mechanism is of such a structural design as to eliminate extension of any latch parts into any light area of the window unit while still presenting manually operable components in readily accessible position on the window.

It is still another object of this invention to provide a window construction of the type hereinbefore described wherein the movable sash components of the window are readily removable from the window unit for cleaning and like purposes.

Yet another object of this invention is the provision of a window construction of the type described wherein such components as glazing seals, weather seals and slide tracks or rails may be quickly and easily removed or installed for purposes of repair or replacement.

A still further object of the present invention is to provide a new and useful window construction of the type described in which the frame components are readily fabricated for fin-trim or woodbuck type window installations.

Still further objects and advantages of the present invention will become more readily apparent to those skilled in the art when the following description is read in the light of the accompanying drawings.

In the drawings:

FIG. 1 is a front or inside elevation of an illustrative embodiment of the window unit.

FIG. 2 is a rear or outside elevation of the window unit shown in FIG. 1.

FIG. 3 is a vertical section taken on line 3—3, FIG. 2.

FIG. 4 is a vertical section taken on line 4—4, FIG. 2.

FIG. 5 is a horizontal section taken on line 5—5, FIG. 1.

FIG. 6 is a horizontal section taken on line 6—6, FIG. 1.

FIG. 7 is a front elevation in fragmentary vertical section of the latch mechanism shown in FIG. 6.

FIG. 8 is a pictorial perspective illustration of the latch mechanism shown in FIG. 6.

FIG. 9 is a fragmentary vertical elevation in partial section illustrating the attachment of the center rail to the frame.

FIG. 10 is a vertical section taken on line 10—10, FIG. 9.

FIG. 11 is a horizontal section taken on line 11—11, FIG. 10.

FIG. 12 is an enlarged fragmentary rear elevation of the window in partial vertical section illustrating the screen lock.

FIG. 13 is a fragmentary pictorial perspective illustration of the upper portion of the removable sliding sash component.

FIG. 14 is a fragmentary horizontal section illustrating a modified form of the structural member from which the frame is constructed.

FIG. 15 is a view like FIG. 14 of a further modification of the frame component.

The nature of the present invention may be stated in general terms as relating to a window construction of the type including one or more fixed sash panels and one or more horizontally sliding sash panels all contained and supported within a frame in which all component sections (head, sill and side bar) are formed from a common one-piece structural member. In this window unit the glazing of the fixed and sliding panels is secure and weathertight,

and the movable panels are provided with a latch member serving as a functional hand grip for moving the sliding panels horizontally of the frame relative to the fixed panels and automatically operating to lock the movable panel in its closed position.

In the descriptions herein following, and in the accompanying drawings, the concepts of the present invention are exemplarily disclosed in the form of a double panelled window, one fixed and one sliding, for purposes of illustration of an operable embodiment. However, the concepts of this invention are equally applicable to windows including a plurality of panels, both fixed and movable, in a variety of cooperative relationships one to the other. It is not intended nor contemplated that the scope of this invention be limited in any way whatever beyond those requirements made necessary by the prior art and the hereinafter appended claims.

DETAILED DESCRIPTION

In the illustrative embodiment of the present invention disclosed in the accompanying drawings the numeral **10** designates, generally, a window unit constructed in accordance with the novel concepts of the invention and composed of a frame **12** for installation directly in a window opening. Frame **12** includes a sill member **14**, a header **16**, and interconnecting side bars **18** and **18***a*. The sill and header are interconnected vertically intermediate the length of the frame by a center bar or meeting rail **20** defining within the frame two like openings on either side thereof. Each of said openings is closed by a glazed panel, one fixed, **22**, and one slidable, **24**. In addition, the opening in front of the sliding panel **24** is provided with a screen panel **26** enclosing one side thereof within the frame component.

In installation in a light opening the present window construction has a normally "indoor" side, as is seen in FIG. 1 of the drawings, and an "outdoor" side as is seen in FIG. 2, and over a portion of which the screen panel **26** is removably affixed.

Frame Components

As best seen in FIGS. 3 through 5 of the drawings, the sill, header and side bar frame components **14**, **16**, **18** and **18***a* respectively, are all formed from an elongated, extruded, semi-tubular structural member **28**. Appropriate lengths of this common extruded structural member, each having mitered ends, are arranged and fabricated into a rectangular frame as disclosed with adjacent mitered ends being joined at right angles by welding or a like method of attachment to form a composite, one-piece frame member of substantially identical cross sectional configuration throughout its rectangular length.

The elongated extruded structural member **28** from which the components of the frame **12** are formed may be described in cross sectional configuration (see FIG. 5) as consisting of a flat web **30** extending transversely of the width of the structural member throughout its longitudinal length. One longitudinal edge of the web **30** is provided with a flange **32** projecting outwardly from one face, **34**, of the web and forms therewith a slightly obtuse angle *"a."* The remote longitudinal edge of web **30** is provided with a second flange **36** projecting outwardly from the opposite face, **38**, of the web in a direction opposite to and in parallel with the projection of flange **32** from the web. Flange **36** forms an acute angle *"b"* with the web face **38** which is complementary to obtuse angle *"a."*

Additionally, flange **36** is provided longitudinally of its extreme projected end remote to web face **38** with a perpendicular bead or lip **40** extending in the general direction of the plane of flange **32**. Flange **36** also has a heel-like extension **42** formed as an integral continuation thereof projecting outwardly from face **34** of web **30** for a distance sufficient to align the extended end thereof with the apex of angle *"a"* on a line defining a true perpendicular between the parallel planes of flanges **32** and **36**.

The cross sectional configuration of the extruded structural member **28** is further defined by the face **38** of the web being provided intermediate its length with an integrally formed, generally V-shaped rib **44** projecting outwardly therefrom. The rib **44** consists of one leg **46** of the V extending in parallel with the flanges **32** and **36** and is provided at its extended end with a perpendicularly offset web portion **48** with an integrally formed perpendicular fin **50** thereon projecting beyond and in parallel with leg **46** and offset therefrom by the intermediate web **48**.

The second leg **52** of the V rib **44**, which is formed integrally with the first leg **46** adjacent its point of integral attachment to web **30**, extends outwardly from web **30** at an angle divergent with the angle of the first leg. The extended end of the second angular leg of the V is provided integrally with a U-shaped channel formation **54** the spaced legs of which are disposed in parallel relationship with the parallel planes of flanges **32** and **36** to present the open mouth of the U opening outwardly away from face **38** of the web. That leg of the U-shaped channel member nearest the leg **46** of the V-shaped rib member is provided with a flanged bead **56** extending for a spaced distance toward and in perpendicular to the leg **46** and in general transverse alignment with the offset web portion **48** of leg **46**.

To complete the constructional configuration of structural member **28**, that face of fin **50** on rib **44** disposed toward leg **52** thereof is provided with a plurality of spaced grooves **58** extending longitudinally of the member for purposes to be hereinafter described with detailed description of the improved functions of the structural member in the utility in which it is disclosed.

Again, as is best seen in FIG. 5 of the drawings, the frame **12** is formed by fabrication of a rectangle from four structural members **28** arranged in continuous, right angular alignment and suitably joined at the intersecting corners of the rectangle. By this construction the several webs, flanges, ribs, beads and channels of the structural elements forming the rectangular frame are continuously aligned about the rectangle with portions of each being in direct, spaced opposition one from the other between the head and sill bars and the two side posts of the frame respectively.

To generally complete the frame structure of the novel sliding window construction constituting the present invention, there is provided a center post or meeting rail **60** secured vertically between the head bar and sill of the frame substantially mid-way between the side posts of the frame.

The center bar or meeting rail **60** consists of an elongated, extruded member having a cross sectional configuration including a central, generally I-shaped member **62** one of the two normally parallel plates of which is a straight leg section **64** perpendicular to the cross web **66** thereof, while the second leg **68** of the normally parallel pair is provided with a concave groove **70** laterally, centrally thereof and extending longitudinally of that face defining remote end portions **72** and **74** of the leg lying in the same plane and being parallel with leg member **64**.

The formation of groove **70** in the outer face of leg plate **68** causes an angular inclination of the inner faces of the leg within the side opening channels **75** of I-shaped member **62** resulting a generally V-shaped configuration of these channels in cross sectional view complementary to the V-shaped channels defined by ribs **44** of the structural member **28**.

The extreme outer end or longitudinal edge of portion **72** of leg **68** is provided with a right angular lip or bead **76** extending longitudinally thereof and projecting for a spaced distance into the mouth of adjacent channel **75** in the direction of the leg **64**. The extended end or lon-

gitudinal edge of portion 74 of leg 68 is provided with a right angular lip 78 identical in configuration and location as lip 76. However, lip 78 is provided with an extended portion 80 with projects for a spaced distance outwardly from the opposite face of leg 68, remote to leg 64, where it is turned through 90 degrees to provide a flange 82 lying in parallel spaced relationship with the outer face of portion 74 of leg 68 and forming therewith a generally U-shaped channel 84 longitudinally of the cross rail and disposed with its open face in aligned opposition with channel member 54 on rib 44 of the side bar of window frame 12 remote thereto.

Leg 64, of meeting rail member 62, which is generally straight and flush on its outer face, is provided at that end thereof adjacent to the first described longitudinal edge of leg 68 with a perpendicular web 86 extending for a spaced distance in a direction therefrom remote to leg 68. Web 86 is provided on its extreme, outermost end with a right angular flange 88 extending to lie in spaced parallel relationship with the outerwardly disposed face of the leg 64. Web 86 is additionally provided with a perpendicular fin 90 projecting therefrom in a direction opposite to the direction of projection of flange 88 and which is formed integrally with the web 86 at a point immediately adjacent the integral attachment of the web to the leg 64 of the meeting rail member. A fin 92 corresponding to fin 90 is formed integrally in offset relationship to the leg 64 on that longitudinal edge thereof remote to the integral attachment of the web 86 in such a manner that fin 92 projects oppositely from the cross rail member to fin 90 and in an aligned transverse plane therewith.

Meeting rail 60 is positioned and secured in the frame between the upper header component of the frame and the sill component thereof. Because of the identity of structure of structural member 28 in the frame header and the sill the structural attachment of the upper and lower ends of the cross rail is identical, and this attachment is shown, exemplarily, in FIGS. 9, 10 and 11 relative to the sill member 14.

As is best seen in FIG. 10, the lower end of meeting rail 60 is positioned above the sill component 14 of the frame 12 with the bottom ends of portions 72 and 74 of leg 68 of the meeting rail seating in vertical alignment on the upwardly disposed, flat surface of web portion 48 of the frame component rib 44. At the same time, the bottom surface of leg 64 of the meeting rail 60 seats horizontally along the uppermost horizontal surface of flanged bead 56 on the second leg of rib 44 of the sill component 14.

To position the meeting rail 60 on the sill component of frame 12 as described above the lowermost ends of fins 90 and 92 of the meeting rail 60 are cut away horizontally for a distance above the bottom ends of legs 64 and 68 substantially equal to the vertical depth of fin 50 of the sill component, above which these fins are vertically aligned. Likewise, screen retaining web 86 and flange 88 are cut away for a like distance above the foot of the meeting rail.

The meeting rail 60 is secured to the sill component in the position described by means of two spaced thread cutting screws 94 and 94*a* which are threadedly engaged from the underside of the sill component upwardly through countersunk holes 96 and 96*a* in the web 30 into the lower ends of the two side opening vertical channels 75 defined in the central I-shaped portion of the meeting rail 60, said channels being automatically threaded for a spaced distance above their lower, open ends when said screws are driven into position.

When the meeting rail 60 is secured within the frame 12 by the attachment hereinabove described it will be so positioned, as best seen in FIG. 5, as to locate the generally V-shaped side opening channels in the main body thereof in opposed alignment laterally of the frame with the generally V-shaped channels defined by the ribs 44 on each vertical side component of the frame. At the same time, oppositely extending ribs 90 and 92 formed on the meeting rail are aligned transversely of the frame with the fins 50 on legs 46 of the two V ribs 44 on each side component of the frame. In the same manner, the projecting lips 76 and 78 on the leg 68 of the meeting rail 60 will be aligned transversely with the beads or lips 56 on the legs 52 of the V ribs of the side elements of the frame.

The transverse alignment within the frame of the above recited similar elements of the meeting rail and the intermediate ribs 44 of the side elements of the frame serve to perform complementary and cooperative functions in the window assembly which will be hereinafter described.

Frame Installation

The installation of frame 12 in a wall opening is best illustrated by FIGS. 3, 4 and 5 wherein there is shown a typical "woodbuck" installation consistent with the specific embodiment of the frame structural member 28 hereinbefore described.

In typical fashion the window opening in the structural wall is defined, side, top and bottom, by framing studs or jamb members 98, 100, and 102 respectively. These jamb members present flush surfaces continuously about the opening disposed inwardly thereof.

The window frame 12 is positioned vertically in the opening (FIGS. 4 and 5) from the "outdoor" side of the opening which locates the flanges 32 of all the frame components in abutment with the vertical faces of the jamb members on the "outdoor" side thereof marginally about the window opening which they define. At the same time, the extended or projected ends of heel portions 42 of the frame component flanges 36 are positioned in abutment with the adjacent flush surfaces of the surrounding jamb members. Screws, clinch nails, or the like, 104, are driven, from within the frame, outwardly through countersunk opening 106 in the webs 30 of the side components of the frame into the adjacent jamb members to rigidly and tightly secure the window frame in the opening.

Window Panels

In the window embodiment shown there is a fixed sash 108 and a horizontally sliding, openable sash 110 defined within the frame. The fixed sash consists of a glazed panel 112 which is positioned vertically within the frame with a peripheral, marginal edge portion thereof continuously about one face being located in abutment with the grooved faces of fins 50 of rib members 44 on one side component of the frame and the sill and head components thereof through the portions thereof extending from that side component transversely of the frame to the meeting rail 60. That vertical marginal edge portion of the glazed panel 112 remote to the side component of the frame abuts the grooved face of the fin 90 projecting integrally from the meeting rail in opposition to the fin 50 of rib 44 on the side component of the frame. The glazed panel 112 is secured in the described position by means of a glazing strip 114. Glazing strip 114 takes the form of an elongated strip of resilient material, such as neoprene, vinyl, or the like, which in cross sectional configuration is substantially crescent-shaped, and which is provided in its convex face intermediate the extreme tip ends thereof with a longitudinal groove 116 of generally U-shaped configuration. As is best seen in FIG. 5, the installation of the glazing strip 114 is such that it is partially inserted sideways into the channel defined between the divergent legs of the V-shaped rib 44, and at the same time into the channel 75 defined between the leg members 64 and 68 of the meeting rail. Such insertion of the strip brings groove 116 into registry with and engagement about the bead 56 of the rib 44, and with lip 76 of the leg 68 of the meeting rail. This positioning of the glazing strip serves to locate one point 118 or tip end longitudinally thereabout in engagement with the inner face of the leg 46 of rib 44. The second end tip 120

of the strip engages the glazed panel 112 in opposition to fins 50 and 90. It can be seen that the glazing strip forms a triangular insert having three-point contact between the glazed panel, leg 46 and leg 52 thereby compressively and resiliently holding the glazed panel in place while simultaneously providing a cushioned seal completely about the marginal edge of the panel.

In FIGS. 3 and 4 of the drawings there is shown a horizonal track member 121 carried by the sill component of the window frame. The track member consists of a flat strip 122 having upturned vertical flanges 124 and 126 longitudinal of each side edge. Flange 124 is provided with a rolled-over edge 128 adapted to engage downwardly in channel 54 of rib element 44 of the sill component, while flange 126 is provided with a rolled edge 130 adapted to engage downwardly over the uppermost end of vertically disposed flange 36 on the still component.

As is best seen in FIG. 5 of the drawings, the flat, central portion of the track extends from adjacent the web 30 of one side component of the frame to a point closely adjacent the web of the opposed side component. However, the rolled edge portions 128 and 130 are cut away, as at 132 and 134, for a spaced distance inwardly from each end thereof sufficient to accomodate the laterally projecting ribs 44 and flanges 36 on the side bar components of the frame.

As is further seen in FIG. 5, the flat portion 122 of the track is provided in a central portion thereof with a longitudinally formed drain slot 136 vertically therethrough providing communication with the channeled recess of the sill component defined between rib 44 and flange 36 thereof. Rib 44 of the sill component is provided at spaced points longitudinally thereof with weep holes 138 for draining condensation and the like from within the channel on the "indoor" side of the sill component outwardly onto the upper, inclined face of the web 30 of the sill component.

The sliding panel 110 of the window assembly consists of a rectangular frame 140 which is generally H-shaped in cross sectional configuration with the perpendicular partition wall offset toward one end thereof outwardly away from the panel opening. Glazing of the frame is accomplished by the utilization of a continuous strip 142 of resilient material, such as neoprene, vinyl or the like, which is generally U-shaped in cross sectional configuration with the open mouth thereof receiving and engaging a continuous marginal edge portion of a glazed panel 144. The panel receiving strip is provided on the opposed outer surfaces of the paraell leg portions of the U-shaped configuration with spaced longitudinally extending, and integrally formed, resilient fingers 146 while the adjacent ends of the legs defining the opening thereinto are provided with substantially perpendicular flanges 148.

In the installation of the glazed panel 144 in the frame 140 the strip 142 is inserted telescopically into frame 140 continuously thereabout to bring the undersides of the flanges 148 into abutment with the frame longitudinally of the panel receiving opening and to position the strip within the channel opening of the frame with the resilient fingers 146 therealong in engagement with the inner, adjacent faces of the parallel legs of the frame. By this construction the glazed panel 144 is firmly supported and cushioned within the frame 140 and a seal is established between the remote faces of the panel by the U-shaped glazing strip in engagement within the channel-shaped frame.

The frame 140 of the sliding sash is slidably seated on the horizontal portion of the sill track 121. When supported by the track the upper end of the sliding sash frame projects upwardly for a spaced distance into the cavity defined between the downwardly projecting flange 38 and rib 44 of the upper or header component of the frame 12. The upper, cross component of the sliding sash frame is provided, as seen in FIGS. 4 and 13, with spaced retaining lugs 150 secured horizontally to the upper sash frame component and projecting outwardly from that face thereof disposed toward the downwardly projecting flange 38 of the head element of the window frame so as to overlie the inturned lip 40 on the lowermost end of the flange 38 thus retaining sash frame 140 therein. The lugs 150 may be formed from nylon or other suitable self-lubricating or non-frictional materials.

When positioned in the window frame slidably seated on sill track 121, the sliding sash frame 140 presents on the "indoor" side thereof two finger rails 152 and 154 which take the form of flanges formed longitudinally of the side members of the sash frame to project perpendicularly thereto and to terminate on their projected ends in arcuate lips 156 and 158, respectively, each of which extends at substantially right angles to its integral flange in a direction away from the frame opening.

Further, that side member of the frame supporting flange 152 is additionally provided with a raised bead 160 which extends longitudinally of the "indoor" face of the frame component in spaced parallel relationship to the flange 152 and defining therewith, cooperatively with the frame, a channel 162 vertically of the frame and opening in the direction of the arcuate lip 156 on the flange 152.

Completing the structure of the sliding panel of the window structure, that vertical face on the "outside" of that side component of the slidable frame opposite to flange 156 is provided with a turned over flange element 164 longitudinally of the outermost edge thereof. Turned over flange 164 forms with the adjacent frame component face a channel 166 having its open mouth disposed longitudinally of the frame component in the direction of the framed opening. This structure positions the flange defined channel 166 to telescopically receive vertical flange 82 on the "indoor" side of meeting rail 62 when the panel is moved to a closed position thereby interlocking the frame and the meeting rail.

Weather Seal

In order to provide a weather seal for the sliding sash frame of the window construction a sealing strip 168 is provided continuously about the peripheral edge of the opening defined between the meeting rail and the side component of the frame remote to the fixed sash. The sealing or weather strip 168 consists of an elongated piece of resilient material such as neoprene, vinyl or the like, which is of generally rectangular configuration in cross section (FIGS. 4 and 5) and which is provided with a pair of parallel passages 170 continuously throughout its length serving to increase the resiliency of the member and at the same time providing a savings of material necessary to form the element. The weather strip is provided longitudinally of one face, on the "outdoor" side, with a plurality of spaced beads 172 which, when the strip is properly located, register with and engage in the complementary grooves 58 in the faces of aligned projections 50 on ribs 44 of the side, sill and head sections, and on rib 92 of the meeting rail member. The sealing strip is also provided longitudinally of one face thereof at right angles to said beads with a generally arcuate finger 174 having an angular teat 176 on its extreme end and an undercut groove 178 on one side thereof adjacent its point of integral attachment to the strip. Finger 174 is insertable within the V-shaped channel of the ribs 44 on the side, sill and head sections and the side opening channel 75 of the meeting rail member 62. When the finger 174 is engaged within said defined channel openings the undercut groove 178 thereof engages over the beads 56 of the ribs 44 and the lip 78 of the meeting rail to retain the sealing strip in place in flush contact with the ribs 44 and the meeting rail, as seen in FIG. 5. That longitudinal face of the sealing strip opposed to the beads 172 is provided with a partial concave face 180 which engages continuously about the "outside" face of frame 140 of the sliding sash there-

adjacent when the sliding sash is in a normally closed position (see FIG. 5).

In connection with the sliding sash frame and its horizontal supporting track there is provided a bumper member 182 of generally L-shaped configuration which is formed from a resilient material and which is secured to the inner face 38 of web 30 of the side frame component adjacent the sliding sash and in transverse alignment with the track member at a point spaced thereabove so as to be engaged by the adjacent end of the sliding sash frame upon closing movement of the frame. This bumper serves to cushion the closing of the sliding sash and the foot portion 184 of the L-shaped member projects in the direction of the sliding frame in parallel with the track to engage the adjacent face of the sash frame to provide a seal therealong for that end of the frame when the sash is in a closed position.

Screen Panel

In addition to the sliding sash for closing the openable portion of the window, the window is also provided with a screen 186 on the "outdoor" side thereof away from the sliding sash. The screen consists of a rectangular frame 188 the bottom, top and side members 190 of which are of generally rectangular cross section and each of which is provided with an L-shaped projection 192 extending into the frame opening and defining an undercut channel 194 continuously about the inner peripheral edge of the frame. The channel 194 receives the marginal edges of the screening material 196 downwardly therein and an elongated continuous elastic rope or band 198 is wedged downwardly into the undercut channel 194 overlying the marginal screen edge therein and tensionally retaining the same in the channel to tautly position the screening material entirely over the frame defined opening.

The outer vertical edge of one side component of the screen frame, as best seen in FIG. 12, is provided with a flat bow spring member 200 having the remote ends thereof hooked to and engaged in the outer face of the frame component as at 202 and 204 so as to place the intermediate portion of the spring under outwardly bowed tension.

To accommodate the installation of the screen, the side component of the frame 12 of the window adjacent the sliding sash opening is provided on the inner face thereof as a continuation of flange 32 with a bead 206 extending vertically the length of said frame component in alignment transversely of the window with flange 88 previously described. To install the screen in the openable portion of the window the spring supporting vertical side member of the screen frame is inserted angularly, inwardly intermediate the flange 88 and the outer face of leg 64 of the meeting rail under sufficient force to compressively distort the spring to permit the opposite side member of the screen frame to be moved sufficiently in the direction of rib 44 on the side element of the window frame 12 to bring the outer face of the side member of the screen frame inwardly of the bead 206 on the window frame component whereupon release of compressive movement of the screen frame against spring 200 will urge the remote side element of the screen frame into abutment with the face of the web 30 intermediate bead 206 and rib 44. This is accomplished easily from the inside of the window by depressing the screen toward the center bar of the window by means of pivotal finger loops 207. The resilience of spring 200 will retain the screen frame in fixed tensional position between flange 86 of the meeting rail and web 30 of the side component of window frame 12.

Latch Mechanism

A latching mechanism generally designated at 208 is provided in cooperative association with the frame 140 of the sliding sash and the center post or meeting rail 62 of the window frame assembly. The latching mechanism consists of a swinging catch or keeper 210 which is in the form of an elongated, extruded bar member of a modified L-shaped cross sectional configuration including a thickened heel portion 212 at the juncture of the vertical leg 214 of the L and the perpendicularly extending foot 216 thereof.

The extended toe portion 218 of the swinging catch is vertically notched, as at 220, downwardly of the upper or top face thereof at a point spaced inwardly from the extreme end, thus defining on the extreme toe end of the catch a generally vertically extending, rounded bead 222. The end or forwardmost face 224 of the toe portion of the catch is angularly inclined rearwardly from the upper, forwardmost point on the rounded bead 222 to the lower end of the face at its point of convergence into the bottom face of the foot portion of the catch. This forwardmost face of the toe portion of the swinging catch is provided, intermediate its vertical length, with a grooved channel 226 extending longitudinally throughout the catch bar and defining on the lower, forwardmost end of the toe portion a rib 228 the forwardmost face of which aligns in vertical angularity with the normal plane of the inclined toe face of the catch.

The bottom face of the foot portion of the L-shaped swinging catch is formed arcuately, as at 230, from the forwardmost face of the toe portion rearwardly and upwardly into the body of the foot portion for a spaced distance in the general direction of the heel of the catch and from the innermost end of said arcuate configuration angularly downwardly, as at 232, to the heel of the catch defining the above-described thickened heel portion 212. At the heel of the catch a generally rounded lip 234 is formed in a direction generally outwardly from the normal plane of the vertical leg of the catch in a direction following the line of the angularly inclined bottom face of the foot portion thereof whereby a groove or finger rail is defined generally in the area designated 236 between the normal rearwardmost vertical face of the leg portion of the catch and its convergence into the rounded line of the lip 234 which is at a point spaced above the bottom face of the catch a distance defined by the projecting lip.

Completing the structure of the latch member is a flat bow spring 238 which is positioned longitudinally in the groove 226 on the forward face of the toe portion of the latch with one end of the spring secured to the bottom or inner wall of the groove by serrated edges on the spring, as at 240, and the second end freely engaging the bottom wall of the groove at a point spaced longitudinally from the attached end thereof. The configuration of the spring is such that the bowed portion 242 thereof projects outwardly of the groove 226 for a spaced distance beyond the plane of the vertically inclined forward face of the nose portion of the latch.

In the cooperative installation of the latch member with respect to the frame 140 of the sliding sash and the meeting rail 62 of the window assembly the toe portion of the latch member is slidably inserted vertically in the channel defined by the normally inner face of flange 152 on the sliding sash frame, the arcuate finger rail 156, and the rib 160 extending vertically of the outer face of the adjacent face of the sliding sash frame. This positioning of the latch brings the notch 220 in registry with the rib 160 locating the rounded bead 222 in confined engagement between the adjacent face of flange 152 and the inner face of rib 160 with the generally arcuate bottom face portion 230 of the toe of the catch concentrically aligning with the inner face of the arcuate flange or finger rail 156. This positioning of the latch places the bowed portion 242 of spring 238 in compressive or resilient engagement with the adjacent vertical face of flange 152 of the sash frame urging the forward face of the toe portion of the latch outwardly from said flange face to a point limited by the engagement of the forward vertical face of the vertical leg portion 214 of the latch with the perpendicular flange 164 on the adjacent vertical edge of the frame 140 of the sliding sash. At a point coincidental

with the engagement of the forward vertical face of the leg portion with the flange 164 an angularly flatted portion 244 on the upper face of the foot portion of the catch will be brought to a point of engagement with the adjacent vertical face of the sliding sash frame 140. The coincidental engagement of these two surface areas on the latch member with the respective perpendicularly disposed surfaces of the sliding sash frame is critical to the retention of the latch member in the defined channel which retention is accomplished by the moments of force on the latch member established between these two points of engagement, the engagement of the rounded bead 222 behind rib 160, and the moment of the resilient urging on the latch face by spring 238. The latch catch is retained vertically in place in the defined channel by peening or upsetting bead or rib 160, as at 245, above and below the catch location.

Cooperating with the latch member, supported on the sliding sash frame as defined, is a striker shoulder 246 formed vertically inwardly of the outer face of leg 68 of the meeting rail 60 at a point therein adjacent the junction of the concave groove 70 and the straight leg portion 72 of the meeting rail. The striker shoulder 246 is formed at a point transversely of the outer face of the leg 68 of the meeting rail so as to normally space it a short distance away from the rearward face of the leg portion 214 of the catch when the catch is in the full line position shown in FIG. 6 under the resilient urging of spring 238. However, the upper extended end of leg portion 214 of the catch extends perpendicularly inwardly of the concave area in the leg 68 of the meeting rail for a distance sufficient to bring the rearward vertical face thereof into abutment with the striker shoulder 246 upon movement of the sash frame from a closed position in a direction parallel to the fixed sash and in the direction of the fixed sash portion of the window. At the same time, when the sliding sash frame is in a fully closed position the above-referenced spacing between the striker shoulder 246 and the upper vertical face of the leg portion 214 of the catch is sufficient to permit the leg portion of the catch to be moved arcuately about a pivotal point established on the central axis of the circular bead 222 outwardly and away from the leg 68 of the meeting rail to the position indicated in dotted lines in FIG. 6 of the drawings. When the latch member is arcuately withdrawn as shown in dotted line the sliding sash is then free of obstruction to movement to an open position. It is obvious that the release movement of the latch mechanism to position it in the dotted line position of FIG. 6 is accomplished by finger pressure exerted in the area 236 generally outwardly against the rounded finger lip 234 on the heel portion of the latch. Such outwardly exerted finger pressure is facilitated by use of the left hand, for example, with the thumb engaged behind that vertical face of flange 152 of the sliding sash frame remote to the latch member with the fingers of the hand engaging about the finger lip 234. Reversing the example given to enable use of the right hand for opening of the latch, the finger tips would be engaged on that surface of flange 152 remote to the latch to readily position the thumb for engagement behind the finger lip 234 for pivotal withdrawing of the latch member.

Fin Trim Structure

Referring to FIGS. 14 and 15 of the drawings there are shown two illustrative, modified forms of the structural member 28 from which the components of the window frame 12 may be formed. These two modifications illustrate the adaptability of the present window construction to a fin-trim installation as distinguished from the typical wood buck installation to which the previously described illustrative embodiment was directed.

In FIG. 14 the modified structural member 28 is identical in all respects to the member 28 hereinbefore described (the same designations being used) with a single exception occurring in the specific construction of earlier described flange 32 on one longitudinal edge of the web 30 of the member. In the present embodiment flange 32 is extended for a substantial distance beyond its extreme terminus as hereinbefore described to provide for engagement of the extended portion 248 with a vertical face of a framing stud 250 of the type normaly framing a window opening and providing for an exterior wall installation outwardly therefrom in a typical fin-trim installation. Additionally, the flange 32 is provided with an integrally formed perpendicular rib 252 originating thereon at a point intermediate its length and projecting outwardly in a direction generally away from the window to form with the extended portion 248 of flange 32 a corner for the reception of the exterior wall externally of the framing stud 250. The rib 252 establishes a frame opening for the window within the subsequently applied exterior wall.

In FIG. 15 there is shown another form of the fin-trim window frame wherein the flange 32 of the wood buck structural member hereinbefore described is provided with an attachment 254 forming the frame for the window opening within the area to which the exterior wall is to be subsequently applied externally of the framing stud 250. The framing attachment 254 consists of a flat web 256 having an offset lug 258 on one face thereof for engagement with the extended end of flange 32 which lug is so located and positioned as to locate the adjacent end of the web in coincidence with the projected plane of web 30 of the structural member. The last referenced end of web 256 of the framing attachment is turned at right angles to provide an offset plate portion 260 extending as a continued projection of web 30 outwardly of flange 32 for a spaced distance where it is turned again at right angles to provide a second web portion 262 extending in parallel relationship with web portion 256. Web portion 262 is provided on the end thereof remote to plate 260 with a perpendicular flange 264 extending outwardly away from framing stud 250 and serving with web portion 256 of the attachment to form a frame about the window opening in the same manner as provided by the integral framing components of flange 32 of the structure shown in and described with respect to FIG. 14.

In accordance with the foregoing descriptions and disclosures a horizontal sliding window construction is provided which inherently satisfies all of those objects and advantages heretofore set forth. Substantial savings in time, materials and, consequently, costs of manufacture are made possible by the simple and inexpensive design, construction and fabrication of the novel and improved window constituting the present invention.

It should be specifically noted that the structural elements of the window structure herein disclosed are confined to one-piece tubular, or semi-tubular forms which are readily extruded, and which provide for savings in material required for manufacture without sacrificing any characteristics of strength and rigidity. Further, the several different structural forms utilized to construct the window are so designed as to cooperate one with the other to enable the obtaining of those advantages above denoted.

In addition to those advantages set forth above, the present window construction in its several embodiments, provides a structure of maximum functional utility and having the ultimate in aesthetic quality. For example, the latch mechanism operating cooperatively with the sliding sash and the fixed meeting rail of the window frame serves to operate automatically upon closing of the window to efficiently and effectively lock the window. At the same time, the latch serves as a finger or grasping rail for one hand operation to release the lock and to move the sliding panel to an open, or partially open, position. While the novel latch mechanism described performs the above unique and useful functions it further affords aesthetic advantages in that it does not extend into or over

the glazed area of the window to obstruct vision and present an unsightly and awkward appearance as do prior art latches for similar type windows.

In the foregoing description certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are used for purposes herein to facilitate description and they are intended to be broadly construed.

Having now described the invention, the construction, the operation and use of preferred embodiments thereof, the advantageous new and useful results obtained thereby, the new and useful constructions and reasonable mechanical equivalents thereof obvious to those skilled in the art are set forth in the appended claims.

What is claimed is:

1. In a latch mechanism for a sash mounted in a window frame for horizontal sliding movement therein, said frame having a vertical meeting rail normally adjacent one end of said sash, the combination comprising: a recessed channel in said meeting rail defining a strike surface perpendicular to the path of sliding movement of the sash; a catch pivotally supported on said sash for pivotal movement about a vertical axis; and resilient means biasing said catch against said one end of said sash to position the free end of said catch in said meeting rail channel in the closed position of said sash whereby engagement of said free end of said catch with said striking surface resists sliding movement of said sash from closed to open position and whereby said catch is yieldable against the biasing action of said resilient means for moving said sash from open to closed position.

2. A latch mechanism as defined in claim 1 wherein said catch consists of an elongate bar member of L-shaped transverse configuration, the extreme free end of one of the perpendicular elements of the catch being provided with a rounded bead having pivotal attachment to the sash, the extreme free end of the second perpendicular element of the L-shaped catch being positioned adjacent the recessed channel of said meeting rail, said resilient means being interposed between the sash and the pivotally attached free end of said catch biasing the extreme free end of the second defined perpendicular catch element into said meeting rail recess, and a finger engaging lip projecting from the second-defined perpendicular element of the catch adjacent its angular junction with the first-named pivotally attached perpendicular element.

3. In combination, a frame window sash in sliding adjacency across a meeting rail, a latch strike recess in said meeting rail, a latch catch on said sash, said catch comprising an integrally formed elongated bar of generally L-shaped transverse configuration, a rounded bead extending longitudinally along one free end extremity of the L-shaped bar having pivotal engagement with said sash disposing the transversely remote free end extremity toward said strike recess, and spring means interposed between and bearing against said catch and said sash biasing the second named extremity toward said strike recess.

4. A combination as defined in claim 3 wherein said L-shaped catch is provided intermediate the transversely spaced extremities with a finger engaging abutment formed in opposition to said resilient bias.

5. In a window construction, in combination, a vertical meeting rail; a sash frame supported in sliding relationship across said meeting rail; and a latch catch mounted on said sash frame, said meeting rail having a latch strike recess in one face thereof, said sash frame having an undercut channel therein, said catch comprising an elongated bar of generally L-shaped transverse section, one longitudinal edge of the free side of one leg extremity of the L-shaped catch being pivotally secured in said undercut frame channel, the said free side extremity of said leg extremity adjacent said pivotally secured longitudinal edge being resiliently biased outwardly from said undercut channel, the extremity of the second leg of the L-shaped catch being disposed toward said meeting rail strike recess, and a finger engaging abutment formed on an intermediate portion of said catch generally opposing said bias.

6. In a window construction, a rectangular window frame, a window sash slidably mounted in said window frame between open and closed position, and latch means associated with a frame element of said window frame and an adjacent frame element of said window sash in the closed position of said window sash for normally retaining said window sash against movement from closed to open position, said latch means including a recessed channel in said window frame element defining a strike surface perpendicular to the path of sliding movement of said window sash, and a latch catch of generally L-shaped transverse configuration, the extreme free end of one of the perpendicular elements of said latch catch being formed along one edge thereof with a rounded bead having pivotal engagement with said window sash frame element, said sash frame element having a laterally projecting flange confronting the said extreme free end of said one perpendicular element of said latch catch, and spring means interposed between said flange and a portion of the extreme free end of said one perpendicular latch catch element adjacent said rounded bead biasing the end portion of the other perpendicular element of said latch catch into said recessed channel.

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