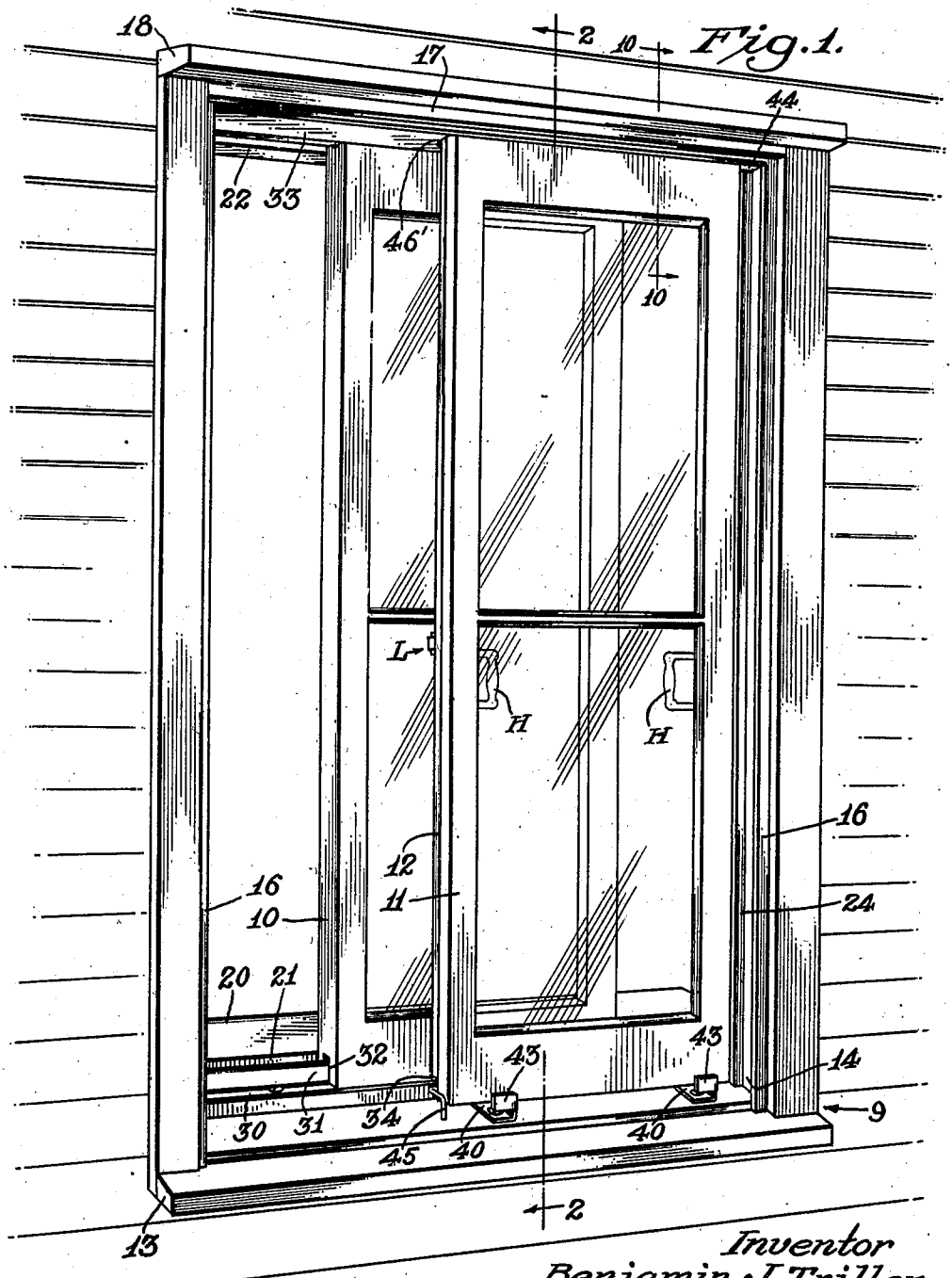
Feb. 8, 1944. B. J. TRILLER 2,341,344

WINDOW STRUCTURE

Filed April 17, 1941 3 Sheets-Sheet 1

Fig. 1.



Inventor
Benjamin J. Triller
BY
Parker, Carlson, Pilgrim & Hubbard
Attorneys.

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Fig. 2.

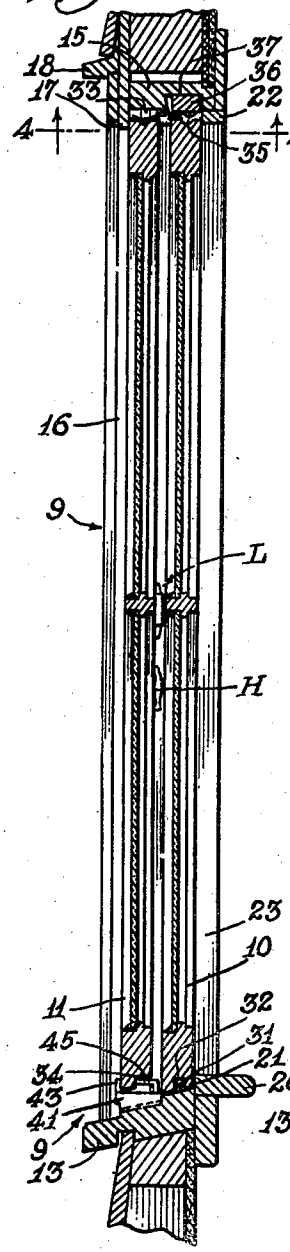


Fig. 3.

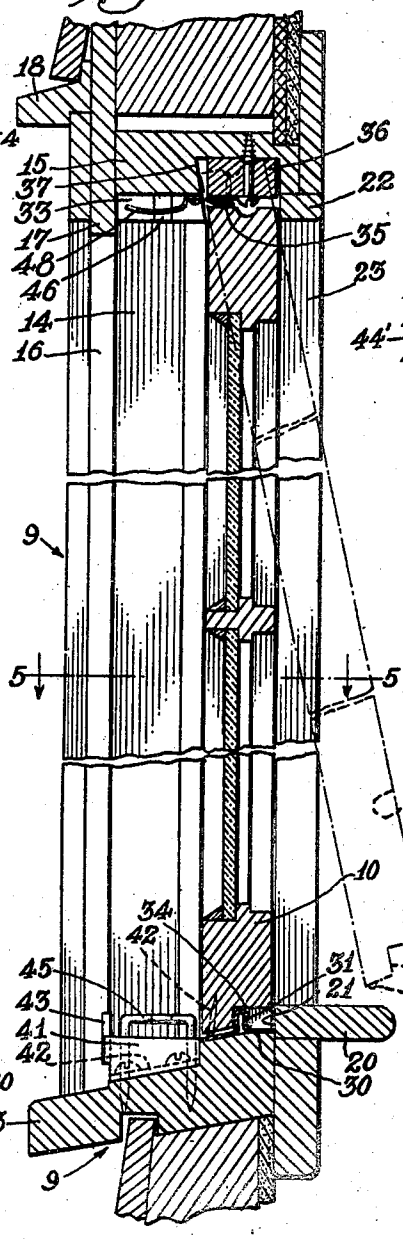
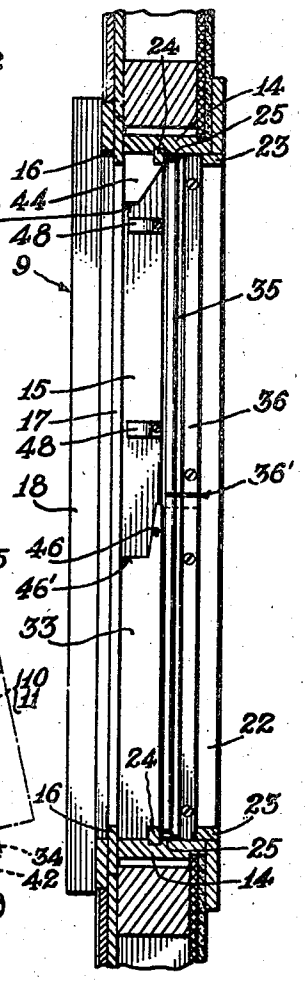


Fig. 4.



Inventor
Benjamin J. Triller
By
Parker, Carlson, Pilgrim & Hubbard
Attorneys.

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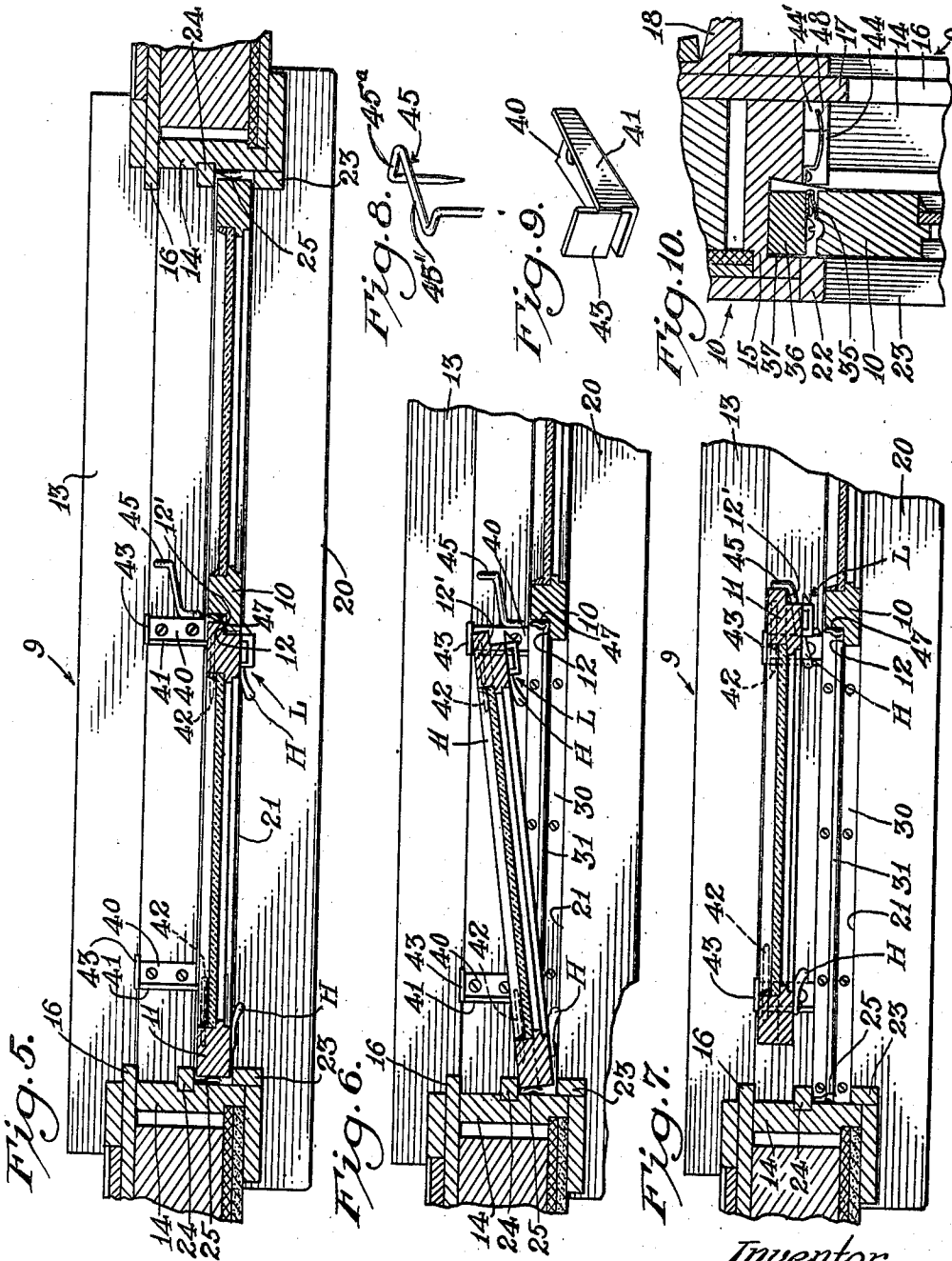
WINDOW STRUCTURE

Filed April 17, 1941 3 Sheets-Sheet 3



Inventor
Benjamin J. Triller
By
Parker, Carlson, Pettigrew & Hubbard
Attorneys.

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UNITED STATES PATENT OFFICE

2,341,344

WINDOW STRUCTURE

Benjamin J. Triller, Dubuque, Iowa

Application April 17, 1941, Serial No. 388,921

4 Claims. (Cl. 20—42)

The invention relates to improvements in window structures and more particularly to window structures of the horizontal sliding sash type.

One object of the invention is to provide an improved window structure of the above general character which is simple and sturdy in construction, adapted for complete assembly at the factory and capable of being installed with a minimum of labor whereby actual cost to the user is materially reduced.

Another object is to provide a horizontal sliding sash type window structure which is more nearly weather tight than windows of this type as heretofore constructed.

Still another object is to provide a window structure of the sliding sash type in which the cooperating elements of the frame and sash are formed and arranged to provide for drainage toward the outside thus effectually preventing moisture from entering and collecting in the interfitting parts of the frame.

A further object is to provide a window structure of the horizontal sliding sash type on which storm sash and screens may be hung with conventional hardware without interfering with the opening and closing of the window.

It is also an object of the invention to provide a window structure in which the sash can be installed and from which it can be removed with a minimum effort thus facilitating initial installation and subsequent cleaning of the window.

Other objects and advantages of the invention will become apparent from the following detailed description of the preferred embodiment illustrated in the accompanying drawings in which:

Figure 1 is a perspective view of the improved window structure as viewed from the outside.

Fig. 2 is a sectional view of the window structure taken in a vertical plane substantially along line 2—2 of Fig. 1.

Fig. 3 is a sectional view similar to Fig. 2 but on a larger scale showing the manner in which the sash is removed from the frame.

Fig. 4 is a horizontal sectional view taken along the line 4—4 of Fig. 2.

Fig. 5 is a horizontal sectional view of the window structure taken on the line 5—5 of Fig. 3 showing both sashes in closed position.

Fig. 6 is a fragmentary sectional view similar to Fig. 5 showing the intermediate position of the shiftable sash in its movement to open position.

Fig. 7 is a fragmentary sectional view similar to Fig. 6 but showing the shiftable sash in full open position.

Fig. 8 is a detail view of a combined stop and guide member for the shiftable sash.

Fig. 9 is a detailed perspective view of the combined supporting shoe and stop for the shiftable sash.

Fig. 10 is a fragmentary vertical sectional view of the window structure taken along the line 10—10 of Fig. 1.

While the invention is susceptible of various modifications and alternative constructions, I have shown in the drawings and will herein describe in detail the preferred embodiment, but it is to be understood that I do not thereby intend to limit the invention to the specific form disclosed but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

In carrying out the invention I provide a window frame 9 adapted to be installed in a building or the like in the conventional manner to define a generally rectangular window opening. The frame is fitted with a plurality of sashes, at least one of which is slidable horizontally across the opening and another of which is shiftable bodily transversely of the plane of the opening to provide a clear path for the slidable sash. The arrangement is such that the sashes are disposed in abutting relation in a common plane to effectually close the opening. To open the window the shiftable sash is moved from the common plane into a parallel plane spaced outwardly therefrom so that the companion sash may be moved horizontally a distance sufficient to uncover substantially half of the window opening.

In the particular embodiment illustrated, two sashes are provided, namely, a sliding sash 10 and a shiftable sash 11. Each sash is of the generally rectangular form most frequently used in conventional building structures but other shapes can be used, of course, if desired. To provide a tight closure the sashes are formed with complementary abutting side edges preferably having interfitting grooves or rabbets as indicated at 12 and 12' (Figs. 5–7) adapted to interlock when the window is closed. A sash lock L of any suitable character may be utilized for latching the sashes together in tight engagement. Conventional handles H are provided on opposite sides of the shiftable sash to facilitate the movement of this sash between open and closed positions.

The frame 9, in the preferred form illustrated, is constructed substantially entirely of standard shapes and can therefore be manufactured with-

out the expense of producing specially designed parts. Thus the frame comprises a conventional downwardly sloping sill 13, spaced side jambs 14 and a head jamb 15 secured together to define a generally rectangular opening. A conventional casing is provided for the outside of the frame including the usual blind stops 16 at each side and a blind stop 17 at the top of the frame. A cap 18 is secured to the frame above the blind stop 17.

On its inner side the frame is provided with conventional trim including the usual stool 20 (Figs. 2 and 3) adjacent the inner edge of the sill which forms an upstanding shoulder or abutment 21 for engagement with the lower edges of the sashes. An inside stop strip 22 (Figs. 2–4) attached to the head jamb 15 provides a similar abutment for engagement with the upper edges of the sashes. At each side of the frame inside stops 23 in cooperation with parting strips 24 attached to the side jambs 14 define inwardly facing channels for the reception of the outer side edges of the respective sashes. Conventional spring type weather strips 25 fitted in the channels provide a weather tight seal between the side edges of the sashes and the frame.

To guide the sliding sash 10 in its horizontal movement across the window opening and to provide a weather tight joint between the sash and the sill, a guide strip 30 is extended entirely across the window opening. This strip is formed with an upstanding rib or flange 31 engaging in a downwardly facing groove 32 in the lower edge of the sash. A stop strip 33 (Figs. 2–4) attached to the head jamb 15 at one side of the window opening cooperates with the inside stop 22 to confine the upper edge of the sliding sash against transverse movement.

The shiftable sash 11 instead of being grooved along its lower edge for the reception of the guide flange 31 is rabbeted as at 34 (Figs. 2 and 3) so that the sash may be moved laterally of the strip as well as longitudinally thereof. The vertical shoulder provided by the rabbet abuts against the rib 31 when the sash is in closed position and thus acts to provide a weather tight joint therewith.

The guide strip 30 may be of any suitable character and, as herein shown, is formed of sheet metal such as spring bronze with a longitudinal fold defining the rib 31 and providing lateral flanges for attachment to the sill. It will be observed (Figs. 2 and 3) that the outer flange of the guide strip and the portion of the sill to which it is attached, are inclined outwardly so as to automatically discharge rain water outside the building. This is advantageous in preventing entry of rain below the sash thereby excluding moisture from the joints of the frame and materially prolonging the life of the window structure.

A conventional spring type weather strip 35 engages the upper edges of the sashes when in closed position to provide a weather tight joint at the top of the window. In the exemplary window structure the weather strip is attached to a rail 36 secured in a longitudinal groove 37 in the head jamb 15. The weather strip and rail are divided at one side of the center of the frame as indicated at 36' (Fig. 4) and the longer of these sections is removably secured to the head jamb while the other may be permanently attached thereto. The rail normally acts to hold the sashes in assembled relation with the frame and the removal of the longer section presents a sash receiving channel which permits convenient disassembly of the sash from the frame as will appear presently.

To permit the sliding sash 10 to be moved horizontally across the frame to the open position shown in Fig. 1, it is necessary to displace the shiftable sash 11 from its normal closed position in which it is disposed in the same plane as the sliding sash (see Fig. 5). The present invention provides a frame and sash structure whereby this displacement is effected by a combination of movements under guidance of the frame itself and without requiring the installation of a track or the like. More particularly, the construction permits movement of the shiftable sash to a plane spaced outwardly from the common plane and parallel thereto. This outward movement of the shiftable sash is an important factor in making the window structure weather tight as it enables the cooperating parts of the frame and sash to be inclined so as to drain outwardly. Moreover, it permits the use of standard weather stripping around the entire window opening thereby insuring a tight fit between the sash and the frame at all points.

In its outward movement, the shiftable sash 11 is supported and guided at its lower edge by a pair of supporting shoes attached to the sill 13. As herein shown, the supporting shoes are alike, each consisting of a flat base 40 and an upstanding flange 41 (Fig. 9) over which the sash is adapted to slide. The base portion of the shoe is perforated so that it may be fastened to the sill by screws or the like. The flange 41 is preferably tapered to conform to the angle of inclination of the sill whereby the upper edge is disposed in the same horizontal plane as the raised portion of the sill upon which the sash rests when in closed position (see Fig. 3). Thus, the shiftable sash is maintained in substantial horizontal alinement with the sliding sash when in open position. This improves the general appearance of the window structure and avoids the use of depending fittings to hold the sash in place. Metal bearing members herein shown as elongated staples 42 are driven into the lower edge of the sash to ride over the edges of the shoes and thus reduce wear on the sash. Outward movement of the sash is limited by the blind stop 17 engaging the upper edge of the sash and by suitable stops 43 formed on the supporting shoes engaging the lower edge of the sash. The stops 43 may be conveniently formed integrally with the flanges 41 of the shoes as shown in Fig. 9.

When the sash 11 is in closed position its outer side edge is disposed in the channel formed by the inside stop 23 and the parting strip 24 to provide a weather tight seal at the side of the window. Before the sash is shifted outwardly, the side edge portion must be withdrawn from the channel sufficiently to clear the parting strip 24. This is accomplished by grasping the center handle H and rocking the sash about a vertical axis adjacent its outer side edge into the inclined position shown in Fig. 6. The shoe 40 disposed adjacent the center of the frame supports the inner or swinging side of the sash in this rocking movement and thus prevents the sash from binding in the frame.

While in the inclined position, the sash is moved edgewise to the right by means of the handles. A guide and stop device 45 in the form of a staple-like member of heavy wire or bar stock bent into the configuration shown in Fig.

8, cooperates with the lower edge of the sash to guide it in this movement and to limit the extent of the movement. To this end the stop member is driven into the sill so that its main body portion 45' lies in a horizontal plane disposed between the lower edge of the sash and the base of the rabbet 34. A forwardly bent section 45a of the member is thus positioned for engagement by the lower edge portion of the sash as shown in Fig. 1, whereby edgewise movement of the sash to the left, as viewed in this figure, is interrupted.

At its upper edge the sash is similarly guided at one side by an angularly disposed shoulder 46 (Fig. 4) defined by a suitably shaped notch in the end of the stop strip 33. The shoulder 46 is located directly above and in substantial alinement with the body portion of the member 45 so that the sash is maintained in a vertical plane during its movement to the open position. The notch in the strip 33 also defines a stop shoulder 46' (Fig. 4) substantially alined with the stop section 45a of the member 45, the shoulder and stop member thus cooperating to prevent canting of the sash when in open position.

The upper edge of the sash 11 is guided at its other side edge during the edgewise sliding movement by the beveled end portion of a block 44 (Figs. 4 and 10) secured to the head jamb 15 at that side of the frame. As will be seen by reference to Figs. 3 and 10, the block 44 is of substantially the same thickness as the strip 33 and presents a squared end portion 44' in opposed relation to the stop shoulder 46' and spaced therefrom by the width of the sash to provide clearance for swinging the same to open position.

The sash 11 is swung into open position after the edgewise movement above described by pivoting about a vertical axis adjacent its inner side edge. In this movement, the outer or swinging side of the sash is supported by the shoe 40 located adjacent the side jamb which, as previously stated, has its bearing edge disposed in the same horizontal plane as the portion of the sill upon which the sash rests when in closed position. It will be apparent, therefore, that canting of the sash in its movement to open position is effectually prevented. The sash is shown in the open position in Fig. 7 wherein it will be noted that the sash is disposed outwardly of the plane of the window opening but substantially parallel thereto. Flat springs 48 fixed to the head jamb 15 frictionally engage the upper edge of the sash to yieldably hold it in the open position and to prevent vibration or chattering. With the shiftable sash so positioned a clear path is provided for the sliding sash 10 which may accordingly be moved horizontally into the position normally occupied by the sash 11.

It will be observed that the shiftable sash 11 when in open position and in its movements to and from that position is at all times disposed inwardly of the blind stops 16 and 17. Accordingly storm sash or screens may be installed on the frame in the conventional manner and with conventional hardware and fixtures without interfering in any way with the opening and closing of the window. Moreover, as shown in Fig. 7, sufficient clearance is provided between the outer side jamb of the frame to accommodate the usual stay rods or the like employed with storm sash and screens and to leave these stay rods readily accessible from inside the window.

As will be seen by reference to Fig. 5, the sashes 10 and 11 when in closed position are disposed in a common plane with the abutting rabbeted edges 12 and 12' held in interlocking engagement by the latch L. A weather strip 47 attached to one sash effectually seals the joint between the sashes. Weather strips 25 engaging the outer side edges, and weather strips 35 engaging the upper edges of the respective sashes as previously described insure weather tightness at all these points. Weather tightness at the bottom of the frame is insured by the flanged strip 30.

The frame 9 of the improved window structure may be completely assembled at the factory and shipped as a unit to the place at which it is to be installed since no sash weights or counterbalancing mechanisms are required. To avoid breakage of glass and to facilitate handling, the sashes are preferably packed separately from the frame and are assembled therewith after installation of the frame in a building. The assembly of the sashes in the frame is an extremely simple operation. For this purpose one section of the rail 36, that is, the longer section is detached from the head jamb 15, leaving the groove 37 open. The back wall of the groove is undercut, as shown in Fig. 3, so that the upper edge of a sash may be inserted therein when the sash is inclined or tilted inwardly to the position shown in broken lines in Fig. 3. The groove is of sufficient depth to allow the lower edge of the sash to clear the stool 20, whereby the sash may be swung into a vertical position and then lowered to the normal position shown in full lines in the drawings. The slidable sash is inserted in the frame first and then moved to its outer position whereupon the second sash may be inserted in the frame in the same manner. After both sashes have been assembled in the frame, the slidable sash 10 is moved into its closed position to expose the groove 39 and the section of the rail 36 is replaced therein. Removal of either sash from the window is effectually prevented as long as the rail remains in place. In this connection it should be noted that the rail 36 is accessible for removal only from the inside of the window.

The ease of assembly and disassembly makes it practical to remove the sash from the frame for washing, painting or other attention. To remove a sash from the frame one section of the rail 36 is detached from the head jamb as above described. The sash to be removed is then shifted upwardly into the channel thus provided until its lower edge clears the stool 20, and is then swung outwardly to the position shown in broken lines in Fig. 3. A slight downward movement withdraws the upper edge of the sash from the channel and thus frees the sash for removal from the frame. Reinsertion of the sash is effected in the same manner as the initial assembly above described.

It will be apparent from the foregoing that the invention provides a novel window structure presenting important advantages in manufacture, installation and use. The novel arrangement for assembling the sash in the frame permits installation and removal of sash with extreme ease requiring only the temporary removal of one section of the locking strip 36. Since the sash can be installed in this convenient manner and further, since there are no sash weights or counterbalancing mechanisms to be installed, the frame structure including weather stripping

can be assembled completely at the factory. This is desirable because of the more efficient working conditions that can be maintained under such circumstances and it likewise contributes to reduction of labor costs. Another important factor in reducing costs is the simplicity of construction and the use throughout of standard structural shapes and hardware.

The factory assembly of the frame structure contributes further savings in building operations by eliminating the waste which is always present when the workmen are required to cut and fit the frame parts on the job. It also materially speeds up construction by eliminating these time consuming operations.

The improved window structure has the attractive appearance of a casement type window without the disadvantages of the latter. Thus, with applicant's structure, conventional hardware may be utilized for hanging screens and storm sash without interfering with the opening and closing of the window. In this connection it should be noted that the attractive appearance is maintained when the window is opened since the shiftable sash is moved to the outside and maintained in the same horizontal plane as the sliding sash. Both sashes are effectually guided in their respective movements and accidental displacement is prevented, yet either or both sashes can be quickly and easily removed for washing, painting, or other attention.

Of even greater practical importance is high degree weather tightness provided by the improved window structure. Thus, by reason of the novel manner in which the cooperating parts of the frame and sash are interrelated, efficient weather stripping may be applied around the entire periphery of each sash. Moreover, grooved and rabbeted sections of the framing are faced so that drainage is automatically directed toward the outside of the window. Thus, even though the window may be subjected to driving rain, entry of water into the joints of the framework is effectually prevented. This, of course, materially prolongs the useful life of the window structure by protecting the same from conditions favoring the decay of wooden structural elements.

I claim as my invention:

1. A window structure comprising, in combination, a frame defining an opening, a sliding sash supported in the frame for horizontal movement across the opening, a shiftable sash supported in said frame and adapted to lie in a common plane with said sliding sash to close the opening, said frame and said shiftable sash being formed to permit the latter to shift outwardly from said common plane to provide a clear path for movement of the first sash, and means on the frame for yieldably holding said shiftable sash in its outer position.

2. In a window structure, the combination of a frame comprising a head jamb, side jambs and a sill, a plurality of sashes supported on said frame, at least one of said sashes being mounted for horizontal sliding movement and another of the sashes being mounted for limited movement transversely of the path of said one sash to provide a clear path for the same, a member on the sill providing an abutment for engagement with lower edge of each sash, and a stop member on the head jamb effective to hold the sash in operative relation with said abutment, said member having a section adapted for convenient removal whereby either sash may be lifted to clear the abutment on the sill for removal from the frame.

3. In a window structure, in combination, a frame defining a generally rectangular opening and including a downwardly and outwardly sloping sill, a plurality of sashes dimensioned to fit into said frame in edge-to-edge relation and in a common plane to close the opening, means providing an outwardly facing abutment extending around the opening engageable by the inner peripheral edges of the sashes when in closed position to limit inward movement of the same, one of said sashes being mounted for horizontal sliding movement in said plane, means on the frame for guiding another of said sashes for pivotal movement about a vertical axis and edgewise sliding movement effective to displace the sash outwardly from said plane and thereby provide a clear path for the movement of said one sash, said guiding means including a plurality of members carried on the sill and arranged to support the lower edge of said other sash in a substantially horizontal plane in its outward movement over the sloping sill, and stop means cooperative with the upper and lower edges of said other sash to limit the outward movements thereof so as to maintain the sash in assembled relation with the frame.

4. A window structure comprising, in combination, a window frame defining a generally rectangular opening and including an outwardly sloping sill, a pair of sashes adapted to lie in a common plane adjacent the inner edge of the sill to close the opening, means on the sides of the frame forming channels dimensioned to receive the outer side edges of the sashes so as to form weather-tight seals with the frame, means at the top and bottom of the frame operative to guide one of said sashes first in a pivoting movement about a vertical axis along its outer side edge, then in an edgewise movement to withdraw the sash edge from the channel and subsequently in a pivoting movement about a vertical axis along its inner side edge into a plane substantially parallel to said common plane but spaced outwardly therefrom to provide a clear path for a sliding movement of the other sash in said common plane, said guiding means at the bottom of the frame including a pair of members extending transversely of the sill and presenting a horizontal guide surface substantially in the plane of the lower outer edge of said one sash effective to hold the sash in cooperative relation with the guiding means at the top of the frame throughout the movements of the sash.

BENJAMIN J. TRILLER.