Feb. 27, 1962 B. J. STEGLEY ETAL 3,022,547

WINDOWS

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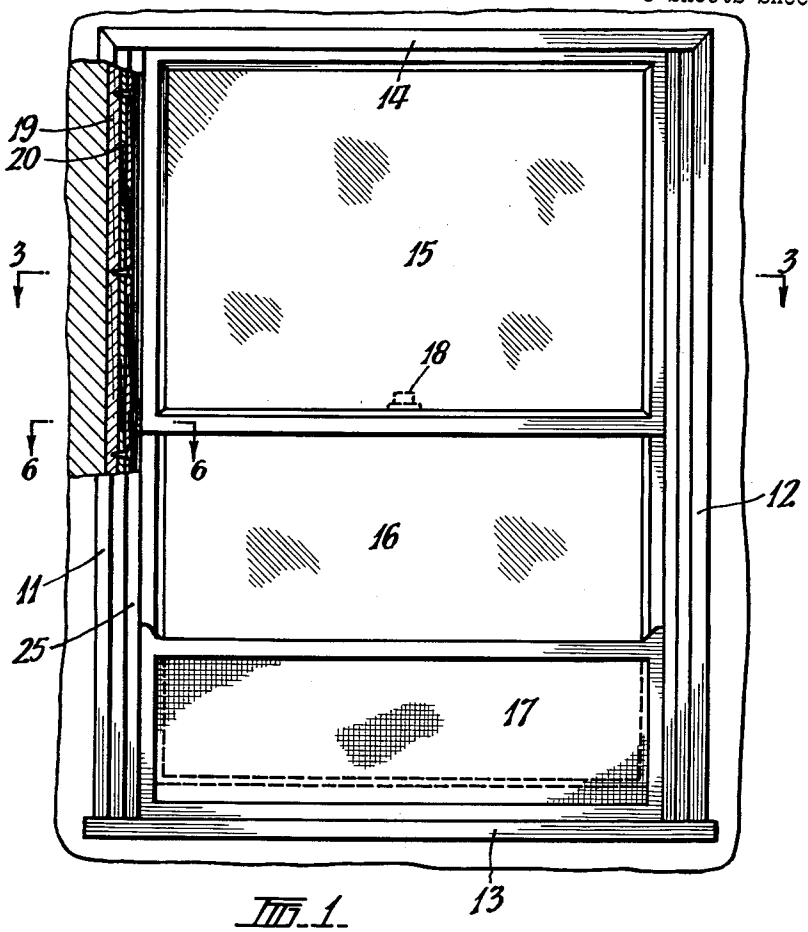


Fig. 1

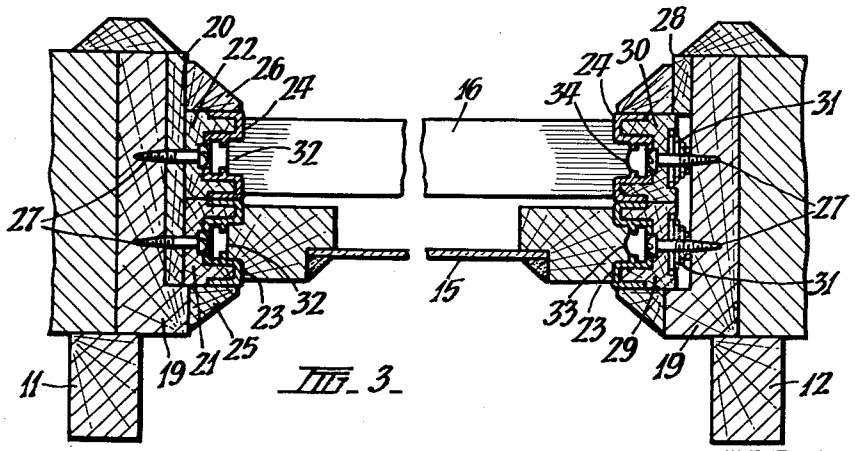


Fig. 3

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WINDOWS

Filed Nov. 24, 1959 3 Sheets-Sheet 2

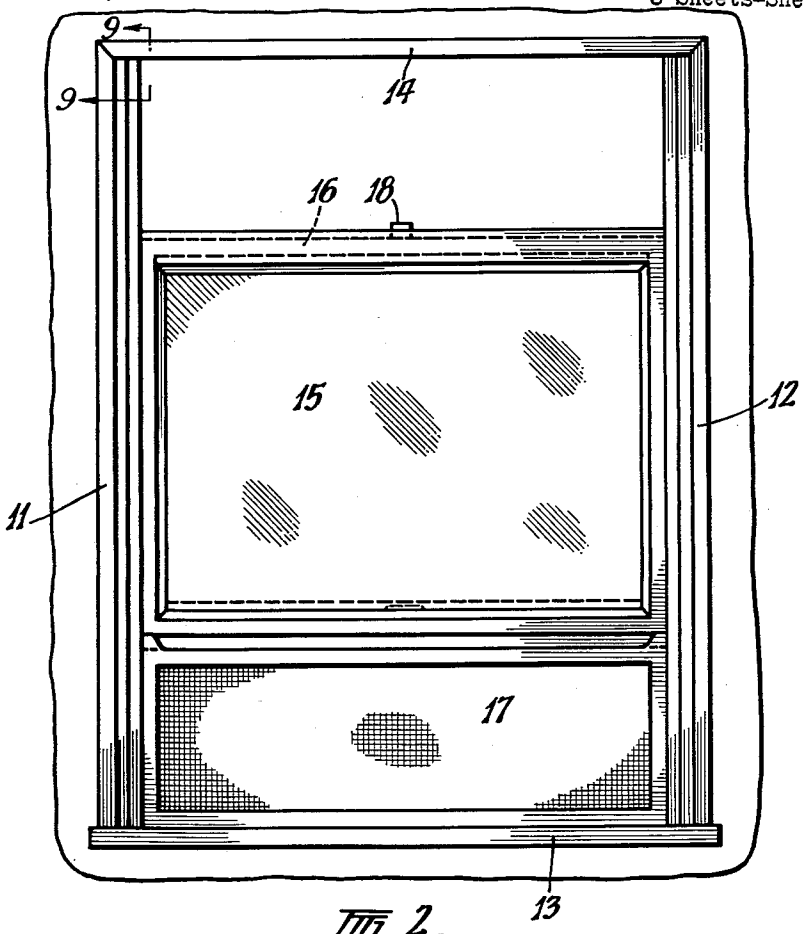


Fig. 2.

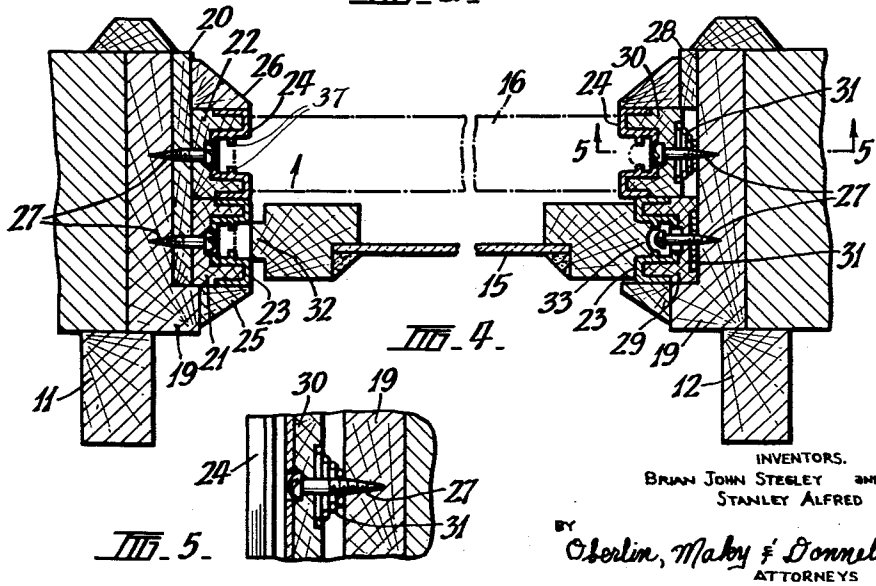


Fig. 4.

Fig. 5.

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WINDOWS

Filed Nov. 24, 1959 3 Sheets-Sheet 3

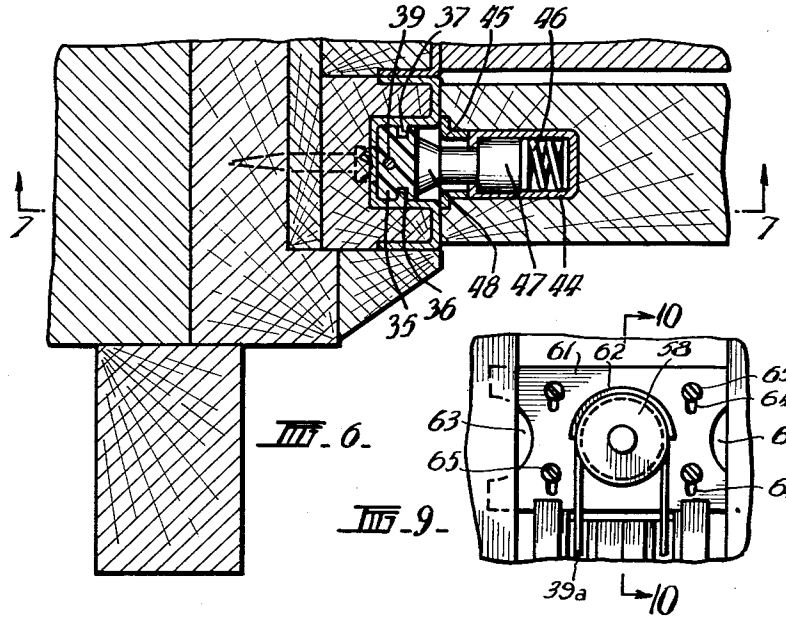


Fig. 6.

Fig. 9.

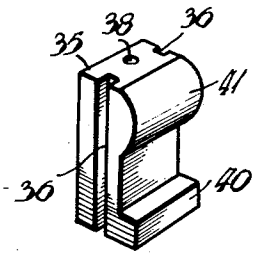


Fig. 8.

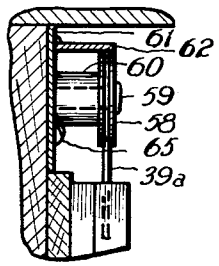


Fig. 10.

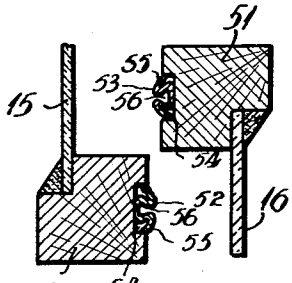


Fig. 11.

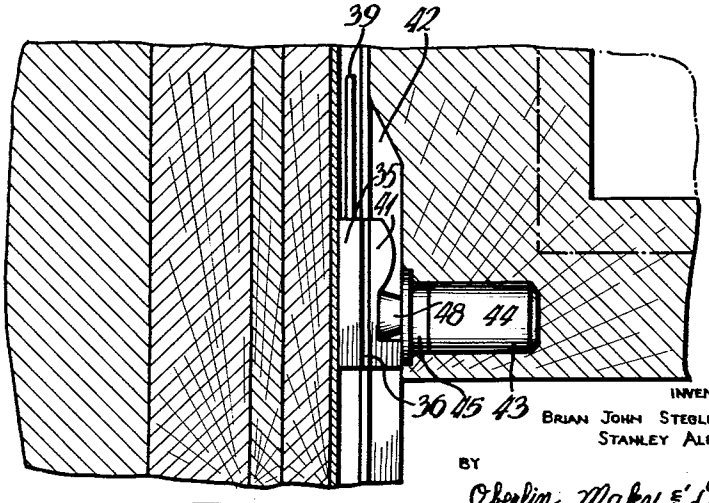


Fig. 7.

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WINDOWS

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Filed Nov. 24, 1959, Ser. No. 855,134
6 Claims. (Cl. 20—52.2)

This invention relates to improvements in windows, especially vertically slideable windows—such as windows of the double hung type—and it refers particularly to the means for mounting the sashes in the window frame.

An important object of the invention is to provide improved mountings for the slideable sashes of a window such that the sashes may be readily removed.

It is known to mount vertically-slideable sashes in windows in such manner that the sashes may be readily disengaged from their guideways—as for purposes of cleaning or repair of the glass panes. That has been done principally with relatively small and light sashes which do not have to be supported by counterbalancing means, owing to the difficulty of disengaging and re-engaging the sashes with the counterbalancing means.

A further object of the invention, therefore, is to provide a construction of sash mounting, especially for the vertically slideable sashes of double hung windows, which will enable the sashes to be readily removed from the window and wherein the sash cords may be readily disconnected from the sashes and re-connected when the sashes are fitted back in position.

Another object of the invention is to provide means for detachably engaging a sash with a sash cord such that the sash may be readily disengaged from the sash cord when the sash is being removed from the window and readily re-engaged with the sash cord when being returned to position.

It has also been proposed to interconnect the two sashes of a double hung window so that the weight of one sash is counter-balanced by that of the other sash. However, as the sash cords interconnecting the sashes tend to vary in length in use the two sashes do not always co-act in the manner required. Thus, if the sash cords extend or stretch the lower sash may be properly closed but the top sash will still remain open a small extent, and if the sash cords should contract, it may not be possible to fully close the lower sash when the top sash has been closed.

A still further object of the invention is to provide a mounting for a sash cord pulley wheel which will enable adjustment to be readily effected to compensate for any substantial alterations in the length of the sash cord. Yet another object is to provide a construction of mounting for a pulley wheel—for the support of a sash cord—which will be conducive to ease of installation and convenience in maintenance.

Another object of the invention is to provide a construction of sash guideway for a double hung window or a window of similar type, which will be relatively economical to manufacture and install and at the same time provide for a substantially rattle-free mounting of the sashes and a relatively smooth and easy sliding movement thereof.

Yet another object of the invention is to provide means for ensuring effective weathering of the meeting rails of the window sashes of a double hung window, or the equivalent, particularly a wooden window. Yet another object is to provide simple and economical means for sealing the meeting rails of the sashes of wooden double hung windows.

The window constructed according to this invention has sash guide means including at least one guideway

mounted relative to a jamb or stile of the window and held against movement vertically as well as inwardly and outwardly of the window but permitted to move laterally of the window, and resilient means operative to press the guideway towards the sash mounted in the guideway so as to exert a yieldable pressure upon the sash. The window may have fixed guideways on one jamb or stile and resiliently mounted guideways on the other jamb. The resiliently mounted guideways may be conveniently fastened in position by screws engaged with the jamb or stile so that the guideways can move laterally towards and from the sash stile without being permitted to move vertically or longitudinally relative to the window. The relative edge or surface of the sash stile, which is engaged in the resiliently mounted guideway may be grooved to avoid interference with the heads of the screws.

The guideways are preferably made of wood with facing or wearing strips of metal—such as aluminium or an aluminium alloy—and the resilient means operative to press the guideway inwardly may be compression springs of volute type.

In order that the sashes may be readily connected to and disengaged from the sash cords there are provided blocks slidably mounted in the sash guideways and adapted to be engaged by resiliently mounted plungers fitted to the sashes. These blocks are engaged in the guideways in such manner that they cannot move laterally relative to the guideways of the window.

In order to effect a sealing of the meeting rails of the sashes there is provided a sealing strip, attached to at least one of the meeting rails, so as to extend from one side to the other, said sealing strip being adapted, when the sashes are in closed position, to fit snugly between the meeting rails so as to prevent, or largely restrict, passage of air between said meeting rails.

The pulley wheels for supporting the sash cords are mounted rotatably upon mounting plates provided with slots or enlarged holes for the reception of fastening screws, so that the pulley wheels may be adjusted vertically in height relative to the window stiles or jambs, whereby adjustment may be made to compensate for stretch in the sash cords. These pulley wheels are mounted in the upper corners of the window frame, above the upper extremities of the sash guideways and they have guard plates for preventing inadvertent disengagement of the sash cords therefrom.

In order that the invention may be clearly understood and readily put into practical form, we shall now describe, with reference to the accompanying illustrative drawings, a preferred construction of double-hung windows made according to the invention. In these drawings:

FIG. 1 is a view of the window in front elevation, from the outside, with part of one window stile cut away to show the mounting of the sash guideway at that side, the sashes being shown in closed position;

FIG. 2 is a view, similar to FIG. 1, showing the sashes in partly-open position;

FIG. 3 shows a horizontal section at the line and in the direction of the arrows 3—3 of FIG. 1, the section being on enlarged scale;

FIG. 4 is a sectional view, similar to FIG. 3, illustrating the manner in which the top or outer sash may be removed from its guideways;

FIG. 5 shows a vertical cross section taken on the line and in the direction of the arrows 5—5 of FIG. 4;

FIG. 6 is a horizontal cross-section on further enlarged scale through part of one window stile and a sash rail showing one way of connecting a sash cord to the window sash, the section being taken on the line and in the direction indicated by the arrows 6—6 of FIG. 1;

FIG. 7 is a vertical cross-section taken on the line

and in the direction indicated by the arrows 7—7 of FIG. 6;

FIG. 8 is a perspective view of the sash-cord connector member shown in FIGS. 6 and 7;

FIG. 9 is a vertical cross-section on the line and in the direction of the arrows 9—9 of FIG. 2, showing the mounting of the pulleys for supporting the sash cord;

FIG. 10 is a vertical cross-section on the line and in the direction of the arrows 10—10 of FIG. 9; and

FIG. 11 is a transverse cross-section through the meeting rails of the sashes when said sashes are in partly-open position (with the meeting rails spaced apart vertically).

The double hung window shown in the drawings has a frame comprising two jambs or stiles 11 and 12, a sill 13 and a head 14, two sashes 15, 16, a fly-wire screen 17 and means 18 for locking the sashes in closed position.

The jamb 11 consists of an angled member 19 to which is fitted a flat member 20, two channel-shaped guideways 21, 22 having wearing members 23, 24 fitted thereto and beadings 25, 26, the guideways 21, 22, being fastened in position by means of screws 27 and the inner surfaces of said guideways being counterbored to accommodate the heads of said screws. The parts 19, 20, 21, 22, 25 and 26 are conveniently made of wood and the wearing members 23, 24 are made of metal, such as an aluminium alloy, the outer side portions of the guideways 21, 22, being recessed, as shown in FIGS. 3 and 4, to accommodate the outer sides or branches of the wearing members 23, 24. Each of the wearing members has inwardly extending ribs 37 which act as guides for the sash cord connector member and also as stops for the relative edge of the sash engaged with the wearing member.

The jamb 12 is constructed somewhat the same as the jamb 11 save that the flat member 20 is replaced by a spacer strip 28, and the two channel-shaped guideways 29, 30 are mounted resiliently between that strip 28 and the angled portion of the member 19. The guideways 29, 30 are fastened resiliently in position inwardly of the inner surface of the angled member 19 by screws 27, the heads of which are accommodated in counterbored openings in the inner surfaces of the guideways, and compression springs 31 are located between the inner surface of the angled member 19 and the outer surface of said guideways 29, 30, the outer surfaces of said guideways being recessed or counterbored to accommodate the relative ends of said springs. Thus, the guideways 29, 30 may be pressed, and moved, laterally or sideways—against the pressure of the springs 31—between the spacer strip 28 and the angled portion of the member 19 towards the inner surface of said member 19. The guideways 29, 30 are held against vertical movement by the screws 27, which also operate to limit their sideways travel away from the inner surface of the member 19 under the action of the springs 31.

The guideways 29, 30 are provided with wearing members 23, 24 as previously described, each having a pair of inwardly extending ribs or flanges 37.

The sashes 15, 16 are mounted slidably in the guideways 21, 22 and 29, 30—the sash 15 being slidable in the guideways 21, 29 and the sash 16 being slidable in the guideways 22, 30. Each of the sashes has laterally projecting tongues 32, 33 on the outer surface of its two stiles (see FIGS. 3 and 4) and these tongues fit neatly but slidably between the ribs 37 of the wearing members 23, 24 of the guideways in such manner that there will be little likelihood of the sashes rattling in the guideways if properly fitted. The spring loading of the guideways 29, 30 reduces the likelihood of rattling. As the heads of the screws 27 will project through the guideways 29, 30 when said guideways are moved laterally outwardly against the pressure of the springs 31 the outer surface of each of the tongues 33 is grooved at 34 so as to reduce likelihood of the side edge of each sash being fouled by the heads of the screws 27 when the sashes are moved sideways.

The guideways 21, 22 and 29, 30 and the sashes 15, 16 are so constructed and mounted that when it is desired to remove a sash it is merely necessary to move the sash sideways against the pressure of the springs 31 until the tongue 32 is clear of the relative guideway 21 or 22 and then that latter side may be swung inwardly (or outwardly) until the tongue 33 is freed from its guideway, when the sash may be lifted out of the window frame. It will be apparent that the upper sash 15 cannot be swung inwardly unless the lower sash has been first removed, and that the lower sash 16 cannot be swung outwardly until the upper sash has been removed.

The flywire screen 17 is mounted in the guideways 21, 29 in the same manner as the sashes, and it may be removed in the same manner. When the screen 17 is in the outer pair of guideways 21, 29 (as shown) the lower sash 16 cannot be removed from the outside until the screen has been removed, and the two sashes may be removed only when they are not locked together by the locking means 18, as the outwards or inwards swinging movement of the sashes is prevented by the head 14 and/or sill 13 when the sashes are locked in closed position.

In order to counterbalance the two sashes, so as to facilitate the opening and/or closing movements by reducing the effective weight to be lifted when a sash is raised, counterbalance weights may be connected to the opposite sides of each sash by sash cords or cables, or spring counterbalancing means may be connected to the sashes, or the two sashes may be interconnected by suitable cords or cables in such manner that when one sash is raised the other is lowered. In order to connect the sash cords or cables to the sashes we provide the means illustrated particularly in FIGS. 6, 7 and 8.

A block 35, conveniently made of nylon, has grooves 36 in its opposite sides to accommodate the inwardly extending ribs 37 of the wearing members 23, 24, the block 35 being of such size as to be adapted to fit neatly but slidably in the channel-shaped middle portions of the wearing members 23, 24. A hole 38 is provided vertically through the block 35 to accommodate a metal rod 39 fastened to the end portion of a sash cord or cable 39*a*, which rod 39 may be securely fastened to the block, and at the lower end of the block is an inwardly projecting ledge 40. At the upper end of the block 35, a short distance above the ledge 40, is a curved cam-portion 41. The blocks 35 are held against lateral or sideways movement relative to the window frame by the interengagement of the ribs 37 in the grooves 36.

The lower end portion of each sash stile is shaped to provide a space 42 by cutting away the tongue, 32 or 33, at that location. A laterally-extending hole 43 is provided in each side of the sash close to the lower edge thereof and in each of said holes is a housing 44 having an inturned flange at its outer end—see FIG. 6. This housing 44 is retained in position by a ferrule 45 in the outer end of the hole 43, said ferrule 45 having an outturned flange adapted to bear upon a wearing strip 23 or 24 of the guideways in which the sash is mounted. Mounted in the housing 44 is a compression spring 46 and a plunger 47 having a conically tapered head 48 at its outer end. The parts are so constructed that the tapered head 48 of the plunger 47 can fit between the ledge 40 and the cam-portion 41 of the block 35 and thereby assist in supporting the sash when the block 35 is held in fixed position by the sash cord, but if the block 35 can be moved downwardly relative to the sash then as the cam-portion 41 moves past the plunger 47 the head 48 will ride on the cam-portion 41 so as to cause the plunger to be pressed inwardly. That is to say, the spring-pressed plunger 47 constitutes a spring catch or detent adapted to be releasably engaged with the block 35.

In normal operation the block 35 at each side of a sash, connected to the sash cords 39*a*, will hold the

sashes in any set position and by reason of the upward pressure applied to the blocks they will facilitate the raising of the sash. When the sash is pressed downwardly the heads **48** bearing on the ledges **40** of the two blocks **35** will cause said blocks to slide downwardly in the sash guideways.

When it is desired to remove the lower sash **16**, for example, from the window frame it is only necessary to raise the sash to such an extent that the outer sash **15** rests upon the flywire screen **17** and then press the sash **16** sideways against the resiliently mounted guideway **30** until the tongue **32** of the one stile of the sash is clear of the fixed guideway **22** and then lift the sash out of the window—the sash is then automatically disengaged from the blocks **35**. The upper sash **15** may then be removed in similar manner. In replacing the sashes **15, 16** they should be placed so that the heads **48** of the plungers **47** are above the ledges **40** of the blocks **35**, and then lowered so that the heads **48** of the plungers engage with said ledges **40**.

A second flywire screen, similar to the screen **17**, may be fitted removably in the inner guideways **22, 30** and supported in the top portion of the window frame by any suitable catches of known type fastened to the upper rail of that screen and to the head **14**. Thus, when the sashes **15, 16** are moved to the full open position both upper and lower window openings are covered by flywire screens.

It will be appreciated that the provision of the wearing strips **23, 24** of metal such as aluminium provides for a relatively smooth sliding action of the sashes in the guideways even with the sashes held relatively firmly by the pressure of the springs **31**.

In cases where it is not required to have the flywire screens it is preferred that a stop member be fastened in each of the outer guideways **21, 29** at about the same height as the top of the screen **17** so as to limit the downward movement of the upper sash **15**.

In order to ensure effective weathering of the meeting rails **50, 51** of the window sashes **15, 16** sealing strips **52, 53** are fitted tightly in lateral slots **54** provided in the meeting surfaces of said meeting rails. These strips **52, 53** are of identical construction and each has upper and lower arcuate branches **55** and a middle channel portion **56**. The edges of the branches **55** are adapted to bite into the sides of the slots **54** in the rails **50, 51** so as to hold the strips **52, 53** in position, and said strips **52, 53** project beyond the meeting surfaces of said rails **50, 51** so as to be adapted to interengage when the sashes are closed and they provide for an effective weather-sealing of the space between the two meeting rails **50, 51**. The sealing strips are preferably made of a resilient metal—as spring steel or stainless steel, though some aluminium alloys may be suitable. Also, certain of the so-called plastics may be suitable. If a resilient material be used in the manufacture of the sealing strips then the strips will also tend to reduce noise due to rattling of the sashes when in closed or nearly-closed position as the spring members will tend to press the meeting rails apart.

The pulley wheels **58** for supporting the sash cords, and thereby supporting the two sashes **15, 16**, are mounted on stub axles **59** so as to be freely rotatable thereon, and spacers **60** are provided to hold the pulley wheels in correct lateral positions relative to the jambs **11, 12**. Each axle **59** is securely fastened to a plate **61** so as to extend substantially horizontally when the plate **61** is vertical and above each pulley wheel **58** is an arcuate plate **62** shielding the top of the pulley wheel and operative to prevent the sash cord **39***a* becoming inadvertently detached from its pulley wheel. Each of the plates **61** is recessed at **63** in its opposite ends and it has a series of slots **64** for the reception of fastening screws **65**. It is apparent that the vertical location of each pulley wheel relative to the jamb **11** or **12** may be adjusted to make due compensation for any increase in length of the sash cords **39***a*.

It is to be noted that the guideways **21, 22** and **29, 30** do not extend up to the head **14**, and neither do the wearing members **23, 24**, but there is a sufficient space above the upper ends of the guideways and the wearing members for the plates **61** to fit. The pulley wheel mountings may be readily fitted in position, and readily removed whenever it is found to be necessary.

What we claim is:

1. In a window structure; two opposed jambs, a sash guideway mounted on each jamb, a sash member slidably engaging said guideways, at least one of said guideways being resiliently mounted and urged to a position away from its supporting jamb for releasable engagement with said sash, and means to reciprocate the sash within said guideways including a block carried within a guideway between the sash and such guideway for longitudinal movement therealong, counterbalancing means supported on a jamb adjacent said last-mentioned guideway and operatively connected to said block for movement therewith along such guideway said block having a camming surface disposed above a stop member, such surface and stop member being directed toward the sash, and plunger means carried by the sash axially reciprocated by such camming surface and normally bearing against said block between such camming surface and stop means releasably to connect the sash to said reciprocating means.

2. A window structure comprising in combination: two opposed opposed jambs, a first sash guideway fixed to one jamb, a second sash guideway mounted for movement toward and away from the other jamb, a sash engaging said guideways for vertical movement therealong, resilient means disposed between said second sash guideway and said other jamb resiliently urging the guideway against said sash whereby compression of the second guideway against its jamb permits removal and insertion of the sash between said guideways, and means to reciprocate the sash within the guideways including a block carried within each guideway between the sash and guideway, counterbalancing means supported on each jamb adjacent said guideways and having cord means connected to each block for movement therewith along such guideways each block having a camming surface disposed above a ledge to define therebetween a bearing area, such camming surface and ledge being directed toward the sash, and resiliently mounted plunger means carried by the sash for engagement with each of said blocks, said plunger means being axially depressed by the camming surface of a block and normally engaging said bearing area releasably to connect the sash to said reciprocating means.

3. In a window structure the combination defined in claim 2 wherein each sash guideway is of channel-shape in horizontal cross-section and it has on its inner sides inwardly projecting ribs adapted to engage with the sash-supporting block mounted in it so as to hold said block against lateral sideways movement while permitting such longitudinal movement.

4. In a window structure the combination defined in claim 2 and including a window head and a sill member, wherein the upper ends of the sash guideways are spaced from the underside of the window head and said counterbalancing means includes pulley wheel mountings fastened to the opposed jambs between the upper ends of the sash guideways and the underside of the window head, the pulley wheel mountings including pulley wheels supporting the sash cords.

5. A window structure comprising in combination: two opposed jambs, a first sash guideway fixed to one jamb, a second sash guideway mounted for movement toward and away from the other jamb, a sash engaging the guideways for vertical movement therealong, resilient means disposed between said second sash guideway and said other jamb resiliently urging the guideway against said sash whereby compression of the second guideway against its

jamb permits removal and insertion of the sash between said guideways, each guideway having a wearing strip of substantially channel shape in horizontal cross-section provided with inwardly projecting ribs extending vertically for substantially the full length of the guideway, a sash-supporting block mounted for vertical sliding movement in each guideway, counterbalancing means supported on each jamb adjacent said guideways, each counterbalancing means having cord means connected to a block for movement therewith along its guideway each block having a camming surface disposed above a ledge to define therebetween a bearing area, such camming surface and ledge being directed toward the sash, and a plunger resiliently mounted in each side of the sash for engagement with each of said blocks, said plungers being axially depressed by the camming surface of a block and normally engaging said bearing area releasably to connect the sash to said reciprocating means.

6. A double-hung window structure comprising in combination: two opposed jambs, a first sash guideway fixed to one jamb, a second sash guideway mounted for movement toward and away from the other jamb, a first sash engaging such first and second guideways for vertical movement therealong, resilient means disposed between said second sash guideway and said other jamb resiliently urging the guideway against said sash whereby compression of the second guideway against its jamb permits removal and insertion of the sash between said guideways, additional sash guideways carried by said jambs identical to said first and second guideways, respectively, but spaced laterally therefrom on said jambs, a second sash disposed within said additional guideways, each of said guideways having a wearing strip of substantially channel shape in horizontal cross-section provided with inwardly projecting ribs extending vertically for substantially the full length of each guideway, a sash-supporting block mounted for vertical sliding movement in each guideway, each block having a camming surface disposed above a ledge to define therebetween a bearing area, such camming surface and ledge being directed toward a side of a sash disposed within the accompanying guideway, each sash-supporting block having vertical grooves in its opposite sides for engagement by said vertical ribs of the wearing strips, the lower sides of each sash having a recess, a plunger resiliently mounted in each side of each sash at the recess for engagement with each of said blocks, said plunger being axially depressed by the camming surface of a block and normally engaging a bearing area of a block releasably to connect the sash to said block, pulley wheels mounted for rotation on each jamb adjacent the top thereof, and sash cord means trained over each pulley and connecting the blocks of adjacent guideways, whereby raising one of said sashes lowers the other and vice versa.

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