

March 31, 1959

H. K. LUNDGREN
WINDOW SASH MOUNTING

2,879,559

Filed Aug. 26, 1956

2 Sheets-Sheet 1

Fig. 1

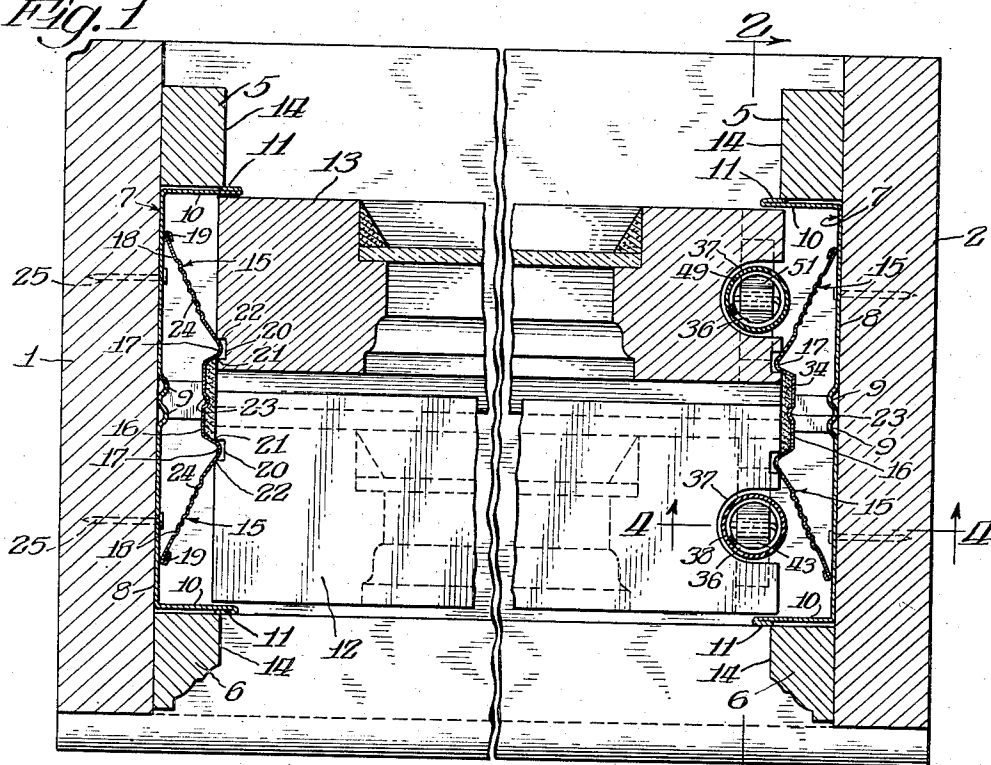


Fig. 2

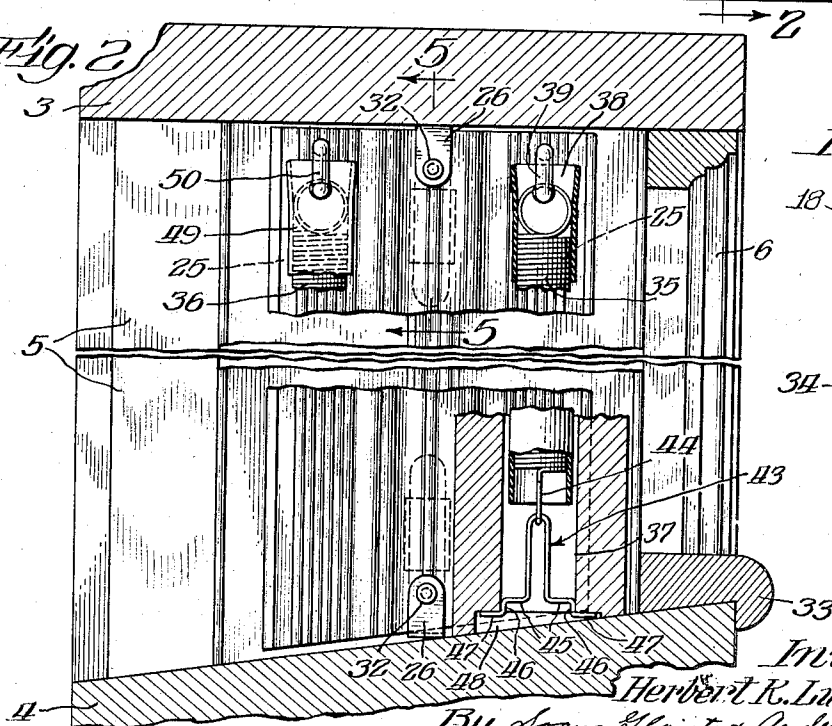
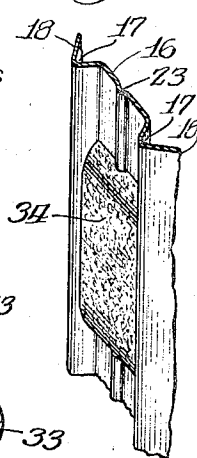


Fig. 3



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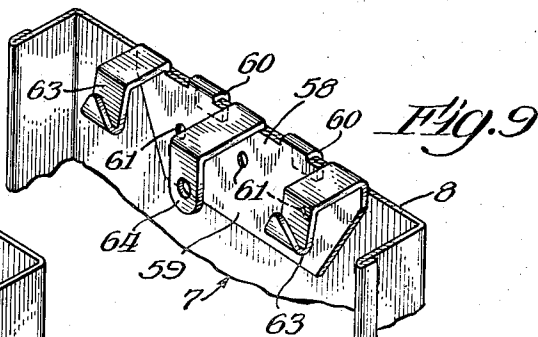
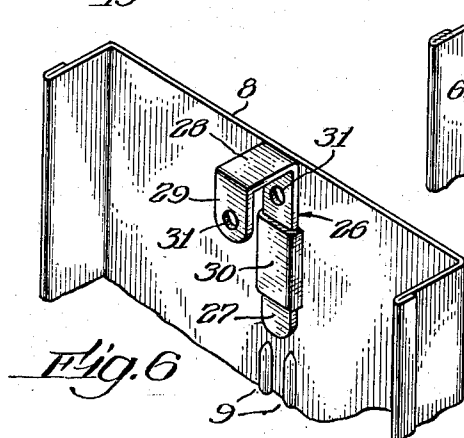
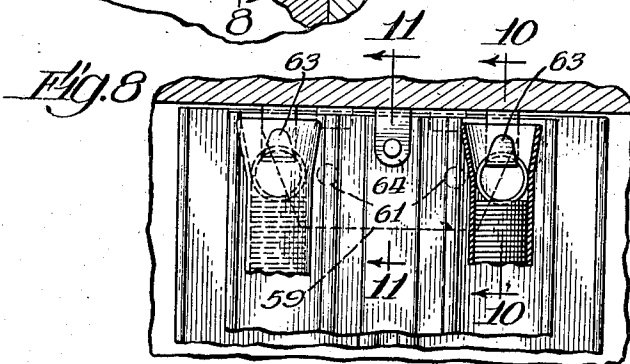
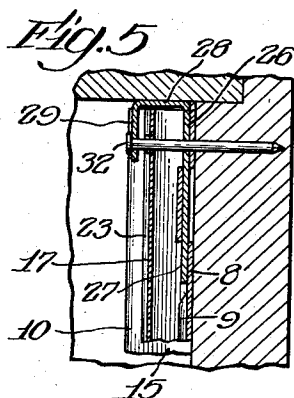
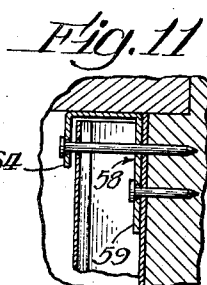
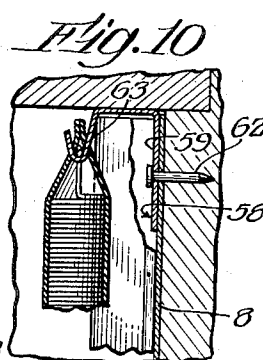
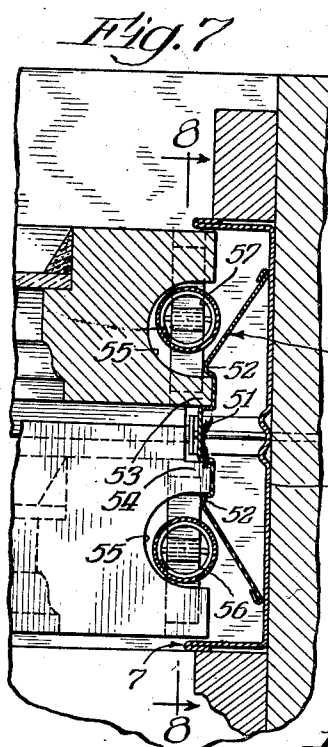
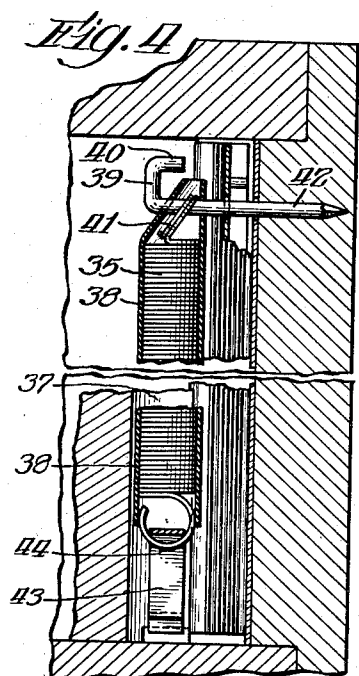
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1

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WINDOW SASH MOUNTING

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5 Claims. (Cl. 20—52.2)

This invention relates to improvements in window sash mounting and it has particular reference to an improved combination weather stripping and removable sash mounting arrangement for vertically slidable double hung sash windows.

The main objects of the invention are to provide a very simple but nevertheless very effective combination weather stripping and removable mounting for double hung vertically slidable sashes; to provide such a weather stripping and mounting arrangement which may be incorporated in standard window frame constructions without significant change in the frame construction; to provide such a mounting which may have associated therewith, an effective sash counterbalancing arrangement; to provide a combination weather stripping, removable mounting and counterbalancing structure which may easily be applied to existing or old windows; and in general, it is the object of the invention to provide an efficient, simple, durable and low cost combination weather stripping, removable mounting and sash balancing structure of the character indicated.

Other objects and advantages of the invention will be understood by reference to the following specification and accompanying drawings (2 sheets) wherein there is described and illustrated a sash mounting arrangement embodying a selected form of the invention together with certain modifications of the same.

In the drawings:

Fig. 1 is a plan section through a double hung window structure, the plane of the section being through the upper sash and above the upper rail of the lower sash;

Fig. 2 is a vertical section on the line 2—2 of Fig. 1, certain parts being broken away to condense the figure;

Fig. 3 is a perspective illustration of a detail;

Fig. 4 is a vertical section on the line 4—4 of Fig. 1;

Fig. 5 is a vertical section on the line 5—5 of Fig. 2;

Fig. 6 is a perspective illustration of another detail;

Fig. 7 is a section in a horizontal plane and is similar to a portion of Fig. 1 but illustrates a modification;

Fig. 8 is a section on the line 8—8 of Fig. 7;

Fig. 9 is a perspective which illustrates another detail employed in the construction shown in Fig. 8; and,

Figs. 10 and 11 are sections on the lines 10—10 and 11—11 respectively of Fig. 8.

The window structure illustrated in the drawings comprises a standard or conventional window frame which embodies opposite sides 1 and 2, a top cross member 3 and a bottom member or sill 4 which has its top surface inclined downwardly and outwardly for water drainage. Outer or blind stops 5 and inner or trim stops 6 are secured to the frame sides 1 and 2.

Sheet metal channels or pans 7 of suitable non-corrosive metal, for example aluminum, are employed to line the recesses or guideways formed between the pairs of stops 5 and 6 and by the inner faces of the frame sides 1 and 2. These pans 7 preferably have their bottom walls 8 provided with a pair of centrally disposed stiffening ribs

2

9 and they have side flanges 10 which are preferably made somewhat wider or deeper than the corresponding dimension of the stops 5 and 6 so as to thereby deepen the recess in which marginal side portions of the sashes are received. These side flanges preferably have their free edges strengthened by outwardly rebent margins 11. In this instance, the rebent margins 11 are illustrated as being of such width that they overlap the respectively adjacent stops 5 and 6. However, these rebent margins may be narrow enough to be disposed entirely beyond the inner faces of the stops and the side walls 10 of the pan may then be caused to lie against the respectively adjacent edge faces of the stops 5 and 6.

Inner and outer or lower and upper sashes 12 and 13 respectively are provided with a width which is such that when the sashes are in proper place in the frame, marginal side portions thereof will enter into both of the pans 7 to a predetermined extent approximately as shown in Figure 1. It will be observed that in the illustrated instance, the sashes extend sideways only slightly beyond the inner faces 14 of the said stops 5 and 6 and that the side walls 10 of the pan serve, in effect, to deepen the guideway in order to receive side portions of substantial width. If desired, the thickness of the stops 5 and 6 may be even less than that shown since they are not directly relied upon for weather sealing effect or even for sash guiding effect. The use of stops is, however, desirable to conform to accepted practice and to protect and back up the flanges 10 of the pans.

Spring plates 15 are interposed between the bottoms 3 of the pans and the respectively adjacent edges of the sashes 12 and 13. These may be of aluminum, bronze, or other material and each spring plate comprises a central web portion 16 which substantially parallel the planes of the side edges of the sashes, relatively narrow, inwardly projecting rib formations 17 of the edges of said web portion, and wing portions 18 which extend angularly outwardly from said ribs 17 into bearing engagement with the pan bottoms 8. The ribs 17 are generally V-shaped and integrally connect the central web portion 16 of the spring plate to the respective wing portions 18 thereof and these spring plates are so formed that when they are in place between the sash edges and the bottoms of the pans 7 they will be stressed so that the ribs 17 bear firmly against the respectively adjacent sash edges, and so that the free edge portions of the wings 18 bear firmly against the bottoms of the respective pans. The said free edges of the wings are preferably strengthened by rebent margins 19 as illustrated.

The side edges of the sashes are preferably provided with recesses or grooves 20 which receive said ribs 17. These grooves 20 may be cut to conform in cross section to the cross sectional shape of the ribs 17 but practical considerations indicate that it is preferable that the grooves 20 be cut in the simple rectangular form shown or otherwise so as to provide spaced lines 21 and 22 of contact between each rib 17 and the sash which it engages. This latter arrangement provides excellent draft proof contact between each of the ribs 20 of the spring plates 15 and each of the side edges of the associated groove 20 in the respective sashes. Thus there is provided a double seal between each rib 17 and its associated sash. The bearing of the wings 18 adjacent their free edges 19 on the bottom 8 of the pan serves to provide draft proof engagement between the spring plates and the pan bottom 8 so that the flow of air around the edges of the sashes is effectively prevented.

The central web 16 of the spring plate is preferably provided with a centrally disposed vertically extending rib 23 which stiffens said web portion of the spring plate and which also serves as a guide for a workman by which

to position the spring plate in the pan 7, wherein the ribs 9 also provide a cooperating centering guide. The wings 18 of the spring plate are also preferably formed with ribs 24 as shown for strengthening purposes.

The pans 7 may be fixedly anchored in place against the sides of the window frame, for example by pairs of nails such as indicated at 25 (Fig. 1) adjacent the upper end of the pan or a few such nails may be driven through the central rib 9 in the pan bottom at selected points along the length thereof for holding the pan in place. The spring plate 15 may be held in place in any manner which will permit the plate to flex toward and from the adjacent pan bottom. One such means comprises the provision at both top and bottom of the structure of an anchoring clip 26. As shown in Figures 5 and 6, such anchoring clips may be of J-shaped form having a long leg 27, a bottom member 28 and a short leg 29. The long leg 27 of the clip may be positioned in a loop 30 punched inwardly from the bottom 8 of the pan so that said leg 27 is merely slid into said loop whereby the clip is held against portions of the bottom 8 beyond the ends of said loop 30. The pans and the pressure plates extend substantially the full length of the window frame sides so that the upper and lower end portions of said spring plates may be positioned between the legs 27 and 29 of the clips 26 as shown in Figure 5. The legs of the clip are provided with aligned holes 31 and the ends of the spring plates may be provided with similar holes so that nails such as indicated at 32 (Figs. 2 and 5) may be driven through the aligned holes and into the frame sides to thereby further anchor the pans at their upper and lower ends, to position the clips 26 and to limit sidewise shifting of the respective spring plates without restricting flattening and expansion thereof between the sash edges and the frame sides.

By inspection of Figure 1 it will be observed that the sashes may be inserted in the frame after the spring plates are in position, it being merely necessary to insert first the outer or upper sash 13 by placing one of its side edges in operative relation to its guide rib 17 of the spring plate, then moving said sash edge into the pan 7 and swinging the sash outwardly about said operatively related sash edge and guide rib to move the other side edge of the sash past the inner side wall 10 of the opposite pan and into operative relationship to the outer rib 17 of the adjacent spring plate. The spring plate adjacent the first positioned edge is at least partially collapsed by pressure applied through the sash, to permit said swinging movement of the sash to operative position, and the opposite spring plate may also be flexed towards the adjacent pan bottom 8 to aid in attaining the desired slidably mounted position of the sash in which it is guided for vertical movement primarily by the opposite spring plate ribs 17. The fit of the sash 13 with reference to the outer side flanges 10 of the pans is preferably such that there will be no significant friction between the outside of the sash 13 and said pan sides 10. The fit should, however, be reasonably close in order to restrict if not prevent the passage of rain and wind between said pan sides and the adjacent portions of the sash into the pan.

The inner or lower sash may be similarly inserted into place and removal of the sashes is effected by reverse procedure. When the sashes are inserted or removed, they are, of course, positioned at a suitable point intermediate the top and bottom of the frame so as to avoid interference from the top trim strip and from the window sill 33. To prevent leakage between the central web portions 16 and the meeting rail portions of the sashes, suitable pads 34 of compressible felt or other material may be secured to the said central web portions in the area opposite the ends of said meeting rails when the sashes are closed. This sealing material 34 should be soft enough to yield to the pressure of the ends of the meeting rails without effecting outward displacement of the spring plates when the sashes are in closed position and the

meeting rails in engagement with each other. If preferred, soft spring metal sealing members may be employed instead of said pads 34. Also, the need for such pads may be eliminated by making the sash edges and the central web portion 16 and said ribs 17 in such matching form and of such related proportions that the web 16 will lie flat against the sash edges when the ribs 17 are in guiding engagement with the sashes. This requires more care to insure a proper interfitting relationship between said central web portion and the sash edges and is for that reason less preferred than the illustrated arrangement. In such an arrangement the rib 23 would preferably be pressed outwardly instead of inwardly as shown and this reversed rib structure may be employed in the illustrated arrangement, the purpose of the rib being served whether it projects inwardly or outwardly.

For small sizes of sashes, the described spring plate removable sash mounting arrangement also provides sufficient frictional engagement with the side edges of the sashes to hold them in any selected position of vertical adjustment intermediate the top and bottom of the frame. For larger sizes of sashes suitable additional counterbalancing means may be provided. One suitable counterbalancing means comprises stretchable coil springs 35 and 36 associated respectively with the inner and outer sashes 12 and 13, said springs being positioned in recesses or grooves 37 provided in the edges of the sashes at one side thereof. For most purposes, it is sufficient to provide spring counterbalancing means of the character being described at one side only of the sashes, although they may be provided at both sides if desired.

The spring 35 for the inner sash is preferably enclosed in a sheath or tube 38 of flexible vinyl or other tough plastic material. This tube may be of any selected color, for example aluminum colored to more or less match the color of an aluminum spring plate 15 and aluminum pan 7. The upper end of the spring 35 together with the upper end portion of the covering tube 38 are hooked on a supporting hook 39 which is driven into the adjacent side member of the window frame through holes provided for that purpose in the upper ends of the spring plate and pan as shown in Figure 4. The hooks 39 preferably include rebent free end portions 40 which overlie the eye loop 41 of the spring which is suspended from the main stem 42 of the hook so as to prevent accidental disengagement of the spring eye from the hook in the event that quick upward movement of the sash tends to throw the spring upwardly. The lower end of the spring is anchored to the lower edge of the sash in any suitable manner.

A preferred arrangement for anchoring the lower end of the spring to the lower edge of the sash is the anchoring clip 43 (Figures 2 and 4) whereby the spring is detachably connected to the sash. This anchoring clip comprises an inverted U-shaped upper portion which receives the lower end eye or loop 44 of the spring, oppositely horizontally extending leg portions 45, depending side portions 46 and oppositely outwardly extending free end portions 47. The legs 45 are preferably of such length that the side portions 46 will engage the opposite walls of the groove 37 so as to position said upper portion substantially centrally of the groove. The free end portions 47 of the clip engage the bottom of the sash which may be slightly recessed as indicated at 48 from the normally angularly disposed plane of the bottom edge of the sash so as to receive said legs in horizontal positions as illustrated in Figure 2. It will be seen that the anchoring member 43 may be made of sufficiently springy metal and so constructed that when its shoulders 46 are positioned against the opposite sides of the groove 37, the bottom of the eye portion will be more or less closed and the clip held frictionally in place incident to the tendency of the legs of the eye portion of the clip to expand to initial open relationship. Also, the clip 43 may have its legs made of unequal lengths so that the end portions will

5

underlie the angular bottom edge of the sash so as to avoid the recessing indicated at 48.

The counterbalancing spring 36 for the upper sash may be similarly enclosed in a sheath 48 and suspended from a hook 50 (Fig. 2) similar to the hook 39. The lower end of said spring may be detachably connected to the bottom rail of said upper sash by means of an anchoring clip 51 (Figure 1) which is similar to the clip 43 already described.

The plastic material sheaths 38 and 49 serve at least two important functions, namely improvement of appearance by concealing the turns of the springs, and the elimination of noise incident to the movement of the spring turns against the wall of the recess in the sashes as the springs are stretched or contracted during lowering and raising of the sashes. To further aid in eliminating noise, the outside surfaces of the springs may be coated with suitable non-metallic material, fiber flocking being one suitable material. When the lower sash is closed, its counterbalancing spring 35, in the absence of the sheath 38, would be exposed to view between the top rail of the sash and the suspending hook 39; the sheath 38 serves, however, to conceal most if not all of the spring and provides much better appearance. As a practical matter, the sheath 38 is usually terminated about an inch above the upper edge of the lower sash. In respect of the upper sash, the spring is normally concealed when the sash is in its up or closed position, but when the sash is adjusted downwardly some of the spring would become visible between its suspending hook 50 and the top edge of the sash. The sheath 49 serves to conceal the spring 36 when the upper sash is lowered and it is preferable that the sheath 49 cover most of the length of the spring which will be exposed when the upper sash is moved downwardly to its lowermost position.

In Figure 7 there is illustrated a modified arrangement in which a spring plate 15a is provided with a central parting stop formation 51 which cooperates with spaced ribs 52 to embrace portions 53 and 54 respectively of the outer and inner sashes. Said sashes are guided for vertical movement by the fitting relationship of said sash portions 53 and 54 between the respectively adjacent sides of the parting stop formation 51 and said ribs 52. The sash portions 53 and 54 are provided as an incident to the formation of recesses 55 in the side edges of the sashes to receive counterbalancing springs 56 and 57 which are associated with the window frame and with the respective sashes in substantially the same way that the springs 35 and 36 are associated with the sashes 12 and 13 in Figures 1 and 2. The spring plate 15a normally yieldingly bears against the adjacent edge portions of the sashes and against the bottom 8 of the pan 7 which is of the same construction as shown in Figure 1.

Instead of employing spring suspending hooks like the hooks 39 (Figure 4) and spring plate positioning means like the clips 26 (Figure 6) there may be employed a fixture 58 such as shown in Figure 9. This fixture is a sheet metal stamping which embodies a base plate 59 provided with a pair of rebent ears 60 which will be adapted to hook over the upper edge of the back wall 8 of the pan 7 to thereby support the fixture from the upper end of the pan. The base plate is provided with a pair of openings 61 through which suitable fastenings 62 (Figure 10) may be driven to anchor the upper end portion of the pan and to position the fixture 58 centrally thereof. The fixture 58 is also provided with suitable hook formations 63 which are located in axial alignment with the normal positions of the counterbalancing springs and on which the upper ends of the springs and the upper ends of their sheaths may be hooked as shown in Figures 8 and 10. The fixture is also provided with a spring plate retaining part 64 which is operative to serve the same function as the clip 26 of Figure 6. The spring plate retaining member 64 may be provided with an opening in registry with a similar

6

opening in the base plate 59 for receiving a fastening nail like the nail 32 of Figure 5 (see also Figure 11).

When the structure includes counterbalancing springs at one side as shown in Figure 1, the preferable method for removing the sashes is to force the sashes and the counterbalancing springs toward the adjacent frame side until the other side of the sashes can be swung inwardly clear of the frame. After so swinging the sash inwardly of the frame opening, it is manipulated to permit the spring to contract to unstretched condition whereupon the lower end of the sash may be disengaged from the anchoring clip 43 to permit removal of the sash free of the spring which remains anchored at its upper end to the supporting element.

In some instances where extra heavy sashes are used, counterbalancing springs may be employed at both sides of the sashes. For removing a sash in such a case, the preferable method is to unhook the counterbalancing spring and its sheath from the supporting hook at the top of one side of the frame so that the spring at that side may move readily with the sash. The unhooked upper end of the spring is suitably held to the sash, or the spring may be permitted to drop down through the recess in the sash edge, after which removal is effected as described for a sash which is spring counterbalanced at one side only.

The spring plates 15, if damaged, may easily be replaced. To withdraw one of these spring plates, the fastening means such as the nail 32 (Figures 2 and 5) is withdrawn from both the upper and lower positioning members 26. The spring plate is then free to shift edgewise. The wing 24 adjacent the outside of the window frame is then pried up so that it may be passed over the outer flange 11 of the guideway lining and the spring is then pulled edgewise outwardly until it is completely removed from the guideway. Outward movement of the spring plate is freely permitted by the downward and outward angle of the sill 4 of the window frame. A replacement spring plate may be inserted by reverse procedure and locked in place by returning the fastening means 32 to place. The spring plate being the active portion of the mounting and being supported in spaced relation to the guideway may at times be damaged by caretakers so that its easy replacement is a very desirable feature. The guideway lining tray or channel 7 being backed up or supported by the frame side and the stops 5 and 6 is much less subjected to damage, but even if it should be damaged, its removal and replacement is also very easy to accomplish since it is held in place only by a few nails or similar fastenings which may easily be removed.

Various changes in the described structure may be made while employing the principles thereof.

I claim:

1. The combination in a double hung window structure of a window frame, an inner and an outer sash removably mounted for vertical slidable movement between the sides of said frame, and means on at least one side of said frame for guiding the vertical movement of said sashes and for permitting the removal of said sashes from said frame, said means comprising a spring plate extending vertically along one side of said frame for substantially the entire length of the window opening, said sashes including along the side edges thereof a recess for cooperation with said spring plate for guiding the travel of said sashes, said plate including a central longitudinal web portion having a rib formation adjacent each of the longitudinal edges of said central web portion, said ribs projecting inward of the respective adjacent sash recess, and a wing extending outwardly and rearwardly from each of the ribs into engagement with said adjacent frame side at a position inwardly of the outer edges thereof, said wings being of such width as to yieldingly support said central web portion in slideable contact with said sashes in spaced relation to said adjacent frame side to thereby guide the vertical movement of said sashes and to permit flexing of said wings so as to

provide movement of said central web portion normal to said adjacent frame side to allow disengagement of said sashes from said frame.

2. The combination in a double hung window structure of a window frame, an inner and an outer sash removably mounted for vertical slidable movement in recesses in opposite sides of said frame, and means on at least one side of said frame for guiding the vertical movement of said sashes and for permitting the removal of said sashes from said frame, said means comprising a pan secured to said one side of the frame and extending substantially the entire length of the sash receiving recess therein, said pan having a bottom wall of a width which substantially corresponds to the width of said recess, and having side wall flanges which extend into overlying relationship respectively to marginal side portions of the inner face of the inner sash and of the outer face of the outer sash, and a spring plate extending longitudinally of said pan for substantially the entire length thereof, said sashes each including along the side edge thereof a recess for cooperation with said spring plate in guiding the travel of said sashes, said plate including a central longitudinal web portion having a rib formation adjacent each of the longitudinal edges of said central web portion, said ribs projecting inwardly of the respective adjacent sash recess, and a wing extending outwardly and rearwardly from each of the ribs into engagement with said pan bottom at a position inwardly of said wall flanges thereof, said wings being of such width as to yieldingly support said central web portion in slidable contact with said sashes in spaced relation to said adjacent pan bottom to thereby guide the vertical movement of said sashes while permitting the flexing of said wings so as to provide movement of said central web portion normal to said adjacent pan bottom to allow disengagement of said sashes from said frame.

3. The combination in a double hung window structure of a window frame, an inner and an outer sash removably mounted for vertical slidable movement between the sides of said frame, and means on at least one side of said frame for guiding the vertical movement of said sashes and for permitting the removal of said sashes from said frame, said means comprising a spring plate extending vertically along one side of said frame for substantially the entire length of the window opening, said sashes each including along the side edge thereof a recess for cooperation with said spring plate in guiding the travel of said sashes, said plate including a central longitudinal web portion having a raised longitudinal section centrally thereof and a rib formation adjacent each of the longitudinal edges of said central web portion, said raised section being formed with opposed sides generally perpendicular to said web portion to thereby provide a parting stop between said sashes, said ribs projecting inward of the respective adjacent sash recess, and a wing extending outwardly and rearwardly from each of the ribs into engagement with said adjacent frame side at a position inwardly of the outer edges thereof, said wings being of such width as to yieldingly support said central web portion in slidable contact with said sashes in spaced relation to said adjacent frame side to thereby guide the vertical movement of said sashes between one of said ribs and the adjacent side of said raised section while permitting the flexing of said wings so as to provide movement of said central web portion normal to said adjacent frame side to allow disengagement of said sashes from said frame.

4. The combination in a double hung window structure of a window frame, an inner and an outer sash removably mounted for vertical slidable movement between the sides of said frame, and means on at least one side of said frame for guiding the vertical movement of said sashes and for permitting the removal of said sashes from said frame, said means comprising

a spring plate extending vertically along one side of said frame for substantially the entire length of the window openings, said sashes including along the side edges thereof polygonal shaped recesses for cooperation with said spring plate in guiding the travel of said sashes, said plate including a central longitudinal web portion having a rib formation adjacent each of the longitudinal edges of said central web portion, said ribs being generally V-shaped and proportioned to extend only partially into said polygonal grooves, and a wing extending outwardly and rearwardly from each of the ribs into engagement with said adjacent frame side at a position inwardly of the outer edges thereof, said wings being of such width as to yieldingly support said rib formations within said polygonal grooves to thereby provide slidable contact along the outer two edges of said grooves with the associated rib to obtain a double weather stripping seal between said sashes and said spring plate and to guide the vertical movement of said sashes, and said wing width also permitting flexing of said wings to allow movement of said central web portion normal to said adjacent frame side to provide for disengagement of said sashes from said frame.

5. In a double hung window structure having a frame, an inner and an outer sash provided with recesses along their side edges and removably mounted for vertical slidable movement between the sides of the frame, and counterbalancing means comprising extensible coil springs located in the sash recesses which are respectively detachably secured to an upper portion of said frame and to the bottom of each of the sashes, the improvement comprising means along one side of the frame for guiding the vertical movement of the sashes and for permitting the removal of the sashes from the frame, said means including a pan and a spring plate, said pan extending substantially the entire length of the sash receiving frame side and having a bottom wall of a width which substantially corresponds to the width of the space occupied by the sashes and having parallel side wall flanges which extend into overlying relationship respectively with an inner face portion of the inner sash and with an outer face portion of the outer sash, said spring plate extending longitudinally of said pan for substantially the entire length thereof and embodying a central longitudinal web portion having a pair of integral ribs, adjacent respective longitudinal side edges of said central web portion and which project inward of the respective recesses provided in the sash, and a pair of wing members each of which extends outwardly and rearwardly from one of said ribs into engagement with the bottom of said pan at a position inwardly of said wall flanges thereof, said wings being of such width and being disposed so as to yieldingly support said central web portion in slidable contact with the sashes in spaced relation to said bottom of said pan to thereby maintain the sashes within said pan wall flanges, provide for clearance for the counterbalancing springs, and to guide the vertical movement of the sashes, and said wing width also permitting flexing of said wings outward along said pan bottom toward said wall flanges so as to provide movement of said central web portion normal to said pan bottom to allow disengagement of the sashes from the frame.

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