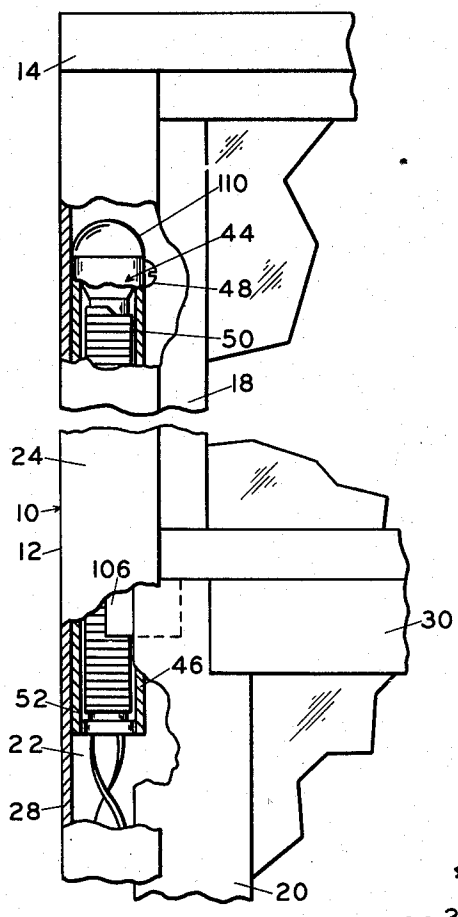
Sept. 13, 1960 D. C. GRAHAM 2,952,048

BALANCED REMOVABLE WINDOW SASH

Filed May 26, 1959 2 Sheets-Sheet 1



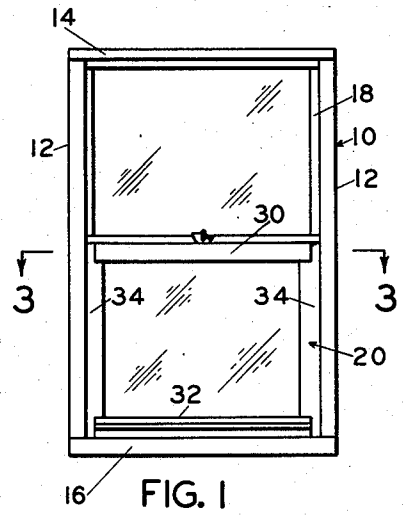


FIG. 1

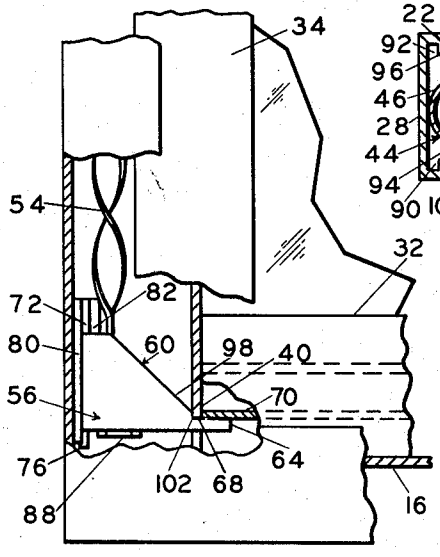


FIG. 2

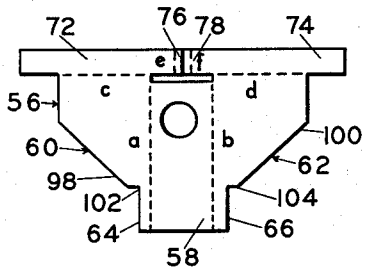


FIG. 7

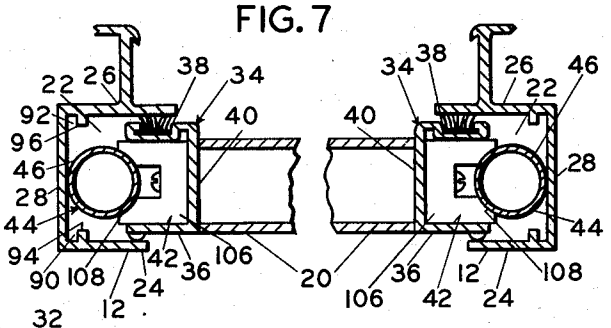


FIG. 3

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BALANCED REMOVABLE WINDOW SASH

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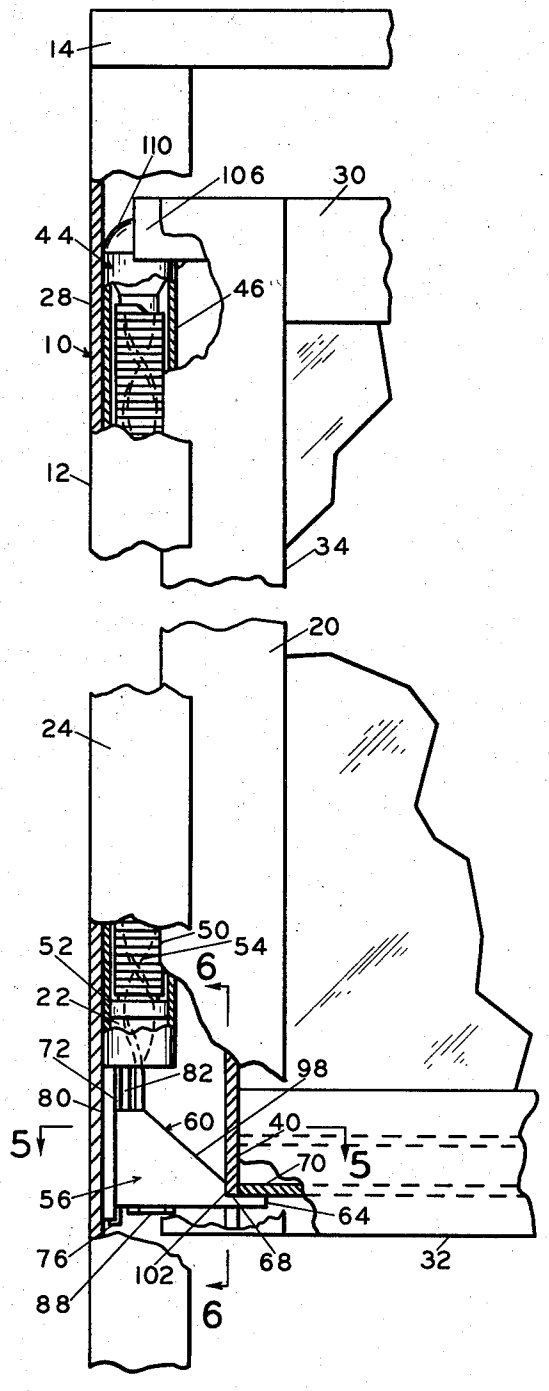


FIG. 4

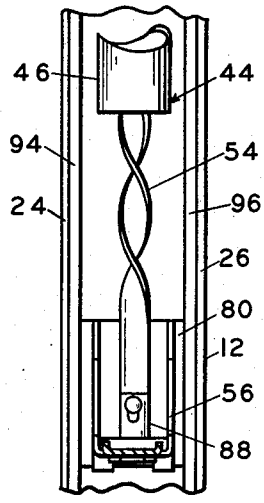


FIG. 6

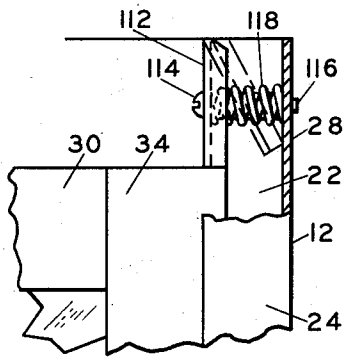


FIG. 8

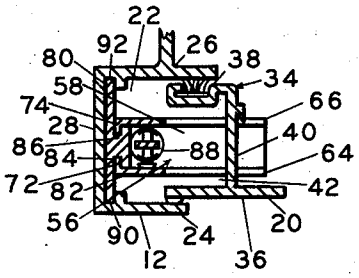


FIG. 5

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2,952,048

BALANCED REMOVABLE WINDOW SASH

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Filed May 26, 1959, Ser. No. 815,853

8 Claims. (Cl. 20—52.2)

This invention relates to improvements in window sash mounting and more particularly to a removable sash mounting arrangement for a balanced vertically slidable window sash.

In order to facilitate raising of a window sash and retaining it in desired raised position, it is customary to provide along the jambs of the window frame and the adjacent side rails of the sash, a sash balancing means preferably of the spring loaded type anchored at its upper end to an upper portion of the window frame jamb and secured at its lower end to the lower end of the sash. Removable sash are commonly held in laterally positioned place in frame jamb guides by laterally yieldable means disposed between one or both of said jambs and the adjacent rail of the sash, so that when a sash is to be removed it is forced in one direction laterally against the yieldable means to permit the opposite side of the window sash to be removed from engagement with the frame guide at that side.

In removing a sash from the window frame, for the purpose of washing the outside of the pane or for any other purpose, and in re-inserting the sash, inconvenience and awkwardness has been previously experienced in uncoupling and coupling the sash from the sash balance. It is an object of my invention to provide a removable balanced vertically slidable window sash arrangement facilitating removal and insertion of the sash, and more particularly to provide for such removal and insertion of the sash without the necessity of manually releasing or engaging coupling means between the sash and the balancing means.

Another object is to provide sash balancing means for a vertically slidable removable window sash incorporating guide support means for restraining lateral movement of the sash in the guides of the frame jambs in all positions of its vertical movement except for one position in which the sash is laterally movable for removing or inserting the sash from the frame.

The invention contemplates a construction and arrangement of elements whereby the above is accomplished through the use of a shoe attached to the bottom of a sash balance, the shoe being guided in a track in the frame jamb and restraining lateral movement of the sash as well as supporting the sash in the vertical plane.

The sash balance is positioned in the jamb so that the shoe will come to rest on the bottom of the balance casing when the sash has been raised to approximately one inch of its fully raised position. Upon further raising of the sash, it is lifted off the shoe rendering its lateral restraint of the sash ineffective, to permit manipulation of the sash to either side for removal thereof from the window frame. Lateral guide means is also preferably provided at the upper end of the sash which is guided along the balance casing and is adapted to run off the top of the balance casing at the same time that the shoe engages the bottom of the casing, to permit lateral movement of the sash for removal thereof from the frame.

Another object is to provide a construction and arrangement of elements as set forth above, wherein the shoe and top guide are provided with camming surfaces to facilitate re-insertion of the sash to its guided position.

Other objects and advantages more or less ancillary to the foregoing and the manner in which all of the various objects are realized will appear in the following description, which considered in connection with the accompanying drawings, set forth the preferred embodiment of the invention.

In the drawings—

Figure 1 is an inside view in elevation of a window in which the invention is adapted to be embodied;

Figure 2 is an enlarged view in elevation of the left side of the window shown in Figure 1, with parts broken away to show the invention applied thereto;

Figure 3 is a partly broken sectional view taken on line 3—3 of Figure 1;

Figure 4 is a partly broken view of the upper portion of the construction shown in Figure 2, with the lower sash raised to a position where, upon further raising thereof it is disconnectible from the sash balance and removable from the window frame;

Figure 5 is a sectional view taken on line 5—5 of Figure 4;

Figure 6 is a sectional view taken on line 6—6 of Figure 4;

Figure 7 is a view of the blank from which the sash supporting shoe is fashioned; and

Figure 8 is a view of an optional stop member disposed in an upper corner of the window frame.

Referring now to the drawings, the particular embodiment of the invention disclosed for the purpose of illustration is shown in connection with a single hung window with removable sash. The construction includes a window frame, designated generally by the numeral 10, having jamb members 12, a header 14 and a sill 16, preferably in the form of aluminum extrusions, all secured together in any well known manner. Mounted in the frame 10 is an upper fixed sash 18 and a lower operating or vertically slidable sash 20.

The frame jamb members 12 in cross section, as best shown in Figure 3, provide vertical channels 22 for receiving the lower sash 20, the channels 22 being formed by the inner and outer side flanges 24 and 26 of the jamb members and the connecting base web 28.

The lower slidable sash 20 comprises a top rail 30, a bottom rail 32 and the styles 34, all of which are preferably in the form of aluminum extrusions secured together in well known manner. The styles 34 are of identical construction and, as best shown in Figure 3, include inner and outer side flanges 36 and 38 joined by a continuously extending web 40 to form laterally outwardly opening channels 42.

The sash 20 is disposed centrally between the frame jamb members 12, with the outer free edges of sash style flanges 36 and 38 in spaced relation with respect to the base webs 28 of the frame jamb members 12. The sash 20 is retained in such position against lateral displacement, by means to be described, throughout sliding movement from its lowermost position to within approximately one inch of its uppermost position. Upon further raising of the sash 20, it is laterally movable in the frame jamb channel 22, for example to the left, to free the sash style 34 at the right from its frame jamb channel, as hereinafter described, whereupon the sash can be swung inwardly about its left hand edge and removed.

In each of the jamb channels 22, between the jamb base web 28 and the sash style 34 is mounted a sash counterbalancing means 44 of any one of a number of well known types, preferably of the spring loaded type. One suitable counterbalancing means comprises a vertically extending sheath or tube 46 of aluminum or other

suitable stiff material, secured at its upper end by suitable means 48 preferably in contact with the jamb base web 28. The upper end of the tube 46 terminates short of the frame header 14 and the lower end thereof terminates approximately midway between the frame header 14 and the frame sill 16, the location of the terminal ends of the tube 46 and the purpose therefor being described hereinafter in detail.

Disposed in the tube 46 is an elongated ribbon torsion spring 50 which is securely anchored at its upper end in any suitable manner in the upper end portion of the tube 46. At its lower end, the spring 50 is securely anchored to a slotted member 52 which is rotatably mounted in the lower end portion of the tube 46. Threaded through the slotted member 52 is a spiral ribbon stem 54, to the lower end of which is attached a sash supporting shoe 56. With the stem 54 and shoe 56 fixed against rotation, as later explained, the unwinding of the torsion spring 50 turns the slotted member 52 and forcibly moves the stem 54 and shoe 56 in an upward direction. The spring 50 is wound to have a torsional force to approximately balance the weight of the sash 20 so that it can be raised with minimum manual effort and lowered without danger of its slamming shut of its own weight. As previously stated, other types of well known sash balancing means may be employed.

The shoe 56 has a rectangular planar horizontal base 58 and flanges 60 and 62 projecting upwardly from the marginal side edges thereof at right angles with respect to the plane of the base 58. The distance between the outer faces of the flanges 60 and 62 is somewhat less than the distance between the inside faces of the sash style flanges 36 and 38, as clearly shown in Figure 5, so that the inner end portion of the shoe 56 can extend into the channel 42 of the sash style 34. The inner end portons 64 and 66 of the flanges 60 and 62 are shallow in height with the upper edges parallel to the plane of the base 58, and provide a seat upon which the lower end of the sash 20 is adapted to rest. The flange portions 64, 66 provide greater rigidity for the seat than if the sash rested directly on the inner end of the base 58.

As before stated, the inner end portion of the shoe 56 extends between the sash style flanges 36 and 38 and, referring particularly to Figure 2, it will be noted that the lower end of the web 40 of the sash style 34 is recessed as at 68, with the flange portions 64, 66 underlying the recessed lower end of the web 40 and also underlying the web 70 of the sash bottom rail 32, whereby the sash is adequately supported.

The outer marginal edges of the shoe flanges 60 and 62 are provided with inturned flanges 72 and 74 extending in a direction toward each other, as best shown in Figures 5 and 6, the lower ends of which are formed with outwardly extending support tabs 76 and 78. A slide pad 80 resting on the support tabs 76 and 78 is secured in any suitable manner to the inturned flanges 72 and 74. As shown, the slide pad 80 has an integral appendage 82, T-shaped in cross section, forming slots 84 and 86 with the pad 80 for receiving the inturned flanges 72 and 74. The slide pad 80 and appendage 82 are preferably formed of "Teflon" or other suitable plastic having a low coefficient of friction, but if desired it may be made as an integral part of the shoe 56, the whole being formed of metal or plastic. It is preferred, however, to form the shoe 56 of a metal blank as shown in Figure 7, which is then bent along the broken lines *a, b, c, d, e* and *f* to form the shoe as described above, to which the slide pad 80 is attached in the manner described. A coupling 88, of any suitable construction, connects the lower end of the balance stem 54 with the base 58 of the shoe 56.

The marginal side edges of the slide pad 80 are arranged to slide vertically in grooves 90 and 92 formed by the frame jamb web 28 and the ribs 94 and 96 which extend inwardly toward each other from the inner faces of the jamb flanges 24 and 26, as best shown in Figures 3 and 5. Engagement of the slide pad 80 in the slide grooves 90 and 92 retains the shoe 56 in fixed position except for its vertically slidable movement, to provide a rigid support for the sash 20.

The shoe flanges 60 and 62, between the slide pad 80 and the sash seating shallow flange portions 64 and 66, are formed with inclined upper edges 98 and 100, forming camming surfaces for guiding the sash 20 to and from its normally seated position on the shoe 56, when removing or inserting the sash with respect to the frame 10, as hereinafter more fully explained. Shoulders 102 and 104 are formed at the adjacent edges of the inclined flange portions 98, 100 and the shallow sash seating flange portions 64, 66 against which shoulders the web 40 of the sash style 34 abuts, thereby normally preventing lateral movement of the sash 20 in the frame 10.

In order to restrain lateral movement of the upper end of the sash 20 and thereby prevent cocking and binding of the sash when manual force is applied more to one side than the other in raising or lowering the sash, a guide pad 106 is secured in the upper end of the sash style channel 42. The outer end of the guide pad 106, which is preferably made of "nylon" or "Teflon," though other materials may be employed, is provided with an arcuate recess 108 for sliding engagement with the tube 46 of the balancing means 44.

Assuming the sash 20 to be in its lowermost position, as shown in Figure 2, and it is desired to remove the sash, the operator pushes it upward. The shoe 56 through the torsion spring 50 of the balancing means 44, exerts a force against the lower end of the sash 20, being thereby maintained in engagement with the sash and assisting in effecting raising of the sash. The terminal lower end of the tube 46 is disposed so that it engages the upper outer end of the shoe 56 when the sash has been raised to within approximately one inch of its uppermost limit of travel, or to the position as shown in Figure 4. The terminal upper end of the tube 46 is disposed so that in this last referred to position of the sash, the guide pad 106 is almost disengaged from the tube 46. Now, upon pushing the sash upward a slight distance further, the lower end of the sash style web 40 clears the shoulders 102, 104 of the shoe, and the guide pad 106 clears the upper end of the tube 46. Then, upon further pushing the sash upward and laterally, to the left as viewed in Figure 4, the lower end of the sash style web 40 rides upwardly and outwardly along the inclined flange portions 98, 100 of the shoe 56 and the guide pad 106 rides upwardly and outwardly over the semi-spherical knob 110 in the upper end of the tube 46.

The lateral movement of the sash permits disengagement of its right hand style 34, as viewed in Figure 3, from the frame jamb 12 at that side, whereupon the right hand end of the sash can be swung inwardly into the room and then removed. Since, as previously noted, the arrangement and construction of parts is the same at both sides of the sash and frame, the sash can also be removed by moving it upwardly and laterally to the right.

By reversing the above procedure, the sash can be easily re-inserted. The camming surfaces of the semi-spherical knob 110 and the shoe flange portions 98, 100 guide the sash to its seated position on the seating flange portions 64, 66.

In Figure 8 is shown, a modification, wherein a positive stop plate 112 is disposed in one upper corner of the frame 10, to stop the sash 20 when it has been raised to the position shown in Figure 4, thus preventing accidental lateral displacement of the sash when it is desired merely to raise rather than remove the sash. When employing the positive stop plate 112, the sash is removable by manually depressing the stop plate 112 and then

raising the sash and moving it laterally in a direction away from the stop plate **112**.

The stop plate **112** is retained in the upper right hand corner of the frame **10**, as shown in Figure 8, by a shouldered screw **114** which extends loosely through the stop plate **112** and is secured by a rivnut **116** to the web **28** of the frame jamb member **12**. A spring **118** extending about the shouldered screw **114** between the stop plate **112** and the web **28** normally urges the stop plate **112** laterally in the path of the sash **20**, to stop the same when it has reached the position shown in Figure 4. By manually pressing against the lower portion of the stop plate **112** it is movable to the dotted line position of Figure 8, whereupon its lower end disengages the sash **20**, and the latter can be moved upwardly and to the left to remove the sash in the manner previously described.

Although I have disclosed an exemplary embodiment of my invention herein for the purposes of illustration, it will be understood that various changes, modifications and substitutions may be incorporated therein without necessarily departing from the spirit of the invention.

I claim:

1. A shoe adapted for attachment to a sash balance for supporting a sliding sash removably mounted in a window frame, said shoe having at one end a horizontal seat portion on which said sliding sash is adapted to seat, a pair of laterally spaced flanges extending rearwardly and upwardly from the side edges of said seat, a shoulder formed adjacent said seat and each of said flanges in rearward spaced relation with respect to the forward end of said seat, against which shoulder a lower side portion of said sash is adapted to abut to restrain lateral movement of said sash on said seat, said flanges having upper edge portions disposed at an oblique angle of inclination with respect to the plane of said seat and extending rearwardly from said shoulder providing a camming guide for laterally inserting or removing and guiding said sash to and from said seat, and vertically extending flanges extending outwardly from the vertical rearward edges of said laterally spaced flanges at right angles thereto, adapted to be received in vertical guideways of said window frame.

2. In a sliding sash window, a window frame having jambs, at least one of said jambs defining a U-shaped channel comprising an end wall and inwardly extending spaced side walls, a lower sash mounted for vertical slidable movement between said side walls between closed and open position and disposed in spaced relation with respect to said end wall for relative lateral movement within said channel with respect to said end wall, a sash balance disposed in said channel between said end wall and the adjacent side of said sash, a shoe carried by the lower end of said balance for vertical movement in said channel, said shoe having a laterally inwardly projecting portion in supporting engagement with said sash at its lower end and having abutment means restraining lateral movement of said sash when in supported engagement with said shoe, stop means in said channel disposed to arrest said shoe when said sash is raised to a point short of its fully open position, said sash upon being raised from said last named position being disengageable from said abutment means whereby said sash is movable laterally in said channel to disengage the opposite side of said sash from its jamb for removal of said sash from said frame.

3. A construction as defined in claim 2 wherein the side of said sash slidably received in said jamb is formed as a U-shaped channel, the open end of which faces said jamb and is arranged to receive said sash balance upon lateral movement of said sash in said window frame channel.

4. A construction as defined in claim 2 wherein the abutment of said shoe has a cam surface for laterally and vertically guiding said sash to and from its seated position on said shoe.

5. In a sliding sash window, a window frame having jambs, at least one of said jambs defining a U-shaped channel comprising an end wall and inwardly extending spaced side walls, a lower sash mounted for vertical slidable movement between said side walls between closed and open position and disposed in spaced relation with respect to said end wall for relative lateral movement within said channel with respect to said end wall, a spring loaded sash balance disposed in said channel between said end wall and the adjacent side of said sash, said balance being anchored at its upper end adjacent the upper end of said jamb, a shoe carried by the lower end of said balance, said shoe having a laterally inwardly projecting portion underlying the lower end of said sash for vertically supporting the same and having abutment means engaging a lower side portion of said sash restraining lateral movement of said sash, a vertically extending under-cut groove in said channel adjacent the end wall thereof, said shoe having tongue means slidably engaging said groove for movement of said shoe in a vertical direction in said channel, stop means in said channel disposed to arrest said shoe when said sash is raised to a point short of its fully open position, said sash upon being raised from said last named position being disengageable from said abutment means whereby said sash is movable laterally in said channel to disengage the opposite side of said sash from its jamb for removal of said sash from said frame.

6. In a sliding sash window, a window frame having jambs, at least one of said jambs defining a U-shaped channel comprising an end wall and inwardly extending spaced side walls, a lower sash mounted for vertical slidable movement between said side walls between closed and open position and disposed in spaced relation with respect to said end wall for relative lateral movement in said channel with respect to said end wall, a sash balance disposed in said channel between said end wall and the adjacent side of said sash, said sash balance comprising an elongated tube secured to said end wall, spring loaded balancing means in said tube anchored thereto at its upper end, a shoe carried by the lower end of said spring loaded balancing means for vertical movement in said channel, said shoe having a laterally inwardly projecting portion in supporting engagement with said sash at its lower end and having abutment means restraining lateral movement of said sash when in supported engagement with said shoe, the lower end of said tube forming a stop for said shoe disposed to arrest said shoe when said sash is raised to a point short of its fully open position, said sash upon being raised from said last named position being disengageable from said abutment means whereby said sash is movable laterally in said channel to disengage the opposite side of said sash from its jamb for removal of said sash from said frame.

7. A construction as defined in claim 2 wherein said abutment is provided with a shoulder engaging a lower side portion of said sash for restraining lateral movement thereof, and provided further with a cam surface engageable by said sash upon disengagement of said sash from said shoulder for laterally and vertically guiding said sash to and from its seated position on said shoe.

8. In a sliding sash window, a window frame having jambs, at least one of said jambs defining a U-shaped channel comprising an end wall and inwardly extending spaced side walls, a lower sash mounted for vertical slidable movement between said side walls between closed and open position and disposed in spaced relation with respect to said end wall for relative lateral movement within said channel with respect to said end wall, a sash balance disposed in said channel between said end wall and the adjacent side of said sash, said sash balance comprising an elongated tube secured to and terminating at its upper end short of the upper end of said channel end wall, spring loaded balancing means in said tube anchored thereto at its upper end, a shoe carried by the

lower end of said spring loaded balancing means for vertical movement in said channel, said shoe having a laterally inwardly projecting portion in supporting engagement with said sash at its lower end and having abutment means restraining lateral movement of the lower end of said sash when in supported engagement with said shoe, and a guide member secured to and extending laterally from the upper end of said sash slidably engaging said tube restraining lateral movement of the upper end of said sash, the lower end of said tube being disposed to form a stop for said shoe when said sash is raised to a point short of its fully open position, said guide member being disengageable from said tube and the lower end of said sash being disengageable from said abutment upon raising of said sash from said last named position whereby said sash is movable laterally in said channel to disengage the opposite side of said sash from its jamb for removal of said sash from said frame.

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