Nov. 17, 1931. J. A. STEWART 1,832,058

WINDOW CONSTRUCTION

Original Filed July 6, 1928 3 Sheets-Sheet 1

Fig. 11.

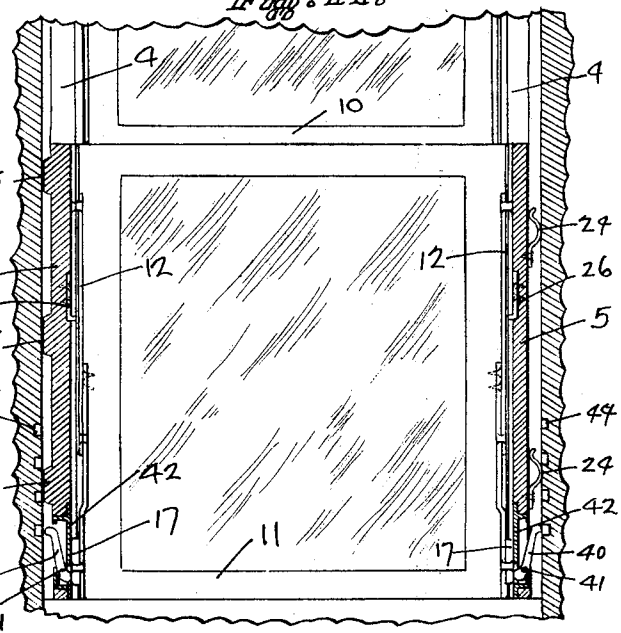


Fig. 12.

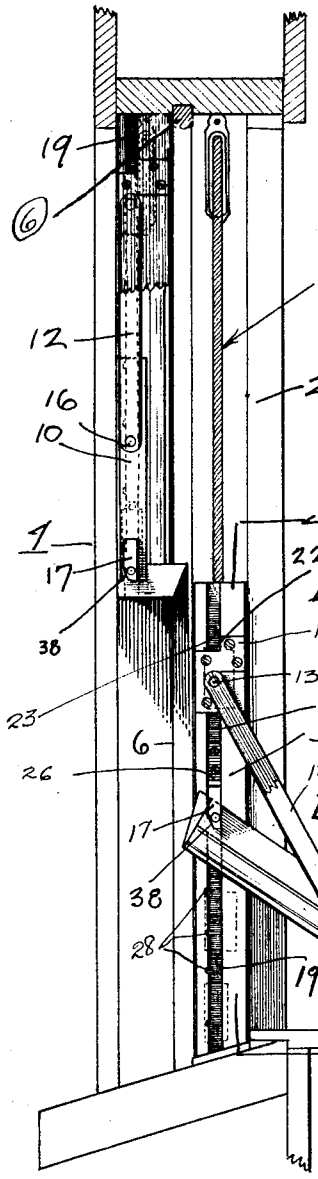


Fig. 3.

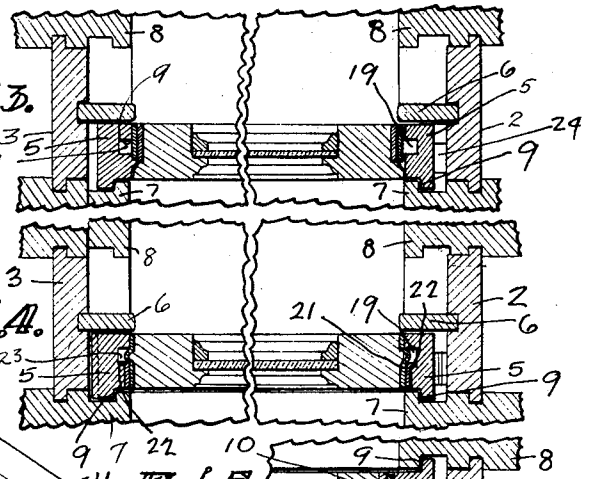
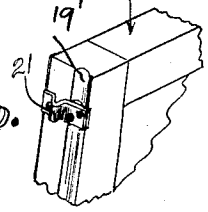


Fig. 4.

Fig. 5.

Fig. 10.



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WINDOW CONSTRUCTION

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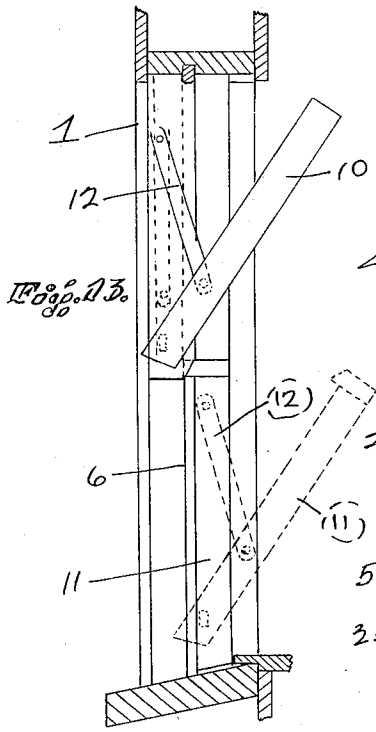


Fig. 1a.

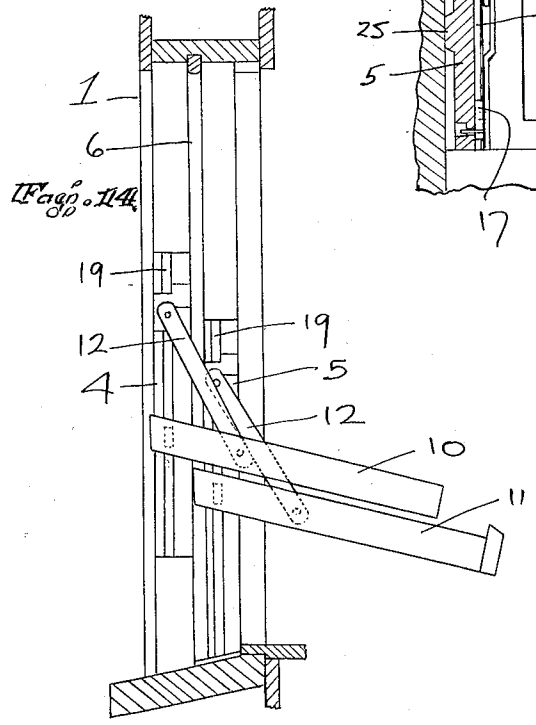
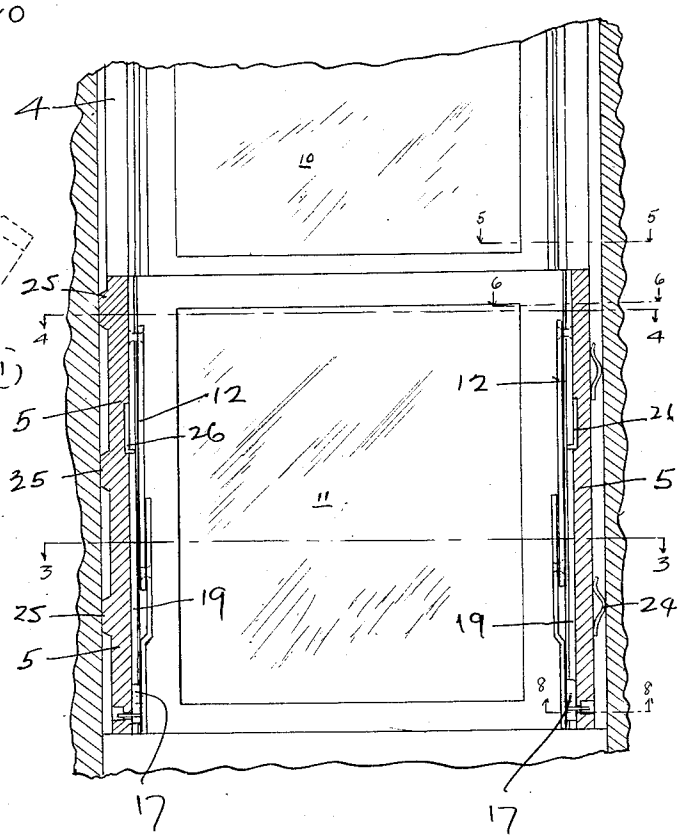


Fig. 1b.

Fig. 2.

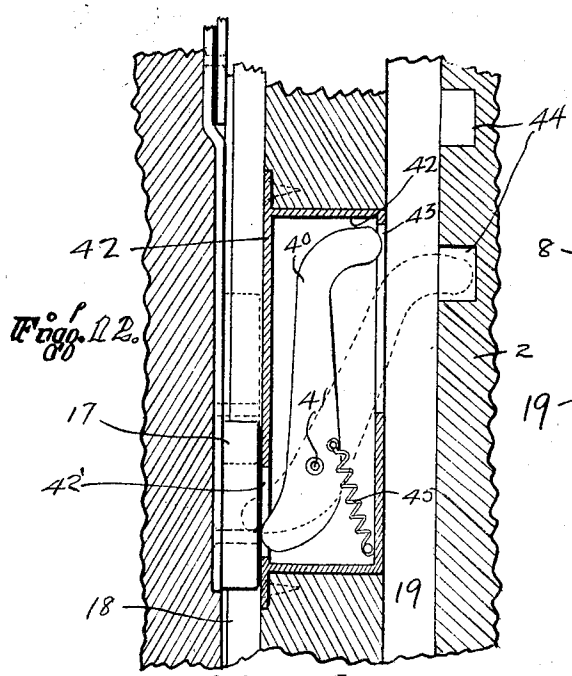


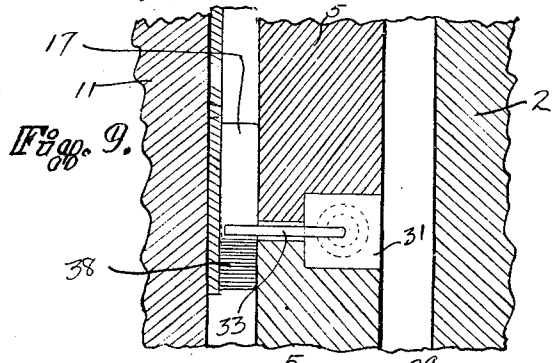
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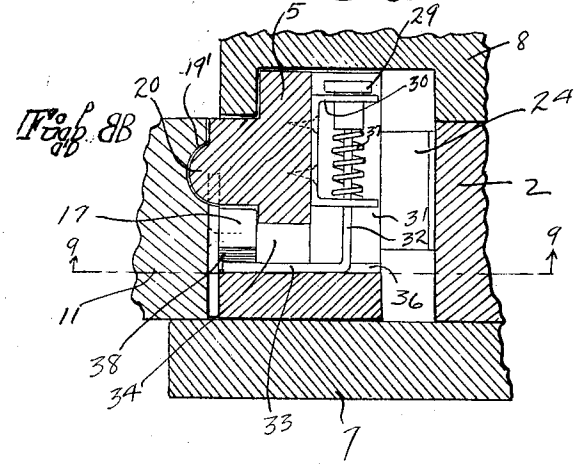
Nov. 17, 1931. J. A. STEWART 1,832,058

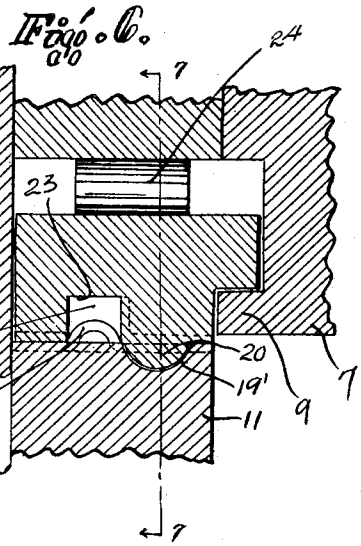
WINDOW CONSTRUCTION

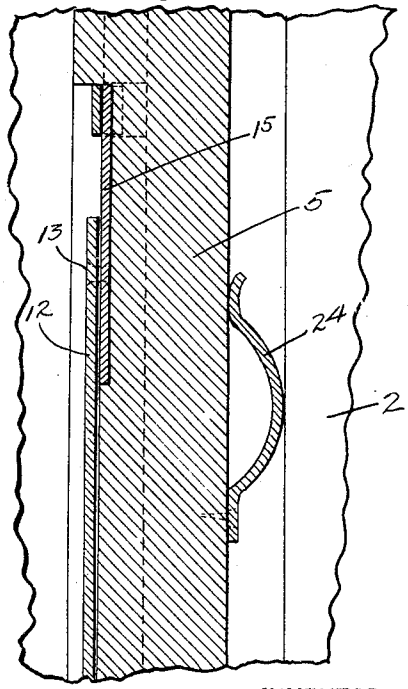
Original Filed July 6, 1928 3 Sheets-Sheet 3











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Patented Nov. 17, 1931 1,832,058

UNITED STATES PATENT OFFICE

JAMES A. STEWART, OF OAKLAND, CALIFORNIA, ASSIGNOR TO MANAGEMENT AND FINANCE CORPORATION OF CALIFORNIA, A CORPORATION

WINDOW CONSTRUCTION

Application filed July 6, 1928, Serial No. 290,816. Renewed May 4, 1931.

The invention resides in the provision of a double hung, reversible window which is superior in many points of construction and operation, and in consideration of advantageous results which may be obtained thereby, compared to reversible windows such as heretofore constructed.

In the double hung, reversible window of this invention, the sashes in addition to being slidable up and down in the ordinary manner can be tilted to swing into the room, or in other words reversed, without causing any portion of the sashes to project outwardly beyond the window frame. Because of this, it is unnecessary to remove screens, awnings or other attachments such as may be mounted on the outer side of the window frame, in order to clean the sashes or to dispose them in tilted positions for purposes of ventilation.

Another of the advantages of the invention is the provision for an easy adjustment of the sashes into positions to provide a plurality of ventilation arrangements, it being possible to tilt or swing the sashes inwardly from any position of vertical adjustment as well as when the sashes are in fully closed or open positions; and it is also possible to adjust the sashes to permit of an unobstructed opening of the entire space within the confines of the window frame for extreme ventilation.

The upper end of the lower sash may be swung inward while the upper sash remains in vertical and closed position, and the lower edge of the lower sash is maintained in close contact with the sill, whereby air currents entering the room will be deflected upwardly and the desired ventilation provided for without direct horizontal drafts into the room. Both sashes may be tilted in this manner if desired, or the upper sash tilted inward while the lower sash remains closed in order to upwardly direct air currents into the upper part of the room. The sashes may be otherwise disposed as desired, dependent upon the ventilation desired.

For cleaning the sashes the upper sash may be swung inward and down to lie over and close to the inwardly swung lower sash or either or both sashes may be swung into other positions for cleaning as desired, with neither sash projecting outward beyond the window frame, and in this way ready access to the sashes may be had for cleaning purposes.

Another of the important features of this invention is the provision for and the maintaining of water proof joints in the window construction, by novel and effective means of a simple and inexpensive nature.

A further object of this invention is to provide a window construction which will be durable, reliable in operation and not subject to easy derangement, there being especially constructed means for maintaining the vertically slidable members on which the sashes are hung, in proper alignment at all times so as to insure ease and reliability of operation, and durability of construction.

The window of this invention is characterized by novel and convenient locking means which, when the sashes are grasped in order to tilt or swing them inwardly, will automatically lock the slide members on which the sashes are mounted, against sliding movement regardless of the position of adjustment of said sliding members, thus providing for ease and reliability of operation and preventing movement of the slide members out of proper alignment.

With the above mentioned and other objects in view, the invention consists in the novel construction and combination of parts hereinafter described, illustrated in the accompanying drawings, and set forth in the claims hereto appended, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Referring to the drawings:

Fig. 1 represents a vertical sectional view of a window constructed in accordance with this invention, with parts shown in side elevation.

Fig. 2 represents a fragmentary vertical sectional view of the window taken on the plane of line 2—2 of Fig. 1, with the sash in closed position.

Fig. 3 represents a horizontal sectional

view taken on the plane of line 3—3 of Fig. 2.

Fig. 4 represents a fragmentary horizontal sectional view taken on the plane of line 4—4 of Fig. 2.

Fig. 5 represents an enlarged sectional view taken on the plane of line 5—5 of Fig. 2.

Fig. 6 represents a horizontal section taken on the plane of line 6—6 of Fig. 2.

Fig. 7 represents a fragmentary sectional view taken on the plane of line 7—7 of Fig. 6.

Fig. 8 represents a cross sectional view taken on the plane of line 8—8 of Fig. 2, particularly showing the means for locking the slide bars against movement.

Fig. 9 represents a cross sectional view taken on the plane of line 9—9 of Fig. 8.

Fig. 10 is a fragmentary perspective view of part of one of the sashes, showing the catch member on the side thereof.

Fig. 11 represents a fragmentary vertical sectional view showing a modified form of means for locking the slide bars against movement.

Fig. 12 represents an enlarged fragmentary vertical sectional view of the modified form of locking means shown in Fig. 11.

Fig. 13 represents a vertical sectional view of a window of this invention showing in full lines a ventilation arrangement in which the upper sash is tilted inward while the lower sash remains in vertical and closed position and also showing in dotted lines a reversed arrangement in which the upper sash remains vertical and in closed position while the lower sash is tilted into open position.

Fig. 14 represents a vertical sectional view of the window of this invention as when the sashes are adjusted into position for cleaning first the upper sash and then the lower sash.

The embodiment of the invention shown in the accompanying drawings includes a window frame 1, on the jambs 2 and 3 of which upper and lower pairs of slide bars 4 and 5 are slidably mounted. These bars are mounted between the parting beads 6 and inner and outer stops 7 and 8, there being provided co-acting flanges 9 on the stops and slide bars to slidably retain the bars in place. An upper sash 10 is hung on the upper bars 4, and a lower sash 11 is hung on the bars 5. The slide bars are connected with the usual weight or cord and pulley counter-balancing means generally designated 11′. The hangers for these sashes comprise in each instance, hanger arms 12 pivoted at certain ends as at 13 to plates 15 fixed to the slide bars, which arms at their other ends are pivoted as at 16 to the sides of the sashes. Shoes 17 are pivoted on the lower ends of each sash and slidably engage in grooves 19 provided in the slide bars. The sashes are so constructed that when in closed position they will meet one another and the window frame members in such a way as to provide weather proof joints. By this hanging arrangement, the sashes may be reversed, that is, may be swung inward in such manner that the outer sides of the glass panes are presented interiorly of the room, whereby they may be readily reached for cleaning, and no part of either sash will project beyond the outer side of the window frame. By this arrangement it is unnecessary to remove screens, awnings, or other attachments, in order to clean the windows and the operator need not reach out of the window in effecting the cleaning operation. By having the sashes tiltably mounted in this manner on the slide bars 4 and 5, said sashes may be tilted when the slide bars are at any position of vertical adjustment.

In order to maintain weather proof joints and to provide for ease and reliability of operation of the sashes and to also hold the sashes securely locked with the slide bars against unintentional swinging or movement relative to the slide bars, the sashes and slide bars are especially constructed so as to interfit and a special spring means is employed in connection with the slide bars. Each sash is provided on opposite side rails with grooves 19′ located between the inner and outer faces of said rails, which grooves are adapted to receive ribs or projections 20 formed on the outer faces of the slide members. These tongue and groove arrangements provide for holding the sashes and slide members in proper relation and also provide for weather proof joints. Adjacent their upper ends, the side rails of each sash are provided with substantially V-shaped laterally projecting resilient catch members 21 which are adapted to engage the plates 15 and slide over said plates when the sashes are returned to vertical position or are moved out of vertical position. A portion 22 of each plate 15 is bent into a notch or recess 23 provided in each slide bar. The catch members 21 are adapted to extend into said recesses 23 so as to abut the metal shoulders provided by the angularly bent terminals 22 of the plates 15. This construction provides for a secure holding of the sashes in proper relation with the slide bars but permits intentional swinging of the sashes relative to the slide bars. The co-acting interfitting members of the slide bars and sashes are made operable by employment of bowed leaf spring members 24 which are mounted on certain of the slide bars of each pair and yieldingly and slidably engage the adjacent jambs of the window frame. The other slide bar of each pair is cut away so as to have a plurality of, in this instance three, spaced projecting portions 25 which slidably engage the adjacent jamb, this arrangement reducing friction. The springs 24 are under tension and at all times urge the slide bars and sashes laterally thereby maintaining a tight, yielding contact between the slide bars and sashes and between the slide bars and

window frame, and providing weather proof joints.

When the sashes are grasped and swung or tilted out of position between the slide members, the V-shaped members 21 act as cams in riding against and over the portions 22 of the plates 15. The spring members 24 will yield at this time and permit the slide bars to move apart sufficiently to free the sashes. The sashes are limited in their reversing movement by stops 26 mounted in the slots 19 of the slide bars and adapted to be engaged by the shoes when the sashes have been swung into the reversed position shown in Fig. 4. To assist in holding the sashes in tilted position, the shoes are provided with small knobs or projections 27 adapted to engage in notches or like depressions 28 provided in the side walls of the slots 19.

It will be noted that the upper slide bars 4 are thicker than the lower bars 5 so as to dispose the upper sash hangers 12 in position such that they will clear and may be moved in part past the hangers 12 of the lower sash when the two sashes are swung inward to their limits and when both sashes are in their lowermost positions.

In order to maintain the slide bars in proper alignment and to prevent vertical sliding of said bars when the sashes are tilted or swung relative to said bars, means is provided for automatically locking the slide bars against sliding movement, which means will operate incident to the swinging of the sashes relative to the slide bars. The present embodiment of this means includes a friction shoe 29 carried adjacent the lower end of each slide bar in position to engage the adjacent stop of the window frame and thereby prevent sliding movement of the slide bar. An L-shaped rod 32 is fixed to the inner end of the shoe 29 and is slidably supported in the bracket 30 with the leg 33 thereof extended through a transverse opening 34, which opening extends from the back of the groove 19 of the slide bar into the recess 31. By this arrangement, the free end of the L-shaped rod 32 is disposed in the groove 19 of the slide bar. Opposite the leg 33 of this L-shaped member is a transverse groove 36 into which the leg 33 will extend when the automatic lock or brake is operated. An expansion spring 37 is mounted on the member 32 and at its ends abuts the inner end of the shoe 29 and the bracket 30 so as to at all times urge the shoe 29 into locking position. When the sashes are in vertical position between the slide bars regardless of the position of vertical adjustment of the slide bars, the shoes 17 are engaged with the legs 33 of the L-shaped members 32 so as to hold the friction shoes 29 in inoperative position against the action of the springs 37. The shoes 17 are beveled as at 38 so that they will engage the portions 33 of the member 32 and move said members laterally so as to hold the friction shoes 29 out of gripping position. Immediately on the swinging or tilting of either sash relative to the slide bars, the shoes 17 are raised clear of the legs 33 of the L-shaped member 32 and the springs 37 force the shoes 29 into frictional and locking engagement with the adjacent stops of the window frame, thereby locking the slide bars against movement coincidentally with the swinging of the sash. This automatic locking will take place at any position of adjustment of the slide bars and not only prevent the upward sliding movement of the slide bars as occasioned on swinging the sashes inward, but prevents any upward movement of one bar relative to the other and thereby maintains said bars in proper alignment.

In Figs. 11 and 12 there is shown a modified form of means for locking the slide bars. In this form of the invention the construction is the same throughout (the same reference numerals being used), with the exception of the locking means, which latter comprises detent members 40 pivoted between their ends as at 41 within casings 42 set into the lower ends of the slide bars. The lower ends of these detents are adapted to project outward through openings 42′ in the casings, into the slots 19 of the slide bars, in position to be engaged by the shoes 17. The upper ends of the detent members are adapted to project through openings 43 in said casings 41 and into any one of a series of notches or recesses 44 formed in the adjacent jambs of the window frame. Retractile springs 45 are connected with the casings and detents so as to normally urge the upper ends of the detents into the notches 44. In this form of the invention when the sashes are in upright position, the shoes engage the detents and hold them out of locking position. On swinging the sashes relative to the slide bars, the shoes 17 are moved clear of the detents, which latter are then moved by the springs 45 so that their upper ends will extend into certain of the notches 44 and thereby lock the slide bars against vertical adustment. In this form of locking means, as with the other form previously described, after a locking operation, when the shoes are returned to vertical position, the detents will be engaged by the shoes and withdrawn from locking position.

Having thus described this invention, what I claim and desire to secure by Letters Patent is:

1. A window comprising a window frame; sashes; a pair of slide members for each sash, which slide members are slidably supported on the window frame; hanger arms pivoted at certain ends to the sides of the sashes between the upper and lower ends of the latter and pivoted at their other ends on said slide

members; and slide shoes carried on the sashes adjacent to the lower ends thereof and slidably engaging with said slide members at all times during adjustment of the sashes.

2. A window comprising a window frame; sashes; a pair of slide members vertically slidable on the window frame; counter-balancing means connected with said slide members and the window frame; means pivotally and slidably connecting the lower end of each sash to opposite slide members; and means pivotally connected on opposite sides of each sash and the side members to permit the sash to be opened between the slide members.

3. A window comprising a window frame; sashes; a pair of slide members vertically slidable on the window frame; counter-balancing means connected with said slide members and the window frame; means pivotally and slidably connecting the lower end of each sash to opposite slide members; and means pivotally connected on opposite sides of each sash and the side members to permit the sash to be opened and reversed between the slide members.

4. A window comprising a window frame; sashes; a pair of slide members vertically slidable on the window frame; counter-balancing means connected with said slide members and the window frame; means pivotally and slidably connecting the lower end of each sash to opposite slide members; means pivotally connected on opposite sides of each sash and the side members to permit the sash to be opened and reversed between the slide members; and counter-balancing means for said slide members operatively connected with the latter and the frame.

5. A window comprising a window frame; sashes; a pair of slide members vertically slidable on the window frame; counter-balancing means connected with said slide members and the window frame; means pivotally and slidably connecting the lower end of each sash to opposite slide members; means pivotally connected on opposite sides of each sash and the side members to permit the sash to be opened and reversed between the slide members; and means for locking the slide members against movement.

6. A window comprising a window frame; sashes; a pair of slide members vertically slidable on the window frame; counter-balancing means connected with said slide members and the window frame; means pivotally and slidably connecting the lower end of each sash to opposite slide members; means pivotally connected on opposite sides of each sash and the side members to permit the sash to be opened and reversed between the slide members; and means operating automatically to hold the slide members against movement, incident to movement of the sash relative to said slide members.

7. A window comprising a window frame; a sash; means providing for up and down movement of the sash in the window frame; means for pivotally and slidably connecting the lower end of the sash to the first mentioned means; and means connected on opposite sides of the sash and to the first mentioned means to permit the sash to be opened and reversed between said first mentioned means.

8. A window comprising a window frame; a sash; means providing for up and down movement of the sash in the window frame; means for pivotally and slidably connecting the lower end of the sash to the first mentioned means; means connected on opposite sides of the sash and to the first mentioned means to permit the sash to be opened and reversed between said first mentioned means; and means for locking the sash against bodily up and down movement operating automatically incident to swinging of the sash.

9. A window comprising a window frame; a sash; means providing for up and down movement of the sash in the window frame; means for pivotally and slidably connecting the lower end of the sash to the first mentioned means; means connected on opposite sides of the sash and to the first mentioned means to permit the sash to be opened and reversed between said first mentioned means; and means for locking the sash against bodily up and down movement operating automatically incident to swinging of the sash, which last named means is released and permits up and down movement of the sash on the return of the sash to upright position.

10. A window comprising a window frame; a pair of slide members movable up and down in said frame; a sash disposed between the slide members; means for pivotally and slidably connecting the lower end of the sash to the opposite slide members; means pivotally connected on opposite sides of the sash and the slide members to permit the sash to be opened and reversed between the slide members; and means yieldably holding one of the slide members in engagement with the sash.

11. A window comprising a window frame; a pair of slide members movable up and down in said frame; a sash disposed between the slide members; means for pivotally and slidably connecting the lower end of the sash to the opposite slide members; means pivotally connected on opposite sides of the sash and the slide members to permit the sash to be opened and reversed between the slide members; means yieldably holding one of the slide members in engagement with the sash, said sash having grooves in opposite sides thereof; and ribs on the slide members adapted to engage in said grooves.

12. A window comprising a window frame; a pair of slide members movable up and down in said frame; a sash disposed be-

tween the slide members; shoes arranged at corresponding points on opposite sides of the bottom of the sash and slidably pivoted on the opposite slide members; and a support arm pivotally connected at corresponding points on opposite sides of the sash, and pivotally connected to the relative slide members to permit swinging movement of the sash around the pivot of said shoes between the slide members.

13. A window comprising a window frame; a pair of slide members movable up and down in said frame; a sash disposed between the slide members; shoes arranged at corresponding points on opposite sides of the bottom of the sash and slidably pivoted on the opposite slide members; a support arm pivotally connected at corresponding points on opposite sides of the sash, and pivotally connected to the relative slide members to permit swinging movement of the sash around the pivot of said shoes between the slide members; and means for holding the sash against unintentional movement from a position of alignment with and between said slide members.

14. A window comprising a window frame; a pair of slide members movable up and down in said frame; a sash disposed between the slide members; shoes arranged at corresponding points on opposite sides of the bottom of the sash and slidably pivoted on the opposite slide members; a support arm pivotally connected at corresponding points on opposite sides of the sash, and pivotally connected to the relative slide members to permit swinging movement of the sash around the pivot of said shoes between the slide members; and means for holding the sash against unintentional movement from a position of alignment with and between said slide members, which means includes spring members urging one of the slide members towards the sash; and interfitting portions on the sash, one of said slide members cooperating when the sash is in position of alignment with the slide members.

15. A window comprising a window frame; slide members movable up and down in said frame, each of said slide members having a groove therein; a sash disposed between the slide members; shoes mounted on the lower ends of the sash and slidably engaged in the grooves of the slide members; hanger arms pivoted at their ends to the sides of the sash and to the slide members respectively; interfitting portions on the sash and slide members cooperating when the latter are in position of alignment with one another; and means for yieldingly forcing one of the slide members towards the sash.

16. A window comprising a window frame; slide members movable up and down in said frame, each of said slide members having a groove therein; a sash disposed between the slide members; shoes mounted on the lower ends of the sash and slidably engaged in the grooves of the slide members throughout their entire stroke of adjustment; hanger arms pivoted at their ends to the sides of the sash and to the slide members respectively; interfitting portions on the sash and slide members cooperating when the latter are in position of alignment with one another; and means for yieldingly forcing one of the slide members towards the sash, which means includes a spring carried by a slide member and slidably engaging an adjacent part of the window frame.

17. A window comprising a window frame; slide members movable up and down on said frame; a sash disposed between said slide members; shoes on the sash; guide means on the slide members with which said shoes slidably engage throughout their entire stroke of adjustment; hangers pivoted at their ends to the sides of the sash and to said slide members; interfitting portions provided on the sides of the sash and on the slide members respectively, which portions cooperate throughout the length of the sash when the latter is in position of alignment with the slide members; spring means normally urging one of the slide members towards the sash; and means for locking the slide member against up and down movement.

18. A window comprising a window frame; slide members movable up and down on said frame; a sash disposed between said slide members; shoes on the sash; guide means on the slide members with which said shoes slidably engage throughout their entire stroke of adjustment; hangers pivoted at their ends to the sides of the sash and to said slide members; interfitting portions provided on the sides of the sash and on slide members respectively, which portions cooperate throughout the length of the sash when the latter is in position of alignment with the slide members; spring means normally urging one of the slide members towards the sash; and means operating automatically to hold the slide members against up and down movement incident to movement of the sash out of position of alignment with the slide members, said holding means being held in inoperative position by said shoes when the sash is in aligned position.

19. A window comprising a window frame; slide members movable up and down on said frame; a sash disposed between said slide members; shoes on the sash; guide means on the slide members with which said shoes slidably engage throughout their entire stroke of adjustment; hangers pivoted at their ends to the sides of the sash and to said slide members; interfitting portions provided on the sides of the sash and on the slide member respectively, which portions cooperate throughout the length of the sash when

the latter is in position of alignment with the slide members; spring means normally urging one of the slide members towards the sash; means operating automatically to hold the slide members against up and down movement incident to movement of the sash out of position of alignment with the slide members, which last named means comprises a detent member carried by each slide member and adapted to engage the window frame and by such engagement hold the slide members against movement; and spring means normally urging said detent member into position of engagement with the frame, which detent member has a portion thereof disposed to be engaged by the shoe and to be moved out of position of engagement with the window frame and held in such position when the sash is disposed in position of alignment with the slide members.

20. A window comprising a window frame; slide bars movable up and down in the frame; a sash disposed between the slide bars; shoes carried on the lower portions of the sash; guide means on the slide bars with which the shoes slidably engage throughout their entire stroke of adjustment; hangers pivoted at their ends to the sides of the sash and to the slide bars respectively; spring means interposed between one of the slide bars and window frame and yieldably urging said slide bars towards the sash, said slide bars having a recess therein; metal plates mounted on the slide bars with portions thereof extending into said recesses; and cam members mounted on opposite sides of the sash adjacent to the upper ends of the sash and arranged to slidably engage with the plates and to extend into said recesses to hold the sash against unintentional movement out of position of alignment with the slide members.

21. A window comprising a window frame; slide bars movable up and down in the frame; a sash disposed between the slide bars; shoes carried on the lower portions of the sash; guide means on the slide bars with which the shoes slidably engage throughout their entire stroke of adjustment; hangers pivoted at their ends to the sides of the sash and to the slide bars respectively; spring means interposed between one of the slide bars and the window frame and yieldably urging said slide bars towards the sash, said slide bars having a recess therein; metal plates mounted on the slide bars with portions thereof extending into said recesses; cam members mounted on opposite sides of the sash adjacent to the upper ends of the sash and arranged to slidably engage with the plates and to extend into said recesses to hold the sash against unintentional movement out of position of alignment with the slide members, said sash having grooves extending throughout the length of the sash on opposite sides thereof; and ribs on the slide members engaging with said grooves.

22. A window comprising a window frame; an upper sash; a lower sash; upper and lower portions of slide bars movable up and down on said sash frame; means for connecting each sash with its pair of slide bars comprising hanger arms pivoted to the sides of the sashes and to said slide members, each of said slide members having a groove therein; shoes pivoted on opposite sides of the sashes at the lower ends thereof and slidably engaging in said grooves throughout their entire stroke of adjustment; means for preventing the sashes from being unintentionally moved out of position of alignment with their slide bars; and means operating automatically to hold the slide bars against up and down movement; which means is operated by said shoes incident to movement of the sashes out of alignment with the slide bars.

23. A window comprising a window frame; sashes; a pair of slide members for each sash, which slide members are slidably supported on the window frame; co-acting means on the window frame and slide bars to allow vertical rearward movement of the slide bars relative to the window frame; hanger arms pivoted at certain ends of the latter and pivoted at their other ends on said slide members; and slide shoes carried on the sashes adjacent to the lower ends thereof and slidably engaging with said slide members throughout their entire stroke of sash adjustment.

In testimony whereof, I have hereunto set my hand at San Francisco, California, this 26th day of April 1928.

JAMES A. STEWART.