June 10, 1930. W. J. KLEMM 1,762,993

WINDOW STRUCTURE

Filed April 19, 1929 2 Sheets-Sheet 1

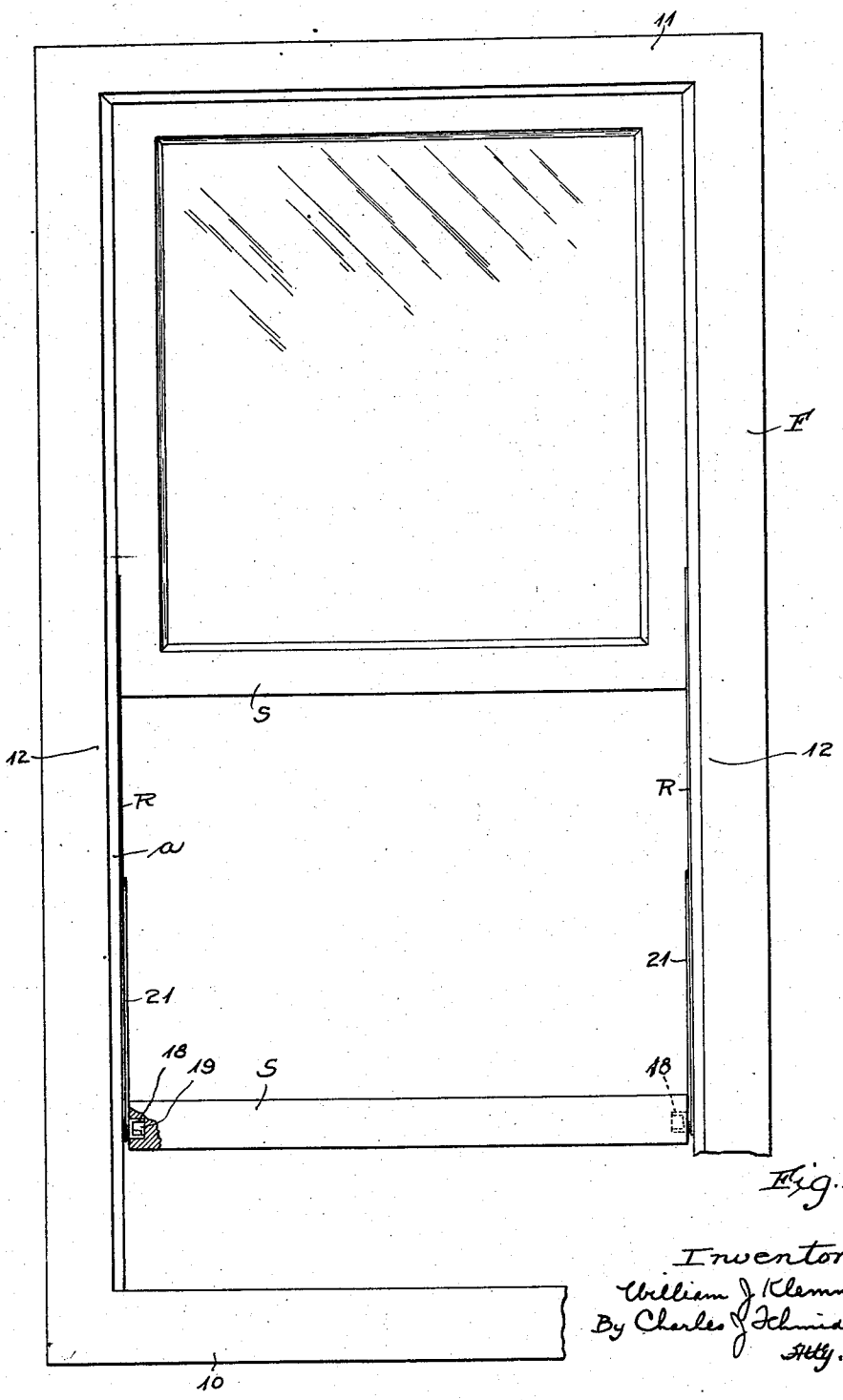


Fig. 1.

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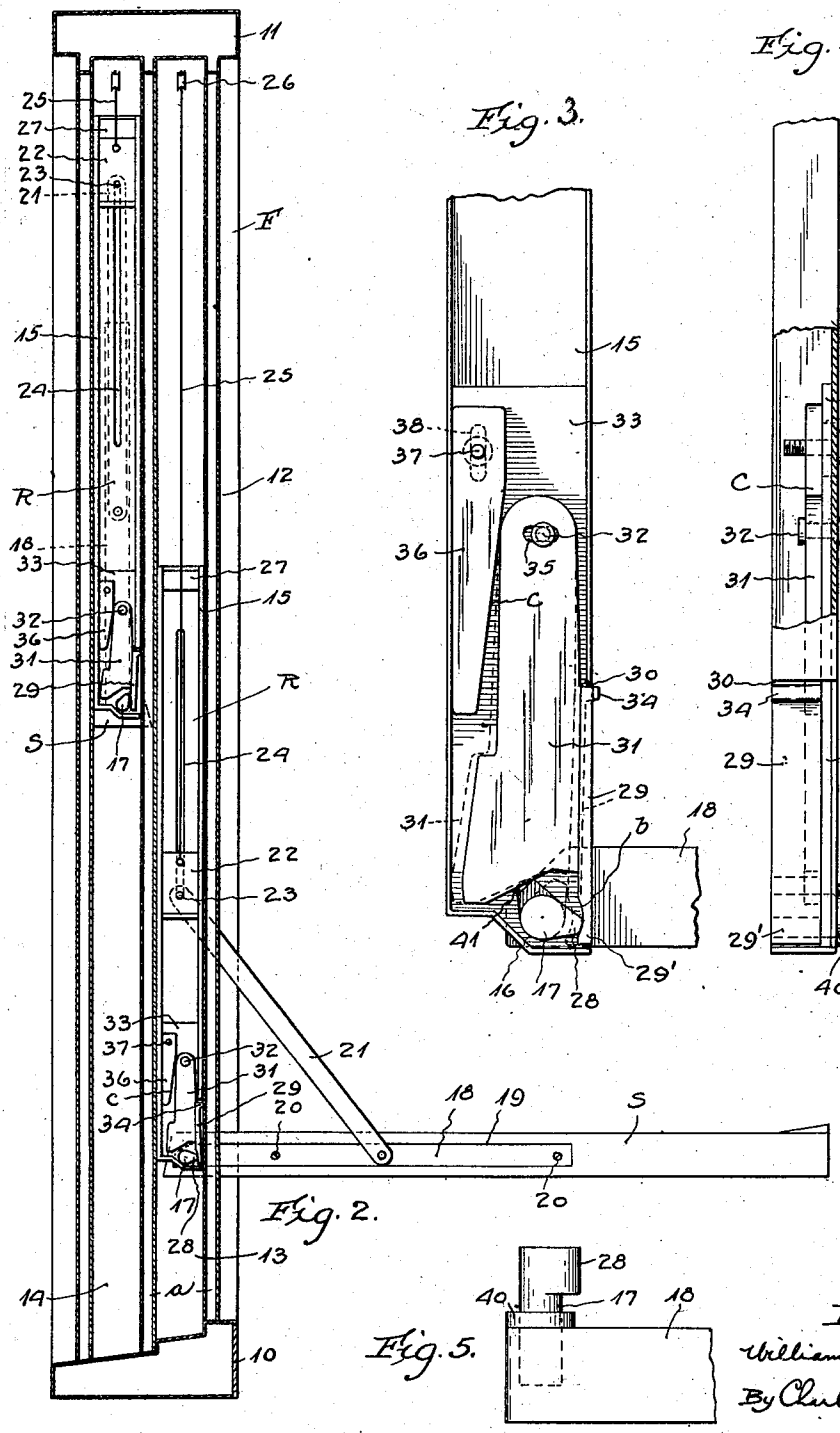


Fig. 2.

Fig. 3.

Fig. 4.

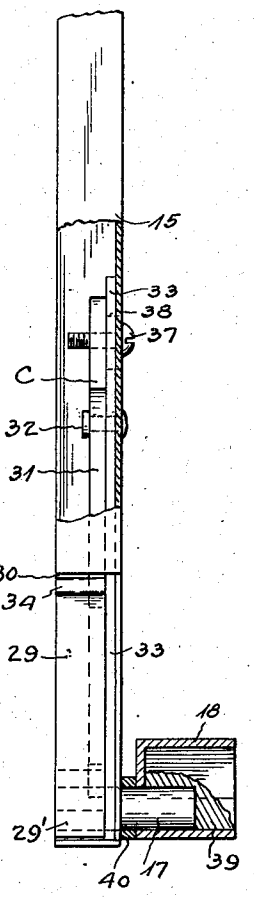


Fig. 5.

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UNITED STATES PATENT OFFICE

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WINDOW STRUCTURE

Application filed April 19, 1929. Serial No. 356,498.

My invention relates to window structures, particularly to that type in which the window sashes, in addition to being vertically slidable in the window frame, are adapted to be swung on horizontal axes for ventilation purposes and to be more accessible for washing from the inside of the building.

The important object of the invention is to provide simplified and more efficient construction for securely automatically locking the sash against vertical movement when it is swung to inclined position, and to balance the weight of the sash when inclined so that it can be more easily manipulated.

The above and other features of my invention are incorporated in the structure shown on the drawings in which

Fig. 1 is a front elevation of a window frame with the sash therein;

Fig. 2 is a sectional view on plane 2—2 Fig. 1;

Fig. 3 is an enlarged side elevation of the lower end of a runner showing my improved locking arrangement;

Fig. 4 is a front elevation of the parts shown in Fig. 3, and

Fig. 5 is a side elevation of the inner end of a sash supporting arm.

The window frame F, shown, is constructed of sheet metal and comprises a sill 10, the head 11, and the jambs 12. The jambs have the inner and outer channels 13 and 14 for guiding the runner structures R to which the window sashes S are attached to move vertically therewith or to swing thereon.

Each runner structure comprises a length of channel bar 15 having at the lower end of its web a pivot hole 16 for receiving the pivot pin 17 at the inner end of the corresponding sash supporting arm 18, these arms being preferably of metal and of channel form. As shown in Figs. 1 and 2 the sashes have longitudinal grooves 19 at their edges for receiving the supporting arms and screws 20 or other suitable means will detachably secure the sash against displacement.

Pivoted to each supporting arm intermediate its ends is a flat bar 21 whose upper end is pivoted to a slider block or plate 22 slidable longitudinally in the respective channel bar 15, the pivot pin 23 extending through a slot 24 in the channel bar web, this slot limiting the travel of the slider block and consequently the distance of downward swing of the window sash. A chain or chord 25 is secured to each slider block and extends around a sash pulley 26 to a sash weight (not shown) in a well known manner, the sash weights balancing the weight of the sash as it is raised or lowered in its guide channels 13 or 14, and by the pull on the bars 21 balancing the swinging movement of a sash and assisting in swinging the sash upwardly from a swing down position.

When the sash is vertical the pull of the sash weights may be taken up by the engagement of the pivot pins 23 with the upper ends of the slots 24, but preferably stop members 27 are secured in the channel bars against which the slider blocks may abut and so take the strain from the pivot pins when the sash is vertical.

I shall now describe the mechanism for holding the runner structures against vertical movement when a sash is swung to inclined position. The pivot pins 17 are each provided with a cam projection 28 for engaging a brake shoe 29. The shoe plays in the opening 30 in the inner flange of the channel bar 15 and is carried by a lever 31 shown in the form of a plate pivoted at its upper end by a pin 32 extending from the channel bar web. To strengthen the lower end of the channel bar and provide a more rigid seat for the lever, a plate 33 may be secured to the channel bar web by riveting or welding.

The lower end 29′ of the brake shoe or flange extends a distance below the lower end of the lever plate 31 to be in the path of the cam projection 28. When a sash is vertical the cam projection extends upwardly as shown in connection with the upper sash Fig. 2, and by dotted lines in Fig. 3. When the sash is swung downwardly the cam projection engages the shoe end 29′ and the lever 31 is swung on its pivot 32 to project the shoe outwardly through opening 30 and force it into fric-

tional engagement with the inner side of the adjacent stop *a* on the window frame and such engagement will lock the sash against vertical movement while it is in inclined position. To localize the braking pressure to give the shoe a firmer hold on the stop I preferably provide a projection 34 on the shoe and this projection may be at the upper end of the shoe between the shoe end 29′ and the pivot 32 so that the resulting leverage will multiply the cam pressure and produce powerful pressure of the projection 34 against the window frame stop.

In order to make the braking pressure uniform for substantially all angular positions of a sash the end 29′ of each shoe has the concave surface *b* substantially concentric with the pivot pin 17. When the sash is vertical the cam ends 28 are above these surfaces but as soon as the sash is swung downwardly the cam ends force the shoes outwardly into braking engagement with the stops *a* and then engage with the concave surfaces *b* so that the applied braking pressure remains uniform and injury to the stops will be avoided.

To permit compensation for wear of the brake shoe projections 34 I provide means for adjusting the swing center of the lever 31. The opening 35 receiving the pivot pin 32 is laterally elongated so that the swing center may be shifted laterally. To hold the adjustment and to form a fulcrum abutment for the lever a wedge 36 is inserted between the lever end and the rear flange of the channel bar 15, the lever end being rounded where it engages the wedge surface *c* to reduce friction. The wedge shown is in the form of a plate held in position by a screw 37, the screw extending through an elongated opening 38 in the channel bar web and reinforcing plate 33 so that the wedge may be adjusted longitudinally to shift the fulcrum abutment of the brake shoe lever 31 laterally to compensate for wear of the brake shoe. After setting of the wedge it is rigidly secured by tightening the screw 37 which threads therethrough.

When a sash is within its window frame guides the cam ends are in position to permit the brake shoe structures to assume their inner positions as indicated on the upper sash in Fig. 2 and by dotted lines Fig. 3, and the sash is free for vertical movement in its guides and is balanced by the sash weights. From any vertical position of a sash it can be swung downwardly and the cams will then engage with and swing the brake structures which at their upper ends fulcrum against the wedges and the brake projections 34 will be forced against the frame stops to lock the sash against vertical movement. In the arrangement shown, the limit of downward swing of the sash is to a horizontal position, the pins 23 of the bars 21 then engaging with the lower ends of the slots 24. During engagement of the cams with the concave surfaces *b* of the brake lever structures the sash may be swung to intermediate positions without releasing of the braking and when so swung they will hold their positions on account of the balancing power of the sash weights acting on the sliders 22 and bars 21. When the sash is swung up close to vertical position the cams will release the brake shoe structures and then the sash is again free for vertical movement in its guides.

As shown in Fig. 4 the pivot pins 17 may be rigidly secured in the supporting arms 18 by welding as indicated at 39. A washer 40 is inserted between each arm and the respective runner structure to leave clearance for the corresponding bar 21. To permit ready application of the arm to the runner structure the pivot opening 16 for the pivot pin 17 is extended to form the passage 41 for the cam projection 28. This passage is angularly situated so that after insertion of the pivot pin the arm 18 will be held in operative position by the engagement of the cam projection against the plate 33.

Removal of a sash for reglazing or repairs can be readily accomplished by withdrawing the screws 20 and sliding the sash from the arms 18, and the sash can as readily be reapplied to the arms.

I thus provide simple, efficient and economically manufactured window structures which are strong and durable and in which the sash can be easily manipulated and adjusted without undue exertion. I do not desire to be limited to the exact construction, arrangement and operation shown and described as modifications can be made which will come within the scope of the invention.

I claim:—

1. In window structures, the combination of a window frame having upright side channels, runners slidable in said channels, a window sash pivoted to said runners to swing relative thereto into open or closed position, window weights connected with said runners, brake shoe structures pivoted on said runners, and cam projections on said sashes rotated during swinging movement of a sash to open position to swing and force said brake shoe structures into braking engagement with the sides of said channels.

2. In a window structure, the combination of a window frame having upright side channels, runners slidable in said channels, window sash pivot pins pivoting said sash to said runners to swing relative thereto into open or closed position, brake shoes in said runners, said runners having openings

through which said brake shoes may be projected into friction engagement with the sides of said channels, and means actuated by said pivot pins during swinging movement of said sash to open position to force said brake shoes outwardly into friction engagement with the channel sides to thereby lock said runners and sash thereon against vertical movement in said channels.

3. In a window structure, the combination of a window frame having upright side channels, runners slidable in said channels, a window sash pivoted to said runners to swing vertically into open or closed position, a lever in each runner, a brake shoe on each lever, said runners having openings adjacent to said brake shoes, and cams rotated upon swinging of said sash to open position to actuate said levers to cause the brake shoes to be projected through said openings into friction engagement with the sides of said channels to thereby lock said sash against vertical movement in said channels.

4. In a window structure, the combination of a window frame having upright side channels, runners slidable in said channels, a window sash pivoted to said runners to swing relative thereto, brake shoes pivoted on said runners, and cams concentric with the sash pivot axes and rotated into engagement with said shoes when said sash is swung downwardly to swing and force said shoes into braking engagement with the sides of said channels to thereby lock said runners against vertical movement.

5. In a window structure, the combination of a window frame having side channels, runners slidable in said channels, a window sash pivoted at its lower corners to said runners, said sash being adapted to swing upwardly into closed position or downwardly into open position, each runner having a longitudinal slot, bars secured to said sash, a slider member in each runner connected through said slot with the respective bar whereby vertical swing of said sash will cause longitudinal movement of said slider members in said runners, and sash weights connected with said slider members for balancing the weight of said sash during swing thereof.

6. In a window structure, the combination of a window frame having side channels, runners slidable in said channels, a window sash having pivot pins at its lower corners journaled in said runners to adapt said sash to swing vertically relative to said runners, a brake lever in each runner having a brake shoe, and a cam projection on each pin for cooperating with the respective brake lever to cause actuation thereof to force its brake shoe into engagement with the channel side to lock the runner against vertical movement when the sash is swung open.

7. In a window structure, the combination of a window frame having side channels, runners slidable in said channels, a window sash having pivot pins journaled in said runners to adapt said sash to swing vertically, a brake shoe pivoted on each runner, cams rotated by said pins to swing and force said shoes into braking engagement with the channel sides when said sash is swung down whereby said sash will be locked against vertical movement, and means for adjusting the pivot axis of each brake shoe to compensate for wear of the shoe.

8. In a window structure, the combination of a window frame having vertical side channels, runner frames slidable in said channels, each runner frame having a pivot opening at its lower end, supporting arms having pivot pins journaled in said pivot openings, a sash detachably secured to said arms to swing therewith relative to said runner frames, a brake lever pivoted at its upper end on each runner frame, a cam projection on each pivot pin for engaging the lower end of the respective lever to swing the lever when the sash is swung downwardly, and a brake shoe on each lever forced into braking engagement with the adjacent channel side during such swing of the lever.

9. In a window structure, the combination of a window frame having vertical side channels, runner frames in said channels having each a pivot opening at its lower end, supporting arms having pivot pins journaled in said pivot openings, a window sash supported by said arms for swing relative to said runner frames, a brake lever on each runner frame pivoted at its upper end, a cam projection on each pin for engaging the lower end of the respective lever, a brake shoe intermediate the ends of each lever, said cam projections swinging said levers to force said shoes into braking engagement with the channel sides when the sash is swung down whereby to lock the runner frames against movement in said channels, and means for adjusting the pivot axis of said levers to compensate for wear on said brake shoes.

10. In a window structure, the combination of a window frame having upright channels, runners slidable in said channels, a window sash pivoted to said runners to swing vertically into open or closed position, a brake lever in each runner pivotally supported at one end, cams rotated upon swinging movement of the sash to engage with the other ends of said levers to swing said levers when said sash is swung downwardly, and brake shoes on said levers intermediate their ends forced into braking engagement with the adjacent channel sides during swing of said levers by said cams.

11. In a window structure, the com-

bination of a window frame having side channels, runners slidable in said channels, a window sash pivoted to said runners to be swung upwardly into closed position or downwardly into open position, side bars pivoted to said sash, a slider block in each runner connected with the respective side bars whereby vertical swing of said sash will cause longitudinal movement of said slider blocks in said runners, and sash weights connected with said slider blocks for balancing the weight of said sash during swing thereof.

In witness whereof, I hereunto subscribe my name this 3rd day of April, 1929.

WILLIAM J. KLEMM.