Apr. 24, 1923. 1,452,732

F. DUTCHER

WINDOW CONSTRUCTION

Filed May 20, 1921

Fig. 1

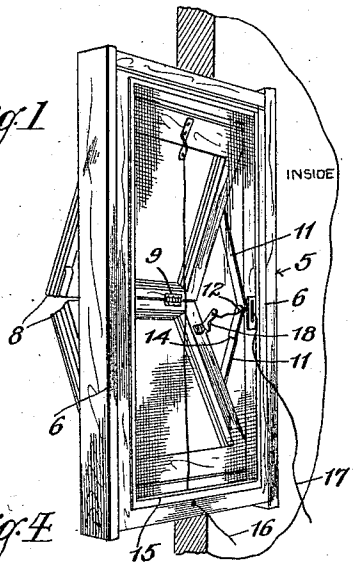


Fig. 2

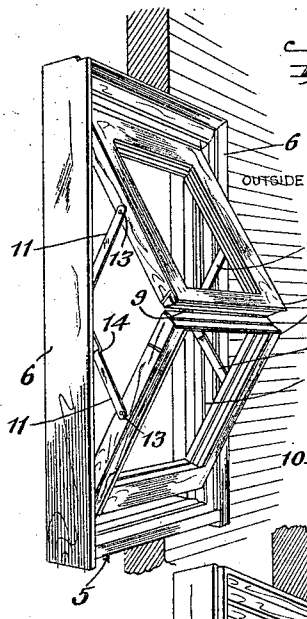


Fig. 6

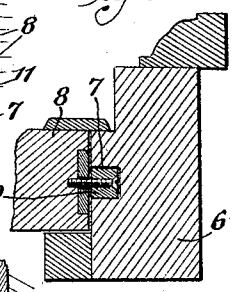


Fig. 3

Fig. 4

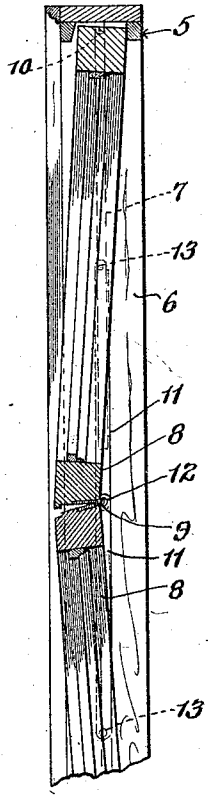
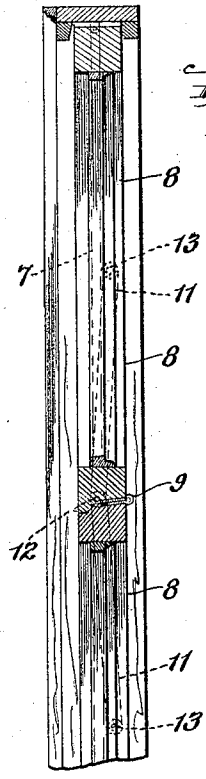
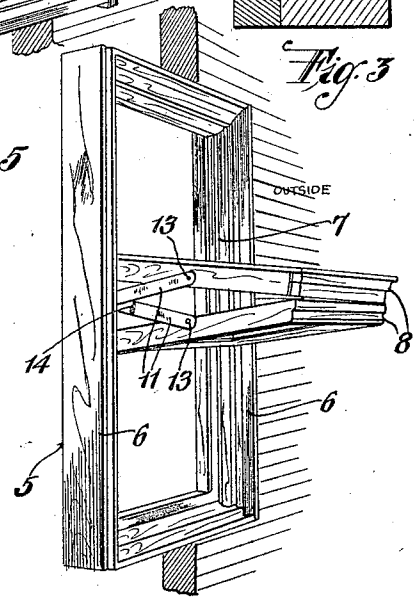


Fig. 5





INVENTOR

Frank Dutcher

BY M. C. Tyddane

ATTORNEY

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UNITED STATES PATENT OFFICE.

FRANK DUTCHER, OF LOS ANGELES, CALIFORNIA.

WINDOW CONSTRUCTION.

Application filed May 20, 1921. Serial No. 471,106.

To all whom it may concern:

Be it known that I, FRANK DUTCHER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Window Constructions, of which the following is a specification.

This invention relates to self-balancing window sashes of that type wherein the sashes are hingedly connected to each other and slidably mounted in the window frame as shown, for example in Letters Patent numbered 1,281,312, granted to me on October 15, 1918.

It is the primary object of my present invention to eliminate all flexible operating connections between the sashes and to provide in lieu thereof rigid arms pivotally connected to each side of the window frame and to the respective sashes and constituting rigid supports for maintaining the sashes at any desired angular relation to the frame. These sash supporting arms also effectively operate, when the sashes are in closed position to prevent the accidental or unintentional opening movement of the sashes.

The invention also comprehends the provision of means whereby the sashes may be conveniently operated without necessitating the removal of a screen entirely covering the inner side of the frame opening.

It is also a general object of my invention to provide a window construction as above characterized which is exceedingly simple as well as strong and durable and whereby both sashes may be easily and quickly adjusted simultaneously regardless of their size or weight.

With the above and other objects in view the invention consists in the improved window construction and in the form, construction, and relative arrangement of its several parts as will be hereinafter more fully described, illustrated in the accompanying drawing, and subsequently incorporated in the subjoined claims.

In the drawing wherein I have illustrated one satisfactory and practical embodiment of the invention and in which similar reference characters designate corresponding parts throughout the several views;

Fig. 1 is a perspective view of the window from the interior of a room, the sashes being partly open and a screen secured in the window frame.

Fig. 2 is a similar view of the exterior of the window, the screen being omitted.

Fig. 3 is a perspective view similar to Figure 2 showing the maximum open position of the sashes.

Fig. 4 is a fragmentary vertical sectional view showing the relative positions of the sashes and their supporting arms at the start of the opening movement.

Fig. 5 is a similar view with the sashes in fully closed position.

Fig. 6 is an enlarged detail transverse section illustrating one manner of slidingly mounting the sashes in the window frame.

Referring in detail to the drawing, 5 designates the window frame having the usual side bars 6, each of which is provided in its inner face with a longitudinally extending groove 7.

In the frame 5 a pair of sashes 8 is mounted, the meeting rails of said sashes being hingedly connected to each other as at 9. Upon the opposite side edges of the upper sash at the upper end thereof and likewise at the lower end of the lower sash, rollers are mounted as illustrated at 10 in Figure 6 of the drawing. These rollers are loosely engaged in the grooves 7 for free longitudinal travel.

To each side bar of the window frame a pair of rigid metal arms 11 are attached at one of their ends by means of a common pivot pin 12. It will be observed that these pivots are located in the same plane as the hinges 9 which connect the sashes 8 to each other. It is to be further noted that the pivots 12 are disposed in line with the vertically movable pivot rollers 10 which travel in the grooves 7. The other ends of the arms 11 are respectively pivoted to the sash stiles at opposite sides of the window as at 13, said pivots being disposed midway of lines connecting the rollers 10 and hinges 9. One of the arms 11 in each pair is angularly offset as shown at 14 to permit of the close folding movement of said arms (see Fig. 3).

Upon referring to Figures 1 and 2 of the drawing it will be observed that the sash stiles in addition to forming parts of the sash frames also constitute two sides of a parallelogram at each side of the window, the arms 11 forming the other two sides thereof. As each sash is attached at its

center region to the arms 11 it is obvious that the entire weight of the sashes is sustained by these arms. Therefore as the sashes are forced outwardly at their hingedly connected ends to an open position, the downward movement of the upper sash in the frame will be counterbalanced by a corresponding upward movement of the lower sash. This automatic counterbalancing action is primarily due to the location of the pivots 12 and the fact that the distance between the pivots 12 and 13 is exactly one-half of the distance between the rollers 10 and the hinges 9 so that the ends of the arms 11 and the pivots 13 with which they are engaged move on the same circular arcs in the adjustment of the sashes. The operation of the sashes is very free and easy, there being an entire absence of frictional binding at the pivots. Thus the sashes are self sustaining in any adjusted position, the upper sash acting as a strut and the lower sash as a tension member.

When the sashes are completely closed as in Figure 5, it will be noted that the pivots 13 connecting the arms 11 to the respective sashes are disposed out of vertical alignment with the pivot 12 connecting said arms to the window frame and inwardly of the grooves 7. It is apparent that before the sashes may move vertically and swing outwardly in the frame towards an open position the pivot connections 13 must first be disposed beyond the vertical line of the pivots 12. In order to accomplish this result a positive manually applied pressure against the hingedly connected sashes is required and they are securely held against possible opening due to air drafts or other causes.

In Figure 1 of the drawing I have shown a screen 15, fitted into the frame 5 and entirely covering the frame opening. A cord, chain, or other flexible element 16 extends through a suitable guide in the frame sill and then upwardly exteriorly of the screen and is attached to the top rail of the upper sash. A second flexible element 17 extends through an opening in one side of the screen frame and is attached to a pivoted latch element 18 on one side of the lower sash, adapted for engagement with a keeper on the screen 15. By pulling upon the element 16, after the opening movement is started by manual pressure, the two sashes may swing to a fully open position and by pulling upon the element 17 they may be returned to closed position in the window frame without removing the screen.

When the sashes are disposed as seen in Figures 1 and 2 ample ventilation is afforded at opposite sides thereof while the interior of the room is protected against the admission of driving rain. The sashes may be further adjusted to provide additional ventilation at the top and bottom of the window or to the extreme open position shown in Figure 3 which affords nearly 100% ventilation.

In the above description and accompanying drawing I have described an embodiment of my invention as applied to a wood window construction. It will, however, be understood that the present improvements may likewise be incorporated in metallic window structures and that various alternatives might be substituted for the slide rollers 10 and grooves 7 above referred to as well as the other detail parts herein described.

I have found the present invention particularly desirable for use in connection with large heavy window sashes as it permits of the quick and easy adjustment of the sashes with a minimum of manual effort. The improved construction is likewise simple, durable and efficient in operation and may be produced at relatively small cost.

While I have described one desirable and practical embodiment of the invention it may also be exemplified in various other structural forms and I therefore reserve the privilege of adopting all such legitimate changes as may be fairly included within the spirit and scope of the invention as claimed.

I claim:—

1. In combination with a window frame and a pair of sashes hingedly connected at their meeting ends and having their other ends mounted in the frame for pivotal and vertical sliding movement; means centrally pivoted to each side of the window frame and operatively connected to each of the sashes to counterbalance said sashes against each other and permit the same to simultaneously move from their closed to substantially fully open position.

2. In combination with a window frame and a pair of sashes hingedly connected at their meeting ends and having their other ends mounted in the frame for pivotal and vertical sliding movement; a pair of rigid supporting arms at each side of the frame pivoted at one of their ends to one of the side stiles of the respective sashes at the central region thereof and having their other ends mounted upon a common pivot fixed in the vertical side of the frame at the central region thereof, said arms counterbalancing the sashes against each other and permitting the same to move from their closed to substantially fully open position.

3. In combination with a window frame and a pair of sashes hingedly connected at their meeting ends and having their other ends mounted in the frame for pivotal and vertical sliding movement; a pair of rigid supporting arms at each side of the frame pivoted at one of their ends to one of the side stiles of the respective sashes at the

central region thereof and having their other ends mounted upon a common pivot fixed in the vertical side of the frame, the pivotal connections of said arms to the sashes being disposed out of vertical alignment with and inwardly of the pivots connecting the arms to the frame when the sashes are in closed position whereby the arms prevent the accidental opening movement of the sashes, the pairs of arms folding upon each other and counterbalancing the sashes in their manual adjustment to an open position in angular relation to each other.

4. In combination with a window frame and a pair of sashes hingedly connected at their meeting ends and having their other ends mounted in the frame for pivotal and vertical sliding movement; means for counterbalancing said sashes against each other comprising rigid relatively foldable members pivotally connected to each sash and to the frame, said members, when the sashes are in closed position being so angularly disposed with respect to the vertical plane of the sashes as to resist casual pressures against the sashes tending to move the same to an open position.

5. In combination with a window frame and a pair of sashes having pivots at one of their ends vertically movable in opposite sides of the frame and hingedly connected to each other at their other ends for relative angular movement in said frame from closed to substantially fully open position, means for counterbalancing said sashes against each other comprising foldable parts connected to the respective sashes and pivotally mounted upon the frame in the line of said vertically movable pivots.

6. In combination with a window frame and a pair of sashes having pivots at one of their ends vertically movable in opposite sides of the frame and hingedly connected to each other at their other ends for relative angular movement in said frame from closed to substantially fully open position, means for counterbalancing said sashes against each other comprising foldable parts connected to the respective sashes at one of their ends and having their other ends mounted upon a common pivot fixed in the frame in the horizontal plane of the hinge connection between said sashes and located in line with said vertically movable pivots.

7. In combination with a window frame and a pair of sashes having pivots at one of their ends vertically movable in opposite sides of the frame and hingedly connected to each other at their other ends for relative angular movement in said frame from closed to substantially fully open position, means for counterbalancing said sashes against each other comprising a pair of counterbalancing arms foldable between each side of the window frame and the sashes, said arms being pivotally connected at one of their ends to one edge of the respective sashes and having their other ends pivotally mounted upon the frame in the horizontal plane of the hinge connection between said sashes and in line with the vertically movable pivots.

In testimony whereof I affix my signature.

FRANK DUTCHER.