May 10, 1955 A. H. SOULE 2,707,809

MULTIPLE WINDOW CONSTRUCTION

Filed Aug. 25, 1952 2 Sheets-Sheet 1

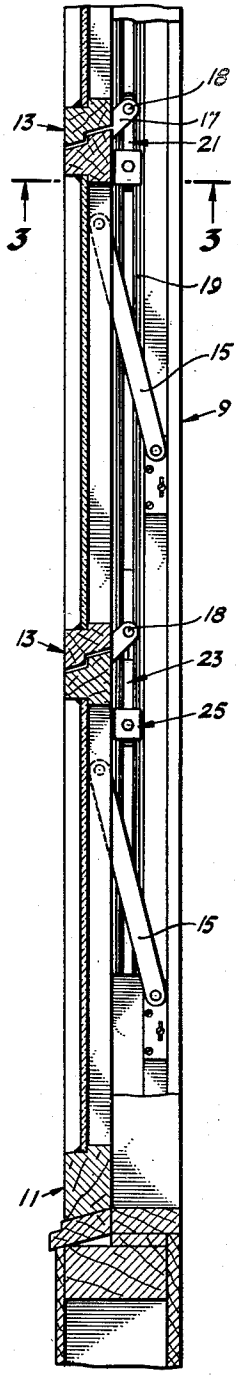


FIG. 1.

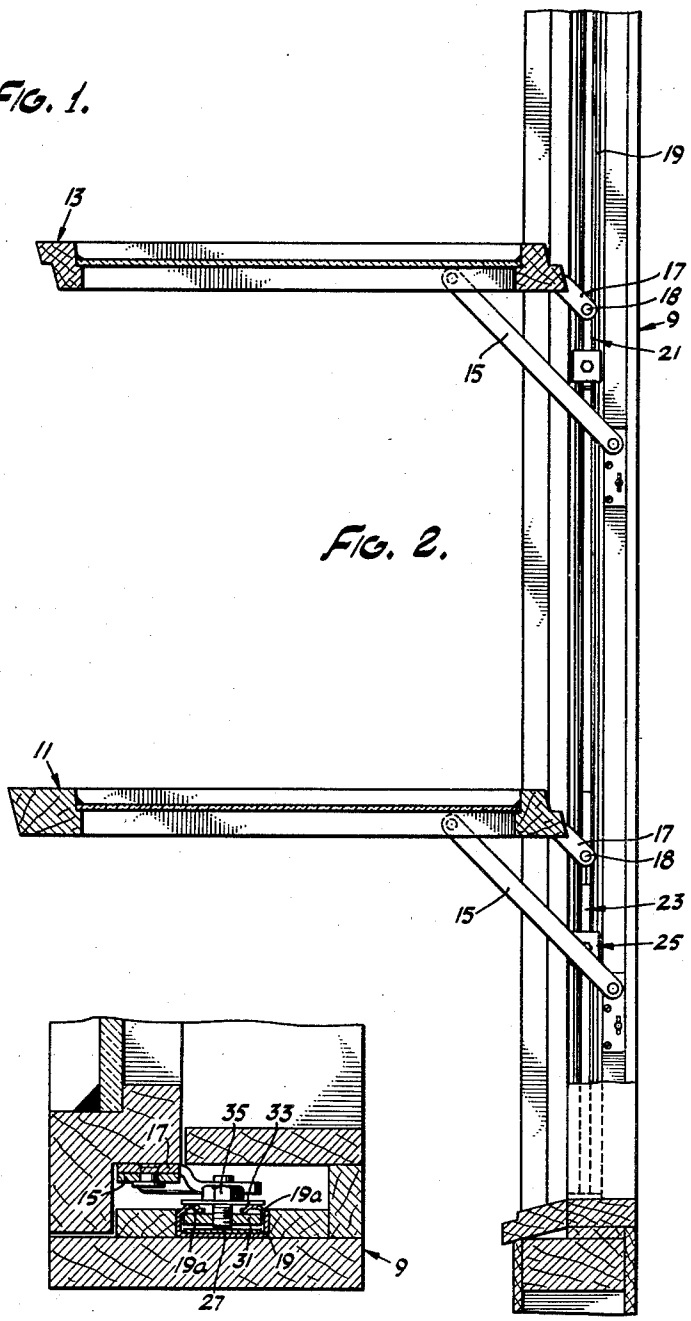


FIG. 2.

FIG. 3.

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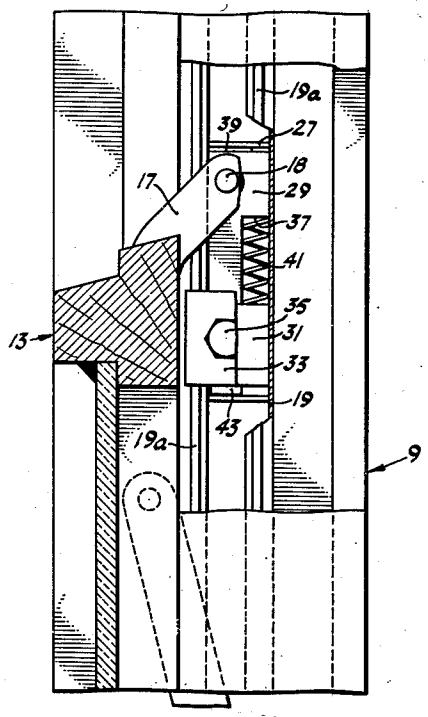


FIG. 4.

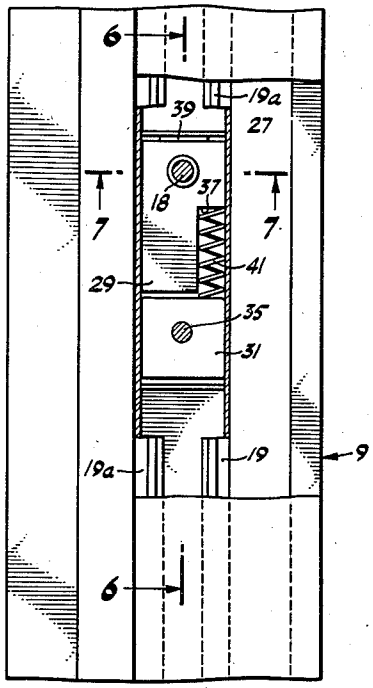


FIG. 5.

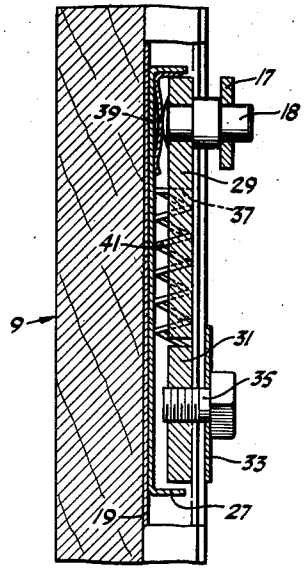


FIG. 6.

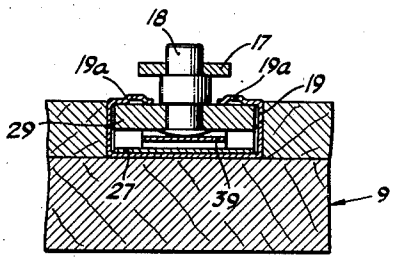


FIG. 7.

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MULTIPLE WINDOW CONSTRUCTION

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Application August 25, 1952, Serial No. 306,109

6 Claims. (Cl. 20—42)

This invention relates to a multiple window construction of the type including a plurality of vertically disposed sashes swingable about horizontal axes from closed to opened positions and vice versa.

The application of Russell S. Strand entitled "Multiple Window Construction," Serial No. 132,250, filed December 10, 1949, which is now abandoned discloses such a construction wherein the lower sash is utilized as an operator to open and close the upper sashes. The hardware includes channel-shaped tracks reciprocably disposed in runways in the side of the window frame and receiving shoes for the sashes, the shoes for the upper sashes being adjustably secured to the tracks, and the shoes for the lower sash being slidably disposed within the tracks and adapted to be detachably latched to the tracks. When applying the hardware to the sashes and the frame, to mount the sashes within the frame, considerable adjustment of the shoes for the upper sashes is usually required in order to assure proper closure of the upper sashes when the lower sash is closed. This is a time consuming operation and, furthermore, even when proper adjustment is attained, improper operation of the window can result because of subsequent warping of the sashes.

A main object of the invention is to provide an improved window construction in which the shoes for the upper sashes are so constructed as to apply a closing force to the upper sashes, independently of the movement imparted to the sashes by the movement of the tracks, whereby the time consuming adjustments of the upper shoes normally heretofore required is eliminated or substantially reduced, and proper operation of the sashes is assured even though the sashes warp subsequent to their being mounted in the window frame.

Various other objects of the present invention will be apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is a longitudinal vertical mid-sectional view in side elevation through a window embodying the concepts of the present invention.

Fig. 2 is a view similar to Fig. 1, but showing the sashes as having been moved to their opened positions.

Fig. 3 is a horizontal fragmentary sectional view taken along line 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary side elevational view, partly broken away, of part of the hardware disclosed in Fig. 1, with the wedge being shown in place.

Fig. 5 is a view similar to Fig. 4 showing parts after removal of the wedge and showing a partial upward travel of the shoe holder.

Fig. 6 is a sectional view taken along line 6—6 of Fig. 5.

Fig. 7 is a sectional view taken along line 7—7 of Fig. 5.

Referring to the accompanying drawings wherein similar reference characters designate similar parts throughout, there is disclosed a window frame 9 having swingably mounted therein a lower sash 11 and one or more

sashes 13, two of such upper sashes being shown. The mounting of the sashes within the frame assumes the form of links 15 pivotally connected at their opposite ends to the sashes and frames, and by arms 17 fixed to the sashes and pivotally connected by pivots 18 to shoes fitting within channel-shaped tracks 19. Tracks 19 are reciprocably disposed in runways formed in the sides of frame 9 as best shown in Fig. 3, and have inwardly extending lips 19*a* for retention of the shoes.

The shoes for the upper sashes are adjustably secured to the tracks 19 in a manner to be presently described and are given the reference numeral 21, whereas the shoes for the lower sash are slidably disposed within the tracks and are given the reference numeral 23. Lower shoes 23 are adapted to be releasably latched to tracks 19 by latch mechanism 25 of conventional construction, for instance, such as disclosed in the patent to Russell S. Strand, No. 2,598,619.

The construction of an upper shoe is best shown in Figs. 3 through 7, where it is apparent there is included a channel-shaped shoe holder 27 fitting within the associated track 19 and retained therewithin by lips 19*a*. Fitting within holder 27 and also retained by lips 19*a* is the shoe proper, which comprises two pieces, an upper member 29 and a lower member 31, the latter being adjustably secured to the track by a washer 33 and a screw 35, see Fig. 3. Upper shoe member 29 is spring-biased into engagement with lips 19*a* by an L-shaped spring 39 having a convex leg compressed between said member (specifically between the riveted end of pivot 18) and track 19. Member 29 is notched at 37 to accommodate an expansion spring 41 which urges members 29 and 31 apart. At the time of installation, shoe members 29 and 31 are maintained in contact with one another by a removable wedge 43 disposed between the lower shoe member and the laterally extending lower end of holder 27, see Fig. 4.

When applying previous hardware to a window frame and the sashes to mount the sashes in the frame, the workmen are required to adjust the shoes for the upper sashes in order that the upper sashes will close tight when the lower sash is closed. These adjustment operations consume time that could be utilized in installing other sashes, and the adjustment time is increased when the workmen are unfamiliar with the hardware, as is frequently the case. This adjustment time obviously increases the expense of installing sashes in a window frame, and furthermore if the workmen have a tendency to be careless, the upper sashes are likely not to fit properly.

With the upper shoe construction of the present invention, the wedges 43 can be removed after the lower sash has been properly adjusted (such as set out in the application to Arthur H. Soule, entitled "Window Structure Hardware," Serial No. 139,983, filed January 23, 1950, now abandoned), to allow holders 27, under the influence of the expansion springs 41, to move upwardly to apply a closing force to the upper sashes independent of movement of tracks 19. That is, the upper sash is yieldably disposed in a position angularly leading the lower sash, with reference to closing movement of the sashes, so that when the lower sash is closed the upper sash is yieldingly forced against the frame by springs 41. This application of closing forces assures that the upper sashes will close properly when the lower sash is closed, and eliminates the time-consuming adjustments of the upper shoes which have been heretofore necessary. It will be apparent that the above construction will also compensate for warping of the sashes after they have been mounted in place to allow proper operation thereof without binding of the tracks in their runways.

While I have shown the preferred form of my inven-

tion, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

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

1. A device of the class described, comprising a window frame having vertical slides mounted for reciprocal movement along the inner opposed side faces of said frame, a pair of superposed sashes swingably mounted in the frame, means articulately connecting the sashes to the slides whereby movement of the lower sash is transmitted to the upper sash to cause similar movement of the sashes upon operation of the lower sash, said means including for the upper sash a pair of shoes disposed one on either side of and pivotally connected to the upper sash and slidable along the slides, and spring means connected between each of said shoes and each of said slides urging the shoes upwardly relative to said slides whereby the upper sash will slightly lead, with reference to closing movement thereof, the angular position of the lower sash.

2. A device of the class described, comprising a window frame having vertical slides mounted for reciprocal movement along the inner opposed side faces of said frame, a pair of superposed sashes swingably mounted in the frame by means of links pivotally connected at their opposite ends to the frame and to the sashes adjacent the upper ends thereof, means articulately connecting the upper ends of the sashes to the slides, whereby movement of the lower sash is transmitted to the upper sash to cause similar movement of the sashes upon operation of the lower sash, said means including for the upper sash a pair of shoes disposed one on either side of and pivotally connected to said upper sash and slidably engaging the slides, and yieldable means between each of the shoes and each of the slides urging the shoes upwardly relative to the slides whereby the upper sash will slightly lead, with reference to closing movement thereof, the angular position of the lower sash.

3. A device of the class described, comprising a window frame having vertical slides mounted for reciprocal movement along the inner opposed side faces of said frame, a pair of superposed sashes swingably mounted in the frame by means of links pivotally connected at their opposite ends to the frame and to the sashes adjacent the upper end thereof, means articulately connecting the upper ends of the sashes to the slides, whereby movement of the lower sash is transmitted to the upper sash to cause similar movement of the sashes upon operation of the lower sash, said means including for the upper sash a pair of shoes disposed one on either side of and pivotally connected to the upper sash and slidably engaging the slides, spring means mounted on the slides urging the shoes upwardly, and stop means limiting upward movement of the shoes to positions where the upper sash will slightly lead, with reference to closing movement thereof, the angular position of the lower sash.

4. A device of the class described, comprising a slide adapted to be reciprocably disposed in one of the inner opposed side faces of a window frame, a shoe slidable along the slide and having means for pivotal connection to a sash, spring means urging the shoe in one direction along the slide, and means for limiting movement of the shoe in said direction.

5. A device of the class described, comprising a slide adapted to be reciprocably disposed in one of the inner opposed side faces of a window frame, a shoe slidable along the slide and having means for pivotal connection to a sash, spring means urging the shoe in one direction along the slide, means for limiting movement of the shoe in said direction, a U-shaped holder slidable along the slide and containing the shoe, and a fixed shoe secured to the slide and fitting within the holder, the combined lengths of shoes being less than the effective length of the holder, said spring means fitting within the holder and between the fixed and movable shoes.

6. A device of the class described, comprising a slide adapted to be reciprocably disposed in one of the inner opposed side faces of a window frame, a shoe slidable along the slide and having means for pivotal connection to a sash, spring means urging the shoe in one direction along the slide, means for limiting movement of the shoe in said direction, a U-shaped holder slidable along the slide and containing the shoe, a fixed shoe secured to the slide and fitting within the holder, the combined lengths of shoes being less than the effective length of the holder, said spring means fitting within the holder and between the fixed and movable shoes, and a removable element of a thickness substantially equal to the difference between the combined lengths of the shoes and the effective length of the holder and fitting between the fixed shoe and the adjacent end of the holder.

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