Feb. 13, 1951 F. F. BEIL 2,541,325

WINDOW STRUCTURE

Filed June 22, 1945 2 Sheets-Sheet 1

Fig. 1.

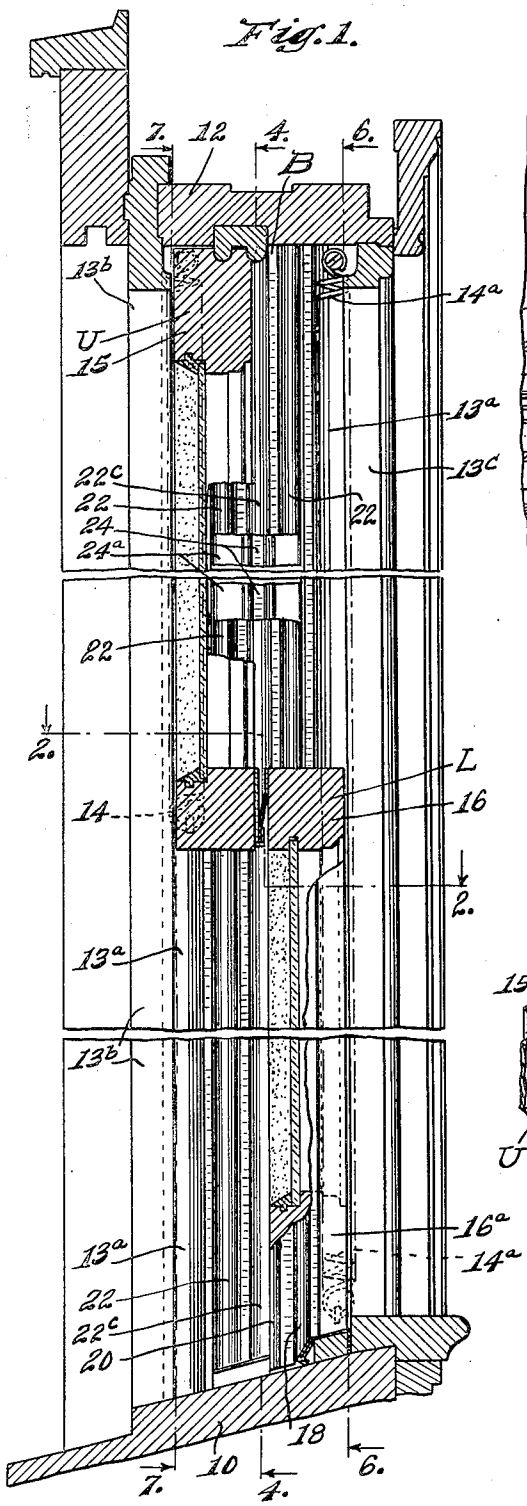


Fig. 2.

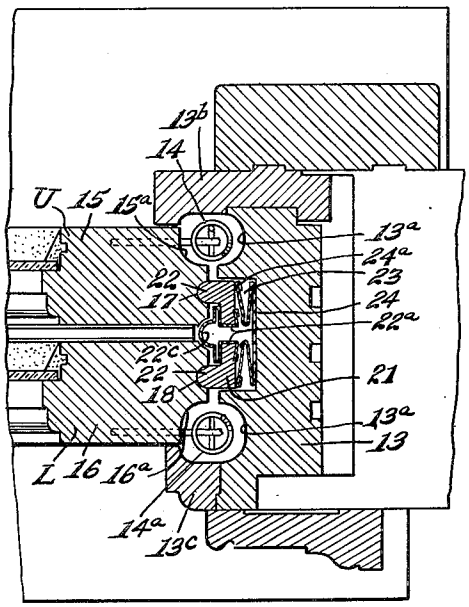
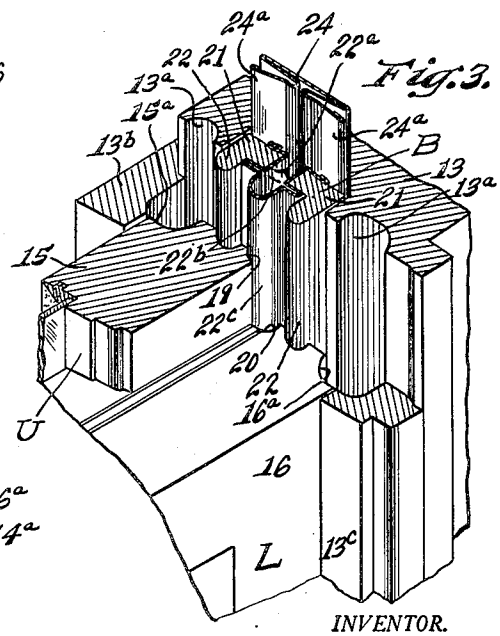


Fig. 3.



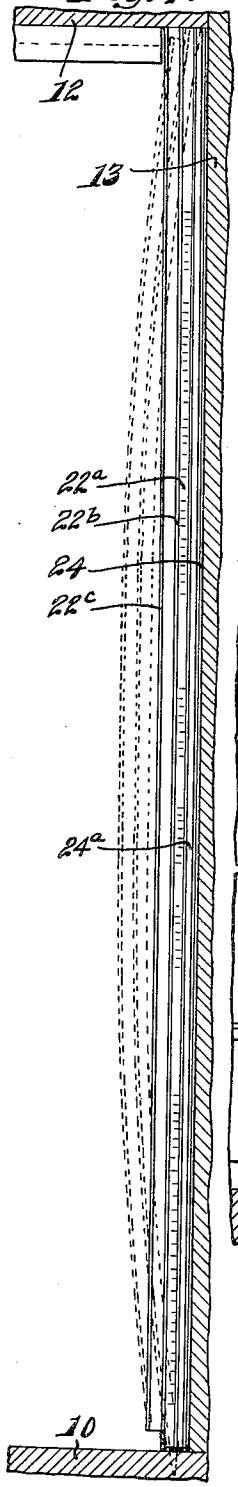
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Filed June 22, 1945 2 Sheets-Sheet 2

Fig. 4.



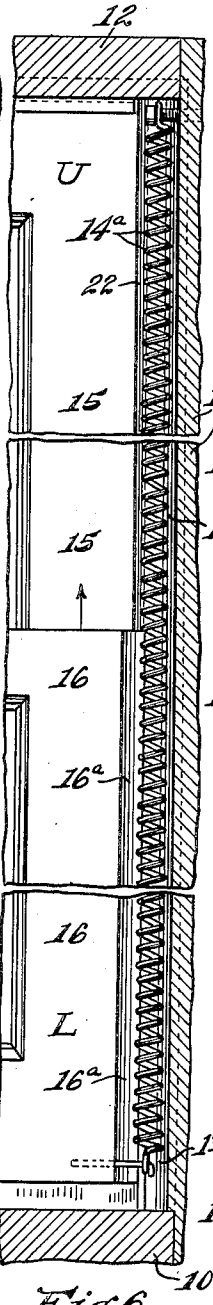


Fig. 6.

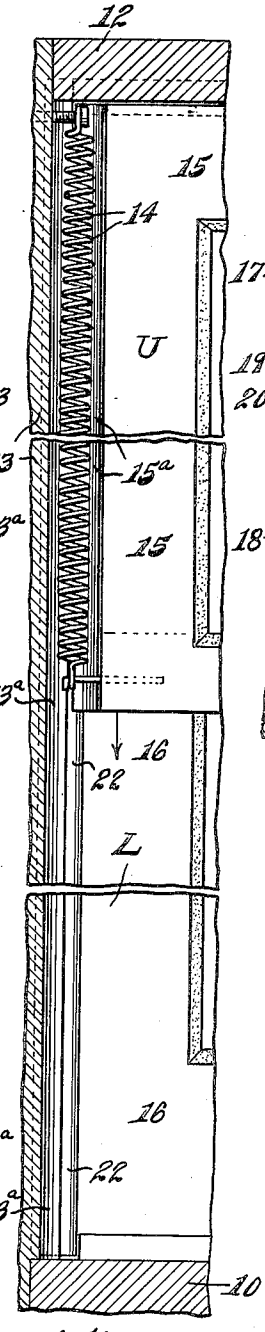
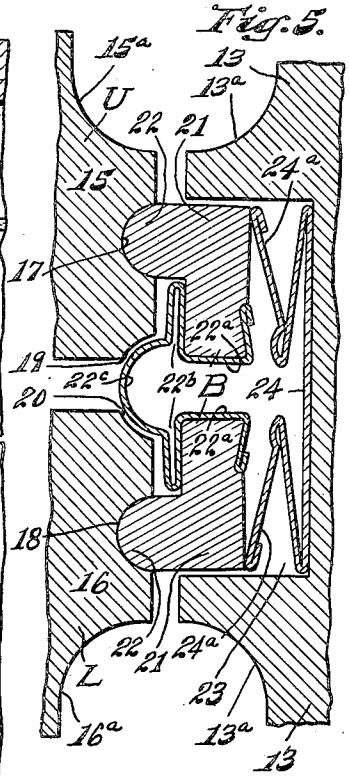


Fig. 7.

Fig. 5.



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WINDOW STRUCTURE

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10 Claims. (Cl. 20—52.4)

1

My present invention relates to window structure of the type in which vertically sliding sash are supported by coil springs and cooperating elements are provided for affording proper friction on the sash whereby the sash will remain in any position to which they may be adjusted.

A particular object is to provide such a window structure having a floating friction bar of novel construction mounted in the jamb in each side of the two sash of a double-hung window for providing a sealing engagement with the sash and affording a part stop.

It is my purpose to provide such a friction bar having spaced sealing and guide members constructed preferably of wood or plastic and resiliently connected by a metal element.

A further object is to provide such a friction bar which in cooperation with other parts, performs the function of providing tight joints between the bar and the sash and of frictionally engaging the sash so that in cooperation with the coil springs adequate friction is afforded in all positions of the sash and all conditions of expansion and contraction.

A further object is to provide resilient means in the jambs for biasing the friction bar toward the sash and also serving as weather strip sealing means.

A still further object is to provide a window structure in which the last-described resilient means and the friction bar may be installed in the jambs or removed therefrom without the aid of tools and without the use of nails, screws or other fastenings.

Another object is to provide such a structure with the parts so made and arranged that the sash may be assembled in or removed from the frame by snapping them into place or removing them from the frame in the shortest time and with the least labor.

Particularly it is my object to provide such a friction bar which, in cooperation with the other parts, will maintain proper friction with each of the sash regardless of shrinking or swelling of the sash and which will always afford weather seal with the sash.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my device whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims and illustrated in the accompanying drawings, wherein:

Figure 1 is a vertical sectional view through a window structure embodying my invention.

Figure 2 is a horizontal sectional view on the line 2—2 of Figure 1.

2

Figure 3 is a sectional perspective view through part of a window frame and having sashes therein illustrating the friction and providing weather sealing connection between the jamb and the sashes.

Figure 4 is a vertical sectional view on the line 4—4 of Figure 1 illustrating the manner in which the friction bar and the weather sealing resilient members for biasing it toward the sash may be installed and held in place.

Figure 5 is a horizontal sectional view somewhat similar to Figure 2 but enlarged to better show the arrangement of the friction bar with relation to the sash and the resilient weather strip member which biases the bar toward the sash.

Figure 6 is a vertical sectional view taken on the line 6—6 of Figure 1.

Figure 7 is a vertical sectional view taken on the line 7—7 of Figure 1.

In the drawings herewith, the window sill is shown at 10. The head jamb at 12 and a side jamb at 13. The window illustrated is of the double hung type having the upper sash U and the lower sash L.

The sash are hung on coil springs 14 and 14a secured at their upper ends to the jambs and at their lower ends to the lower parts of the stiles of the respective sash. There are two springs for each sash. They are of the kind more fully illustrated in Madsen Patent No. 1,889,752. The stiles of the upper and lower sash are indicated at 15 and 16 respectively. The stiles are provided with similar grooves 15a and 16a, and the jambs are provided with grooves 13a, Fig. 5, and housing the springs 14, 14a.

The window frame has the blind stop 13b and the inside stop 13c, Fig. 2, which complete the spring housings. These springs 14 and 14a are selected and tested with great care and their tension is preferably such as to balance the weight of the upper and lower sash vertically of the lower frame.

We note that the structure at the opposite side of the sash from that illustrated in Figure 2 is the same as that shown in Figure 2.

By the use of springs constructed within certain limits of tension and by controlling the friction of the sliding strips, I have produced a structure in which the sash may be moved freely and conveniently and with a minimum of effort to any position from full open to full closed and in which the sash will be held in any position in which it is left.

The structure herein provided affords such friction under all conditions of use and makes possible the manufacture of a window which will

not stick in damp weather. The present structure also allows minimum infiltration of air under all conditions. These desirable results are obtained by the structure now to be described in greater detail.

The sash fit between the side jambs with enough play to avoid any binding under the maximum swelling to which the parts may be subjected. The desired friction with proper weather seal are provided by means of the friction bar B and the resilient bar 24, Figure 5. The friction bar B has two members 21, laterally spaced as shown for instance in Figures 2 and 5, having rounded beads 22, cooperating with correspondingly shaped grooves 17 and 18 in the respective sash.

The wood members 21 of the friction bar B are connected by resilient metal member A having channel-shaped portions 22*a* to receive parts of the members 21. The channel shaped portions 22*a* of the member A are connected by a vertical strip 22*b* having a central portion 22*c* forming a parting strip and fitting into and cooperating with rabbets 19 and 20 in the adjacent edges of the stiles 15 and 16 of the upper and lower sash, but free from contact with the sash.

For biasing the friction bar B toward the sash so that it will properly perform its function of affording friction and providing a parting stop and weather seal, I provide the member 24 illustrated as having a double Z-shape. The member 24 is received in a single channel 23 provided in the jamb 13, and has the spring flanges 24*a* bearing against the respective wooden members 21 of the friction bar B in such fashion as to tend to press the beads 22 into the grooves 17—18.

The member 24 is thus yieldingly compressed between the bottom of the grooves 23 and the friction bar B so that it functions as a weather strip sealing the weather structure against the infiltration of air across the face of the beam.

The parts are so constructed and proportioned that the friction bar B is floatingly projected into the channel or groove 23 in the jamb 13 when the beads 22 project well away from the jamb to afford proper frictional engagement between these beads and the sash under all conditions of contraction and expansion of the parts. While the friction bar B is thus floatingly mounted, it is yet snugly sealed on both sides to prevent air infiltration. The sealing is accomplished by continuous contact of the bar B with the sash and with the member 24, which presses against the bottom of the channel 23.

The friction bar B may be made of a single piece without the resilient connecting member A, but I have found that there are substantial advantages in the present structure over such a single piece bar.

The member 24 and the friction bar B both extend full length of the two sash so that there are no breaks anywhere through which air may go through the window. A single bar and a single member 24 may be installed on each side of the window for providing friction and weather sealing for both sash.

The wood parts of the bar B are preferably made of hardwood or semi-hardwood and they may be coated with a water repellant and may be impregnated with a suitable lubricant, if desired.

A sealing bar B' may be inset in the head jamb at the top of the window frame for cooperation with the upper sash.

Another advantage of the structure herein described lies in the simplicity with which the member 24 and friction bar B may be installed. The bar B terminates a little short of the side jambs 13. The member 24 can be loosely set in place in the channel 23 of the side jamb 13 and the upper end of the friction bar B can be slipped behind the end of the bar B' as indicated in Figure 4.

The lower ends of the bars B may be notched to coact with small metal retainers 23*a* fastened to the sill 10. The bar B may be bowed to its dotted shape shown in Figure 4, and its lower end slipped to position for coacting with the retainer 23*a*, and the bar B can then be released, and it will fit snugly in place projecting into the channel 23.

The end of the bar B' and the retaining sleeve 23 are so positioned as to retain the floating movement of the friction bar B required for permitting it to perform its functions properly.

In installing the sash in the frame, it is assumed that inside stop 13*c* on one side has been removed. The sash can be set in place for cooperation with the friction bar on the other side with the springs 14 properly connected. The sash can then be swung to position, sliding over the bead or beads of the bar B at the side of the frame from which the inside stop has been removed, and snapped into position where it will be retained by the sealing bars. Both sash can be similarly inserted in a minimum of time.

Springs 14, 14*a* at one side of the frame are installed after the sash are in place, and the inside stop 13*c* is then fastened in position.

The sash are removable with equal convenience.

The inside stop 13*c* may be removed and the springs 14, 14*a* on that side taken out, whereupon the sash may be snapped out of position. By pushing a sash toward the opposite side jambs, enough play is permitted to permit the sash to be snapped out.

The friction bars B and the members 24 insure the maintenance of proper friction between the sash and the frame under all working conditions so that the sash and springs 14, 14*a* will always properly cooperate.

The members 24 and bars B afford an excellent weather seal. The friction and the seal are maintained even in case of the rare instances of bowed jambs, and in all conditions of expansion and contraction of the wooden parts.

I have found that a wood-to-wood sliding connection tends to give a more equal friction under all conditions than does a metal-to-wood or metal-to-metal sliding contact. Where a metal-to-wood or metal-to-metal sliding contact is provided, any corrosion of the metal results in a change in the friction. This is particularly important with spring-hung windows where the ideal condition is one where the coil springs normally tend to hold the sash half way up and the friction is just a little more than enough to cause the sash to be held in any position of adjustment.

Assume that the sash is in perfect balance when it is at mid-position of its vertical travel. At this position the tension on the springs balances the weight of the sash. When the sash is pulled to a lower position, the spring tension increases and thus will exceed the weight of the sash which would tend to pull the sash back to the center position. It is necessary then that sufficient friction be introduced to resist this tendency of the sash to go back to the center position. Now, if the sash is raised from the mid-position, the spring is shortened and the spring

tension is reduced, in which case the tension of the spring is less than the weight of the sash and the sash tends to fall toward back to the center position. Under this condition it is necessary that sufficient friction be introduced to prevent the sash from lowering itself. These are the conditions produced in the window through the use of coiled springs built to rigid specifications which cover the amount of initial tension in the coil and the build-up rate of the spring. By initial tension is meant the pull in pounds necessary to start the spring extending from a closed position and the build-up rate is the increase in tension which occurs as the spring is extended further and further.

The friction bar of the kind here described has certain advantages which may be enlarged upon. If the friction bar is an integral single bar, the expansion of one sash may tend to pull the parting stop away from the other sash. There is less of that tendency with the present structure. With the present structure each member 21 may move directly in and out to a degree in the channel 23 without twisting the other member 21 as might occur with a one-piece friction bar.

It is also of some importance that in the present structure the members 21 may have slight limited play toward and from each other to enable the bar to fit the sash snugly under all conditions of expansion and contraction and under all conditions of variations with the tolerances of manufacture.

It is preferable and it is my purpose that the frame and sash be finished and machined to the highest degree of accuracy, yet if there are slight variations from the ideal, the structure here provided will take care of them and afford the minimum necessary friction in cooperation with the coil springs to hold each sash in any position of its adjustment.

It is my purpose to cover by my claims any modifications or use of mechanical equivalents which may be reasonably included within their scope and the scope of my invention.

I claim as my invention:

1. In a removable friction bar, a pair of spaced wood members, each having a bead for coacting with a window sash, and a resilient member connecting said wood members for permitting their limited movement relative to each other said resilient member having dovetail channels receiving marginal edges of said wood members whereby the wood members are connected relative to said resilient member.

2. In a window structure, a frame having side jambs, each provided with a central vertical channel, a pair of sashes vertically slidable between the jambs, each having grooves in its stiles, friction bars floatingly movable toward and from the bottoms of the channels in the jambs and between the walls of said channels, each of said friction bars having individual spaced members each provided with a bead for fitting into the groove of a sash and having a resilient central connecting member, and continuous means extending the full length of the channel for biasing the beaded members of said friction bar toward the sashes, said last means being received in the respective channels and serving as a weatherstrip.

3. In a window structure, a frame having side jambs, each provided with a central vertical channel, a pair of sashes vertically slidable between the jambs, each having grooves in its stiles, a friction bar floatingly movable toward and from the bottom of the channel in the jamb and between the walls of said channel, said friction bar having spaced members provided with beads for fitting into the grooves of the sashes and having a resilient central connecting member and shaped to form a rounded parting stop and continuous means extending the full length of the channel for biasing the beaded members of the friction bar toward the sashes, said last means being received in the respective channels and serving as a weatherstrip.

4. In a window structure, a frame having side jambs, each provided with a central vertical channel, a pair of sashes vertically slidable between the jambs, each having grooves in its stiles, a friction bar floatingly movable toward and from the bottom of the channel in the jamb and between the walls of said channel, said friction bar having spaced members provided with beads for fitting into the grooves of the sashes and having a resilient central connecting member, and shaped to form a rounded parting stop, said sash having rounded rabbets to coact with said parting stop, and means for biasing the beaded members of said friction bar toward the sashes, said last means being received in the respective channels.

5. In a window structure, a frame having side jambs, each provided with a vertical channel, a pair of sashes arranged to slide vertically between the jambs, each sash having rounded grooves in its stiles and having rounded rabbets to coact with a rounded parting stop, a friction bar floatingly movable laterally of the window in said channel, said friction bar having spaced wood members, each provided with a rounded bead to project into the grooves of the sash, and having a resilient metal connecting bar provided with channels to receive parts of said wood members and shaped to form a rounded parting stop, and resilient means in said channel for biasing the first-described members of the friction bar toward the sashes.

6. In a window structure, a frame having side jambs, each formed with a vertical channel, a pair of sashes vertically slidable between the jambs, adapted to be resiliently supported on the jambs, said sashes having rounded grooves in their stiles and having rounded rabbets in their stiles to cooperate with the parting stop, friction bars, each having spaced wood members provided with rounded beads to cooperate with the grooves in the sashes and having a resilient member connecting said first-named wood members and shaped to form a parting stop to cooperate with said rabbets, and a resilient metal member in each channel, having a part for engaging the bottom of the channel and parts for biasing the wood members of the friction bar toward the sashes, whereby controlled friction on the sashes is provided for holding the sashes in any of their adjusted positions.

7. In a window structure, a frame having side jambs, each provided with a vertical channel, a pair of sashes vertically slidable between said jambs adapted to be resiliently hung, each having in each stile a rounded groove to cooperate with a sealing bar, and a rounded rabbet to cooperate with a parting stop, tensioned to normally hold the sashes at the middle positions of their movement, a friction bar floatingly movable between the walls of each channel toward and from the bottom of said channel, said friction bar having spaced wood members, each provided with a

rounded bead to cooperate with a groove in a sash and having a resilient connecting member shaped to form a parting stop to cooperate with the rabbets in the sashes and a resilient strip in each channel engaging the bottom thereof and having projecting parts for engaging the wood members of said friction bar and biasing them toward their respective sashes, said sashes and jambs being constructed to allow expansion and contraction thereof without binding.

8. In a window structure, a frame having side jambs, each provided with a vertical channel, a pair of sashes vertically slidable between said jambs adapted to be resiliently hung, each having in each stile a rounded groove to cooperate with a sealing bar, and a rounded rabbet to cooperate with a parting stop, tensioned to normally hold the sashes at the middle positions of their movement, a friction bar floatingly movable between the walls of each channel toward and from the bottom of said channel, said friction bar having spaced wood members, each provided with a rounded bead to cooperate with a groove in a sash and having a resilient connecting member shaped to form a parting stop to cooperate with the rabbets in the sashes and a resilient strip in each channel engaging the bottom thereof and having projecting parts for engaging the wood members of said friction bar and biasing them toward their respective sashes, said sashes and jambs being constructed to allow expansion and contraction thereof without binding, means on the frame at the top and bottom of said friction bars to limit the amount of movement of the friction bars away from the jambs, said friction bars being sufficiently resilient to permit them to be sprung to insert their ends behind said limiting means.

9. A friction bar having a pair of spaced wood members formed with longitudinal beads for cooperation with a pair of window sash stiles of window sashes, the panes of which are mounted in two planes parallel to, and spaced from, each other a slightly greater distance than the thickness of the sash, said friction bar having a resilient strip for connecting said wood members, the central part of which connecting strip is shaped to form a parting stop projecting between said pair of window sash stiles.

10. In a friction bar, a pair of spaced wood members having beads for coaction with grooves in a pair of window sash stiles of window sashes, the panes of which are mounted in two planes parallel to, and spaced from, each other at a slightly greater distance than the thickness of the sash, a resilient connecting strip having a pair of oppositely opening channels, one for receiving part of one of said wood members and the other for receiving part of the other of said wood members, said connecting strip having a central portion connecting the respective channels together and forming a parting stop adapted to engage between said pair of sash stiles.

FORREST F. BEIL.

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The following references are of record in the file of this patent:

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