May 16, 1939. E. F. WILEY 2,158,714

MULTIPLE SASH WINDOW HARDWARE

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Fig. 1.

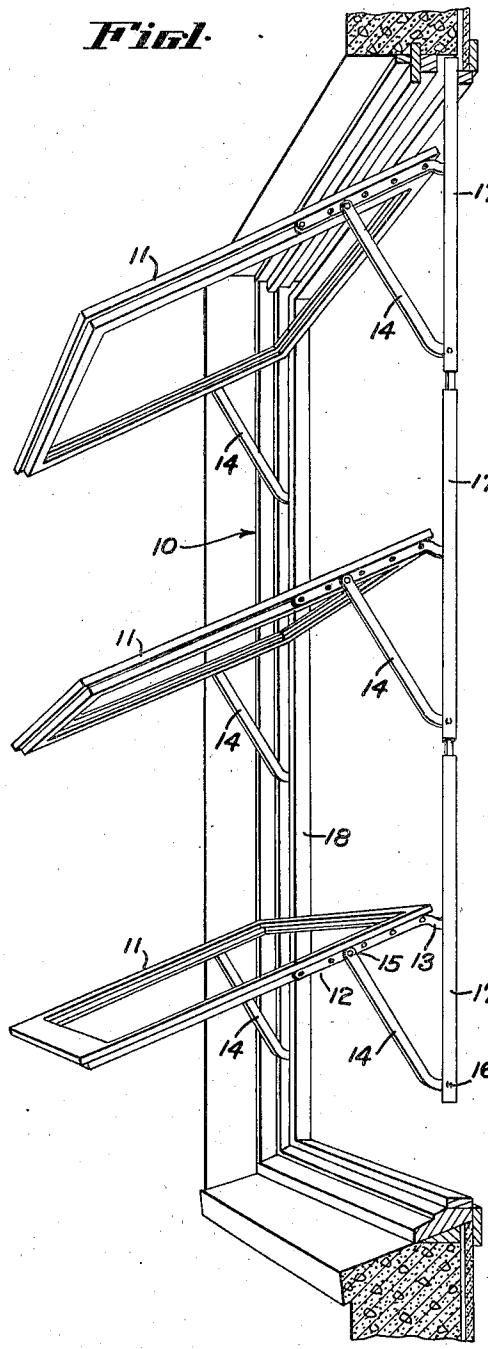


Fig. 2.

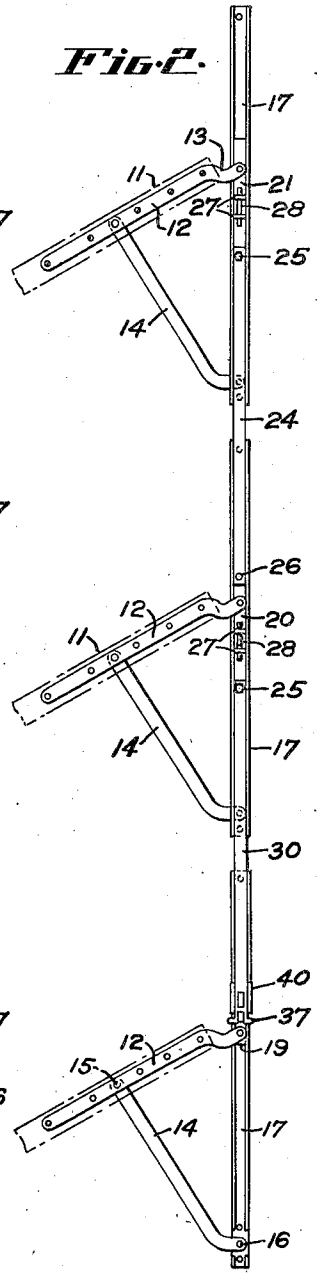
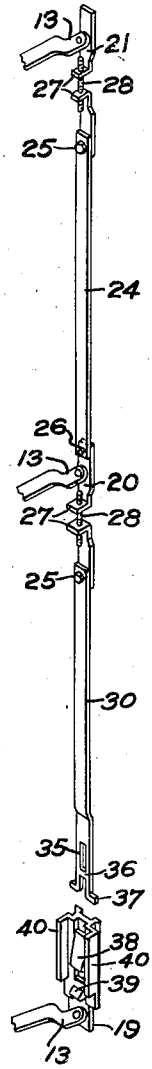


Fig. 3.



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Fig. 5.

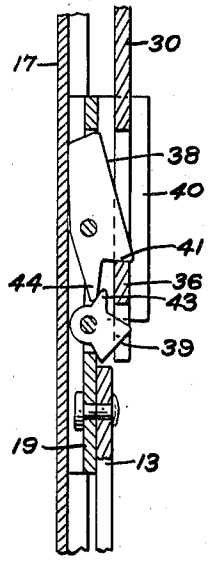


Fig. 6.

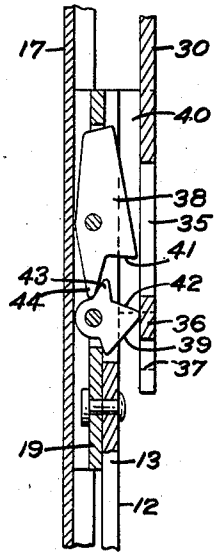


Fig. 7.

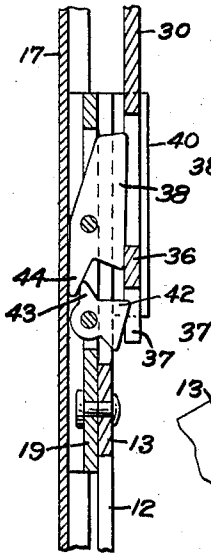


Fig. 8.

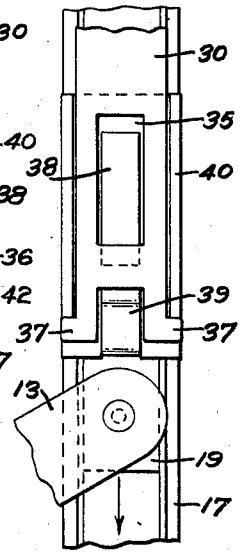


Fig. 9.

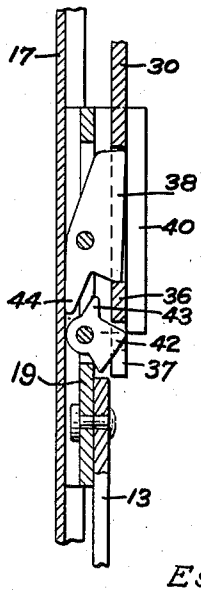


Fig. 10.

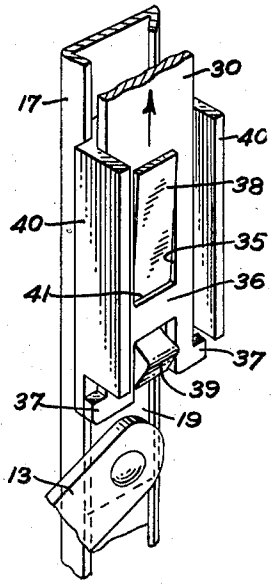
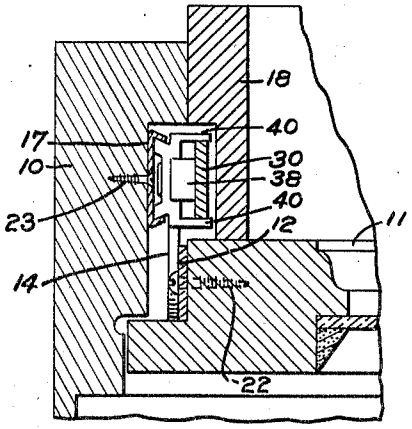


Fig. 4.



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Patented May 16, 1939

2,158,714

UNITED STATES PATENT OFFICE

2,158,714

MULTIPLE SASH WINDOW HARDWARE

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Application July 28, 1937, Serial No. 156,097

7 Claims. (Cl. 20—42)

This invention relates to multiple sash window hardware, and particularly to the hardware or operating mechanism for awning type windows in which the manipulation of one sash automatically controls the opening and closing of the other sashes.

All automatically operating awning type window hardware known at the present time is difficult to install, and its installation must be done by specially trained mechanics. The reason for this is that it has been customary to manufacture such hardware in several separate parts. These parts usually comprise an arm and hinge to be screwed to the sash and a guide in the form of a metal channel or the like that is imbedded in or screwed to the frame jamb at a predetermined location. In these structures, the guide members are placed upon the frame as separate units so that accurate positioning of the guides and extreme accuracy in the milling of the sashes and frames is required to assure proper alignment and smooth operation. Likewise, where a separate releasing mechanism is employed for disconnecting the sashes to permit of their independent operation, such mechanism must also be installed with absolute accuracy to insure its proper functioning with the sash and frame hardware.

It is the object of the present invention to provide multiple sash window hardware that may be installed on sash and frame quickly and easily and without the necessity of careful measurement.

A further object is to provide such hardware that is readily adjustable upon being installed to fit windows of various dimensions and to accommodate variations in spacing and position of the several parts that may occur during installation.

A still further object is the provision of hardware of this character that may be fabricated and assembled at the factory in single units, including the sash and frame parts, the guide mechanism for the frame, and means for operatively connecting and disconnecting adjacent sashes.

One form of the invention is illustrated in the accompanying drawings, and described in detail in the following specification wherein further advantages thereof are made apparent.

In the drawings—

Fig. 1 is a perspective view of a window with sash hardware constructed in accordance with the present invention, one side of the window being broken away to expose details of construction;

Fig. 2 is a side elevation of the hardware from one side of the window illustrated in Fig. 1;

Fig. 3 is a perspective view of certain parts illustrated in Fig. 2, these parts being sliding shoes and travel bars by means of which the several sashes are operatively connected;

Fig. 4 is a horizontal sectional view taken through a frame and sash illustrating the manner of application of the hardware thereto;

Fig. 5 is a vertical sectional view of a releasable shoe carried by the control sash illustrating the position of the parts during opening of the sashes;

Fig. 6 is a similar view illustrating the position of the parts during closing of the control sash while the other sashes remain open;

Fig. 7 is a similar view illustrating the position of the parts during subsequent opening of the control sash and prior to re-engagement with the other sashes;

Fig. 8 is a front elevation of the same showing the parts in the position illustrated in Fig. 7;

Fig. 9 is a vertical sectional view of the same showing the position of the parts upon reclosing of the control sash after re-engagement with the other sashes to cause them to close simultaneously with the control sash; and

Fig. 10 is a perspective view of the same with the parts in the position illustrated in Fig. 9.

The window shown in Fig. 1 is illustrative of one type to which the invention may be applied. This window comprises a frame 10 and three superposed swinging sashes illustrated at 11 shown in an open position and mounted for swinging movement so that all may be closed to completely close the opening in the frame 10.

The sashes 11 are substantially identical in construction, and the hardware for each side of each sash 11 comprises a sash plate 12 secured by screws to the edge of the sash and terminating at its upper end in a bent arm 13 which projects inwardly from the sash. A link 14 is pivotally connected as at 15 to the sash plate, and pivotally connected as at 16 to a point adjacent the lower end of a guideway or track 17. The track 17 is screwed to the frame and thereafter concealed by a stop member in the form of a long wooden strip 18 against which the inner face of the sash abuts when it is in its closed position.

The track 17 consists of a flat bar having its edges flanged inwardly as illustrated in Figs. 4 and 10 so that it will slidably retain shoes that are guided for vertical movement by it. The end of the arm 13 is pivoted to such a shoe which

slides in the track 17. The shoe to which the arm 13 is pivoted varies in construction depending upon the sash with which it is to be used. Referring to Fig. 3, a shoe for a bottom sash is illustrated at 19, while a shoe 20 is shown for an intermediate sash, and a shoe 21 for a top sash. Travel bars, presently to be described, connect these shoes to which the arms 13 are pivoted so that the sashes may be caused to operate simultaneously. These travel bars, however, may be installed after the other members have been applied to the sashes and frame. The unit, therefore, which comprises the sash plate 12, the link 14, the track 17 and either of the shoes 19, 20, or 21, as the case may be, is fabricated and assembled at the factory. It being understood that the track 17 used with each individual sash is a separate element, these units which are comparatively compact and easy to handle may be assembled and packed in readiness for application to the sash and frame. Three such units are illustrated in Fig. 2 as in their open position, and when they are closed, the members 12, 14 and 17 are substantially parallel so that they may be conveniently handled and packed.

The manner in which these units are applied to the sash and frame is best illustrated in Fig. 4 of the drawings wherein the sash plate 12 is illustrated as secured by screws 22 to the edge of the sash. There is usually a rabbeted shoulder, as illustrated, against which this sash plate may be disposed to insure sufficiently accurate alignment thereof, but absolute accuracy is not essential. When both sash plates 12 are aligned against the rabbeted shoulders and secured to the sash, the sash is placed in position within the frame with the hardware in the position that it assumes when the sash is closed. The track 17 then naturally assumes its proper position against the frame member 10 where it is secured without further measurement or alignment by means of screws 23. After all of the sashes have been applied in this manner and the shoes thereof have been connected by travel bars in a manner to be described, a stop member 18 is set in place to conceal the operating mechanism.

The top shoe 21, as illustrated in Fig. 3, is connected with the intermediate shoe 20 by means of a travel bar 24, a bolt 25 connects the upper end of the travel bar with the shoe 21, and a pin 26 on the shoe 20 projects through a hole in the lower end of the travel bar. This pin may be loose-fitting so that the travel bar may be readily connected to it, the travel bar having sufficient resiliency to prevent its coming off the pin. A slight inward bend may be given to the travel bar before it is installed to increase its tendency to spring inwardly and insure against its becoming disengaged from the pin 26. To make it possible to vary the distance between the shoes, each of the shoes 21 and 20 is formed in two parts having outwardly bent ends 27 connected by right- and left-hand threaded screws 28. Turning of the screws 28 serves to vary the length of the shoes 20 and 21, and thereby adjusts the effective length of the travel bars to accommodate sashes of different dimensions. The shoe 20 is connected with the shoe 19 on the bottom sash by a similar travel bar 30, the connection between the travel bar 30 and shoe 19 being a releasable one.

The lower end of the travel bar 30 is provided, as illustrated in Figs. 3, 8 and 10, with a slot 35 interrupted by a crossbar 36, and at the extreme bottom thereof are outwardly extending lugs 37. The shoe 19 includes latching mechanism in the form of a latch member 38 and a tumbler 39, both pivoted, as illustrated in Figs. 5 to 7, within a central vertically extending slot in the shoe. The back of the shoe 19 is shaped to slide within the track 17 (see Fig. 4), and side flanges 40 extend forwardly from the edges of the shoe to guide the travel bar 30 so that a slot 35 will register with the latch mechanism with the lugs 37 in a position to engage with the bottom edges of the flanges 40. In Fig. 3, the shoe 19 and latch mechanism carried thereby is illustrated in a position before it has been connected with the travel bar 30, but the normal operating position of the parts is that illustrated in Fig. 10 with the travel bar received between the flanges 40. The travel bar is resilient and is preferably given a slight inward bend so that its resiliency maintains it in position for cooperation with the shoe 19.

By means of the latch mechanism carried by the shoe 19, the lower sash may be operated independently or may be connected for simultaneous operation with the intermediate and top sashes. The lower sash is therefore referred to as the control sash, and it will be understood, as the description proceeds, that any one of the sashes may be used as a control sash instead of the lower sash through the use of such a latching shoe. The operation of the sash through the mechanism herein disclosed is similar to the operation of the sash in my copending application entitled "Operating mechanism for multiple sash windows", Serial No. 10,379, filed March 11, 1935. Through this mechanism, opening of the lower sash or control sash causes opening of all the sashes. The control sash may then be closed independently. Upon subsequent opening of the control sash, it is again connected with the remaining sashes for simultaneous operation so that subsequent closing thereof closes the remaining sashes.

This operation is accomplished through the mechanism of the latch shoe 19 cooperating with the lower end of the travel bar 30 in the manner illustrated in detail in Figs. 5 to 10, inclusive. In Fig. 5 the parts are illustrated in the positions occupied by them as the control sash is being opened and the shoe 19 is moving downwardly in the track 17, it being understood that the operation begins with all sashes fully closed. Crossbar 36 of the travel bar 30 is engaged by a shoulder 41 on the pivoted latch 38 so that the shoe pulls the travel bar 30 downwardly and causes opening of all the sashes to any desired angle as determined by the angle of opening of the control sash.

When the control sash is closed the shoe 19 moves upwardly and, as illustrated in Fig. 6, the crossbar 36 slides over a projection 42 on the tumbler 39, springing the resilient travel bar 30 outwardly and permitting the shoe 19 to move upwardly independently thereof. Thus the control sash or bottom sash has been closed, leaving the top sashes in their open position.

Upon reopening of the bottom sash, the shoe 19 again moves downwardly. The crossbar 36 first strikes the projection 42 on the tumbler 39, rocking that tumbler about its pivot so that a finger 43 thereon engages a tail 44 on the latch 38 and swings the latch about its pivot toward the position illustrated in Fig. 7, the crossbar 36 finally striking and coming to rest against the latch to move it to and retain it in the position illustrated in this figure. At this time the lugs

37 at the bottom of the travel bar 30 engage, as best illustrated in Fig. 8, with the shoulders provided by the bottoms of the flanges 40 so that if the bottom sash is swung outwardly beyond its original position at which the top sashes were left, this engagement between the lugs 37 and flanges 40 pulls the travel bar downwardly and causes all the sashes connected therewith to follow the movement of the control sash.

Upon reclosing of the control sash, which again moves the shoe 19 upwardly, the travel bar springs from the position illustrated in Fig. 7 to that illustrated in Fig. 9 where the upper edge of the slot 35 therein engages with the top of the latch 38 and the travel bar is thus forced upwardly by the latch 38 so that all sashes are closed simultaneously. The parts remain in the position illustrated in Figs. 9 and 10, while the sashes are in their closed position so that upon commencement of the cycle of operation the downward movement of the shoe 19 will, as illustrated in Fig. 5, again cause the shoulder 41 of the latch 38 to engage with the crossbar 36 of the travel bar, restoring the latch to the position of Fig. 5 and causing it to draw the travel bar downwardly.

While the invention is illustrated as applied to a window comprising three outwardly swinging sashes in which the lower sash is employed to control the others, it is to be understood that it is not limited to this form, but that it may be used in many types of windows regardless of the number of sashes, the direction that they swing, or the particular sash that is chosen to control the others.

Various changes may be resorted to in the construction and arrangement of the several parts of the invention herein described and illustrated within the scope of the appended claims.

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

1. The combination with a multiple sash window wherein the movement of one sash controls the others, hardware for mounting the sashes in the frame and comprising separate units for mounting the sashes independently of each other, each unit comprising a guide track for the frame, a shoe slidably confined thereby, a plate for the sash pivoted at one end to said shoe, and a link pivoted at one end to the guide track and at the other end to said plate.

2. The combination with a multiple sash window wherein the movement of one sash controls the others, hardware for mounting the sashes in the frame and comprising separate units for mounting the sashes independently of each other, each unit comprising a guide track for the frame, a shoe slidably confined therein, a plate for the sash pivoted at one end to said shoe, a link permanently pivoted at one end directly to the guide track and at the other end to said plate, the guide tracks of the separate sashes being arranged for alignment in the frame, and said shoes having means engageable with travel bars for operating connection with shoes of adjacent sashes.

3. The combination with a multiple sash window and hardware for mounting each sash independently in the frame of travel bars for operatively connecting the hardware of adjacent sashes, and means for adjusting the length of the travel bars, said means comprising a threaded member connecting separate portions of a travel bar and adapted upon being rotated to vary the length of the bar.

4. The combination with a multiple sash window wherein the movement of one sash controls the others, hardware for mounting the sashes in the frame and comprising separate units for mounting the sashes independently of each other, each unit comprising a flat guide track adapted to be screwed against the frame and having inwardly flanged edges, a sliding shoe received between said edges, a plate for the sash pivoted at one end to said shoe, and a link pivoted to the guide track and the plate.

5. In a multiple sash window including travel bars for connecting the operating mechanism of adjacent sashes, a shoe for releasably engaging one of said travel bars and comprising a pivoted latch engageable with said travel bar, and a pivoted tumbler engageable with said latch to position the latch for engagement with the travel bar.

6. In a multiple sash window including travel bars for connecting the operating mechanism of adjacent sashes, one of said travel bars having slots and outwardly projecting lugs at one end thereof, a shoe for releasably engaging said travel bar, said shoe having a pivoted latch engaging in said slots and having shoulders engageable with said lugs.

7. The combination with a multiple sash window wherein the movement of one sash controls the others, hardware for mounting the sashes in the frame and comprising separate units for mounting the sashes independently of each other, one such unit comprising a guide track for the frame, a shoe slidably confined thereby, a plate for the sash pivoted at one end to said shoe, a link permanently pivoted at one end directly to the guide track and at the other end to said plate, the guide tracks of the separate sashes being arranged for alignment in the frame, said shoe carrying a latch mechanism for releasable engagement with a travel bar for operating connection with a shoe of an adjacent sash.

ESMOND F. WILEY.