

PROJECTED WINDOW

(12)

The present invention relates to sash windows, and more particularly to a projected window in which a sash is pivotally mounted in an outer frame for swinging movements between open and closed positions.

5 Various projected windows are known in which a sash is hung between opposed upper and lower members of an outer frame for swinging movements between open and closed positions. Some of the known windows are not furnished with any means for retaining the sash in a
10 predetermined open position in which the sash is disposed at a predetermined angle with respect to the outer frame. The others of the known windows have such retaining means; however, this prior retaining means serves to hold the sash in position only at the lower rail
15 thereof. With these prior arrangements, the sash cannot be stably retained against pressure of wind.

According to a first aspect of the invention there is provided a projected window comprising:

(a) an outer frame having a pair of upper and lower
20 frame members with a pair of opposed guide tracks therealong, each of said upper and lower frame members having a predetermined number of longitudinally spaced holes;

(b) a sash having a pair of upper and lower rails
25 and a pair of opposed stiles, one of said opposed stiles being hung between said opposed guide tracks and movable

(followed by page 1a)

therealong for swinging movements of said sash between open and closed positions;

(c) a pair of upper and lower stay arms, each pivotally secured at one end to a respective one of said upper and lower rails near the centre thereof and at the other end to a respective one of said upper and lower frame members near one end thereof;

(d) a pair of upper and lower fastening bolts longitudinally slidably carried by said sash near opposite ends of said one stile, said upper fastening bolt being movable to project into a selected one of said holes of said upper frame member, said lower fastening bolt being movable to project into a selected one of said holes of said lower frame member; and

(e) means for retaining said upper fastening bolt in projected and retracted positions selectively, said retaining means comprising:

(i) a fixed sleeve extending longitudinally of said first stile and having a reverted T-shaped slot composed of a longitudinal and a transverse section, said upper fastening bolt slidably and turnably projecting axially through said sleeve;

(ii) a pin projecting from said upper fastening bolt into said T-shaped slot and movable between said transverse and vertical slot sections as said upper fastening bolt is turned and axially moved; and

(iii) a first spring acting between said sleeve and said upper fastening bolt to normally bias the latter upwardly toward said projected position.

The invention will be described by way of example with reference to the accompanying drawings, wherein:-

Figure 1 is a front elevational view of a projected window

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embodying the present invention;

Figure 2 is an enlarged front elevational view, with parts broken away, of the window of Figure 1;

Figure 3 is a fragmentary enlarged side elevational view,
5 with parts shown in cross section, of the window of Figure 1;

Figure 4 is an enlarged horizontal cross-sectional view, with parts shown in dash-and-two-dot lines, of the window of Figure 1;

Figure 5 is an enlarged exploded perspective view of a roller mounted on the upper end of a sliding

stile of a sash;

Figure 6 is a fragmentary enlarged vertical cross-sectional view of an upper fastening bolt and a sleeve therefor;

5 Figure 7 is a modified projected window;

Figure 8 is an enlarged front elevational view, with parts broken away, of the window of Figure 7;

Figure 9 is an enlarged side elevational view, with parts broken away, of the window of Figure 7;

10 Figure 10 is an enlarged vertical cross-sectional view, with parts omitted, of the window of Figure 7;

Figure 11 is an enlarged horizontal cross-sectional view, with parts shown in
15 dash-and-two-dot lines, of the window of Figure 7; and

Figures 12 and 13 are enlarged front elevational views of a portion of a fastener-bolt moving mechanism, showing the manner in which the fastening bolts are moved between projected and retracted positions.

20 The present invention is particularly useful when embodied in a projected window such as shown in Figures 1 - 4, generally indicated by the numeral 1.

The projected window 1 comprises an outer frame
25 2 adapted to be mounted within an opening in a building wall (not shown) and defining a window opening, and a sash 3 mounted in the outer frame 2 for swinging

movements between various open and closed positions.

The outer frame 2 (illustrated in dash-and-two-dot lines for clarity in Figure 1) includes a header (or upper frame member) 2a, a sill (or lower frame member) 2b, and a pair of opposed side jambs 2c, 2d joined with the header 2a and the sill 2b at their ends. The sill 2b has a bottom guide rail 4 upwardly projecting therefrom, defining a lower guide track. The header 2a has a pair of parallel top guide rails 5, 5 downwardly projecting therefrom, defining an upper guide track. The sash 3 is hung between the upper and lower guide tracks for swinging movements as described below.

The sash 3 includes a pane of glass 6 and an inner frame extending along and embracing the periphery of the pane 6. The inner frame includes a pair of upper and lower horizontal rails 8, 9 and a pair of opposed vertical members or stiles 10, 11.

As shown in Figures 1, 2, 3 and 5, a sash roller 12 is mounted on a vertical hollow shaft 13 mounted on the sash 3 near the upper end of one of the opposed stiles 10, the shaft 13 being secured (by staking) at one end to an upper auxiliary plate 14 attached to the upper rail 8. The shaft 13 has at the other end a first flange 13a which serves to prevent the sash roller 12 from being removed. The sash roller 12 extends into the upper guide track and terminates in a

second flange 12a. The two top guide rails 5, 5 have opposed inwardly directed third flanges 5a, 5a which are engageable with the second flange 12a to prevent the sash roller 12 from being removed from the upper 5 guide track.

A sash carriage 15 is mounted on the sash 3 near the lower end of the one stile 10. The sash carriage 15 includes a pair of rollers 16, 16 supported by a roller casing 15a of generally C-shaped transverse 10 cross section defining a downwardly opening groove (Figure 3). Each roller 16 has an endless peripheral groove 16a (Figure 3) receptive of the top portion of the bottom guide rail 4. The roller casing 17 is mounted on the sash 3 near the lower end of the one 15 stile 10, being pivotally secured by a pin 18 to a lower auxiliary plate 17 attached to the lower rail 9. Because of the sash roller 12 and the sash carriage 15, the sash 3 is pivotable about the one stile 10, and the latter in turn is slidable along the upper and lower 20 guide tracks.

The sash 3 is also supported by a pair of upper and lower stay arms 19, 20 which serves to restrict the swinging movement of the sash 3 as illustrated in Figure 4. The upper stay arm 19 is pivotally secured 25 at one end to the upper rail 8 (of the sash 3) near the center thereof by a pin 21 and at the other end to the header 2a near one end thereof by a pin 22. Likewise,

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the lower stay arm 20 is pivotally secured at one end to the lower rail 9 near the center thereof by a pin 23 and at the other end to the sill 2b near the one end thereof by a pin 24.

5 As shown in Figures 1, 2, 3 and 6, an upper fastening bolt 25 is slidably and turnably received through a fixed sleeve 26 extending longitudinally of the one stile 10 and aligned axially with the shaft 13 and thus the sash roller 12. The upper fastening bolt
10 25 is movable to project through the sash roller's shaft 13 into a selected one of a plurality of longitudinally spaced holes 27a, 27b, 27c, 27d, 27e of the header 2a. The sleeve 26 has a reverted T-shaped slot 28 composed of a longitudinal 28a and a transverse
15 section 28b. The upper fastening bolt 25 has a pin 29 projecting perpendicularly therefrom into the T-shaped slot 28 and movable between the longitudinal and transverse slot sections 28a, 28b as the upper fastening bolt 25 is turned and axially moved, there
20 being a first spring 30 acting between the sleeve 26 and the upper fastening bolt 25 to normally bias the latter upwardly toward its projected position. The upper fastening bolt 25 has near its lower end a first knob 31 for pulling the upper fastening bolt 25
25 downwardly from its projected position (shown by solid lines in Figure 6) to its retracted position (shown by dash-and-two-dot lines in FIG. 6) against the bias of

the first spring 30 and for turning the upper fastening bolt 25.

As shown in Figures 2 and 4, a lower fastening bolt 32 is axially slidably supported by the sash carriage 15, there being a second spring 33 acting between the sash carriage 15 and the lower fastening bolt 32 to normally bias the latter downwardly to project into a corresponding selected one of a plurality of longitudinally spaced holes 34a, 34b, 34c, 34d, 34e of the sill 2b. The lower fastening bolt 32 has a second knob 35 for pulling the lower fastening bolt 32 upwardly from its projected position to its retracted position. Thus the sash 5 can be retained in a selected one of various open and closed positions.

As shown in Figure 3, an upwardly directed first hook 36 is mounted on the interior side of the casing 15a and is engageable with a downwardly directed second hook 37 of the sill 2b, preventing the sash carriage 15 from coming upwardly off the bottom guide rail 4.

With the sash 5 fully closed, the opposed stiles 10, 11 are in contact with first and second weather strips 38, 39 (Figure 4), respectively, which are carried by the opposed side jambs 20c, 20d respectively, and the upper and lower rails 8, 9 are in contact with third and fourth weather strips 40, 41 (Figure 3), respectively, which are carried by the header 2a and the sill 2b respectively.



In Figure 1, the upper and lower fastening bolts 25, 32 are disposed in projected position; the upper fastening bolt 25 is inserted in the leftmost hole 27a of the header 2a, and the lower fastening bolt 32 is inserted in the leftmost hole 34a of the sill 2b, locking the sash 5 in fully closed position. At that time the pin 29 of the upper fastening bolt 25 is disposed near the upper end of the longitudinal section 28a of the T-shaped slot 28. To retract the upper and lower fastening bolts 25, 32 to the position of Figure 2, the first and second knobs 31, 35 are pulled downwardly and upwardly, respectively, against the bias of the first and second springs 30, 33. Then the first knob 31 is turned about the axis of the upper fastening bolt 25 until the pin 29 thereof is received in the transverse slot section 28b, preventing the upper fastening bolt 25 from moving axially upwardly.

With the upper and lower fastening bolts 25, 32 retracted, as a pull (not shown) on the one stile 10 of the sash 3 is pulled rightwardly in Figures 2 and 4, the stile slides along the header 2a and the sill 2b toward the right side jamb 2d while, on the other hand, the other stile 11 revolves about the sliding stile 10 to project exteriorly, i. e. upwardly in Figure 4. Thus the sash 3 can be moved in a swinging fashion between various open and closed positions in which the sash 3 [is disposed at various] angles with respect to



the header 2a and the sill 2b. This swinging movement of the sash 3 is restricted or regulated by the stay arms 19, 20, as indicated by dash-and-one-dot lines 3A, 3B, 3C, 3D, 3E in Figure 4.

5 To retain the sash 3 in a selected one of various open positions, e. g. the position 3B, the sliding stile 10 is moved along the guide tracks until the upper and lower fastening bolts 25, 32 are vertically aligned with the hole 27c of the header 27
10 and the corresponding hole 34c of the sill 2b, respectively. Then the first knob 31 of the upper fastening bolt 25 is turned until the pin 29 received in the transverse section 28b is vertically aligned with the longitudinal slot section 28a, thus releasing
15 the upper fastening bolt 25 to slide upwardly under the bias of the spring 30 to project into the hole 27c of the header 27. Meanwhile, the lower fastening bolt 32 is released to project into the hole 34b of the sill 34, respectively.

20 With this arrangement, since both the upper and lower rails 8, 9 of the sash 3 are held in position, the sash 3 can be retained stably without accidental displacement or deformation due to pressure of wind.

Figures 7 through 11 illustrate a modified
25 projected window 51 having a mechanism 60 for moving upper and lower fastening bolts 55, 62 between projected and retracted positions. Throughout this and

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the preceding embodiments, like reference numerals designate similar parts which serve to perform the same function.

As shown in Figures 8, 9 and 10, the upper
5 fastening bolt 55 is axially slidably received through
an upper fixed sleeve 56 extending longitudinally of
the sliding stile 10 and disposed in axial alignment
with the shaft 13 and thus the roller 12. In response
to the operation of the mechanism 10 as described
10 below, the upper fastening bolt 55 is movable to
project through the roller's shaft 13 into a selected
one of the holes 27a', 27b', 27c', 27d', of the header
2a, there being an upper spring 57b between the upper
sleeve 56 and the upper fastening bolt 55 to normally
15 bias the latter upwardly toward its projected position.
The upper fastening bolt 55 has near its lower end a
pin 58 projecting perpendicularly therefrom for a
purpose described below.

Likewise, the lower fastening bolt 62 is axially
20 slidably received through a lower fixed sleeve 63
extending longitudinally of the sliding stile 10. An
angled plate 66 is fixed to the lower end of the lower
fastening bolt 62 and is movable to project into a
selected one of the holes 34a', 34b', 34c', 34d' of the
25 sill 2b as the lower fastening bolt 62 is moved
downwardly in response to the operation of the
mechanism 10 as described below, there being a lower

spring 64 acting between the lower sleeve 63 and the lower fastening bolt 62 to normally bias the latter downwardly toward its projected position. The lower fastening bolt 62 has near its upper end a pin 65
5 projecting perpendicularly therefrom for a purpose described below.

The mechanism 60 (Figures 7 to 13) comprises an actuator arm 71 pivotally mounted on the sliding stile 10 near the center thereof and connected to a handle 70
10 for pivotal movement in response to the turning of the handle 70, a lower pulling plate 72 vertically slidably mounted on the sliding stile 10 and connected to the actuator arm 71 via a link 73 for vertical movement in response to the pivotal movement of the actuator arm
15 71, a disk-like plate 74 mounted on the sliding stile 10 and connected at an eccentric position to the upper end of the lower pulling plate 72 for turning in response to the vertical movement of the lower pulling plate 72, and an upper pulling plate 75 vertically
20 slidably mounted on the sliding stile 10 and connected at its lower end to the disk-like plate 74 at an eccentric position for vertical (downward and upward) movement in response to the turning of the disk-like plate 74 and thus the vertical (upward and downward)
25 movement of the lower pulling plate 72.

The upper and lower pulling plates 75, 72 are connected to the upper and lower fastening bolts 55,

62, respectively, by first and second connecting members 76, 77. The first connecting member 76 is secured at its lower end to the upper end of the upper pulling plate 75 and has near its upper end a first opening 78 into which the pin 58 of the upper fastening bolt 55 projects. Likewise, the second connecting member 77 is secured at its upper end to the upper end of the lower pulling plate 72 and has near its lower end a second opening 79 into which the pin 65 of the lower fastening bolt 62 projects.

In Figure 7, the upper and lower fastening bolts 55, 62 are disposed in projected position; that is, as indicated by dash-and-two-dot lines in Figure 10, the upper fastening bolt 55 is inserted in the leftmost hole 27a' of the header 2a, and the angled plate 66 (attached to the lower end of the lower fastening bolt 62) is inserted in the leftmost hole 34a' of the sill 2b, locking the sash 5 in fully closed position. At that time the upper and lower pulling plates 75, 72 are disposed in raised and lowered positions, respectively, as shown in Figure 12.

To retract the upper fastening bolt 55 and the angled plate 66 to the solid-line position of Figure 10, the actuator arm 71 is turned clockwise by the handle 70 (Figure 7), pulling the lower pulling plate 72 upwardly as shown in Figure 13. This upward movement of the lower pulling plate 72 not only causes

the disk-like plate 74 to turn clockwise, but also causes the lower fastening bolt 62 and thus the angled plate 66 to move upwardly. The clockwise turning of the disk-like plate 74 in turn causes the upper pulling
5 plate 75 to move downwardly. Thus the upper fastening bolt 55 is moved downwardly to the retracted position (indicated in solid lines in Figure 10).

With the upper fastening bolt 55 and the angled plate 66 retracted, as the sash 3 is pulled on the one
10 stile 10 rightwardly in Figures 7 and 11, the one stile 10 slides along the header 2a and the sill 2b toward the right side jamb 2d while, on the other hand, the other stile 11 revolves about the sliding stile 10 to project exteriorly, i. e. upwardly in Figure 11. Thus
15 the sash 3 can be moved in a swinging fashion between various open and closed positions in which the sash 3 is disposed at various angles with respect to the header 2a and the sill 2b. This swinging movement of the sash 3 is restricted or regulated by the stay arms
20 19, 20 (Figures 7, 8 and 11), as indicated by dash-and-one-dot lines 3A', 3B', 3C', 3D' in Figure 11.

To retain the sash 3 in a selected one of various open positions, e. g. the position 3B, the sliding stile 10 is moved along the guide tracks until
25 the upper fastening bolt 55 and the angled plate 66 are vertically aligned with the hole 27b' of the header 2a and the corresponding hole 34b' of the sill 2b,

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respectively. Then as the actuator arm 71 is turned counterclockwise in Figure 13 by the handle 70, the upper and lower pulling plates 75, 72 are moved upwardly and downwardly, respectively, as shown in

- 5 Figure 12, causing the upper fastening bolt 55 and the angled plate 66 to project into the hole 27b' of the header 2a and the hole 34b' of the sill 2b, respectively, as indicated in dash-and-two-dot lines in Figure 10.

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CLAIMS:-

1. A projected window comprising:

(a) an outer frame having a pair of upper and lower frame members with a pair of opposed guide tracks therealong, each of said upper and lower frame members having a predetermined number of longitudinally spaced holes;

(b) a sash having a pair of upper and lower rails and a pair of opposed stiles, one of said opposed stiles being hung between said opposed guide tracks and movable therealong for swinging movements of said sash between open and closed positions;

(c) a pair of upper and lower stay arms, each pivotally secured at one end to a respective one of said upper and lower rails near the center thereof and at the other end to a respective one of said upper and lower frame members near one end thereof;

(d) a pair of upper and lower fastening bolts longitudinally slidably carried by said sash near opposite ends of said one stile, said upper fastening bolt being movable to project into a selected one of said holes of said upper frame member, said lower fastening bolt being movable to project into a selected one of said holes of said lower frame member; and

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(e) means for retaining said upper fastening bolt in projected and retracted positions selectively, said



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retaining means comprising:

- (a) a fixed sleeve extending longitudinally of said first stile and having a reverted T-shaped slot composed of a longitudinal and a transverse section,
5 said upper fastening bolt slidably and turnably projecting axially through said sleeve;
- (b) a pin projecting from said upper fastening bolt into said T-shaped slot and movable between said transverse and vertical slot sections as said upper
10 fastening bolt is turned and axially moved; and
- (c) a first spring acting between said sleeve and said upper fastening bolt to normally bias the latter upwardly toward said projected position.

2. A projected window according to claim 1,
15 said upper fastening bolt having a first knob for pulling said upper fastening bolt axially from said projected position to said retracted position against the bias of said first spring and for turning said upper fastening bolt.

20 3. A projected window according to claim 1 or 2, including a vertical hollow shaft secured to the upper end of said one stile, and a sash roller mounted on said shaft, said upper fastening bolt being projectable through said shaft, said upper frame member
25 having a pair of parallel upper guide rails defining one of said opposed guide tracks in which said roller is received.

4. A projected window according to any preceding



claim, including a sash carriage pivotally secured to the other end of said one stile and axially slidable supporting said lower fastening bolt, a second spring acting between said sash carriage and said lower fastening bolt to normally bias the latter downwardly toward
5 said projected position, said lower frame member having a lower guide rail defining the other of said opposed guide tracks along which said carriage is guided.

10 5. A projected window according to claim 4, said carriage having at least one second roller rollable on and along said lower guide rail.

6. A projected window according to any preceding claim, including means for moving said upper and lower
15 fastening bolts between projected and retracted positions, said moving means comprising:

(a) a handle pivotally mounted on said one stile near the centre thereof;

(b) a pair of first and second connecting members
20 secured at one end to said upper and lower fastening bolts, respectively; and

(c) a mechanism operatively connected with said handle and said first and second connecting members and operable, in response to turning of said handle,
25 to move said first and second connecting members toward and away from each other.

7. A projected window according to claim 6,



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said mechanism comprising:

(a) an actuator arm connected to a shaft of said handle for pivotal movement in response to the turning of said handle;

5 (b) a lower pulling plate vertically slidably mounted on said one stile and connected to said actuator arm via a link for vertical movement in response to the pivotal movement of said actuator arm;

(c) a disk-like plate mounted on said one stile
10 and connected at an eccentric position to an upper end of said lower pulling plate for turning in response to vertical movement of said lower pulling plate; and

(d) an upper pulling plate vertically slidably mounted on said one stile and connected at its lower
15 end to said disk-like plate at an eccentric position for vertical movement in response to the turning of said disk-like plate.

8. A projected window substantially as described with reference to and as illustrated in
20 Figures 1 to 6 of the accompanying drawings.

9. A projected window substantially as described with reference to and as illustrated in Figures 7 to 11 of the accompanying drawings.