

Apparatus for securing windows

Field of the Invention

5 The present invention relates to a device for securing windows. In particular, but not exclusively, it relates a device for securing windows and preventing them from falling off buildings.

Background of the Invention

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There are various types of windows found in residential and industrial buildings. Each type of window has a different operating mechanism and a few special parts. And in each type the parts and hardware fit together differently, and serve different functions.

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Casement windows open with cranks or levers so they open in the manner of hinged doors. Older casements swing on hinges, while newer versions have pivot mechanisms. Most swing outward, but models that swing inward are available.

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Casement windows are popular for several reasons:

- (i) they adapt to any architecture;
- (ii) they provide operation and performance features that are not
- 25 able to be matched by other operating windows;
- (iii) they provide excellent ventilation because both halves of the window can be opened;
- (iv) they are considered to be energy efficient because they seal tightly when closed; and
- 30 (v) they are easier to clean than most other windows because both inside and outside surfaces are accessible from indoors.

Sliding windows have sashes that move horizontally on a track. Usually only one of the sashes moves and the other is fixed. Since only half of the

window area can be opened, sliding windows provide less ventilation area than casement or rotating windows. However, they are inexpensive, especially if the frame is aluminum, and easy to clean if the moveable sash is removed.

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Rotating windows open by pivoting about a central point. They allow good ventilation because when they are open, almost the entire window area is unobstructed. Because either side can face in, cleaning them is easy. Reflective coatings can be applied to one side of the glass and the homeowner can rotate the windows to reflect heat inward or outward as the season demands.

Awning windows, also known as hopper windows, swing open like casement windows but are hinged on the top or bottom rather than on the side. Some swing inward, but most swing outward. Because they are easy to clean and provide more security than other types of windows, they are common in schools and in multifamily housing.

There have been reported incidents of windows falling from buildings from heights that pose a danger to the safety of people and/or property below or near such buildings.

The majority have fallen due to improper installation or accelerated corrosion of the fasteners holding friction stays, as well as a result of wear and tear. The fasteners are usually rivets, and normally are of aluminium. Windows are subject to wear and tear because users open and close them. Besides poor maintenance and rough handling, other possible causes are poor design and workmanship.

Stainless steel rivets are more durable and corrosion resistant than aluminium rivets and have thus replaced aluminium rivets as a preferred choice. Nevertheless, even with stainless steel rivets, there is a need for homeowners or occupants to check and maintain their windows regularly to be certain they are safe and secure. While it is the homeowner's or

occupant's responsibility to ensure that their properties are maintained in a proper manner so that they do not pose a danger or hazard to public safety, there is still a need to provide better safety measures to prevent windows from falling from buildings.

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Summary of the Invention

In accordance with a first preferred aspect, there is provided an apparatus for securing a window sash to its frame, the apparatus comprising a flexible
10 attachment member having a first end thereof securable to the window sash and a second end thereof securable to the frame.

In accordance with another aspect of the invention there is provided a method for securing a window sash to its frame comprising:

- 15 (a) securing a first end of a flexible attachment member to the sash; and
 (b) securing a second end of the flexible attachment member to the frame.

20 Preferably, the flexible attachment member is taut when the window sash is fully opened. More preferably, the flexible attachment member is under a tension when the window sash is fully opened so that in the event the window sash becomes detached from its frame, there is no shock in the tensile load on the flexible attachment member. Advantageously, the
25 flexible attachment member acts as a support in addition to the window fasteners.

Preferably, the flexible attachment member is a wire rope. More preferably, the wire rope is of stainless steel. Advantageously, the wire rope is flexible
30 to accommodate the opening and closing of the window sash and sufficiently strong to withstand the entire weight of the window sash should the window sash become detached from its frame.

Preferably, the wire rope is 2.0 – 2.5mm in diameter and able to withstand a load of 50kg. Most window sashes, including the window pane, usually weigh between 3 – 6kg. Window panes in industrial buildings may weigh more than 10kg.

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Preferably, the wire rope is 12 – 15cm in length in order to achieve the above tautness and tension when the window sash is fully opened.

10 In accordance with yet another aspect of the invention, there is provided a window unit having an attachment member for securing a window sash to its frame, the attachment member comprising a flexible means wherein one end of the flexible means is secured to a sash for holding the window pane and the other end is secured to the frame.

15 Definitions

By “pane” is meant a piece of glass in a window.

20 By “sash” is meant the framework of a window in which a pane of glass is set. It also refers to a single assembly of stiles and rails made into a frame for holding glass.

By “frame” is meant the enclosure in which at least one window sash is mounted.

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Brief Description of the Drawings

30 In order that the present invention may be fully understood and readily put into practical effect, there shall now be described by way of non-limitative example only preferred embodiments of the present invention, the description being with reference to the accompanying illustrative drawings.

In the drawings:

Figure 1 is a front view of a casement window in a closed position with an attachment member in accordance with an embodiment of the present invention;

5 Figure 2 is a front view of a casement window in an opened position with an attachment member in accordance with an embodiment of the present invention;

Figure 3 is a front view of an awning window in a closed position with an
10 attachment member in accordance with an embodiment of the present invention;

Figure 4 is a front view of an awning window in an opened position with an
15 attachment member in accordance with an embodiment of the present invention;

Figure 5 is a front view of a sliding window in a closed position with an attachment member in accordance with an embodiment of the present invention; and

20 Figure 6 is a front view of two awning windows in a closed position with attachment members in accordance with an embodiment of the present invention.

25 **Detailed Description of the Preferred Embodiments**

Referring to the accompanying drawings, Figure 1 shows a casement window 18 with an attachment member 10 for securing a sash 15, which holds a window pane 20, to its frame 30.

30 The attachment member 10 comprises a stainless steel wire rope 40 with a first end 44 secured to the sash 15 and a second end 42 secured to the frame 30. The wire rope 40 is secured to the frame 30 and sash 15 by metal plates 50 screwed onto the frame 30 or sash 15 that comprises the

wire rope 40 between metal plates 50 and the frame 30 or sash 15. Alternatively, the metal plates 50 may be riveted to the frame 30 or sash 15. The metal plates and screws / rivets may be made of stainless steel or coated with zinc to prevent corrosion. In order to prevent the wire rope 40 from slipping through the metal plates 50, the wire rope 40 may be secured to the plates 50 by adhesives or have a tortuous path through openings in plates 50. In addition or alternatively, the ends of the wire rope 40 may be tied into a knot and inserted into a cavity cut into the plates 50 so the knot will prevent the wire rope 40 from slipping through the plates 50. Alternatively, the ends of the wire rope 40 may form a coil and the coil is then sandwiched between the frame 30 / sash 15 and the plates 50. The wire rope 40 may also be secured to the plates 50 by welding the ends of the wire rope 40 and plates 50 together. The screws / rivets secure the wire rope 40 and plates 50 to the frame 30 / sash 15. The securing of wire rope 40 to frame 30 and sash 15 is such that in normal operation, and over a normal life expectancy, the wire rope 40 will be secured to both frame 30 and sash 15.

Figure 2 shows the windows 18 of Figure 1 in an opened position. For convenience, the term "window" 18 applies to both the window pane 20 and the sash 15 holding the window pane. The wire rope 40 is flexible and long enough to allow the windows 18 to fully open and not get in the way when the windows 18 are being opened and closed. The wire rope 40 is pulled tightly and experiences a slight tension when the window 18 is fully opened. In the event the window 18 becomes detached from its frame 30, the wire rope 40 will prevent the window 18 from falling from the building. The tight wire rope 40 may prevent the window 18 from smashing into the side walls of the building and this, in turn, may prevent shattered glass from raining down on people and/or property below or near the building.

In the case of non-sliding windows, a window sash 15 is most susceptible to falling out of its frame 30 when it is fully opened because there is minimal support from its frame 30 and any catches or locks. In addition, the sash 15 also experiences external forces such as wind loading from strong winds

and gravitational forces on the weight of the window 18. Preferably, the wire rope 40 is taut when the window sash 15 is fully opened. By “taut” is meant that there is no slack in the wire rope 40 when the window sash 15 is fully opened. Therefore, in the event the window 18 becomes detached
5 from its frame 30, there is no sudden loading or “jerking” in the wire rope 40. Advantageously, the taut wire rope 40 may prevent the window pane from smashing into the sides of the building walls. This, in turn, may prevent shattered glass from raining down onto people and/or property below or near such buildings.

10 The wire rope 40 may be between 2.0 – 2.5mm in diameter and made of stainless steel. Such wire ropes can withstand a load of up to 50kg.

Figure 3 shows an awning window 18 in a closed position with the
15 attachment member 10. Similarly, the attachment member 10 comprises a stainless steel wire rope 40 with a first end 44 secured to the sash 15 and a second end 42 secured to the frame 30.

Figure 4 shows the awning window 18 of Figure 3 in an opened position.
20 Once again, the wire rope 40 is flexible and long enough to allow the window 18 to fully open and not get in the way when the windows 18 are being opened and closed. In the event the window 18 becomes detached from its frame 30, the wire rope 40 will prevent the window 18 from falling from the building.

25 Figure 5 shows a sliding window 18 in a closed position with the attachment member 10. Similarly, the attachment member 10 comprises a stainless steel wire rope 40 with a first end 44 secured to the sash 15 and a second end 42 secured to the frame 30.

30 Figure 6 shows two adjacent awning windows 18 in a closed position with attachment members 10. The two awning windows 18 are mounted in the same frame 30. Each attachment member 10 comprises the stainless steel wire rope 40 with a first end 44 secured to the sash 15 and a second end

42 secured to the frame 30. In the case where the windows 18 are adjacent to each other, there need only be one metal plate 50 secured to the frame 30 since both wire ropes 40 may be secured to this one metal plate 50 on the frame 30.

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Whilst there has been described in the foregoing description preferred embodiments of the present invention, it will be understood by those skilled in the technology concerned that many variations or modifications in details of design or construction may be made without departing from the present invention.

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THE CLAIMS

1. An apparatus for securing a window sash to its frame, the apparatus comprising a flexible attachment member having a first end thereof
5 securable to the sash for holding a second end thereof securable to the frame.
2. An apparatus according to claim 1, wherein the flexible attachment member is taut when the window sash is fully opened.
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3. An apparatus according to claims 1 or 2, wherein the flexible attachment member is under a tension when the window sash is fully opened.
- 15 4. An apparatus according to any one of claims 1 to 3, wherein the flexible attachment member is a wire rope.
5. An apparatus according to claim 4, wherein the wire rope is made of stainless steel.
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6. An apparatus according to any one of claims 4 or 5, wherein the wire rope is 2.0 – 2.5mm in diameter.
7. An apparatus according to any one of claims 4 to 6, wherein the
25 wire rope is able to withstand a load of 50kg.
8. An apparatus according to any one of claims 4 to 7, wherein the wire rope is 12 – 15cm in length.
- 30 9. A window unit having an attachment member for securing a window sash to its frame, the attachment member comprising a flexible means wherein one end of the flexible means is secured to the sash and the other end is secured to the frame.

10. A method for securing a window sash to its frame comprising:
- (a) securing a first end of a flexible attachment member to the sash; and
 - (b) securing a second end of the flexible attachment member to the frame.

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11. A method according to claim 10 further comprising the step of ensuring the flexible attachment member is taut when the window sash is fully opened.

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12. A method according to claims 10 or 11, wherein the flexible attachment member is a wire rope.

