This invention relates to an improved storm window and more particularly to an improved storm window of the sliding sash type.

In storm window manufacture, it is important to minimize the weight of the metal employed in the window frames and other structural parts, since the cost of metal is a major factor in the total cost of manufacture. The minimization of pounds per window in metal usage is ultimately limited by the strength requirements of the frame. Therefore, the lower the strength requirements of the frame, the lower the cost of window manufacture. Such savings can be reflected in increased profits, lower costs to the consumer, or both.

The strength requirements of the frame members of the window can be reduced by bracing. Of course, if the bracing employs as much or more material than is saved by reducing the strength requirements of the frame, no real economy is achieved. But if the bracing can be accomplished by elements that must be employed in any case, then bracing can achieve a real saving.

Thus, for example, if the window sash of a sliding sash window can be employed to brace the frame, the frame strength requirements can be reduced, metal can be saved, and a true economy realized. The sash does brace the jambs or side members of the window, which are longest and therefore most easily deflected frame elements, against inward lateral deflection (moving together). But the sash does not brace the jambs against outward lateral deflection (moving apart), and the jambs must therefore have a certain increment of strength that would not be necessary if the jambs were braced against outward lateral deflection.

The present invention provides a window structure in which the window sash braces the jambs against outward as well as inward lateral deflection. This eliminates the incremental strength requirement mentioned above, and to that extent makes possible a reduction in usage of metal and a corresponding increase in profits and/or reduction in price.

Conventional sliding sash storm windows include mounting frames having multiple sidetracks for mounting windows and screens. Latch bolt means are provided at the lower portions of each sash and window unit and the latch bolt means are engageable with cooperating members in each track so that the screen or storm window unit may be retained in a preselected, raised position.

Conventional sliding sash storm windows use sash latch bolts comprising a plate member which is slidably mounted in a channel at each lower corner of the screen or window. Each latch bolt is provided with a projecting end portion which extends beyond the frame of the screen or window and slidingly engages a slot or hole provided in the window or screen track to retain the sash against upward and downward movement until the latch bolt is retracted.

Frequently, the latch arrangements of conventional windows fail to securely lock the window sash in a raised position. Moreover, the latches are often accidentally or even intentionally released before one has a firm grip on the window. Moreover, they must be disengaged by hand when the window is raised and must be held in a released position until the desired elevation is reached.

In the present invention the latch cannot be accidently or intentionally released until one has a firm grip on the window or screen and is, in fact, supporting the screen or window. Also, the window or screen can be raised by pushing the window or screen from the bottom without manually releasing each latch bolt.

The latch arrangement employed in this invention supports the jambs of the window frame against outward as well as against inward lateral deflection. The locking bolt, at its fully extended position, interferes with the detent means on the jambs to hold the sash in an elevated position and the interengagement between the locking bolt and the detent means occurs between at least one oblique detent engaging lower surface of the locking bolt and the detent means throughout a range of outward lateral deflection of the jambs of the window frame. The detent means and its associated locking bolt means are slidably interengageable within the deflection range and the sliding interengagement is shaped to wedge the detent means and its associated jamb laterally inwardly, under the weight of the sliding sash, toward a condition of zero lateral deflection of the jamb.

The foregoing and additional objects, features, and advantages of the invention will become apparent and more fully understood from the following detailed description of the invention and from the accompanying drawings, in which:

FIG. 1 is a fragmentary, elevational view of a track-mounted storm window showing a latch bolt in accordance with this invention;

FIG. 2 is a fragmentary, enlarged, elevational view of a latch bolt according to this invention, with portions broken away for clarity;

FIG. 3 is a cross sectional view, the plane of the section being indicated by the line 3--3 in FIG. 1;

FIG. 4 is a cross sectional view, the plane of the section being indicated by the line 4--4 in FIG. 2;

FIG. 5 is a cross sectional view, the plane of the section being indicated by the line 5--5 in FIG. 3;

FIG. 6 is a schematic illustration of a locking bolt means and its associated detent, progressively illustrating the detent means being drawn toward a condition of zero lateral deflection; and

FIG. 7 is a schematic illustration of a locking bolt means and its associated detent, progressively illustrating the locking bolt being moved to accommodate an inwardly deflected detent.

Referring now to the drawings, a sliding sash window 10 is illustrated. The window 10 is slidably mounted in a multiple track jamb or frame 11. The frame 11 is fixed to a wooden window casing (not shown). The frame 11 includes flanges 12, 13, 14, and 15. As may be seen most clearly in FIG. 3, the flanges 12--15 define three tracks and the middle track, which is defined by the flanges 13 and 14, serves as a guide for the window 10.

The window 10 includes a lower frame member 16 and the frame member 16 is provided with a channel 17. The channel 17 extends across the entire width of the frame member 16 and a locking bolt 18 is slidably mounted at each end of the track 17. Each locking bolt 18 includes an upper and lower flanges 19 and 20, respectively, that retain the locking bolt within the channel.

The lower flange 20 has a recessed portion 21 and a compression spring 22 is mounted within this recessed portion. One end of the compression spring 22 is fixed...
to the channel 17 by a stop member 23 and the outer end of the spring 22 urges the locking bolt to the left, as viewed in FIGS. 1, 2, and 3. The locking bolt 18 projects outwardly beyond the flange member 16 and into the space between the flanges 13 and 14. The projecting end of the latch bolt is provided with a pawl-type hook portion 24 which engages one of a series of detents 25 that are provided along the inner face of the flange 13. The detents 25 are originally extended as a straight projection from the flange 13 and, as is indicated in phantom outline in FIG. 2, an upper edge 26 is formed on each detent by cutting into the extruded portion to the projection 13 and then upwardly along the projection until about one-half of each detent is severed from the projection 13. The severed portion of each detent 25 is then bent backwardly to form a cam surface 27. Similar detents may be formed from projections 28 and 29, which are provided on the flanges 12 and 14 (FIG. 3).

In FIGS. 1 and 2, the window 10 is illustrated in a partially raised position with the hooked portion 24 of the locking bolt 18 fully extended and engaging the upper edge 26 of one of the detents 25 to support the window. In order to lower the window, the window must be raised slightly so that the end of the hook portion 24 will clear the edge 26. The locking bolt 18 may then be bent in by pressing down on the spring 22, by inserting a finger into an opening 31 in the locking bolt 18. Since the window must be raised slightly before the locking bolt 18 can be released, the risk of losing one’s grip on window 10 is minimized.

The window 10 may be raised by pushing upwardly on the frame member 16. In this instance, the locking bolt 18 need not be pulled inwardly, since the cam surface 27 will push the hook portion 24 inwardly.

The foregoing description is directed to an ideal arrangement wherein the detents and jams are in an initial condition of zero lateral deflection so that the edge 26 of each detent 25 is directly engaged by a horizontal face 40 of the hook portion 24. This ideal condition obtains and jam 11 is in a condition of zero deflection when an edge 41 of the flange 13 and a bead 42 on the flange 14 are spaced a deflection range 43 from the sash 10. This condition seldom exists in practice, however, since the jam 11 is frequently deflected outwardly or inwardly during its manufacture or installation. If the jam 11 is deflected inwardly for a value that exceeds the limits of the range 43, the sash 10 will urge it upward to a condition of zero deflection by engagement with the bead 42 and the edge 41. If, on the other hand, the jam 11 is deflected outwardly, the sash 10 and its locking bolt 18 will urge the jam 11 toward a condition of zero deflection in the following manner.

FIG. 6 (A, B, and C) illustrates, schematically, the locking bolt 18 in a fully extended condition, with the flange 20 butting against the stop member 23. Under ideal conditions of zero deflection, the edge 26 of the detent 25 would be directly engaged by the face 40. In the condition labeled A, however, the jam 11 is initially deflected a value 45 within a range of outward lateral deflections 44. Since the bolt 18 is in its fully extended condition, the detent 25 and the associated jam 11 are drawn inwardly by an oblique sloping cam face through an intermediate deflected distance 46 (FIG. 6B) toward a condition of zero deflection (FIG. 6C). The weight of the sash 10 provides the necessary mass to cause the resulting inward force on the detent 25. Upon release of the sash, the detent and its jam may tend to spring back to their deflected condition, but will not snap back to their precise condition of initial deflection. After repeated lockings, therefore, the jam will attain a condition of substantially zero deflection.

Referring now to FIG. 7 (A, B, and C), a locking bolt 18 is illustrated as being associated with a detent 25 which is inwardly deflected. The inward deflection in this instance is a value 47 within a range of inward lateral deflections 48. The maximum inward deflection can be no greater than the value 47 since the sash 10 would limit the jam 11 to this range. As the sash 10 is advanced, the detent 25 forces the bolt 18 inwardly against the bias of its spring so that the bolt 18 adjusts itself to the inward deflection. Although the jam 11 is not urged toward a condition of zero deflection while it is de-flected within the range 47, this deflection is compensated for by the inward movement of the bolt 18 which is caused by another oblique sloping cam face thereon. Deflection beyond the range that can be compensated for is prevented by the sash itself.

The invention is not restricted to the slavish imitation of each and every one of the details described above, which have been set forth merely by way of example with the intent of most clearly setting forth the teaching of the invention. Obviously, devices may be provided which change, eliminate, or add certain specific details without departing from the invention.

What is claimed is:

1. A sliding sash window comprising a fixed window frame having jamb tracks, a sliding sash received in said tracks and adapted to react in tension as well as in compression to support the jams of said window frame against outward as well as inward lateral deflection, said sash for holding said sash in sash in elevated positions and for transmitting to said jamb the tension reactions of said sash, and its associated locking-bolt means at said fully extended position obtaining throughout a range of outward lateral deflection of said fixed window frame, each said detent means and associated locking-bolt means being slidably interengangeable within said range, said sliding interengagement including at least one oblique detent engaging lever surface on each said bolt means to provide a slope along at least a portion of said range to wedge the detent means and its associated jam laterally inwardly, under the weight of said sliding sash, said condition of zero lateral deflection of the jam.

2. A sliding sash window comprising a fixed window frame having jamb tracks, a sliding sash received in said tracks and adapted to react in tension as well as in compression to support the jams of said window frame against outward as well as inward lateral deflection, locking-bolt means on said sash for holding said sash in elevated positions and for transmitting to said jams the tension reactions of said sash, and said locking-bolt means being retractable from their fully extended positions for release from interference with said sash means, the interference between each said sash means and its associated locking-bolt means at said fully extended position obtaining throughout a range of outward lateral deflection of said fixed window frame, said said detent means and associated locking-bolt means being slidably interengangeable within said range, said sliding interengagement including at least one oblique detent engaging lower surface on each said bolt means to provide a slope along at least a portion of said range to wedge the detent means and its associated jam laterally inwardly, under the weight of said sliding sash, said condition of zero lateral deflection of the jam.

3. A sliding sash window comprising a fixed window frame having jamb tracks, a sliding sash received in said tracks and adapted to react in tension as well as in compression to support the jams of said window frame against outward as well as against inward lateral deflection, locking-bolt means on said sash for holding said sash in elevated positions and for transmitting to said jamb
the tension reactions of said sash, detent means in said tracks for interlocking with said locking-bolt means, said locking-bolt means being retractable from their fully extended positions for release from interference with said detent means the interference between each detent means and its associated locking-bolt means at said fully extended position obtaining throughout a range of outward lateral deflections of said fixed window frame, means on each locking bolt defining a condition of zero lateral deflection of the jamb, and means on each locking bolt to provide sliding interengagement within said range between each locking bolt and its associated detent, said means for providing sliding interengagement including at least one oblique detent engaging lower surface on each bolt means to provide a slope for urging each detent means toward said means defining a condition of zero lateral deflection.

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