

AN IMPROVED HINGE ASSEMBLY

FIELD OF INVENTION

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The present invention relates to an improved hinge for providing safe operation of a casement window between an opened and closed position.

BACKGROUND OF THE INVENTION

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Casement windows are popular as they allow more ventilation therethrough than sliding windows. These types of windows have a window frame mounted flush with the wall, and a window sash swingingly mounted thereon to allow the window to be in an open position, and a closed position. In the closed position, the window sash is substantially flush with the window frame.

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The window sash is typically mounted onto the frame by way of hinges, pivots, friction stays, or the like, broadly termed as hinge assemblies. These hinge assemblies may be located on the window frame to allow side opening of the window sash, or located to allow opening of the window sash at the top or bottom, such as for an awning or ventilator.

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The hinge assemblies are fastened onto the window frame and sash by means of fasteners, typically in the form of rivets or screws.

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Unfortunately, with repetitive and prolonged use of the hinge assemblies, coupled with material degradation, the rivets or screws will fail. When these rivets or screws fail, the hinge assemblies will be dislodged from the window frame and sash, causing the sash to be removed from the window frame.

This situation is unacceptable and very dangerous, and even more so if the rivets or screws that have failed are from a window of a high-rise location.

There have been attempts to improve the situation, mainly by increasing the number of fasteners or rivets or screws to the window frame. However, this solution is time consuming, as more man-hours are required to fasten each window frame. Further, as the type of fasteners are the same, this solution and is not effective, as the fasteners will still experience the same type of failure.

It is an object of the present invention to alleviate the above problems.

SUMMARY OF INVENTION

It is an object of the present invention to provide an improved hinge assembly for a casement window, said casement window having a window sash and a window frame, said hinge having a support structure pivotally mounted on base members on each end, said first base member fastened to the window frame at one end, and a second base member to the window sash at the other end, said support structure movable so as to have a variable effective length to allow a user to manipulate the position of the window sash in relation to the window frame to cause the window to be in an opened or closed position, wherein the hinge further includes at least a first secondary engagement means to securely engage the support structure onto the window frame.

It is to be understood that the first secondary engagement means is advantageous as it provides a second form of engagement for the widow frame. Therefore, this improved hinge assembly will have better resistance to failure.

In a preferred embodiment, the first secondary engagement means is a male and a complementary female member integral to at least the first base member.

Preferably, the first secondary engagement means is a slot and a corresponding catch, to engage the first base member onto the window frame.

5 In a preferred embodiment the first secondary engagement means further includes a biasing means, to maintain the engagement of the male member to the complementary female member so as to engage the support structure to at least the window frame.

Preferably, the biasing means is releasable, so that the first secondary engagement means can be disengaged to release the support structure from the window frame.

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In a preferred embodiment, the catch is on the first base member, and the complementing slot is on a surface of the window frame.

15 In another preferred embodiment, the catch is on a surface of the window frame, and the complementing slot is on the first base member.

Preferably, the first secondary engagement further includes a locking means to lock the first base member, to maintain the engagement between the first base member and the window frame.

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According to another aspect of the invention, there is provided an improved hinge assembly for a casement window, said casement window having a window sash and a window frame, said hinge having a support structure pivotally mounted on base members on each end, said first base member fastened to the window frame at one end, and a second base member to the window sash at the other end, said support structure
25 movable so as to have a variable effective length to allow a user to manipulate the position of the window sash in relation to the window frame to cause the window to be in an opened or closed position, wherein the hinge further includes a second secondary engagement means to securely engage the support structure onto the window sash.

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In a preferred embodiment, the second secondary engagement means is a male and a complementary female member integral to the second base member.

Preferably, the secondary engagement means is a slot and a corresponding catch, to engage the second base member onto the window frame.

- 5 In a preferred embodiment, the secondary engagement means further includes a biasing means, to maintain the engagement of the male member to the complementary female member so as to engage the secondary structure to at least the window frame.

- 10 Preferably, the biasing means is releasable, so that the secondary engagement means can be disengaged to release the support structure from the window frame.

In a preferred embodiment, the catch is on a bottom portion of the first base member, and the complementing slot is on a surface of the window frame.

- 15 In another preferred embodiment, the catch is on a surface of the window frame, and the complementing slot is on the first base member.

- 20 Preferably, the secondary engagement further includes a locking means to lock the first base member, to maintain the engagement between the first base member and the window frame.

DESCRIPTION OF FIGURES

Figure 1 shows a preferred embodiment of the improved hinge assembly.

5 Figure 2 shows another preferred embodiment of the improved hinge assembly.

Figure 3 shows a preferred embodiment of the engagement means.

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DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made in detail to the preferred embodiments of the invention, examples of which are illustrated in the accompanying drawings. While the invention will
15 be described in conjunction with the preferred embodiments, it will be understood that they are not intended to limit the invention to these embodiments. On the contrary, the invention is intended to cover alternatives, modifications and equivalents, which may be included within the spirit and scope of the invention as defined by the appended claims. Furthermore, in the following detailed description of the present invention, numerous
20 specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be obvious to one of ordinary skill of the art that the present invention may be practiced without these specific details. In other instances, well known methods, procedures, components, and features have been described in detail so as not to unnecessarily obscure aspects of the present invention.

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The improved hinge assembly 100 is shown in a preferred embodiment in Figure 1. The improved hinge assembly 100 includes a support structure 10, to connect the window sash 50 to the window frame 40 of a casement window. In this embodiment, the support structure 10 is the type commonly known as a friction stay 90. However, it is to be
30 understood that the support structure 10 may also be a pivot or a hinge without departing from the spirit of the invention.

The friction stay 90 of Figure 1 allows a user to manipulate the effective length or distance, between the window sash 50 and the window frame 40 so as to cause the window to be in varying open positions, or in a closed position.

5 The improved hinge assembly 100 has the necessary fasteners. The apertures 25 for these fasteners on the base members 20 of the friction stay 90 are also shown in Figure 1. The purpose of these fasteners is to attach the support structure 10 to both the window sash 50 at one end, and the window frame 40 at the other, so that they may be connected. The friction stay 90, as shown in Figure 1, has two base members. A first
10 base member 21, for attachment of the friction stay 90 to the window frame 40, and a second base member 22 for attachment of the friction stay 90, to the window sash 50.

Further and importantly, the improved hinge assembly 100 has a first secondary engagement means 30 in the form of male 31 and female 32 members for secondary
15 engagement of the support structure 10, to at least the window frame 40, as seen in Figure 1.

The male 31 and female 32 members are shown in the form of a slot 33 and a catch 34, the slot 33 dimensioned to receive the catch 34 in an interlocking engagement
20 therebetween.

In the embodiment of Figure 1, the catch 34 is integral to a first base member 21 of the support structure 10, and the catch 22 (not shown in the figures), is integral to a surface
25 of the window frame 40.

Advantageously, when installing the improved hinge assembly 100, an installation worker will only need to slide the catch 34 of the first base member 21, to the slot 33 integral to the window frame 40 to enact the engagement. The conventional fasteners or rivets or screws may then be riveted to complete the engagement.
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In a preferred embodiment of the improved hinge assembly 100, there is a biasing means (not shown in the figures), to prevent the first secondary engagement means

30from being removed. Specifically, the biasing means maintains the interlocking engagement of the catch 34 and the slot 33, to prevent the catch 34 from sliding out from the slot 33, and to prevent the friction stay 90 from being removed from the window frame 40.

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In another embodiment, a locking means is used, to lock the position of the catch 34, and slot 33, so that they may remain in their interlocking engagement.

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It is to be appreciated that the first secondary engagement means 30 not only minimizes the installation time of the casement window; it also reduces the overall failure rate of the fasteners. The manner of the secondary engagement is such that the type of forces resisted by the rivets or screws and the secondary engagement are perpendicular to each other. Specifically, the rivets or screws resist lateral forces better, whereas the first secondary engagement means 30 resist vertical forces better. Therefore, the improved hinge assembly having a secondary engagement in the form of a slot and a catch, is advantageous.

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Figure 2 shows another embodiment of the improved hinge assembly, where a second secondary engagement means 60 is formed at the second base member 22 of the friction stay 90. Explanation for the second secondary engagement means 60 is the same as for the first secondary engagement means 30 as both these secondary engagements are identical, and thus, the effects and features of the first secondary engagement means 30 will apply equally to the second secondary engagement means 60.

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For ease of reference, the reference numerals applicable to the second secondary engagement means 60 are the following. Male and female member 61 and 62, slot and catch of the secondary engagement means, 63 and 64.

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Figure 3 shows a close up view of the first and second base members 21, 22, the catches 34, 64 in interlocking engagement with the slots 33, 63 of the window frame 40 and the window sash 50.

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According to another aspect of the invention, the catches 34, 64 are integral to the window frame and sash respectively, and the slots 33, 63 are integral to the first and second base member 21, 22. The explanation and advantage for this form of engagement means 30, 60, is identical to that as previously illustrated.

CLAIMS

1. An improved hinge assembly for a casement window, said casement window having a window sash and a window frame,

5 said hinge having a support structure pivotally mounted on base members on each end, said first base member fastened to the window frame at one end, and a second base member to the window sash at the other end;

 said support structure movable so as to have a variable effective length to allow a user to manipulate the position of the window sash in relation to the window frame to
10 cause the window to be in an opened or closed position;

 wherein the hinge further includes at least a first secondary engagement means to securely engage the support structure onto the window frame.

2. An improved hinge assembly for a casement window according to claim 1, wherein
15 the first secondary engagement means is a male and a complementary female member integral to at least the first base member.

3. An improved hinge assembly for a casement window according to claim 2, wherein
20 the first secondary engagement means is a slot and a corresponding catch, to engage the first base member onto the window frame.

4. An improved hinge assembly for a casement window according to any one of
claims 1 to 3, wherein the first secondary engagement means further includes a biasing
25 means, to maintain the engagement of the male member to the complementary female member so as to engage the support structure to at least the window frame.

5. An improved hinge assembly for a casement window according to claim 4, wherein
the biasing means is releasable, so that the first secondary engagement means can be
disengaged to release the support structure from the window frame.

6. An improved hinge assembly for a casement window according to any one of the claims 3 to 5, wherein the catch is on a bottom portion of the first base member, and the complementing slot is on a surface of the window frame.

5 7. An improved hinge assembly for a casement window according to any one of claims 3 to 5, wherein the catch is on a surface of the window frame, and the complementing slot is on the first base member.

10 8. An improved hinge assembly for a casement window according to any one of claims 1 to 3, wherein the first secondary engagement further includes a locking means to lock the first base member, to maintain the engagement between the first base member and the window frame.

15 9. An improved hinge assembly for a casement window, according to claim 1, wherein the hinge further includes a second secondary engagement means to securely engage the support structure onto the window sash.

20 10. An improved hinge assembly for a casement window according to claim 9, wherein the second secondary engagement means is a male and a complementary female member integral to the second base member.

25 11. An improved hinge assembly for a casement window according to claim 10, wherein the secondary engagement means is a slot and a corresponding catch, to engage the second base member onto the window frame.

30 12. An improved hinge assembly for a casement window according to any one of claims 9 to 11, wherein the secondary engagement means further includes a biasing means, to maintain the engagement of the male member to the complementary female member so as to engage the support structure to at least the window frame.

13. An improved hinge assembly for a casement window according to claim 12, wherein the biasing means is releasable, so that the secondary engagement means can be disengaged to release the support structure from the window frame.

5 14. An improved hinge assembly for a casement window according to any one of the claims 11 to 13, wherein the catch is on a bottom portion of the first base member, and the complementing slot is on a surface of the window frame.

10 15. An improved hinge assembly for a casement window according to any one of claims 11 to 13, wherein the catch is on a surface of the window frame, and the complementing slot is on the first base member.

15 16. An improved hinge assembly for a casement window according to any one of claims 9 to 11, wherein the secondary engagement further includes a locking means to lock the first base member, to maintain the engagement between the first base member and the window frame.