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(54) FRAME CONSTRUCTION IN BAY WINDOWS

(71) We, YOSHIDA KOGYO K.K., a corporation duly organized under the laws of Japan and existing at No. 1, Kanda Izumi-cho, Chiyoda-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a frame construction in bay windows.

Bay windows project outwardly from the building wall and their own weight acts on and is borne by the window lower frames that are supported at only one end on the housing outer wall. Where the frame construction is formed with separate aluminium extrusions, it is assembled usually by means of a plurality of screws. With the screw connection only, however, the cantilever-like lower frames of the window cannot provide durable support for the overall weight of the bay window.

Angle or diagonal bracings are used as extra support especially for large bay window units and those glazed with heavy insulating glass. These support means, however, are exposed to sight and lessen a pleasing appearance of the bay window.

The present invention seeks to provide a rugged frame construction in bay windows.

The invention further seeks to provide reinforcing means in a frame construction, which means is concealed from view.

The invention further seeks to provide a rugged frame construction which can be assembled with ease.

According to the invention there is provided a bay window frame construction comprising an inner frame adapted for securement on a wall around an opening and including a vertical hollow or recessed portion, an outer frame spaced from the inner frame to form an outer frame of the bay and including a hollow mullion, a lower spacer member extending between the vertical hollow or recessed portion and the hollow mullion, the arrangement being secured in clamping arrangement by means of a bolt and cooperating nut located with

the bolt head and the nut each in a respective one of the hollow or recess in the vertical portion and the hollow in the mullion, the bolt extending through the vertical portion, the spacer member and mullion.

The vertical portion of the inner frame may have a flange for attachment to the building wall and be hollow with a partition plate therein through which the bolt passes. The hollow mullion may have a partition plate, the bolt extending through this partition plate. The spacer member may also be hollow.

In order that the invention may be understood more easily, an embodiment thereof will now be described by way of example, with reference to the drawings, in which:—

Figure 1 is a fragmentary horizontal cross-sectional view of a bay window constructed in accordance with the invention, with parts cut away for clarity; and

Figure 2 is a fragmentary vertical cross-sectional view taken along the line II—II of Figure 1.

In Figure 1, a bay window unit 10 projects outwardly from and is attached to a building wall 11 in which is formed a rough opening 12 that the bay window unit 10 covers. The building wall 11 includes a wooden column 13 which, together with a spaced column and a pair of head and sill members (not shown) bounds the rough opening 12.

The bay window unit 10 comprises a frame construction 14 made up of a plurality of separate aluminium extrusions, the frame construction 14 including an inner frame 15, an intermediate frame 16, and an outer frame 17. The inner frame 15 has a vertical hollow portion 18 with a mounting fin or flange 19 secured to the column 13 by means of screws 20. A partition plate 21 extends between opposed walls 22, 23, of the hollow portion 18 to provide support for a first washer plate 24 to abut against the partition plate 21. The washer plate 24 is substantially coextensive in width to the partition plate 21.

The intermediate frame 16 includes a

pair of spaced upper and lower hollow portions 25, 26 (Figure 2) extending horizontally from the vertical hollow portion 18 of the inner frame 15. The intermediate frame 16 is glazed with a sheet of glass 27 to provide a dead light. The outer frame 17 comprises a hollow mullion 28 attached to the free ends of the upper and lower hollow portions 25, 26. The hollow mullion 28 cooperates with a spaced mullion (not shown) and a pair of top and bottom rails, the bottom rail being designated at 29, in forming a window frame in which are mounted a pair of windows horizontally movable on and along a pair of guide rails 30a, 30b, one of the windows being indicated at 30c. The hollow mullion 28 is provided with partition plates 31, 32 extending at a right angle with respect to each other, the partition plates 31, 32 jointly providing support for a washer bracket 33 of L-shaped cross-section. The partition plate 31 lies parallel to the partition plate 21. The washer bracket 33 has a second washer plate 34 mating with the partition plate 31 and a third washer plate 35 mating with the partition plate 32, the second and third washer plates 34, 35 being integral and extending perpendicularly to each other. The second plate 34 is substantially coextensive in width to the partition plate 31.

A seat board 36 is placed on the sill and has its side margin 37 inserted between spaced flanges 38, 39 of the lower hollow portion 26, as shown in Figure 2. The upper hollow portion 25 has a support flange 40 on which a head board unit 41 is carried. An overhanging structure or roof decking 42 projects outwardly from the building wall and bears upon the upper hollow portion 25 and the head board unit 41.

An elongated bolt 43 is provided to connect the hollow mullion 28 tightly with the vertical hollow portion 18. The bolt 43 has a stem 44 extending through the washer plate 24 and the partition plate 21, all the way through the lower hollow portion 26, and through the partition plate 31 and the washer bracket plate 34. The bolt 43 has a head 45 acting on and retained in place by the washer plate 24, and an externally threaded end 46 engaged by a nut 47 which acts on the washer bracket plate 34. With tightening rotation of the nut 47 on the end 46 of the bolt stem 44, the hollow mullion 28 is securely fastened to the vertical hollow portion 18 with the lower hollow portion 26 therebetween. With this arrangement, the mullion 28, the lower frame portion 26, and the vertical frame portion 18 can be joined tightly together by the bolt 43 extending through them, and the washer plate 24 and the washer bracket plate 34 can provide increased mechanical strength

for the mullion 28 and the frame portion 18 against damages which would otherwise result from direct engagement by the head 45 and nut 47.

The plate 35 of the washer bracket 33 additionally provides reinforced support for a pair of screws 48, 49 extending there-through and through the partition plate 32, threadedly into a pair of sockets 50, 51, respectively, formed on the bottom rail 29.

The inner frame 15 need not be hollow but may be solid or purely of channel form. In the case of a solid inner frame the head 45 of the bolt can be located in a recess e.g. a bore provided in the frame.

The inner frame need not be secured to a wall structure by means of flanges such as 19 but can be secured by, for example, screws extending directly through the frame into the wall.

WHAT WE CLAIM IS:—

1. A bay window frame construction comprising an inner frame adapted for securement on a wall around an opening and including a vertical hollow or recessed portion, an outer frame spaced from the inner frame to form an outer frame of the bay and including a hollow mullion, a lower spacer member extending between the vertical hollow or recessed portion and the hollow mullion, the arrangement being secured in clamping arrangement by means of a bolt and cooperating nut located with the bolt head and the nut each in a respective one of the hollow or recess in the vertical portion and the hollow in the mullion, the bolt extending through the vertical portion, the spacer member and mullion.

2. A construction according to claim 1 wherein the vertical portion of the inner frame has a flange for attachment to the building wall and is hollow with a partition plate therein, through which the bolt passes.

3. A construction according to claim 2, wherein the hollow mullion has a partition plate the bolt extending through the partition plate.

4. A construction according to claim 3, wherein the spacer member is hollow.

5. A construction according to claim 3 or 4, wherein a washer plate is provided between each partition plate and the bolt head or nut.

6. A construction according to claim 5, wherein the hollow mullion has a second partition plate at right angles to the first partition plate and a third washer plate is provided integral with the other washer plate at the hollow mullion and mating with said second partition plate, the outer frame having a bottom rail on which a pair of sockets are formed, there being a pair of screws extending through said third washer

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pair of spaced upper and lower hollow portions 25, 26 (Figure 2) extending horizontally from the vertical hollow portion 18 of the inner frame 15. The intermediate frame 16 is glazed with a sheet of glass 27 to provide a dead light. The outer frame 17 comprises a hollow mullion 28 attached to the free ends of the upper and lower hollow portions 25, 26. The hollow mullion 28 cooperates with a spaced mullion (not shown) and a pair of top and bottom rails, the bottom rail being designated at 29, in forming a window frame in which are mounted a pair of windows horizontally movable on and along a pair of guide rails 30a, 30b, one of the windows being indicated at 30c. The hollow mullion 28 is provided with partition plates 31, 32 extending at a right angle with respect to each other, the partition plates 31, 32 jointly providing support for a washer bracket 33 of L-shaped cross-section. The partition plate 31 lies parallel to the partition plate 21. The washer bracket 33 has a second washer plate 34 mating with the partition plate 31 and a third washer plate 35 mating with the partition plate 32, the second and third washer plates 34, 35 being integral and extending perpendicularly to each other. The second plate 34 is substantially coextensive in width to the partition plate 31.

A seat board 36 is placed on the sill and has its side margin 37 inserted between spaced flanges 38, 39 of the lower hollow portion 26, as shown in Figure 2. The upper hollow portion 25 has a support flange 40 on which a head board unit 41 is carried. An overhanging structure or roof decking 42 projects outwardly from the building wall and bears upon the upper hollow portion 25 and the head board unit 41.

An elongated bolt 43 is provided to connect the hollow mullion 28 tightly with the vertical hollow portion 18. The bolt 43 has a stem 44 extending through the washer plate 24 and the partition plate 21, all the way through the lower hollow portion 26, and through the partition plate 31 and the washer bracket plate 34. The bolt 43 has a head 45 acting on and retained in place by the washer plate 24, and an externally threaded end 46 engaged by a nut 47 which acts on the washer bracket plate 34. With tightening rotation of the nut 47 on the end 46 of the bolt stem 44, the hollow mullion 28 is securely fastened to the vertical hollow portion 18 with the lower hollow portion 26 therebetween. With this arrangement, the mullion 28, the lower frame portion 26, and the vertical frame portion 18 can be joined tightly together by the bolt 43 extending through them, and the washer plate 24 and the washer bracket plate 34 can provide increased mechanical strength

for the mullion 28 and the frame portion 18 against damages which would otherwise result from direct engagement by the head 45 and nut 47.

The plate 35 of the washer bracket 33 additionally provides reinforced support for a pair of screws 48, 49 extending there-through and through the partition plate 32, threadedly into a pair of sockets 50, 51, respectively, formed on the bottom rail 29.

The inner frame 15 need not be hollow but may be solid or purely of channel form. In the case of a solid inner frame the head 45 of the bolt can be located in a recess e.g. a bore provided in the frame.

The inner frame need not be secured to a wall structure by means of flanges such as 19 but can be secured by, for example, screws extending directly through the frame into the wall.

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1. A bay window frame construction comprising an inner frame adapted for securement on a wall around an opening and including a vertical hollow or recessed portion, an outer frame spaced from the inner frame to form an outer frame of the bay and including a hollow mullion, a lower spacer member extending between the vertical hollow or recessed portion and the hollow mullion, the arrangement being secured in clamping arrangement by means of a bolt and cooperating nut located with the bolt head and the nut each in a respective one of the hollow or recess in the vertical portion and the hollow in the mullion, the bolt extending through the vertical portion, the spacer member and mullion.

2. A construction according to claim 1 wherein the vertical portion of the inner frame has a flange for attachment to the building wall and is hollow with a partition plate therein, through which the bolt passes.

3. A construction according to claim 2, wherein the hollow mullion has a partition plate the bolt extending through the partition plate.

4. A construction according to claim 3, wherein the spacer member is hollow.

5. A construction according to claim 3 or 4, wherein a washer plate is provided between each partition plate and the bolt head or nut.

6. A construction according to claim 5, wherein the hollow mullion has a second partition plate at right angles to the first partition plate and a third washer plate is provided integral with the other washer plate at the hollow mullion and mating with said second partition plate, the outer frame having a bottom rail on which a pair of sockets are formed, there being a pair of screws extending through said third washer

plate and said second partition plate threadedly into said pair of sockets.

5 7. A construction according to any one of claims 1 to 6, wherein the area between the inner and outer frames is glazed with a sheet of glass, and the outer frame has a pair of horizontally movable windows mounted therein.

8. A frame construction substantially as described herein with reference to, or as 10 illustrated in, the drawings.

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