

PATENT SPECIFICATION

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(54) EXTERIOR WINDOW UNIT HAVING ADAPTER SILL MEMBER.

(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:—

This invention relates to a window unit having an adapter sill member for use in combination with a pre-installed sill disposed in an opening in a building wall.

The type of exterior window units in which this invention is concerned provides a high degree of thermal insulation, air-tightness, and sound insulation since the units are mounted on the outside of openings in building walls, in which openings other window units have been previously installed. The exterior window units of this kind have found extensive use because they can retain the pleasing appearance of the pre-installed window assemblies having paper screen sashes (known as "Shoji" in Japan). The frame sills of the exterior window units usually include a hollow body of generally rectangular cross section having an upper and a lower portion, and an inner vertical side portion interconnecting the upper and lower portions at their inner ends or edges and having a pair of upper and lower vertical fins formed integrally therewith and extending therefrom one upwardly and the other downwardly, to form a first or vertical mounting portion to be mated with and secured to the exterior vertical surface of the sill of the previously installed window assemblies by screws or other fastening means which pass through the lower vertical fin, the frame sill also including a horizontal flange formed integrally with and projecting inwardly from the upper vertical fin at its top end to form a second or horizontal mounting portion to be mated with and secured to the top horizontal surface of the sill by screws or other fastening means passing through the horizontal flange. When it is desired to install the exterior window

units from inside the building walls, it is difficult to fix the first or vertical mounting portion to the exterior vertical surface of the sill because of difficult access to the screw-receiving holes formed through the lower vertical fin extending downwardly of the frame sill body.

It has frequently been desired to increase the height of the upper vertical fins to provide a better weather resistance. Where standard sills having a thickness of from 36 mm to 45 mm are employed, the first or vertical mounting portion having such an increased upper vertical fin can not be secured directly onto the exterior vertical surface of the sill because the screw-receiving holes formed through the lower vertical fin are located downwardly of the sill when the first or vertical mounting portion is mated with the exterior vertical surface of the sill. One method of overcoming this difficulty has been to interpose an additional wooden plate between the first or vertical mounting portion of the frame sill and the exterior vertical surface of the sill and to fix the first or vertical mounting portion to the exterior vertical surface of the sill by screws passing through the lower vertical fin and the wooden plate. This procedure has been found not entirely satisfactory, however, in that it would increase the installation costs on account of the use of such added materials. Another alternative has been to provide screw-receiving holes through the lower vertical fin of the first or vertical mounting portion in alignment with the positions of studs in the wall and to fix the first or vertical mounting portion to the exterior vertical surface of the sill by screws passing through the screw-receiving holes into the studs. This approach is also disadvantageous in that it requires a relatively time-consuming operation to drill or otherwise process the lower vertical fin to provide such screw-receiving holes at the construction site because the locations of the studs in the walls are not always constant.

The present invention seeks to provide an improved exterior window unit wherein a

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frame sill can be mounted firmly on a fixed sill in a building wall with a maximum of ease.

5 According to the invention, there is provided an exterior window unit for covering an opening in a building wall, the opening having a first sill, said exterior window unit comprising a frame having a second sill, a pair of sashes mounted within the frame in
10 parallel closely spaced planes, and an adapter member for extending along the length of the first sill, wherein the adapter member comprises a vertical portion adapted to be secured to an exterior vertical surface of the first sill and a horizontal portion adapted to be secured
15 to a horizontal top surface of the first sill, the vertical portion having a first engaging means extending along its lower edge, and wherein the second sill comprises a first mounting means having a vertical portion and a horizontal portion adapted to be secured respectively to said vertical and horizontal portions of the adapter member and a second mounting means having a second engaging means engaging the first engaging means of the adapter member.

Preferably, the first engaging means comprises a channel having a substantially U-shaped cross-section and the second engaging means comprises a downwardly extending flange having such a size and shape that it can be received in the channel.

The invention will now be described in greater detail, by way of example, with reference to the drawings, in which:—

35 Figure 1 is a fragmentary vertical cross-sectional view through an exterior window unit having a frame sill and an adapter member both of which are provided in accordance with the invention;

40 Figure 2 is a vertical cross-sectional view through modified frame sill and adapter member connected together; and

45 Figures 3 and 4 are vertical cross-sectional views through further modified frame sills.

Figure 1 shows an exterior window unit 10 mounted on the exterior of a building wall 11 and covering an opening 12 therein. The building wall 11 includes an exterior siding 13, a stud 14, a batten 15, a thermal insulation board 16 and an interior siding 17. The building wall 11 has a wooden sill 18 having in its top surface 19 a pair of spaced apart, parallel grooves 20, 20 in which the lower edges of a pair of sashes 21, 21 are normally received for horizontal sliding movement, the sill being of a standard type having a thickness of from 36 mm to 45 mm.

60 The exterior window unit 10 generally comprises a frame 22 made preferably of extruded aluminum and including a sill 23, and a pair of relatively movable sashes 24, 24 of the rolling type mounted within the frame 22 in parallel closely spaced planes. As shown in Figure 1, the frame sill 23 includes a

hollow body 25 of generally rectangular cross section having an upper portion 26, a lower portion 27 and a pair of connecting portions 28 and 29 connecting the upper and lower portions.

70 The upper portion 26 comprises a plate slanted downwardly outward and stepped as at 30 adjacent to its outer end or edge, the slanted plate having a pair of spaced apart, parallel flanges or rails 31, 31 formed integrally therewith and projecting upwardly therefrom on which the pair of sashes 24, 24 ride for horizontal rolling movement.

75 The lower portion 27 includes a horizontal plate 32, a second slanted plate 33 extending substantially in parallel relationship to the first-mentioned slanted plate 26, and a vertical plate 34 connecting the horizontal plate 32 and the second slanted plate 33. The second slanted plate 33 is disposed at a level below the horizontal plate 32 to provide a stepped portion for receiving the upper end portion of the exterior siding 13 as shown in Figure 1.

80 The connecting portions 28 and 29 comprise respective vertical plates connecting the first slanted plate 26 and the horizontal plate 32 adjacent to their inner ends or edges 35 and 36, and the stepped end portion 30 of the first slanted plate 26 and the second slanted plate 33 at their outer ends or edges.

85 The frame sill 23 also includes a mounting portion 37 having a vertical plate 38 projecting upwardly from the first slanted plate 26 at its inner end or edge 35 and a horizontal plate 39 formed integrally with and extending inwardly at right angles from the vertical plate 38, the horizontal plate 39 having its free end directed downwardly substantially at right angles thereto to provide a longitudinal flange 40 for abutment against the top surface 19 of the sill 18. Both of the vertical and horizontal plates 38 and 39 extend along the entire length of the sill 18.

90 The horizontal plate 32 of the lower portion 27 of the frame sill body 25 has an engaging fin 41 formed integrally therewith and projecting downwardly at right angles therefrom, the fin being disposed intermediate the inner edge 36 of the horizontal plate 32 and the vertical plate 29. The engaging fin 41 has its free end bent at an angle to provide an engaging end portion 42.

95 An adapter member 43 is provided for attaching the frame sill 23 onto the sill 18. The adapter member 43 is preferably made of extruded aluminum and extends along the entire length of the sill 18, the adapter member being of substantially L-shaped cross section having a vertical plate portion 44 and a horizontal plate portion 45 extending inwardly at right angles therefrom. The vertical plate portion 44 has its lower marginal end portion formed into a substantially U-shaped hook 46 for receiving snugly the engag-
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ing fin 41 therein. The adapter member 43 may be replaced by a plurality of plate members each identical in cross section to the adapter member 43 but of substantially shorter length which plate members are disposed on the sill 18 in longitudinally spaced relationship.

When the exterior window unit 10 is to be installed, the adapter member 43 is first brought into abutment against and secured to the top and exterior vertical surfaces 19 and 47 of the sill 18 by nails 48 passing through the vertical plate section 44 of the adapter sill member 43 at longitudinally spaced locations along the length thereof. Then, the frame sill 23 is brought into engagement with the adapter member 43 with the surface of the vertical plate 38 of the mounting portion 37, the edge 36 of the horizontal plate 32 and the end portion 42 of the engaging fin 41 in abutment against the exterior surface of the vertical plate section 44 of the adapter member 43. The frame sill 23 is then moved downwardly until the undersurface of the horizontal plate 39 of the mounting portion 37 is brought into abutment against the upper surface of the horizontal plate portion 45 of the adapter member 43, and the engaging fin 41 is snugly received into the hook portion 46 of the vertical plate portion 44. In this condition, the edge of the downwardly directed flange 40 of the horizontal plate portion 39 of the mounting portion 37 is held against the top surface 19 of the sill 18, and the outer edge of the horizontal plate section 45 of the adapter sill member 43 against the inner surface of the flange 40. Finally, a number of screws 49 are threaded through the horizontal plate portion 39 and the horizontal plate portion 45 into the sill 18 as shown in Figure 1 to connect the frame sill 23 securely to the sill 18.

According to a modified form of the invention shown in Figure 2, a mounting portion 37a has its corner portion into which a vertical and a horizontal plate 38a and 39a merge raised along the length thereof so as to provide a channel portion 50 of substantially U-shaped cross-section. A vertical plate portion 44a of an adapter member 43a has its upper end or edge extended beyond the top surface of a horizontal plate portion 45a so as to provide an engaging portion 51 which is complementary in shape to the channel section 50. For installation of the exterior window unit 10, the adapter member 43a is secured (as in Figure 1) to the exterior vertical surface 47 of the sill 18 by nails passing through the vertical plate portion 44a. Then, the frame sill 23a is brought into engagement with the adapter member 43a with the surface of the vertical plate portion 38a, the edge 36 of the horizontal plate 32 and the end portion 42 of the engaging fin 41 in abutment against the exterior surface of the ver-

tical plate section 44a of the adapter member 43a. The frame sill 23a is moved downwardly until the engaging fin 41 and the engaging portion 51 are snugly received in the hook portion 46 and the channel portion 50, respectively. This arrangement obviates the need for the screws 49 in the preceding embodiment shown in Figure 1 on account of the channel portion 50 and the engaging portion 51 being interengaged with each other.

According to another modification, the horizontal plate 32 may be omitted as shown in Figure 3 to reduce the weight of the frame sill 23.

Figure 4 shows a further modification in which, in addition to the inner connecting portion 29 being omitted, the vertical plate 34 extends upwardly in a plane intermediate of the width of the sill body 25 to interconnect the upper and lower portions 26 and 27.

By virtue of the provision of the adapter sill member 43 (43a), while the sill 18 is of the standard type having a thickness of from 36 mm to 45 mm, the height H (Figure 1) of the vertical plate portion 38 of the mounting portion 37 can be substantially increased to provide a better weather resistance. This is because the engaging fin 41 extending downwardly of the frame sill body 25 need not be fixed directly onto the exterior vertical surface 47 of the sill 18 by screws or similar fastening means, and need only be received in the hook section 46.

WHAT WE CLAIM IS:—

1. An exterior window unit for covering an opening in a building wall, the opening having a first sill, said exterior window unit comprising a frame having a second sill, a pair of sashes mounted within the frame in parallel closely spaced planes, and an adapter member for extending along the length of the first sill, wherein the adapter member comprises a vertical portion adapted to be secured to an exterior vertical surface of the first sill and a horizontal portion adapted to be secured to a horizontal top surface of the first sill, the vertical portion having a first engaging means extending along its lower edge, and wherein the second sill comprises a first mounting means having a vertical portion and a horizontal portion adapted to be secured respectively to said vertical and horizontal portions of the adapter member and a second mounting means having a second engaging means engaging the first engaging means of the adapter member.

2. An exterior window unit according to claim 1, in which the first engaging means comprises a channel having a substantially U-shaped cross-section and the second engaging means comprises a downwardly extending flange having such a size and shape that it can be received in the channel.



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ing fin 41 therein. The adapter member 43 may be replaced by a plurality of plate members each identical in cross section to the adapter member 43 but of substantially shorter length which plate members are disposed on the sill 18 in longitudinally spaced relationship.

When the exterior window unit 10 is to be installed, the adapter member 43 is first brought into abutment against and secured to the top and exterior vertical surfaces 19 and 47 of the sill 18 by nails 48 passing through the vertical plate section 44 of the adapter sill member 43 at longitudinally spaced locations along the length thereof. Then, the frame sill 23 is brought into engagement with the adapter member 43 with the surface of the vertical plate 38 of the mounting portion 37, the edge 36 of the horizontal plate 32 and the end portion 42 of the engaging fin 41 in abutment against the exterior surface of the vertical plate section 44 of the adapter member 43. The frame sill 23 is then moved downwardly until the undersurface of the horizontal plate 39 of the mounting portion 37 is brought into abutment against the upper surface of the horizontal plate portion 45 of the adapter member 43, and the engaging fin 41 is snugly received into the hook portion 46 of the vertical plate portion 44. In this condition, the edge of the downwardly directed flange 40 of the horizontal plate portion 39 of the mounting portion 37 is held against the top surface 19 of the sill 18, and the outer edge of the horizontal plate section 45 of the adapter sill member 43 against the inner surface of the flange 40. Finally, a number of screws 49 are threaded through the horizontal plate portion 39 and the horizontal plate portion 45 into the sill 18 as shown in Figure 1 to connect the frame sill 23 securely to the sill 18.

According to a modified form of the invention shown in Figure 2, a mounting portion 37a has its corner portion into which a vertical and a horizontal plate 38a and 39a merge raised along the length thereof so as to provide a channel portion 50 of substantially U-shaped cross-section. A vertical plate portion 44a of an adapter member 43a has its upper end or edge extended beyond the top surface of a horizontal plate portion 45a so as to provide an engaging portion 51 which is complementary in shape to the channel section 50. For installation of the exterior window unit 10, the adapter member 43a is secured (as in Figure 1) to the exterior vertical surface 47 of the sill 18 by nails passing through the vertical plate portion 44a. Then, the frame sill 23a is brought into engagement with the adapter member 43a with the surface of the vertical plate portion 38a, the edge 36 of the horizontal plate 32 and the end portion 42 of the engaging fin 41 in abutment against the exterior surface of the ver-

tical plate section 44a of the adapter member 43a. The frame sill 23a is moved downwardly until the engaging fin 41 and the engaging portion 51 are snugly received in the hook portion 46 and the channel portion 50, respectively. This arrangement obviates the need for the screws 49 in the preceding embodiment shown in Figure 1 on account of the channel portion 50 and the engaging portion 51 being interengaged with each other.

According to another modification, the horizontal plate 32 may be omitted as shown in Figure 3 to reduce the weight of the frame sill 23.

Figure 4 shows a further modification in which, in addition to the inner connecting portion 29 being omitted, the vertical plate 34 extends upwardly in a plane intermediate of the width of the sill body 25 to interconnect the upper and lower portions 26 and 27.

By virtue of the provision of the adapter sill member 43 (43a), while the sill 18 is of the standard type having a thickness of from 36 mm to 45 mm, the height H (Figure 1) of the vertical plate portion 38 of the mounting portion 37 can be substantially increased to provide a better weather resistance. This is because the engaging fin 41 extending downwardly of the frame sill body 25 need not be fixed directly onto the exterior vertical surface 47 of the sill 18 by screws or similar fastening means, and need only be received in the hook section 46.

WHAT WE CLAIM IS:—

1. An exterior window unit for covering an opening in a building wall, the opening having a first sill, said exterior window unit comprising a frame having a second sill, a pair of sashes mounted within the frame in parallel closely spaced planes, and an adapter member for extending along the length of the first sill, wherein the adapter member comprises a vertical portion adapted to be secured to an exterior vertical surface of the first sill and a horizontal portion adapted to be secured to a horizontal top surface of the first sill, the vertical portion having a first engaging means extending along its lower edge, and wherein the second sill comprises a first mounting means having a vertical portion and a horizontal portion adapted to be secured respectively to said vertical and horizontal portions of the adapter member and a second mounting means having a second engaging means engaging the first engaging means of the adapter member.

2. An exterior window unit according to claim 1, in which the first engaging means comprises a channel having a substantially U-shaped cross-section and the second engaging means comprises a downwardly extending flange having such a size and shape that it can be received in the channel.

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3. An exterior window unit according to claim 1 or claim 2, in which the vertical portion of the adapter member extends at its upper end beyond the top surface of the horizontal portion to form an engaging portion, and the first mounting means has a portion into which the vertical and horizontal portions merge raised longitudinally to provide a channel portion, of U-shaped cross-section, the engaging portion and the channel portion being complementary in shape to and engaging with each other.
4. An exterior window unit according to any one of claims 1 to 3, in which the second sill includes a hollow body of generally rectangular cross-section having an upper and a lower wall, and a pair of inner and outer vertical side walls connecting the upper and lower walls at their inner and outer ends or edges, respectively.
5. An exterior window unit according to claim 4, in which a part of the lower wall of the sill body is omitted.
6. An exterior window unit according to claim 4, in which the inner vertical side wall of the sill body is omitted and in which the sill body has a vertical plate extending between the upper and lower portions in a plane intermediate of the width of the sill body.
7. An exterior window unit substantially as described herein with reference to the drawings.
- For the Applicants:
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