

SEAL STRUCTURE OF VERTICAL PIVOTED WINDOW

BACKGROUND OF THE INVENTION

The present invention relates to a seal
5 structure of a vertical pivoted window in which a sash is
mounted to a window frame so as to be horizontally
rotatable about a vertical pivot, for effecting a sealing
between the window frame and an outer peripheral surface
of the sash on the outdoor side of the window.

10 A vertical pivoted window of this kind is
disclosed, for example, in Japanese Utility Model
Publication No. SHO 57-14314.

In this kind of vertical pivoted window,
in order to effect a sealing between the window frame and
15 the outer peripheral surface of the sash on the outdoor
side of the window, there is known such seal structure
that outdoor side air-tight members are mounted to
outdoor side portions of upper, lower and bilateral
vertical frame elements of the sash, so that the four
20 outdoor side air-tight members are pressed into contact
with inner surfaces of upper, lower and bilateral
vertical frame members of the window frame when the sash
is closed.

There is also known such seal structure
25 that rain barriers are provided to the upper and lower

frame members of the window frame, and that hook-shaped fin pieces are provided to the bilateral vertical frame members of the window frame and the bilateral vertical frame elements of the sash so that the fin pieces of the vertical frame members of the window frame respectively come into opposition to the fin pieces of the vertical frame elements of the sash when the sash is closed.

In the former seal structure, the four air-tight members are provided to be pressed into contact with the upper, lower and bilateral vertical frame members of the window frame, and therefore, in order to open or close the sash, it is necessary to elastically deform these four air-tight members. Thus, relatively large force is required for opening or closing the sash. In addition, gaps are liable to remain between the air-tight members and the window frame at the corner portions thereof, which reduces a sealing effect.

The latter seal structure intends to prevent rain water from invading into the indoor side relying on dripping by dripping mechanism and an effect of making a pressure in a room formed between the window frame and the sash substantively equal to the outdoor air pressure. However, in this structure, there remains a possibility that rain water may invade up to the indoor side sealing portion between the window frame and the

sash in case of hard wind and rain.

SUMMARY OF THE INVENTION

An object of the present invention is to
5 substantially eliminate defects or drawbacks encountered
in the prior art described above and to provide a seal
structure of a vertical pivoted window having an
improved sealing function.

This and other objects can be achieved
10 according to the present invention by providing a seal
structure of a vertical pivoted window which comprises a
window frame and a sash mounted thereto so as to be
horizontally rotatable about a vertical pivot, the window
frame comprising an upper frame member, a lower frame
15 member and first and second vertical frame members which
are assembled in rectangular shape, the sash comprising
an upper frame element, a lower frame element and first
and second vertical frame elements which are assembled in
rectangular shape, the seal structure being characterized
20 in that the first vertical frame member of the window
frame is integrally provided, at its outdoor side
portion, with an outdoor side first vertical fin piece
and the first vertical frame element of the sash is
integrally provided, at its outdoor side portion, with a
25 first vertical fin piece so that the first vertical fin

piece of the first vertical frame element comes into contact with an outdoor side surface of the outdoor side first vertical fin piece of the first vertical frame member when the sash is closed; the second vertical frame member of the window frame is integrally provided, at its outdoor side portion, with an outdoor side second vertical fin piece and the second vertical frame element of the sash is integrally provided, at its outdoor side portion, with a second vertical fin piece so that the second vertical fin piece of the second vertical frame element comes into contact with an indoor side surface of the outdoor side second vertical fin piece of the second vertical frame member when the sash is closed; an outdoor side upper transverse rain barrier is fitted to the upper frame element of the sash at its outdoor side portion so that the upper transverse rain barrier are pressed into contact with an outdoor side upper transverse fin piece formed to the upper frame member of the window frame when the sash is closed; the outdoor side upper transverse rain barrier extends transeversely beyond the first and second vertical frame elements of the sash and are pressed into contact at least with the outdoor side first vertical fin piece of the first vertical frame member of the window frame when the sash is closed; an outdoor side lower transverse rain barrier is fitted to the lower

frame element of the sash at its outdoor side portion so that the lower transverse rain barrier is pressed into contact with an outdoor side lower transverse fin piece formed to the lower frame member of the window frame when the sash is closed; and the lower transverse rain barrier extends transeversely beyond the first and second vertical frame elements of the sash and are pressed into contact at least with the outdoor side first vertical fin piece of the first vertical frame member of the window frame when the sash is closed.

According to the present invention, on the outdoor side of the vertical pivoted window, sealing is made between the first vertical frame member of the window frame and the first vertical frame element of the sash and between the second vertical frame member of the window frame and the second vertical frame element of the sash respectively by bringing the first vertical fin piece of the first vertical frame element into contact with the outdoor side surface of the outdoor side first vertical fin piece of the first vertical frame member and by bringing the second vertical fin piece of the second vertical frame element into contact with the indoor side surface of the outdoor side second vertical fin piece of the second vertical frame member. Between the upper frame member of the window frame and the upper frame

element of the sash and between the lower frame member of the window frame and the lower frame element of the sash on the outdoor side of the window, sealing is made by use of the outdoor side upper transverse rain barrier fitted to the upper frame element and the outdoor side lower transverse rain barrier fitted to the lower frame element, respectively. Since the outdoor side upper and lower transverse rain barriers respectively extend transversely beyond the first and second frame elements of the sash, the sealing at four corner portions of the sash is made more reliable. Further, considering that the upper and lower corner portions of the sash on the side of the first vertical frame element are exposed to the outdoors, the outdoor side upper and lower transverse rain barriers are respectively provided to be pressed into contact with the outdoor side first vertical fin piece of the first vertical frame member of the window frame when the sash is closed, thereby enhancing the reliability of the sealing at these corner portions. Thus, the seal structure according to the present invention has an improved sealing effect.

Further, in the present invention, sealing is made between the window frame and the sash on the outdoor side of the window without using vertical rain barrier nor vertical air-tight member with the exception

of corner portions. Therefore, as for the outdoor side of the window, only the outdoor side upper and lower transverse rain barriers are required to be elastically deformed at the time of opening or closing the sash.

5 Therefore, force required for opening or closing the sash is reduced.

In a preferred example of the present invention, each of the outdoor side upper and lower transverse rain barriers comprises a transverse rain barrier portion and vertical rain barrier portions which are integrally provided at both longitudinal end portions of the transverse rain barrier portion so as to extend in a direction substantively normal to the transverse rain barrier portion, the transverse rain barrier portions of the outdoor side upper and lower transverse rain barriers are respectively fitted to the upper and lower frame elements of the sash and the vertical rain barrier portions of the outdoor side upper and lower transverse rain barriers are respectively fitted to upper and lower portions of the first and second vertical frame elements of the sash.

In another preferred example of the present invention, each of the outdoor side upper and lower transverse rain barrier comprises a transverse rain barrier portion, a vertical rain barrier portion which is

integrally provided at one longitudinal end portion of the transverse rain barrier portion so as to extend in a direction substantitively normal to the transverse rain barrier portion, and an end fixing member which is
5 brought into contact with the other longitudinal end portion of the transverse rain barrier portion and fixed to the second vertical frame element of the sash.

In another preferred example of the present invention, each of the outdoor side upper and
10 lower transverse rain barriers comprises a transverse rain barrier portion and end fixing members which are brought into contact with both longitudinal end portions of the transverse rain barrier portion and respectively fixed to the first and second vertical frame elements of
15 the sash, and the fixing member fixed to the first vertical frame element of the sash is provided with a seal piece which is pressed against the longitudinal end face of the transverse rain barrier portion to form a continuous structure therewith.

20 The nature and further features of the present invention will be made more clear through the description made hereunder with reference to the accompanying drawings.

In the accompanying drawings:

Fig. 1 is a brief front view of a vertical pivoted window showing an embodiment of the present invention;

5 Fig. 2 is a sectional view taken along the line II-II in Fig. 1;

Fig. 3 is a sectional view taken along the line III-III in Fig. 1;

10 Fig. 4 is a disassembled perspective view of an upper frame element and vertical frame elements of a sash;

Fig. 5 is a perspective view of a first example of an outdoor side upper transverse rain barrier according to the present invention;

15 Fig. 6 is a view showing an upper sealing portion between the window frame and the sash of Fig. 1;

Fig. 7 is a view showing a lower sealing portion between the window frame and the sash of Fig. 1;

20 Fig. 8 is a plan view of a second example of an outdoor side upper transverse rain barrier according to the present invention;

Fig. 9 is a rear front view of the outdoor side upper transverse rain barrier of Fig. 8;

25 Fig. 10 is a perspective view of the outdoor side upper transverse rain barrier of Fig. 8; and

Fig. 11 is a perspective view of a third example of an outdoor side upper transverse rain barrier according to the present invention.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

Preferred embodiments of the present invention will be described hereunder with reference to the accompanying drawings.

10 It is first to be noted that terms "upper", "lower", "left", "right" and the like terms are used with respect to the illustrations in the accompanying drawings with the exception of Figs. 9 to 11. Figs. 9 to 11 illustrate the embodiments in a condition of being rotated by 180 degrees as compared with the other Figures for convenience' sake.

15 As shown in Fig. 1, a window frame 5 is composed of an upper frame member 1, a lower frame member 2, a left vertical frame member 3 and a right vertical frame member 4 which are assembled in rectangular shape.

20 A sash 6 is mounted to the window frame 5 so as to be horizontally rotatable about a vertical pivot 7, thereby constituting a vertical pivoted window. The sash 6 is composed of an upper frame element 8, a lower frame element 9, a left vertical frame element 10, a right vertical frame element 11 which are assembled in

25

rectangular shape, and a glass 12 fitted in thus assembled frame elements.

As shown in Fig. 2, the upper frame member 1 of the window frame 5 comprises a main body 20 and indoor side and outdoor side upper transverse fin pieces 21 and 22 which are integrally formed to the inner surface of the main body 20 along the longitudinal direction thereof. The lower frame member 2 comprises a main body 23 and indoor and outdoor side lower transverse fin pieces 24 and 25 which are integrally formed to the inner surface of the main body 23 along the longitudinal direction thereof.

As shown in Fig. 3, the left vertical frame member 3 of the window frame 5 comprises a main body 26 and indoor side and outdoor side left vertical fin pieces 27 and 28 which are integrally formed to the inner surface of the main body 26. The right vertical frame member 4 comprises a main body 29 and indoor side and outdoor side right vertical fin pieces 30 and 31 which are integrally formed to the inner surface of the main body 29.

The respective fin pieces of the left and right vertical frame members 3 and 4 are cut at their upper and lower end portions so that the upper and lower frame members 1 and 2 are made to abut against the main

bodies 26 and 29 of the left and right frame members 3 and 4 and connected thereto as shown in Fig. 1. Four indoor side fin pieces and four outdoor side fin pieces respectively constitute a continuous structure around four sides of the window frame.

As shown in Fig. 2, the upper frame element 8 of the sash 6 comprises a main body 32 and indoor side and outdoor side upward open grooves 33 and 34 which are formed to the outer surface of the main body 32 along the longitudinal direction thereof. The lower frame element 9 comprises a main body 35 and indoor side and outdoor side downward open grooves 36 and 37 which are formed to the outer surface of the main body 35 along the longitudinal direction thereof.

As shown in Fig. 3, the left vertical frame element 10 of the sash 6 comprise a main body 38 and indoor side and outdoor side outward open grooves 39 and 40 which are formed to the outer surface of the main body 38 along the longitudinal direction thereof. Further, a left vertical fin piece 41 is integrally formed at an outdoor side portion of the outer surface of the main body 38 so that the left vertical fin piece 41 overlaps the outdoor side surface of the outdoor side left vertical fin piece 28 of the left vertical frame member 3 when the sash 6 is closed. The right vertical

frame element 11 comprises a main body 42 and indoor side and outdoor side outward open grooves 43 and 44 which are formed to the outer surface of the main body 42 along the longitudinal direction thereof. Further, a right vertical fin piece 45 is integrally formed at an outdoor side portion of the outer surface of the main body 42 so that the right vertical fin piece 45 overlaps the indoor side surface of the outdoor side right vertical fin piece 31 of the right vertical frame member 4 when the sash 6 is closed.

The main bodies 32 and 35 of the upper and lower frame elements 8 and 9 are made equal in dimension in the depth direction, which dimension is smaller than the dimension in the depth direction of the main bodies 38 and 42 of the left and right vertical frame elements 10 and 11. As shown in Fig. 1, the upper and lower portions of the main bodies 38 and 42 of the left and right vertical frame elements 10 and 11 are cut out, and the both longitudinal end portions of the upper and lower frame elements 8 and 9 are respectively inserted into the cutout portions and connected to the main bodies 38 and 42 of the left and right vertical frame elements 10 and 11. That is, as shown in Fig. 4, the upper and lower portions of inner walls 38a and 42a of the main bodies 38 and 42 of the left and right vertical frame elements 10

and 11 and parts of indoor side and outdoor side walls 38b, 42b, 38c and 42c thereof are cut in accordance with the contours of the upper and lower frame elements 8 and 9, and the upper and lower frame elements 8 and 9 are
5 inserted through the cutout portions and connected to outer walls 38d and 42d of the main bodies 38 and 42 of the left and right vertical frame elements 10 and 11 by means of screws.

As shown in Figs. 2 and 3, an indoor side
10 upper transverse air-tight member 50, an indoor side lower transverse air-tight member 51, an indoor side left vertical air-tight member 52 and an indoor side right vertical air-tight member 53 are respectively fitted to the indoor side upward open groove 33, the indoor side
15 downward open groove 36 and the indoor side outward open grooves 39 and 43 so that these air-tight members are respectively pressed into contact with the indoor side upper transverse fin piece 21, the indoor side lower transverse fin piece 24, the indoor side left vertical
20 fin piece 27 and the indoor side right vertical fin piece 30 when the sash 6 is closed, thereby effecting a sealing between the window frame 5 and the sash 6 on the indoor side of the window.

To the outdoor side upward open groove 34
25 and the outdoor side downward open groove 37 are fitted

an outdoor side upper transverse rain barrier 54 and an outdoor side lower transverse rain barrier 55, respectively.

As shown in Fig. 5, the outdoor side upper transverse rain barrier 54 has almost C-shape opening downward and comprises a long-shaped transverse rain barrier portion 56 and vertical rain barrier portions 57 extending from both longitudinal end portions of the transverse rain barrier portion 56 in a direction substantively normal to the transverse rain barrier portion 56. The vertical rain barrier portions 57 may be integrally formed to the transverse rain barrier portion 56 or integrally bonded thereto. The transverse and vertical rain barrier portions 56 and 57 are respectively composed of a mount portion 58 and a fin portion 59 formed integrally with the mount portion 58. Further, transverse seal pieces 60 are formed integrally to the mount portion 58 of the transverse rain barrier portion 56 at its portions near the both longitudinal ends thereof so as to be directed to the outdoor side.

As shown in Fig. 6, the transverse rain barrier portion 56 of the outdoor side upper transverse rain barrier 54 is fitted to the outdoor side upward open groove 34 of the upper frame element 8, and the vertical rain barrier portions 57 thereof are fitted to the

outdoor side outward open grooves 40 and 44 of the left and right vertical frame elements 10 and 11. Thus, the transverse rain barrier portion 56 is prevented from shrinking in the longitudinal direction.

5 One of the transverse seal pieces 60 is in contact with the upper end surface of the outdoor side wall 38c of the main body 38 of the left vertical frame element 10 (the outdoor side upper end surface 10a of the left vertical frame element 10) and with the outdoor side
10 upper end surface 8a of the upper frame element 8 so as to effect a sealing at the metal contact portion a between the outdoor side wall 38c of the main body 38 of the left vertical frame element 10 and the outdoor side wall 8b of the upper frame element 8 to prevent rain
15 water from invading through the metal contact portion a into the inside of the left vertical frame element 10.

 The other transverse seal piece 60 is in contact with the upper end surface of the outdoor side wall 42c of the main body 42 of the right vertical frame
20 element 11 (the outdoor side upper end surface 11a of the right vertical frame element 11) and with the outdoor side upper end surface 8a of the upper frame element 8 so as to effect a sealing at the metal contact portion b between the outdoor side wall 42c of the main body 42 of
25 the right vertical frame element 11 and the outdoor side

wall 8b of the upper frame element 8 to prevent rain water from invading through the metal contact portion b into the inside of the right vertical frame element 11.

The fin portions 59 of the transverse and
5 vertical rain barrier portions 56 and 57 are respectively pressed into contact with the outdoor side upper transverse fin piece 22 of the upper frame member 1 and the upper portions of the outdoor side left and right vertical fin pieces 28 and 31 of the left and right
10 vertical frame members 3 and 4 when the sash 6 is closed.

The outdoor side lower transverse rain barrier 55 has substantively the same shape as that of the outdoor side upper transverse rain barrier 54. As shown in Fig. 7, the transverse rain barrier portion 56
15 thereof is fitted to the outdoor side downward open groove 37 of the lower frame element 9, and the vertical rain barrier portions 57 thereof are fitted to the outdoor side outward open grooves 40 and 44 of the left and right vertical frame elements 10 and 11. Thus, the
20 transverse rain barrier portion 56 is prevented from shrinking in the longitudinal direction.

One of the transverse seal pieces 60 is in contact with the lower end surface of the outdoor side wall 38c of the main body 38 of the left vertical frame
25 element 10 (the outdoor side lower end surface 10b of the

left vertical frame element 10) and with the outdoor side lower end surface 9a of the lower frame element 9 so as to effect a sealing at the metal contact portion c between the outdoor side wall 38c of the main body 38 of the left vertical frame element 10 and the outdoor side wall 9b of the lower frame element 9 to prevent rain water from invading through the metal contact portion c into the inside of the left vertical frame element 10.

The other transverse seal piece 60 is in contact with the lower end surface of the outdoor side wall 42c of the main body 42 of the right vertical frame element 11 (the outdoor side lower end surface 11b of the right vertical frame element 11) and with the outdoor side lower end surface 9a of the lower frame element 9 so as to effect a sealing at the metal contact portion d between the outdoor side wall 42c of the main body 42 of the right vertical frame element 11 and the outdoor side wall 9b of the lower frame element 9 to prevent rain water from invading through the metal contact portion d into the inside of the right vertical frame element 11.

The fin portions 59 of the transverse and vertical rain barrier portions 56 and 57 are respectively pressed into contact with the outdoor side lower transverse fin piece 25 of the lower frame member 2 and the lower portions of the outdoor side left and right

vertical fin pieces 28 and 31 of the left and right vertical frame members 3 and 4 when the sash 6 is closed.

A second example of the outdoor side upper transverse rain barrier 54 will be described hereunder with reference to Figs. 8, 9 and 10. (It is clear that substantively the same example as that of the outdoor side upper transverse rain barrier 54 is applicable to the outdoor side lower transverse rain barrier 55. Therefore, the explanation is omitted in respect of the outdoor side lower transverse rain barrier 55.)

As shown in Figs. 8 to 10, the outdoor side upper transverse rain barrier 54 comprises a transverse rain barrier portion 56, a vertical rain barrier portion 57 extending from one longitudinal end portion of the transverse rain barrier portion 56 in a direction substantively normal to the transverse rain barrier portion 56, and an end fixing member 70 provided at the other longitudinal end portion of the transverse rain barrier portion 56. The vertical rain barrier portion 57 may be integrally formed to the transverse rain barrier portion 56 or integrally bonded thereto. The fin portion 59 of the vertical rain barrier portion 57 is provided to be pressed into contact with the upper portion of the outdoor side left vertical fin piece 28 of the left vertical frame member 3 when the sash 6 is

closed, thereby closing a gap between the upper portion of the outdoor side left vertical fin piece 28 of the left vertical frame member 3 and the upper portion of the left vertical frame element 10, thereby enhancing the reliability of sealing between the window frame and the sash on the outdoor side of the window at this left upper corner portion. This is required because the left upper and lower corner portions of the sash 6 are exposed to the outdoors when the sash 6 is closed. The fine portion 59 of the transverse rain barrier section 56 extends transversely up to the end of the right vertical fin piece 45 of the right vertical frame element 11, thereby enhancing the reliability of sealing between the window frame and the sash on the outdoor side of the window at this right upper corner portion. It is to be noted that the right upper and lower corner portions of the sash 6 are covered by the window frame 5 and not exposed to the outdoors when the sash 6 is closed.

The end fixing member 70 is formed of a plastic material and comprises a fixing piece 71 which is brought into contact with the end face of the mount portion 58 of the transverse rain barrier portion 56 and an attachment piece 72, thereby having a crank-like shape. A pin 73 provided at the fixing piece 71 is fitted to a hollow portion 58a of the mount portion 58 of

the transverse rain barrier portion 56, so that the longitudinal end surface of the mount portion 58 of the transverse rain barrier portion 56 is supported by the fixing piece 71. The attachment piece 72 is fixed to the
5 bottom portion of the outdoor side outward open groove 44 of the right vertical frame element 11 by means of a screw 74, so that the longitudinal end portion of the transverse rain barrier portion 56 is fixed and supported onto the right vertical frame element 11. The screw 74
10 simultaneously serves as a connection member for connecting the upper frame element 8 and the right vertical frame element 11. In the illustrated embodiment, a longitudinal end portion of the mount portion 58 of the transverse rain barrier portion 56 is
15 cut off, but this is a matter of optional design.

According to this example of the outdoor side upper transverse rain barrier 54, since the only one vertical rain barrier portion 57 is provided at one longitudinal end portion of the transverse rain barrier
20 portion 56; the outdoor side upper transverse rain barrier 54 can be made more easily and at lower cost. That is, since it is very troublesome and causes high cost to form or bond the vertical rain barrier portion 57 integrally to the transverse rain barrier portion 54,
25 trouble and cost can be reduced by reducing the number of

the vertical rain barrier portion 57 to be provided to the outdoor side upper transverse rain barrier 54.

5 The fixing piece 71 of the fixing member 70 may be bonded to the end face of the mount portion 58 of the transverse rain barrier portion 56 or may be merely brought in contact with the same. The fixing piece 71 has a function of supporting the longitudinal end portion of the mount portion 58 of the transverse rain barrier portion 56 onto the right vertical frame element 11, thereby preventing the positional change thereof.

10 Next, a third example of the outdoor side upper transverse barrier 54 will be described hereunder with reference to Fig. 11. (It is clear that substantively the same example as that of the outdoor side upper transverse rain barrier 54 is applicable to the outdoor side lower transverse rain barrier 55. Therefore, the explanation is omitted in respect of the outdoor side lower transverse rain barrier 55.)

15 As shown in Fig. 11, the outdoor side upper transverse rain barrier 54 comprises a transverse rain barrier portion 56 and right and left end fixing members 70 and 80 provided at both longitudinal end portions of the transverse rain barrier portion 56.

20 The right end fixing member 70 is formed

of a plastic material and comprises a fixing piece 71 which is brought into contact with the end surface of the mount portion 58 of the transverse rain barrier portion 56 and an attachment piece 72, thereby having a crank-like shape. A holding piece 75 formed to an upper surface of the fixing piece 71 is brought into contact with the upper surface 58b of the mount portion 58 of the transverse rain barrier portion 56, and an upper surface 72a of the attachment piece 72 is brought into contact with the lower surface 58c of the mount portion 58, thereby supporting the longitudinal end portion of the mount portion 58 of the transverse rain barrier portion 56. The attachment piece 72 is fixed to the bottom portion of the outdoor side outward open groove 44 of the right frame element 11 by means of a screw 74, so that the longitudinal end portion of the transverse rain barrier portion 56 is fixed and supported onto the right vertical frame element 11. The screw 74 simultaneously serves as a connection member for connecting the upper frame element 8 and the right vertical frame element 11.

The left end fixing member 80 is formed of a plastic material and comprises a main body 84 and a seal piece 85. The main body 84 comprises a fixing piece 81 which is brought into contact with the end surface of the mount portion 58 of the transverse rain barrier

portion 56 and an attachment piece 82, thereby having a crank-like shape. A pin 83 is provided at the fixing piece 81 of the main body 84. The seal piece 85 is formed of elastic material such as rubber into a shape of vertical plate, and is heat fused or bonded to the outdoor side surface of the fixing piece 81 and the outdoor side surface of the upper portion of the attachment piece 82. The pin 83 is fitted into the hollow portion 58a of the mount portion 58 of the transverse rain barrier portion 56, so that the longitudinal end surface of the mount portion 58 of the transverse rain barrier portion 56 is supported by the fixing piece 81. In this condition, the seal piece 85 is pressed against the end face of the fin portion 59 to form a continuous structure. The seal piece 85 is so provided as to be pressed into contact with the outdoor side left vertical fin piece 28 of the left vertical frame member 3 when the sash 6 is closed. The attachment piece 82 is fixed to the bottom portion of the outdoor side outward groove 40 of the left vertical frame element 10 by means of a screw 86, so that the longitudinal end portion of the transverse rain barrier portion 56 is fixed and supported onto the left vertical frame element 10. The screw 86 simultaneously serves as a connection member for connecting the upper frame element 8 and the left

vertical frame element 10.

According to this example of the outdoor side upper transverse rain barrier 54, since the fixing members 70 and 80 are provided to the both longitudinal end portions of the transverse rain barrier portion 56 instead of the vertical rain barrier portions 57, the outdoor side upper transverse rain barrier 54 can be made more easily and at lower cost. That is, since it is very troublesome and causes high cost to form or bond the vertical rain barrier portion 57 integrally to the transverse rain barrier portion 56, trouble and cost can be reduced by dispensing with the vertical rain barrier portions 57.

In the above described embodiments of the present invention, on the outdoor side of the vertical pivoted window, sealing is made between the left vertical frame member of the window frame and the left vertical frame element of the sash and between the right vertical frame member of the window frame and the right vertical frame element of the sash respectively by bringing the left vertical fin piece of the left vertical frame element into contact with the outdoor side surface of the outdoor side left vertical fin piece of the left vertical frame member and by bringing the right vertical fin piece of the right vertical frame element into contact with the

indoor side surface of the outdoor side right vertical
fin piece of the right vertical frame member. Between
the upper frame member of the window frame and the upper
frame element of the sash and between the lower frame
5 member of the window frame and the lower frame element of
the sash on the outdoor side of the window, sealing is
made by use of the outdoor side upper transverse rain
barrier fitted to the upper frame element and the outdoor
side lower transverse rain barrier fitted to the lower
10 frame element, respectively. Since the outdoor side
upper and lower transverse rain barriers respectively
extend transversely beyond the left and right frame
elements of the sash, the sealing at four corner portions
of the sash is made more reliable. Further, considering
15 that the upper and lower corner portions of the sash on
the side of the left vertical frame element are exposed
to the outdoors, the outdoor side upper and lower
transverse rain barriers are respectively provided to be
pressed into contact with the outdoor side left vertical
20 fin piece of the left vertical frame member of the window
frame when the sash is closed, thereby enhancing the
reliability of sealing at these corner portions. Thus,
the seal structure according to the present invention has
an improved sealing effect.

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Further, in the present invention, sealing

is made between the window frame and the sash on the outdoor side of the window without using vertical rain barrier nor vertical air-tight member with the exception of corner portions. Therefore, as for the outdoor side of the window, only the outdoor side upper and lower transverse rain barriers are required to be elastically deformed at the time of opening or closing the sash. Therefore, force required for opening or closing the sash is reduced.



CLAIMS

1. a seal structure of a vertical pivoted window which comprises a window frame and a sash mounted thereto so as to be horizontally rotatable about a vertical pivot, the window frame comprising an upper frame member, a lower frame member and first and second vertical frame members which are assembled in rectangular shape, the sash comprising an upper frame element, a lower frame element and first and second vertical frame elements which are assembled in rectangular shape,

the seal structure being characterized in that the first vertical frame member of the window frame is integrally provided, at its outdoor side portion, with an outdoor side first vertical fin piece and the first vertical frame element of the sash is integrally provided, at its outdoor side portion, with a first vertical fin piece so that the first vertical fin piece of the first vertical frame element comes into contact with an outdoor side surface of the outdoor side first vertical fin piece of the first vertical frame member when the sash is closed; the second vertical frame member of the window frame is integrally provided, at its outdoor side portion, with an outdoor side second vertical fin piece and the second vertical frame element of the sash is integrally provided, at its outdoor side



portion, with a second vertical fin piece so that the second vertical fin piece of the second vertical frame element comes into contact with an indoor side surface of the outdoor side second vertical fin piece of the second vertical frame member when the sash is closed; an outdoor side upper transverse rain barrier is fitted to the upper frame element of the sash at its outdoor side portion so that the upper transverse rain barrier are pressed into contact with an outdoor side upper transverse fin piece formed to the upper frame member of the window frame when the sash is closed; the outdoor side upper transverse rain barrier extends transeversely beyond the first and second vertical frame elements of the sash and are pressed into contact at least with the outdoor side first vertical fin piece of the first vertical frame member of the window frame when the sash is closed; an outdoor side lower transverse rain barrier is fitted to the lower frame element of the sash at its outdoor side portion so that the lower transverse rain barrier is pressed into contact with an outdoor side lower transverse fin piece formed to the lower frame member of the window frame when the sash is closed; and the lower transverse rain barrier extends transeversely beyond the first and second vertical frame elements of the sash and are pressed into contact at least with the outdoor side first vertical fin



piece of the first vertical frame member of the window frame when the sash is closed.

2. A seal structure according to claim 1,
5 characterized in that each of the outdoor side upper and lower transverse rain barriers comprises a transverse rain barrier portion and vertical rain barrier portions which are integrally provided at both longitudinal end portions of the transverse rain barrier portion so as to
10 extend in a direction substantively normal to the transverse rain barrier portion, the transverse rain barrier portions of the outdoor side upper and lower transverse rain barriers are respectively fitted to the upper and lower frame elements of the sash and the
15 vertical rain barrier portions of the outdoor side upper and lower transverse rain barriers are respectively fitted to upper and lower portions of the first and second vertical frame elements of the sash.

20 3. A seal structure according to claim 1, characterized in that each of the outdoor side upper and lower transverse rain barrier comprises a transverse rain barrier portion, a vertical rain barrier portion which is integrally provided at one longitudinal end portion of
25 the transverse rain barrier portion so as to extend in a



direction substantitively normal to the transverse rain barrier portion, and an end fixing member which is brought into contact with the other longitudinal end portion of the transverse rain barrier portion and fixed
5 to the second vertical frame element of the sash.

4. A seal structure of according to claim 1, characterized in that each of the outdoor side upper and lower transverse rain barriers comprises a transverse
10 rain barrier portion and end fixing members which are brought into contact with both longitudinal end portions of the transverse rain barrier portion and respectively fixed to the first and second vertical frame elements of the sash, and the fixing member fixed to the first
15 vertical frame element of the sash is provided with a seal piece which is pressed against the longitudinal end face of the transverse rain barrier portion to form a continuous structure therewith.