

CURTAIN WALL

BACKGROUND OF THE INVENTION

1. FIELD OF THE INVENTION

The present invention relates to a curtain wall, which specifically relates to a curtain wall using a plurality of face members made of different materials such as glass, metal panel and stone to form a wall surface.

2. DESCRIPTION OF RELATED ART

Conventionally, when an exterior wall of a structure such as a building is made of curtain wall, a non-transparent face member made of metal or stone etc. is usually provided on a part corresponding to a spandrel wall or a hanging wall on the side of the structure, i.e. on a spandrel part (spandrel portion) corresponding to floor slab etc. in order that the floor slab cannot be seen from the outside, while a face member made of glass is usually provided on a part corresponding to an opening portion (vision portion) for lighting.

Although some of the metal or stone face members are supported by horizontal members and vertical members via a seal member as disclosed in Japanese Patent No. 2515034, many of the face members are supported by the horizontal members and the vertical members using a medium member such as a frame.

However, even if the metal or stone face members are supported by the medium member, the glass face member needs no medium member and is still supported by the vertical members and the horizontal members only via the seal member.

Therefore, it is necessary for the vertical members and the horizontal members that a cross-sectional shape of a part for supporting the glass face members is different from that of a part for supporting the metal or stone face members in order to correspond to the presence of the medium member. Accordingly, in addition to types of the vertical members and the horizontal members themselves, types of extrusion molds for manufacturing these members have increased, so that manufacturing cost and managing cost are increased.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a curtain wall capable of reducing

cost thereof by using common members for the face members to be attached even when there are face members attached using the medium members and face members attached without using the medium members.

A curtain wall according to an aspect of the present invention has a first face member attached to a section formed by a plurality of vertical members and a plurality of horizontal members, and a second face member attached to the section via a medium member, in which an engaging portion engaged with an outer batten for holding an outdoor-side of the first face member and an attachment attached to a seal member being in close contact with an indoor-side of the first face member are provided on the vertical members and the horizontal members, and in which the attachment attached to the horizontal members is also used for attaching the medium member of the second face member.

In this arrangement, while the first face member is attached to the vertical members and the horizontal members by the outer batten, the second face member is attached to the horizontal members via the medium member. In this case, since the medium member is attached by the attachment of the seal member for attaching the first face member, cross-sectional shapes of the horizontal members can be made common both for attaching the first face member and for attaching the second face member, so that there is no need to change the cross-sectional shapes in accordance with the face members. Accordingly, the horizontal members can be commonly used to help reducing cost.

In the curtain wall of the present invention, a support plate for supporting the medium member may preferably be provided on the vertical member.

In this arrangement, since the medium member and the second face member attached thereon are also attached to the horizontal members via the support plate to be supported, the medium member itself can be securely supported by both horizontal members and vertical members. Further, heavy second face member made of metal or stone etc. can be supported without difficulties.

In the curtain wall of the present invention, the vertical members and the horizontal members may preferably be frames of a frame body forming a curtain wall unit.

In this arrangement, since the frame body forming the curtain wall unit can be constructed in advance in a factory etc., it is only necessary to attach the face members to the frame body after the transported frame body is attached to mullions etc. at a construction site, so that performance of work at the construction site can be improved.

In the curtain wall of the present invention, the vertical members and the horizontal members may be made of aluminum extrusions. Further, the first face member may be a glass plate. Furthermore, the second face member may be an aluminum panel or a stone unit. In addition, the medium member may be an aluminum frame surrounding the periphery of the second face member.

In the curtain wall of the present invention, space between the curtain wall unit and a curtain wall unit adjacent to the curtain wall unit may preferably be closed by a joint catch pan having a draining member and a catch pan integrated therein.

In this arrangement, the work for closing the space can be done easier than an arrangement in which the draining member and the catching pan are separately provided. Further, the joint catch pan can be provisionally fixed in advance on the frame body to be constructed in the factory, so that the performance of the work at the construction site can be further improved.

In the curtain wall according to the present invention, an airtight member may preferably be attached to the joint catch pan.

According to this arrangement, it is not necessary to close the periphery of the joint catch pan by a seal member, so that the work at the construction site can be made easy.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front view showing an embodiment of the present invention;

Fig. 2 is a vertical cross section taken along arrows II—II of Fig. 1;

Fig. 3 is a horizontal cross section taken along arrows III—III of Fig. 1;

Fig. 4 is a perspective view showing components of the aforesaid embodiment;

Fig. 5 are views for explaining conditions before and after fixing the components;

Fig. 6 is a vertical cross section taken along arrows VI—VI of Fig. 1;

Fig. 7 is a horizontal cross section taken along arrows VII—VII of Fig. 1;

Fig. 8 is a perspective view showing another component of the aforesaid embodiment;

Fig 9 is a vertical cross section taken along arrows IX—IX of Fig. 1; and

Fig 10 is a horizontal cross section taken along arrows X—X of Fig. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

An embodiment of the present invention will be described below with reference to attached drawings.

Fig. 1 is a front view showing a curtain wall 1 of the present embodiment.

The curtain wall 1 is formed by disposing three curtain wall units 2, 3 and 4 in vertical and horizontal directions along vertical mullions (not shown).

Both of the upper side and the lower side of an exterior surface of the curtain wall unit 2 shown in the middle of the figure are made of glass. The upper side of an exterior surface of the curtain wall unit 3 at the upper side of the figure is made of aluminum and the lower side thereof is made of glass. The upper side of an exterior surface of the curtain wall unit 4 at the lower side of the figure is made of stone and the lower side thereof is made of glass.

The curtain wall units 2 to 4 will be specifically explained below.

Fig. 2 and Fig. 3 are a vertical cross section and a horizontal cross section respectively taken along arrows II—II and arrows III—III of Fig. 1.

The curtain wall unit 2 has a frame body 10, in which an upper frame 11, a lower frame 12, right and left vertical frames 13 and 14 and a horizontal medium frame 15 are framed, the frames 11 to 15 being made of aluminum extrusions, and a pair of glass plates 16 as first face members provided on the upper and the lower sides of the outdoor-side of the frame body 10. The upper glass plate 16 corresponds to a spandrel portion and the lower glass plate 16 corresponds to a vision portion.

As enlarged in Fig. 4, two engaging portions 112 projecting in the upper direction and bent toward the indoor-side are provided on a horizontal portion 111 at the outdoor-side of the upper frame 11. A hanging piece 113 hanging in the lower direction is provided on the indoor-side of the engaging portions 112, and an attachment 114 projecting toward the outdoor-side is provided on the side of the lower end of the hanging piece 113. The tip of the attachment 114 has hook-shaped portions 115 respectively projecting in the upper and the lower directions.

Two engaging portions 122 projecting in the lower direction and bent toward the indoor-side are provided on a horizontal portion 121 of the lower frame 12, which projects toward the outdoor-side. The horizontal portion 121 is provided on the lower end of a hanging piece 123. An attachment 124 projecting toward the outdoor-side is provided on the side of the upper end of the hanging piece 123. The tip of the attachment 124 also has

hook-shaped portions 125 respectively projecting in the upper and the lower directions.

Two engaging portions 132 and 142 projecting toward the outside of the face direction (toward other adjacent vertical frames 14 and 13) and bent toward the indoor-side are provided on vertical portions 131 and 141 projecting toward the outdoor-side of the vertical frames 13 and 14. The vertical portions 131 and 141 are provided on the tips of face pieces 133 and 143 along the face direction. Attachments 134 and 144 projecting toward the outdoor-side are provided on the side of the base end of the face pieces 133 and 143. The tips of the attachments 134 and 144 also have hook-shaped portions 135 and 145 respectively projecting in the right and the left directions.

Two engaging portions 152 projecting in the mutually opposing directions and bent toward the indoor-side are provided on a pair of upper and lower horizontal portions 151 projecting toward the outdoor-side of the horizontal medium frame 15. Attachments 154 projecting toward the outdoor-side are provided on upper and lower vertical surfaces 153 at the base ends of the horizontal portions 151, and each tip of the attachments 154 has hook-shaped portions 155 respectively projecting in the upper and the lower directions.

The outdoor-side of the upper and the lower sections having the frames 11 to 15 of the frame body 10 is an accommodation portion 17, the periphery of the accommodation portion 17 being surrounded by the horizontal portions 111, 121 and 151 and the vertical portions 131 and 141 of the frames 11 to 15. The glass plate 16 is provided in the accommodation portion 17.

A seal member 18 (indoor-side glazing bead) is provided on the attachments 114, 124, 134, 144 and 154 of the frames 11 to 15 projecting into the accommodation portion 17, the seal members 18 continuously extending in all sides of the glass plate 16. Specifically, the indoor-side of the seal member 18 is engaged with the hook-shaped portions 115, 125, 135, 145 and 155 directed toward the inside of the accommodation portion 17 among each pair of the hook-shaped portions 115, 125, 135, 145 and 155 respectively provided on the attachments 114, 124, 134, 144 and 155, while the outdoor-side of the seal member 18 is in close contact with an indoor side of the glass plate 16.

The glass plate 16 in the upper accommodation portion 17 is supported by an outer batten 116 engaged with the engaging portions 112 of the upper frame 11, outer battens 136 and 146 engaged with the engaging portions 132 and 142 of the vertical

frames 13 and 14, and an outer batten 156 engaged with the upper engaging portions 152 of the horizontal medium frame 15.

The glass plate 16 in the lower accommodation portion 17 is supported by an outer batten 126 engaged with the engaging portion 122 of the lower frame 12, the outer battens 136 and 146 engaged with the engaging portions 132 and 142 of the vertical frames 13 and 14, and the outer batten 156 engaged with the lower engaging portion 152 of the horizontal medium frame 15.

A seal member 19 (outdoor-side glazing bead) is attached to the tips of each outer batten 116, 126, 136, 146 and 156, the seal member 19 continuously extending in all sides of the glass panel 16, and the indoor-side of the seal member 19 is in close contact with an outdoor-side of the glass plate 16.

Fig. 4 shows a joint catch pan 20, which spans between the adjacent curtain wall units 2 and between opposing ends of the upper frames 11. The catch pan 20 covers first to third spaces A to C (Fig. 3) formed between the adjacent vertical frames 13 and 14 from the above to prevent rain from entering into the vertically communicating spaces A to C.

The catch pan 20 has a drainer 21 spanning between upper beds 117 of the upper frames 11 and covering the first space A on the outdoor-most-side, and a catching portion 22 spanning between lower beds 118 of the upper frames 11, the catching portion 22 covering the second and the third spaces B and C and having a groove-shaped cross section, the drainer 21 and the catching portion 22 being integrated.

As shown in Fig. 5, the drainer 21 is provided along a slope of the upper bed 117 of the upper frame 11 to introduce the rain to the outdoor-side relative to the first space A. A vertical fixing portion 23 is provided on the indoor-side of the drainer 21. A screw 24 fixes the fixing portion 23 on a fixing piece 117A extending from the upper bed 117 toward the indoor-side. A dry sponge airtight member 25 is continuously attached to the backsides of the drainer 21 and the fixing portion 23.

On the other hand, the catching portion 22 introduces the rain in right and left direction to store the rain on the lower bed 118 of the upper frame 11. A bottom surface 26 of the catching portion 22 extends to the lower side of the fixing piece 117A on the side of the upper bed 117 to almost completely cover the upper side of the second space B. The airtight member 25 is also continuously attached to the backsides of the bottom surface 26 and the indoor-side of a side surface 27.

The catch pan 20 is slidably disposed from one end of the upper frame 11, moved

to a position between both upper frames 11 after the curtain wall units 2 are positioned side by side, and fixed on the respective upper frames 11.

In Fig. 5, (A) is a view showing a condition in which the catch pan 20 is located to a position between the upper frames 11, and (B) is a view showing a condition in which the catch pan 20 is fixed by the screw 24.

A projection 28 projecting toward the indoor-side is provided on the upper side of the fixing portion 23 of the catch pan 20. When the screw 24 is tightened, the projection 28 is brought into contact with the fixing piece 117A of the upper frame 11 to regulate tightness of the screw 24. Accordingly, the catch pan 20 is fixed on the upper frame 11 at predetermined position, so that press degree of the airtight member 25 in the indoor/outdoor direction is secured in certain value.

On the indoor-side of the catching pan 20, the upper end of the side surface 27 of the catching portion 22 is attached to a jaw portion 118A provided as a lip groove of the upper frame 11. The jaw portion 118A has a tapered surface 118B inclined downward toward the indoor-side. When the catching pan 20 is fixed by the screw 24, the upper end of the side surface 27 is attached to the tapered surface 118B and shifted from the outdoor-side to the indoor-side. Accordingly, the catching pan 20 is guided to go down in the lower direction as closer the catch pan 20 approaches toward the indoor-side, so that the catch pan 20 can be provided on a predetermined position more smoothly, and the vertical press degree of the airtight member 25 is made constant. The elastic airtight member 25 is securely pressed by the catching portion 22 to be brought into good and close contact with the lower bed 118.

Fig. 6 and Fig. 7 are a vertical cross section and a horizontal cross section of the curtain wall unit 3 respectively taken along arrows VI—VI and arrows VII—VII of Fig. 1.

The curtain wall unit 3 has an aluminum panel 36 as the second face member instead of the upper glass plate 16 corresponding to the spandrel portion of the curtain wall unit 2. The other components of the curtain wall unit 3 are approximately identical with those of the curtain wall unit 2 such as similar frame body 10.

The aluminum panel 36 is attached to the frame body 10 via a frame 30 as the medium member. The frame 30 is formed by fixing all sides thereof by an upper frame 31, a lower frame 32, right and left vertical frames 33 having the same cross-sectional shapes and a vertical medium member 34 to be accommodated in the accommodation portion 17,

the frames 31 to 34 being made of aluminum extrusions, the vertical medium member 34 being fixed by screws 35. The vertical medium member 34 is used here to prevent the aluminum panel 36 from curving by irradiation of direct sunlight.

A stud bolt 37 projects at a suitable position of the indoor-side surface of the aluminum panel 36. The aluminum panel 36 is fixed on the respective frames 31 to 34 of the frame 30 by a nut 38 screwed to the stud bolt 37.

Attachment pieces 311 and 321 projecting toward the indoor-side and bent in the lower direction are provided on the upper frame 31 and the lower frame 32 of the frame 30. The attachment pieces 311 and 321 are hooked on the attachments 114 and 154 provided on the upper frame 11 and the horizontal medium frame 15 of the frame body 10, so that the frame 30 is attached to the frame body 10. In other words, the attachments 114 and 154 of the frame body 10 are not only used for attaching the seal member 18 of the glass plate 16, but also used for attaching the frame 30.

Specifically, the attachment piece 311 provided on the upper frame 31 of the frame 30 is engaged with the upper hook-shaped portion 115 forming the attachment 114 of the upper frame 11, while the attachment piece 321 provided on the lower frame 32 of the frame 30 is engaged with the upper hook-shaped portion 155 of the upper attachment 154 of the horizontal medium frame 15.

Indoor-side surfaces of the right and left vertical frames 33 forming the frame 30 are attached to the attachments 134 and 144 provided on the vertical frames 13 and 14 of the frame body 10 from the outdoor-side.

Further, a support plate 50 made of stainless etc., which is enlarged in Fig. 8 is fixed on the vertical frames 13 and 14 of the frame body 10 by a screw 51. A hook 52 of the support plate 50 is inserted and engaged in a slit (not shown), which is provided on the vertical frame 33 of the frame 30, so that the frame 30 is supported not only by the upper and the lower frames 11 and 12 of the frame body 10, but also by the vertical frames 13 and 14.

Incidentally, in curtain wall units 3' provided on the right and the left sides of the curtain wall unit 3 in Fig. 7, the vertical frames 13 and 14 of the frame body 10 have indoor members 13A and 14A and outdoor members 13B and 14B, the indoor and the outdoor members 13A, 14A, 13B and 14B forming hollow portions 137 and 147. The support plate 50 is fixed on the hollow portions 137 and 147 by screws. According to the arrangement, since the support plate 50 is fixed on the highly rigid hollow portions 137

and 147, the vertical frames 13 and 14 can support greater vertical load via the support plate 50, so that the arrangement can be used for larger frame 30 and aluminum panel 36.

Fig. 9 and Fig. 10 are a vertical cross section and a horizontal cross section of the curtain wall unit 4 taken along arrows IX—IX and arrows X—X of Fig. 1.

The curtain wall unit 4 uses a stone unit 46 as another second face member instead of the upper glass plate 16 corresponding to the spandrel portion of the curtain wall unit 2. The other components of the curtain wall unit 4 are approximately identical with those of the curtain wall unit 2 or 3 such as similar frame body 10.

Specifically, the stone unit 46 is attached to the frame body 10 via a frame 40 as the medium member. The frame 40 has an upper frame 41, a lower frame 42 and right and left vertical frames 43 having the same cross-sectional shapes, the frames 41 to 43 being made of aluminum extrusions and extending in all sides of the frame 40, the frame 40 being accommodated in the accommodation portion 17.

In this arrangement, the cross-sectional shapes of the upper frame 41 and the vertical frames 43 are identical with those of the upper frame 31 and the vertical frames 33 forming the frame 30 of the curtain wall unit 3, so that the frames can be manufactured by the same extrusion molds. On the other hand, the lower frame 42 has a horizontal extension 422 extending toward the outdoor-side, so that heavier stone unit 46 can be securely supported by the extension 422.

An anchor bolt 47 projects at a suitable position of an indoor-side of the stone unit 46. The stone unit 46 is fixed on the frame 40 by a nut 48 screwed to the anchor bolt 47.

Attachment pieces 411 and 421 projecting toward the indoor-side and bent in the lower direction are also provided on the upper frame 41 and the lower frame 42 of the frame 40. The structure for hooking the attachment pieces 411 and 421 on the attachments 114 and 154 of the frame body 10 to attach the frame 40 to the frame body 10 is the same as in the curtain wall unit 3. Accordingly, the attachments 114 and 154 of the frame body 10 are not only used for attaching the seal member 18 of the glass plate 16 or the frame 30, but also used for attaching the frame 40.

Incidentally, in the frame body 10 of curtain wall units 4' shown in Fig. 10, the vertical frames 13 and 14 are made of the indoor members 13A and 14A and the outdoor members 13B and 14B for the same reason as in the curtain wall units 3', i.e. in order to deal with larger frame 40 and stone unit 46.

As shown by chain double-dashed line on the outdoor-side in Fig. 9 and Fig. 2, projection pieces 116A, 126A, 136A and 146A projecting toward the outdoor-side may be provided on the outer battens 116, 126, 136 and 146 for holding the glass plate 16 in order to flush the outdoor-sides of the thick stone unit 46 and the outer battens 116, 126, 136 and 146.

According to the present embodiment, following advantages can be obtained.

(1) In the curtain wall unit 2 forming the curtain wall 1, the glass plate 16 is attached to the frame body 10 by the outer battens 116, 126, 136, 146 and 156, and the seal member 18 being in close contact with all indoor-sides of the glass plate 16 is attached to the attachments 114, 124, 134, 144 and 154 provided on the frames 11 to 15 of the frame body 10.

On the other hand, in the curtain wall units 3 and 4, the aluminum panel 36 and the stone unit 46 are attached to the frame body 10 via the frames 30 and 40 and the attachment pieces 311, 321, 411 and 421 of the frames 30 and 40 are hooked on the attachments 114, 124 and 154 of the frame body 10.

As described above, the attachments 114, 124 and 154 provided on the upper and the lower frames 11 and 12 and the horizontal medium frame 15 of the frame body 10 are used both for attaching the seal member 18 of the glass plate 16 and for attaching the frames 30 and 40, so that the same cross-sectional shape of the frames 11, 12 and 15 of the frame body 10 can be used for the glass plate 16, the aluminum panel 36 and the stone unit 46 irrespective of whether the frames 30 or 40 is used or not. Accordingly, the types of the frames 11, 12 and 15 and the extrusion molds for manufacturing the frames can be decreased, so that the cost can be reduced.

In the present embodiment, since the vertical frames 13 and 14 of the frame body 10 are also common to the curtain wall units 2 to 4, the whole frame body 10 can be commonly used and the cost can be reduced.

(2) Further, the frame 30 and the frame 40 are different only in the cross-sectional shapes of the lower frames 32 and 42 and the upper frames 31 and 41 and the vertical frames 33 and 43 respectively have the same cross-sectional shapes, so that the members and the molds can be further commonly used, thereby securely reducing the cost.

(3) Frame structure of parts of the frame body 10 respectively corresponding to the spandrel portion and the vision portion can be made common, so that the aluminum panel 36 or the stone unit 46 can be provided on the part corresponding to the vision

portion via the frames 30 or 40. Accordingly, which face member is provided on which section for the frame body 10 can be optionally determined after considering design of a wall surface etc., so that degree of freedom of the design can be increased.

(4) Since the support plate 50 is provided on the vertical frames 13 and 14 in the curtain wall units 3 and 4, the frames 30 and 40 themselves and the heavy aluminum panel 36 and stone unit 46 attached to the frames 30 and 40 can be supported by the vertical frames 13 and 14 via the support plate 50, so that support intensity of the whole frame body 10 can be improved.

(5) Since the frames 11 to 15 are unitized as the frame body 10 forming the curtain wall units 2 to 4, the frame body 10 can be constructed in advance in a factory etc. Accordingly, it is only necessary to attach the glass plate 16, the aluminum panel 36 and the stone unit 46 to predetermined positions after the transported frame body 10 is attached to the mullions etc. at a construction site and it is not necessary to construct the frame body 10 at the construction site, so that performance of work at the construction site can be improved.

(6) Conventionally, the draining member and the catch pan have been separately provided to close the space between the adjacent curtain wall units, so that a lot of work has been required to close the space. However, the joint catch pan 20 of the present embodiment has the integrated drainer 21 and the catching portion 22, so that the space between the units 2 to 4 can be easily closed by the catch pan 20. Further, the catch pan 20 can be provisionally fixed in advance on the frame body 10 to be constructed in the factory, so that the performance of the work at the construction site can be further improved.

(7) Since the dry sponge airtight member 25 is attached to the catch pan 20, it is not necessary to close the periphery of the catch pan 20 by wet seal member. In this respect, it is also an advantage that the work at the construction site can be facilitated.

Incidentally, the scope of the present invention is not restricted to the above embodiment.

For example, though all of the frames 11 to 15 of the frame body 10 in the curtain wall units 2 to 4 of the above embodiment are common, it is only necessary for the present invention that at least the upper frames 11, the lower frames 12 and the horizontal medium frames 15 for the frames 30 and 40 to be attached are respectively common, and the present invention includes an arrangement in which the vertical frames 13 and 14 have

different cross-sectional shapes for each of the units 2 to 4.

Though the frames 30 and 40 of the above embodiment are different only in the cross-sectional shapes of the lower frames 32 and 42, the cross-sectional shapes of the upper frames 31 and 41 or the cross-sectional shapes of the vertical frame 33 and 43 may be different with each other. On the contrary, the lower frames 32 and 42 may have the same cross-sectional shapes.

Though the aluminum panel 36 and the stone unit 46 are referred as the second face members in the above embodiment, the curtain wall may be formed by only one of these face members and the glass plate 16 as the first face member. Even in this case, an object of the present invention can be achieved.

The material etc. of the first face member and the second face member according to the present invention can be optional, and metal panel made of aluminum etc. can be used as the first face member, and the metal panel being held by the outer batten. Further, the glass plate may be fixed on the medium members such as a frame by optional fixing means and the glass plate may be attached on the frame body via the medium member.

In short, the present invention can be applied to any curtain wall, in which the first face member is attached by the outer batten and the second face member is attached via the medium member.

Further, though the screw 24 fixes the catch pan 20 in the above embodiment, the catch pan 20 may be fixed by friction between the catch pan 20 and the upper frame 11 etc.

Shapes of the vertical members, the horizontal members, the attachments of the horizontal members, the medium member etc. may be optionally determined in implementation, and these shapes are not restricted to those in the above embodiment.

WHAT IS CLAIMED IS:

1. A curtain wall, comprising:
a first face member attached to a section formed by a plurality of vertical members and a plurality of horizontal members; and
a second face member attached to the section via a medium member,
wherein an engaging portion engaged with an outer batten for holding an outdoor-side of the first face member and an attachment attached to a seal member being in close contact with an indoor-side of the first face member are provided on the vertical members and the horizontal members; and
wherein the attachment attached to the horizontal members is also used for attaching the medium member of the second face member.
2. The curtain wall according to claim 1, wherein a support plate for supporting the medium member is provided on the vertical member.
3. The curtain wall according to claim 1 or 2, wherein the vertical members and the horizontal members are frames of a frame body forming a curtain wall unit.
4. The curtain wall according to any one of claim 1 to claim 3, wherein the vertical members and the horizontal members are made of aluminum extrusions.
5. The curtain wall according to any one of claim 1 to claim 4, wherein the first face member is a glass plate.
6. The curtain wall according to any one of claim 1 to claim 5, wherein the second face member is an aluminum panel or a stone unit.
7. The curtain wall according to any one of claim 1 to claim 6, wherein the medium member is an aluminum frame surrounding the periphery of the second face member.
8. The curtain wall according to claim 3, wherein space between the curtain wall unit and a curtain wall unit adjacent to the curtain wall unit is closed by a joint catch pan



having a draining member and a catch pan integrated therein.

9. The curtain wall according to claim 8, wherein an airtight member is attached to the joint catch pan.

